Being Mindfully Present in the Moment:
Influences on Psychological Functioning

Denise M. Kirby

A thesis submitted to Victoria University of Wellington
in fulfilment of the requirements for the degree of
Doctor of Philosophy in Psychology

Victoria University of Wellington

2012

Abstract

Mindfulness is defined as a fundamental *way of being*, a way of relating to all of one's experiences whether positive, negative, or neutral, with an attentive, curious, and nonevaluative mindset (Kabat-Zinn, 2003; Williams, Teasdale, Segal, & Kabat-Zinn, 2007). The basic premise underlying mindfulness is that accepting moment-to-moment experiences as they arise, with an open-minded disposition, helps protect against psychological symptoms such as anxiety, depression, stress, and adverse ruminative thoughts (Baer, 2003; Hofmann, Sawyer, Witt, & Oh, 2010). In addition, mindfulness is also thought to enhance psychological health and wellbeing, such as increases in emotional intelligence, body image, and positive mental health (Bohlmeijer, ten Klooster, Fledderus, Veehof, & Baer, 2011; Stewart, 2004).

Extant mindfulness literature has largely focused on the outcomes that are associated with mindfulness-based interventions designed to enhance an individual's state of mindfulness, though, less is known about naturally occurring dispositional mindfulness. According to some researchers, mindfulness manifesting as a *trait* (or individual difference characteristic) is an inherent human capacity that varies between individuals (Brown & Ryan, 2003; Kabat-Zinn, 1990). To examine the complexities of trait mindfulness, it is necessary to have a comprehensive understanding of the operationalisation of the construct. To date, however, methods for assessing mindfulness have received little attention in psychological research (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006).

Across a series of three empirical studies (Chapters 2 through 4), this thesis aimed to explore the naturally occurring construct of trait mindfulness using two measures designed to capture this multifaceted phenomenon – the Five-Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2006) and the Trait Toronto Mindfulness Scale (Trait TMS; Davis, Lau, & Cairns, 2009). Study 1 (Chapter 2) began with a psychometric analysis of the FFMQ, and then explored how the tendency to be mindful related to both positive and negative psychological outcomes. Contrary to expectations, a confirmatory factor analysis of the FFMQ in this sample yielded a 2-factor model of mindfulness (Nonjudging Awareness and Describing) as opposed to the five factors proposed by Baer et al. (2006). Further analyses revealed that the factor of Nonjudging Awareness appeared to be the most potent aspect of mindfulness that positively predicted happiness, life satisfaction, and adaptive coping (positive psychological outcomes) and negatively predicted depression, anxiety, and maladaptive coping (negative psychological outcomes).

In Study 2 (Chapter 3), both the FFMQ and the Trait TMS were compared and tested for factor structure across three points in time on a community sample of individuals ($N = 319$). Both measurement invariance and convergent validity were explored, with results supporting expectations. First, results yielded a 5-factor structure of the FFMQ and a 2-factor structure of the Trait TMS. Second, factorial invariance on both mindfulness measures was evidenced across three time points. Third, results indicated moderate construct overlap between these two trait measures of mindfulness, i.e., they tapped a similar construct, as was expected.

Study 3 (Chapter 4) sought to extend on the previous two studies' findings by 1) exploring whether trait mindfulness was positively predictive of positive psychological outcomes and negatively predictive of negative outcomes across time, and 2) comparing the psychological functioning of two groups – individuals with and without meditation experience – across time. Using the same sample from Study 2, trait mindfulness, as measured by the FFMQ and Trait TMS, supported hypotheses, though some predicted findings appeared to be manifested between the second and third time points only. Moreover, results indicated that meditation experience may protect against maladaptive psychological outcomes such as depression and anxiety, while increasing feelings of subjective happiness and life satisfaction (supporting traditional meditation ideology and current empirical literature).

In combination, the present research supports and contributes novel perspectives to the existing body of mindfulness literature by suggesting that establishing ways to amplify the naturally occurring trait of mindfulness, although challenging, will prove fertile within Western clinical psychology, which looks to influence an individual's psychological wellbeing. Chapter 5 concludes this thesis with a discussion of the implications of the combined series of studies. Strengths and limitations of this research were considered, and future directions were proposed.

Acknowledgements

As you, the reader, have accessed my ‘book’ about mindfulness, it indicates that my dissertation journey is complete, and for this, to be frank, I am most grateful. It is hard to recall times when I was not in an isolation research bubble, and I am eager to feel the sunshine back on my face for longer than a 20 minute desk-time break. The completion of this research does not however imply that my journey into the world of mindfulness is over, in fact, it has only just begun. This subtle, yet quite complex phenomenon has me 100% intrigued, and is a way of living that sits quite well with me – a bit like coming home.

The individual who deserves my appreciation and acknowledgement first and foremost is my most patient supervisor, Associate Professor Paul Jose. Paul has provided me with positivity and humour when it was far from apparent to me, and has had a genuine interest in all that we have pondered together. Thank you Paul, this would not have been written without your guidance and grounding. I thank my secondary supervisor, Associate Professor John McDowall, simply for being the man that he is. I feel honoured to have witnessed his unique genuineness and wisdom over the years. I also extend a very big gracious thank you to the participants in this research, for their time, interest, and willingness to be a part of research that is so sparse within a New Zealand context. The volume of meditators who participated was remarkable, and perhaps a testament of the effects of such a practice – the qualities of openness, curiosity, and patience in order to partake in longitudinal research.

To the important people in my life, who needn’t be named as they know who they are, my sincere appreciation is extended to you all for not taking it personally when I was persistently absent, both mentally and physically. You’re a special bunch of people, and it is now the *right* time for cupcakes, coffee, hugs, and lime and ginger cider. And finally, I would like to acknowledge a man who modelled for me humility, bravery, and what it means to have unconditional love, my big brother. This book really has been written in his memory, as his presence was so strongly felt when I often found myself staring blankly at the screen in front of me. Dean believed in me whenever I doubted, as far back as teaching me how to ride a bike, and I sure wish he could have seen this end product, as he would have been so very proud.

Table of Contents

Abstract	i
Acknowledgements	iii
Contents	iv
List of Tables	ix
List of Figures	xiii
CHAPTER 1: Mindfulness: An Overview	1
Traditional Mindfulness Meditation	2
Western Conceptualisations of Mindfulness	5
Mindfulness from a process perspective	5
Mindfulness from a way of responding perspective	6
Mindfulness from a dispositional perspective	8
Mindfulness from a by-product perspective	10
Proposed Mechanisms of Change	12
Reductions in negatively biased cognition	14
Disrupting ruminative thought processes	15
Emotion regulation	17
Prolonged exposure	18
Mindfulness and Psychotherapy	20
Mindfulness-based stress reduction	20
Mindfulness-based cognitive therapy	21
Acceptance and commitment therapy	21
Dialectical behavioural therapy	21
Mindfulness-based relapse prevention	22
Purpose of this Research	28
Overview of Studies	30
CHAPTER 2: Examining the Factor Structure of the FFMQ and the Relationships between Psychological Outcomes	33
Method	39
Participants	39
Procedure	39
Measures	40
Results	44
Analytic Strategy	44

Confirmatory Factor Analysis	45
Descriptive Statistics	48
Correlations	48
Path Model Analysis	49
Comparing Strengths of Structural Paths	53
Discussion	55
CHAPTER 3: A Psychometric Examination of the FFMQ and Trait TMS Measures: Factorial Invariance, Reliability and Validity	60
Method	64
Participants	64
Procedure	66
Measures	66
Results and Discussion	68
Analytic Strategy	68
Confirmatory Factor Analysis	69
FFMQ Analyses	69
Descriptive Statistics	76
Correlations	77
Trait TMS Analyses	81
Descriptive Statistics	86
Correlations	86
Testing for Measurement Invariance	87
FFMQ measurement invariance	88
Time 1 versus Time 2	88
Time 2 versus Time 3	89
Time 1 versus Time 3	90
Trait TMS measurement invariance	91
Time 1 versus Time 2	91
Time 2 versus Time 3	91
Time 1 versus Time 3	92
Measurement Invariance between Meditators and Nonmeditators	93
FFMQ analyses at Time 1	93
FFMQ analyses at Time 2	94
FFMQ analyses at Time 3	95

Trait TMS analyses at Time 1	96
Trait TMS analyses at Time 2	97
Trait TMS analyses at Time 3	97
Convergent Validity between the FFMQ and Trait TMS	99
Convergent Validity between the FFMQ and Trait TMS: Comparing Meditators with Nonmeditators	103
CHAPTER 4: Longitudinal Relationships between Mindfulness, Psychological Outcomes, and Meditation Experience	107
Method	112
Participants and Procedure	112
Measures	113
Results	116
Analytic Strategy	116
Confirmatory Factor Analysis on Psychological Outcome Measures	117
Descriptive Statistics	121
Correlations	123
Longitudinal Path Model Analyses for Mindfulness Measures	124
Longitudinal measurement model for the FFMQ	124
Longitudinal measurement model for the Trait TMS	126
Longitudinal Path Model Analyses for Mindfulness and Psychological Outcomes	128
The FFMQ and positive and negative outcomes structural model	128
The Trait TMS and positive and negative outcomes structural model	130
Mindfulness, Psychological Outcomes, and Meditation Experience	133
Multivariate analyses of variance	133
Longitudinal path model analysis on meditation experience	136
FFMQ and psychological outcomes	136
Trait TMS and psychological outcomes	137
Predictors of Psychological Outcomes in Relation to Trait Mindfulness ..	140
Linear Latent Growth Curve Modeling	142
Independent latent growth curve modeling	142
FFMQ base model	143
Trait TMS base model	144

Positive outcomes base model	145
Negative outcomes base model	145
Parallel Process Latent Growth Curve Models	146
FFMQ predicting psychological outcomes	146
Trait TMS predicting psychological outcomes	149
Meditation Experience Predicting Mindfulness and Psychological Outcomes	151
FFMQ and meditation experience conditional model	151
Trait TMS and meditation experience conditional model	153
Positive outcomes and meditation experience conditional model ...	155
Negative outcomes and meditation experience conditional model ..	155
Discussion	155
Predictors of Positive and Negative Psychological Outcomes: Measurement Models	157
Meditation Experience, Mindfulness, and Psychological Functioning ...	159
Assessing Growth Patterns and Change in Mindfulness and Psychological Outcomes	161
CHAPTER 5: General Discussion: What have we learnt from the Present Research?	163
Key Findings and Implications	163
Psychometric Analysis of Two Trait Mindfulness Measures	163
Mindfulness' Association with Positive and Negative Psychological Outcomes	166
Comparing Meditators' and Nonmeditators' Psychological Functioning Across Time	170
Applications to Scientific Research	174
Strengths and Contributions of this Research	177
Limitations and Future Directions	179
Concluding Comments	181
References	183
Appendices	203
Appendix A: Five-Facet Mindfulness Questionnaire	203
Appendix B: Beck Depression Inventory	205
Appendix C: State-Trait Anxiety Scale	207
Appendix D: Ruminative Response Styles Questionnaire	208
Appendix E: Negative Life Events Scale	209

Appendix F: Adolescent Coping Efforts Scale	211
Appendix G: Subjective Happiness Scale	212
Appendix H: Satisfaction With Life Scale	213
Appendix I: Positive Life Events Scale	214
Appendix J: Trait Toronto Mindfulness Scale	216
Appendix K: Meditation History Questionnaire	217
Appendix L: Factor Items for the FFMQ	218
Appendix M: Parcelled Items of the FFMQ	220
Appendix N: Factor Items for the Trait TMS	222
Appendix O: Parcelled Items of the Trait TMS	223
Appendix P: Beck Anxiety Inventory	224
Appendix Q: Demographic Characteristics	225
Appendix R: Positive and Negative Affect Scale	227
Appendix S: Temporal Satisfaction With Life Scale	228
Appendix T: The Savouring Beliefs Inventory	229
Appendix U: Correlations between the FFMQ, Trait TMS, and Positive and Negative Outcome Measures at Time 1, 2, and 3	230
Appendix V: Goodness-of-fit statistics and Parameter Estimates for Exploratory LGCM Analyses	233

List of Tables

Table 1.1.	<i>A Summary of Empirical Research Studies that have Investigated Mindfulness and its use in Treating both Psychological and Medical Conditions</i>	23
Table 2.1.	<i>The Shortened 15-item Scale to Measure Mindfulness taken from the full FFMQ</i>	41
Table 2.2.	<i>Means and Standard Deviations for the Two Mindfulness Factors and the Positive and Negative Outcome Scores</i>	48
Table 2.3.	<i>Correlations between the Two Factors of Mindfulness and Positive and Negative Outcome Scores</i>	49
Table 2.4.	<i>Equality Constraint Results for the Structural Model</i>	54
Table 3.1.	<i>Age Distribution on Gender</i>	65
Table 3.2.	<i>Demographic Characteristics for Meditators versus Nonmeditators</i>	66
Table 3.3.	<i>Example Items for Factors of the FFMQ</i>	67
Table 3.4.	<i>Scale Reliability (Cronbach's alpha) for the Factors of the FFMQ and the Trait TMS at Three Time Points</i>	68
Table 3.5.	<i>Goodness-of-Fit Statistics for the Hypothesised 5-factor CFA Model of the FFMQ at Three Time Points</i>	70
Table 3.6.	<i>Covariances at Time 1 between the Five Factors of the FFMQ</i>	72
Table 3.7.	<i>Covariances at Time 2 between the Five Factors of the FFMQ</i>	74
Table 3.8.	<i>Covariances at Time 3 between the Five Factors of the FFMQ</i>	76
Table 3.9.	<i>Descriptive Statistics for the Parcelled Factors of the FFMQ at Three Time Points</i>	76
Table 3.10.	<i>Correlations between the Parcelled Subscale Scores of the FFMQ at Time 1</i>	78
Table 3.11.	<i>Correlations between the Parcelled Subscale Scores of the FFMQ at Time 2</i>	79
Table 3.12.	<i>Correlations between the Parcelled Subscale Scores of the FFMQ at Time 3</i>	80
Table 3.13.	<i>Goodness-of-Fit Statistics for the Hypothesised 2-factor CFA Model of the Trait TMS at Three Time Points</i>	81

Table 3.14.	<i>Goodness-of-Fit Statistics for the Revised 2-factor CFA Model of the Trait TMS at Three Time Points</i>	82
Table 3.15.	<i>Descriptive Statistics for the Parcelled Factors of the Trait TMS at Three Time Points</i>	86
Table 3.16.	<i>Correlations between the Parcelled Subscale Scores of the Trait TMS at Three Time Points</i>	87
Table 3.17.	<i>Goodness-of-Fit Statistics for Tests of Invariance for the FFMQ between Time 1 and Time 2</i>	89
Table 3.18.	<i>Goodness-of-Fit Statistics for Tests of Invariance for the FFMQ between Time 2 and Time 3</i>	89
Table 3.19.	<i>Goodness-of-Fit Statistics for Tests of Invariance for the FFMQ between Time 1 and Time 3</i>	90
Table 3.20.	<i>Goodness-of-Fit Statistics for Tests of Invariance for the Trait TMS between Time 1 and Time 2</i>	91
Table 3.21.	<i>Goodness-of-Fit Statistics for Tests of Invariance for the Trait TMS between Time 2 and Time 3</i>	91
Table 3.22.	<i>Goodness-of-Fit Statistics for Tests of Invariance for the Trait TMS between Time 1 and Time 3</i>	92
Table 3.23.	<i>Goodness-of-Fit Statistics for Tests of Invariance for the FFMQ between Meditators and Nonmeditators at Time 1</i>	93
Table 3.24.	<i>Goodness-of-Fit Statistics for Tests of Invariance for the FFMQ between Meditators and Nonmeditators at Time 2</i>	94
Table 3.25.	<i>Goodness-of-Fit Statistics for Tests of Invariance for the FFMQ between Meditators and Nonmeditators at Time 3</i>	95
Table 3.26.	<i>Goodness-of-Fit Statistics for Tests of Invariance for the Trait TMS between Meditators and Nonmeditators at Time 1</i>	96
Table 3.27.	<i>Goodness-of-Fit Statistics for Tests of Invariance for the Trait TMS between Meditators and Nonmeditators at Time 2</i>	97
Table 3.28.	<i>Goodness-of-Fit Statistics for Tests of Invariance for the Trait TMS between Meditators and Nonmeditators at Time 3</i>	98
Table 3.29.	<i>Correlations between the FFMQ and Trait TMS at Three Time Points Compared with Davis et al. (2009)</i>	100
Table 3.30.	<i>Covariances between the FFMQ and the Trait TMS at Three Time Points</i>	102

Table 3.31.	<i>Goodness-of-Fit Statistics for Tests of Invariance between the FFMQ and Trait TMS across Three Time Points</i>	103
Table 3.32.	<i>Goodness-of-Fit Statistics for Tests of Invariance between the FFMQ and Trait TMS Comparing Meditators to Nonmeditators at Three Time Points</i>	105
Table 3.33.	<i>Noninvariant Covariances of the FFMQ and Trait TMS at Time 2 and Time 3 between Meditators and Nonmeditators</i>	106
Table 4.1.	<i>Between-Subject Effects on Group, Positive Outcomes, and Negative Outcomes between Excluded and Included Participants</i>	113
Table 4.2.	<i>Scale Reliability (Cronbach's alpha) for Psychological Measures at Three Time Points</i>	115
Table 4.3.	<i>Goodness-of-Fit Statistics for the Positive and Negative Outcome Variables at Three Time Points</i>	121
Table 4.4.	<i>Means and Standard Deviations for Positive and Negative Outcomes and Mindfulness Scores at Three Time Points</i>	122
Table 4.5.	<i>Intercorrelations between the Positive and Negative Outcome Scores at Three Time Points</i>	123
Table 4.6.	<i>Means and Standard Errors, and Between-Subjects Effects on Group, the FFMQ, and the Trait TMS</i>	134
Table 4.7.	<i>Means and Standard Errors, and Within-Subjects Effects on Time, the FFMQ, and the Trait TMS</i>	135
Table 4.8.	<i>Goodness-of-Fit Statistics and Tests of Differences on the FFMQ and Positive and Negative Outcomes Comparing Meditators to Nonmeditators across Time</i>	136
Table 4.9.	<i>Goodness-of-Fit Statistics and Tests of Differences on the Trait TMS and Positive and Negative Outcomes Comparing Meditators to Nonmeditators across Time</i>	138
Table 4.10.	<i>Parameter Estimates for the Independent Latent Growth Curve Models for the FFMQ, Trait TMS, Positive Outcomes and Negative Outcomes</i> ..	144
Table 4.11.	<i>Parameter Estimates for Parallel Processing Latent Growth Curve Models for the FFMQ Predicting Negative and Positive Outcomes</i>	147
Table 4.12.	<i>Parameter Estimates for Parallel Processing Latent Growth Curve Models for the Two Factors of the Trait TMS Predicting Negative and Positive Outcomes</i>	151

Table 4.13.	<i>Descriptive Statistics for the Conditional LGC Models for Mindfulness and Positive and Negative Outcomes Comparing Meditators to Nonmeditators</i>	153
Table U.1.	<i>Correlations between the FFMQ, Trait TMS and Positive and Negative Outcome Measures at Time 1</i>	230
Table U.2.	<i>Correlations between the FFMQ, Trait TMS and Positive and Negative Outcome Measures at Time 2</i>	231
Table U.3.	<i>Correlations between the FFMQ, Trait TMS and Positive and Negative Outcome Measures at Time 3</i>	232
Table V.1.	<i>Goodness-of-Fit Statistics for the Positive and Negative Outcome Variables Predicting Mindfulness</i>	233
Table V.2.	<i>Parameter Estimates for Parallel Processing Latent Growth Curve Models for Positive and Negative Outcomes Predicting Mindfulness</i>	233

List of Figures

<i>Figure 2.1.</i>	Confirmatory factor analysis of the FFMQ with 2-factors extracted	47
<i>Figure 2.2.</i>	Confirmatory factor analysis of the positive and negative outcome latent variables	51
<i>Figure 2.3.</i>	The fully saturated latent variable path model with mindfulness predicting positive and negative outcomes	52
<i>Figure 3.1.</i>	Confirmatory factor analysis of the FFMQ at Time 1	71
<i>Figure 3.2.</i>	Confirmatory factor analysis of the FFMQ at Time 2	73
<i>Figure 3.3.</i>	Confirmatory factor analysis of the FFMQ at Time 3	75
<i>Figure 3.4.</i>	Confirmatory factor analysis of the Trait TMS at Time 1	83
<i>Figure 3.5.</i>	Confirmatory factor analysis of the Trait TMS at Time 2	84
<i>Figure 3.6.</i>	Confirmatory factor analysis of the Trait TMS at Time 3	85
<i>Figure 3.7.</i>	Confirmatory factor analysis of the FFMQ and Trait TMS	101
<i>Figure 4.1.</i>	Confirmatory factor analysis of the positive and negative outcome variables at Time 1	118
<i>Figure 4.2.</i>	Confirmatory factor analysis of the positive and negative outcome variables at Time 2	119
<i>Figure 4.3.</i>	Confirmatory factor analysis of the positive and negative outcome variables at Time 3	120
<i>Figure 4.4.</i>	A longitudinal measurement model for the FFMQ	125
<i>Figure 4.5.</i>	A longitudinal measurement model for the Trait TMS	127
<i>Figure 4.6.</i>	A longitudinal structural path model for the FFMQ and psychological outcomes	129
<i>Figure 4.7.</i>	A longitudinal structural path model for the Trait TMS and psychological outcomes	131
<i>Figure 4.8.</i>	Average mindfulness factor trends across time	135
<i>Figure 4.9.</i>	Independent (base) latent growth curve model for the FFMQ	143
<i>Figure 4.10.</i>	Parallel process latent growth curve model for the FFMQ predicting negative outcomes	147
<i>Figure 4.11.</i>	An example of a randomly chosen participant's slope trajectory for the FFMQ and for negative outcomes across time	148

<i>Figure 4.12.</i>	An example of a randomly chosen participant's slope trajectory for the FFMQ and for positive outcomes across time	149
<i>Figure 4.13.</i>	The conditional latent growth curve model of the FFMQ at three time points comparing meditators to nonmeditators	152
<i>Figure 4.14.</i>	Comparing the slope trajectory of the Decentering factor between meditators and nonmeditators	154
<i>Figure 4.15.</i>	Comparing the slope trajectory of the Curiosity factor between meditators and nonmeditators	154

CHAPTER 1

Mindfulness: An Overview

*“What day is it?” asked Pooh. “It’s today,” squeaked Piglet. “My favourite day,” said Pooh.
– A.A. Milne*

It has been said that the maintenance and enhancement of human psychological wellbeing can be assessed by the quality of consciousness and awareness one has toward daily life experiences (Brown & Ryan, 2003; Wilber, 2000). Core characteristics that are at the root of consciousness, according to Brown and Ryan and Brown, Ryan, and Creswell (2007), are three modes of mental processing, *attention*, *awareness*, and *mindfulness*. The present thesis will focus on the third of these modes. The basic premise underlying the construct of mindfulness is that accepting moment to moment experiences as they arise with an open-minded disposition helps buffer against daily life stressors such as anxiety, depression, stress, and adverse ruminative thoughts (Baer, 2003; Hofmann et al., 2010; Kabat-Zinn, 1982). Experiencing life fully in the present moment as it unfolds (mindful presence), as opposed to ruminating about past events and experiences or worrying about the future, can, according to proponents of mindfulness, effectively counter symptoms associated with a number of psychological disorders (Baer, 2003; Kabat-Zinn, 1982, 1990; Shapiro & Carlson, 2009). A *mindful* individual is one who attends to present moment experiences with purposeful intention with a nonevaluative sense of awareness to both their external surroundings and internal experiences (Kabat-Zinn, 1990; Langer, 1989).

At the other end of a bipolar continuum to mindfulness, and in direct contrast, *mindlessness* is not paying attention to the present moment, instead, the individual appears to be unconsciously running on autopilot, or performing mechanically (Langer, 2000; Langer & Piper, 1987). Mindlessness, according to Langer and colleagues, is a mindset that occurs without conscious control or awareness; instead, it is believed the individual is habitually reacting to previously drawn distinctions, or acting in accordance with past behaviour, rather than in accordance to what is unfolding directly in front of them, in the present moment.

To date, scholars, authors, and individuals adeptly skilled in mindfulness practice are yet to converge on one universally accepted working definition of the mindfulness phenomenon (Bach & Moran, 2008; Baer, Smith, & Allen, 2004; Brown & Ryan, 2003; Singh, Lancioni, Wahler, Winton, & Singh, 2008). Since the early 1980s, there has been ongoing debate within the scientific community on the scope of the mindfulness construct. For example, how best is mindfulness operationalised, should it be defined as a multifaceted

construct or one singular dimension, is it an inherent human capacity or a likely outcome to having learned mindfulness skills, and are there any theoretical underpinnings to the mindfulness phenomenon (Brown & Ryan, 2003; Kabat-Zinn, 1982; Shapiro & Carlson, 2009)?

Although there is variance in descriptions of the nature of mindfulness, extant psychological literature converges on the notion that mindfulness is fundamentally a *way of being*, or a way of relating to all of one's experiences whether positive, negative, or neutral (Brown et al., 2007; Kabat-Zinn, 2003; Shapiro & Carlson, 2009; Williams et al., 2007). Despite much overlap, the *meaning* behind the construct of mindfulness appears to be further differentiated depending on one's traditional worldview – specifically, whether one views the concept of mindfulness from a Buddhist meditation philosophy, or one that is more rooted in Western psychological theory (Fraser, 2008; Krech, 2006; Shapiro & Carlson, 2009). Before further exploring the Western conceptualisation of mindfulness from a psychological perspective, it is important to elucidate mindfulness's historic foundations and its Eastern roots.

Traditional Mindfulness Meditation

Originating in East Asia, meditation has at least a 2,500 year-old known history as a simple and natural concept of mind-body medicine or treatment, aiding individuals to cope more effectively with everyday living (Kornfield & Breiter, 1985; Wahbeh, Lu, & Oken, 2011). Scholars, expert in historical meditation, have classified two distinct overarching forms of traditional meditative practice – Concentration and Insight (Goleman, 1988; Kabat-Zinn, 1982; Kornfield & Breiter, 1985). *Concentration meditation*, such as transcendental meditation and mantra meditation, is said to strengthen attention and help focus and calm the mind by means of a one-pointed concentration on a visual object, sound or mantra, or one's breath, for extended periods of time (Kabat-Zinn, 1982; Kornfield & Breiter, 1985). Superfluous mental activity, such as thoughts and feelings, are viewed as distractions, thus, students are taught to ignore these and to direct their attention back to the point of concentration (Kabat-Zinn, 1990).

Insight meditation (considered to be the oldest form of Buddhist meditation), also known as Vipassana, mindfulness, and awareness meditation (Engle, 2009), does not restrict the attention to one point of concentration; rather, it expands the field of attention by teaching the practitioner to develop an observing yet detached mindset to all of life's unfolding present-moment experiences (Kabat-Zinn, 1982). It is common for meditators practiced in this form of meditation to use the flow of one's breath as a means to anchor initial attention,

but to then notice, allow, and attend to all manner of internal and external experiences as they are occurring, such as thoughts, emotions, body sensations, and physical events (Engle, 2009; Kabat-Zinn, 1990). In so doing, the individual becomes more attuned to their emotional states, and with that, comes more insight and a greater understanding of the active nature of the human mind and the fluidity of one's thoughts (Kabat-Zinn).

The insight approach to meditation teaches the practitioner to discern between *true* evaluations of their thoughts and experiences (i.e., those based on reality) and a person's *perceptions* of truth (Williams et al., 2007). According to Brown et al. (2007), for example, we construct our view of the world according to how we, as an individual, interpret or evaluate it, rather than on factual representation. For instance, instead of acting rationally from objective evidence, our emotions can stem from the activity of unhelpful thoughts which may bias our perceptions, beliefs, and prejudices (Brown et al.). An example of this, and one that is likely to lead to anxiety, dysphoria, and/or an irrational belief about an experience, is habitually catastrophising every possible scenario of that experience. In other words, it is possible to create our mood and mindset through our beliefs. If our beliefs are negative and maladaptive, so too will be our emotions (Fredrickson, Cohn, Coffey, Pek, & Finkel, 2008).

The process of discernment learnt through mindfulness meditation practice, therefore, allows the individual to see how mental suffering and anguish is due, in large part, to imbalances between true and untrue experience evaluations (Wallace & Shapiro, 2006). The basic objective of insight meditation is to manifest a disposition of calm, detached observation and clarity, referred to as "bare attention" in Buddhist terms (Wallace, 2005, p. 55). This mindset is free from the constraints of typical patterns of thinking, thus reducing reactive (and often adverse) ways of responding to one's life experiences (Kabat-Zinn, 1982).

Interest into the neurocognitive underpinnings of the centuries-old tradition of meditation training and its association with improved psychological and physical wellbeing has led to a steady stream of empirical studies over the last three decades (Brefczynski-Lewis, Lutz, Schaefer, Levinson, & Davidson, 2007; Carter, Presti, Callistemon, Ungerer, Liu, & Pettigrew, 2005; Creswell, Way, Eisenberger, & Lieberman, 2007; Davidson, 2000, 2001, 2003). Researchers employing functional magnetic resonance imaging (fMRI), capable of comparing brain activity of nonmeditators to that of Buddhist monks, have found striking differences between the two groups (Kaufman, 2005). Davidson and Harrington's (2001) research, for example, showed an increase in high-frequency gamma wave brain activity in the left prefrontal cortex (the seat of positive emotions such as happiness) in the brains of

monks only. Increased gamma waves in monks have also been associated with higher mental activity and heightened awareness, such as memory, learning, and focus (Davidson & Harrington; Lutz, Slagter, Dunne, & Davidson, 2008).

Brefczynski-Lewis et al. (2007) and Davidson (2003) also found correlations with hours of practice (i.e., the more hours accrued in meditation practice, the greater the brain changes). A general consensus from scientific research exploring meditation and brain plasticity is that brain circuitry is being continuously shaped by individual experiences, and that explicit cultivation of positive mental states is possible through time spent in meditation training (Davidson; Davidson & Harrington, 2001). Lutz et al. (2008) conducted similar research comparing long-term Buddhist practitioners with a control group (individuals without meditation experience) and found a pattern emerged from the data. Specifically, Lutz and colleagues found that during an attentional focus task, not only did meditation practice influence the degree of effort required to sustain the intended focus, but the length of meditation practice an individual has was also important. More brain activity (areas implicated in monitoring, engaging attention, and attention orienting) was evident in experienced meditators with an average of 19,000 hours of practice than nonmeditators. On the other hand, expert long-term meditators with an average of 44,000 practice hours yielded the greatest reduction in brain-resource allocation (i.e., it appeared that expert meditators required less attention for the task, resulting in less brain activity due to practice and overlearning) (Lutz et al., 2008).

Lutz and colleagues surmised that meditators are more acutely attuned to noticing when the mind wanders (which may explain the increased brain activity in meditators with less experience), thus, can bring their attention back to the task at hand quicker and more effectively than nonmeditators. According to Lutz et al. (2008), the more advanced an individual is in meditation, the less the degree of effort is required overall. In meditators who have less experience, the ability to sustain focus and attention requires minimal effort only after an initial peak in brain activity (Lutz et al.). To put it succinctly, long-term extensive meditation training appears to induce a trait change. This pattern is commonly seen in other skill acquisition domains, such as language development and learning a musical instrument. Before learning the skill, for example, no effort is initially required, though during skill acquisition a rapid increase in effort is seen. Then finally, with increased expertise minimal effort is required to sustain attentional focus (Kee & Wang, 2008). This, according to Siegel (2007), is the mechanism by which a temporary state can be manifested into a longer-lasting trait of the individual, i.e., neural plasticity is in play.

Recognising how important the mental and/or spiritual state of an individual is in influencing the person's psychological and physical wellbeing, several Western therapeutic approaches looked to meditation as an adjunct in treating a myriad of health-related ailments (Hayes, Strosahl, & Wilson, 1999; Kabat-Zinn, 1982; Linehan, 1984; Marlatt, 2002; Segal, Williams, & Teasdale, 2002). Hence, appreciation of the synergistic nature between mind and body has resulted in mindfulness meditation techniques being incorporated into several established psychotherapy methodologies (Brown et al., 2007).

Western Conceptualisations of Mindfulness

According to Conze (1972), mindfulness has historically been viewed as a mode or state of awareness that is actively cultivated through specific meditative practice.

Consequently, mindfulness and meditation are often seen as synonymous, hence, the terms are often erroneously used interchangeably (Dane, 2010). Within the existing body of mindfulness literature it is now readily accepted that the emergence of mindfulness does not necessarily require meditation experience, nor does it entail adopting any specific spiritual orientation or belief (Brown & Ryan, 2003; Kabat-Zinn, 1990; Ospina et al., 2007; Singh et al., 2008; Shapiro, Carlson, Astin, & Freedman, 2006).

Specifically, existing mindfulness research posits two overarching tenets: First, that mindfulness manifested as a *psychological state* can be induced through meditation practice and/or specific mindfulness-enhancing psychotherapy techniques. And second, mindfulness that manifests as a *trait* (or individual difference characteristic similar to that of a personality trait) can vary between individuals depending on the frequency with which they experience states of mindfulness (Baer et al., 2004; Brown & Ryan, 2003; Frewen, Evans, Maraj, Dozois, & Partridge, 2007; Kabat-Zinn, 1990). Within these two broad perspectives, Western psychological research has further described the mindfulness construct as having both affective and cognitive qualities. For example, as a process (an orientation that encompasses state and trait-like domains), as a way of responding (with an inquiring attitude of curiosity and attentiveness), as a dispositional trait or characteristic (i.e., an individualised attribute), and as a by-product of cultivating specific mindfulness-enhancing skills (Kabat-Zinn, 1982; Krech, 2006; Langer, 1989; Shapiro & Carlson, 2009; Singh et al., 2008; Williams, 2008). These different perspectives will now be discussed in turn.

Mindfulness from a process perspective

One of the leading and most seminal mindfulness researchers to date, Jon Kabat-Zinn, claims that “mindfulness is the awareness that emerges through paying attention on purpose, in the present moment, and nonjudgmentally to the unfolding of experience moment by

moment” (Kabat-Zinn, 2003, p. 145). Rather than viewing mindfulness as the next promising cognitive behavioral technique, or simply as an exercise or element of a larger treatment modality, Kabat-Zinn advocates that mindfulness must be respected for the unique qualities and characteristics it offers as a meditative process. His mindfulness-based stress reduction programme (MBSR; Kabat-Zinn, 1982) is a group-intervention programme originally designed for medical patients dealing with stress due to chronic pain, and was one of the first of its kind to mesh Western psychotherapy with Eastern roots in meditation.

Kabat-Zinn postulates that all human beings are capable of cultivating mindfulness (in varying degrees) as a psychological state, either learned through programmes such as the MBSR, via traditional meditation practice, or through one’s natural inherent tendency. From Buddhist philosophy, Kabat-Zinn (1990) drew seven key meditational developmental attitudes, or processes, and incorporated these into a structured 8-10 week intervention programme for use with clinical populations. The first attitude, *nonjudging*, teaches individuals to become aware of their emotions, prejudices, and judgements, noticing how often their thoughts are evaluative in nature. The second, *patience*, implies cultivating a sense of openness to whatever it is that is unfolding before one. The third, *beginner’s mind*, is likened to seeing and experiencing the world as it really is, as if for the first time, rather than having preconceived ideas on what, or how, it should be. The fourth, *trust*, is the belief in one’s own abilities and inner wisdom to cultivate mindfulness attitudes. The fifth attitude, *non-striving*, refers to adopting an observing attitude toward what is happening in the present moment, rather than prescribing to a specific goal. For example, the individual does not ‘strive’ to relax. The sixth attitude, *acceptance*, directly follows on from the attitude of non-striving, as it indicates an attitude of noticing and accepting aspects of life over which one has little control. The final attitude cultivated from Kabat-Zinn’s MBSR programme is one of *letting go*. The freedom associated with noticing, allowing and letting go of a particular disturbing thought, event, or experience, is likened to one of open-minded peace.

Mindfulness from a way of responding perspective

Bishop et al. (2004) define mindfulness as a *mode of awareness*, or state-like quality that can be developed with practice, similar to what Kabat-Zinn (1982) initially posited. According to Bishop and colleagues, the individual adept at mindfulness demonstrates a way of responding that is fully present in the moment, noticing and accepting the truth of exactly what is unfolding. Or in other words, relating openly to all of one’s experiences. Bishop et al. (2004) proposed an operational definition with their two-component model of mindfulness: 1) self regulation of attention, and 2) orientation to experience. In the first component, Bishop

and colleagues state that certain skills (such as the mastery of sustained attention and switching between tasks) are required to regulate the focus of one's attention. Bishop et al. (2004) refer to sustained attention as having the ability to focus on something over a period of time, and switching between tasks as the ability to shift the focus from one task or object to another.

In the second component of Bishop et al.'s mindfulness model, orientation to experience refers to a particular way of behaving which is characterised by curiosity, openness, and acceptance. This way of behaving is thought to be cultivated through specific mindfulness meditation practices. The first component in Bishop et al.'s (2004) two-component model describes mindfulness as a psychological state, or as Kee & Wang (2008) describe it, as a form of mental skill; whereas the second component accounts for personality characteristics that underlie mindfulness tendencies (Bishop et al.). During mindfulness meditation, the individual may be instructed to first notice the sensation of their breath, while then noticing and accepting all of their body sensations, thoughts, and feelings as they arise (Bishop et al., 2004). The person is not instructed to alter their thoughts or change anything, but merely to note their emotions and thoughts as passing events in the mind (i.e., as impermanent), whilst maintaining a curious and accepting attitude to their thoughts when they do arise, regardless of valence (Bishop et al.).

Behavioural avoidance strategies typically used for coping with aversive experiences, unpleasant emotions, or to rid ourselves of discomfort (such as symptoms associated with stress and anxiety), are expected to be reduced once the orientation of acceptance and openness becomes more habitual for the individual (Bishop, 2002). After mindfulness instruction, it becomes apparent to the individual how one experience can easily influence another. For example, one negative judgment can create a cascade of negative emotions toward other experiences. This cascade effect heightens the subjective meaning associated with that experience (Bishop et al., 2004). Eventually, the person becomes expert at discriminating between attitudes associated with different experiences, learning instead to see each of their experiences as new, thus, placing no judgement on each experience (Bishop et al.).

As a direct consequence of adopting an accepting and open disposition to all of one's experiences as they arise (a process of decentering), Bishop and colleagues hypothesise that reductions in the emotional suffering and psychological distress of an individual will result, or at least be experienced as less intense. This, in turn and in time, leads to increases in the quality of the person's subjective psychological wellbeing, as insight into the unique

workings of the human mind and all its complexities becomes evident to the individual (Bishop et al., 2004).

Mindfulness from a dispositional perspective

If mindful meditation practice is thought to increase a mindful state by means of living in the present rather than being distracted by past-or future-orientated thoughts (Thompson & Waltz, 2007), what is known about everyday mindfulness – the naturally occurring trait that varies between individuals? To date, there has been little research examining this attribute as a naturally occurring individual difference characteristic. This is despite the recent development of several psychometric instruments designed to capture the construct, similar to scales that assess a person's personality or cognitive style (Sternberg, 2000). Some mindfulness researchers are in agreement that dispositional mindfulness may reflect a greater tendency to develop mindful states over time (Sharma, 2006; Wayment, Wiist, Sullivan, & Warren, 2010); whereas, others claim that inducing mindful states (e.g., through formal meditation practice) can lead to increases in dispositional mindfulness, similar to the trend seen in skill acquisition discussed earlier (Brown et al., 2007; Kabat-Zinn, 1990; Shapiro & Carlson, 2009; Siegel, 2007).

Brown and Ryan (2003), for example, purport that mindfulness is inherently a psychological state of consciousness (with qualities of awareness and attention) that can vary considerably between individuals. Specifically, individuals who are naturally more mindful, according to these authors, are said to be more attentive to and aware of internal experiences, events, and processes (both psychological and physical) than less mindful individuals (Brown & Ryan). As mentioned previously, Kabat-Zinn (1982, 1990) posits that mindfulness is inherent to all human beings in varying degrees (i.e., it varies on a continuum), indicating that we are all capable of it from day-to-day if we so choose (a similar perspective that Brown and Ryan, 2003, discussed above, later embraced). Similarly, Sternberg (2000) postulates that mindfulness can help explain a variety of human behaviours through its state- and trait-like characteristics, and argues that the construct lies somewhere on a continuum between the constructs of personality and cognition. Specifically, Sternberg views the construct as a type of *cognitive style* (that is, a preferential way of viewing the world using one's cognitive abilities, which refelects individual skills and differences). Sternberg (2000) claims that there is overlap between mindfulness and the personality characteristic of *openness to experience*, characterised by curiosity, imagination, and openness to new and novel experiences and information (Costa & McCrae, 1992).

On the other hand, the premise that practice in inducing a mindful psychological state can effect trait mindfulness, is described by Siegel (2007) as “effortless mindfulness” (p. 119). Rather than behaving automatically, or from old memory-shaped top-down judgements (as is seen with habitual mindlessness), awareness to present moment experiences changes as mindfulness becomes more ingrained in one’s way of being (Siegel). Specifically, Siegel (2007) purports that mindfulness as an individual characteristic trait that appears effortless may have been enhanced through neural connections and growth in prefrontal brain areas made through practicing mindfulness techniques. This view is consistent with the mechanisms that are in play when acquiring a new skill, as discussed earlier in this chapter.

According to Siegel, this initial effortful practice of a manifested mindful state may result in the strengthening and enhancement in synaptic connectivity in the brain through repeated activation of the same set of neural circuitry, in much the same way as is seen in procedural memory activation – the mode of memory that is manifested during learning and cognitive performance (Anderson, 1982). Siegel (2007) describes the shift in the quality of awareness from a passive and/or reactive process (common to most human behaviour) to one that encompasses intention and sustained attention. This heightened quality of awareness to all of life’s experiences becomes a preferred, and eventually, a habitual way of living and responding. Hence, through practice, the psychological state of mindfulness manifested through specific mindfulness enhancing techniques will eventually, according to Siegel (2007), lead to an enduring and effortless trait of mindfulness.

From a different perspective, Thompson and Waltz (2007) argue that the relationship between everyday mindfulness (trait) and personality characteristics is blurry and requires further investigation. These authors reason that it is uncertain whether everyday mindfulness shapes an individual’s personality, or if personality shapes everyday mindfulness, and further, question whether existing individual personality traits and/or experiences interfere with the mindfulness process. Specifically, results from Thompson and Waltz’s (2007) research revealed that state mindfulness (measured during a seated meditation) was not representative of trait mindfulness, and that the ability to manifest a mindful state during formal meditation practices was not dependent on increased trait mindfulness, especially in individuals who did not regularly practice meditation.

Furthermore, results from Thompson and Waltz’s study showed mood and personality scores differed according to what form of mindfulness they were measuring (i.e., state or trait), and whether the individual was experienced in meditation experience. Thompson and Waltz’s (2007) research suggests that relationships seen between constructs (including

whether mindfulness is measured as a trait or a state) in the group of nonmeditators may not emerge for the meditating group. Further exploration into these themes appears justified, for example, a non-experimental study design that compares meditators to nonmeditators and allows for the naturally occurring disposition of mindfulness and its influence over naturally occurring psychological outcomes (such as happiness and depression), would help to tease apart these relationships further.

Mindfulness from a by-product perspective

Ellen Langer (1989), a social psychologist and one of the earliest and most influential academic researchers of mindfulness, believes the construct has both trait-like and state-like characteristics, consistent with research mentioned previously (Bishop et al., 2004; Kabat-Zinn, 1982, 1990; Siegel, 2007; Sternberg, 2000). Specifically, Langer claims that individual differences in mindfulness are thought of as a personal attribute or trait, whereas, the state of being mindful is situation-specific and is short lived. Further, Langer (2000) postulated that “mindfulness is a flexible state of mind in which we are actively engaged in the present, noticing new things, and is sensitive to context” (p. 220). When behaving mindfully, according to Langer, we pay attention to the situation we find ourselves in and the context (or constraints) of the situation. Further still, Bodner and Langer (2001) claim that there are stable individual differences (traits) in the propensity to achieve the state of mindfulness, such as curiosity and patience.

In sum, Langer and colleagues’ underlying view of the mindfulness construct, from a Western scientific perspective, is that it is a *by-product* of mindful learning, rather than an outcome or specific focus on results, that encompasses four specific cognitive domains – novelty seeking, novelty producing, flexibility, and engagement (Bodner & Langer, 2001). According to Bodner and Langer, these cognitive domains are manifested in characteristic traits, such as the cultivation of an open-minded attitude to one’s experience and behaviour that challenges pre-existing assumptions and perspectives, together with the willingness to change one’s initial mindset. Individuals who yield higher mindfulness scores, according to Bodner and Langer (2001) and Langer (1989), will also display higher scores in the cognitive domains of novelty seeking, novelty producing, flexibility, and engagement, than individuals with lower mindfulness scores.

Langer (1989) places less emphasis on mindfulness as an outcome, believing it to limit an individual’s learning process and even distort one’s judgements by only seeing an experience one-dimensionally, and prefers to define the construct as a *process orientation*. The nature of human behaviour, according to Langer (2000), is to hold a particular

perspective in the mind as if it was constant or fixed, rather than seeing that everything is changing from one moment to the next. Langer sees this inflexible mindset as a consequence of mindlessly learned behaviour and provides the example of when factual information is obtained via a textbook or through a teacher (i.e., in educational institutions), and hence, is thereafter viewed as an absolute truth.

Langer's (1989) process orientation of *mindful learning* is characterised as "an active cognitive mode or style, in which the individual is situated in the present, seeing the familiar in the novel and the novel in the familiar" (Langer, 2000, p. 222). According to Langer, an attribute from everyday mindfulness is the simple act of noticing new things, and, having the sense to see opportunities when they present themselves (i.e., not limiting our capacity by self-imposing a pre-conceived mindset). Within this view, consequential advantages of mindfulness as a by-product are enhanced cognitive functioning, alertness, and appreciation for multiple perspectives within an environment that is in a constant state of change (Langer, 1989, 2000). Specific implications for employing a more mindful mode of mind in daily life is the escape it can offer from constraining mindsets. Staying open to all of our experiences, whether positive or negative, allows for creativity, curiosity, and the flourishing of an inquisitive mind, which is thought to lead to happier and healthier lives (Langer, 1989; Bodner & Langer, 2001).

Similar to Langer's (1989, 2000) postulations above, Williams (2008) claims that mindful awareness emerges as a by-product from cultivating three related skills. These three specific skills are: "a) intentionally paying attention to moment-by-moment events as they unfold in the internal and external world; b) noticing habitual reactions to such events, often characterized by aversion or attachment (commonly resulting in rumination and avoidance); and c) cultivating the ability to respond to events, and to our reactions to them, with an attitude of open curiosity and compassion" (Williams, p. 721). According to Williams et al. (2007), there are two different modes of mind – "the doing mode and the being mode" (p. 46). The *doing* mode (bearing similarities to Langer's 1989 state of mindlessness) relies on mental habits and automatic routines. For example, the individual is most often unaware that their mindset is switching between memories of the past and anticipation of future events, rather than focussing on the moment at hand (Williams et al., 2007; Williams, 2008). Williams specifically describes this mode as "conceptual, language-based, verbal and analytic" (p. 729).

Contrary to the doing mode, the *being* mode focuses on present moment sensory experience, and is "non-conceptual, intuitive, and experiential in nature" (Williams et al., 2007; Williams, 2008, p. 729). Mindful awareness – cultivated through the acquisition of the

above mentioned three skills – teaches the individual to recognise whether they are currently in the doing or being mode. According to Williams, for most people the doing mode is the ‘default’ mode of mind. Once this mode of mind has been recognised, the individual can then choose to disengage from the more habitual and automatic doing mode, and adopt a more controlled and focused mindset – i.e., that of the being mode (Williams, 2008).

Williams et al. (2007) believe that mindfulness is not about giving more attention to a specific stimulus, rather, it is about cultivating a different *quality of attention* that encompasses the breath, body sensations, sights, sounds, thoughts and feelings, i.e., viewing the body from the perspective of being mode. The usual manner of human thinking, as previously mentioned, is one that gets carried away by our thoughts which often leads to maladaptive rumination or anticipation about the future (Nolen-Hoeksema, 1991; Williams et al.; Williams, 2008). Inhabiting the body with full mindful awareness, according to Williams and colleagues, helps to focus the mind on one experience/thought at a time, resulting in less mind-wandering, and consequently, less emotional problems.

The qualities of *non-striving* and *letting go* (Kabat-Zinn, 1990), often manifested through mindfulness enhancing techniques (such as in some forms of meditation practices and mindfulness interventions), are thought to be two of the mechanisms underpinning reductions in psychological distress (Kabat-Zinn; Kornfield, 1993; Williams et al., 2007). Releasing, or letting go of evaluations placed on one’s experiences and/or thoughts, and learning to be present and open (in other words, adopting a non-striving attitude) to whatever we are feeling in that exact moment, is believed to reduce the expectations of that particular moment (Williams, 2008). Thus, any negative associations we may hold toward an experience, thought, or toward ourselves, tend to be experienced as less intense, or may even dissipate entirely (Williams). Both Williams et al.’s (2007) and Langer’s (1989) proposed operationalisation of the mindfulness construct offers some insight into the ways in which cultivating a particular form of awareness (i.e., mindful awareness) may help in disrupting the cycle of negative thinking. In the following section other *mechanisms of change* will be discussed

Proposed Mechanisms of Change

The mechanisms underpinning the salutary effects and/or changes that are often cited as a result of increased mindfulness vary considerably depending on the perspective from which they are studied. For example, Singh et al. (2008) claim the primary aim of increasing mindfulness is to help understand the complex nature of our own minds and help with personal transformation. In this view, *insight* is at the foundation of mindful awareness.

Specifically, Singh and colleagues (2008) state that “mindfulness meditation has always been more than a psychological construct that mediates or moderates human behaviour” (p. 663). This perspective is consistent with that of traditional Buddhist philosophy, which purports that through the committed practice of mindfulness (or insight) meditation practice, the mind can be awakened to the awareness of ‘what is’, i.e., present moment reality (Engle, 2009; Kornfield, 1993; Wallace, 2005).

Kornfield (1993) states that the core of mindfulness within the Buddhist tradition, is simply a way of being and acting that permits one’s inner stillness to flourish. Moreover, mindfulness from a Buddhist perspective pays little attention, if any, to employing mindfulness therapeutically as a clinical method of ameliorating psychological or physical distress. Rather, it is viewed as more of an attitude or disposition one chooses to adopt in daily life. Hence, the Eastern approach to mindfulness is less focused on establishing the associated mechanisms that underpin symptom reduction and enhances in wellbeing (Engle, 2009; Kabat-Zinn, 1990). From a Western psychological perspective, however, there have been several attempts at establishing the core mechanisms that underpin the therapeutic change of this approach (Frewen et al., 2007; Gilbert & Christopher, 2009; Kiken & Shook, in press; Ramel, Goldin, Carmona, & McQuaid, 2004; Shapiro, Carlson, Astin, & Freedman, 2006; Teasdale, Segal, & Williams, 1995). A large proportion of current literature on mindfulness primarily focuses on ways in which the construct helps alleviate the negatives in a person’s life (Baer, 2003; Brown & Ryan, 2003; Shapiro & Carlson, 2009), i.e., the mechanisms involved from a disease-model of human functioning perspective (Cohen & Herbert, 1996).

Similarly, one of the primary goals of traditional cognitive behavioural therapies (CBT) is to reduce negatively biased cognition, commonly associated with psychological disorders, such as depression and anxiety (Beck, Rush, Shaw, & Emery, 1979). Whereas CBT attempts to instil change by altering an individual’s thought content, mindfulness-based therapies typically do not attempt to change any aspect of one’s current situation; rather, the individual is shown how to change the *relationship* that they have with their thoughts to one that is more accepting, open, and less judgemental (Kiken & Shook, in press; Orsillo, Roemer, & Barlow, 2003; Ramel et al., 2004). A review of extant mindfulness literature has highlighted four mechanisms proposed to be largely responsible for promoting therapeutic change – reducing negatively biased cognition, disrupting ruminative thought processes, regulating emotion, and prolonged exposure. Each will be discussed in turn.

Reductions in negatively biased cognition

Several researchers purport that mindfulness practice may facilitate reductions in dysfunctional cognition and mood (Frewen et al., 2007; Gilbert & Christopher, 2009; Kiken & Shook, in press); hence, reductions in negatively biased cognition may act as an underlying mechanism, or mediating variable, at the core of these changes. The perspective shared by the above group of authors builds on classical cognitive theories of depression and anxiety that supports the causative role that negative cognitive styles have on psychological dysfunction (Beck et al., 1979; Kiken & Shook; Riskind, 1997; Nolen-Hoeksema, 1991; Segal, Williams, & Teasdale, 2002).

Specifically, when an individual is experiencing negative events or stress in life, negatively biased cognitions (characterised by rigid and extreme attributions and beliefs concerning self-worth) are thought to activate a schema of self-blame, hopelessness, and inadequacy, which in turn, may lead to depressive disorders (Gilbert & Christopher, 2009; Ingram, Atchley & Segal, 2011; Ramel et al., 2004). For example, Kiken and Shook (in press) tested the hypothesis that negatively biased cognition may mediate the inverse association between mindfulness and emotional distress, with results of this study revealing a partial mediation. Kiken and Shook's findings showed that individuals who reported high levels of mindfulness (when compared to individuals reporting low levels of mindfulness) had less negatively biased cognition, which contributed to less emotional distress. Kiken and Shook (in press) concluded from their results that mindfulness may provide some protection against certain psychological disorders by reducing the amount of negatively biased cognition in individual experiences. Although negatively biased cognition may be an important factor in the relationship between mindfulness and emotional distress, further empirical exploration is needed to thoroughly test this hypothesis.

Similar to Kiken and Shook's (in press) area of interest, and consistent with empirical evidence purporting that negatively biased cognition can exacerbate dysphoric mood, leading to further depression (Beck et al., 1979; Dimidjian, Kleiber, & Segal, 2010; Segal et al., 2002), Gilbert and Christopher (2009) proposed that mindfulness may act as a moderating variable between depression and negatively biased cognitions. Specifically, these authors found that depressive affect was more positively associated to negatively biased cognitions when mindfulness-based attention was low, than when mindfulness-based attention was high (Gilbert & Christopher).

Gilbert and Christopher's (2009) research replicated similar research conducted by Frewen et al. (2007), who found that although negative events, thoughts, and emotions do

still occur for individuals with greater levels of dispositional mindfulness, in general, they occur less frequently, and are perceived as less intense (thus, less intrusive) than for individuals who are lower in trait mindfulness. Frewen and colleagues concluded that mindfulness enables people to “let go of negative automatic thoughts” (p. 771), a concept that overlaps with that of researchers positing the important role mindfulness plays in disrupting ruminative cognitive scripts (Coffey, Hartman, & Fredrickson, 2010; Michalak, Hölz, & Teismann, 2010; Nolen-Hoeksema, 1991; Nolen-Hoeksema, Morrow, & Fredrickson, 1993; Segal et al., 2002).

Disrupting ruminative thought processes

Rumination, according to Nolen-Hoeksema (1991), is a cognitive process of repetitively focusing on one’s thoughts and emotions that are associated with negative mood. For example, individuals who ruminate, unduly deliberate on their negative emotional state, the causes, the consequences, and the meanings they associate with that state, believing that self-focused attention will help to alleviate their symptoms (Ramel et al., 2004; Rude, Little Maestas, & Neff, 2007). Longitudinal empirical literature, however, suggests that rumination employed as a method of problem solving is not only ineffectual, but more often increases and prolongs dysphoric and depressed mood, and is predictive of depressive relapse (Michalak et al., 2010; Nolen-Hoeksema, 1991; Nolen-Hoeksema et al., 1993; Ramel et al., 2004; Thomsen, 2006).

Mindfulness researchers have purported that training in mindfulness can help change thought patterns, and/or attitudes about one’s thoughts, by disrupting habitual and reflexive patterns of responding (i.e., ruminative thought processes) (Baer, 2003; Kabat-Zinn, 1990; Segal et al., 2002). Specific mindfulness skills teach the individual how to foster a different relationship toward their emotional distress (i.e., taking a more decentered approach), whilst redirecting attention to present moment activity (Baer; Kabat-Zinn, 1982; Teasdale et al., 1995; Williams et al., 2007). For example, teaching the individual to attend to all aspects of their awareness, such as their breathing, their body sensations, sounds, and moment-to-moment experiences with a curious and open disposition, is believed to result in reduced ruminative habits (Baer 2003; Kabat-Zinn, 1990).

Changing the way we view our emotional distress, according to Shapiro et al. (2006), requires “a fundamental shift in perspective” (p. 377) – from being overly immersed in one’s immediate experience, to disengaging (or mentally stepping back) and observing both internal and external experiences with greater clarity, openness, objectivity, and perspective. Shapiro and colleagues refer to this shift in perspective as “reperceiving” (p. 377); similar in

meaning and context to the terms decentering, detachment, and deautomatisation (Engle, 2009; Greenberg & Safran, 1987; Kabat-Zinn, 1990). Reperceiving also bears similarity to Kabat-Zinn's claim that the mindfulness practitioner learns to see that the content of their thoughts such as sensations, feelings, and memories, are not their own, rather, they are actual psychological events of the mind that will pass away in time (Kabat-Zinn).

This nonjudgmental and decentered approach toward one's thoughts is said to interfere with habitualised neural circuitry by providing an alternative, and more adaptive, appraisal of their circumstances (Davidson, 2010; Garland, Gaylord, & Park, 2009; Wells, 2002; Williams et al., 2007). Further, the attentional training aspect of mindfulness helps an individual to set an *intention* to whatever it is that they are attending to. For example, the person chooses to focus on their breath. According to Williams and colleagues, it is this intentional focus that helps suspend automatic ruminative modes of processing for as long as the focus of attention is sustained. Several authors claim that practice in mindfulness allows the individual, when in times of distress, to detach (step back) from their thoughts, emotions, and sensations in order to generate a level of awareness where thoughts are experienced as mental events, rather than reflections of absolute truth, or literal facts – hence, they are impermanent (Frewen et al., 2007; Garland et al., 2009; Kabat-Zinn, 1990). Garland and colleagues eloquently refer to this level of awareness as a “transitory metacognitive state of attending in a mindful way” (p. 38).

Breslin, Zack, and McMain (2002) argue that it is important that the ‘detaching from aversive experiences’ component of mindfulness is not viewed as a method of distracting oneself from acute distress. Rather, when one detaches from mental events when practicing mindfulness, one *chooses* to engage in this process with an open-minded intention and attitude of acceptance (Breslin et al.). Alternatively, as Craske and Hazlett-Stevens (2002) claim, “detachment is a competing state of awareness that replaces the state of attempting to control or diminish internal experience” (p. 72). For instance, the individual learns how to observe their current experience, thoughts, and emotions without judgement, regardless of valence, so as not to avoid or suppress whatever it is that they are experiencing (Breslin et al., 2002; Craske & Hazlett-Stevens).

This deliberate adoption of the “observer mode” (Breslin et al., 2002, p. 287) is an active process that allows for a more positive reappraisal from automatic ruminative stress appraisals. In other words, when faced with stressful mental events, the individual first decenters from the experience with a nonjudgmental attitude, and then reappraises the stressor with a more conscious, nonautomatic or effortful, mode of processing (Garland et al.,

2009). It is thought that in this manner of attending to life events, a greater sense of control over one's behaviour is manifested (Breslin et al., 2002).

The decentered observing stance adopted by mindfulness practitioners offers practical implications for the theory underpinning the experiential avoidance phenomenon, which posits that people seek out strategies to escape, avoid, or modify experiences that they find aversive (Hayes, Wilson, Gifford, Follette, & Strosahl, 1996). For example, psychological therapy to reduce experiential avoidance typically encourages the individual to *approach* the unpleasant stimuli (rather than avoid or ignore it), so in this regard, mindfulness could be a potential strategy used for therapeutic effect as it encourages a neutral observation of all of life's experiences (Orsillo et al., 2003; Wells, 2002). As previously mentioned, mindfulness techniques teach the individual to view their thoughts as simply mental events of the mind, and not necessarily realities. Without activating counterproductive ruminatory styles of thinking, mindfulness provides insight into the typical processing patterns of the human mind; hence, the individual is less likely to fear their thoughts (Wells, 2002).

Emotion regulation

While reduced rumination through mindfulness practice is proposed as one mechanism in which psychological functioning is enhanced via means of greater self-control, several researchers have proposed that emotion regulation may be another mechanism of mindfulness in which therapeutic change is engendered (Coffey et al., 2010; Davidson, 2010; Hayes, Feldman, & Gables, 2004; Kumar, Feldman, & Hayes, 2008). Emotion regulation is broadly defined as the ability to alter, or control, one's thoughts or behaviours in order to cope more effectively with negative affect (Coffey et al.; Davidson; Hayes et al.). It is purported that the strength of the association that one feels toward a negative emotion is what causes negative affect to endure. In other words, negative emotion will persevere if the individual overidentifies with their thoughts or becomes excessively consumed by them (Davidson, 2010). Davidson claims that practice in mindfulness can decrease the intensity experienced from negative stimuli, and reduce the amount of attention one gives to that emotion, which in turn, is said to hasten the recovery from emotional distress.

Emotion dysregulation has been linked to a number of health and psychopathological conditions, such as, substance use disorders, depression, social anxiety, borderline personality disorder, and suicidal ideation (Breslin et al., 2002; Keltner & Kring, 1998; Kumar et al., 2008; Linehan, 1993; Nolen-Hoeksema et al., 1993). Classical psychotherapy interventions typically target emotion and ways to improve one's ability to manage their negative emotion (Kazantzis, Reinecke, & Freeman, 2010; Kabat-Zinn, 1990). Cultivating emotional balance is

also considered to be an important target of mindfulness-based treatment, as it helps decrease habitual and reactive patterns of responding to aversive internal and external experiences (Davidson, 2010; Hayes et al., 2004; Kabat-Zinn). Although emotion regulatory processes can be automatic or controlled, and conscious or unconscious, it is thought that mindfulness techniques provide skills to influence how an individual experiences and expresses their emotions (Gross, 1998).

Furthermore, mindfulness seeks to enhance tolerance to triggers of emotional distress (such as negative thinking, negative feelings, and negative body sensations), which Breslin et al. (2002) claim act as a form of desensitisation. For instance, instead of personally engaging in a thought that is associated with negative emotion (such as thinking *I am a failure*), the individual is taught simply to notice and acknowledge it as a thought, and then to note its nature as a transitory mind event (Kabat-Zinn, 1982). In this sense, more mindful individuals report a greater capacity to “let go” of their negative thoughts (Frewen et al., 2007, p. 771), by increased cognitive, behavioural, and emotional flexibility (Shapiro et al., 2006). As awareness and acceptance is at the core of mindfulness philosophy, an individual adept in mindfulness practice can be exposed to negative affect without reacting to it maladaptively (such as the tendency to employ avoidance strategies or suppress the experience) (Breslin et al.). Greater emotion regulation (or control over one’s emotional processes) and attentional flexibility, is thought, therefore, to be a consequence of increased mindfulness, which is associated with lower levels of psychological distress and significant reductions in relapse (Coffey et al., 2010; Garland et al., 2009; Hayes et al., 2004; Kabat-Zinn, 1990; Kumar et al., 2008).

Prolonged exposure

The fourth proposed mechanism of change overlaps with the three discussed above, by positing that mindfulness practice equips the individual with skills to cope with prolonged exposure to negative emotion and sensations, such as chronic pain and the fear response involved with many anxiety disorders (Kabat-Zinn, 1982). It is thought that prolonged exposure, when in the absence of distressing consequences, is typically what leads to desensitisation (and at times extinction) of certain psychological symptoms (Baer, 2003; Kabat-Zinn, 1982, 1990; Linehan, 1993; Shapiro et al., 2006). For example, Kabat-Zinn’s extensive research into chronic pain has suggested that the practice of mindfulness skills may lead to less emotional reactivity toward an individual’s experience of pain; thus, over time, a reduction in negative emotional response to pain sensations is evidenced. Rather than the actual physical sensations of pain subsiding, Kabat-Zinn (1982) has surmised that it is the

anguish and suffering that is commonly associated with chronic pain conditions that can be reduced by mindfulness techniques, indicating that mindfulness may function to change the relationship one has with their physical pain.

Further, as previously mentioned, mindfulness techniques provide the individual with skills with which to observe their experiences nonjudgmentally, i.e., with greater objectivity and less reactivity (Shapiro et al., 2006). This nonevaluative attitude of acceptance is said to negate avoidance behaviours and thought suppression when faced with negative affect and aversive stimuli, which in turn allows for increased exposure to such states (Shapiro et al.). According to Roemer and Orsillo (2003) and Baer (2003), during mindfulness practice, similar mechanisms may be at work that are consistent with ones typically seen during therapeutic exposure therapy. For example, during interoceptive exposure – a form of cognitive behaviour therapy typically used in treating severe anxiety disorders such as panic disorder, OCD, PTSD, and specific phobias (Antony & Rowa, 2005; Barlow, Craske, Cerny, & Klosko, 1989) – individuals are encouraged to fully experience their internal emotional and physiological states without attempting to change, control, or avoid them (Roemer & Orsillo).

It is thought (as was discussed previously) that during mindfulness practice, the individual acquires insight into the nature of reality and into the impermanence of one's thoughts and feelings, thus, the individual learns experientially not to fear or avoid experiences that are considered unpleasant, with the knowledge that they will pass in time (Baer, 2003; Segal et al., 2002; Shapiro & Carlson, 2009). Therefore, mindfulness may indirectly facilitate emotional processing simply by exposing the individual to all of their experiences, sensations and thoughts (Roemer & Orsillo, 2003).

Linehan's (1993) and Linehan, Tutek, Heard, and Armstrong's (1994) research on borderline personality disorder found that typically, negative emotions are intensely experienced in sufferers of this psychological disorder. Consequently, they are often feared and avoided. A proponent of mindfulness and its salutary effects, Linehan purports that fear responses and avoidance behaviours (such as worry, substance addictions, and compulsions) typically seen in individuals with this form of dysfunction, tend to decrease when an individual can observe their thoughts and emotions without getting caught up in them. Therefore, according to Linehan (1993), mindfulness practice works similarly to the mechanisms underlying prolonged exposure, by increasing the individual's ability to explore and tolerate their negative emotional states, hence, prolonged exposure may be the mechanism that impacts upon therapeutic change. A behavioral intervention designed to treat individuals with borderline personality disorder (Dialectic Behavioural Therapy; DBT;

Linehan, 1993) was developed from Linehan's extensive research, which has both a mindfulness skill component and an emotion regulation component. The following section will briefly discuss this and several other psychotherapies that have emerged over the last decade, which incorporate elements of mindfulness.

Mindfulness and Psychotherapy

To date, mindfulness has been used successfully in treating symptoms associated with a wide range of psychopathology, and as a complementary treatment for a number of medical conditions (Table 1.1 provides an example of empirical research studies that have investigated mindfulness and its use in treating both mental and physical health conditions¹). The benefit of mindfulness as a component of psychotherapy (also referred to as acceptance-based therapy) appears undeniable as it continues to gain empirical support with the emergence of several mindfulness-based interventions over recent years (see below). Most forms of these evidence-based treatments integrate mindfulness into therapy by teaching specific skills and techniques taught by an appropriate therapist. Among the most established, recognised, and empirically evaluated, are mindfulness-based stress reduction (MBSR; Kabat-Zinn, 1982), mindfulness-based cognitive therapy (MBCT; Segal et al., 2002), acceptance and commitment therapy (ACT; Hayes et al., 1999), dialectical behaviour therapy (DBT; Linehan, 1984), and mindfulness-based relapse prevention (Marlatt, 2002).

Mindfulness-based stress reduction

MBSR (Kabat-Zinn, 1982), as briefly mentioned earlier in this chapter, was the first mindfulness intervention programme originally developed for patients suffering from stress and chronic pain. This Western form of training draws on Eastern philosophy and is the most frequently cited mindfulness programme in extant empirical literature (Baer, 2003; Cullen, 2011). More than 18,000 individuals have completed the programme from the Stress Reduction Clinic based at the University of Massachusetts Medical Center, and worldwide, there are currently more than 500 MBSR clinics in practice (Cullen). MBSR follows a manualised structure with specific mindfulness techniques being taught involving seated diaphragmatic breathing meditation, a body scan, and Hatha yoga postures (Kabat-Zinn, 1990). Within the boundaries of a comprehensive 8-week programme, participants also acquire skills and strategies to help the individual cope with aversive situations or

¹ A comprehensive literature review on the efficacy of mindfulness-based interventions is beyond the scope of this thesis, however, empirical research articles on the construct of mindfulness can be accessed through health science databases such as, MEDLINE, PsychInfo, BioMed, Web of Science, and PubMed.

experiences, such as stress, depressive thoughts, anxiety, chronic pain, and illness (Kabat-Zinn).

Mindfulness-based cognitive therapy

Similar in principle to MBSR, MBCT (Segal et al., 2002) is a methodologically strong theory-driven intervention that was originally designed to prevent relapse of major depressive episodes, which has also been successfully administered to individuals during a single depressive episode. Segal and colleagues claim that mild negative affect may reactivate depressive thinking in individuals prone to depressive episodes; therefore, mindfulness training encourages awareness and insight into early signs of a potential depressive relapse in order to prevent the escalation of negative thoughts and emotions. MBCT focuses on the transient nature of thoughts and dysphoric states in order to facilitate a decentered view toward one's experiences (Baer, 2003; Teasdale et al., 1995). For example, participants in a typical 8-week group intervention programme are encouraged to view their thoughts as mental events rather than true reflections of reality (Baer; Segal et al., 2002) – an idea discussed earlier.

Acceptance and commitment therapy

ACT (Hayes et al., 1999) is a functional and contextual therapy that is theoretically based in contemporary Behaviour Analysis and Relational Frame Theory, and focuses on the individual's behaviour and presenting problems, and the context in which they occur. This treatment approach teaches individuals that distressing thoughts and feelings are an inevitable aspect of everyday life; therefore, ameliorating these emotions is not regarded as a primary treatment target (Bach & Moran, 2008). At the core of ACT's philosophy is that most psychological problems stem from experiential avoidance (attempting to avoid aversive experiences); hence, therapy teaches the individual that their thoughts, body sensations and emotions are separate, therefore need not be avoided (Bach & Moran). Specifically, observing and accepting all of one's experiences with a nonjudgmental attitude, rather than trying to assert control over them, allows for greater flexibility and understanding of what is more often at the root of maladaptive thinking (Baer, 2003).

Dialectical behavioural therapy

DBT (Linehan, 1984) is a multifaceted evidence-based behavioral therapy designed originally for chronically parasuicidal individuals diagnosed with borderline personality disorder (BPD). It is very specific in its treatment targets, combining specific problem-orientated behavioural and cognitive strategies, such as behavioural skill training, exposure to emotional cues, interpersonal and emotion regulation skills, cognitive modification, distress

tolerance skills, mindfulness and acceptance, and contingency management (Linehan, Armstrong, Suarez, Allmon, & Heard, 1991). Treatment typically involves weekly individual and group therapy sessions that run concurrently over a one year period (Dimeff & Koerner, 2007). DBT is also suitable for treating disorders that commonly co-occur with BPD, such as, depression, substance use and dependence disorders, binge eating disorder, and bulimia nervosa (Dimeff & Koerner).

Mindfulness-based relapse prevention

Marlatt and Gordon (1985) originally developed relapse prevention (RP), a cognitive-behavioural treatment, for individuals with substance addiction disorders (i.e., the misuse of psychoactive drugs and alcohol). Recent empirical evidence also supports its efficacy for treating depression, anxiety disorders, bipolar disorder, gambling, sexual offending, schizophrenia, and obesity (Witkiewitz & Marlatt, 2004). Whereas traditional RP focuses on challenging dysfunctional thoughts and behaviours (Marlatt & Gordon, 1985), MBRP attempts to alter the relationship one has with one's thoughts by fostering acceptance and mindful compassion toward oneself and one's behaviours (Marlatt, 2002). Mindfulness skills and meditation practice are two components taught during the intervention to help individuals cope with urges, cues, and automatic thoughts that are associated with maladaptive behaviours stemming from their addictions (Witkiewitz, Marlatt, & Walker, 2005). Assessment of potential interpersonal, intrapersonal, environmental and physiological risks and triggers for relapse are identified with the aim of reducing the occurrence of relapse episodes (Witkiewitz et al.).

As mentioned earlier, Table 1.1 provides a summary of empirical studies that have successfully incorporated mindfulness techniques into Western psychotherapy interventions (specifically, the five mindfulness-based interventions discussed above), for treating a wide range of both psychological and medical conditions.

Table 1.1

A summary of empirical research studies that have investigated mindfulness and its use in treating both psychological and medical conditions

Study condition	Study	Sample size	Outcome	Intervention/assessment
Psychological disorders				
Depression	Teasdale et al. (2000)	145	The rate of depressive relapse halved in patients who had three or more previous depressive episodes over a 1-year follow up	MBSR
	Ma & Teasdale (2004)	75	Significantly fewer relapse episodes of depression over a 1-year follow up period compared to a control group (36% vs. 78% relapse)	MBCT
Anxiety	Kabat-Zinn et al. (1992)	22	Significant reductions in anxiety, panic symptoms, and depression post intervention and at a 3-month follow-up	MBSR
	Miller et al. (1995)	22	Statistically and clinically significant improvements in anxiety, depression, and panic, and maintenance in reductions in anxiety and in general psychological distress at a 3-year follow-up	MBSR
Stress and emotional distress	Astin (1997)	28	Significant improvements in overall psychological symptomatology, such as depression, anxiety, obsessive-compulsive, somatisation, interpersonal sensitivity, psychoticism, paranoid ideation, and overall, domain-specific sense of control	MBSR
	Speca et al. (2000)	90	Significant reductions in mood disturbance and stress-related symptoms such as, depression, irritability, fatigue, anxiety, anger,	MBSR

Eating disorders	Kristeller & Hallett (1999)	18	and confusion Significant decreases in bingeing frequency and intensity, and on measures of depression and anxiety. Improvements in attitudes towards eating and control over eating, and increases in mindfulness	MBSR (adapted)
	Telch et al. (2001)	44	89% of participants had stopped binge eating, compared to 12.5% of controls. Reduced concerns about weight, shape, and eating patterns, and reductions in urges to eat when feeling angry. Improvements largely maintained at 6-month follow up	DBT
Personality disorders	Linehan et al. (1994)	26	Significant improvements in both general and interpersonal adjustment (such as anger and social adjustment) in participants with borderline personality disorder	DBT
	Low et al. (2001)	10	Reductions in deliberate self-harm, dissociative experiences, depression, impulsiveness and suicidal ideation, and an increase in survival and coping beliefs	DBT
Substance use disorders	Bowen et al. (2009)	168	Significantly lower rates of substance use over the 4-month post-intervention period compared to controls. Improvements in cravings, awareness, and acceptance, and consistent homework compliance, attendance, and participant satisfaction	MBRP
	Davis et al. (2007)	18	At a 6-week follow-up, 10 of 18 subjects (56%) achieved smoking abstinence. Compliance with meditation was positively	MBSR

Parasuicidal behaviour	Katz et al. (2004)	62	associated with smoking abstinence and decreases in stress and affective distress Significant reductions in behavioural incidents as an inpatient and reduced self-harm, depressive symptoms, and suicidal ideation at a 1-year follow up	DBT
	Linehan et al. (1991)	22	Significant reductions in the frequency and medical risk of parasuicidal behaviour over a 1-year period	DBT
Attention-deficit/hyperactivity disorders	Zylowska et al. (2008)	32	Significant improvements in self-reported ADHD symptoms (i.e., inattentiveness, hyperactivity, set-shifting, anxiety, and depression) and test performance on set shifting, attention, and cognitive inhibition	MBSR adapted to ADHD
	Smalley et al. (2009)	105	Individuals with ADHD report themselves as less mindful than non-ADHD controls and more novelty-seeking, less self-directed, and more self-transcendent	Empirical scales assessing mindfulness and personality
Medical conditions				
Cancer	Carlson et al. (2001)	89	Significantly less tension, depression, anger, stress, neurological problems, gastrointestinal symptoms, anxiety, fear, and emotional instability compared to controls	MBSR
	Bränström et al. (2010)	71	Greater decrease in perceived stress, posttraumatic stress symptoms, and increased positive states of mind when compared with a control group	MBSR
Chronic illness and pain	Kabat-Zinn (1982)	51	Significant reductions in pain, in the number of medical symptoms	MBSR

	McCracken et al. (2005)	108	reported, mood disturbance, and psychiatric symptoms Significant improvements in emotional, social, and physical functioning, and decreases in health care use. Improvements still seen at a 3-month follow up	ACT
Coronary disease	Sullivan et al. (2009)	208	Significant reductions in depression and anxiety, and improvements in overall quality of life when compared to controls	MBSR
	Tacon et al. (2003)	18	Greater reductions in anxiety and negative emotions, less use of reactive coping styles, and better emotional regulation than controls	MBSR
Sleep disorders	Heidenreich et al. (2006)	16	Increases in total sleep time and quality, and decreases in dysfunctional thoughts, such as worry and social control	MBCT
	Ong et al. (2008)	30	Statistically and clinically significant improvements in several nighttime symptoms of insomnia as well as reductions in pre-sleep arousal, sleep effort, and dysfunctional sleep-related cognitions	MBSR
Fibromyalgia	Kaplan et al. (1993)	77	Significant improvement in wellbeing, pain, fatigue, sleep, coping, and fibromyalgia symptoms	MBSR
	Grossman et al. (2007)	58	General improvements in wellbeing (i.e., pain perception, coping with pain, anxiety, depression, and somatic complaints) that were largely sustained 3 years postintervention	MBSR
Burnout	Cohen-Katz et al. (2005)	27	Significant reductions in emotional exhaustion and depersonalisation, and improvements in sense of	MBSR

	May and O'Donovan (2007)	58	personal accomplishment at a 3-month follow up. Increases in mindfulness postintervention	Empirical scales assessing mindfulness, burnout, wellbeing, and job satisfaction
Diabetes	Rosenszweig et al. (2007)	14	High scores in mindfulness was significantly associated with cognitive and affective wellbeing, satisfaction at work, and lower experiences of emotional exhaustion and burnout	MBSR
	Gregg et al. (2007)	81	Improved glycemic regulation and control at a 3-month follow up, plus significant decreases in depression, anxiety, and general psychological distress associated with type 2 diabetes	ACT
			Significant improvements in patient reported self-management and coping, and in diabetes-related acceptance at a 3-month follow up	

Note. MBSR = mindfulness-based stress reduction; MBCT = mindfulness-based cognitive therapy; DBT = dialectical behaviour therapy; MBRP = mindfulness-based relapse prevention; ACT = acceptance and commitment therapy.

Purpose of the Present Research

The present chapter thus far, demonstrates how complex defining and operationalising the construct of mindfulness is from a Western psychological perspective. Rather than make a further attempt at creating a working definition of the mindfulness phenomenon, the present thesis has other objectives. The first area of interest of the current research concerns the measurement of mindfulness, and the tools that exist with which to quantify the construct. Empirically supported psychometric measures provide researchers with tools with which to examine the effects of various treatment interventions. They also provide a way in which to scientifically investigate naturally occurring traits and constructs, such as an individual's propensity to behave mindfully, or to be happy or depressed in daily life. To date, however, methods for assessing mindfulness have received little attention in psychological research (Baer et al., 2006). The last decade has seen the development of a number of self-report measures of mindfulness², though it is only through continual statistical examination of these scales that researchers can assess their validity and reliability. For example, with every administration of a psychometric instrument, it is assumed that it will function in an equivalent manner, though according to some researchers, this assumption is rarely tested (Byrne & van de Vijver, 2010; Cheung & Rensvold, 2002; Milfont & Fischer, 2010; Vandenberg & Lance, 2000).

With this assumption in mind, the first objective of the present research is to empirically test two measures of trait mindfulness – the Five-Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2006) and the Trait Toronto Mindfulness Scale (Trait TMS; Davis et al., 2009). Rigorous examination using sophisticated statistical techniques allows the researcher to confirm whether the tools used to measure a variable of interest are appropriate and reliable (Byrne & van de Vijver, 2010). Despite the importance of such validation, the empirical assessment of mindfulness is still in its infancy; hence, by statistically assessing and comparing two current scales that are proposed to capture trait mindfulness, the present research aims to contribute to the existing body of mindfulness literature.

The second aim of this research is to explore whether an individual's natural tendency to be mindful in daily life predicts various psychological constructs such as happiness,

² For example, the Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003); the Freiburg Mindfulness Inventory (FMI; Buchheld, Grossman, & Walach, 2001); the Toronto Mindfulness Scale (TMS; Lau et al., 2006); the Kentucky Inventory of Mindfulness Skills (KIMS; Baer, Smith, & Allen, 2004); the Cognitive and Affective Mindfulness Scale (CAMS; Feldman, Hayes, Kumar, Greeson, & Laurenceau, 2007); and the Southampton Mindfulness Questionnaire (SMQ; Chadwick, Hember, Symes, Peters, Kuipers, & Dagnan, 2008).

depression, and life satisfaction. As previously mentioned, extant mindfulness literature has largely focused on outcomes that are associated with mindfulness-based interventions, such as the ones discussed previously, and there is a rapidly expanding body of empirical evidence supporting the efficacy of these interventions (as is evidenced in Table 1.1).

However, according to some researchers (Baer, 2011; Brown & Ryan, 2003; Kabat-Zinn, 1990), even in the absence of formal mindfulness training, mindfulness (and mindlessness) is an inherent human capacity that varies between individuals. In employing several comprehensive and robust statistical techniques, the current research will explore how dispositional, or naturally occurring, mindfulness and various psychological outcomes are interrelated. Psychology has traditionally focussed on the amelioration of psychopathology (Sharma, 2006), and it is only recently, with the emergence of positive psychological research, that the enhancement of physical and mental wellbeing is being explored. As limited research currently exists that investigates trait mindfulness and its influence on other psychological life domains (both positive and negative), the present thesis aims to directly address this gap in knowledge.

The final objective of the current thesis is to compare two groups' psychological functioning across time, namely, individuals with and without meditation experience. Although the merits of meditation practice on health and mental wellbeing are widely accepted and documented (Grossman, Niemann, Schmidt & Walach, 2004; Kornfield, 1993; Sharma, 2006; Wallace, 2005; Walsh & Shapiro, 2006), sound empirical examination into its effect is sparse. For example, growing evidence suggests that long-term meditators report less cognitive anxiety, are more highly attuned to their emotional states (hence, cultivate a higher degree of mindfulness), and respond to situations more calmly and reflectively, and less impulsively, than nonmeditators (Baer, 2003; Sharma; Wayment et al., 2010). However, according to a meta-analysis by Ospina et al. (2007), scientific research on meditation practices to date has largely been flawed by poor methodological quality.

Ospina and colleagues' research reported that out of 286 intervention studies published between 1956 and 2005 that involved a meditation intervention, only 14% ($n = 40$) were considered of high methodological quality. The main concerns to emerge from Ospina et al.'s (2007) meta-analysis were inappropriate and unreliable randomisation methods, lack of control groups, inadequate double blinding procedures, meditation practices not described, and inappropriate concealment of treatment group allocation. Ospina and colleagues concluded that in order to draw firm conclusions into the efficacy of meditation practice, future research needs to be much more rigorous in design and analysis, and reporting of

results must be executed correctly. The current thesis will examine group mean differences in mindfulness, and in both positive and negative psychological outcomes (such as happiness, life satisfaction, depression, and anxiety), to explore whether meditation experience increases (or decreases) an individual's ability to behave adaptively in daily life circumstances.

Overview of Studies

Across a series of three studies, this thesis will explore the naturally occurring construct of trait mindfulness. Study 1 is described in the following chapter (Chapter 2) and aims to address two primary objectives. The first objective begins with a psychometric analysis of the Five-Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2006). Specifically, in a non-meditating sample of university students, I sought to confirm using confirmatory factor analysis (CFA) the factor structure of the FFMQ. Baer and colleagues propose that mindfulness should be operationalised into five distinct categories that sit under an overarching mindfulness construct. These five factors are labelled as Observing, Nonreacting, Describing, Acting with Awareness, and Nonjudging. If the five proposed factors in this measure function as the authors proclaim and are replicated in this sample, it would show that each of the five factors measure different elements, or facets, of mindfulness, supporting the FFMQ's reliability and validity.

In the second objective, I measured the same sample groups' tendency to be mindful in daily life across five domains (i.e., the five factors of the FFMQ), and examined how this tendency relates to both positive and negative psychological outcomes. In support of the general consensus that mindfulness is associated with enhancing mental and physical wellbeing, and negatively associated with psychopathology (as discussed prior), it was first predicted that all five mindfulness factors would be negatively related to the negative outcomes of depression, anxiety, rumination, maladaptive coping, and negative life events intensity. Furthermore, it was expected that mindfulness factor scores would be positively associated with the positive outcomes of subjective happiness, life satisfaction, adaptive coping strategies, and positive life events intensity.

With three specific objectives, Study 2 (described in Chapter 3), provides a comprehensive psychometric analysis of two measures designed to assess trait mindfulness. In the first objective, a large cross-sectional community sample was recruited to confirm the factor structure of both the FFMQ (Baer et al., 2006) and the Trait Toronto Mindfulness Scale (Trait TMS; Davis et al., 2009) across three points in time. The authors of the Trait TMS propose a 2-factor structure to their scale, the first being Curiosity and the second being Decentering. If these two mindfulness scales operate as they are proposed to across time,

results of this study will strongly support their use in future mindfulness research. In the second objective, using structural equation modeling (SEM) techniques, I explore measurement invariance on the same longitudinal data (and also compare participants with and without experience in meditation across time) to assess whether scale scores of the two mindfulness measures perform equivalently across time.

Study 2's third objective investigates the relationships between these two scales, which were designed to measure the same construct. The FFMQ (Baer et al., 2006) and the Trait TMS (Davis et al., 2009) seem to assess different facets (or components) of mindfulness, which allows for a more robust investigation into the construct they measure. Therefore, confirmatory factor analytic techniques will be employed to examine whether there is any overlap (testing for convergent validity) between the FFMQ and Trait TMS, or if they are in fact measuring different aspects of mindfulness altogether. As both measures are tapping into the mindfulness construct (specifically, trait mindfulness), it is reasonable to expect that all five factors of the FFMQ will be positively correlated with the two factors of the Trait TMS to a moderate extent.

Described in Chapter 4, Study 3 examines the relationships between facets of mindfulness and psychological outcomes in a similar way to Study 1, though it extends the first study by comparing two groups longitudinally. Using the same sample as described in Study 2, Study 3 aims to address three primary objectives. The first, is to explore whether individual trait mindfulness is positively predictive of positive psychological outcomes (such as happiness, life satisfaction, and savouring), and negatively predictive of negative outcomes (such as, depression, anxiety, and negative affect) across three separate time points, three months apart. The second goal examines group differences in the psychological constructs mentioned above, between individuals with and without meditation experience. Due to extant literature mentioned previously, the expectation is that meditation experience may act as a protective factor against the development of some psychological conditions (negative outcomes), whilst enhancing wellbeing (positive outcomes).

In Study 3's final objective, latent growth curve modeling (LGCM) techniques will compare growth patterns across time between the two sample groups (individuals with and without meditation experience). In particular, the third goal of this thesis' final study investigates whether the developmental trajectory of a particular psychological construct (e.g., mindfulness), is predictive of the developmental trajectory of other constructs (e.g., positive outcomes), over time. More specifically, this final objective investigates whether dispositional mindfulness scores change over time (i.e., do mindfulness scores at baseline

assessment increase, decrease, or remain the same at follow-up assessments), and second, whether or not group membership (i.e., meditators versus nonmeditators) is associated with change in the relationships of these psychological constructs over time. Chapter 5 concludes this thesis by discussing the major findings from this series of studies. Theoretical implications for future psychological research into mindfulness, and limitations of the current research will be considered.

CHAPTER 2

Examining the Factor Structure of the FFMQ and the Relationships between Psychological Outcomes

Whilst Chapter 1 introduced the theoretical underpinnings and provided a conceptual overview of mindfulness, the present chapter examines how mindfulness and psychological outcomes are interrelated in a sample of university students. There are two main objectives of the current study. First, I sought to confirm using confirmatory factor analysis (CFA) the factor structure of Baer et al.'s (2006) measure of trait mindfulness – the Five-Facet Mindfulness Questionnaire. Second, I examined the relationships between factors of mindfulness and both positive and negative psychological outcomes such as depression, anxiety, happiness, and life satisfaction. Let us consider the issue of factor structure for the mindfulness construct first.

As the previous chapter discussed, disagreement on how mindfulness should be operationalised seems the rule rather than the exception. One area of debate is whether the construct should be viewed as multifaceted, or simply as one construct. Segal et al. (2002) suggest there are at least several elements to mindfulness, including acceptance and observation of present-moment experience. Similarly, Dimidjian and Linehan (2003) suggest there are six distinct factors of mindfulness, each related to what one does when being mindful, and how one goes about it. In contrast, Brown and Ryan (2004) and Brown et al. (2007), argue that mindfulness merely consists of a single factor, and that factor involves having awareness and paying attention to the present moment.

The authors of the FFMQ propose that mindfulness should be operationalised into five distinct categories that sit under an overarching mindfulness construct (Baer et al., 2006). As mentioned previously, these five factors are labelled as Observing, Nonreacting, Describing, Acting with Awareness, and Nonjudging. The Observing factor, as described by Baer and colleagues, is to notice internal and external experiences, such as sights, sounds, thoughts, emotions, and sensations. The Nonreacting to internal experiences factor is characterised by the allowing of thoughts and feelings to come and go without being carried away with them. The Describing factor refers to labelling internal experiences with words. Acting with Awareness describes attending to the moment at hand, whatever that activity or experience may be. And the final factor, Nonjudging of internal experiences, refers to taking a nonevaluative attitude toward one's thoughts and feelings (Baer et al., 2006).

The FFMQ was the measure chosen for the current study due to its broad-based psychometric design, making it a seemingly good candidate to represent mindfulness. Baer and colleagues (2006) examined the factor structure of mindfulness using five recently developed mindfulness questionnaires³. Psychometric properties of these questionnaires have been explored, including internal consistency, incremental validity, and convergent and discriminant correlations (Baer et al.). On a sample of 613 individuals, exploratory factor analysis (EFA) on the combined pool of items from all five questionnaires led Baer et al. (2006) to conclude that: a) mindfulness is a multifaceted construct, rather than a single factor, and b) the construct of mindfulness can be understood and interpreted within five distinct factors. Only items with the highest loadings on their respective factor (eight items on average per factor), derived from an EFA were included in the final FFMQ. Hierarchical confirmatory factor analysis (CFA) on an independent sample of 268 participants confirmed that the same five factors emerged (Baer et al., 2006).

A further strength of the FFMQ is that each of the five factors measure different elements of mindfulness. This means that data are able to be examined more rigorously at the factor (facet) level. Research suggests that in order to distinguish relationships between complex constructs and other variables, measurement at the factor level is preferred, as composite total scores can distort or obscure a given relationship (Smith, Fischer, & Fister, 2003; Smith & McCarthy, 1995). This approach is important when assessing treatment or therapy efficacy for psychological symptoms, as improvement or symptom reduction is able to be associated with a specific factor or set of factors (Baer et al., 2006). Furthermore, analysis at the factor level is also important for examining discriminant validity within an assessment measure (Smith et al., 2003). For example, to analyse all specified factors separately means we can reliably assess which factor is significantly related to the dependent variable and which ones are not (Smith et al.).

The second goal of the current study was to explore the associations between mindfulness and both positive and negative psychological outcomes, i.e., to explore construct validity. As previously discussed, much interest is emerging on the benefits of mindfulness for psychological health and wellbeing, and for physical health conditions. A strong body of empirical research supports mindfulness as a promising treatment for reducing depressive symptoms, anxiety and rumination (Baer et al., 2004, 2006, 2008; Jain et al., 2007; Weiss,

³ These five questionnaires were the Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003); the Freiburg Mindfulness Inventory (FMI; Buchheld et al., 2001); the Kentucky Inventory of Mindfulness Skills (KIMS; Baer et al., 2004); the Cognitive and Affective Mindfulness Scale (CAMS; Feldman et al., 2007); and the Southampton Mindfulness Questionnaire (SMQ; Chadwick et al., 2008).

Nordlie, & Siegel, 2005), decreasing binge eating frequency (Kristeller & Hallett, 1999), reducing the use of addictive substances (Bowen et al., 2009), and reducing the recurrence of suicidal behaviour (Katz et al., 2004; Williams, Duggan, Crane, & Fennell., 2006).

A meta-analysis on 64 empirical studies by Grossmann et al. (2004) investigated health-related benefits when mindfulness meditation was the central component of the treatment intervention. Medical and psychological conditions, such as depression, anxiety, obesity, eating disorders and cancer diagnoses were explored (Grossman et al.). The health-related benefits examined were both physical and mental in nature, and included claims regarding improvements in quality of life, self-efficacy and control, and enhanced emotional coping in times of chronic illness and stress (Grossman et al., 2004). Results of this meta-analysis revealed consistent significant medium strength effect sizes ($d = 0.54$) across the different types of samples, leading Grossman and colleagues to conclude that mindfulness training may significantly enhance coping with distress and disability in everyday life. These findings add weight to the explosion in research supporting the basic hypothesis that mindfulness can reduce distress in individuals with a variety of medical and psychiatric conditions⁴.

Although over the past three decades research on mindfulness treatment for reducing psychological symptoms in clinical populations has proliferated, research investigating the enhancement of positive psychological outcomes from mindfulness is less prevalent. In the Buddhist tradition where mindfulness practices originate, it is believed that mindfulness skills are cultivated from long-term practices in meditation (Kabat-Zinn, 2003). It is also widely accepted in both Eastern philosophy and Western psychology that meditation practice can promote psychological wellbeing (HH Dalai Lama & Cutler, 1998; Kabat-Zinn, 1990; Walsh & Shapiro, 2006). Several encouraging preliminary studies to recently emerge show how mindfulness can facilitate social and emotional functioning (Roth & Robins, 2004), enhance feelings of wellbeing and life satisfaction (Shapiro, Oman, Thoresen, Plante, & Flinders, 2008), and increase positive mood states (Carlson, Ursuliak, Goodey, Angen, & Specia, 2001; Chang et al., 2004; Jain et al., 2007).

Shapiro and colleagues, for example, explored whether gains in mindfulness through meditation-based interventions can lead to improved wellbeing in college undergraduates. Intervention techniques involved mindful sitting meditation (being aware of body sensations, thoughts, and emotions, whilst focusing on one's breathing), mindful movement (stretches

⁴ See other reviews by Baer (2003) and Bishop (2002).

and postures to enhance the awareness of the musculoskeletal system), and cultivating mindfulness into daily life via mindful eating, a mindful work environment, and how to cope more effectively with daily stress (Shapiro et al., 2008). Mindfulness was assessed at three time points (pretest, posttest, and an 8-week follow up), with results showing: a) an increase in mindfulness across time, b) mindfulness significantly mediating reductions in perceived stress and rumination, and c) that measures of adherence to practice, independently predicted positive outcomes, i.e., increased practice leads to increases in positive outcomes. Shapiro and colleagues thus concluded that increasing mindfulness through practicing mindful techniques may be a significant mediating factor affecting positive psychological outcomes and wellbeing.

Similar research by Jain et al. (2007) employed a shorter version of Kabat-Zinn's (1982) mindfulness-based stress reduction (MBSR) programme to explore whether mindfulness predicts positive mood states in a sample self-identified as being highly stressed. Results revealed that after a one-month mindfulness intervention, positive mood states significantly increased across time, and effect sizes were larger than medium ($d = .71$), whereas the effect size for the control group was virtually zero ($d = -.03$) (Jain et al.). Furthermore, results suggested a trend for practice effects on positive states of mind, such that increased practice in mindfulness techniques were associated with increases in positive mood states (Jain et al., 2007).

It is therefore intuitive to think that positive emotions are both indicators of general wellbeing, and causes of it. Noted psychologist Barbara Fredrickson's (1998) pioneering research provides considerable support for this view. Consequently, time spent investigating ways in which to increase positive emotions seems warranted. Barbara Fredrickson is a social psychologist who conducts research in the area of emotion and positive psychology. Her research claims that many positive emotions broaden individuals' thought-action repertoires, resulting in the pursuit of a wider range of thoughts and actions than before (Fredrickson, Mancuso, Branigan, & Tugade, 2000). This process is helpful according to Fredrickson and colleagues, as these repertoires can build a variety of enduring personal resources, such as physical, social, and intellectual resources, that help undo the after-effects of negative emotions.

To my knowledge, there has only been one quantitative review published (see Sin & Lyubomirsky, 2009) investigating how positive emotions can be increased through mindfulness techniques. It is important to note that in this review the participants all had clinical and health issues, such as traumatic brain injury, rheumatoid arthritis, and

fibromyalgia. In order to explore the potential benefits mindfulness has on a nonclinical sample, solid empirical evidence is necessary in order to advance beyond merely anecdotal and clinical observations. Thus, the current study not only aims to contribute to the body of work accrued over the past 30 years showing mindfulness to be negatively associated with psychological symptoms, but it also intends to explore whether mindfulness is predictive of constructs such as happiness and life satisfaction in a nonclinical population, addressing a current gap in the literature.

Although scientific research suggests that global mindfulness is related to both positive and negative psychological outcomes, there is currently a paucity of research examining the relationship between individual mindfulness facets (i.e., factors of mindfulness) and psychological outcomes. Using global mindfulness measures to assess construct validity is problematic, because if global mindfulness correlates with another measure (e.g., happiness), one cannot know which component of mindfulness accounts for the covariation (Strauss & Smith, 2009). To build an understanding of the relationship between individual mindfulness factors and other measures requires assessment at the factor level. According to Strauss and Smith, the construct validity of a measure and of a theory accrues over time on the basis of many studies, so replication of empirical research is crucial for theory development and validation. The present study therefore aimed to address this gap in knowledge by objectively examining the relationships between psychological outcomes and different factors of mindfulness.

In regards to specific predictions for the current study, it is important to revisit Baer et al.'s (2006, 2008) findings, as I drew on these studies to formulate my hypotheses. Recall that Baer and colleagues (2006) designed the FFMQ, the instrument employed in the current study, to measure mindfulness globally as well as at the factor level. These authors predicted negative correlations between psychological maladjustment, such as depression, anxiety, somatisation, and hostility, and global mindfulness scores. Their predictions were largely supported: specifically, four factors (Acting with Awareness, Nonreacting, Describing, and Nonjudging) were significantly related to psychological maladjustment, with the Nonjudging factor being most strongly correlated. Further regression analyses revealed that three of the five factors (Acting with Awareness, Nonjudging, and Nonreacting), were significant predictors of psychological maladjustment. The Observing factor was found to be related to psychological maladjustment in a sample having some exposure to meditation experience.

Similarly, in their subsequent study, Baer et al. (2008) found that four out of five factors (again, all but Observing) were negatively associated with psychological

maladjustment in a general sample. However, in a separate meditating sample, all five factors (including Observing) showed a negative relationship with psychological maladjustment. The Nonjudging factor was again seen to be most strongly associated with psychological maladjustment, consistent with Baer et al.'s (2006) findings. Baer et al. (2008) further found that four out of five factors (all but Observing) were positively associated to psychological wellbeing, with the Nonjudging factor being the strongest predictor. In a meditating sample, however, all five factors were positively associated with psychological wellbeing, a similar trend to what was seen when analysing psychological maladjustment. Both Baer et al. (2006) and Baer et al. (2008) concluded that the Observing factor's relationship with other variables may change as a function of meditation experience, which appears not to be the case for the other four factors.

In the present study, I measured the tendency of a group of nonmeditating university students to be mindful in daily life across five domains (i.e., the five factors of the FFMQ), then examined how this tendency relates to both positive and negative psychological outcomes. First, consistent with previous research (Baer et al., 2006, 2008), it was predicted that all five mindfulness factors would be negatively related to the negative outcomes of depression, anxiety, rumination, maladaptive coping, and negative life events intensity. This study aims to add to Baer and colleagues' findings by investigating negative constructs not previously explored. If a mindful state allows an individual to experience negative emotions and thoughts without fixating on them and being adversely affected by them (Baer et al., 2006), then it is plausible to expect that the effects of mindfulness will generalise to other similar negative constructs. Rather than an individual automatically (and adversely) reacting to negative emotions experienced, a mindful person might be seen to exhibit a flexibility that allows him or her to act with intention and reflection, rather than automaticity (Fink, Foran, Seeney, & O'Hea, 2009), a concept previously discussed in Chapter 1.

Second, based on previous findings (Baer et al., 2006, 2008), it was predicted that the factor of Nonjudging would be more strongly associated with negative outcomes than Nonreacting, Observing, Acting with Awareness, and Describing would be. Recall the Nonjudging factor reflects a nonevaluative stance toward thoughts and emotions and the acceptance of inner experience. If this factor functions as Baer et al. (2006) claims, then one might also expect it to be more strongly associated with a different cluster of negative outcomes.

The third prediction was that, in general, mindfulness factor scores would be positively associated with the positive outcomes of subjective happiness, life satisfaction,

adaptive coping strategies, and positive life events intensity. As previously discussed, Baer et al. (2008) found that mindfulness was positively associated with psychological wellbeing. Specifically, six elements of psychological wellbeing were assessed, including self-acceptance, positive relations with others, autonomy, environmental mastery, purpose in life, and personal growth. The current study aims to add to Baer et al.'s research by assessing a new cluster of positive psychological outcomes. As prior research (Jain et al., 2007; Shapiro et al., 2008) suggests that mindfulness can enhance positive affect and wellbeing, it is relevant to predict that individuals high in global mindfulness would report higher scores on positive outcome measures than individuals low in global mindfulness.

Finally, a research question was posed concerning whether a particular factor of mindfulness would be comparatively more strongly related to positive outcomes than others. Baer et al. (2008) found all factors except Observing were significant predictors of psychological wellbeing in a nonmeditating sample. The Nonjudging factor was only marginally more strongly predictive of psychological wellbeing than Nonreacting, Acting with Awareness, and Describing. The same pattern could be found in the present study, however, to my knowledge no other previous research has explored this question. The current study therefore aims to build on, and add to Baer et al.'s (2008) observations.

Method

Participants

A sample of 103 individuals participated in this study, of which 60% were female. The mean age for the sample was 21 years with a range from 18 to 46 years. Seventy eight percent of the participants was European New Zealand, 3% was New Zealand Maori, 1% was Pacific Islanders, 6 % was Asian, and 11% classified their ethnicity as "Other". The majority of participants were introductory psychology students at Victoria University of Wellington, New Zealand, who volunteered to participate in the study as part of a mandatory course requirement. The remaining participants were recruited through leaflets posted around Victoria University of Wellington's Kelburn Campus, and they were compensated for their participation with movie vouchers.

Procedure

Prior to data collection, the study's ethics application was approved by the School of Psychology's Human Ethics Committee at Victoria University of Wellington, New Zealand. Participants were invited to complete an internet-based survey via the on-line computer software programme SurveyMonkey. The survey included a range of measures such as demographics (age, sex, nationality, ethnicity), questionnaires that examined emotion

regulation functioning (i.e., depression, anxiety, rumination, mindfulness), and measures investigating emotionally-charged life events and reactions to them (i.e., positive/negative life events, coping strategies, savouring). A briefing page stating the general aims of the study and the anticipated use of the data was presented to the participants at the outset. The survey took participants approximately 45 minutes to complete.

Measures

Mindfulness⁵. All participants completed a shortened version of the Five-Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2006). This questionnaire measures five factors of a general tendency to be mindful in daily life: Observing, Describing, Acting with Awareness, Nonjudging of inner experience, and Nonreacting to inner experience. Each of these factors measures distinct skills inherent in the concept of mindfulness. The FFMQ is normally a 39-item measure rated on a 5-point Likert scale. However, for the purpose of this study, the scale was shortened to 15 items due to the large number of other measures participants needed to complete (the three highest-loading items for each of the five factors obtained from Baer et al., 2008, were used – see Table 2.1).⁶ In addition, to increase the scale's sensitivity, a 7-point Likert scale was employed, with 1 being “never or very rarely true” and 7 being “very often or always true”. Scale items included “In difficult situations, I can pause without immediately reacting” (Nonreacting); “I pay attention to sounds, such as clocks ticking, birds chirping, or cars passing” (Observing); “I drive on automatic pilot without paying attention to what I’m doing” (Acting with Awareness – negatively loaded in this example); “I can usually describe how I feel at the moment in considerable detail” (Describing); and “I criticise myself for having irrational or inappropriate emotions” (Nonjudging – negatively loaded in this example). The overall scale exhibited satisfactory internal reliability ($\alpha = .70$).

⁵ See Appendix A for the Five-Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2006).

⁶ Furthermore, it was of interest to see if the FFMQ can indeed be shortened without any adverse effects on its factor structure. A 39-item measure in itself is considered relatively long, so shortening the measure allows us to assess whether it is still a valid and reliable measure in which to assess trait mindfulness with.

Table 2.1

The Shortened 15-item Scale to Measure Mindfulness taken from the full FFMQ

Factor 1: Nonreacting

Item 1. I perceive my feelings and emotions without having to react to them

Item 2. In difficult situations, I can pause without immediately reacting

Item 3. When I have distressing thoughts or images, I just notice them and let them go

Factor 2: Observing

Item 4. When I take a shower or a bath, I stay alert to the sensations of water on my body

Item 5. I notice how foods and drinks affect my thoughts, bodily sensations, and emotions

Item 6. I pay attention to sounds, such as clocks ticking, birds chirping, or cars passing

Factor 3: Acting with Awareness

Item 7*. I find it difficult to stay focussed on what's happening in the present

Item 8*. It seems I am "running on automatic" without much awareness of what I'm doing

Item 9*. I don't pay attention to what I'm doing because I'm daydreaming, worrying, or otherwise distracted

Factor 4: Describing

Item 10. I'm good at finding words to describe my feelings

Item 11*. I have trouble thinking of the right words to express how I feel about things

Item 12. I can usually describe how I feel at the moment in considerable detail

Factor 5: Nonjudging

Item 13*. I criticize myself for having irrational or inappropriate emotions

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

Item 15*. Usually when I have distressing thoughts or images, I judge myself as good or bad, depending what the thought/image is about

Note. *Reverse-scored items.

Depression⁷. Participants completed a shortened version (12 items) of the Beck Depression Inventory-11 (BDI-11; Beck, Steer, & Brown, 1996). This measure assesses the severity of common symptoms of depression, such as hopelessness, irritability, guilt, weight loss, and fatigue. Each question has a set of four possible answer choices which range in intensity. Individuals are required to indicate which statement best describes the way they have felt over the past two weeks. For example, "I do not feel sad"; "I feel sad much of the time"; "I am sad all the time"; and "I am so sad or unhappy that I can't stand it". Items are scored on a 4-point Likert scale (0 = no symptoms to 3 = severe symptoms), with higher scores indicating higher levels of depressed mood. Previous research (e.g., Beck et al., 1996) has demonstrated excellent reliability and validity of this scale. This scale showed high internal reliability ($\alpha = .84$) in the present data collection.

Anxiety⁸. To measure anxiety, participants completed a shortened version (20 items) of the State-Trait Anxiety Scale – Form Y (STAI-Y; Spielberger, 1983). The STAI-Y differentiates between the temporary and emotional condition of 'state anxiety' (STAI S-

⁷ See Appendix B for the Beck Depression Inventory (BDI; Beck et al., 1996).

⁸ See Appendix C for the State-Trait Anxiety Scale-Form Y (STAI-Y; Spielberger, 1983).

Anxiety) and the more general and long-standing quality of ‘trait anxiety’ (STAI T-Anxiety), as well as the ability to distinguish between anxiety and depressive symptoms in an individual (Spielberger, 1983). Persons high on STAI S-Anxiety are characterised by subjective feelings of tension and apprehension that vary in intensity depending on the amount of stress perceived by an individual, whereas, persons high on STAI T-Anxiety tend to perceive a larger number of situations as dangerous or threatening than persons who are low on STAI T-Anxiety (Spielberger, 1983). Responses are rated on a 4-point Likert scale (1 = almost never to 4 = almost always). Items included “I am content” (reverse-coded) and “I feel that difficulties are piling up so that I cannot overcome them”. This scale exhibited excellent internal reliability ($\alpha = .93$).

Rumination⁹. Participants completed a shortened version (11 items) of the ruminative response subscale from the Response Styles Questionnaire (RSQ; Nolen-Hoeksema, Morrow, & Fredrickson, 1993). The RSQ includes items describing responses to depressed mood that are focused on self (e.g., “I think back to other times I have been depressed”), focused on symptoms (e.g., “I think about how hard it is to concentrate”), or focused on the possible consequences and causes of their mood (e.g., “I go away by myself and think about why I feel this way”) (Nolen-Hoeksema et al.). Responses are given on a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree) with higher scores indicating higher levels of ruminative coping. In this sample, high internal reliability for this scale was found ($\alpha = .88$).

Negative Life Events¹⁰. Intensity of negative life event stress was measured using a 26-item scale constructed for the purposes of this study and modelled on the Everyday Life Events Scale (Jose, Cafasso, & D’Anna, 1994). Participants were presented with a list of common negative life events, and they were first asked to indicate whether these particular events had happened to them over the past two weeks. If the respondent indicated that a particular event had happened, then they were asked to rate on a 4-point Likert scale (1 = none, 2 = a little, 3 = some, 4 = a lot) how much of a problem that specific event was for them. Example event items are “You fought or argued with your parents” and “You got very sick or were badly injured”. This scale showed high internal reliability ($\alpha = .81$).

Maladaptive Coping¹¹. To measure maladaptive coping strategies employed by participants, items were drawn from the ACES (Adolescent Coping Efforts Scale; Jose & Huntsinger, 2005). Participants were invited to think about all of the stressful events that had

⁹ See Appendix D for the Response Styles Questionnaire (RSQ; Nolen-Hoeksema et al., 1993).

¹⁰ See Appendix E for the Negative Life Events Scale (Jose et al., 1994).

¹¹ See Appendix F for the Maladaptive Coping sub-scale of the ACES (Jose & Huntsinger, 2005).

recently happened to them (see the negative life events stress scale, Appendix E). They were then asked how they responded to these events, and indicated on a 4-point Likert scale (1 = not at all to 4 = a lot), how much they used ten different maladaptive coping strategies to cope with the stressful events. For example, “I smoked cigarettes, took drugs, or drank alcohol in order to deal with the problem” and “I got into a fight” were two of these ten items. This scale exhibited satisfactory internal reliability ($\alpha = .76$).

Happiness¹². To measure global trait happiness, the 4-item Subjective Happiness Scale (SHS; Lyubomirsky & Lepper, 1999) was used. Two items ask respondents to characterise their happiness, one with absolute ratings and the other with ratings relative to peers, whereas the other two items offer brief descriptions of happy and unhappy individuals, and ask respondents the extent to which each characterisation describes them. This scale is scored on a 7-point Likert scale with 1 being “less happy” and 7 being “more happy”, with higher scores indicating higher levels of happiness. One item on this measure is “Compared to most of my peers, I consider myself: unhappy (1) to happy (7)”. This scale exhibited high internal reliability in this sample ($\alpha = .87$).

Life Satisfaction¹³. Life satisfaction was measured using the Satisfaction With Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985), a 5-item scale developed to assess global subjective judgments of satisfaction with one's life. Life satisfaction is one factor in the more general construct of subjective wellbeing, and is thought of as cognitively driven, rather than emotionally driven (Diener et al.). This scale is scored on a 7-point Likert scale (1 = strongly disagree to 7 = strongly agree) with higher scores indicating higher levels of life satisfaction. An item on this measure is “If I could live my life over, I would change almost nothing”. This sample showed high internal reliability for this scale ($\alpha = .84$).

Positive Life Events¹⁴. Intensity of positive life events was measured using a 26-item scale constructed for the purposes of this study and modelled on the Everyday Life Events Scale (Jose, Cafasso, & D’Anna, 1994). Participants were presented with a list of common positive life events, for which they were requested to indicate whether that particular event had happened to them over the past two weeks. If the respondent indicated that a particular event had happened, then they were asked to rate on a 4-point Likert scale (1 = none, 2 = a little, 3 = some, 4 = a lot) how positive an experience that specific event was for them.

¹² See Appendix G for the Subjective Happiness Scale (SHS; Lyubomirsky & Lepper, 1999).

¹³ See Appendix H for the Satisfaction With Life Scale (SWLS; Diener et al., 1985).

¹⁴ See Appendix I for the Positive Life Events Scale (Jose et al., 1994).

Example event items are “You were grateful for someone in your life” and “You experienced something new that was interesting”. This scale showed high internal reliability ($\alpha = .82$).

Adaptive Coping¹⁵. To measure adaptive coping strategies employed by participants, items were drawn from the ACES (Adolescent Coping Efforts Scale; Jose & Huntsinger, 2005). Participants were invited to think about all of the stressful events that had recently happened to them (see the negative life events scale, Appendix E) and how they had responded to these events. They were then asked to indicate on a 4-point Likert scale (1= not at all to 4 = a lot), how much they used 11 different adaptive coping efforts in response to these stressful events. For example, “I talked to someone in order to feel better” and “I thought about all the things I could do to make the situation better”. This scale exhibited satisfactory internal reliability ($\alpha = .70$).

Results

Analytic Strategy

There are two main objectives of the current chapter. The first is to confirm the factor structure of Baer et al.’s (2006) FFMQ using confirmatory factor analysis (CFA). Recall that Baer and colleagues proposed that mindfulness is a multifaceted construct – specifically, that the overarching construct of mindfulness consists of five distinct facets or elements, including Observing, Nonreacting, Describing, Nonjudging, and Acting with Awareness. The second goal is to explore the relationships between trait mindfulness and both positive and negative psychological outcomes. As described earlier in this chapter, previous literature has found global trait mindfulness scales to correlate negatively with a wide range of maladaptive constructs and indicators of psychopathology (Baer et al., 2004, 2006, 2008; Grossman et al., 2004), and positively with measures of general health and wellbeing (Jain et al., 2007; Shapiro et al., 2008). I sought to determine whether identified factors of mindfulness would be related to similar constructs in a similar way.

For this study, rather than using a global score of mindfulness, which has been done before, I specifically wanted to investigate whether identified *facets of mindfulness* are differentially correlated with a variety of psychological outcomes. My first prediction was that all five mindfulness factor scores would have a negative association with negative outcomes. Secondly, I predicted that the Nonjudging factor will be more strongly associated with negative outcomes. Thirdly, I predicted that in general, all mindfulness factor scores

¹⁵ See Appendix F for the Adaptive Coping sub-scale of the ACES (Jose & Huntsinger, 2005).

would have a positive association with positive outcomes. And fourthly, I explored whether a particular factor would be more strongly related to positive outcomes. Both correlational and path model analyses were employed to examine these predictions.

Confirmatory Factor Analysis

Confirmatory factor analysis (using the AMOS SEM statistical programme; Arbuckle, 2009) rigorously tests an a posteriori factor structure using a range of fit indices (Bryant & Yarnold, 1995); hence, a CFA was conducted on the 103 participants' data to attempt to confirm the five factors of the FFMQ (Baer et al., 2006). The two most popular ways of evaluating model fit are those that involve the χ^2 goodness-of-fit statistics as well as fit indexes (Hu & Bentler, 1999). The χ^2 goodness-of-fit statistic is the ratio of the chi square value divided by the degrees of freedom – a ratio of less than 3 for χ^2/df is considered appropriate (Hu & Bentler). Model fit indices can be classified into absolute and incremental fit indexes and are used to quantify the degree of fit along a continuum, therefore supplementing the χ^2 test (Hu & Bentler, 1999).

Because there is not one universally accepted fit index, a variety of indices were used to provide a comprehensive indication of fit. Two absolute fit indices are the standardised Root Mean Squared Residual (sRMR) and the Root Mean Square Error of Approximation (RMSEA). These fit indices assess how well an a priori model reproduces the sample data (Hu & Bentler, 1999). Values below .08 for the sRMR are considered acceptable, and the RMSEA is considered acceptable with values under .06 (Hu & Bentler). In contrast, an incremental fit index measures the proportionate improvement in fit by comparing a target model with a more restricted, nested baseline model (Hu & Bentler, 1999). Two commonly reported values are the Comparative Fit Index (CFI) and the Incremental Fit Index (IFI). Values greater than .90 are considered acceptable for both of these model indices.

The 15 items taken from the FFMQ (Baer et al., 2006) were stipulated to load onto the relevant five factors proposed by the authors (see Table 2.1); however, the CFA revealed unacceptable fit indices when entered as a 5-factor model, $\chi^2 = 148.91$; $p < .001$; $df = 80$; $\chi^2/df = 1.86$; RMSEA = .09; sRMR = .09; IFI = .81; CFI = .80. Internal reliability was found to be poor for both Nonreacting (Cronbach's $\alpha = .29$) and Observing ($\alpha = .39$), but was acceptable for Acting with Awareness ($\alpha = .74$), Describing ($\alpha = .72$), and Nonjudging ($\alpha = .75$). In an attempt to improve the model fit indices, data were reanalysed using a 4-factor model, followed by 3 factors, yet both continued to yield unacceptable model fit indices. Data were then analysed with a 2-factor model, yet despite items converging onto the two factors (a combination of Nonjudging and Acting with Awareness items on the first factor, and

Describing items on the second factor), model fit indices were still found to be unacceptable, $\chi^2 = 112.16$; $p < .001$; $df = 34$; $\chi^2/df = 3.30$; RMSEA = .15; sRMR = .12; IFI = .74; CFI = .73.

Interestingly, two out of the three items from the Nonreacting factor did not load on either of the two factors, and out of the Observing items, one item did not load on either factor and one was negatively loaded. A double loading on item 11 was suggested by AMOS (e.g., through modification indices) to improve the model fit indices, as was parceling the Nonjudging factor into 3 groups of items¹⁶. Little, Cunningham, Shahar, and Widamon (2002) have described several advantages of item parceling, namely the reliability of a parcel of items is greater than that of a single item, so parcels serve as a more stable indicator of a latent construct. Previous research also suggests when using small sample sizes, parceling items can help to improve model fit indices (Little et al.)¹⁷.

In sum, upon combining items from Nonjudging and Acting with Awareness (renamed Nonjudging Awareness) to make up the first factor ($\alpha = .79$), and items from the Describing factor for the second factor ($\alpha = .72$), double loading an item onto both factors, and employing the technique of parceling, model fit indices improved to meet acceptable standards and fit these data reasonably well, $\chi^2 = 11.08$; $p = .14$; $df = 7$; $\chi^2/df = 1.58$; RMSEA = .07; sRMR = .05; IFI = .98; CFI = .98. Factor loadings on the two factors of mindfulness can be seen in Figure 2.1. The covariance between the two latent constructs of Nonjudging Awareness and Describing was non-significant (beta = .12, $p = .30$). This means that the two factors were not significantly related to each other, hence, were measuring different elements of mindfulness.¹⁸

¹⁶ Parcel 1 included items 8 and 13; parcel 2 included items 9 and 15; parcel 3 included items 7 and 14 (see Table 2.1 for items).

¹⁷ An in-depth discussion on parceling is beyond the scope of this thesis (see Little et al., 2002, for more information and issues related to item parceling).

¹⁸ It cannot be discounted that the participants' age ($M = 21$ years) influenced the pattern of results to emerge from this study, as research does suggest that younger individuals are in general less mindful, and less attracted to meditation practices than older adults (Frewen et al., 2011; Grossman & Van Dam, 2011; Wallace, 2005). It is possible that this younger sample of participants may have scored lower on the FFMQ than an older sample would, and consequently a different pattern of results may have emerged with an older population (i.e., different factors might have been seen). Although participants' mean age in Baer et al.'s (2006) original study (the FFMQ's authors) was 20.5 years, similar to the present study, Study 2 aims to address this potential implication by employing a different sample.

Figure 2.1. Confirmatory factor analysis of the FFMQ with 2 factors extracted. All coefficients are standardised regression coefficients¹⁹. *** $p < .001$. *ns* = nonsignificant. Parcel 1 includes items 8 and 13; Parcel 2 includes items 9 and 15; Parcel 3 includes items 7 and 14.

As these data did not replicate Baer et al.'s (2006) five factor model, the next step was to explore whether these two factors of mindfulness – Nonjudging Awareness and Describing – would be differentially related to various psychological constructs, and if so, would they predict a range of positive and negative psychological outcomes in a sensible fashion? Original hypotheses were adjusted in order to allow exploration of the revised two factor model. For example, instead of global mindfulness being negatively associated with negative outcomes, as was first predicted, it was now expected that both Nonjudging Awareness and Describing would be negatively related to negative outcomes. The second prediction, that the Nonjudging factor would be more strongly associated with negative outcomes than the other four factors, was also adjusted to fit the two factor model. It was now predicted that Nonjudging Awareness would be more strongly associated to negative outcomes than the Describing factor would be. Thirdly, it was originally predicted that in general, mindfulness factor scores would be positively associated with positive outcomes. This prediction still stands, though only the two factors of Nonjudging Awareness and Describing would now be related to positive outcomes. Finally, fourth, a research question exploring whether a

¹⁹ Path coefficients are standardised regression beta weights that indicate the strength of the relationship between variables (Jöreskog, 1993). Coefficients range from -1 to 1 in magnitude – the larger the coefficient the stronger the relationship.

particular factor would be more strongly related to positive outcomes, is still proposed. However, I now explore whether Nonjudging Awareness is more or less strongly related to positive outcomes than the Describing factor.

Descriptive Statistics

Descriptive statistics for the two factors of mindfulness and outcome measures are presented in Table 2.2.

Table 2.2

Means and Standard Deviations for the Two Mindfulness Factors and the Positive and Negative Outcome Scores

	<i>M</i>	<i>SD</i>
Nonjudging Awareness	13.09	4.34
Describing	12.02	3.73
Depression	18.28	5.12
Anxiety	44.57	10.54
Rumination	33.66	9.94
Maladaptive coping	1.00	0.52
Negative life events intensity	11.80	8.49
Subjective happiness	18.63	5.21
Life satisfaction	22.54	6.28
Adaptive coping	1.49	0.50
Positive life events intensity	42.80	11.89

Note. The BDI-11 is referred to as Depression, the STAI-Y as Anxiety, the RSQ as Rumination, and the SWLS as Life satisfaction, and will continue to be labelled as such throughout this chapter.

Correlations

Correlations were calculated to explore the relationships between mindfulness and a range of positive and negative outcomes. As illustrated in Table 2.3, the two factors of mindfulness were shown to be differentially correlated in expected ways (supporting the revised hypotheses). Participants who took a nonevaluative stance toward thoughts and feelings (Nonjudging), whilst at the same time attending to one's present moment activity (Acting with Awareness), were less likely to ruminate, be depressed or anxious, and were less likely to employ maladaptive coping strategies. The intensity of negative life events was also negatively correlated with Nonjudging Awareness, indicating that the stress intensity from various negative life events was reduced in those individuals who, although aware of the event, held a nonjudging view toward it. In contrast, subjective happiness and life satisfaction were both moderately correlated with Nonjudging Awareness in a positive direction, indicating that participants who reported higher levels of happiness and life satisfaction tended to have a nonjudgmental temperament while being present in the moment.

The second factor of mindfulness, Describing, revealed a similar pattern of results to the Nonjudging Awareness factor, although the relationships were less strong. Individuals in this sample who labelled their internal experiences with words were less likely to ruminate, be depressed or anxious, and were less likely to employ maladaptive coping strategies. Although non-significant, a negative relationship between the Describing factor on the one hand and rumination and negative life events on the other hand was seen. Results revealed that Describing had little influence over the positive psychological constructs examined.

Table 2.3

Correlations between the Two Factors of Mindfulness and Positive and Negative Outcome Scores

	NJA	DES	DEP	ANX	RUM	MAL	NLE	SH	LS	ADAP
DEP	-.54**	-.25**	-							
ANX	-.67**	-.23*	.80**	-						
RUM	-.59**	-.18	.58**	.67**	-					
MAL	-.51**	-.24*	.50**	.51**	.45**	-				
NLE	-.53**	-.08	.49**	.55**	.51**	.43**	-			
SH	.44**	.19	-.55**	-.74**	-.46**	-.35**	-.38**	-		
LS	.28**	.05	-.33**	-.48**	-.26**	-.09	-.21*	.80**	-	
ADAP	-.02	.12	-.15	-.18	.01	-.03	.05	.29**	.16	-
PLE	.02	.12	-.28**	-.28**	-.10	-.07	.05	.50**	.51**	.27**

Note. * $p < .05$, ** $p < .01$. All significance tests were one-tailed. NJA = Nonjudging awareness; DES = Describing; DEP = Depression; ANX = Anxiety; RUM = Rumination; MAL = Maladaptive coping; NLE = Negative life events intensity; SH = Subjective Happiness; LS = Life satisfaction; ADAP = Adaptive coping; PLE = Positive life events intensity.

Path Model Analysis

Path analysis allows simultaneous examination of the relationships among latent variables, which permits direct comparison of the relative strengths of the relationships (Kline, 2005). In the current study, investigating how mindfulness factors directly predicted certain psychological outcomes was assessed using path analysis. By utilising path analysis, model goodness of fit statistics can be considered to determine whether the hypothesised path model fit the observed data well (Hu & Bentler, 1999). A key strength to path model analysis is how it can uniquely test hypotheses concerning the relative strength of relationships (Brown, 2006). Therefore, path analysis was utilised to test two further hypotheses.

The first was to explore which factor is the stronger of the two in predicting both positive and negative outcomes. As correlations in the present study revealed that the Nonjudging Awareness factor was more strongly associated overall with both positive and negative psychological outcomes than the Describing factor, it is reasonable to expect that this factor would also be more strongly predictive of both positive and negative outcomes in

the path model. Second, path analysis further probed whether negative outcomes or positive outcomes were more strongly predicted by these two mindfulness factors. As correlations revealed only a moderate relationship between Nonjudging Awareness, subjective happiness, and life satisfaction, and no relationship between Describing and positive outcomes, it is realistic to expect that negative outcomes would be more strongly predicted by mindfulness than would positive outcomes.

The fit indices described in the previous CFA section of this chapter were used: specifically, the χ^2/df ratio, the RMSEA, the sRMR, the IFI, and the CFI. Based on the results of the CFA of the mindfulness measure, the latent variable of Nonjudging Awareness was constituted with three parcels of items, and the model included a double-loaded item (as Figure 2.1 demonstrates). The model, as noted above, achieved acceptable model fit indices. Furthermore, taking into consideration the sample size, it was decided that the most efficient and focussed way to enact path modeling was to create a small number of latent constructs from the nine mood outcome indicators. As seen in Figure 2.2, all predicted psychological outcomes loaded uniquely and significantly on the relevant latent variables. The model fit of this measurement model was good, $\chi^2 = 38.98$; $p = .05$; $df = 26$; $\chi^2/df = 1.50$; RMSEA = .07; sRMR = .07; IFI = .97; CFI = .97. The covariance between the two latent constructs of negative outcomes and positive outcomes was significant (beta = -.77, $p = .002$). This result means that the two outcome constructs were significantly negatively related to each other, as one would expect. Individuals scoring high on negative outcomes, should for example, score low on positive outcomes.

Figure 2.2. Confirmatory factor analysis of the positive and negative outcome latent variables. ** $p < .01$, *** $p < .001$. All coefficients are standardised regression coefficients. NLE = Negative life events intensity; DEP = Depression; ANX = Anxiety; RUM = Rumination; Mal co = Maladaptive coping; SH = Subjective Happiness; LS = Life satisfaction; PLE = Positive life events intensity; Adap co = Adaptive coping.

Once the two CFAs verified that the predictors could be represented as two latent constructs of mindfulness (i.e., Nonjudging Awareness and Describing) and that the outcome variables could be represented as two latent constructs (i.e., positive and negative outcomes), a latent variable path model was constructed. The model was fully saturated, namely, both factors of mindfulness predicted both factors of the outcome variables. Figure 2.3 presents the final latent variable path model from the procedures aforementioned, and it was found to fit these data well, $\chi^2 = 116.74$; $p = .01$; $df = 83$; $\chi^2/df = 1.41$; RMSEA = .06; sRMR = .07; IFI = .95; CFI = .95.

Figure 2.3. The fully saturated latent variable path model with mindfulness predicting positive and negative outcomes. All coefficients are standardised regression coefficients. ** $p < .01$, *** $p < .001$, *ns* = nonsignificant. Par 1 = Parcel 1 (items 8 and 13); Par 2 = parcel 2 (items 9 and 15); Par 3 = parcel 3 (items 7 and 14); NLE = Negative life events intensity; DEP = Depression; ANX = Anxiety; RUM = Rumination; Mal co = Maladaptive coping; PLE = Positive life events intensity; SH = Subjective happiness; LS = Life satisfaction; Adap co = Adaptive coping.

Comparing Strengths of Structural Paths

As discussed earlier, previous research shows that global mindfulness is associated with reduced negative affect and psychological symptoms. The path model presented in Figure 2.3 revealed that the latent variable of Nonjudging Awareness was negatively and significantly associated with negative outcomes ($\beta = -.84, p < .001$), whereas, the Describing latent variable was negatively but non-significantly associated with negative outcomes ($\beta = -.06, p = .385$). This finding only partially supports hypothesis 1 – that both factors of mindfulness would be negatively associated with negative outcomes – by revealing that Nonjudging Awareness was the only factor that predicted the latent construct of negative outcomes.

To evaluate the relative strength of paths among latent variables, a test for equal factor variance constraints can be used. The simplest constraint is to set one parameter equal to another parameter, i.e., parameters are held to equality by giving them the same value (Brown, 2006). Equality constraints were employed to investigate whether Nonjudging Awareness would be the stronger of the two factors in predicting negative outcomes, as was expected. Both Nonjudging Awareness and Describing parameters to negative outcomes were set as equal. As is presented in Table 2.4, this equality constraint yielded a significant chi-squared change value ($p = .001$), suggesting that Nonjudging Awareness predicted negative outcomes more strongly than did Describing, supporting hypothesis 2.

As previously discussed, prior research suggests that increased mindfulness has a positive effect on general health and wellbeing. In the current study, it was hypothesised that both mindfulness factors would be positively associated with the latent construct of positive outcomes. As Figure 2.3 demonstrates, hypothesis 3 was only partially supported. Nonjudging Awareness was positively and significantly associated with positive outcomes ($\beta = .49, p = .003$), whereas, Describing was positively yet nonsignificantly associated with positive outcomes ($\beta = .11, p = .258$). This finding shows that Nonjudging Awareness was in fact the only factor that predicted the latent construct of positive outcomes, contrary to predictions.

Equality constraints were employed to investigate whether Nonjudging Awareness was more strongly related to positive outcomes than Describing. Both parameters to positive outcomes were set as equal. Table 2.4 shows the equality constraint yielded a significant chi-squared change value ($p = .034$), suggesting that the Nonjudging Awareness factor of mindfulness predicted the latent construct of positive outcomes more strongly than did the Describing factor.

The two additional hypotheses (the first exploring which mindfulness factor is stronger at predicting both positive and negative outcomes, and the second exploring which psychological outcome was more strongly predicted by mindfulness) were tested with equality constraints as well. To test the first additional hypothesis, parameters to both negative and positive outcomes from the Nonjudging Awareness factor were set as equal. Next, to test whether Describing more strongly predicted negative as opposed to positive outcomes, both parameters were set as equal. As is seen in Table 2.4, equality constraints revealed a statistically significant result in the first case ($p = .001$), and a nonsignificant result in the second case ($p = .279$). Thus, in combination, these results suggest that the factor of Describing was equally strong in predicting positive and negative outcomes (in this particular case, Describing did not predict either outcome), and that Nonjudging Awareness predicted both outcomes, with negative outcomes being more strongly predicted than positive outcomes. These results address the final two predictions – that Nonjudging Awareness would predict both positive and negative outcomes more so than Describing, and that negative outcomes would be more strongly predicted by mindfulness than positive outcomes.

Table 2.4

Equality Constraint Results for the Structural Model

Two compared paths	$\Delta\chi^2$	Δdf	p -value	Interpretation
NJA → Neg Out Des → Neg Out	22.47	1	.001	NJA predicted Negative Outcomes more strongly than Describing
NJA → Pos Out Des → Pos Out	4.52	1	.034	NJA predicted Positive Outcomes more strongly than Describing
NJA → Neg Out NJA → Pos Out	44.68	1	.001	NJA predicted Negative Outcomes more strongly than Positive outcomes
Des → Neg Out Des → Pos Out	1.17	1	.279	Describing did not predict either Positive Outcomes or Negative Outcomes

Note. NJA = Nonjudging Awareness; Des = Describing; Neg Out = Negative Outcomes; Pos Out = Positive Outcomes.

Discussion

Mindfulness is complex, multifaceted, and a phenomenon that warrants ongoing scientific investigation. The current study explored the interrelationships between two factors of mindfulness and positive and negative psychological outcomes. The study had two main objectives which will now be discussed in turn. First, I sought to build upon and clarify the results of Baer et al. (2006) by attempting to confirm the factor structure of the authors' trait measure of mindfulness – the Five Facet Mindfulness Questionnaire. Contrary to Baer and colleagues' findings, a confirmatory factor analysis in the present case did not provide supportive evidence for a five factor model. As discussed earlier, two factors (Nonjudging Awareness and Describing) emerged from the CFA on the current dataset and were found to be the best fit to these data.

In an attempt to explain this finding, it is important to note the several differences between the current study and Baer et al.'s (2006) research. The published FFMQ is constituted with 39 items, however, due to the constraints of collecting data on a wide range of measures, only 15 items were used to measure mindfulness in the present case. The use of only 15 items from the original scale might explain why in this study only two factors were derived as the best fit for these data²⁰. Furthermore, the sample size for the present study was smaller than that of Baer et al.'s (2006) study, where 613 participants were originally administered the FFMQ, followed by a CFA on an independent sample of 268 participants. In the current study, a CFA was conducted on 103 participants, which may have provided insufficient statistical power in which to replicate a 5-factor model (Cohen, 1992).

A further pertinent point is that according to Baer et al. (2004, 2006, 2008), the factor structure of the FFMQ seems to be sensitive to changes caused by individuals who have had meditation experience. For instance, relations between factors of mindfulness and related variables appear to be altered by the amount of meditation experience an individual has had. In both Baer and colleagues' (2006) and (2008) studies, the Observing factor was only seen as a significant factor of a broad mindfulness construct in a meditating sample. In earlier research, Baer et al. (2004) had proposed that individuals with no meditation experience routinely place judgement on the experiences to which they attend. Meditators, on the other hand, tend to be skilled at harnessing an attitude of nonjudgmental acceptance toward their cognitions, perceptions, and emotions. All sensations are observed carefully, but are not

²⁰ This result also provides support for using the FFMQ in its original 39-item form, though it would be interesting to explore in further research when the factor structure evidences change, according to the number of items used.

evaluated as good or bad, important or trivial, or right or wrong (Baer et al., 2004). Similarly, according to Thompson and Waltz (2007), experienced meditators tend to exhibit more stable moods than nonmeditators, which again could potentially influence the factor structure of mindfulness measures.

A limitation of the current study is the inability to compare factor structures between meditators and nonmeditators. Although participants were asked to report whether they had ever participated in any mindfulness practices (such as TaiChi, Qigong, Vipassana meditation, Transcendental meditation, or mindfulness meditation), the question posed was too broad to ascertain whether participants were currently practicing these techniques. Specific questions asking whether the participant is currently a meditator, and if so, for how long, would provide data which could be used to compare meditators to nonmeditators. Differences in factor structure (if any) could then be identified, providing clarification of whether different mechanisms of mindfulness are in play between those who meditate and those who do not.

According to Davidson (2010), for example, those adept at meditation have learned to accept their thoughts and emotions as fleeting, rather than thinking of them as underlying self-truths that have permanence. Hence, their emotions following a negative stimulus tend to be less intense, making the speed of recovery faster than that of nonmeditators (Davidson). As further empirical research appears warranted, both Study 2 and 3 of this thesis (Chapters 3 and 4) build on the current study's results in an attempt to address the above limitation. For instance, participants were specifically asked questions related to meditation experience, and the sample included a significant number of meditators which could be compared with nonmeditators.

The second goal of the present study was to explore the relationships between different factors of mindfulness and positive and negative psychological outcomes. First, it was predicted that increased scores in Nonjudging Awareness and Describing factors of mindfulness would be negatively associated with negative psychological outcomes – and specifically, that Nonjudging Awareness would be more strongly predictive. Results only partially supported these predictions by revealing that only the Nonjudging Awareness factor negatively predicted the latent construct of negative outcomes. That is, allowing reality to be as it is by being present in the moment and by refraining from applying evaluative labels to internal experiences (Nonjudging Awareness), had more influence over negative outcome scores than did labelling internal experiences or noting observed phenomena with words (Describing) (Baer et al., 2004).

It was further predicted that increased scores in Nonjudging Awareness and Describing would be positively associated with positive outcomes, and specifically, that the Nonjudging Awareness factor would be stronger at predicting positive outcomes than Describing. Findings only partially supported these predictions by revealing that Nonjudging Awareness was the only factor to positively predict the latent construct of positive outcomes. It appears that in this sample, the tendency to adopt a nonevaluative stance while attending to one's activity at hand (Nonjudging Awareness) enhanced positive outcomes more strongly than labelling internal experiences with words (Describing) (Baer et al., 2004).

Further analyses tested two additional hypotheses. First, the Nonjudging Awareness factor was expected to be more strongly predictive of both positive and negative psychological outcomes than Describing. Results suggested that the more influential component, affecting both positive and negative psychological outcomes, was indeed the nonjudging/present-focused element to mindfulness. Second, it was predicted that negative psychological outcomes would be more strongly predicted by mindfulness than positive outcomes would be. In support, results showed that being mindful in daily life more strongly influenced negative constructs, such as depression and anxiety, than positive constructs, such as subjective happiness and life satisfaction.

It therefore appears that mindfulness affects positive, as well as negative outcomes, though it seems to have more impact on the latter than the former. The majority of mindfulness interventions aim to reduce stress, anxiety and dysphoria (Astin, 1997; Shapiro, Schwartz, & Bonner, 1998), hence, the efficacy of such programmes is often judged on symptom reduction, rather than the enhancement of positive constructs. Few studies have examined improvements in psychological wellbeing, though the present findings suggest that further investigation is indeed warranted. In sum, it appears that the Nonjudging Awareness factor was the 'active ingredient' within the broader construct of mindfulness in predicting both positive and negative latent constructs.

The present study yielded some important findings. To start with, results show how important measurement at the factor level is, in attempting to understand the relationships between constructs. Further, the current study also extends prior research by isolating a potent factor of mindfulness, something that few prior studies have done. In this sample the Nonjudging Awareness factor of mindfulness evidenced an ability to both negatively predict five negative outcomes and positively predict four positive outcomes. If the combined factors of Nonjudging and Acting with Awareness are indeed responsible for causing or leading to these results, then training an individual to develop these specific skills may improve one's

ability to cope with various life stressors, and enhance reactions to positive events, thus, resulting in increased overall wellbeing.

It is readily accepted by mindfulness researchers that the ability to be mindful is not only an individual trait difference, but also a skill that can be cultivated (Emanuel, Updegraff, Kalmbach, & Ciesla, 2010; Kabat-Zinn, 1990; Kabat-Zinn et al., 1992; Shapiro & Carlson, 2009). Thus, the present study's findings suggest that improving an individual's ability to understand that one's emotions (positive or negative), are inevitably fleeting, and thus temporary, may help people to be better equipped to cope with life in general (Emanuel et al.). This finding has significant implications for interventions, as it seems reasonable to surmise that being more mindful in daily life has many beneficial outcomes. Specifically, the current study's results suggest that individuals, who engage fully in their current activity, by allowing reality to be as it is without applying evaluative labels, may enhance their quality of life.

According to Watkins and Teasdale (2004), different modes of self-focused processing may determine whether self-focused attention has adaptive or maladaptive effects on an individual. The nonjudgmental acceptance by people practicing mindfulness permits the person to stop brooding about their unpleasant thoughts and feelings, thus preventing rigid self-absorption and rumination (Borders, Earleywine, & Jajodia, 2010). Equanimity²¹ toward all emotions and thoughts, whether positive or negative, may reduce the perceived need for rumination, as distress is no longer judged so negatively (Borders et al.). Supporting such an assertion, results of the current study suggest that it is this nonjudgmental acceptance and awareness that is the key ingredient in both protecting against negative outcomes and enhancing positive outcomes. This series of results suggests that mindfulness (or particular factors of mindfulness) is associated with more than just the absence of maladaptive symptoms, rather, it is also associated with increased psychological wellbeing. For instance, positive affect is not just the absence of negative affective states (Bränström, Kvillemo, Brandberg, & Moskowitz, 2010). Bränström and colleagues' research found that the Observing factor of the FFMQ influenced positive states of mind but had no effect on negative emotional outcomes, and the factors of Nonreactivity and Acting with Awareness were most consistently related to positive psychological outcomes.

Recall that in the current study, the factors of Nonjudging and Acting with Awareness were merged to form one factor – Nonjudging Awareness. It is therefore possible, that the

²¹ Equanimity is a Buddhist term describing a state of mental or emotional stability or composure, arising from a deep awareness and acceptance of the present moment (Borders et al., 2010). Buddhism promotes the idea that equanimity is achieved through meditation.

skill of acting with awareness has more influence on positive outcomes than does taking a nonevaluative attitude toward one's thoughts and feelings. Alternatively, nonjudging of inner experiences are necessary in the process of acting with awareness, but nonjudging might not influence positive outcomes as much in itself (Bränström et al., 2010). As prior research (Kabat-Zinn 1990; Kabat-Zinn et al., 1992; Shapiro & Carlson, 2009; Shapiro, Brown, Thorensen, & Plante, 2011) suggests that mindfulness negates the effects of psychological symptoms, it is possible that it is this reduction in negative affect that directly results in the enhancement of positive affect. However, it is also plausible that individuals with greater psychological wellbeing are more likely to employ mindfulness techniques, i.e., happier people may be more mindful. Future research should explore the causal and temporal relationships between positive outcomes and mindfulness. Study 3 (Chapter 4) of this thesis will explore these topics in greater detail.

The current study shows promising results for our understanding of which specific elements of mindfulness influence psychological outcomes. However, there are several limitations to Study 1 that Study 2 and Study 3 of this thesis aim to address. First, although the sample size in the current study was adequate for testing what was hypothesised, in both Study 2 and 3, the sample size is significantly larger, providing a better chance of detecting small effects; hence, statistical power is improved (Lenth, 2001). Second, in the current study, data were collected at one point in time which means the hypotheses can only ever be suppositions rather than conclusions about causality. To improve on the ability to identify temporal and causal relationships, a longitudinal design (three time points) is employed in Study 2, and this same dataset is used again in Study 3. Longitudinal designs allow one to test for mediation effects, thus, enabling more rigorous inferences about causal relations (Cole & Maxwell, 2003).

Third, the final path model in the current study for the mindfulness measure is ad hoc (derived from data using modification indices rather than from theory); hence, it may not be replicable in other samples. Because Study 2 is longitudinal, Baer et al.'s (2006) 5-factor model can be tested again at Time 1, then, once a reasonable model is derived, the aim will be to confirm it at Time 2, and again at Time 3. This detailed form of analysis provides the potential to yield powerful findings across time. Finally, as already briefly mentioned, both Study 2 and 3 addresses the limitation of not explicitly knowing whether the sample meditated or not. There will be two distinct groups in the following studies – nonmeditators and meditators. This will provide the opportunity to compare differences in mindfulness scores between these two groups.

CHAPTER 3

A Psychometric Examination of the FFMQ and Trait TMS Measures: Factorial Invariance, Reliability and Validity

Study 1 (Chapter 2) yielded important findings in revealing that present moment awareness devoid of any evaluative label of one's experience may influence psychological outcomes. It was the factor of Nonjudging Awareness – the combined FFMQ factors of Nonjudging and Acting with Awareness (Baer et al., 2006) – that appeared to be the most potent facet of mindfulness in predicting both positive and negative outcomes in that particular sample of individuals. The current chapter builds on and extends the results from Study 1 and addresses a number of the previous study's limitations. Specifically, Study 2 of this thesis has three main objectives which will be discussed in turn. First, I sought to confirm using Confirmatory Factor Analysis (CFA) the factor structure of two current measures of trait mindfulness – the Five-Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2006) and the Trait Toronto Mindfulness Scale (Trait TMS; Davis et al., 2009) – at three points in time. Second, I explored factorial invariance using longitudinal data (and also compared participants with and without experience in meditation across time) to assess whether scale scores of the two mindfulness measures employed are equivalent across time. And third, I investigated the relationships between these two scales, which were designed to measure the same construct, i.e., convergent validity is explored.

As previously mentioned, the assessment of mindfulness has received little attention in the current existing body of mindfulness research. Self-report measures of mindfulness have only started to emerge over the last decade, though, it is only with focused empirical examination of these psychometric instruments that one can reliably define, describe and/or refine the construct that the instruments claim to measure (Baer et al., 2004). Psychology as a discipline is yet to agree on one universally accepted operational definition of mindfulness (Baer et al.; Brown & Ryan, 2003; Shapiro & Carlson, 2009), so it is of interest to empirically investigate the instruments that currently exist for measuring mindfulness to help better understand the construct.

When employing psychometric measures in scientific research, replication of the measure's factor structure is essential for achieving valid and reliable results (Byrne & van de Vijver, 2010). Study 1 yielded findings that call for this need for replication, as only two factors from a possible 5-factor scale were seen to be the best fit to the data in this previously described sample. The replication of Baer et al.'s (2006) proposed factor structure for the

FFMQ was unsupported by this result. Chapter 2 proposed a number of plausible reasons for this finding and discussed the limitation of using only concurrent data.

In directly addressing this limitation, Study 2 was designed to acquire longitudinal data with which to test the factor structure of two measures of mindfulness over time. The reader is referred to Chapter 2 (p. 33) for a detailed description of the FFMQ – the first measure to be examined. The second measure examined in this Chapter was developed by Davis et al. (2009), who created a trait version of the original Toronto Mindfulness Scale (TMS; Lau et al., 2006). The two factors in the model for the TMS are Curiosity (capturing an individual's interest in their internal experiences) and Decentering (relating to the awareness of one's experiences with distance and disidentification) (Lau et al.). Retaining these two factors, Davis et al. (2009) changed each item from the original State TMS into the present tense to create a trait version (Trait TMS). Internal consistency reliability (alpha coefficient) was found by Davis et al. to be high for both factors (.91 for Curiosity and .85 for Decentering).

Although Davis et al.'s (2009) research offers important preliminary findings, it appears that no further research has confirmed and validated this factor structure by confirmatory factor analyses. As mentioned previously, CFAs provide confirmation of a measure's factor structure, and allow for measurement refinement (Floyd & Widaman, 1995). The current study will therefore be the first to provide psychometric validation of this new measure of trait mindfulness, hence, results from this study will provide a starting point from which future research can build.

As a 5-factor structure has been proposed for the FFMQ (Baer et al., 2006) and a 2-factor structure for the Trait TMS (Davis et al., 2009), CFAs in the present study were used to replicate their respective factor structures across three separate time points. Specifically, CFAs were used to test the hypotheses that the FFMQ and the Trait TMS are multidimensional constructs comprised of five and two factors (respectively), that should remain stable across time (Little, Preacher, Selig, & Card, 2007). The replication of a measure's factor structure provides strong support and validation for the underlying theory of a proposed measurement model (Hurley et al., 1997). Furthermore, demonstrating factorial invariance of a measure across time enables the researcher to know that the factor structure identified remains stable across time (i.e., that mindfulness, for example, is reliably measured by these scales over time).

The second objective of the current study concerns the issue of psychometric equivalence. When comparing psychological constructs across different groups it is essential

that the measures perform comparably within these groups (Cheung & Rensvold, 2002; Milfont & Fischer, 2010; Vandenberg & Lance, 2000). According to prior research (Byrne & van de Vijver, 2010; Milfont & Fischer), it is usually assumed that a construct's measure functions in the same way across different populations. Byrne and van de Vijver specifically define this assumption as *measurement* and *structural equivalence*. Although researchers typically assume that an instrument will perform equivalently across groups, it may not function in this fashion. If it does not, then obtained findings can be deceptive (Vandenberg & Lance, 2000).

Measurement equivalence, or invariance, according to Byrne and van de Vijver (2010), refers to equality in factor structure, factor loadings, perceived item content, and item averages. Structural equivalence, or invariance, on the other hand, refers to equality in the construct's dimensions or components, i.e., the relationship or covariances among the different factors that make up a given construct (Byrne & van de Vijver). Although easily tested using confirmatory factor analytic techniques, factorial invariance is often underutilised in scientific research (Byrne & van de Vijver, 2010; Vandenberg & Lance, 2000), and in particular, it has been infrequently performed in mindfulness research.

Although mindfulness has been conceptualised as a stable trait (Brown & Ryan, 2003; Kabat-Zinn, 1990; Shapiro & Carlson, 2009), there has been very little longitudinal research exploring the stability (i.e., the extent to which a measure at one point in time correlates with the same measure at other times) and comparability (or convergent validity) of mindfulness scale scores (Obradovic, Pardini, Long, & Loeber, 2007). According to Obradovic and colleagues, lack of temporal invariance in scale scores can lead to results that suggest developmental changes, but in fact might be spuriously caused by changes in item functioning. Obradovic et al. (2007) encourage researchers to administer the same measure at different time points and to different groups, in order to confirm whether the same construct is being measured in a stable fashion over time.

The aim of Study 2's second objective is to investigate whether both the FFMQ (Baer et al., 2006) and Trait TMS (Davis et al., 2009) perform in a similar way when used at more than one point of time. Further, Study 2 explores whether group membership influences mindfulness scores; specifically, if meditation experience (as opposed to no meditation experience) affects how an individual interprets mindfulness scale items. On this second point, Grossman (2008) argues that an individual's response to a mindfulness term or phrase can differ considerably depending on the individual's experience with meditation. Grossman suggests, in particular, that individuals inexperienced with meditation practice are unlikely to

understand (and interpret) mindfulness scale items in the same way as individuals with meditation experience. Commonly used terms that meditators are familiar with and/or comfortable interpreting, such as, *awareness*, *noticing*, and *nonjudging*, are likely, for instance, to have different meanings for individuals without meditation experience (Grossman, 2008).

As mentioned previously in Chapter 2, Baer et al. (2006) performed factor analyses of the FFMQ and identified an Observing factor in meditators that did not appear in nonmeditators, leading them to think that the FFMQ's factor structure is sensitive to meditation history. Baer et al. (2008) replicated this finding and further found the proposed five factors differentially related to psychological wellbeing in comparisons of meditators and nonmeditators. Similarly, research by Van Dam, Earleywine, and Danoff-Burg (2009), further showed that scale scores in the FFMQ varied according to group membership. Specifically, Van Dam and colleagues explored group bias in a sample comprised of meditators and nonmeditators, with findings suggesting that relationships between aspects of mindfulness differed depending on the group to which they belonged.

Van Dam et al. (2009) found that meditators were more likely to endorse both mindfulness-present (e.g., "When I take a shower or a bath, I stay alert to the sensations of water on my body") and mindfulness-absent (e.g., "I find it difficult to stay focused on what's happening in the present") items with nearly equivalent frequency, whereas, nonmeditators were more likely to reject mindfulness-absent items than to accept mindfulness-present items. In combination, the above findings stress the importance of conducting measurement invariance analyses, especially when comparing different groups.

Study 2's third objective was to explore convergent validity between the FFMQ (Baer et al., 2006) and Trait TMS (Davis et al., 2009). A number of published psychometric measures of mindfulness (see footnote 2, p. 28) provide the researcher tools with which to measure global mindfulness scores; however, using total scores rather than sub-factor scores limits the researcher from reliably assessing which particular mechanisms of mindfulness are related to the dependent variable in question (Smith et al., 2003). The FFMQ and the Trait TMS appear to assess different facets (or components) of mindfulness, allowing for a more robust investigation into the construct they measure.

To my knowledge, only one scientific study (Davis et al., 2009) has empirically examined the associations between the FFMQ with the Trait TMS. With a sample of 461 participants (comprised of both meditators and nonmeditators), Davis and colleagues investigated how the Trait TMS relates to other measures of mindfulness, and specifically

hypothesised that the measure would be significantly correlated with six current mindfulness questionnaires²². Davis and colleagues confirmed their hypothesis, with results yielding significant positive correlations between the two factors of the Trait TMS and all six mindfulness measures examined. Of particular relevance to the current study, there were small ($r = .15$) to large correlations ($r = .74$) between factors of the Trait TMS and the FFMQ. The Curiosity factor of the TMS was most strongly related to the Observing factor of the FFMQ ($r = .51$), whereas, the Decentering factor of the TMS had the strongest association to the FFMQ's Nonreacting factor ($r = .74$) (Davis et al., 2009).

In addressing the present study's third objective, confirmatory factor analytic techniques (examining latent variable correlations without error) will be employed on a new sample of individuals, to examine whether there is any overlap between the FFMQ and Trait TMS, or if they are in fact measuring different aspects of mindfulness altogether. In light of Davis et al.'s (2009) research, it is reasonable to expect that all five factors of the FFMQ will be positively correlated with the two factors of the Trait TMS to a moderate extent.

Method

Participants

A nationwide advertisement invited individuals over the age of 16 years to participate in the *New Zealand Happiness Study*. Initially at Time 1, 552 people participated in this community-based longitudinal study, however, due to attrition and matching participants across three time points, the final matched sample included 319 (68.70% female and 31.30% male) New Zealand residents. Several factors prevented data from being matched across time: Either participants did not provide a unique identifier (which included identification numbers appearing more than once), or a particular individual's dataset was incomplete (this included missing values at any time point). These factors resulted in participants being removed from the dataset, hence, 233 individuals were excluded from all statistical analyses due to missing a given time point or skipping significant sections of the questionnaire.

A chi-square test revealed no significant differences between the excluded participants and the included participants in age, $\chi^2(2) = .36, p = .84$, gender, $\chi^2(1) = 2.85, p = .09$, or meditation experience, $\chi^2(1) = .13, p = .72$. A multivariate analysis of variance was conducted to test for differences between the excluded and included participants for scores on

²² The six mindfulness measures compared in Davis et al.'s (2009) study were the Five-Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2006); the Freiburg Mindfulness Inventory (FMI; Buchheld et al., 2001); the Mindful Attention Awareness Scale (MASS; Brown & Ryan, 2003); the Kentucky Inventory of Mindfulness Skills (KIMS; Baer et al., 2004); the Cognitive and Affective Mindfulness Scale-Revised (CAMS-R; Feldman et al., 2007); and the Southampton Mindfulness Questionnaire (SMQ; Chadwick et al, 2008).

the FFMQ and Trait TMS. A one-way MANOVA using group (excluded vs. included) as the fixed factor on the two DVs (the FFMQ and the Trait TMS) revealed no significant multivariate effect between excluded and included participants on mindfulness measures $F(2, 395.00) = 1.47, p = .23$, partial $\eta^2 \leq .01$. Analysis of each measure revealed no significant effects between excluded ($M = 2.77, SD = .45$) and included ($M = 2.82, SD = .48$) participants for the FFMQ, $F(1, 396) = .96, p = .33$, partial $\eta^2 < .01$. Similarly, no significant effects were seen between the excluded ($M = 2.11, SD = .67$) and included ($M = 2.04, SD = .64$) participants for the Trait TMS $F(1, 396) = 1.07, p = .30$, partial $\eta^2 < .01$.

In the final sample, participants ranged in age from 16 to 80 years with a mean age of 38.83 years ($SD = 16.41$). To achieve three equal-sized groups for data analysis, the distribution was trichotomised based on statistical frequencies rather than on theoretical grounds. Table 3.1 provides a summary of the age distribution along with the participants' gender. 89.3% of the final sample self-identified as Pakeha/NZ European, 5% as Maori, 2.5% as Asian, and 9.1% classified their ethnicity as "Other" (and 34 individuals were missing data on ethnicity). One hundred and seventeen (36.7%) participants reported that they currently partake in meditation, and of those individuals, 26.7% reported that their meditation experience involved mindfulness components. Table 3.2 presents demographics for meditators and nonmeditators.

Table 3.1

Age Distribution on Gender

Age (years)	Male	Female	Total
16-26	34	71	105
27-47	34	73	107
48-80	32	75	107

Note. Total $N = 319$. Values are frequencies.

Table 3.2

Demographic Characteristics for Meditators versus Nonmeditators

	Meditators	Nonmeditators
Age (years):		
16-26	20	85
27-47	47	60
48-80	50	57
Gender:		
Male	26	74
Female	91	128

Note. Total $N = 319$. Values are frequencies.

Procedure

Prior to data collection, the researcher gained ethics approval from the School of Psychology's Human Ethics Committee at Victoria University of Wellington, New Zealand. The longitudinal design of Study 2 involved a survey that was administered at three points in time approximately three months apart (May, August, and November, 2010)²³. Advertising fliers were sent to community groups (including meditation centres), retirement villages, recreational centres, and to workplaces across New Zealand. An advertisement for the study was also placed on www.facebook.com. Once each participant had been allocated their unique identification number, the survey was made available to them either online (through the computer software website SurveyMonkey.com) or in hardcopy. Participants were given up to a month to complete the survey.

A large battery of measures were included in the survey pertaining to the emotional functioning of the individual as well as routine demographic questions²⁴. It took approximately 40-50 minutes to complete the survey and participants were reminded before commencement that participation was voluntary and anonymous (due to their unique identifier). Although participation at all three time points was not mandatory, it was, however, strongly encouraged. A \$20 gift voucher upon completion of all three time points was given to participants as a token of appreciation. Each participant was contacted via email, post, or telephone advising them of the next survey completion date.

²³ Three month time intervals are congruent with existing longitudinal studies that focus on assessing naturalistic changes in a population (Muthén & Curran, 1997). According to Byrne & van de Vijver (2010), a three month time frame is also relevant for analysing individual differences and observing the temporal order of events.

²⁴ These specific measures are discussed in the following chapter (Chapter 4), and are presented in Appendices B, G, P, Q, R, S, and T.

Measures

The two specific psychometric measures of interest employed for this study are two measures of trait mindfulness – the Five-Facet Mindfulness Questionnaire (FFMQ; Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006), and the Trait Toronto Mindfulness Scale (Trait TMS; Davis, Lau, & Cairns, 2009).

The Five-Facet Mindfulness Questionnaire²⁵. The FFMQ has manifested good psychometric properties in community samples, student samples, and with groups of meditators (Baer et al., 2006, 2008). The FFMQ has been described previously in Chapter 2 (p. 40), though instead of a shortened version that was employed in Study 1, the original 39-item scale was administered and scored on a 5-point Likert scale (1 = never or very rarely to 5 = very often or always). Example items are presented in Table 3.3. Participants were asked to choose the option that best describes what is generally true for them. In this particular sample, each subscale of the FFMQ exhibited high to excellent internal reliability across time (see Table 3.4).

Table 3.3

Example Items for Factors of the FFMQ

Factor	Example Item
Nonjudging	I believe some of my thoughts are abnormal or bad and I shouldn't think that way*
Describing	I'm good at finding the words to describe my feelings
Awareness	I find it difficult to stay focussed on what's happening in the present*
Observing	I notice how foods and drinks affect my thoughts, bodily sensations, and emotions
Nonreacting	I perceive my feelings and emotions without having to react to them

Note. *Reverse-scored items.

The Toronto Mindfulness Scale²⁶. As previously discussed, a 13-item 2-factor trait version of the original state Toronto Mindfulness Scale (TMS; Lau et al., 2006) was developed by Davis et al. (2009). The Trait TMS measures an individual's general level of mindfulness, which is thought to be relatively constant from day to day. Scale items include, "I am curious to see what my mind is up to from moment to moment" (Curiosity) and "I experience myself as separate from my changing thoughts and feelings" (Decentering). Responses are given on a 5-point Likert scale (0 = not at all to 4 = very much) where

²⁵ See Appendix A for the FFMQ (Baer et al., 2006).

²⁶ See Appendix J for the Trait TMS (Davis et al., 2009).

participants are asked to indicate the extent to which they agree with each statement. Higher scores indicate higher levels of trait mindfulness. In this sample, the two subscales of the Trait TMS exhibited acceptable to excellent internal reliability (see Table 3.4).

Meditation history²⁷. Specific questions in the survey probed whether individuals were currently partaking in any form of meditation practice, and if so, for how long. Participants were given a range of meditation options (such as TaiChi/Qui Gong, Mindfulness meditation/Vipassana, and Transcendental meditation), including the option of “Other” where the individual could list their meditation practice if not otherwise specified.

Table 3.4

Scale Reliability (Cronbach’s alpha) for the Factors of the FFMQ and the Trait TMS at Three Time Points

Scale: Subscale (number of items)	Time 1	Time 2	Time 3
FFMQ:			
Nonjudging (8)	.93	.92	.95
Describing (8)	.92	.93	.94
Awareness (8)	.89	.90	.92
Observing (8)	.80	.84	.85
Nonreacting (7)	.83	.86	.87
Trait TMS:			
Curiosity (6)	.90	.92	.92
Decentering (7)	.71	.79	.80

Results and Discussion

Analytic Strategy

The primary goal of Study 2 was to empirically examine and validate two measures of mindfulness. The present study was designed to address three specific objectives. First, longitudinal CFAs using Structural Equation Modeling (SEM) were employed to confirm the hypothesised factor structure of the FFMQ (Baer et al., 2006) and the Trait TMS (Davis et al., 2009) across three separate time points. As previously discussed, the FFMQ is proposed as a 5-factor model, namely, Nonreacting, Acting with awareness, Observing, Describing, and Nonjudging, and the Trait TMS is proposed as a 2-factor model – Curiosity and Decentering.

Within the framework of confirmatory factor analysis, Study 2’s second objective was to assess scale score invariance of the FFMQ and the Trait TMS across time comparing a sample of meditators with a sample of nonmeditators. Assessing measurement invariance is of critical importance when employing psychometric instruments, and particularly when one wishes to compare multiple groups with a single measure (Byrne & van de Vijver, 2010;

²⁷ See Appendix K for questions pertaining to an individual’s meditation experience.

Cheung & Rensvold, 2002; Milfont & Fischer, 2010). Individuals who meditate often report they do so to declutter their minds and reduce stress and anxiety (Wallace, 2005), and studies have shown that an increase in mindfulness is often a consequence of regular meditation practices (Kabat-Zinn, 2003; Kabat-Zinn et al., 1992; Shapiro & Carlson, 2009). Previous research (Baer et al., 2006, 2008; Grossman, 2008; Van Dam et al., 2009) suggests that meditators may view scale items of mindfulness differently to that of nonmeditators, hence, yielding different relationships to psychological constructs. Tests of measurement and structural equivalence are essential for comparing scale score differences between groups as it enables the researcher to establish how different groups interpret scale items (Milfont & Fischer, 2010).

The third objective in Study 2 was to employ path model analyses to examine how strongly related (or not) these two trait measures of mindfulness are at each time point. Specifically, the relationship between the FFMQ and Trait TMS was tested using SEM techniques to investigate evidence of convergent validity between the two measures. Exploring the different facets of mindfulness helps to facilitate a more concrete operationalised definition of the mindfulness construct (Davis et al., 2009). Furthermore, a series of equality constraint analyses compared meditators and nonmeditators to detect whether group membership influences, or moderates, the strength of the relationship between the FFMQ and the Trait TMS.

Confirmatory Factor Analysis

Confirmatory factor analysis (CFA) is a technique used to test whether a hypothesised factor model fits the observed covariance relationships in a particular sample (Byrne, Shavelson, & Muthén, 1989; Byrne & van de Vijver, 2010). CFAs were conducted on the 319 matched participants' data at three different time points in an attempt to confirm the five factors of the FFMQ (Baer et al., 2006) and the two factors of the Trait TMS (Davis et al., 2009). Evaluating model fit, i.e., degree of similarity between the hypothesised model to relationships found in the dataset, is achieved by analysis of the χ^2 goodness-of-fit statistics as well as a range of other fit indexes (Hu & Bentler, 1999). The model fit indices described in Chapter 2 (p. 45) were again used in the present study; specifically, the standardised Root Mean Squared Residual (sRMR), the Root Mean Square Error of Approximation (RMSEA), the Comparative Fit Index (CFI), and the Incremental Fit Index (IFI).

FFMQ Analyses

The 39 items of the FFMQ (Baer et al., 2006) were stipulated to load onto the relevant five factors proposed by the authors (See Appendix L). Due to the advantages of item

parceling (groups of items rather than individual items) described by Little et al. (2002), items were assigned sequentially to parcels in the order they appear on the original FFMQ to their corresponding factor (i.e., item 1 of Nonreacting to parcel 1, item 2 of Nonreacting to parcel 2, and so on). This yielded a total of 15 parcels (3 parcels per factor), each parcel averaging 2-3 items. These parcels contained the same items at each time point. Chapter 2 discussed why item parceling was the preferred method for CFA analyses, namely, parcels help improve model fit indices, they effectively reduce the number of indicators of a construct, and parceling helps reduce spuriously significant correlations – meaning the reliability of a parcel of items is greater than that of a single item (Little et al., 2002). The hypothesised model fit the data well (see Table 3.5) at all three time points, supporting Baer et al.'s (2006) proposed 5-factor model.

Table 3.5

Goodness-of-Fit Statistics for the Hypothesised 5-factor CFA Model of the FFMQ at Three Time Points

	χ^2	Df	χ^2/df	CFI	RMSEA	sRMR	IFI
Time 1	150.99	80	1.89	.98	.05	.04	.98
Time 2	144.74	80	1.81	.98	.05	.04	.98
Time 3	123.58	80	1.55	.99	.04	.03	.99

Note. χ^2 = chi-square; *df* = degrees of freedom; χ^2/df = the ratio of chi-square to degrees of freedom; CFI = Comparative Fit Index; RMSEA = Root Mean Square Error of Approximation; sRMR = standardised Root Mean Square Residual; IFI = Incremental Fit Index.

At each time point, the 5-factor CFAs are schematically represented in Figures 3.1, 3.2, and 3.3 along with their corresponding covariances in Tables 3.6, 3.7, and 3.8 respectively.

Figure 3.1. Confirmatory factor analysis of the FFMQ at Time 1. All coefficients are standardised regression coefficients. *** $p < .001$.²⁸ NR P1 = Nonreacting Parcel 1; NR P2 = Nonreacting Parcel 2; NR P3 = Nonreacting Parcel 3; Obs P1 = Observing Parcel 1; Obs P2 = Observing Parcel 2; Obs P3 = Observing Parcel 3; Awa P1 = Acting with Awareness Parcel 1; Awa P2 = Acting with Awareness Parcel 2; Awa P3 = Acting with Awareness Parcel 3; Des P1 = Describing Parcel 1; Des P2 = Describing Parcel 2; Des P3 = Describing Parcel 3; NJ P1 = Nonjudging Parcel 1; NJ P2 = Nonjudging Parcel 2; NJ P3 = Nonjudging Parcel 3.²⁹

²⁸ Covariances were omitted for the sake of simplicity (refer to Table 3.6).

²⁹ See Appendix M for the parcelled items of the FFMQ.

Table 3.6

Covariances at Time 1 between the Five Factors of the FFMQ

	Nonreacting	Observing	Awareness	Describing	Nonjudging
Nonreacting	-				
Observing	.36***	-			
Awareness	.40***	.24***	-		
Describing	.32***	.41***	.43***	-	
Nonjudging	.47***	.11	.44***	.38***	-

Note. *** $p < .001$.

Figure 3.2. Confirmatory factor analysis of the FFMQ at Time 2. All coefficients are standardised regression coefficients. *** $p < .001$.³⁰ NR P1 = Nonreacting Parcel 1; NR P2 = Nonreacting Parcel 2; NR P3 = Nonreacting Parcel 3; Obs P1 = Observing Parcel 1; Obs P2 = Observing Parcel 2; Obs P3 = Observing Parcel 3; Awa P1 = Acting with Awareness Parcel 1; Awa P2 = Acting with Awareness Parcel 2; Awa P3 = Acting with Awareness Parcel 3; Des P1 = Describing Parcel 1; Des P2 = Describing Parcel 2; Des P3 = Describing Parcel 3; NJ P1 = Nonjudging Parcel 1; NJ P2 = Nonjudging Parcel 2; NJ P3 = Nonjudging Parcel 3.³¹

³⁰ Covariances were omitted for the sake of simplicity (refer to Table 3.7).

³¹ Refer to footnote 29.

Table 3.7

Covariances at Time 2 between the Five Factors of the FFMQ

	Nonreacting	Observing	Awareness	Describing	Nonjudging
Nonreacting	-				
Observing	.45***	-			
Awareness	.38***	.19	-		
Describing	.41***	.45***	.40***	-	
Nonjudging	.34***	.10	.46***	.31***	-

Note. *** $p < .001$.

Figure 3.3. Confirmatory factor analysis of the FFMQ at Time 3. All coefficients are standardised regression coefficients. *** $p < .001$.³² NR P1 = Nonreacting Parcel 1; NR P2 = Nonreacting Parcel 2; NR P3 = Nonreacting Parcel 3; Obs P1 = Observing Parcel 1; Obs P2 = Observing Parcel 2; Obs P3 = Observing Parcel 3; Awa P1 = Acting with Awareness Parcel 1; Awa P2 = Acting with Awareness Parcel 2; Awa P3 = Acting with Awareness Parcel 3; Des P1 = Describing Parcel 1; Des P2 = Describing Parcel 2; Des P3 = Describing Parcel 3; NJ P1 = Nonjudging Parcel 1; NJ P2 = Nonjudging Parcel 2; NJ P3 = Nonjudging Parcel 3.³³

³² Covariances were omitted for the sake of simplicity (refer to Table 3.8).

³³ Refer to footnote 29.

Table 3.8

Covariances at Time 3 between the Five Factors of the FFMQ

	Nonreacting	Observing	Awareness	Describing	Nonjudging
Nonreacting	-				
Observing	.49***	-			
Awareness	.41***	.15	-		
Describing	.40***	.36***	.36***	-	
Nonjudging	.46***	.16	.49***	.37***	-

Note. *** $p < .001$.

Descriptive Statistics

Descriptive statistics for the parcelled factors of the FFMQ at Time 1, Time 2, and Time 3 are presented in Table 3.9.

Table 3.9

Descriptive Statistics for the Parcelled Factors of the FFMQ at Three Time Points

	Parcel 1		Parcel 2		Parcel 3	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Time 1						
Nonjudging	3.38	0.91	3.48	0.89	3.74	1.04
Describing	3.63	0.87	3.60	0.81	3.59	0.89
Awareness	3.17	0.71	3.38	0.76	3.22	0.76
Observing	3.44	0.80	3.36	0.70	3.54	0.78
Nonreacting	3.11	0.68	3.02	0.73	3.06	0.76
Time 2						
Nonjudging	3.46	0.81	3.53	0.84	3.78	0.94
Describing	3.55	0.95	3.51	0.85	3.55	0.92
Awareness	3.18	0.72	3.36	0.72	3.19	0.71
Observing	3.34	0.82	3.29	0.70	3.43	0.83
Nonreacting	3.11	0.71	3.00	0.78	3.00	0.79
Time 3						
Nonjudging	3.52	0.91	3.59	0.92	3.81	0.99
Describing	3.57	0.95	3.55	0.86	3.58	0.93
Awareness	3.24	0.75	3.36	0.80	3.22	0.79
Observing	3.33	0.84	3.23	0.72	3.43	0.81
Nonreacting	3.12	0.70	3.05	0.76	3.00	0.79

Note. See Appendix M for a list of items allocated within factor parcels.

Correlations

Intercorrelations of the parcelled subscale scores of the FFMQ at Time 1 are presented in Table 3.10; Table 3.11 presents Time 2 intercorrelations; and Time 3 intercorrelations are shown in Table 3.12. At each time point, the pattern of correlations were similar; for example, all parcels within a particular factor yielded strong positive correlations across time (i.e., the Nonjudging factor ranged from .80 to .87 at all three time points). This pattern indicates that the parcelled items within a factor are measuring a similar component of mindfulness, as would be expected.

Correlations among the five factors, however, yielded a wider range of degree of relationship. For example, correlations between the Observing and Describing factors across time were only modestly positively correlated (i.e., correlations ranged from .14 to .40 across time). These findings indicate that each of the five factors appear to represent distinct content. The present results are congruent with Baer et al.'s. (2006) research, where the authors hypothesised that correlations between the five factors would be modest but statistically significant. Baer and colleagues reported a nonsignificant correlation between the Observing and Nonjudging factors, whereas all other correlations among the five factors ranged from .15 to .34. Similarly, the present results yielded largely nonsignificant correlations between the Observing and Nonjudging factors, whereas in general, all other factors yielded modest, though significant, positive correlations ranging from .12 to .44 across time.

Recall that Study 2's first objective was to replicate the 5-factor model proposed by Baer et al. (2006). The data in this sample has replicated this factor structure at three separate time points offering strong support for the construct validity and reliability of the FFMQ. To build on these findings, objective 2 of the current study will examine the measure's factorial invariance across time.

Table 3.10

Correlations between the Parcelled Subscale Scores of the FFMQ at Time 1

	NJ P1	NJ P2	NJ P3	Des P1	Des P2	Des P3	Awa P1	Awa P2	Awa P3	Obs P1	Obs P2	Obs P3	NR P1	NR P2
NJ P2	.82**	-												
NJ P3	.81**	.80**	-											
Des P1	.29**	.35**	.39**	-										
Des P2	.21**	.27**	.29**	.84**	-									
Des P3	.29**	.35**	.37**	.83**	.81**	-								
Awa P1	.37**	.30**	.39**	.32**	.31**	.33**	-							
Awa P2	.31**	.28**	.36**	.37**	.34**	.36**	.78**	-						
Awa P3	.39**	.32**	.41**	.38**	.35**	.38**	.80**	.76**	-					
Obs P1	.05	.14*	.19**	.35**	.33**	.27**	.21**	.24**	.15**	-				
Obs P2	-.03	.05	.14*	.35**	.32**	.28**	.18**	.19**	.13*	.71**	-			
Obs P3	-.03	.05	.07	.18**	.26**	.16**	.10	.16**	.06	.53**	.48**	-		
NR P1	.35**	.38**	.37**	.20**	.24**	.23**	.26**	.30**	.31**	.25**	.22**	.14**	-	
NR P2	.33**	.30**	.35**	.29**	.32**	.34**	.24**	.24**	.32**	.25**	.25**	.20**	.62**	-
NR P3	.30**	.30*	.33**	.17**	.21**	.21**	.26**	.31**	.31**	.26**	.24**	.19**	.68**	.59**

Note. * $p < .05$, ** $p < .01$. All significant tests were one-tailed. NJ P1 = Nonjudging Parcel 1; NJ P2 = Nonjudging Parcel 2; NJ P3 = Nonjudging Parcel 3; Des P1 = Describing Parcel 1; Des P2 = Describing Parcel 2; Des P3 = Describing Parcel 3; Awa P1 = Acting with Awareness Parcel 1; Awa P2 = Acting with Awareness Parcel 2; Awa P3 = Acting with Awareness Parcel 3; Obs P1 = Observing Parcel 1; Obs P2 = Observing Parcel 2; Obs P3 = Observing Parcel 3; NR P1 = Nonreacting Parcel 1; NR P2 = Nonreacting Parcel 2; NR P3 = Nonreacting Parcel 3.³⁴

³⁴ Refer to footnote 29.

Table 3.11

Correlations between the Parcelled Subscale Scores of the FFMQ at Time 2

	NJ P1	NJ P2	NJ P3	Des P1	Des P2	Des P3	Awa P1	Awa P2	Awa P3	Obs P1	Obs P2	Obs P3	NR P1	NR P2
NJ P2	.81**	-												
NJ P3	.80**	.80**	-											
Des P1	.22**	.19**	.30**	-										
Des P2	.21**	.18**	.27**	.85**	-									
Des P3	.30**	.27**	.35**	.84**	.84**	-								
Awa P1	.39**	.35**	.40**	.29**	.34**	.37**	-							
Awa P2	.38**	.35**	.39**	.24**	.32**	.35**	.82**	-						
Awa P3	.36**	.33**	.38**	.32**	.35**	.39**	.81**	.75**	-					
Obs P1	.12*	.09	.21**	.40**	.38**	.38**	.20**	.23**	.17**	-				
Obs P2	-.02	-.01	.08**	.33**	.34**	.27**	.12*	.16**	.06	.73**	-			
Obs P3	-.01	.02	.04	.32**	.33**	.26**	.08	.09	.04	.61**	.60**	-		
NR P1	.29**	.27**	.27**	.29**	.32**	.33**	.32**	.36**	.27**	.34**	.32**	.25**	-	
NR P2	.25**	.28**	.31**	.36**	.37**	.38**	.29**	.27**	.24**	.34**	.32**	.18**	.68**	-
NR P3	.24**	.20**	.23**	.28**	.29**	.31**	.24**	.28**	.24**	.34**	.36**	.26**	.75**	.63**

Note. * $p < .05$, ** $p < .01$. All significant tests were one-tailed. NJP1 = Nonjudging Parcel 1; NJP2 = Nonjudging Parcel 2; NJP3 = Nonjudging Parcel 3; DesP1 = Describing Parcel 1; DesP2 = Describing Parcel 2; DesP3 = Describing Parcel 3; AwaP1 = Acting with Awareness Parcel 1; AwaP2 = Acting with Awareness Parcel 2; AwaP3 = Acting with Awareness Parcel 3; ObsP1 = Observing Parcel 1; ObsP2 = Observing Parcel 2; ObsP3 = Observing Parcel 3; NRP1 = Nonreacting Parcel 1; NRP2 = Nonreacting Parcel 2; NRP3 = Nonreacting Parcel 3.³⁵

³⁵ Refer to footnote 29.

Table 3.12

Correlations between the Parcelled Subscale Scores of the FFMQ at Time 3

	NJ P1	NJ P2	NJ P3	Des P1	Des P2	Des P3	Awa P1	Awa P2	Awa P3	Obs P1	Obs P2	Obs P3	NR P1	NR P2
NJ P2	.87**	-												
NJ P3	.84**	.83**	-											
Des P1	.32**	.35**	.35**	-										
Des P2	.28**	.29**	.29**	.87**	-									
Des P3	.32**	.33**	.35**	.86**	.84**	-								
Awa P1	.41**	.40**	.43**	.28**	.31**	.32**	-							
Awa P2	.40**	.42**	.41**	.27**	.31**	.31**	.84**	-						
Awa P3	.40**	.41**	.44**	.30**	.32**	.33**	.84**	.81**	-					
Obs P1	.12*	.16**	.25**	.30**	.30**	.27**	.14*	.17**	.15**	-				
Obs P2	.03	.06	.11	.27**	.33**	.26**	.05	.09	.03	.73**	-			
Obs P3	.04	.12*	.16	.20**	.25**	.14*	.10	.12*	.09	.58**	.54**	-		
NR P1	.32**	.36**	.36**	.27**	.32**	.30**	.30**	.36**	.32**	.38**	.37**	.27**	-	
NR P2	.36**	.37**	.36**	.32**	.34**	.36**	.30**	.33**	.30**	.35**	.30**	.25**	.68**	-
NR P3	.35**	.36**	.39**	.30**	.31**	.32**	.32**	.34**	.34**	.40**	.30**	.29**	.75**	.69**

Note. * $p < .05$, ** $p < .01$. All significant tests were one-tailed. NJP1 = Nonjudging Parcel 1; NJP2 = Nonjudging Parcel 2; NJP3 = Nonjudging Parcel 3; DesP1 = Describing Parcel 1; DesP2 = Describing Parcel 2; DesP3 = Describing Parcel 3; AwaP1 = Acting with Awareness Parcel 1; AwaP2 = Acting with Awareness Parcel 2; AwaP3 = Acting with Awareness Parcel 3; ObsP1 = Observing Parcel 1; ObsP2 = Observing Parcel 2; ObsP3 = Observing Parcel 3; NRP1 = Nonreacting Parcel 1; NRP2 = Nonreacting Parcel 2; NRP3 = Nonreacting Parcel 3.³⁶

³⁶ Refer to footnote 29.

Trait TMS Analyses

The 13 items of the Trait TMS (Davis et al., 2009) were stipulated to load onto the relevant two factors proposed by the authors (See Appendix N). Using methods recommended by Little et al. (2002), items were assigned to a parcel based on the weight of the factor loadings obtained³⁷. For example, using the items that are proposed to load onto the Curiosity factor, the highest three loadings were assigned to each of the three parcels. Then the lowest three item loadings were added to each of these parcels. This procedure continued until all scale items were assigned to their relevant parcel. This yielded a total of 6 parcels (3 per factor), each averaging 2-3 items per parcel. Parcels contained the same items at each time point. The hypothesised 2-factor model yielded some fit indices that fell below acceptable levels across all three time points (see Table 3.13). Recall, a ratio of less than 3 for χ^2/df is considered ideal, and the RMSEA is considered acceptable with values under .06 (Hu & Bentler, 1999). On the other hand, the obtained IFI, CFI, and sRMR indices were good.

Table 3.13

Goodness-of-Fit Statistics for the Hypothesised 2-factor CFA Model of the Trait TMS at Three Time Points

	χ^2	Df	χ^2/df	CFI	RMSEA	sRMR	IFI
Time 1	34.62	8	4.33	.97	.10	.06	.97
Time 2	30.06	8	3.76	.98	.09	.05	.98
Time 3	27.46	8	3.43	.98	.09	.04	.98

Note. χ^2 = chi-square; df = degrees of freedom; χ^2/df = the ratio of chi-square to degrees of freedom; CFI = Comparative Fit Index; RMSEA = Root Mean Square Error of Approximation; sRMR = standardised Root Mean Square Residual; IFI = Incremental Fit Index.

To investigate this modest-fitting model further, an Exploratory Factor Analysis (EFA) at each time point was conducted to explore whether the stipulated factor weights (according to Davis et al., 2009) loaded onto their proposed factors. The EFA revealed two distinct factors, supporting Davis et al.'s 2-factor model, though, item 1 (proposed to load on the Decentering factor) was seen to double load at each time point, and item 4 (also proposed to load on the Decentering factor) double loaded at Time 2, but loaded on the Curiosity factor at both Time 1 and Time 3. In an attempt to improve model fit indices, items 1 and 4 were removed from the model and a further CFA was conducted at each time point. The model fit indices improved considerably at all three time points (see Table 3.14) suggesting that a

³⁷ According to Little et al. (2002), this method of assigning items is useful when an instrument has few factors in order to derive parcels that are equally balanced.

statistically better fitting model could be attained if these two items were removed from the model. However, for theoretical reasons and to be consistent with published research, all further statistical analyses in the present study will use the original proposed Trait TMS (Davis et al., 2009) factor structure, rather than the revised version I propose here. For future researchers who use this scale, if data yield a mediocre fit to the hypothesised factor structure, possible deletion of items 1 and 4 would be worthy of further investigation.

Table 3.14

Goodness-of-Fit Statistics for the Revised 2-factor CFA Model of the Trait TMS at Three Time Points

	χ^2	df	χ^2/df	CFI	RMSEA	sRMR	IFI
Time 1	12.87	8	1.61	.99	.04	.03	.99
Time 2	15.16	8	1.90	.99	.05	.03	.99
Time 3	22.17	8	2.77	.99	.07	.04	.99

Note. χ^2 = chi-square; *df* = degrees of freedom; χ^2/df = the ratio of chi-square to degrees of freedom; CFI = Comparative Fit Index; RMSEA = Root Mean Square Error of Approximation; sRMR = Standardised Root Mean Square Residual; IFI = Incremental Fit Index.

At each time point the 2-factor CFAs are schematically represented in Figures 3.4, 3.5, and 3.6.

Figure 3.4. Confirmatory factor analysis of the Trait TMS at Time 1. All coefficients are standardised regression coefficients. *** $p < .001$. Cur P1 = Curiosity Parcel 1; Cur P2 = Curiosity Parcel 2; Cur P3 = Curiosity Parcel 3; Dec P1 = Decentering Parcel 1; Dec P2 = Decentering Parcel 2; Dec P3 = Decentering Parcel 3.³⁸

³⁸ See Appendix O for the parcelled items of the Trait TMS.

Figure 3.5. Confirmatory factor analysis of the Trait TMS at Time 2. All coefficients are standardised regression coefficients. *** $p < .001$. Cur P1 = Curiosity Parcel 1; Cur P2 = Curiosity Parcel 2; Cur P3 = Curiosity Parcel 3; Dec P1 = Decentering Parcel 1; Dec P2 = Decentering Parcel 2; Dec P3 = Decentering Parcel 3.³⁹

³⁹ Refer to footnote 38.

Figure 3.6. Confirmatory factor analysis of the Trait TMS at Time 3. All coefficients are standardised regression coefficients. *** $p < .001$. Cur P1 = Curiosity Parcel 1; Cur P2 = Curiosity Parcel 2; Cur P3 = Curiosity Parcel 3; Dec P1 = Decentering Parcel 1; Dec P2 = Decentering Parcel 2; Dec P3 = Decentering Parcel 3.⁴⁰

⁴⁰ Refer to footnote 38.

Descriptive Statistics

Descriptive statistics for the parcelled factors of the Trait TMS at Time 1, Time 2, and Time 3 are presented in Table 3.15.

Table 3.15

Descriptive Statistics for the Parcelled Factors of the Trait TMS at Three Time Points

	Parcel 1		Parcel 2		Parcel 3	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Time 1						
Curiosity	2.08	0.99	2.23	1.06	2.37	1.02
Decentering	1.86	0.79	1.83	0.84	1.83	0.93
Time 2						
Curiosity	2.08	1.02	2.16	1.07	2.30	1.04
Decentering	1.69	0.84	1.76	0.93	1.77	0.94
Time 3						
Curiosity	2.01	1.04	2.09	1.07	2.33	1.08
Decentering	1.74	0.86	1.80	0.88	1.83	0.92

Note. See Appendix O for a list of items allocated within factor parcels.

Correlations

Intercorrelations of the parcelled subscale scores of the Trait TMS at all three time points are presented in Table 3.16. Parcels within a factor yielded strong positive correlations for the Curiosity factor across time, ranging from .70 to .84, and average positive correlations for the Decentering factor, ranging from .44 to .61. The range in correlations indicates that the parcelled items within a factor are measuring a similar component of mindfulness with the Curiosity factor being most strongly related.

The first objective of the current study was to replicate the 2-factor scale of the Trait TMS proposed by Davis et al. (2009). To my knowledge, a psychometric examination of this new trait mindfulness measure has not yet been conducted, therefore, results of the present study offers new support for the validation and reliability of this measure. The 2-factor model was replicated, albeit, with a modest-fitting model to the data. Earlier I proposed a revised model to improve the model fit by removing two double loaded items, and would recommend future researchers to continue empirically validating this measure by attempting to replicate its factor structure. Objective 2 of the present study will further examine this measure's reliability by exploring the measure's invariance across time.

Table 3.16

Correlations between the Parcelled Subscale Scores of the Trait TMS at Three Time points

	Cur P1	Cur P2	Cur P3	Dec P1	Dec P2	Dec P3
Time 1						
Cur P1	-					
Cur P2	.79**	-				
Cur P3	.72**	.70**	-			
Dec P1	.47**	.43**	.33**	-		
Dec P2	.30**	.24**	.22**	.45**	-	
Dec P3	.20**	.16**	.11	.44**	.48**	-
Time 2						
Cur P1	-					
Cur P2	.84**	-				
Cur P3	.74**	.76**	-			
Dec P1	.55**	.55**	.42**	-		
Dec P2	.42**	.42**	.34**	.58**	-	
Dec P3	.35**	.34**	.27**	.56**	.53**	-
Time 3						
Cur P1	-					
Cur P2	.81**	-				
Cur P3	.74**	.79**	-			
Dec P1	.55**	.54**	.47**	-		
Dec P2	.41**	.38**	.39**	.61**	-	
Dec P3	.29**	.31**	.25**	.59**	.55**	-

Note. ** $p < .01$. All significant tests were one-tailed. Cur P1 = Curiosity Parcel 1; Cur P2 = Curiosity Parcel 2; Cur P3 = Curiosity Parcel 3; Dec P1 = Decentering Parcel 1; Dec P2 = Decentering Parcel 2; Dec P3 = Decentering Parcel 3.⁴¹

Testing for Measurement Invariance

To assess whether a psychometric instrument measures the same construct(s) in exactly the same way across time and across different groups (the present study's second objective), explicit testing for factorial invariance is recommended (Byrne & van de Vijver, 2010; Milfont & Fischer, 2010). SEM techniques are the most widely accepted and commonly used method for this assessment (Byrne & van de Vijver; Cheung & Rensvold, 2002). A series of steps tests for the equivalence of factorial structure over time (Byrne et al., 1989; Byrne & van de Vijver, 2010; Cheung & Rensvold; Vandenberg & Lance, 2000). For example, the first procedural step is to establish a configural (or baseline) model for goodness-of-fit (i.e., the analysis of χ^2 , df , χ^2/df , CFI, RMSEA, sRMR, and IFI, as suggested by Hu & Bentler, 1999). Only when a well-fitting configural model is established is it appropriate to continue with further invariance tests (Vandenberg & Lance, 2000).

Step 2 tests the measurement model for measurement invariance (MI); for instance, all factor loadings are constrained equal across the model (Byrne & van de Vijver, 2010). Step 3 then tests the structural model for structural invariance (SI), i.e., all covariances among

⁴¹ Refer to footnote 38.

the factors are constrained equal (Byrne & van de Vijver). These sequential steps address *full* measurement invariance (Byrne et al., 1989); however, all parameters held equal across a model may in some cases be too restrictive (Milfont & Fischer, 2010; Vandenberg & Lance, 2000). Byrne and colleagues and Vandenberg and Lance, therefore, suggest that the concept of *partial* invariance (where only the nonsignificant parameters are constrained to be invariant) is acceptable, though only if these parameters make up the minority. Full or partial invariance of a measure then provides the justification for testing group differences (Vandenberg & Lance, 2000).

The difference in chi-square (χ^2 difference test or $\Delta\chi^2$) between two models (for example, when comparing between different time points or between groups) is the traditional test for measurement equality (Byrne & van de Vijver, 2010; Cheung & Rensvold, 2002) in conjunction with other relevant model fit indices recommended by Hu and Bentler (1999). A nonsignificant χ^2 change value indicates that the models compared are identical or invariant (Cheung & Rensvold). Recent debate, however, suggests there are several limitations in using the difference in chi-square when assessing equality in a measure (Cheung & Rensvold, 2002; Milfont & Fischer, 2010; Vandenberg & Lance, 2000)⁴². Cheung and Rensvold propose supplementing the $\Delta\chi^2$ with examining critical values for the change in comparative fit index (ΔCFI). Changes in CFI of .01 or less indicate the compared models are invariant, differences falling between .01 and .02 suggest differences may exist, and when the change in CFI is greater than .02, it is strongly indicative of noninvariance (Cheung & Rensvold, 2002). To test for factorial invariance in the present study, both the $\Delta\chi^2$ and ΔCFI tests will be reported. The results of longitudinal invariance analyses for both measures of mindfulness follow.

FFMQ measurement invariance

Time 1 versus Time 2

Summarised in Table 3.17 are the overall goodness-of-fit indices and the tests of differences in fit between Time 1 and Time 2 administrations of the FFMQ. As can be seen, factorial invariance is supported between these two models.

⁴² A detailed discussion of the different tests of invariance is beyond the scope of this thesis and I refer the reader to several articles that address this issue in length (Byrne et al., 1989; Byrne & van de Vijver, 2010; Cheung & Rensvold, 2002; Vandenberg & Lance, 2000).

Table 3.17

Goodness-of-Fit Statistics for Tests of Invariance for the FFMQ between Time 1 and Time 2

Model description	Comparative model	χ^2 (df)	χ^2/df	RMSEA	sRMR	IFI	$\Delta\chi^2$ (Δdf)	CFI (ΔCFI)	Statistical significance
1. Configural model; no equality constraints imposed	—	295.73 (160)	1.85	.04	.04	.98	—	.9799	—
2. Measurement model; all factor loadings constrained equal	2 versus 1	304.2 (170)	1.79	.04	.04	.98	8.48 (10)	.9802 (.0003)	<i>ns</i> ($p = .58$)
3. Structural model; Model 2 with covariances among all five factors constrained equal	3 versus 2	315.52 (180)	1.75	.03	.05	.98	11.31 (10)	.9800 (.0002)	<i>ns</i> ($p = .33$)

Note. χ^2 = chi-square; df = degrees of freedom; χ^2/df = the ratio of chi-square to degrees of freedom; RMSEA = Root Mean Square Error of Approximation; sRMR = standardised Root Mean Square Residual; IFI = Incremental Fit Index; $\Delta\chi^2$ = difference in chi square; Δdf = difference in degrees of freedom; CFI = Comparative Fit Index; ΔCFI = difference in CFI. *ns* = nonsignificant. Bonferroni adjustment was $p < .005$.

Time 2 versus Time 3

Table 3.18 presents the overall goodness-of-fit indices and the tests of differences in fit between Time 2 and Time 3 administrations of the FFMQ. Again, factorial invariance is supported between these two models.

Table 3.18

Goodness-of-Fit Statistics for Tests of Invariance for the FFMQ between Time 2 and Time 3

Model description	Comparative model	χ^2 (df)	χ^2/df	RMSEA	sRMR	IFI	$\Delta\chi^2$ (Δdf)	CFI (ΔCFI)	Statistical significance
1. Configural model; no equality constraints imposed	—	268.32 (160)	1.68	.03	.04	.99	—	.9852	—
2. Measurement model; all factor loadings constrained equal	2 versus 1	278.09 (170)	1.64	.03	.04	.99	8.48 (10)	.9853 (.0001)	<i>ns</i> ($p = .46$)
3. Structural model; Model 2 with covariances among all five factors constrained equal	3 versus 2	284.79 (180)	1.58	.03	.05	.99	11.31 (10)	.9858 (.0005)	<i>ns</i> ($p = .75$)

Note. χ^2 = chi-square; df = degrees of freedom; χ^2/df = the ratio of chi-square to degrees of freedom; RMSEA = Root Mean Square Error of Approximation; sRMR = standardised Root Mean Square Residual; IFI = Incremental Fit Index; $\Delta\chi^2$ = difference in chi square; Δdf = difference in degrees of freedom; CFI = Comparative Fit Index; ΔCFI = difference in CFI. *ns* = nonsignificant. Bonferroni adjustment was $p < .005$.

Time 1 versus Time 3

As shown in Table 3.19, analyses reveal that the factor structure of the FFMQ between Time 1 and Time 3 is also invariant.

Table 3.19

Goodness-of-Fit Statistics for Tests of Invariance for the FFMQ between Time 1 and Time 3

Model description	Comparative model	χ^2 (df)	χ^2/df	RMSEA	sRMR	IFI	$\Delta\chi^2$ (Δdf)	CFI (ΔCFI)	Statistical significance
1. Configural model; no equality constraints imposed	—	274.58 (160)	1.72	.03	.04	.98	—	.9838	—
2. Measurement model; all factor loadings constrained equal	2 versus 1	280.65 (170)	1.65	.03	.04	.98	6.07 (10)	.9844 (.0006)	<i>ns</i> ($p = .81$)
3. Structural model; Model 2 with covariances among all five factors constrained equal	3 versus 2	291.06 (180)	1.62	.03	.04	.98	10.41 (10)	.9843 (.0001)	<i>ns</i> ($p = .41$)

Note. χ^2 = chi-square; df = degrees of freedom; χ^2/df = the ratio of chi-square to degrees of freedom; RMSEA = Root Mean Square Error of Approximation; sRMR = standardised Root Mean Square Residual; IFI = Incremental Fit Index; $\Delta\chi^2$ = difference in chi square; Δdf = difference in degrees of freedom; CFI = Comparative Fit Index; ΔCFI = difference in CFI. *ns* = nonsignificant. Bonferroni adjustment was $p < .005$.

In sum, testing factorial invariance across three separate time points suggests that the FFMQ (Baer et al., 2006) measures mindfulness in a very similar way across time. Specifically, results from the present study's second objective demonstrate that the FFMQ exhibits both measurement and structural equivalence, providing further empirical support for the measure's validation and reliability for this trait measure of mindfulness.

Trait TMS measurement invariance

Time 1 versus Time 2

A summary of the overall goodness-of-fit indices and the tests of differences in fit between Time 1 and Time 2 administrations of the Trait TMS are presented in Table 3.20. Factorial invariance is supported over this time period.

Table 3.20

Goodness-of-Fit Statistics for Tests of Invariance for the Trait TMS between Time 1 and Time 2

Model description	Comparative model	χ^2 (df)	χ^2/df	RMSEA	sRMR	IFI	$\Delta\chi^2$ (Δdf)	CFI (ΔCFI)	Statistical significance
1. Configural model; no equality constraints imposed	–	64.68 (16)	4.04	.07	.06	.97	–	.9745	–
2. Measurement model; all factor loadings constrained equal	2 versus 1	64.77 (20)	3.24	.06	.06	.98	.09 (4)	.9747 (.0002)	<i>ns</i> ($p = .10$)
3. Structural model; Model 2 with the covariance between the two factors constrained equal	3 versus 2	66.23 (21)	3.15	.06	.07	.98	1.46 (1)	.9744 (.0003)	<i>ns</i> ($p = .23$)

Note. χ^2 = chi-square; df = degrees of freedom; χ^2/df = the ratio of chi-square to degrees of freedom; RMSEA = Root Mean Square Error of Approximation; sRMR = standardised Root Mean Square Residual; IFI = Incremental Fit Index; $\Delta\chi^2$ = difference in chi square; Δdf = difference in degrees of freedom; CFI = Comparative Fit Index; ΔCFI = difference in CFI. *ns* = nonsignificant. Bonferroni adjustment was $p < .01$.

Time 2 versus Time 3

Both measurement and structural invariance is shown between Time 2 and Time 3 administration of the Trait TMS, as evidenced in Table 3.21.

Table 3.21

Goodness-of-Fit Statistics for Tests of Invariance for the Trait TMS between Time 2 and Time 3

Model description	Comparative model	χ^2 (df)	χ^2/df	RMSEA	sRMR	IFI	$\Delta\chi^2$ (Δdf)	CFI (ΔCFI)	Statistical significance
1. Configural model; no equality constraints imposed	–	57.51 (16)	3.60	.06	.05	.98	–	.9797	–
2. Measurement model; all factor loadings constrained equal	2 versus 1	59.21 (20)	2.96	.06	.05	.98	1.70 (4)	.9808 (.0011)	<i>ns</i> ($p = .79$)
3. Structural model; Model 2 with the covariance between the two factors constrained equal	3 versus 2	60.14 (21)	2.86	.05	.06	.98	.93 (1)	.9809 (.0001)	<i>ns</i> ($p = .33$)

Note. χ^2 = chi-square; df = degrees of freedom; χ^2/df = the ratio of chi-square to degrees of freedom; RMSEA = Root Mean Square Error of Approximation; sRMR = standardised Root Mean Square Residual; IFI = Incremental Fit Index; $\Delta\chi^2$ = difference in chi square; Δdf = difference in degrees of freedom; CFI = Comparative Fit Index; ΔCFI = difference in CFI. *ns* = nonsignificant. Bonferroni adjustment was $p < .01$.

Time 1 versus Time 3

Table 3.22 presents the overall goodness-of-fit indices and the tests of differences in fit between Time 1 and Time 3 administrations of the Trait TMS. Again, factorial invariance is evidenced over this time period.

Table 3.22

Goodness-of-Fit Statistics for Tests of Invariance for the Trait TMS between Time 1 and Time 3

Model description	Comparative model	χ^2 (df)	χ^2/df	RMSEA	sRMR	IFI	$\Delta\chi^2$ (Δdf)	CFI (ΔCFI)	Statistical significance
1. Configural model; no equality constraints imposed	–	62.07 (16)	3.88	.07	.06	.98	–	.9764	–
2. Measurement model; all factor loadings constrained equal	2 versus 1	64.19 (20)	3.21	.06	.06	.98	2.12 (4)	.9773 (.0009)	<i>ns</i> ($p = .71$)
3. Structural model; Model 2 with the covariance between the two factors constrained equal	3 versus 2	68.84 (21)	3.28	.06	.08	.98	4.65 (1)	.9755 (.0018)	<i>ns</i> ($p = .03$)

Note. χ^2 = chi-square; df = degrees of freedom; χ^2/df = the ratio of chi-square to degrees of freedom; RMSEA = Root Mean Square Error of Approximation; sRMR = standardised Root Mean Square Residual; IFI = Incremental Fit Index; $\Delta\chi^2$ = difference in chi square; Δdf = difference in degrees of freedom; CFI = Comparative Fit Index; ΔCFI = difference in CFI. *ns* = nonsignificant. Bonferroni adjustment was $p < .01$.

To conclude, factorial invariance analyses of the Trait TMS indicate this measure functions similarly across time, i.e., it reliably measures the construct of mindfulness at different time points. Results from the present study's second objective, therefore, provide empirical validation for Davis et al.'s (2009) proposed 2-factor model of mindfulness, suggesting that the Trait TMS is a stable and sound instrument for measuring the mindfulness construct.

Measurement Invariance between Meditators and Nonmeditators

A further aim of the present study's second objective was to explore longitudinal analyses of invariance between a sample of meditators and a sample of nonmeditators. Research mentioned previously (Baer et al., 2006, 2008; Grossman, 2008; Van Dam et al., 2009) purports that individuals with meditation experience may differ in their interpretation of mindfulness items compared to individuals without meditation experience. Factorial invariance analyses on the FFMQ and Trait TMS comparing these two groups, aim to investigate whether group membership influences how an individual interprets mindfulness scale items. Recall, approximately a third ($n = 117$) of participants in the present study claimed to currently partake in meditation, compared with two thirds without meditation experience ($n = 202$).

FFMQ analyses at Time 1

Table 3.23 presents goodness-of-fit indices and the tests of differences for the FFMQ between meditators and nonmeditators at Time 1. Factorial invariance between the two groups was revealed, indicating meditators and nonmeditators did not differ in their responses to the measure's items at this time point. According to Baer et al. (2006, 2008), some differences should have been obtained. Specifically, the authors found the Observing factor was only evident in participants with meditation experience. Invariance analyses at Time 1 in the present study, therefore, do not support Baer et al.'s findings.

Table 3.23

Goodness-of-Fit Statistics for Tests of Invariance for the FFMQ between Meditators and Nonmeditators at Time 1

Model description	Comparative model	χ^2 (df)	χ^2/df	RMSEA	sRMR	IFI	$\Delta\chi^2$ (Δdf)	CFI (ΔCFI)	Statistical significance
1. Configural model; no equality constraints imposed	—	233.34 (160)	1.46	.04	.06	.98	—	.9767	—
2. Measurement model; all factor loadings constrained equal	2 versus 1	245.68 (170)	1.45	.04	.06	.98	2.36 (10)	.9760 (.0007)	<i>ns</i> ($p = .26$)
3. Structural model; Model 2 with covariances among all five factors constrained equal	3 versus 2	263.74 (180)	1.47	.04	.08	.97	18.06 (10)	.9734 (.0026)	<i>ns</i> ($p = .05$)

Note. χ^2 = chi-square; df = degrees of freedom; χ^2/df = the ratio of chi-square to degrees of freedom; RMSEA = Root Mean Square Error of Approximation; sRMR = standardised Root Mean Square Residual; IFI =

Incremental Fit Index; $\Delta\chi^2$ = difference in chi square; Δdf = difference in degrees of freedom; CFI = Comparative Fit Index; ΔCFI = difference in CFI. *ns* = nonsignificant. Bonferroni adjustment was $p < .005$.

FFMQ analyses at Time 2

Summarised in Table 3.24 are goodness-of-fit indices and tests of differences for the FFMQ at Time 2 between meditators and nonmeditators. In contrast with Time 1, the FFMQ yielded partial structural invariance between these two groups at Time 2. When all covariances were constrained equal (Model 3, as seen in Table 3.24) the model yielded a significant result. To investigate which covariance(s) were significantly different between these two groups, covariances were systematically constrained one at a time (as recommended by Byrne & van de Vijver, 2010). This constraining process revealed that the covariance between the factors of Nonreacting and Acting with Awareness differed across the two groups, with meditators scoring higher (.63) than nonmeditators (.20)⁴³.

Table 3.24

Goodness-of-Fit Statistics for Tests of Invariance for the FFMQ between Meditators and Nonmeditators at Time 2

Model description	Comparative model	χ^2 (df)	χ^2/df	RMSEA	sRMR	IFI	$\Delta\chi^2$ (Δdf)	CFI (ΔCFI)	Statistical significance
1. Configural model; no equality constraints imposed	—	240.40 (160)	1.50	.04	.05	.98	—	.9768	—
2. Measurement model; all factor loadings constrained equal	2 versus 1	251.35 (170)	1.48	.04	.05	.98	10.95 (10)	.9766 (.0002)	<i>ns</i> ($p = .36$)
3. Structural model; Model 2 with covariances among all five factors constrained equal	3 versus 2	280.58 (180)	1.56	.04	.09	.97	29.23 (10)	.9710 (.0056)	$p < .005$
3a. Model 2 with the covariance between NR and AWA unconstrained, and all other covariances constrained	3a versus 2	267.09 (179)	1.49	.04	.07	.98	15.74 (9)	.9746 (.0036)	<i>ns</i> ($p = .07$)

Note. χ^2 = chi-square; df = degrees of freedom; χ^2/df = the ratio of chi-square to degrees of freedom; RMSEA = Root Mean Square Error of Approximation; sRMR = standardised Root Mean Square Residual; IFI = Incremental Fit Index; $\Delta\chi^2$ = difference in chi square; Δdf = difference in degrees of freedom; CFI =

⁴³ Values are standardised regression coefficients (beta weights).

Comparative Fit Index; ΔCFI = difference in CFI. NR = Nonreacting; AWA = Acting with awareness. *ns* = nonsignificant. Bonferroni adjustment was $p < .005$.

FFMQ analyses at Time 3

Goodness-of-fit statistics and tests for differences for Time 3 between meditators and nonmeditators are presented in Table 3.25. Comparable findings with Time 2 were revealed, i.e., Model 3 (as seen in Table 3.25) yielded a significant result. After constraining covariances one by one, again, the covariance between Nonreacting and Acting with Awareness was found to differ between meditators (.60) and nonmeditators (.28)⁴⁴, indicating partial structural invariance.

Table 3.25

Goodness-of-Fit Statistics for Tests of Invariance for the FFMQ between Meditators and Nonmeditators at Time 3

Model description	Comparative model	χ^2 (df)	χ^2/df	RMSEA	sRMR	IFI	$\Delta\chi^2$ (Δdf)	CFI (ΔCFI)	Statistical significance
1. Configural model; no equality constraints imposed	–	251.25 (160)	1.57	.04	.04	.98	–	.9758	–
2. Measurement model; all factor loadings constrained equal	2 versus 1	270.71 (170)	1.59	.04	.04	.97	19.46 (10)	.9733 (.0025)	<i>ns</i> ($p = .03$)
3. Structural model; Model 2 with covariances among all five factors constrained equal	3 versus 2	303.00 (180)	1.68	.05	.09	.97	32.29 (10)	.9673 (.006)	$p < .005$
3a. Model 2 with the covariance between NR and AWA unconstrained, and all other covariances constrained	3a versus 2	292.95 (179)	1.64	.05	.07	.97	22.24 (9)	.9698 (.0025)	<i>ns</i> ($p = .01$)

Note. χ^2 = chi-square; df = degrees of freedom; χ^2/df = the ratio of chi-square to degrees of freedom; RMSEA = Root Mean Square Error of Approximation; sRMR = standardised Root Mean Square Residual; IFI = Incremental Fit Index; $\Delta\chi^2$ = difference in chi square; Δdf = difference in degrees of freedom; CFI = Comparative Fit Index; ΔCFI = difference in CFI. NR = Nonreacting; AWA = Acting with awareness. *ns* = nonsignificant. Bonferroni adjustment was $p < .005$.

⁴⁴ Values are standardised regression coefficients (beta weights).

In sum, longitudinal tests of invariance on the FFMQ (Baer et al., 2006) between meditators and nonmeditators demonstrated that meditators viewed items designed to measure mindfulness in much the same way as nonmeditators (inconsistent with Baer et al., 2006, 2008). Although one covariance was noninvariant (between Nonreacting and Acting with Awareness), the decrease in the value of CFI (ΔCFI) was not greater than .01 in magnitude; indicating, according to one view (Cheung & Rensvold, 2002), that the invariance hypothesis should *not* be rejected. Partial structural invariance in this case, therefore, indicates that these two groups of individuals did not significantly differ in their interpretation of the FFMQ.

Trait TMS analyses at Time 1

Table 3.26 presents goodness-of-fit indices and the tests of differences for the Trait TMS between meditators and nonmeditators at Time 1. Invariance between these two groups was revealed, indicating no significant differences between meditators and nonmeditators.

Table 3.26

Goodness-of-Fit Statistics for Tests of Invariance for the Trait TMS between Meditators and Nonmeditators at Time 1

Model description	Comparative model	χ^2 (df)	χ^2/df	RMSEA	sRMR	IFI	$\Delta\chi^2$ (Δdf)	CFI (ΔCFI)	Statistical significance
1. Configural model; no equality constraints imposed	—	36.62 (16)	2.29	.06	.06	.98	—	.9745	—
2. Measurement model; all factor loadings constrained equal	2 versus 1	44.34 (20)	2.22	.06	.06	.97	7.72 (4)	.9699 (.0046)	<i>ns</i> ($p = .10$)
3. Structural model; Model 2 with the covariance between the two factors constrained equal	3 versus 2	44.87 (21)	2.14	.06	.06	.97	.53 (1)	.9705 (.0006)	<i>ns</i> ($p = .47$)

Note. χ^2 = chi-square; df = degrees of freedom; χ^2/df = the ratio of chi-square to degrees of freedom; RMSEA = Root Mean Square Error of Approximation; sRMR = Standardised Root Mean Square Residual; IFI = Incremental Fit Index; $\Delta\chi^2$ = difference in chi square; Δdf = difference in degrees of freedom; CFI = Comparative Fit Index; ΔCFI = difference in CFI. *ns* = nonsignificant. Bonferroni adjustment was $p < .01$.

Trait TMS analyses at Time 2

Time 2 results are summarised in Table 3.27. Tests of equivalence again revealed full measurement invariance between meditators and nonmeditators, indicating these two groups did not differ at the Time 2 administration of the Trait TMS.

Table 3.27

Goodness-of-Fit Statistics for Tests of Invariance for the Trait TMS between Meditators and Nonmeditators at Time 2

Model description	Comparative model	χ^2 (df)	χ^2/df	RMSEA	sRMR	IFI	$\Delta\chi^2$ (Δdf)	CFI (ΔCFI)	Statistical significance
1. Configural model; no equality constraints imposed	–	24.16 (16)	1.51	.04	.04	.99	–	.9921	–
2. Measurement model; all factor loadings constrained equal	2 versus 1	26.59 (20)	1.33	.03	.04	.99	2.43 (4)	.9936 (.0015)	<i>ns</i> ($p = .66$)
3. Structural model; Model 2 with the covariance between the two factors constrained equal	3 versus 2	26.60 (21)	1.27	.03	.04	.10	.01 (1)	.9945 (.0009)	<i>ns</i> ($p = .92$)

Note. χ^2 = chi-square; df = degrees of freedom; χ^2/df = the ratio of chi-square to degrees of freedom; RMSEA = Root Mean Square Error of Approximation; sRMR = standardised Root Mean Square Residual; IFI = Incremental Fit Index; $\Delta\chi^2$ = difference in chi square; Δdf = difference in degrees of freedom; CFI = Comparative Fit Index; ΔCFI = difference in CFI. *ns* = nonsignificant. Bonferroni adjustment was $p < .01$.

Trait TMS analyses at Time 3

Goodness-of-fit statistics and invariance tests for Time 3 comparing meditators and nonmeditators are presented in Table 3.28. As can be seen, all tests were nonsignificant, suggesting meditators were no different to nonmeditators in responses to the Trait TMS at Time 3.

Table 3.28

Goodness-of-Fit Statistics for Tests of Invariance for the Trait TMS between Meditators and Nonmeditators at Time 3

Model description	Comparative model	χ^2 (df)	χ^2/df	RMSEA	sRMR	IFI	$\Delta\chi^2$ (Δdf)	CFI (ΔCFI)	Statistical significance
1. Configural model; no equality constraints imposed	—	43.31 (16)	2.71	.07	.08	.98	—	.9749	—
2. Measurement model; all factor loadings constrained equal	2 versus 1	49.03 (20)	2.45	.07	.08	.97	5.72 (4)	.9733 (.0016)	<i>ns</i> ($p = .22$)
3. Structural model; Model 2 with the covariance between the two factors constrained equal	3 versus 2	49.33 (21)	2.35	.07	.07	.97	.30 (1)	.9740 (.0007)	<i>ns</i> ($p = .58$)

Note. χ^2 = chi-square; df = degrees of freedom; χ^2/df = the ratio of chi-square to degrees of freedom; RMSEA = Root Mean Square Error of Approximation; sRMR = standardised Root Mean Square Residual; IFI = Incremental Fit Index; $\Delta\chi^2$ = difference in chi square; Δdf = difference in degrees of freedom; CFI = Comparative Fit Index; ΔCFI = difference in CFI. *ns* = nonsignificant. Bonferroni adjustment was $p < .01$.

To conclude, longitudinal invariance analyses on the Trait TMS (Davis et al., 2009) between meditators and nonmeditators yielded nonsignificant results at all three time points. This instrument designed to measure trait mindfulness appears to measure the construct in the same way (i.e., participants assigned similar meaning to the items in this measure over time), for individuals with and without meditation experience. Equivalency of a psychometric instrument across multiple groups satisfies the assumption that a measure functions similarly independent of group membership (Byrne & van de Vijver, 2010). As the Trait TMS currently lacks empirical investigation, the current study provides important new findings in support of the reliability and validity of this latest trait measure of mindfulness. Recall, the primary goal of Study 2 was to empirically examine and validate two measures of mindfulness and to assess whether group membership influences responses to these mindfulness items. Analyses reported above have addressed this primary goal. The third and final objective of the current study aims to explore the relationships *between* these two measures of mindfulness and to determine whether group membership has an influence on the strength of these relationships. The following section reports these analyses.

Convergent Validity between the FFMQ and Trait TMS

As discussed previously, only one empirical study (Davis et al., 2009) has investigated convergent validity between the FFMQ and the Trait TMS. Davis and colleagues hypothesised that the Trait TMS would be positively correlated with the FFMQ. Specifically, the authors found the Curiosity factor of the Trait TMS to be most strongly correlated with the Observing factor of the FFMQ, whereas, the Decentering factor of the Trait TMS was most strongly related to the Nonreacting factor of the FFMQ.

Davis et al.'s (2009) findings make theoretical sense when examining the instruments' items. For instance, items from the Observing factor (FFMQ) – “I pay attention to how my emotions affect my thoughts and behaviour” and “I notice how foods and drinks affect my thoughts, bodily sensations and emotions” – are conceptually quite comparable to items on the Curiosity factor (Trait TMS) – “I am curious about what I might learn about myself by taking notice of how I react to certain thoughts, feelings or sensations” and “I am curious about each of my thoughts and feelings as they occur”. Similarly, items on the Nonreacting factor (FFMQ) and the Decentering factor (Trait TMS) are also conceptually comparative, for example, “When I have distressing thoughts or images I am able just to notice them without reacting” (Nonreacting, FFMQ) and “I am aware of my thoughts and feelings without overidentifying with them” (Decentering, Trait TMS).

In the current study, findings obtained from confirmatory analytic techniques using SEM were congruent with Davis et al.'s (2009) findings at three separate time points (see Table 3.29 for Davis et al.'s correlations compared with the current study's). Covariances (beta weights) in the present study were mostly in the low to average range, primarily all positively significant, and the Curiosity (Trait TMS) and Observing (FFMQ) factors and Decentering (Trait TMS) and Nonreacting (FFMQ) factors were most strongly related to each other at all three time points, consistent with Davis et al.'s (2009) findings. For a schematical depiction of this CFA see Figure 3.7 and Table 3.30 for the corresponding covariances. These findings suggest that there is moderate construct overlap (convergent validity) between these two measures of mindfulness, as was expected.

Table 3.29

Correlations between the Trait TMS and FFMQ at Three Time Points compared with Davis et al. (2009)

	TMS Curiosity				TMS Decentering			
	T1	T2	T3	(Davis et al., 2009)	T1	T2	T3	(Davis et al., 2009)
FFMQ Nonreacting	.08	.20***	.26***	(.32*)	.63***	.63***	.73***	(.63*)
FFMQ Observing	.40***	.45***	.49***	(.51*)	.44***	.51***	.54***	(.37*)
FFMQ Awareness	.02	.13*	.16*	(.20*)	.22**	.21***	.15*	(.43*)
FFMQ Describing	.22***	.23***	.23***	(.20*)	.24***	.34***	.28***	(.21*)
FFMQ Nonjudging	.15*	.17**	.12**	(.15*)	.27***	.20**	.29***	(.51*)

Note. Values in parentheses are Davis et al.'s (2009) correlations between the Trait TMS and FFMQ. T1 = Time 1; T2 = Time 2; and T3 = Time 3.

Figure 3.7. Confirmatory factor analysis of the FFMQ and Trait TMS. *Note.* Refer to Table 3.30 for covariances at all three time points.

Table 3.30

Covariances between the FFMQ and the Trait TMS at Three Time Points

	NR	Obs	Awa	Des	NJ	Cur	Dec
Time 1							
NR	-						
Obs	.36***	-					
Awa	.40***	.24***	-				
Des	.31***	.41***	.43***	-			
NJ	.46***	.11	.44***	.38***	-		
Cur	.08	.40***	.02	.22***	.15*	-	
Dec	.63***	.44***	.22**	.24***	.27***	.50***	-
Time 2							
NR	-						
Obs	.45***	-					
Awa	.37***	.19**	-				
Des	.41***	.45***	.40***	-			
NJ	.34***	.09	.46***	.31***	-		
Cur	.20***	.36***	.13*	.23***	.17**	-	
Dec	.63***	.51***	.21***	.34***	.20**	.58***	-
Time 3							
NR	-						
Obs	.49***	-					
Awa	.41***	.14*	-				
Des	.40***	.36***	.36***	-			
NJ	.45***	.15*	.49***	.37***	-		
Cur	.26***	.45***	.16*	.23***	.12**	-	
Dec	.73***	.54***	.15*	.28***	.29***	.60***	-

Note. * $p < .05$, ** $p < .01$, *** $p < .001$. Boldface values indicate the strongest hypothesised correlations between the two measures. Values are standardised regression coefficients (beta weights). All significant tests were one-tailed. NR = Nonreacting (FFMQ); Obs = Observing (FFMQ); Awa = Acting with Awareness (FFMQ); Des = Describing (FFMQ); NJ = Nonjudging (FFMQ); Cur = Curiosity (Trait TMS); Dec = Decentering (Trait TMS).

Tests of invariance were employed to further examine the relationships between the FFMQ (Baer et al., 2006) and the Trait TMS (Davis et al., 2009) over time. Confirmatory analytic techniques compared an unconstrained model (the five factors of the FFMQ associated with the two factors of the Trait TMS) with a constrained version (all covariances between the two measures were held constant) of the same model, to explore whether the two instruments measured mindfulness in a similar way across time. Table 3.31 presents goodness-of-fit indices and tests of differences comparing the FFMQ and Trait TMS associations at three separate time points. As evidenced in Table 3.31, the associations between the two measures are invariant across time, indicating both instruments appear to correlate with each other in a similar way across multiple time points. Or alternatively, presumed equality in item content and the relations between the scales' factors is supported over time (Byrne & van de Vijver, 2010).

Table 3.31

Goodness-of-Fit Statistics for Tests of Invariance between the FFMQ and Trait TMS across Three Time Points

Model description	Comparative model	χ^2 (df)	χ^2/df	RMSEA	sRMR	IFI	$\Delta\chi^2$ (Δdf)	CFI (ΔCFI)	Statistical significance
Time 1 versus Time 2									
1. Configural model; no equality constraints imposed	—	641.56 (336)	1.91	.04	.05	.97	—	.9659	—
2. Structural model; all covariances between the FFMQ and Trait TMS constrained equal	2 versus 1	658.75 (357)	1.85	.04	.05	.97	17.19 (21)	.9663 (.0004)	<i>ns</i> ($p = .70$)
Time 2 versus Time 3									
1. Configural model; no equality constraints imposed	—	634.11 (336)	1.89	.04	.05	.97	—	.9700	—
2. Structural model; all covariances between the FFMQ and Trait TMS constrained equal	2 versus 1	648.67 (357)	1.82	.04	.05	.97	14.56 (21)	.9706 (.0006)	<i>ns</i> ($p = .84$)
Time 1 versus Time 3									
1. Configural model; no equality constraints imposed	—	653.23 (336)	1.94	.04	.05	.97	—	.9669	—
2. Structural model; all covariances between the FFMQ and Trait TMS constrained equal	2 versus 1	673.16 (357)	1.89	.04	.06	.97	19.93 (21)	.9670 (.0001)	<i>ns</i> ($p = .53$)

Note. χ^2 = chi-square; df = degrees of freedom; χ^2/df = the ratio of chi-square to degrees of freedom; RMSEA = Root Mean Square Error of Approximation; sRMR = standardised Root Mean Square Residual; IFI = Incremental Fit Index; $\Delta\chi^2$ = difference in chi square; Δdf = difference in degrees of freedom; CFI = Comparative Fit Index; ΔCFI = difference in CFI. *ns* = nonsignificant. Bonferroni adjustment was $p < .002$.

Convergent Validity between the FFMQ and Trait TMS: Comparing Meditators with Nonmeditators

The final goal of the present study was to investigate the relationships between the FFMQ and Trait TMS over time comparing meditators' scores to those of nonmeditators. This series of analyses aimed to investigate whether group membership influenced convergent validity of these two measures. Confirmatory analytic techniques compared an

unconstrained model (the five factors of the FFMQ associated with the two factors of the Trait TMS) with a constrained model (all covariances between the two measures were held constant) between meditators and nonmeditators at three points in time.

At Time 1 (see Table 3.32), goodness-of-fit statistics for test of invariance between the FFMQ and Trait TMS revealed invariance between these two groups, suggesting that after one administration of these measures the items were interpreted in much the same way, irrespective of meditation history. In contrast, however, at both Time 2 and Time 3, only partial invariance between meditators and nonmeditators was evidenced (see Table 3.32). All significantly different (i.e., noninvariant) covariances were higher in the group of meditators when compared with nonmeditators at both time points (refer to Table 3.33).

These results suggest that items designed to tap into the mindfulness construct become more consolidated or co-aligned for individuals who possess more meditation experience. As it is widely accepted that those who meditate are in general more mindful (Baer et al., 2006, 2008; Kabat-Zinn, 1990, 2003; Kabat-Zinn et al., 1992; Shapiro & Carlson, 2009; Van Dam et al., 2009), the sample of meditators in the present study may have become more familiar with the wording of items and their understanding of such terms (language such as *awareness*, *noticing*, and *accepting* are familiar terms used in meditation), and more so than nonmeditators.

The perceived sense of what construct is being tapped, and hence brought to mind, might not be as salient after just one administration of either measure, for both groups. This result argues for the utility of employing longitudinal data when investigating psychometric properties of a group of similar measures, and when using several comparison groups. The decrease in the value of CFI (ΔCFI) was, however, not greater than .01 in magnitude (as was also seen in prior analyses of meditators and nonmeditators in the current study), suggesting that although subtle differences between models may exist, according to Cheung and Rensvold (2002), it is not reason enough alone to reject the invariance hypothesis.

Table 3.32

Goodness-of-Fit Statistics for Tests of Invariance between the FFMQ and Trait TMS Comparing Meditators to Nonmeditators at Three Time Points

Model description	Comparative model	χ^2 (df)	χ^2/df	RMSEA	sRMR	IFI	$\Delta\chi^2$ (Δdf)	CFI (ΔCFI)	Statistical significance
Time 1									
1. Configural model; no equality constraints imposed	–	528.89 (336)	1.57	.04	.06	.96	–	.9539	–
2. Structural model; all covariances between the FFMQ and Trait TMS constrained equal	2 versus 1	565.58 (357)	1.58	.04	.08	.95	36.69 (21)	.9501 (.0038)	<i>ns</i> ($p = .02$)
Time 2									
1. Configural model; no equality constraints imposed	–	490.09 (336)	1.46	.04	.05	.97	–	.9676	–
2. Structural model; all covariances between the FFMQ and Trait TMS constrained equal	2 versus 1	546.21 (357)	1.53	.04	.10	.96	56.12 (21)	.9680 (.0004)	$p < .002$
2a. Structural model; 13 covariances constrained equal and 8 unconstrained ⁴⁵	2a versus 1	521.79 (349)	1.50	.04	.08	.96	31.70 (13)	.9682 (.0002)	<i>ns</i> ($p = .002$)
Time 3									
1. Configural model; no equality constraints imposed	–	566.14 (336)	1.69	.05	.06	.96	–	.9591	–
2. Structural model; all covariances between the FFMQ and Trait TMS constrained equal	2 versus 1	615.63 (357)	1.72	.05	.11	.95	56.12 (21)	.9594 (.0003)	$p < .002$
2a. Structural model; 18 covariances constrained equal and 3 unconstrained ⁴⁶	2a versus 1	602.27 (354)	1.70	.05	.10	.95	36.16 (18)	.9599 (.0005)	<i>ns</i> ($p = .01$)

Note. χ^2 = chi-square; df = degrees of freedom; χ^2/df = the ratio of chi-square to degrees of freedom; RMSEA = Root Mean Square Error of Approximation; sRMR = standardised Root Mean Square Residual; IFI = Incremental Fit Index; $\Delta\chi^2$ = difference in chi square; Δdf = difference in degrees of freedom; CFI = Comparative Fit Index; ΔCFI = difference in CFI. *ns* = nonsignificant. Bonferroni adjustment was $p < .002$.

⁴⁵ Unconstrained covariances are presented in Table 3.33.

⁴⁶ Refer to footnote 45.

Table 3.33

Noninvariant Covariances of the FFMQ and Trait TMS at Time 2 and Time 3 between Meditators and Nonmeditators

	Meditators	Nonmeditators
	Time 2	
Nonreacting → Awareness	.59	.24
Awareness → Decentering	.31	.01
Nonreacting → Decentering	.73	.66
Describing → Decentering	.27	.16
Nonjudging → Curiosity	.01	-.24
Nonjudging → Decentering	.33	.11
Awareness → Curiosity	.06	-.12
Decentering → Curiosity	.61	.64
	Time 3	
Nonreacting → Awareness	.60	.28
Nonreacting → Decentering	.77	.61
Awareness → Curiosity	-.07	-.21

Note. Values are standardised regression coefficients (beta weights). All significant tests were one-tailed. FFMQ (Nonreacting, Awareness, Nonjudging, Describing); Trait TMS (Curiosity, Decentering).

In conclusion, results designed to illuminate the third and final objective of the present study confirm that the FFMQ (Baer et al., 2006) and the Trait TMS (Davis et al., 2009) measure the construct of mindfulness similarly, suggesting a shared construct. As argued by Davis et al.'s (2009) findings, convergent validity was also evidenced in results from the present study. Findings between meditators and nonmeditators in the current study may indicate that across time, meditators may differ slightly in their interpretation of mindfulness scale items. Future researchers of mindfulness will benefit from remaining vigilant when conducting analyses comparing these two groups. The current study used a variety of sophisticated statistical analyses to support the reliability and validity of both measures, and findings suggest that both the FFMQ and Trait TMS are appropriate measures with which to assess trait mindfulness in a sample of New Zealand adults aged 16-80, offering a unique empirical contribution to existing mindfulness literature. In combination, results from the present study highlight the importance of rigorous empirical examination of the psychometric assessment of mindfulness.

Study 3 (Chapter 4) extends upon findings presented in the current chapter by employing the same samples (meditators and nonmeditators) from Study 2. A measurement model (in SEM) will be derived to predict both positive and negative psychological outcomes across time and the influence that trait mindfulness has on such outcomes. Differences between meditators and nonmeditators in the associations between mindfulness and both positive and negative outcomes will also be examined.

CHAPTER 4

Longitudinal Relationships between Mindfulness, Psychological Outcomes, and Meditation Experience

Study 2 (Chapter 3) empirically examined two current measures of mindfulness with findings supporting the validity and reliability of both psychometric measures employed. Confirmatory factor analysis confirmed the factor structure of the FFMQ (Baer et al., 2006) and the Trait TMS (Davis et al., 2009), and measurement invariance was demonstrated across three separate time points. Study 2 aimed to address a number of gaps in the scientific body of mindfulness research. First, the assessment of mindfulness (including the tools to measure the construct) has received little attention in extant psychological research. Second, with every administration of a psychometric instrument it is assumed that it will function in an equivalent manner, though this assumption is not always tested. Third, scientific research using longitudinal data comparing participants with and without meditation experience is sparse. And finally, fourth, there is a paucity of empirical studies concerning the convergent validity of mindfulness measures.

As Study 2 empirically validated both mindfulness measures examined, the current chapter will employ the FFMQ and Trait TMS to explore whether an individual's natural tendency to be mindful in daily life predicts various psychological constructs, such as happiness, depression, and life satisfaction. Similar to Study 1, Study 3 examines the relationships between facets of mindfulness and psychological outcomes, though it extends the first study by comparing two groups longitudinally. Specific objectives for this current study include: a) exploring whether individual trait mindfulness is positively predictive of positive psychological outcomes and negatively predictive of negative outcomes across time; b) examining group differences of psychological constructs between individuals with and without meditation experience; and c) comparing growth patterns across time between these two sample groups, for example, investigating whether the developmental trajectory of a particular psychological construct, such as mindfulness, is predictive of the developmental trajectory of other constructs, i.e., positive outcomes, over time.

In addressing the first objective, previous research spanning three decades, reviews of outcome studies, and proponents of mindfulness meditation alike, commonly report substantial positive gains resulting from increased mindfulness (Baer, et al., 2004, 2006, 2008;

Kabat-Zinn, 1982, 1990, 2003; Langer, 1989; Shapiro & Carlson, 2009)⁴⁷. More often, these beneficial consequences appear to directly result from intensive mindfulness meditation practice, or interventions specifically designed to enhance an individual's level of mindfulness. Research studies have demonstrated that increases in general positive wellbeing and psychological health, and in contrast, a reduction in the suffering associated with a variety of mental health conditions are often outcomes, or consequences, related to enhanced mindfulness (Davis et al., 2009; Kabat-Zinn, 1990; Shapiro et al., 2011).

It is common for empirical studies exploring the benefits of mindfulness to compare a clinical sample of individuals before and after mindfulness-based treatment interventions to assess changes in psychological symptoms⁴⁸. This method of study design will often yield findings consistent with the researcher's expectations – e.g., mindfulness skills and techniques learned from a specific mindfulness enhancing intervention decreases the psychological symptoms in the clinical sample examined. However, studies with this type of methodology fail to isolate or explore naturally occurring mindfulness in an individual, or determine whether or not this dispositional trait a) changes over time, and b) influences other naturally occurring psychological processes in the individual.

Brown and Ryan (2003) and Kabat-Zinn (2003) claim that mindfulness is an inherent human capacity that can be enhanced through specific training and practice, though little empirical research has focused on this inherent way of being. As mentioned previously, longitudinal studies are optimal for examining changes in a variable over time, and/or the influence psychological variables have on each other (Duncan & Duncan, 2004; Muthén & Curran, 1997). Detailed investigation of mindfulness as an individual difference characteristic with longitudinal data, will allow for examination into the role of this phenomenon in an individual's daily life.

The first aim of this present study employs a community sample to explore trait mindfulness and its effect on both positive and negative aspects of a person's life across time. Measurement models (similar to those used in Study 1) will examine the FFMQ's (Baer et al., 2006) and Trait TMS's (Davis et al., 2009) relationships to a cluster of positive and negative

⁴⁷ Chapters 1 and 2 discuss previous research purporting the beneficial effects of mindfulness, thus, the reader is referred to these chapters for further references.

⁴⁸ Over the past three decades empirical studies have revealed that a large number of clinical samples have shown improvement in psychological symptoms due to mindfulness-based therapy. Examples include: Substance abuse and addiction (Bowen, et al., 2009); suicidal behaviour (Williams et al., 2006); eating disorders (Kristeller & Hallett, 1999); chronic pain and illness (Carlson et al., 2001; Kabat-Zinn, 1982); and depression and anxiety (Baer et al., 2004; Jain et al., 2007; Kabat-Zinn et al., 1992; Williams et al., 2007) (Also see Table 1.1).

outcomes across three separate time points. Consistent with previous research mentioned (Baer et al., 2006, 2008; Bishop, 2002; Jain et al., 2007), the expectation is that trait mindfulness will be positively associated with positive psychological outcomes and negatively associated with negative psychological outcomes, and that these results will be stable across time.

The second objective in the current study is to examine whether group membership (meditators versus nonmeditators) influences psychological outcomes, such as an individual's perceived sense of happiness and life satisfaction, as well as their degree of depression and anxiety. As previously mentioned, research suggests that individuals with meditation experience may differ in their interpretation of the mindfulness construct when compared with individuals without meditation experience (Baer et al., 2006, 2008; Grossman, 2008; Van Dam et al., 2009). However, recall, in Study 2 of this thesis, invariance analyses did *not* yield substantial differences between meditators and nonmeditators on the two measures of mindfulness examined, rather, analyses suggested that across time meditators may differ subtly in their interpretation of mindfulness items.

Whereas Study 2 investigated differences in the *interpretation* of the mindfulness construct between meditators and nonmeditators, the present study aims to explore group mean differences in mindfulness, and in both positive and negative psychological outcomes. Buddhist-based meditation philosophy purports that meditation practice cultivates the ability to be more mindful in daily life, which in turn, enhances psychological wellbeing (HH Dalai Lama & Cutler, 1998; Kabat-Zinn, 1990). A large body of scientific literature supports this view, claiming that meditators in general are more mindful in daily life than nonmeditators, which is related to decreased rumination and increased awareness and insight (Baer et al., 2006, 2008; Kabat-Zinn, 1982, 2003; Lykins & Baer, 2009; Shapiro & Carlson, 2009; Van Dam et al., 2009; Walsh & Shapiro, 2006; Williams et al., 2007). Earlier in Chapter 1, it was discussed how meditation practice can positively modify people's subjective wellbeing by retraining the mind to think with a more adaptive mindset (Sharma, 2006). For example, enhancing constructive states of mind (such as, self-respect, self-esteem, and compassion) and reducing destructive states of mind (such as negative emotions and low self-image), may play an important role in promoting greater psychological wellbeing and happiness (Sharma).

Researchers have also theorised that meditation increases an individual's ability to behave adaptively while distressed, acting as a buffer against negative life events experienced by an individual (Kabat-Zinn, 1982; Teasdale et al., 1995). The mechanisms underpinning this perspective are thought to be related to the nonjudgmental and nonreactivity elements of

mindfulness that can be attained through practice in meditation (Baer et al., 2004; Kabat-Zinn, 1990; Linehan, 1993). Individuals who meditate are more likely, according to Baer et al. (2004, 2006), Kabat-Zinn (1982, 1990), and Segal et al. (2002), to *observe* their thoughts rather than get caught up in them, and therefore, are less likely to ruminate over maladaptive internal dialogues.

To investigate the proposition that meditation experience enhances psychological functioning, the current study aims to explore whether meditators in this particular sample of individuals are a) more mindful than nonmeditators, and b) report more positive outcomes and less negative outcomes than nonmeditators across time. Consistent with research mentioned previously (Baer et al., 2006, 2008; Kabat-Zinn, 1990; Kabat-Zinn et al., 1992), it was expected that individuals with meditation experience would yield higher scores in mindfulness when compared to their counterparts without meditation experience. In addition, meditators would report higher levels of positive outcomes (such as happiness and life satisfaction) and lower levels of negative outcomes (such as depression and anxiety) than nonmeditators across time.

The third and final objective to the present study explores relationships between variables' patterns of growth over time. For example, do individuals who increase in trait mindfulness over 6 months show a corresponding increase in positive outcomes over the same period of time? And secondly, does such a pattern of change vary depending on meditation experience? Study 3 specifically investigates whether dispositional mindfulness scores change over time (i.e., do mindfulness scores at baseline assessment increase, decrease, or remain the same at follow-up assessments), and second, whether or not group membership (i.e., meditators versus nonmeditators) influences change in the relationships of these psychological constructs over time. Developmental change in a variable is best explored, according to Duncan and Duncan (1999), by investigating an individual's growth trajectory over time, i.e., by assessing individual *differences in change* in individual variables. Blozis (2004) further argues that examining how characteristics of change in different variables are related to each other will aid in our understanding of developmental change. For example, it is important to determine whether an increase in one variable (such as mindfulness) is related to an increase, decrease, or no change in another variable (such as happiness).

Although mindfulness has been associated with increases in psychological wellbeing and decreases in psychological symptoms (Baer et al., 2006, 2008; Grossman et al., 2004; Jain et al., 2007; Shapiro et al., 1998), much less is known about how mindfulness influences the growth trajectory of another variable, its rate of change, and its role in human functioning

(Duncan & Duncan, 2004). A detailed investigation exploring this gap in mindfulness literature is warranted, hence, results from the present study will provide a starting point from which future research can build. It is plausible due to extant literature, to expect that increases in mindfulness over time (growth), would lead to decreases in negative outcomes (a negative growth trajectory), as well as, and in contrast, increased positive outcomes (a positive growth trajectory).

Demonstrating change in behaviour over time is of fundamental interest to all scientific disciplines (Duncan & Duncan, 1999, 2004), though, the measurement of naturalistic individual or group change often poses real challenges to the researcher. For example, assessing true developmental change requires employing longitudinal research designs with large sample sizes (Cole & Maxwell, 2003). Satisfying these research demands however, is often difficult due to time, attrition, and the financial cost for continual assessment that longitudinal designs require (Duncan & Duncan, 2004). Data in the present study is longitudinal in design and relatively large in size, and therefore, is appropriate for assessing both individual and group change.

Latent growth curve modeling (LGCM; Duncan & Duncan, 1999; McArdle & Epstein, 1987) combines elements of repeated measures analysis of variance and confirmatory factor analysis (within a SEM framework), and is one of the most powerful statistical analyses for investigating developmental change over time (Duncan & Duncan, 2004; Hardy & Thiels, 2009). LGCM, compared to the more traditional approaches of measuring predictors of change (such as repeated measures ANOVA), allows the researcher to study development at the group and individual level, addresses questions pertaining to the causes and consequences of developmental change, and has the ability to use variables simultaneously as both independent and dependent variables in a measurement model (Duncan & Duncan)⁴⁹. Specifically, LGCM measures the initial status or baseline average (the intercept) of a population and the rate of change of a variable (the slope) (Duncan & Duncan, 2004; Hardy & Thiels, 2009; Muthén & Curran, 1997).

However, despite the sophisticated statistical advantages of LGCM, it does not appear to have been utilised yet in existing mindfulness literature to date. This technique will provide an effective and elegant way to statistically test the third and final objective of the present study. Specifically, LGCM will be employed to evaluate longitudinal growth trajectories within a community sample of individuals, some with and some without

⁴⁹ See also Duncan and Duncan (1999) and Hardy and Thiels (2009) for a comprehensive discussion of the benefits to using LGCM methodology.

meditation experience. Further, meditators and nonmeditators (in relation to mindfulness scores and positive and negative psychological outcomes) will be compared to assess whether meditation experience predicts change in a construct across time. The present study will, to my knowledge, be the first in current mindfulness research to apply LGCM methodology to longitudinal data comparing meditators to nonmeditators. First, it was expected that individuals high in mindfulness would show a decline in negative outcomes across time, and in contrast, an increase in positive outcomes. Specific hypotheses comparing meditators and nonmeditators were: higher mindfulness levels would be found in participants who meditate; less negative outcomes would be identified over time in the group of meditators; and enhanced positive outcomes would be manifested over time in individuals with meditation experience, as opposed to individuals without such experience.

In sum, objectives of the present study concern three key areas: 1) Whether individual trait mindfulness is positively predictive of positive psychological outcomes and negatively predictive of negative outcomes across time; 2) whether individuals with and without meditation experience differ in psychological functioning, such as happiness, life satisfaction, and depression; and 3) whether mindfulness is predictive of other psychological constructs by examining the relationships between growth patterns and change in these constructs over time.

Method

Participants and Procedure

Recall from Study 2, 319 individuals (68.70% female and 31.30% male) participated during data collection across three time points, approximately three months apart. As outlined in Chapter 3, participants completed a survey pertaining to their emotional functioning as well as routine demographic questions⁵⁰. As described earlier in Chapter 3, the distribution of age was broken down into three approximately equally-sized categories, 16-26 years ($n = 105$; 34 males, 71 females), 27-47 years ($n = 107$; 34 males, 73 females), and 48-80 years ($n = 107$; 32 males, 75 females). In the final matched sample, 89.3% self-identified as Pakeha/NZ European, 5% as Maori, 2.5% as Asian, and 9.1% classified their ethnicity as “Other” (and 34 individuals were missing data on ethnicity). Furthermore, one hundred and seventeen (36.7%) participants reported that they currently partake in meditation, and of those individuals, 26.7% reported that their meditation experience involved mindfulness components (see Table 3.2, Chapter 3, p. 66, for demographic characteristics of meditators and nonmeditators).

⁵⁰ See Appendices B, G, P, Q, R, S, and T.

Previously it was stated that a chi-square test revealed no significant differences between the excluded and the included participants in age, gender, or meditation experience, and a multivariate analysis of variance yielded no significant effects on either the FFMQ (Baer et al., 2006) or the Trait TMS (Davis et al., 2009). Recall, participants were removed from the dataset if they did not complete the survey at all three time points, including skipping significant sections of the questionnaire. MANOVAs in the present study tested for differences between excluded and included participants for scores on positive and negative outcome measures. A one-way MANOVA using group (excluded vs. included) as the fixed factor on the 6 DVs (3 positive outcomes: happiness, life satisfaction, savouring; and 3 negative outcomes: depression, anxiety, negative affect) revealed no significant multivariate effect between excluded and included participants on psychological measures $F(6, 457) = 1.18, p = .31, \text{partial } \eta^2 \leq .05$. Analysis of each positive and negative outcome measure revealed no significant effects between excluded and included participants (see Table 4.1).

Table 4.1

Between-Subject Effects on Group, Positive Outcomes, and Negative Outcomes between Excluded and Included Participants

Psychological Measures	Excluded		Included		<i>F</i> -statistic	Partial η^2
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Positive Outcomes:						
Happiness	5.11	1.36	5.09	1.29	0.04 <i>ns</i>	.001
Life Satisfaction	4.63	1.13	4.63	1.15	0.002 <i>ns</i>	.001
Savouring	5.47	0.85	5.47	0.92	0.002 <i>ns</i>	.001
Negative Outcomes:						
Depression	1.39	0.42	1.35	0.40	1.16 <i>ns</i>	.01
Anxiety	1.51	0.39	1.52	0.38	0.05 <i>ns</i>	.001
Negative Affect	1.76	0.69	1.66	0.61	2.33 <i>ns</i>	.01

Note. (*df* = 1, 462). *ns* = nonsignificant.

Measures

Mindfulness and Meditation⁵¹. Both mindfulness measures employed in the current study are the same as those used in Study 2 (described in Chapter 3). As shown before, both the FFMQ (Baer et al., 2006) and the Trait TMS (Davis et al., 2009) yielded acceptable to excellent internal reliability at each time point (refer to Table 4.2). The measure pertaining to the individuals' experience with meditation is also described in Chapter 3 (see Appendix K).

⁵¹ See Appendix A for the FFMQ (Baer et al., 2006) and Appendix J for the Trait TMS (Davis et al., 2009).

Depression⁵². Depression was measured using the Beck Depression Inventory-11 (BDI-11; Beck, Steer, & Brown, 1996) described in Chapter 2. The full 21-item scale was used in the current study (as opposed to a shortened version used in Study 1). Participants were asked to indicate which statement best describes the way they have felt over the past month. For example, they chose one item among a group of four statements: “I do not feel sad”, “I feel sad much of the time”, “I’m sad all the time, and I can’t snap out of it” and “I’m so sad and unhappy that I can’t stand it”. In this sample, the BDI-II exhibited excellent internal reliability at each time point (see Table 4.2).

Anxiety⁵³. The 21-item Beck Anxiety Inventory (BAI; Beck, Epstein, Brown, & Steer, 1988) was used to assess the emotional, physiological, and cognitive symptoms associated with anxiety, such as heart pounding, dizziness, and feelings of losing control. Each question has a set of four possible answer choices ranging in intensity, where individuals are asked to indicate which statement best describes the way they have felt over the past month. Items are scored on a 4-point scale (0 = no symptoms to 3 = severe symptoms), with higher scores indicating higher levels of anxiety. Previous research (e.g., Beck et al., 1988) has demonstrated excellent reliability and validity of this scale, as is also seen in the present data collection (see Table 4.2 for scale reliabilities for each time point).

Negative Affect⁵⁴. Negative affect was measured using the Positive and Negative Affect Scale (PANAS; Watson, Clark, & Tellegen, 1988). The PANAS consists of two 10-item mood scales derived to measure common symptoms associated with an individual’s positive and negative affect. Higher negative affect scores are indicative of subjective distress, nervousness, and dissatisfaction, whereas low scores represent the absence of these feelings. Individuals were asked to rate the extent to which they have experienced a particular emotion (i.e., scared, hostile, guilty) over the past week. Each question has a set of five possible answer choices ranging in intensity from 1 = very slightly to 5 = extremely. High internal reliability was evidenced for this scale (presented in Table 4.2) at each time point.

Happiness⁵⁵. Global trait happiness was assessed using the 4-item Subjective Happiness Scale (SHS; Lyubomirsky & Lepper, 1999) described in Chapter 2. This scale yielded high internal reliability in this sample at each time point (refer to Table 4.2).

Life Satisfaction⁵⁶. Life satisfaction was measured using the Temporal Satisfaction With Life Scale (TSWLS; Pavot, Diener, & Suh, 1998). The TSWLS is a 15-item scale that

⁵² See Appendix B for the BDI-11 (Beck et al., 1996).

⁵³ See Appendix P for the BAI (Beck et al., 1988).

⁵⁴ See Appendix R for the PANAS (Watson et al., 1988).

⁵⁵ See Appendix G for the SHS (Lyubomirsky & Lepper, 1999).

allows for a comprehensive assessment among past, present, and future levels of global life satisfaction. Responses are rated on a 7-point Likert scale (1 = strongly disagree to 7 = strongly agree), with higher scores indicating higher life satisfaction. Example items include “I am satisfied with my life in the past”, “I would change nothing about my current life” and “There will be nothing that I will want to change about my future”. Table 4.2 presents excellent internal reliability at each time point for this sample.

Savouring⁵⁷. To measure an individual’s beliefs about savouring, the 12-item Savouring Beliefs Inventory (SBI; Bryant, 2003) was used. The SBI consists of three subscales assessing an individual’s perceptions of their ability to derive pleasure through anticipating upcoming positive events (i.e., “I can enjoy pleasant events in my mind before they actually occur”); savouring positive moments (i.e., “I feel fully able to appreciate good things that happen to me”); and reminiscing about past positive experiences (i.e., “It’s easy for me to rekindle the joy from pleasant memories”) (Bryant). This scale is scored on a 7-point Likert scale with 1 = strongly disagree to 7 = strongly agree. This sample showed excellent internal reliability (see Table 4.2).

Table 4.2

Scale Reliability (Cronbach’s alpha) for Psychological Measures at Three Time Points

Scale: Subscale (number of items)	Time 1	Time 2	Time 3
SHS (4)	.90	.89	.91
TSWLS (15)	.93	.94	.93
SBI (12)	.91	.92	.92
BDI-11 (21)	.92	.92	.92
BAI (21)	.88	.86	.85
Neg affect (10)	.87	.89	.88
FFMQ:			
Nonjudging (8)	.93	.92	.95
Describing (8)	.92	.93	.94
Awareness (8)	.89	.90	.92
Observing (8)	.80	.84	.85
Nonreacting (7)	.83	.86	.87
Trait TMS:			
Curiosity (6)	.90	.92	.92
Decentering (7)	.71	.79	.80

Note. SHS = Subjective Happiness Scale; TSWLS = Temporal Satisfaction With Life Scale; SBI = Savouring Beliefs Inventory; BDI-11 = Beck Depression Inventory-11; BAI = Beck Anxiety Inventory; Neg affect = Negative affect (subscale of the PANAS).

⁵⁶ See Appendix S for the TSWLS (Pavot et al., 1998).

⁵⁷ See Appendix T for the SBI (Bryant, 2003).

Results

Analytic Strategy

The primary goal of Study 3 was to explore an individual's natural tendency to be mindful in daily life, and determine how this dispositional trait influences other psychological constructs such as happiness, depression, and life satisfaction, over time. Probable differences between individuals with and without meditation experience were also of primary interest for the current study. Three specific objectives were posed to address these goals. First, CFAs using Structural Equation Modeling (SEM) in AMOS were employed to confirm that the measures used to assess both positive and negative psychological outcomes perform appropriately across time (i.e., measure the construct they claim to, and are stable and reliable at each time point). Next, latent variable path modeling using SEM, derived structural models to test whether mindfulness was positively predictive of positive outcomes (such as happiness, savouring, and life satisfaction), and negatively predictive of negative outcomes (such as depression, anxiety, and negative affect) across time, as is the expectation.

Study 3's second objective also involved SEM techniques, in combination with MANOVAs, to examine whether psychological constructs between individuals with and without meditation experience differed over time. As mentioned, literature purports the benefits that meditation can offer an individual coping with life stressors, such as illness and anxiety, and the overall improvement that meditation is thought to have on general psychological wellbeing (Baer et al., 2006, 2008; Kabat-Zinn, 1990, 2003; Lykins & Baer, 2009; Shapiro & Carlson, 2009; Van Dam et al., 2009; Walsh & Shapiro, 2006; Williams et al., 2007).

Individuals who meditate, according to Kabat-Zinn (1982, 1990), often continue to do so for the apparent psychological gains obtained from time spent in meditation (i.e., relaxation of the mind, disengagement from ruminative thoughts, and increasing awareness to present moment experiences). Although the scientific study of meditation has grown exponentially over the last three decades, there is still limited empirical literature using longitudinal research designs exploring differences according to group status. In support of previous research, it seems befitting to expect that over time, meditation experience would be: a) positively associated with positive outcomes and negatively associated with negative outcomes, b) that meditators would be more mindful than nonmeditators, and c) that meditators would report more positive outcomes and less negative outcomes than nonmeditators at each time point.

Within the framework of latent growth curve modeling (LGCM), the present study's third objective further explored predictors of psychological outcomes in relation to trait mindfulness, and extended this exploration by investigating *changes* across time in a given outcome. One of the primary interests of longitudinal data is exploring the nature of change over time in an attempt to describe developmental processes in a particular sample (Duncan & Duncan, 1999). Growth trajectories of meditators compared to nonmeditators were also examined using LGCM techniques to test for group differences across time.

LGCM was the statistical procedure of choice for addressing Study 3's third objective due to its comprehensive and flexible means of drawing conclusions from the data (Duncan & Duncan, 1999). For example, LGCM can assess whether all individuals conform to the average curve or show the same degree of change (interindividual differences), whether these differences can be explained by individual characteristics (such as mindfulness or happiness), and whether group differences exist within the sample (for example, comparing meditators to nonmeditators in psychological outcomes) (Anderson, 1993; Duncan & Duncan). According to Anderson and Duncan and Duncan (1999), individual developmental change is not always linear, so if the primary interest of the researcher is to explore interindividual differences in a longitudinal population, and/or group change across time, LGCM methodology should be considered the preferable approach for analysis.

It was expected in the current study, that individuals high in mindfulness at the outset of the study would show a decline in negative outcomes across time, and conversely, an increase in positive outcomes. These results would indicate that mindfulness may act as a protective factor in coping with everyday life circumstances. In addition, LGCM were used to compare meditators and nonmeditators with an aim to support existing research findings between these two groups – namely that meditators (when compared to nonmeditators in this particular sample) would function in daily life with an overall enhanced sense of psychological wellbeing, represented by less negative outcomes and more positive outcomes.

Confirmatory Factor Analysis on Psychological Outcome Measures

Confirmatory factor analytical techniques were conducted on the 319 participants' data at three different time points, to examine whether the measures used to assess both positive and negative outcomes loaded uniquely and significantly onto the relevant latent variable. Similar to methods employed in Study 1, it was decided that the most efficient and focussed way to enact path modeling in the current study was to create two latent constructs from the six mood outcome indicators employed in this study. For example, the first latent construct labelled *Negative Outcomes*, included instruments designed to assess depression,

anxiety, and negative affect in an individual; whereas, the second latent construct labelled *Positive Outcomes*, included instruments assessing an individual's happiness, life satisfaction, and beliefs about savouring.

As seen in Figure 4.1, the manifest indicators of depression, anxiety, and negative affect loaded strongly, positively and significantly (betas ranged from $r = .74$ to $.88$) onto the latent construct of negative outcomes at Time 1 (as expected). Further, manifest indicators measuring happiness, life satisfaction, and savouring loaded positively and significantly (betas ranged from $r = .59$ to $.89$) onto the latent construct of positive outcomes (also expected). Time 2 and Time 3 CFAs are schematically represented in Figures 4.2 and 4.3 respectively, and consistent with Time 1 each manifest indicator at Time 2 and Time 3 loaded significantly on to its corresponding latent variable. The relationship between the two latent constructs of negative and positive outcomes was allowed to be modelled (i.e., a covariance was stipulated between these two latent constructs) and it was strongly negatively significant across all three time points (betas ranged from $-.67$ to $-.74$), indicating the two constructs were negatively related to each other, as would be expected.

Figure 4.1. Confirmatory factor analysis of the positive and negative latent construct outcome variables at Time 1. All coefficients are standardised regression coefficients. *** $p < .001$. BDI = Beck Depression Inventory; BAI = Beck Anxiety Inventory; NA = Negative Affect; SHS = Subjective Happiness Scale; TSWLS = Temporal Satisfaction With Life Scale; SB = Savouring Belief.

Figure 4.2. Confirmatory factor analysis of the positive and negative latent construct outcome variables at Time 2. All coefficients are standardised regression coefficients. $^{***}p < .001$. BDI = Beck Depression Inventory; BAI = Beck Anxiety Inventory; NA = Negative Affect; SHS = Subjective Happiness Scale; TSWLS = Temporal Satisfaction With Life Scale; SB = Savouring Belief.

Figure 4.3. Confirmatory factor analysis of the positive and negative latent construct outcome variables at Time 3. All coefficients are standardised regression coefficients. *** $p < .001$. BDI = Beck Depression Inventory; BAI = Beck Anxiety Inventory; NA = Negative Affect; SHS = Subjective Happiness Scale; TSWLS = Temporal Satisfaction With Life Scale; SB = Savouring Belief.

The χ^2 goodness-of-fit statistics and model fit indices described in both Chapter 2 and Chapter 3 were again used in the current chapter to investigate how well the hypothesised path model fit the observed data at three separate time points. Specifically, the standardised Root Mean Squared Residual (sRMR), the Root Mean Square Error of Approximation (RMSEA), the Comparative Fit Index (CFI), and the Incremental Fit Index (IFI) were employed. Model-fit for each CFA at each time point was acceptable (see Table 4.3 for goodness-of-fit statistics).

Table 4.3

Goodness-of-Fit Statistics for the Positive and Negative Outcome Variables at Three Time Points

	χ^2	df	χ^2/df	CFI	RMSEA	sRMR	IFI
Time 1	47.90	8	5.99	.96	.12	.05	.96
Time 2	37.04	8	4.63	.96	.10	.06	.96
Time 3	28.74	8	3.59	.97	.09	.05	.97

Note. χ^2 = chi-square; *df* = degrees of freedom; χ^2/df = the ratio of chi-square to degrees of freedom; CFI = Comparative Fit Index; RMSEA = Root Mean Square Error of Approximation; sRMR = standardised Root Mean Square Residual; IFI = Incremental Fit Index.

To conclude this section, confirmatory factor analyses at three separate time points for the latent constructs of positive and negative outcomes were seen to yield an acceptable fit to these data, suggesting that the six mood indicators are reliable measures of psychological outcomes such as happiness, life satisfaction and depression over time. To further address Objective 1 of the present study, first, longitudinal measurement models were constructed for both the FFMQ (Baer et al., 2006) and the Trait TMS (Davis et al., 2009). Second, structural models using SEM analytical techniques investigated the relationships between these two mindfulness measures, and positive and negative latent variable outcomes across time.

Descriptive Statistics

Descriptive statistics for all measures employed across three time points are presented in Table 4.4.

Table 4.4

Means and Standard Deviations for Positive and Negative Outcomes and Mindfulness Scores at Three Time Points

Variable	<i>M</i>	<i>SD</i>
Time 1		
Depression	1.35	0.40
Anxiety	1.51	0.38
Negative affect	1.66	0.61
Subjective happiness	5.09	1.28
Life satisfaction	4.65	1.16
Savouring	5.48	0.93
Nonjudging	3.51	0.87
Observing	3.44	0.65
Describing	3.61	0.80
Awareness	3.26	0.69
Nonreacting	3.07	0.62
Decentering	1.84	0.68
Curiosity	2.23	0.93
Time 2		
Depression	1.32	0.37
Anxiety	1.44	0.34
Negative affect	1.62	0.60
Subjective happiness	5.09	1.26
Life satisfaction	4.57	1.21
Savouring Beliefs	5.40	0.93
Nonjudging	3.57	0.80
Decentering	1.73	0.75
Observing	3.34	0.68
Describing	3.54	0.86
Awareness	3.25	0.68
Nonreacting	3.05	0.67
Curiosity	2.18	0.96
Time 3		
Depression	1.29	0.35
Anxiety	1.43	0.33
Negative affect	1.61	0.60
Subjective happiness	5.20	1.27
Life satisfaction	4.72	1.16
Savouring Beliefs	5.38	0.96
Nonjudging	3.62	0.89
Observing	3.34	0.69
Describing	3.56	0.87
Awareness	3.28	0.73
Nonreacting	3.07	0.67
Decentering	1.78	0.76
Curiosity	2.14	0.98

Note. The BDI-11 (Beck et al., 1996) is referred to as Depression in this table, the BAI (Beck et al., 1988) as Anxiety, and TSWLS (Pavot et al., 1998) as Life Satisfaction, and will continue to be labelled as such throughout this chapter; the five factors of the FFMQ are Nonjudging, Observing, Describing, Awareness, and Nonreacting; the two factors of the Trait TMS are Decentering and Curiosity.

Correlations

Intercorrelations of the positive and negative outcome scores across three time points are presented in Table 4.5.⁵⁸ The positive outcome measures (i.e., happiness, life satisfaction, and savouring) yielded moderately positive significant correlations at each time point, as expected, indicating the instruments measured a similar construct. The pattern of correlations among the negative outcome measures (i.e., depression, anxiety, and negative affect) at each time point were moderate to strong and all positively and significantly correlated with each other. This pattern (also expected) indicates that instruments employed to measure negative constructs in the present study were indeed measuring negative outcomes. In contrast, correlations between the positive and negative outcome measures at each time point were small to moderate and in the negative direction, as would be expected.

Table 4.5

Intercorrelations between the Positive and Negative Outcome Scores at Three Time points

	Dep	Anx	NA	SH	LS	Sav
Time 1						
Dep	-					
Anx	.63**	-				
NA	.70**	.67**	-			
SH	-.63**	-.43**	-.49**	-		
LS	-.57**	-.39**	-.40**	.63**	-	
Sav	-.37**	-.16**	-.23**	.54**	.43**	-
Time 2						
Dep	-					
Anx	.58**	-				
NA	.68**	.58**	-			
SH	-.58**	-.41**	-.48**	-		
LS	-.50**	-.34**	-.35**	.62**	-	
Sav	-.26**	-.08**	-.11**	.47**	.43**	-
Time 3						
Dep	-					
Anx	.65**	-				
NA	.65**	.59**	-			
SH	-.54**	-.37**	-.46**	-		
LS	-.45**	-.29**	-.39**	.59**	-	
Sav	-.30**	-.08**	-.23**	.49**	.40**	-

Note. ** $p < .01$. All significant tests were one-tailed. Dep = Depression; Anx = Anxiety; NA = Negative affect; SH = Subjective Happiness; LS = Life Satisfaction; Sav = Savouring.

⁵⁸ Intercorrelations between the factors of the FFMQ (Baer et al., 2006) and the factors of the Trait TMS (Davis et al., 2009) are presented in Chapter 3. Intercorrelations at all three time points between positive and negative outcomes and the FFMQ and Trait TMS are presented in Appendix U.

Longitudinal Path Model Analyses for Mindfulness Measures

Latent variable path models using SEM were constructed to test the relationships between factors of the FFMQ and Trait TMS over three separate time points. Recall, SEM enables the simultaneous statistical testing of model fit to the data by allowing multiple dependent variables to be predicted (Byrne, 2010). Exploring the relationships between mindfulness and several positive and negative psychological constructs was a chief goal of Objective 1. Separate measurement models were initially tested for both the FFMQ and the Trait TMS with an aim of confirming whether the factors of the measures would yield stable relationships in the predicted direction across time (i.e., would be positive and significantly related to each other, and that mindfulness at Time 1 predicted mindfulness at Time 2, and mindfulness at Time 2 predicted mindfulness at Time 3). Once acceptable model fit had been demonstrated, these measurement models were used to construct a structural path model in which to explore the influence that trait mindfulness has on psychological outcomes (such as happiness, life satisfaction, and depression).

Longitudinal measurement model for the FFMQ

For all statistical analyses on the FFMQ in the present chapter, it was decided that the most focused and efficient way to analyse the five factors of the FFMQ over time would be to create total scores for each factor. Recall from Study 2, parcels (as recommended by Little et al., 2002) were deemed the most appropriate way of managing the items that loaded on the proposed factor of each mindfulness measure. If, however, parcels were created for the current study's longitudinal path model analyses, the FFMQ would be an extremely complex model consisting of 15 latent variables and 45 manifest indicators. Total scores, as opposed to parcels, therefore, aim to reduce the complexity of the model for ease of interpretability, and to minimise the likelihood of spurious correlations (Little et al., 2002).

The measurement model of the FFMQ at three time points fit these data well, $\chi^2 = 246.82$; $p < .001$; $df = 73$; $\chi^2/df = 3.38$; RMSEA = .08; SRMR = .06; IFI = .95; CFI = .95 (see Figure 4.4). Factor loadings were all significant and moderate to strong at all three time points, indicating that each manifest indicator loaded uniquely on its corresponding latent variable, and that items of the FFMQ are measuring a similar construct over time. Mindfulness at Time 1 was also predictive of mindfulness at Time 2, and mindfulness at Time 2 was predictive of mindfulness at Time 3 (as expected), indicating that dispositional mindfulness, in this sample, was a reasonably stable construct over time.

Figure 4.4. A longitudinal measurement model for the FFMQ. All coefficients are standardised regression coefficients. *** $p < .001$. T1 = Time 1; T2 = Time 2; T3 = Time 3.

In sum, longitudinal latent variable path model analyses confirmed that a) the factors of the FFMQ all reliably measured mindfulness across time and b) individuals who were high in dispositional mindfulness at one time point appear to remain high, suggestive of a stable individual characteristic trait.

Longitudinal measurement model for the Trait TMS

The measurement model for the Trait TMS at three time points fit these data well, $\chi^2 = 244.59$; $p < .001$; $df = 106$; $\chi^2/df = 2.31$; RMSEA = .06; SRMR = .07; IFI = .97; CFI = .97 (see Figure 4.5). Due to the TMS having only two factors (Curiosity and Decentering), parcels were employed as manifest indicators and were created identically to those used in Chapter 3 (see p. 81). Factor loadings for each factor of this measure were significant and moderate to large in size at all three time points, indicating that each manifest indicator on both factors consistently loaded highly on its corresponding latent variable. Covariances between the two latent factors at a given time point were positive and significant at each time point; though, apart from a weak negative relationship between Decentering at Time 2 and Curiosity at Time 3, the two factors were not related across time.

Firstly, these results indicate that individuals who are high in mindfulness at Time 1 (as measured by the Trait TMS) are also high in mindfulness at Time 2 and again at Time 3 (consistent to the temporal stability seen in similar analyses on the FFMQ discussed prior). Secondly, although some overlap between the two factors in this measure are evident, Curiosity and Decentering appear to be measuring two distinct elements of the mindfulness construct. This result is consistent with findings from the original authors of the TMS (State version), who found the average interitem correlations for each factor were substantially larger than the interfactor correlation (Lau et al., 2006). Supporting previous analyses on the FFMQ, mindfulness as measured by the Trait TMS, appears to be a relatively stable characteristic trait in individuals in this particular sample.

Figure 4.5. A longitudinal measurement model for the Trait TMS. All coefficients are standardised regression coefficients. *** $p < .001$. ns = nonsignificant. T1 = Time 1; T2 = Time 2; T3 = Time 3. See Appendix O for the parcelled items of the Trait TMS.

Longitudinal Path Model Analyses for Mindfulness and Psychological Outcomes

To assess how mindfulness predicts psychological outcomes across time (the primary aim of the present study's first objective), two structural models were constructed. The first model combined the measurement model described earlier for the FFMQ at three time points with the CFA of the positive and negative outcomes at three time points. The second structural model combined the measurement model for the Trait TMS at three time points with the CFA of the positive and negative outcomes at three time points.

The FFMQ and positive and negative outcomes structural model

Nine latent variables (i.e., FFMQ, positive outcomes, and negative outcomes at three time points) made up the first structural model. Each latent variable in the model was measured using the manifest indicators previously discussed (i.e., 5 manifest indicators for the FFMQ, 3 for positive outcomes, and 3 for negative outcomes at each time point). Six stability pathways (autocorrelations) and 12 cross-lag paths were included in the model (Byrne, 2010) to construct a fully saturated model. Manifest indicators were correlated within the same construct across time (for example, the first manifest indicator for the FFMQ at Time 1 was allowed to correlate with the first manifest indicator for the FFMQ at Time 2 and again at Time 3 to allow for autocorrelated error) (Byrne). This initial structural model fit these data well, $\chi^2 = 968.93$; $p < .001$; $df = 435$; $\chi^2/df = 2.23$; RMSEA = .06; SRMR = .07; IFI = .94; CFI = .94.

In order to reduce the complexity of the model and to establish model fit indices, in accordance with recommendations from Kline (2005), nonsignificant paths were individually removed (pruned) from the model from the least significant to the most significant. Pruning nonsignificant estimated parameters may also allow for marginal paths to become significant, thus, enabling more reliable results (Kline). In total, the pruning process took nine steps, resulting in 9 out of the original 18 pathways yielding significance (though no additional pathways became significant during this pruning process). The final structural model (presented in Figure 4.6) demonstrates all stability coefficients were strongly significant, $\beta = .55$ to 1.05 , $ps < .001$, and the following three cross-lag pathways: FFMQ scores at Time 2 predicted positive outcomes at Time 3 ($\beta = .21$, $p < .01$); negative outcomes at Time 2 positively predicted FFMQ at Time 3 ($\beta = .15$, $p < .01$); and FFMQ scores at Time 2 negatively predicted negative outcomes at Time 3 ($\beta = -.33$, $p < .001$). The final pruned model fit these data well, $\chi^2 = 974.18$; $p < .001$; $df = 443$; $\chi^2/df = 2.20$; RMSEA = .06; SRMR = .07; IFI = .94; CFI = .94.

Figure 4.6. A longitudinal structural path model for the FFMQ and psychological outcomes. Significant stability pathways are represented by solid black arrows, whereas, significant cross-lags are represented by dashed arrows. All coefficients are standardised regression coefficients. ** $p < .01$, *** $p < .001$. T1 = Time 1; T2 = Time 2; T3 = Time 3. Manifest indicators for each latent variable have been omitted from the figure to ease interpretability (e.g., 5 factors of the FFMQ, happiness, life satisfaction, and savouring for the positive outcomes, and depression, anxiety, and negative affect for the negative outcomes).⁵⁹

In summary, as was expected, trait mindfulness (as measured by the FFMQ) was stable across time, suggesting that individuals in the present sample who had a tendency for everyday mindfulness continued to do so across time. It appears that individual trait mindfulness does not fluctuate much over time, as was expected. Similarly, results indicate that positive outcomes were also stable over time, i.e., individuals high in happiness, life

⁵⁹ Although standardised regression coefficients generally range from -1 to 1 in magnitude, according to Jöreskog (1999), in SEM, the relationship between two variables can be above 1 (as is seen in the structural model above) when two variables are significantly correlated with each other. Jöreskog argues that a common mistake is to interpret coefficients as correlations, rather than as regression coefficients.

satisfaction, and savouring at the initial assessment, remained so over time. The stability of negative outcomes over time was less strong than similar relations for the FFMQ and for positive outcomes.

In addition, significant cross-lags revealed, first, that mindfulness measured with the FFMQ at Time 2 predicted enhanced positive outcomes at Time 3 (which was expected across all time points). In particular, individuals high in trait mindfulness at Time 2 reported an increase in happiness, life satisfaction, and savouring, at Time 3. Second, mindfulness at Time 2 predicted decreases in negative outcomes at Time 3 (as was also the expectation across all time points). Specifically, individuals reporting high levels of naturally occurring dispositional mindfulness reported less depression, anxiety, and negative affect at Time 3. The final significant cross-lag was unexpected and showed that negative outcomes at Time 2 predicted higher levels of mindfulness at Time 3. Although the direction of this relationship was never explicitly hypothesised, it could be interpreted to say that a person who experiences stressful times is predisposed to evidence an increase in mindfulness in order to cope with the new set of problems.

The Trait TMS and positive and negative outcomes structural model

Twelve latent variables, i.e., the two factors of the Trait TMS (Curiosity and Decentering), positive outcomes, and negative outcomes at three time points made up the second structural model. Each latent variable in the model was measured using the manifest indicators previously discussed (i.e., 3 manifest indicators for Curiosity, 3 for Decentering, and 3 each for positive and negative outcomes at each time point). Eight stability pathways (autocorrelations) and 24 cross-lag paths were included in the model. Consistent with FFMQ analyses, manifest indicators were correlated within the same construct across time. This initial structural model between the Trait TMS and positive and negative outcomes fit these data well, $\chi^2 = 814.42$; $p < .001$; $df = 508$; $\chi^2/df = 1.60$; RMSEA = .04; SRMR = .07; IFI = .97; CFI = .97.

Again, in order to reduce the model's complexity, nonsignificant pathways were pruned from the model (Kline, 2005). In total, the pruning process took 20 steps, resulting in a model that retained 12 significant pathways. No additional pathways became significant during the pruning process (see Figure 4.7 for a schematic representation of this structural model). As the final model in Figure 4.7 demonstrates, all eight stability coefficients were strongly and positively significant, ($\beta = .69$ to $.99$, $ps < .001$), with an additional four significant cross-lags. Specifically, for the first cross-lag, Decentering at Time 2 negatively predicted negative outcomes at Time 3 ($\beta = -.15$, $p < .05$), confirming expectations; second,

Decentering at Time 2 negatively predicted Curiosity at Time 3 ($\beta = -.26, p < .001$); third, negative outcomes at Time 2 negatively predicted Curiosity at Time 3 ($\beta = -.10, p < .01$); and fourth, Curiosity at Time 2 positively predicted negative outcomes at Time 3 ($\beta = .16, p < .01$). These last three cross-lags were not initially hypothesised. The final pruned model fit these data well, $\chi^2 = 821.18; p < .001; df = 528; \chi^2/df = 1.56; RMSEA = .04; SRMR = .07; IFI = .97; CFI = .97$.

Figure 4.7. A longitudinal structural path model for the Trait TMS and psychological outcomes. Significant stability pathways are represented by solid arrows, whereas, significant cross-lags are represented by dashed arrows. All coefficients are standardised regression coefficients. * $p < .05$, ** $p < .01$, *** $p < .001$. T1 = Time 1;

T2 = Time 2; T3 = Time 3. Manifest indicators for each latent variable have been omitted from the figure to ease interpretability.

To summarise, the structural model of the Trait TMS and positive and negative outcomes, demonstrates that mindfulness (this time measured by the Trait TMS) appears to be a relatively stable dispositional characteristic trait, as was expected. Individuals in this sample, who were high in mindfulness at Time 1, remained high at Time 2 and Time 3, which is consistent with findings reported earlier (when the FFMQ was the measure of mindfulness). Positive and negative outcome variables also remained stable across time (as was seen prior in the FFMQ structural model).

Inconsistent findings emerged from the four significant cross-lags. First, as was expected, mindfulness (the Decentering factor specifically) predicted decreases in negative outcomes over time, though only between Time 2 and Time 3, suggesting that individuals who are more decentered (as a mindfulness process) in daily life, report less depression, anxiety, and negative affect between these time points. This result is consistent with the earlier FFMQ and negative outcome findings. Second, the Decentering factor was also found to negatively predict the Curiosity factor (an unpredicted, though quite plausible finding) between Time 2 and Time 3, indicating that the more decentered, or emotively unattached an individual is, the less curious they tend to be. The third significant cross-lag makes both conceptual and intuitive sense – the higher the individual scores in depression, anxiety, and negative affect, the less curious they become over time. This finding was again evidenced only between Time 2 and Time 3.

The fourth and final significant cross-lag revealed that between Time 2 and Time 3 the Curiosity factor positively predicted (albeit very weakly) negative outcomes. Participants who appeared to be more curious between Time 2 and Time 3 were also seen to report more negative outcomes at Time 3, perhaps suggesting more of an inquisitive mindset was manifested toward their negative outcomes at this time point. Interestingly, mindfulness as measured by the Trait TMS yielded nonsignificant findings with positive outcomes. It appears that the Curiosity and Decentering components of mindfulness (the two factors measured by the Trait TMS) do not appear to directly influence, or enhance, an individual's perceived sense of life happiness, satisfaction, or savouring beliefs, as was expected, but in contrast they were involved with the negative outcomes.

Mindfulness, Psychological Outcomes, and Meditation Experience

To address the present study's second objective, both multivariate analysis of variance and structural equation modeling were employed to investigate whether group membership (individuals with and without experience in meditation) influences relationships between mindfulness and both positive and negative outcomes. Recall, it was expected (due to extant research discussed earlier) that meditation experience would enhance the psychological functioning of an individual over time, and this would be represented by increased positive outcomes and decreased negative outcomes for meditators, when compared with nonmeditators. Furthermore, meditators should be more mindful in daily life than nonmeditators, as a direct consequence of meditation practice.

Multivariate analyses of variance

First, a series of MANOVAs were conducted to test for differences between the two groups. A mixed model MANOVA involving group (meditators vs. nonmeditators) as the between-subjects factor, by time (3 time points) as the within-subjects factor, with positive outcomes and negative outcomes as the dependent variables yielded a significant multivariate main effect for group membership, $F(2, 316) = 4.37, p < .05$, partial $\eta^2 = .03$. Two covariates proved to be statistically significant predictors: age, $F(6, 309) = 18.59, p < .001$, partial $\eta^2 = .27$; and gender, $F(6, 309) = 7.94, p < .001$, partial $\eta^2 = .13$, but despite their contribution in explaining variance in the dependent variables, the main effect of meditator status still remained statistically significant. The within-subjects multivariate effects indicated that there was a nonsignificant effect of time, $F(4, 314) = .001, p = 1.00$, partial $\eta^2 < .01$ (this nonsignificant result was due to standardising constituent variables before combining into the positive and negative clusters). And finally, there was a nonsignificant time x group interaction, $F(4, 314) = .59, p = .67$, partial $\eta^2 < .01$.⁶⁰ Based on these findings, univariate results were examined for the main effect of group membership only.

The between-subjects univariate effects for group membership indicated that meditators ($M = .12, SD = .06$) compared to nonmeditators ($M = -.11, SD = .06$) reported significantly more positive outcomes such as happiness, life satisfaction, and savouring, $F(1, 317) = 8.11, p < .01$, partial $\eta^2 = .03$. Univariate effects also indicated that meditators ($M = -.10, SD = .06$) reported significantly less negative outcomes, such as depression, anxiety, and

⁶⁰ Composite variables for the positive and negative outcomes, rather than separate individual variables that make up each composite score (i.e., separate scores for happiness, life satisfaction, and savouring for example) were used for this MANOVA. It was decided that this was the most focussed and efficient use of the data and is consistent with other methods of analysis throughout this thesis. Future researchers could explore individual variables separately if that was in their interest.

negative affect than nonmeditators ($M = .09$, $SD = .06$), $F(1, 317) = 5.44$, $p < .05$, partial $\eta^2 = .02$. In sum, these results were in the direction as expected, hence, they supported the above hypotheses.

To explore the effects that group membership has on mindfulness scores over time, a mixed model MANOVA involving group (meditators vs. nonmeditators) as the between-subjects factor by time (3 time points) as the within-subjects factor with the FFMQ and Trait TMS as the dependent variables was conducted. Multivariate main effects indicated that there was a significant between-subjects effect for group membership, $F(7, 311) = 6.68$, $p < .001$, partial $\eta^2 = .13$, and a significant within-subjects effect of time, $F(14, 304) = 2.89$, $p < .001$, partial $\eta^2 = .12$. The multivariate time $\times$ group interaction was nonsignificant, $F(14, 304) = 1.10$, $p = .36$, partial $\eta^2 = .05$. Based on these findings, univariate results were examined for the main effects of group membership and time only.

Means and standard errors for meditators and nonmeditators for the five factors of the FFMQ and the two factors of the Trait TMS are presented in Table 4.6. Univariate between-subjects effects for group membership revealed that meditators consistently scored higher on all mindfulness measures than nonmeditators. These results support hypotheses by indicating that in this particular sample, meditators were more mindful in daily life than their nonmeditating counterparts, with the exception of the Awareness dimension of the FFMQ which was nonsignificant.

Table 4.6

Means and Standard Errors and Between-Subjects Effects on Group, the FFMQ, and the Trait TMS

Scale	Meditators		Nonmeditators		<i>F</i> -statistic	Partial η^2
	<i>M</i>	<i>SE</i>	<i>M</i>	<i>SE</i>		
FFMQ:						
Nonjudging	3.69	0.06	3.45	0.06	7.38***	.02
Observing	3.57	0.05	3.19	0.05	33.07***	.09
Describing	3.75	0.06	3.41	0.06	15.74***	.05
Awareness	3.32	0.05	3.22	0.05	1.85 ns	.01
Nonreacting	3.20	0.05	2.94	0.05	15.82***	.05
Trait TMS:						
Decentering	1.97	0.05	1.62	0.05	24.42***	.07
Curiosity	2.33	0.07	2.05	0.07	7.94***	.02

Note. ($df = 1, 317$). *** $p < .001$. *ns* = nonsignificant.

Means and standard errors for the five factors of the FFMQ and two factors of the Trait TMS at three time points are presented in Table 4.7. Univariate within-subjects effects for time revealed that three factors of the FFMQ (Nonjudging, Observing, and Describing)

and the Decentering factor of the Trait TMS changed significantly across time, whereas the Acting with Awareness and Nonreacting factors of the FFMQ and the Curiosity factor of the Trait TMS did not change significantly across time (see Figure 4.8 for a graphical representation). Overall, results yield fluctuating levels of mindfulness across time, with the Nonjudging factor suggesting a linear pattern, the Observing and Decentering factors indicating both linear and quadratic relationships, and the Describing factor revealing a quadratic pattern across the three time points. No predictions were made for these trajectories over time, and the means are presented here for interested researchers who may wish to pursue this issue in the future.

Table 4.7

Means and Standard Errors and Within-Subjects Effects on Time, the FFMQ, and the Trait TMS

Scale	Time 1		Time 2		Time 3		<i>F</i> -statistic	Partial η^2
	<i>M</i>	<i>SE</i>	<i>M</i>	<i>SE</i>	<i>M</i>	<i>SE</i>		
FFMQ:								
Nonjudging	3.51	0.05	3.57	0.04	3.62	0.05	5.90**	.02
Observing	3.44	0.04	3.35	0.04	3.35	0.04	8.38***	.03
Describing	3.62	0.04	3.55	0.05	3.57	0.05	3.50*	.01
Awareness	3.26	0.04	3.26	0.04	3.28	0.04	0.37 <i>ns</i>	.001
Nonreacting	3.08	0.03	3.05	0.04	3.08	0.04	0.49 <i>ns</i>	.002
Trait TMS:								
Decentering	1.85	0.04	1.74	0.04	1.79	0.04	4.98**	.02
Curiosity	2.23	0.05	2.19	0.05	2.15	0.05	2.29 <i>ns</i>	.01

Note. (*df* = 2, 634). **p* < .05, ***p* < .01, ****p* < .001. *ns* = nonsignificant.

Figure 4.8. Average mindfulness factor trends across time.

Longitudinal Path Model Analysis on Meditation Experience

FFMQ and psychological outcomes

In the current section, a series of equality constraints investigated whether meditators manifested different strengths of relationships between mindfulness and positive and negative outcomes compared to nonmeditators across time. Figure 4.6 (p. 129) presents the longitudinal structural model of the FFMQ and positive and negative outcomes on which the next series of analyses will be modelled. As demonstrated in Figure 4.6, six stability pathways and three cross-lags were found to be significant in this model. Using SEM techniques, equality between the two groups was tested by systematically constraining one pathway (parameter) at a time (a process recommended by Byrne & van de Vijver, 2010, discussed in Chapter 3). Table 4.8 presents goodness-of-fit indices and tests of differences comparing meditators to nonmeditators across time. As is seen in Table 4.8, equality constraints yielded no significant differences between meditators and nonmeditators (inconsistent with hypotheses). Specifically, when keeping each significant parameter constant (one parameter at a time) and comparing this new model to that of the original configural model (Model 1 in Table 4.8), meditators did not appear to yield estimates of a different strength to nonmeditators between mindfulness and positive and negative outcomes.

Table 4.8

Goodness-of-Fit Statistics and Tests of Differences on the FFMQ and Positive and Negative Outcomes Comparing Meditators to Nonmeditators across Time

Model description	Comparative model	χ^2 (df)	χ^2/df	RMSEA	sRMR	IFI	$\Delta\chi^2$ (Δdf)	CFI (ΔCFI)	Statistical significance
1. Configural model; no equality constraints imposed	—	1533.35 (886)	1.73	.05	.08	.93	—	.9279	—
2. Model 1 with the covariance between FFMQ T1 and FFMQ T2 constrained equal	2 versus 1	1533.37 (887)	1.73	.05	.08	.93	.02 (1)	.9280 (.0001)	ns ($p = .89$)
3. Model 1 with the covariance between FFMQ T2 and FFMQ T3 constrained equal	3 versus 1	1534.18 (887)	1.73	.05	.08	.93	.82 (1)	.9280 (.0001)	ns ($p = .36$)
4. Model 1 with the covariance between positive outcomes T1 and positive outcomes T2	4 versus 1	1534.50 (887)	1.73	.05	.08	.93	1.14 (1)	.9278 (-.0001)	ns ($p = .29$)

constrained equal									
5. Model 1 with the covariance between positive outcomes T2 and positive outcomes T3 constrained equal	5 versus 1	1540.37 (887)	1.74	.05	.08	.93	7.02 (1)	.9272 (-.007)	<i>ns</i> (<i>p</i> = .008)
6. Model 1 with the covariance between negative outcomes T1 and negative outcomes T2 constrained equal	6 versus 1	1533.37 (887)	1.73	.05	.08	.93	.01 (1)	.9280 (.0001)	<i>ns</i> (<i>p</i> = .92)
7. Model 1 with the covariance between negative outcomes T2 and negative outcomes T3 constrained equal	7 versus 1	1533.43 (887)	1.73	.05	.08	.93	.07 (1)	.9280 (.0001)	<i>ns</i> (<i>p</i> = .79)
8. Model 1 with the covariance between FFMQ T2 and positive outcomes T3 constrained equal	8 versus 1	1536.52 (887)	1.73	.05	.08	.93	3.17 (1)	.9276 (-.0003)	<i>ns</i> (<i>p</i> = .08)
9. Model 1 with the covariance between FFMQ T2 and negative outcomes T3 constrained equal	9 versus 1	1534.71 (887)	1.73	.05	.08	.93	1.36 (1)	.9278 (-.0001)	<i>ns</i> (<i>p</i> = .24)
10. Model 1 with the covariance between negative outcomes T2 and FFMQ T3 constrained equal	10 versus 1	1533.95 (887)	1.73	.05	.08	.93	.59 (1)	.9280 (.0001)	<i>ns</i> (<i>p</i> = .44)

Note. χ^2 = chi-square; *df* = degrees of freedom; χ^2/df = the ratio of chi-square to degrees of freedom; RMSEA = Root Mean Square Error of Approximation; sRMR = standardised Root Mean Square Residual; IFI = Incremental Fit Index; $\Delta\chi^2$ = difference in chi square; Δdf = difference in degrees of freedom; CFI = Comparative Fit Index; ΔCFI = difference in CFI; *ns* = nonsignificant; T1 = Time 1; T2 = Time 2; T3 = Time 3. Bonferroni adjustment was $p < .005$.

Trait TMS and psychological outcomes

Similar to the above analyses on the FFMQ, the Trait TMS was also used to explore whether meditators yielded estimates of a different strength to nonmeditators in pathways between mindfulness and both positive and negative outcomes. Figure 4.7 (p. 131) presents the longitudinal structural model of the Trait TMS and positive and negative outcomes on which the next equality constraint analyses will be modelled. As demonstrated in Figure 4.7, eight stability pathways and four cross-lags were significant in this model. As was seen with

analyses on the FFMQ, equality between the two groups was tested by systematically constraining one pathway at a time in this model.

Goodness-of-fit indices and tests of differences comparing meditators to nonmeditators across time (presented in Table 4.9) revealed no significant differences between these two groups. Specifically, when significant parameters in the model presented in Figure 4.7 were constrained, and this new model then compared to that of the original configural model (Model 1 in Table 4.9), meditators did not appear to yield estimates of a different strength to nonmeditators between mindfulness (measured by the Trait TMS) and positive and negative outcomes. Again, this finding was contrary to expectations, though consistent with equality constraints performed on the FFMQ above.

Table 4.9

Goodness-of-Fit Statistics and Tests of Differences on the Trait TMS and Positive and Negative Outcomes Comparing Meditators to Nonmeditators across Time

Model description	Comparative model	χ^2 (df)	χ^2/df	RMSEA	sRMR	IFI	$\Delta\chi^2$ (Δdf)	CFI (ΔCFI)	Statistical significance
1. Configural model; no equality constraints imposed	—	1518.95 (1056)	1.44	.04	.08	.95	—	.9499	—
2. Model 1 with the covariance between curiosity T1 and curiosity T2 constrained equal	2 versus 1	1519.49 (1057)	1.44	.04	.08	.95	.54 (1)	.9500 (.0001)	ns (p = .46)
3. Model 1 with the covariance between curiosity T2 and curiosity T3 constrained equal	3 versus 1	1519.06 (1057)	1.44	.04	.08	.95	.11 (1)	.9500 (.0001)	ns (p = .74)
4. Model 1 with the covariance between decentering T1 and decentering T2 constrained equal	4 versus 1	1519.42 (1057)	1.44	.04	.08	.95	.47 (1)	.9500 (.0001)	ns (p = .49)
5. Model 1 with the covariance between decentering T2 and decentering T3 constrained equal	5 versus 1	1519.09 (1057)	1.44	.04	.08	.95	.14 (1)	.9500 (.0001)	ns (p = .71)
6. Model 1 with the covariance between positive	6 versus 1	1519.52	1.44	.04	.08	.95	.57	.9500	ns

outcomes T1 and positive outcomes T2 constrained equal		(1057)					(1)	(.0001)	($p = .45$)
7. Model 1 with the covariance between positive outcomes T2 and positive outcomes T3 constrained equal	7 versus 1	1519.79 (1057)	1.44	.04	.08	.95	.84 (1)	.9498 (-.0001)	<i>ns</i> ($p = .36$)
8. Model 1 with the covariance between negative outcomes T1 and negative outcomes T2 constrained equal	8 versus 1	1518.99 (1057)	1.44	.04	.08	.95	.04 (1)	.9500 (.0001)	<i>ns</i> ($p = .84$)
9. Model 1 with the covariance between negative outcomes T2 and negative outcomes T3 constrained equal	9 versus 1	1520.75 (1057)	1.44	.04	.08	.95	1.80 (1)	.9497 (-.0002)	<i>ns</i> ($p = .18$)
10. Model 1 with the covariance between decentering T2 and curiosity T3 constrained equal	10 versus 1	1518.96 (1057)	1.44	.04	.08	.95	.02 (1)	.9500 (.0001)	<i>ns</i> ($p = .89$)
11. Model 1 with the covariance between curiosity T2 and negative outcomes T3 constrained equal	11 versus 1	1519.21 (1057)	1.44	.04	.08	.95	.26 (1)	.9500 (.0001)	<i>ns</i> ($p = .61$)
12. Model 1 with the covariance between decentering T2 and negative outcomes T3 constrained equal	12 versus 1	1518.96 (1057)	1.44	.04	.08	.95	.01 (1)	.9500 (.0001)	<i>ns</i> ($p = .92$)
13. Model 1 with the covariance between negative outcomes T2 and curiosity T3 constrained equal	13 versus 1	1519.17 (1057)	1.44	.04	.08	.95	.22 (1)	.9500 (.0001)	<i>ns</i> ($p = .64$)

Note. χ^2 = chi-square; df = degrees of freedom; χ^2/df = the ratio of chi-square to degrees of freedom; RMSEA = Root Mean Square Error of Approximation; sRMR = standardised Root Mean Square Residual; IFI = Incremental Fit Index; $\Delta\chi^2$ = difference in chi square; Δdf = difference in degrees of freedom; CFI = Comparative Fit Index; ΔCFI = difference in CFI; *ns* = nonsignificant; T1 = Time 1; T2 = Time 2; T3 = Time 3. Bonferroni adjustment was $p < .004$.

In summary, Objective 2 in the present study was to explore whether group membership influenced mindfulness scores and a cluster of positive and negative psychological outcomes. It was expected, based on previous literature mentioned, that individuals with meditation experience would a) report more positive outcomes, such as happiness, life satisfaction, and savouring; b) report less negative outcomes, such as depression, anxiety, and negative affect; and c) as a consequence of meditation experience, be more mindful in daily life than nonmeditators. These expectations were only partially supported by analyses conducted. Firstly, MANOVAs reported significant main effects between meditators and nonmeditators on both positive and negative outcomes. Specifically, meditators scored significantly higher in positive outcomes at all three time points than nonmeditators, and lower in negative outcomes. MANOVAs also revealed that meditators scored higher in mindfulness (on both the FFMQ and Trait TMS) than nonmeditators at all three time points – supporting the hypothesis (and extant literature) that meditation experience increases dispositional trait mindfulness, and further supporting the proposition that mindfulness is a skill that can be taught via meditative practice (Brown, 2003; Kabat-Zinn, 2003).

In direct contrast, however, SEM techniques employing equality constraint analyses yielded no significant difference between meditators and nonmeditators in strengths of relationships of variables in the model across time. Objective 3 of the present study will explore this area further, as given the complexity of the longitudinal path models between meditation experience, mindfulness, and psychological outcomes, it is possible that equality constraint analyses were too conservative an assessment to yield group differences. Investigating this area in more depth is justified given previous research discussed earlier that purports the benefits that meditation practice has on psychological wellbeing⁶¹, and due to MANOVA results reported above.

Predictors of Psychological Outcomes in Relation to Trait Mindfulness

The final objective of the current study draws on latent growth curve modeling techniques to investigate first, the growth trajectory of mindfulness and other psychological constructs across time, and second, whether meditation experience influences the developmental growth in these constructs' trajectories. As discussed previously, within a SEM framework, LGCM combines elements of repeated measures analysis of variance and

⁶¹ See Baer et al. (2006, 2008); Kabat-Zinn (2003); Kabat-Zinn et al. (1992); Lykins & Baer (2009); Shapiro & Carlson (2009); Van Dam et al. (2009); Walsh & Shapiro (2006); Williams et al. (2007).

confirmatory factor analysis techniques, and is the predominant approach to analysing the course of naturalistic longitudinal data (Duncan & Duncan, 2004; Hardy & Thiels, 2009).

According to Duncan and Duncan (1999), an important advantage of LGCM techniques, and one that offers the researcher a wide range of modeling possibilities, is the ability for both latent and measured (or observed) variables to be used as both predictors and criterion variables (i.e., variables can be analysed simultaneously as both an independent and dependent variable). Other more traditional methods of assessing change, such as repeated measures analysis of variance, do not provide this advantage. An unconditional growth model (a specific type of LGC model) represents the pooled variance of each individual in the population sampled, i.e., it assesses the average rate of change of all participants (Duncan & Duncan. The intercept (the initial status or baseline average of the variable of interest) and slope (rate of change over time of that particular variable of interest) (Duncan & Duncan, 1999) of the total sample group will be used to test the following predictions: 1) mindfulness over time (slope) will positively predict decreases in negative outcomes (i.e., a negative growth trajectory), and 2) mindfulness over time will positively predict increases in positive outcomes (a positive growth trajectory).

Further, LGCM techniques will be used to compare meditators and nonmeditators mindfulness scores and positive and negative psychological outcomes, to examine whether meditation experience explains change in a construct across time. Adding the variable of meditation into the model creates a conditional growth model (a further subset of LGCM; Duncan & Duncan, 1999) and will aid in determining whether an individual's meditation experience is responsible for changes in average levels of other variables, such as positive and/or negative outcomes. Consistent with MANOVAs reported earlier in the present chapter (and in support of extant research purporting the benefits of meditation practice), meditators in the current sample were expected to manifest a positive slope for mindfulness compared to nonmeditators; less negative outcomes (such as depression, anxiety, and negative affect) would be identified over time in the group of meditators; and enhanced positive outcomes (such as happiness, life satisfaction, and savouring) would be manifested over time in individuals with meditation experience, as opposed to individuals without such experience.

In sum, the primary goal of the third and final objective was to explore the developmental growth trajectory and patterns across time in mindfulness in a sample of individuals with or without meditation experience. Mindfulness was predicted to yield a positive developmental trajectory of positive outcomes and a negative developmental trajectory of negative outcomes, and in addition, meditators when compared to nonmeditators,

were predicted to function in daily life with an overall enhanced sense of psychological wellbeing, which would be represented by more positive outcomes and less negative outcomes across time.

Linear Latent Growth Curve Modeling

LGCM methodology involves a number of processes, though due to the scope of the present research, only two will be discussed in turn⁶². First, the hypothesised trajectory shape will be tested to examine whether the trajectory is an accurate representation of the population model (represented by goodness-of-fit statistics that have universally been accepted to suggest good model fit); and second, the independent latent growth curve models (tested in the first step) will be combined into one parallel process model in order to test the proposed hypotheses (Cisler et al., 2011; Cheong, MacKinnon, & Toon Khoo, 2003). The parallel process model allows one to examine whether the slope of one variable (i.e., mindfulness) significantly predicts the slope of another variable (i.e., positive outcomes).

Independent latent growth curve modeling

Independent latent growth curve models (or base models) were tested for each variable of interest in order to establish appropriate model fit and growth trajectory of that variable (Cisler et al., 2011). Both the intercept and linear slope (modelled as unobserved or latent variables) for each variable were estimated (Schwartz, Mason, Pantin, & Szapocznik, 2008). Specifically, in SEM the loadings of all three time points on the intercept latent factor, representing the initial (baseline) level of the variable, were all set at a value of 1, as opposed to being freely estimated (Cisler et al.). Parameters between the latent variable for slope (representing a variable's growth trajectory) and the three time points were fixed to increase at a linear rate (i.e., 0 for the first time of measurement, 1 for the second, and 2 for the third). According to Cheong et al. (2003) and Duncan and Duncan (1993), setting the parameter values of the model in this fixed manner (rather than allowing free estimation of parameters), defines the growth trajectory shape and is recommended when there is no theoretical reason to assume that growth trajectory will be non-linear. The fit of the LGC model to the data was evaluated using standard SEM fit indices recommended by Cisler et al. (2011) and Duncan and Duncan (1999); namely, the chi-square statistic (χ^2), the Root Mean Square Error of Approximation (RMSEA), the standardised Root Mean Squared Residual (sRMR), and the Comparative Fit Index (CFI), described in previous chapters.

⁶² For applications of latent variable growth curve modeling methodology refer to comprehensive empirical literature, such as Cisler et al. (2011), Duncan & Duncan (1999, 2004) and Voelkle (2007).

FFMQ base model

Figure 4.9 provides a graphical representation of the base model for the FFMQ at three time points (see Table 4.10 for parameter estimates).⁶³ The mean intercept for the FFMQ was positive and statistically significant, indicating the sample group's average intercept was different to 1 (the FFMQ is rated on a 5-point scale) at baseline. In contrast, the mean slope was not significant, suggesting as a group, the average slope trajectory did not differ significantly from 0 across time. For individual-level differences in the FFMQ, the variance intercept and variance slope were both positive and statistically significant, indicating a) there was individual variability at the initial time point, and b) there was individual-level variance around the growth trajectory across three time points. The covariance between the slope and intercept of the FFMQ was nonsignificant ($\beta = .18, p = .19$), suggesting that status at Time 1 (intercept) did not significantly covary with slope manifested over the three time points. The LGC base model for the FFMQ yielded good fit to the data, $\chi^2 = 1.91$, RMSEA = .05, sRMR = .002, CFI = .99.

Figure 4.9. Independent (base) latent growth curve model for the FFMQ ($N = 319$).⁶⁴

⁶³ All subsequent base models for the Trait TMS and positive and negative outcome variables will be discussed in text only, rather than graphically depicted. Figure 4.9 demonstrates how each variable examined in these initial base models were represented.

⁶⁴ For all LGCM analyses on the FFMQ, items were combined into a composite score for each time point (rather than five separate sub-factors). Due to the number of analyses that five factors would generate in an LGC model (i.e., a parallel process model would require a model for each of the five sub-factors combined with models for both positive and negative outcomes), and to aid in simplifying interpretability, it was decided that composite scores were the most focussed and efficient way to manage the FFMQ. Total scores of the FFMQ have been

Table 4.10

Parameter Estimates for the Independent Latent Growth Curve Models for the FFMQ, Trait TMS, Positive Outcomes and Negative Outcomes

	Mean intercept	Mean slope	Variance intercept	Variance slope	Covariance
FFMQ	3.37 (.03)***	-.001 (.01) <i>ns</i>	.21 (.02)***	.004 (.002)*	.01 (.004) <i>ns</i>
Decentering	1.80 (.04)***	-	.28 (.03)***	-	.02 (.01)*
Curiosity	2.19 (.05)***	-	.66 (.07)***	-	.01 (.02) <i>ns</i>
Pos Outcomes	.0001 (.04) <i>ns</i>	.0001 (.01)***	.52 (.05)***	.01 (.01) <i>ns</i>	-.01 (.01) <i>ns</i>
Neg Outcomes	.0001 (.05) <i>ns</i>	.0001 (.02)***	.52 (.05)***	.02 (.01)*	-.02 (.02) <i>ns</i>

Note. ($N = 319$); standard errors are given in parentheses; * $p < .05$, *** $p < .001$. *ns* = nonsignificant; Decentering and Curiosity are the two factors of the Trait TMS; Pos = positive; Neg = negative.

Trait TMS base model

The base model for Decentering (the first factor in the Trait TMS) at three time points yielded modest model fit, $\chi^2 = 5.87$, RMSEA = .12, sRMR = .03, CFI = .94, suggesting a nonlinear pattern to the data (see Table 4.10 for parameter estimates). For this particular base model, to aid convergence a starting point value of .02 for the variance was required on the slope, resulting in uninterpretable mean slope and variance slope estimates; hence, these values are omitted from Table 4.10. The base model for Decentering yielded both group and individual differences; in particular, the mean intercept was both positive and statistically significant, as was the variance intercept. This result indicates that the group's average intercept was different to 1 (again rated on a 5-point scale) at baseline, and that there was individual variability at Time 1 intercepts. The covariance between Decentering's intercept and slope was significant ($\beta = .33$, $p < .05$), suggesting that status at Time 1 (intercept) was seen to significantly covary with slope manifested over the three time points, namely, individuals high on Decentering at Time 1 manifested a positive slope of Decentering across the three time points.

The base LGC model for the second factor on the Trait TMS (Curiosity) also required the stipulation of a starting value of .02 for the variance of the slope, as explained above for Decentering. Mean slope and variance slope estimates were therefore not obtained for this model, so again were omitted from Table 4.10. Goodness of fit-statistics were mixed, $\chi^2 = 4.09$, RMSEA = .09, sRMR = .03, CFI = .97, suggesting a non-linear pattern to the data (see Table 4.10 for parameter estimates). Both group and individual differences were again evident, as mean and variance intercepts were positive and statistically significant. Similar to

used in prior research as an overarching measure of mindfulness, for example, Baer et al. (2006) and Van Dam et al. (2009).

the Decentering factor of the Trait TMS, this model suggests that at the initial time point, both the group as a whole and at the individual level, showed significant variability at Time 1. The covariance between the slope and intercept of the Curiosity factor of the Trait TMS, however, was nonsignificant ($\beta = .08, p = .60$), indicating that status for the Curiosity factor at Time 1 did not significantly covary with Curiosity's slope manifested over the three time points.

Positive outcomes base model

Positive outcomes across time were tested with a base LGC model. Consistent with previous analyses in the present chapter, the three manifest indicators of happiness, life satisfaction, and savouring were combined into a composite score for each time point. A good fit to the data was evidenced with this model, $\chi^2 = 2.78$, RMSEA = .07, sRMR = .02, CFI = .99, and parameter estimates are presented in Table 4.10. Due to values being standardised in creating composite scores (z-scores), the group mean intercept and slope had p -values of 1. As mentioned, composite scores are an acceptable way to collapse several variables into one total score (Booyesen, 2002) and should not hinder LGCM analyses. There was statistically significant variability at the individual level, though only at the intercept. The slope variance was not significant, suggesting there was no individual-level variance around the growth trajectory across time; rather, variability was seen at the initial assessment only. The covariance between the slope and intercept of positive outcomes was also nonsignificant ($\beta = -.15, p = .49$).

Negative outcomes base model

The final base model (measuring negative outcomes) yielded an excellent fit to the data across three time points, $\chi^2 = 1.94$, RMSEA = .05, sRMR = .02, CFI = .99 (see Table 4.10 for parameter estimates). Similar to the composite scores created for positive outcomes (discussed above), the three negative outcome variables of depression, anxiety, and negative affect were combined into one total score for each time point. Again, due to this standardising process, p -values of 1 were evidenced for both the mean intercept and mean slope. At the individual-level, however, both the variance intercept and variance slope were positive and statistically significant; indicating, both individual variability at the initial time point and among growth trajectories across the three time points. The negative outcomes LGC model yielded a nonsignificant covariance between the slope and intercept ($\beta = -.17, p = .27$).

Parallel Process Latent Growth Curve Models

As was evidenced and discussed above, all base LGC models were modelled successfully. The second LGCM step, therefore, was to assess these unconditional growth models simultaneously in pairs using the parallel process LGCM method. As mentioned, a parallel process model will ascertain the extent to which the trajectories of variables of interest are related over time (Cheong et al., 2003). Specifically, parallel processing LGCM is able to explore the form of growth and the pattern of associations among the growth parameters of mindfulness, positive outcomes, negative outcomes, and meditation experience. For example, parallel process LGCMs will allow for the modeling of 1) the relationships between FFMQ's intercepts and slopes on negative outcomes' intercepts and slopes; 2) the relationships between FFMQ's intercepts and slopes on positive outcomes' intercepts and slopes; 3) the relationships between the two factors of the Trait TMS (Curiosity and Decentering) intercepts and slopes on negative outcomes' intercepts and slopes; and 4) the relationships between the two factors of the Trait TMS intercepts and slopes on positive outcomes' intercepts and slopes.

FFMQ predicting psychological outcomes

It was hypothesised that the trajectory of mindfulness across time would negatively predict the trajectory of negative outcomes and positively predict the trajectory of positive outcomes. First, to examine the extent to which starting points and changes over time in the FFMQ were associated with starting points and changes over time in negative outcomes, the two unconditional base growth models were combined as one parallel process (graphically represented in Figure 4.10).⁶⁵ Although model fit for the FFMQ predicting negative outcomes was mixed, $\chi^2 = 4.20$, RMSEA = .10, sRMR = .02, CFI = .98, the hypothesis of a negative association between these two variables was supported (see Table 4.11 for parameter estimates). Both the intercept and slope of the FFMQ were significantly negatively related to the intercept and slope of negative outcomes respectively; i.e., increases in mindfulness over time was predictive of decreases in negative outcomes over time. Specifically, individuals in this sample who reported high levels in mindfulness at the initial time point also reported lower levels of negative outcomes such as depression, anxiety, and negative affect (intercept to intercept relationship), and individuals who manifested a positive slope of mindfulness

⁶⁵ All subsequent parallel process LGC models (including the FFMQ predicting positive outcomes and the Trait TMS predicting both positive and negative outcomes) will be discussed in text only rather than graphically depicted. Figure 4.10 demonstrates how each variable in a parallel process LGCM were represented in these further analyses.

across time also manifested a negative slope of negative outcomes across time (slope to slope relationship). To illustrate this relationship, a graphical representation of a randomly chosen participant's growth trajectories is presented in Figure 4.11.

Figure 4.10. Parallel process latent growth curve model for the FFMQ predicting negative outcomes ($N = 319$). All coefficients are standardised regression coefficients. *** $p < .001$. *ns* = nonsignificant. The three time point indicators for each latent variable are omitted from the figure to ease interpretability.

Table 4.11

Parameter Estimates for Parallel Processing Latent Growth Curve Models for the FFMQ Predicting Negative and Positive Outcomes

	Estimate	SE	B	Significance
FFMQ → Negative Outcomes				
1. intercept → intercept	-1.05	.10	-.65	$p < .001$
2. intercept → slope	.08	.05	.19	$p = .12$
3. slope → intercept	1.08	1.03	.11	$p = .30$
4. slope → slope	-1.90	.57	-.71	$p < .001$
FFMQ → Positive Outcomes				
1. intercept → intercept	1.01	.08	.63	$p < .001$
2. intercept → slope	-.02	.04	-.05	$p = .54$
3. slope → intercept	-.02	.04	-.05	$p = .42$
4. slope → slope	.92	.14	.67	$p < .001$

Note. SE = standard error; β = standardised regression coefficients.

Figure 4.11. An example of a randomly chosen participant's slope trajectory for the FFMQ and for negative outcomes across time. For this individual, as FFMQ scores increased over time, negative outcomes decreased.

Next, a parallel process LGCM explored the hypothesis that the FFMQ would be positively predictive of positive outcomes such as happiness, life satisfaction, and savouring over time. The FFMQ base model and positive outcomes base model were combined as one parallel process, yielding a fairly poor linear fit to the data, $\chi^2 = 10.89$, RMSEA = .17, sRMR = .03, CFI = .93. Despite the apparent modest fit to the data (suggesting the longitudinal data were more curvilinear than linear), both the intercept and slope of the FFMQ were significantly positively related to the intercept and slope of positive outcomes, indicative of a positive association across time (see Table 4.11 for parameter estimates). As was expected, increases in mindfulness over time positively predicted increases in positive outcomes – more specifically, individuals in this sample who were high in mindfulness at the initial time point also reported more positive outcomes such as happiness, life satisfaction, and savouring. The slope of mindfulness over time was also positively predictive of the slope of positive outcomes over time. A graphical representation of a randomly chosen participant's positive growth trajectory is presented in Figure 4.12 to illustrate this relationship.

Figure 4.12. An example of a randomly chosen participant's slope trajectory for the FFMQ and for positive outcomes across time. As FFMQ scores increased over time for this individual, so did positive outcomes.

Trait TMS predicting psychological outcomes

Using the Trait TMS as the measure of mindfulness, the same hypotheses were tested. Namely, would individuals high in mindfulness report lower levels of negative outcomes and higher levels of positive outcomes both at Time 1 (intercept to intercept) and across time (slope to slope)? First, the Decentering (the first factor in the Trait TMS) base model and negative outcomes base model were combined as one parallel process to test the association between these two variables. The overall fit of this two variable model was good, $\chi^2 = 2.75$, RMSEA = .07, sRMR = .02, CFI = .98. As expected, the intercept of Decentering was significantly negatively related to the intercept of negative outcomes (see Table 4.12 for subsequent parameter estimates). This finding suggests that individuals in this sample high in mindfulness (specifically the Decentering component to mindfulness) at the initial time point also reported lower levels of negative outcomes (consistent with prior analyses of the FFMQ). Further, the slope of Decentering was marginally significantly negatively related to the slope of negative outcomes (also consistent with FFMQ analyses). Although unpredicted, a significant (though positive) relationship was found between the slope of Decentering and the intercept of negative outcomes, suggesting that individuals who manifested a negative slope for Decentering also reported high levels of negative outcomes at Time 1.

A parallel process LGC model with the Decentering factor predicting positive outcomes was tested next, and it yielded a mixed fit to the data, $\chi^2 = 7.08$, RMSEA = .14, sRMR = .03, CFI = .93. Table 4.12 shows the intercept of Decentering was significantly positively related to the intercept of positive outcomes (consistent with findings from the

FFMQ), though the slope of Decentering was not significantly associated with the slope of positive outcomes (contrary to prediction). These findings indicate that while individuals who reported high levels of the Decentering factor of mindfulness at Time 1 also reported higher levels of positive outcomes, this relationship was not manifested by an association between the two slopes over time.

The second factor in the Trait TMS (Curiosity) was analysed in the same manner as the Decentering factor. First, to examine the extent to which starting points and changes over time in Curiosity were associated with starting points and changes over time in negative outcomes, a parallel process LGC model was tested between these two variables and demonstrated a good fit to the data, $\chi^2 = 2.22$, RMSEA = .06, sRMR = .02, CFI = .99. Evidenced in Table 4.12, the intercept of Curiosity was significantly positively predictive of the intercept of negative outcomes (a finding inconsistent with prediction). No other relationships were found to be statistically significant, suggesting that in this sample of individuals, people high in the Curiosity component of mindfulness at the initial time point also reported high levels of negative outcomes, though this pattern did not appear to manifest across time.

Finally, the Curiosity factor of the Trait TMS was examined in its association with positive outcomes in a parallel process LGCM. The model between these two variables was found to fit the data reasonably well, $\chi^2 = 3.55$, RMSEA = .90, sRMR = .02, CFI = .97. As evidenced in Table 4.12, only the intercept of Curiosity yielded marginal positive significance in an association with the intercept of positive outcomes (similar to the relationship between Curiosity and negative outcomes above); thus, results supported the hypothesis that mindfulness would positively predict positive outcomes, though only at the initial time point. Individuals high in Curiosity indeed reported higher levels of positive outcomes, as predicted, though this relationship was evidenced at Time 1 only and did not appear to continue across time.⁶⁶

⁶⁶ It is intuitive to expect individuals experiencing more negative outcomes in daily life to be lower in mindfulness, and individuals experiencing more positive outcomes to be higher in mindfulness. Therefore, further exploratory LGCM analyses investigating reciprocal relationships between the same variables discussed in this section were conducted, e.g., negative outcomes negatively predicting mindfulness and positive outcomes positively predicting mindfulness. To maintain focus on the present hypotheses, however, these further analyses will not be discussed in the present chapter. Goodness-of-fit statistics and parameter estimates on these further LGC models (including the FFMQ and both factors of the Trait TMS) are presented in Appendix V.

Table 4.12

Parameter Estimates for Parallel Processing Latent Growth Curve Models for the Two Factors of the Trait TMS Predicting Negative and Positive Outcomes

	Estimate	SE	β	Significance
Decentering → Negative Outcomes				
1. intercept → intercept	-.66	.21	-.49	$p < .01$
2. intercept → slope	.11	.07	.36	$p = .15$
3. slope → intercept	2.08	.95	.41	$p < .05$
4. slope → slope	-.62	.37	-.56	$\sim p < .10$
Decentering → Positive Outcomes				
1. intercept → intercept	.68	.18	.48	$p < .001$
2. intercept → slope	-.001	.06	-.002	$p = .99$
3. slope → intercept	-1.38	.89	-.26	$p = .12$
4. slope → slope	.23	.34	.14	$p = .50$
Curiosity → Negative Outcomes				
1. intercept → intercept	.18	.07	.20	$p < .01$
2. intercept → slope	.01	.03	.04	$p = .81$
3. slope → intercept	-.76	.82	-.15	$p = .35$
4. slope → slope	.03	.34	.03	$p = .94$
Curiosity → Positive Outcomes				
1. intercept → intercept	.12	.07	.13	$\sim p < .10$
2. intercept → slope	.003	.02	.01	$p = .91$
3. slope → intercept	.58	.80	.11	$p = .47$
4. slope → slope	.33	.26	.32	$p = .20$

Note. Decentering and Curiosity are the two factors of the Trait TMS; *SE* = standard error; β = standardised regression coefficients; $\sim p < .10$ = marginally significant.

Meditation Experience Predicting Mindfulness and Psychological Outcomes

The final aim of the third objective was to compare (using LGCM techniques) meditators with nonmeditators to investigate whether meditation experience influences, or predicts *change* in a construct across time. Recall, meditators in the current sample were expected to be more mindful than nonmeditators, to report lower levels of negative outcomes such as depression, anxiety, and negative affect, and higher levels of positive outcomes such as happiness, life satisfaction, and savouring across time. The conditional variable (meditation experience) was added to the independent base LGC models of the FFMQ, Trait TMS, and both positive and negative outcome models (discussed previously), creating conditional latent growth models for these variables of interest (Duncan & Duncan, 1999).

FFMQ and meditation experience conditional model

Figure 4.13 graphically represents the conditional LGC model of the FFMQ at three time points with meditation experience (as discussed) being the conditional variable.⁶⁷ Within the raw data, participants' scores were first dichotomised into two groups – participants with

⁶⁷ All subsequent meditation experience conditional LGC models (including the Trait TMS, positive, and negative outcomes) will be discussed in text only, rather than graphically depicted. Figure 4.13 demonstrates how each variable in a conditional LGC model were represented in further analyses.

meditation experience and participants without meditation experience – then this dichotomised variable was added to the base model of the FFMQ LGC model. This new conditional model yielded an excellent fit to the data, $\chi^2 = 1.44$, RMSEA = .04, sRMR = .003, CFI = .99. The intercept of meditation experience was significantly related to the intercept of the FFMQ, ($r = .26$, $p < .001$), indicating at initial baseline assessment, significant group differences existed in participants' response to the FFMQ. Further analyses revealed that the meditators' group mean (see Table 4.13) for the FFMQ was significantly higher at Time 1 compared with the nonmeditators' group mean (as was the expectation) – i.e., meditators were more mindful than nonmeditators at baseline. The meditation variable, however, was not significantly related to the slope of the FFMQ, suggesting that the average growth rate for mindfulness did not appear to differ between the meditators and the nonmeditators.

Figure 4.13. The conditional latent growth curve model of the FFMQ at three time points comparing meditators to nonmeditators ($N = 319$).

Table 4.13

Descriptive Statistics for the Conditional LGC Models for Mindfulness and Positive and Negative Outcomes Comparing Meditators to Nonmeditators

Variable	Meditators		Nonmeditators	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
FFMQ	3.72	0.03	3.24	0.04
Decentering	2.16	0.03	1.68	0.05
Curiosity	2.46	0.03	2.09	0.06
Positive Outcomes	0.36	0.03	-0.11	0.06
Negative Outcomes	0.11	0.06	0.58	0.03

Note. Decentering and Curiosity are the two factors of the Trait TMS.

Trait TMS and meditation experience conditional model

The conditional model of the first factor of the Trait TMS (Decentering) comparing meditators to nonmeditators yielded a reasonable fit to the data, $\chi^2 = 4.09$, RMSEA = .09, sRMR = .02, CFI = .96. Consistent with expectations, the meditation group variable was significantly related to the intercept of Decentering ($r = .28$, $p < .001$), as it was marginally with the slope ($r = .06$, $p = .09$). Follow-up analyses revealed that the meditators' group mean for the Decentering factor of the Trait TMS was significantly higher at initial baseline assessment compared with the nonmeditators' mean (see Table 4.13). Specifically, meditators in this sample reported higher Decentering (as a component of mindfulness) compared to nonmeditators at Time 1. The marginally significant slope between meditation experience and Decentering is graphically depicted in Figure 4.14. As is seen, the slope of Decentering for nonmeditators ($r = -.06$, $p < .05$) was a significant negative slope across time compared to meditators ($r = .00$, $p < .10$) who manifested essentially a flat (nonsignificant) slope. In other words, the meditators in this sample appeared to manifest stable Decentering scores over time, whereas, a negative growth trajectory was evidenced for nonmeditators, i.e., Decentering scores decreased slightly over time.

Figure 4.14. Comparing the slope trajectory of the Decentering factor between meditators and nonmeditators.

For Curiosity, the second factor in the TMS, similar results to the Decentering factor were revealed. The conditional model for Curiosity comparing meditators to nonmeditators fit the data well, $\chi^2 = 2.39$, RMSEA = .06, sRMR = .02, CFI = .99. The variable of meditation experience was significantly related (albeit marginally) to the intercept of Curiosity ($r = .19$, $p = .07$), and meditation experience was significantly related to the slope of Curiosity ($r = .09$, $p < .05$), as was expected. Meditators, on average, scored higher in Curiosity than nonmeditators at baseline, as seen in Table 4.13. Figure 4.15 graphically demonstrates that meditators (in this sample) yielded stable Curiosity scores over time, whereas, a negative growth trajectory was again evidenced for nonmeditators. Curiosity appears to have decreased across time for individuals who did not proclaim to partake in meditation practices.

Figure 4.15. Comparing the slope trajectory of the Curiosity factor between meditators and nonmeditators.

Positive outcomes and meditation experience conditional model

To explore whether meditation experience exerted important effects over positive outcomes, such as an individual's happiness, life satisfaction, and savouring scores, a conditional LGC model compared meditators to nonmeditators on positive outcomes across three time points. This model was seen to fit the data well, $\chi^2 = 2.13$, RMSEA = .06, sRMR = .01, CFI = .99. As expected, the variable of meditation experience was significantly related to the intercept of positive outcomes, ($r = .24$, $p < .05$), indicating, at initial baseline assessment, significant group differences existed in participants' positive outcome scores. Further analyses revealed that the meditators' group mean was higher than nonmeditators' group means (see Table 4.13) – i.e., at Time 1, individuals with meditation experience reported higher levels of happiness, life satisfaction, and savouring than individuals without meditation experience. The variable of meditation experience was not however related to the slope of positive outcomes ($r = -.003$, $p = .91$), suggesting that the average growth rate for positive outcomes did not appear to be influenced by meditation experience.

Negative outcomes and meditation experience conditional model

Finally, to explore whether meditation experience influenced change across time in negative outcomes (depression, anxiety, and negative affect), a conditional LGC model compared meditators to nonmeditators with this variable. The conditional model showed excellent fit to the data, $\chi^2 = 1.88$, RMSEA = .05, sRMR = .02, CFI = .99. The variable of meditation experience was significantly negatively related to the intercept of negative outcomes, ($r = -.22$, $p < .05$), as was expected. This indicates that at baseline, significant group differences existed between individuals' reports of negative outcomes. Follow-up analyses revealed that the meditators' mean score was significantly lower than the nonmeditators' mean score at Time 1 (see Table 4.13). However, the variable of meditation experience was not significantly related to the slope of negative outcomes ($r = .03$, $p = .47$). Although meditators reported lower levels of negative outcomes than nonmeditators at initial baseline, as predicted, the average growth rate for negative outcomes did not appear to be influenced over time by meditation experience, contrary to prediction.

Discussion

The present study was conducted to address a number of limitations from Study 1, extend upon findings from this first study, utilise results that surfaced from Study 2, and add to the scientific body of currently existing mindfulness literature. Recall, in Study 1, concurrent data tested a shortened version of the FFMQ (Baer et al., 2006) for factor structure, and explored the relationship that mindfulness had on a number of positive and negative

variables. First, it should be acknowledged that the employment of concurrent data is limiting due to its inability to identify temporal and causal relationships. Second, Baer and colleagues' proposed 5-factor structure was not confirmed in this study (the relatively small sample size in Study 1's dataset may have been a reason for this, and/or the reduced number of items employed from the original FFMQ). Third, comparisons between individuals with and without meditation experience were unable to be tested due to limited information on participants' current meditation practice.

The present study specifically drew from a three time-point longitudinal dataset in order to explore predictive relationships over time. The five factors of the FFMQ (Baer et al., 2006) were empirically tested and confirmed in Study 2, hence, the original FFMQ was employed with confidence in the present study. The addition of a second measure of mindfulness – the Trait TMS (Davis et al., 2009) – provided means in which different factors of mindfulness could be compared. Furthermore, in order to investigate whether meditation experience influences mindfulness and other psychological constructs, two groups were compared, those with and without meditation experience.

As discussed, a number of gaps still remain in currently existing mindfulness literature, and the design of the present study aimed to address these gaps in knowledge. For example, the first objective was to investigate naturally occurring dispositional trait mindfulness in individuals with and without meditation experience. As mentioned, less is known about individual difference characteristics in this construct, as the majority of currently existing scientific research has focussed on the outcomes and consequences of mindfulness-enhancing intervention programmes. It was hypothesised in the present study that across time, mindfulness as measured by two current measures of trait mindfulness, would be positively associated with positive outcomes and negatively associated with negative outcomes.

The second objective in this study was to investigate differences between meditators and nonmeditators, specifically predicting that meditators would be more mindful as a consequence of meditation practice, and would in general, function psychologically better, as represented by enhanced positive outcomes and reductions in negative outcomes across time when compared with nonmeditators. Although some research does currently exist that investigates individuals with and without meditation experience, as mentioned previously, sound empirical longitudinal methodology on this topic is sparse.

The third and final objective in the current study was to explore the developmental growth trajectories of a number of psychological constructs, such as mindfulness, positive

outcomes, and negative outcomes. Specifically hypothesised was that mindfulness over time (slope) would positively predict decreases in negative outcomes (i.e., a negative growth trajectory), and mindfulness over time would positively predict increases in positive outcomes (a positive growth trajectory). Latent growth curve modeling was the sensitive statistical technique employed in addressing this final objective, which to the best of my knowledge, has yet to be applied to mindfulness research using longitudinal data.

Predictors of Positive and Negative Psychological Outcomes: Measurement Models

Confirmatory factor analyses confirmed that instruments employed to measure a range of psychological outcomes loaded uniquely and significantly onto the appropriate latent variable. Specifically, scales designed to measure happiness, life satisfaction, and savouring were found to be suitable manifest indicators for representing the latent variable of positive outcomes. Similarly, scales designed to assess an individual's level of depression, anxiety, and negative affect were also found to be appropriate indicators for the negative outcomes variable. Next, measurement models were created to assess the stability of the two measures of mindfulness employed over time. All items on both the FFMQ and Trait TMS loaded moderately to strongly on their corresponding latent construct at all three time points, and were also highly correlated between time points – i.e., mindfulness at Time 1 was strongly related to mindfulness at Time 2 and again between Time 2 and Time 3.

To predict psychological outcomes across time (the first objective in this study), a longitudinal structural pathway model was created between the FFMQ and both positive and negative outcome variables, and again for the Trait TMS and positive and negative outcome variables. In Figure 4.6 (p. 129), we saw that significant cross-lags confirmed the expectation that mindfulness would be positively predictive of positive outcomes and negatively predictive of negative outcomes, however, these relationships were only evidenced between Time 2 and Time 3. These findings suggest that increased mindfulness (as measured by the FFMQ) did predict positive outcomes for an individual over time, and further, decreased the amount of negative outcomes experienced by the individual, though it did so only between the second and third time points. These relationships were only seen to manifest between Time 2 and Time 3, perhaps, as the participants became more familiar with the battery of questionnaires over time.

Though it cannot be explained with certainty as to why this pattern was not seen between Time 1 and Time 2, these results may indicate that the survey items were novel to participants at Time 1, hence, individuals were still getting used to what was being asked of them. Over time the content of the items may have become more obvious as the same sets of

questions were presented, and therefore relationships began to emerge. A further factor that may have influenced the pattern of findings in this study is the timing of data collection (May through November). Across this timeframe, New Zealand experienced different seasons, including winter, which is typically more stressful than summer for many people, having potential to influence the relationships seen between Time 2 and Time 3. Furthermore, New Zealand experienced the Darfield, Canterbury earthquake in September, 2010 (the year in which data were collected), affecting the nation significantly. It is realistic, therefore, to consider that life events and seasonal change may have impacted on this particular sample, resulting in these mixed findings to emerge. Results from this study highlight the importance of employing a longitudinal methodology as opposed to relying on concurrent data only, and a future study could employ similar methodology to the present study's to examine the relationships between a third and fourth time point (i.e., accommodating for all four seasons) in order to see if trends emerge across time.

An interesting, though unexpected, positive significant cross-lag relationship emerged (albeit very weakly) between negative outcomes and the FFMQ, suggesting the more negative outcomes experienced by an individual the higher they scored in mindfulness (again, evidenced only between Time 2 and Time 3). This finding may indicate that individuals in this sample put more attention and awareness (elements of mindfulness) toward their negative experiences over time, though the association was weak so calls for a cautious interpretation.

Figure 4.7 (p. 131) presents the structural model between the Trait TMS and both positive and negative outcome variables. Contrasting findings were seen to emerge from this longitudinal path model. First, as expected, mindfulness (though only the Decentering factor of the Trait TMS) had a negative association with negative outcomes (again, only between Time 2 and Time 3). However, there were no significant cross-lags between both Decentering and positive outcomes, or Curiosity and positive outcomes. It appears the more decentered an individual is over time (i.e., relating to one's experience in a wider field of awareness rather than identifying personally with thoughts and emotions; Lau et al., 2006), the less negative outcomes they experience, though, neither facet (Decentering nor Curiosity) appears to affect an individual's happiness, life satisfaction, or savouring beliefs. A further unpredicted finding to emerge was the negative cross-lag relationship between the two factors of the Trait TMS between Time 2 and Time 3, i.e., individuals in this sample who were more decentered, also appeared less likely to be curious.

Briefly discussed earlier in the chapter was the negative cross-lag relationship between negative outcomes and the Curiosity factor of the Trait TMS, which although not

predicted, does support previous research on depression (Segal et al., 2002); specifically, individuals experiencing psychological distress are often withdrawn, introverted, and have less interest in daily life activities. It is not that surprising then, that individuals in this sample high on negative outcomes were also reporting a less curious and inquisitive disposition.

The final significant cross-lag relationship revealed the Curiosity factor of the Trait TMS to be weakly positively predictive of negative outcomes between Time 2 and Time 3, which was both unpredicted and inconsistent with existing research into the construct of curiosity (Kashdan, Rose, & Fincham, 2004). For instance, Kashdan and colleagues claim that in general, highly curious individuals have increased positive subjective experiences (such as positive affect and sensation seeking) and personal growth (such as seeking out personally meaningful interests and desires). The weak positive relationship between the Curiosity factor and negative outcomes yielded from the present data suggests that individuals in this sample who scored high in Curiosity also reported more negative outcomes between Time 2 and Time 3. To investigate this result further, future studies could explore the construct of curiosity and its influence on psychological functioning in more depth, using, for example, the Curiosity and Exploration Inventory (CEI; Kashdan et al., 2004) or the State–Trait Curiosity Inventory (STCI; Spielberger, 1979).

Meditation Experience, Mindfulness, and Psychological Functioning

The present study's second objective aimed to explore differences between individuals with and without meditation experience. It was expected that individuals with meditation experience would report more positive outcomes and less negative outcomes over time, and, as a consequence of meditation experience, be more mindful in daily life than nonmeditators. These predictions were partially supported. First, a series of MANOVAs confirmed that meditators scored significantly higher in positive outcomes at all three time points than nonmeditators, and in contrast, significantly lower in negative outcomes. Further, MANOVAs also revealed that mindfulness scores for meditators (on both the FFMQ and Trait TMS) were indeed higher than nonmeditators' mindfulness scores across all three time points – supporting the hypothesis (and extant literature) that meditation experience is associated with increased dispositional trait mindfulness.

However, contrary to the above findings, and to expectations, equality constraint analyses comparing meditators to nonmeditators yielded no significant group differences. Specifically, the longitudinal path models between the FFMQ and positive and negative outcomes variables (Figure 4.6), and the Trait TMS and positive and negative outcomes variables (Figure 4.7) for both meditators and nonmeditators were not significantly different.

Discussed earlier, was the possibility that constraining parameters one at a time (the method required for testing equality between two groups) may be too conservative for identifying true differences that may exist within these data. Due to previous MANOVAs supporting group differences in the current sample, and mounting scientific literature on the benefits and consequences that regular meditation experience has on psychological wellbeing (discussed throughout this thesis), it was decided further analyses (in the form of latent growth curve modeling) were warranted.

A series of conditional LGC models (with meditation experience being the conditional variable) were conducted to test group differences between meditators and nonmeditators, and to determine whether meditation experience influences change in a variable across time. First, in support of hypotheses, LGCM analyses revealed that at the initial baseline assessment, and across time, meditators' scores on both the FFMQ and Trait TMS were higher than nonmeditators' scores, suggesting that individuals who meditate indeed appear to be more mindful in daily life. Both the intercept and slope on these two mindfulness measures yielded significant differences between individuals who partake in meditative practices and those who do not, consistent with extant literature and what was predicted in the present study.

Second, as expected, group differences were also found for positive and negative outcome scores. Specifically, meditators reported more positive outcomes at the initial time point than nonmeditators, though a nonsignificant slope indicated meditation experience did not appear to predict the growth trajectory of this variable. So although individuals in this sample with meditation experience were seen to differ at Time 1 on measures of happiness, life satisfaction, and savouring, the slopes between meditators and nonmeditators did not diverge over time. A similar trend in the opposite direction was revealed for negative outcomes between these two groups. At baseline assessment meditators reported less negative outcomes than nonmeditators, but change in this variable as measured by the slope, did not appear to be predicted by meditation experience. The growth trajectories of individuals who partake and do not partake in meditation activities, were not seen to differ across time, though group means in this sample were significantly lower in depression, anxiety, and negative affect when compared with the nonmeditating group.

In sum, latent growth curve methodology provided a statistically advanced, robust, and flexible method of addressing the current study's second objective, i.e., developmental differences between meditators and nonmeditators were apparent through LGCM analyses powerful enough to assess change in a construct over time. For complex models (such as the

path models seen here in the current study), LGCM offers a superior method to assess causal relationships between growth trajectories of two or more variables, and to explore differences over time between groups (Cheong et al., 2003). The present results add empirical support for research into the benefits of meditation and to mindfulness research in general. The use of LGCM techniques in mindfulness literature is yet to be explored, therefore, it is hoped that these findings will inspire more longitudinal research employing this method for analysing mindfulness and its influence on other life domains. The final objective to the present study further utilises LGCM techniques to explore predictors of change in mindfulness and psychological outcomes on the current sample population as a whole.

Assessing Growth Patterns and Change in Mindfulness and Psychological Outcomes

The third and final goal to the present study investigated growth trajectories between variables such as mindfulness, positive outcomes and negative outcomes. Similar to what was hypothesised (and found) previously in the current study, and in previous mindfulness literature, it was expected that in general, mindfulness would positively predict positive outcomes over time, and negatively predict negative outcomes. Furthermore, dispositional trait mindfulness was expected to influence the growth trajectories of these psychological measures. Initial base models on the variables of interest were first tested, and then combined within a parallel process LGC methodology, which simultaneously estimated the predictor and outcome variables of interest (Cheong et al., 2003).

On the sample as a whole, base LGC models exploring the FFMQ, the two factors of the Trait TMS, and both positive and negative outcomes across three time points, all yielded significant individual variability within the sample. These results were of no surprise, as differences between meditators and nonmeditators would account for this variability within the sample population. Hypotheses concerning the parallel process LGCM, with mindfulness positively predicting positive outcomes, were largely supported. For instance, both the intercept and slope of the FFMQ were significantly and positively related to the intercept and slope of positive outcomes, suggesting that individuals in this sample who reported high levels of mindfulness at Time 1 also reported significantly more positive outcomes, and continued to do so across time. The Trait TMS showed similar findings, though only at the initial time point. For instance, both factors of the Trait TMS (Decentering and Curiosity) did not appear to predict positive outcomes' growth over time, though did impact on the groups means at baseline assessment (i.e., increased mindfulness at Time 1 indicated increased positive outcomes at Time 1).

A parallel process LGCM with mindfulness negatively predicting negative outcomes was also largely supported and consistent with previous findings in the present chapter. First, the intercept and slope of the FFMQ LGC model was significantly negatively associated with the intercept and slope of the negative outcomes model – this time suggesting that individuals high in mindfulness reported lower levels of negative outcomes across all three time points (demonstrating a negative growth trajectory). Thus, as mindfulness scores increased across time, a reduction in depression, anxiety, and negative affect was evidenced. Second, the Decentering factor of the Trait TMS showed a similar pattern to that of the FFMQ (i.e., both the intercept and slope negatively predicted the intercept and slope of negative outcomes, as was expected). In direct contrast, and unexpected, the intercept on the Curiosity factor of the Trait TMS was significantly positively predictive of the intercept of negative outcomes. Recall that earlier path model analyses also revealed a significant and positive cross-lag relationship between these two variables. Contrary to prediction, in this sample the slope trajectory of Curiosity was not significantly predictive of the negative outcomes slope, indicating that Curiosity, as a factor of mindfulness, does not appear to exert influence on the trajectory of negative outcomes.

In sum, the current chapter aimed to provide an investigation into how dispositional mindfulness (as measured by two current self-report measures of trait mindfulness) influences the psychological functioning of a group of individuals with and without meditation experience. Employing a broad range of sophisticated statistical analyses, results from the present study, in general, confirmed a positive relationship existed between individuals high in dispositional mindfulness and positive outcomes, such as happiness, life satisfaction, and savouring. Furthermore, individuals in this sample high in trait mindfulness, showed a negative relationship to the negative outcomes of depression, anxiety, and negative affect. Not only does it appear that mindfulness (or at least some elements of mindfulness) predicts positive outcomes in an individual's life, but it also seems to positively impact on negative outcomes experienced by an individual. Results from the present study also highlighted important differences between meditators and nonmeditators in this sample, suggesting that meditation experience may buffer against psychological outcomes such as depression and anxiety, while increasing feelings of subjective happiness and life satisfaction (supporting traditional meditation ideology and current empirical literature). In the fifth and final chapter that follows, the implications of the combined series of studies will be discussed. Limitations of the present research will be considered, and future directions will be proposed.

CHAPTER 5

General Discussion: What have we learnt from the Present Research?

Nothing lasts forever, even cold November rain
– Axl W. Rose

Across three studies, this research was designed to empirically investigate facets of the mindfulness phenomenon and explore interrelationships between the construct and psychological functioning. First, the psychometric properties of two current measures designed to assess trait mindfulness were evaluated and compared. Specifically, the FFMQ (Baer et al., 2006) and Trait TMS (Davis et al., 2009) were rigorously tested for content validity in order to investigate this complex multifaceted construct. The findings of these analyses are discussed in Chapters 2 and 3. These two scales were then used to explore relationships between dispositional, or naturally occurring, trait mindfulness and psychological outcomes such as happiness, life satisfaction, depression, and anxiety, with results presented in Chapters 2 and 4. The final objective was to compare two groups' psychological functioning across time, namely, individuals with and without meditation experience, to explore whether meditation experience increases (or decreases) an individual's ability to behave adaptively in daily life circumstances (discussed in Chapters 3 and 4).

By employing both concurrent and longitudinal quantitative research methods, each study in this thesis offered illuminating findings for the proposed objectives. The following three sections in this final chapter focus on bringing together the major findings and implications of this research, with the three thesis objectives being addressed in turn. Following this, clinical applications, and the strengths and contributions of this research to the body of mindfulness literature will be discussed, limitations of this research and suggested avenues for continued research will be acknowledged, and conclusions to end this thesis will be presented.

Key Findings and Implications

Psychometric Analysis of Two Trait Mindfulness Measures

Across two studies (presented in Chapters 2 and 3), results provided support for predictions and prior research, while also contributing some unique and novel findings. In the first study, it was expected that the factor structure of the FFMQ would be replicated – i.e., five distinct factors of mindfulness would be confirmed. However, contrary to expectations, a confirmatory factor analysis of the FFMQ in this sample yielded a 2-factor model of mindfulness (presented in Figure 2.1) as opposed to the five factors proposed by Baer et al.

(2006). The two factors that emerged were Nonjudging Awareness and Describing. A number of reasons for this variance from prediction were discussed in Chapter 2. Namely, the FFMQ was modified for the purpose of this study (15 items from the original 39 items were used), and the sample was concurrent and relatively small ($N = 103$ participants), which reduced statistical power, and may have hindered the attempt to identify five distinct scale factors.

However, findings from this initial study offered an important starting point from which further research could build. In particular, Study 2 (described in Chapter 3) sought to improve on this first study's methodology by employing a larger community sample of individuals from who data was collected longitudinally. In addition, in this subsequent study two measures of mindfulness were compared and tested for factor structure – the FFMQ (in its full original form) and the Trait TMS. In this new sample of individuals, a 5-factor structure of the FFMQ was identified across three time points (Figures 3.1, 3.2, and 3.3), providing strong support and validation to the factor structure of Baer and colleagues' (2006) measure of mindfulness. The 2-factor structure of the Trait TMS, proposed by Davis et al. (2009), was also confirmed across three time points (Figures 3.4, 3.5, and 3.6), as was expected.

CFAs on the Trait TMS, however, yielded modest-fitting models to the data. Chapter 3 discussed how two items were responsible for this attenuated model fit, as items were seen to double-load on both factors. As mentioned earlier in this thesis, the Trait TMS had yet to be psychometrically examined. Therefore, the analyses conducted on this measure presented in Chapter 3 were both novel and notable, and provide some validation for this particular instrument for assessing trait mindfulness. It is hoped that these research findings will encourage future researchers interested in employing this scale to build on these results, and make replicating this measure's factor structure a crucial part of their research.

This thesis highlights the paucity of research that explores the longitudinal stability and comparability (convergent validity) of mindfulness scale scores. To address this gap in knowledge, analyses discussed in Chapter 3 tested the hypothesis that mindfulness would function similarly across time, i.e., scores would be stable and temporal factorial invariance would be demonstrated. As mindfulness has been conceptualised previously as a stable trait (Brown & Ryan, 2003; Kabat-Zinn, 1990; Shapiro & Carlson, 2009), it was expected that both mindfulness measures would show measurement and structural equivalence over time (Byrne & van de Vijver, 2010). Supporting expectations, factorial invariance on both the FFMQ and Trait TMS was evidenced across three time points (see Figures 3.17 through to 3.22), providing further evidence for scale validity. Specifically, the longitudinal

measurement models for both scales between Time 1 and Time 2, Time 2 and Time 3, and Time 1 and Time 3 each measured the construct of mindfulness equivalently across time. To demonstrate both measurement and structural equivalence (as the current research does) on two different trait mindfulness scales provides valuable contributions to the expanding body of mindfulness literature. Factorial invariance has been infrequently performed in mindfulness research to date, hence it is often assumed in existing research, rather than explicitly tested (Byrne & van de Vijver, 2010; Vandenberg & Lance, 2000).

Convergent validity was also investigated in Chapter 3 where relationships between the factors of the FFMQ and Trait TMS were explored. According to Cunningham, Preacher, and Banaji (2001), to establish convergent validity, one needs to show that measures that should be related, are in reality related. As noted previously, it appears that only one empirical study (Davis et al., 2009) has investigated the convergence between these two specific mindfulness measures. In light of Davis and colleagues' research, it was hypothesised that all five factors of the FFMQ would be positively correlated with the two factors of the Trait TMS to a moderate extent. Congruent with Davis et al.'s (2009) findings and supporting hypotheses, results yielded covariances between factors that were mostly in the low to average range, primarily positive and significant. The Curiosity (Trait TMS) and Observing (FFMQ) factors and the Decentering (Trait TMS) and Nonreacting (FFMQ) factors were seen to be most strongly related to each other (see Table 3.30). These results suggest that there is moderate construct overlap between these two trait measures of mindfulness, i.e., they tap a similar construct, as one would expect.

The psychometric evaluation of mindfulness assessment has received little attention in the current body of mindfulness research. Therefore, the combination of findings from Chapters 2 and 3 offer several important implications for future researchers. For instance, confirming a scale's factor structure is crucial for demonstrating how reliable the measure is at tapping the essence of the construct that it claims to be measuring. Byrne (2010) claims that it is often assumed in empirical research that a measure's factor structure will be replicated, though this is not always tested. In the current research, the sample size in the first study was thought to constrain a valid and robust evaluation of the measure's psychometric adequacy, demonstrating the importance of methodological design in this type of work. Furthermore, it is desirable that a measure functions in the same way across time and across different populations (Byrne & van de Vijver, 2010), and this is especially important when the measure of interest is complex and multifaceted like mindfulness. Testing for factorial

invariance, however, has in general been underutilised in existing empirical research (Byrne, 2010), and the present research was an effort to fill this gap in the mindfulness literature.

Finally, researchers investigating the mindfulness construct would benefit from employing different scales that purport to capture the same construct, in order to test hypotheses concerning convergent, or more broadly, construct validity. As this research found that both factors of the Trait TMS bore similarity to two factors of the FFMQ, it is arguable whether the Trait TMS is superfluous when used in conjunction to the FFMQ. This proposition is strengthened given the robust psychometric properties of the FFMQ evidenced in this research, when compared to that of the Trait TMS. Thus, the comparison of the psychometric properties of these two measures may provide guidance to researchers seeking to adopt the single best measure of trait mindfulness.

Mindfulness' Association with Positive and Negative Psychological Outcomes

The current research aimed to support the growing body of mindfulness literature purporting benefits such as increased positive wellbeing and psychological health, and similarly, a reduction in the suffering associated with a variety of mental health conditions that is often attributed to enhanced mindfulness. It was expected that trait mindfulness would be positively associated with positive psychological outcomes and negatively associated with negative psychological outcomes, and that these findings would be stable and consistent across time. The above expectations were addressed in similar but distinct ways across Chapters 2 and 4 using several comprehensive and robust statistical techniques. Key findings from these chapters will be integrated here.

Cumulatively, results extended support to expectations and prior research, whilst also contributing some unique and novel findings. Firstly, Chapter 2 discusses how only one mindfulness factor (labelled Nonjudging Awareness) positively predicted positive outcomes and negatively predicted negative outcomes (Figure 2.3). The previous section in this chapter has discussed how a 2-factor model of mindfulness was evidenced (the combined FFMQ factors of Nonjudging and Acting with Awareness constituted one factor and Describing made up another), rather than the expected 5-factor model proposed by Baer et al. (2006). Therefore, of these two factors, it was the factor of Nonjudging Awareness in this particular sample that appeared to be the most potent ingredient, or mechanism that positively predicted happiness, life satisfaction, adaptive coping, and positive life events intensity (positive psychological outcomes) and negatively predicted depression, anxiety, rumination, maladaptive coping, and negative life events intensity (negative psychological outcomes).

In addition, while results revealed that negative outcomes were more strongly predicted by mindfulness (or at least the nonjudging awareness aspect of mindfulness), positive outcomes were also affected. This supports the premise that mindfulness does not just affect negative outcomes, but also positive ones, though it seems to have more impact on the former than the latter. Prior research (Kabat-Zinn, 1990; Kabat-Zinn et al., 1992; Shapiro & Carlson, 2009; Shapiro et al., 2011) has demonstrated that mindfulness negates the effects of maladaptive psychological symptoms, so it is possible that this reduction in negative affect directly results in the enhancement of positive affect. However, it is also plausible that individuals with greater psychological wellbeing are more likely to employ mindfulness techniques, i.e., happier people may be more mindful.

Fredrickson's (1998) broaden-and-build theory of positive emotions may help explain this differential prediction. According to Fredrickson's theory, positive emotions momentarily broaden people's attention and thinking, which enables the individual to build personal resources (Fredrickson et al., 2008). Mindfully attending to the present moment, according to Fredrickson and colleagues, is said to be a cognitive resource strategy which can increase the quantity of positive emotions experienced by an individual. Stronger resources help one cope with adverse life experiences and manage day-to-day life events more efficiently by creating positive emotions in the moment, despite the valence of the situation (Fredrickson et al., 2008). Hence, increased resilience, happiness, and life satisfaction can result. Teasing apart how one state (i.e., happiness) can lead to another (i.e., a mindful one) would be illuminating future research.

As the first study in this thesis did not replicate all five factors of the FFMQ, hypotheses concerning interrelationships between mindfulness and psychological outcomes could not be conclusively supported or rejected. Therefore, the study described in Chapter 4 built on these initial findings by using a different and larger sample where all five factors of the FFMQ were confirmed, as well as employing the Trait TMS where a 2-factor structure had also been replicated. Thus, within this community sample of individuals, longitudinal relationships between mindfulness and both positive and negative psychological outcomes were explored. Data were approached from a similar statistical framework to that described in Chapter 2, with a range of sensitive techniques being employed, resulting in mixed findings depending on the measure of trait mindfulness that was used.

In particular, global mindfulness as measured by the FFMQ was found to be positively associated with positive psychological outcomes and negatively associated with

negative psychological outcomes, though results only partially supported hypotheses. That is, predicted findings only manifested between the second and third time points only (Figure 4.6). An interesting and unpredicted finding to emerge from Study 3 showed that negative outcomes at Time 2, predicted higher levels of mindfulness (as measured by the FFMQ) at Time 3. Although the direction of this relationship was never explicitly hypothesised, it could be interpreted to say that a person who experiences stressful times is predisposed to evidence an increase in mindfulness in order to cope with the new set of problems. From an evolutionary perspective this finding makes sense, as it may indicate that individuals in this sample put more attention and awareness (elements of mindfulness) toward their negative experiences over time. This relationship also supports the functional value and theoretical implications of depression and anxiety, for example, to bring attention and awareness to salient life challenges (Beck et al., 1979). The association was weak, however, so the finding calls for a cautious interpretation, though it may be an interesting avenue to follow for future research.

When mindfulness was measured by the Trait TMS in Study 3, partial support for predicted relationships was again evidenced. For example, the TMS Decentering factor was negatively associated with negative outcomes, as expected (Figure 4.7). However, once again this was only evidenced between Time 2 and Time 3, similar to the pattern seen with the FFMQ. Furthermore, in contrast to expectations, TMS Decentering was not significantly associated with positive outcomes across time. The second factor of the Trait TMS, Curiosity, yielded further notable findings. Curiosity was found to be positively (albeit very weakly) associated with negative outcomes between Time 2 and Time 3 (Figure 4.7), incongruent with predictions, and an unpredicted and reverse relationship was seen between negative outcomes at Time 2 and Curiosity at Time 3 (albeit a weak negative associative). This latter finding does however make conceptual sense – the higher the individual scores in depression, anxiety, and negative affect, the less curious they become over time.

In addition, this factor was nonsignificantly associated with positive outcomes across time, also inconsistent with expectations. Collectively, these results suggest that in this sample of individuals, mindfulness (as represented by both scales) was seen to be associated with an individual's perceived sense of reduced depression, anxiety, and negative affect, though it was only the FFMQ that appeared to predict an individual's perceived sense of life happiness and satisfaction, and savouring beliefs. This finding indicates that the mindfulness components of curiosity and decentering are not seen to be associated with positive psychological outcomes in an individual's life. Overall, the Trait TMS in this study did not

appear to function as robustly as the FFMQ or as previous literature might claim that it would (Davis et al., 2009; Lau et al., 2006). In contrast, mindfulness was positively associated with positive psychological outcomes and negatively associated with negative psychological outcomes when measured by the FFMQ, as predicted.

Although the benefits of employing a community sample representative of individuals across the lifespan are substantial, this type of recruited sampling may be a factor that helps explain why the expected findings only appeared to be manifested between Time 2 and Time 3. One way to interpret these findings is to give consideration to the sample as a whole. For instance, participants ranged in age from 16 to 80, which may have contributed, to some degree, to the variability of how individuals interpreted scale items. It is also plausible that it took individuals a second time being exposed to the measures to fully comprehend the scale's intent and to respond to these items in a reliable fashion. In other words, random noise in the data between Time 1 and Time 2 may have prevented identification of reliable relationships, but over time, as items become more familiar to the participant, responses may have become more consolidated and the subsequent data may have improved in reliability. In an attempt at elucidating these patterns, it was decided that further exploration using flexible and sensitive LGCM techniques was warranted.

Supporting hypotheses, LGCM analyses revealed a positive association between the slope of the FFMQ and the slope of positive outcomes (Table 4.11), indicating that increases in mindfulness over time positively predicted increases in positive outcomes. In addition, it was found that individuals in this sample, who were high in mindfulness at baseline, subsequently reported more positive outcomes, such as happiness, life satisfaction, and savouring. Furthermore, as was expected, analyses revealed negative associations between the intercept and slope of the FFMQ and the intercept and slope of negative outcomes (Figure 4.10 and Table 4.11); indicating that increases in mindfulness over time were predictive of decreases in negative outcomes over time. Individuals in this sample who reported high levels of mindfulness at Time 1, also reported lower levels of negative outcomes such as depression, anxiety, and negative affect at Time 1 (intercept to intercept relationship). And further, individuals who manifested a positive slope of mindfulness across time also manifested a negative slope of negative outcomes (slope to slope relationship).

Analyses using LGCM with the Trait TMS resulted in mixed findings, consistent with earlier path models using this measure. For example, the intercept of Decentering was significantly and positively related to the intercept of positive outcomes, as was expected, but the slope to slope relationship was not significant (Table 4.12). This result indicated that

although individuals at Time 1 who scored high in Decentering were seen to report more positive outcomes at that same moment in time, a positive association was not supported across time. On the other hand, negative associations across time between the intercept and slope of Decentering and the intercept and slope of negative outcomes were evidenced (as expected). This indicated that increases in the decentering component of mindfulness over time were predictive of decreases in negative outcomes over time. The intercept of Curiosity (the Trait TMS' second factor) was marginally positively associated with the intercept of positive outcomes (as expected), but no slope to slope relationship was evidenced (Table 4.12). Contrary to expectations, the intercept of Curiosity was significantly and positively predictive of the intercept of negative outcomes, but unrelated to the slope.

In sum, a number of statistical analyses were employed in an attempt to tease apart the relationships between various facets of the mindfulness construct and daily life psychological outcomes. Findings across two studies suggested that the FFMQ as a measure of mindfulness was stronger at predicting both positive and negative outcomes than the comparable Trait TMS. Previous research has found factors of the FFMQ to be positively associated with other psychological outcomes such as emotional intelligence, body image, and positive mental health (Baer et al., 2006, 2008; Bohlmeijer et al., 2011; Stewart, 2004), and negatively associated with neuroticism, psychological symptoms, and impulsivity (Bohlmeijer et al; Peters et al., 2011; Thompson & Waltz., 2007).

In current Western practice, mindfulness is more often applied with the aim of reducing clinical symptoms, with interventions designed to directly target maladaptive symptom reduction (Kabat-Zinn, 1990; Segal et al., 2002). Less is known about its potential for enhancing positive outcomes. The present research is both noteworthy and unique, as it attempts to capture naturally occurring dispositional mindfulness concurrently, as well as across time, and investigates the influence this trait has on both positive and negative psychological outcomes. This research serves to remind future researchers to remain wary of the instruments they employ to assess this variable, as some measures may be better equipped to tap the construct than others. Findings in this thesis suggest that interested mindfulness researchers should continue to explore measurement assessment by means of varied statistical analyses, as some expected findings do not appear to generalise across measures. For example, in this sample the FFMQ provided more evidence than the Trait TMS for the impact of changes in mindfulness, on both positive and negative psychological outcomes over time.

Comparing Meditators' and Nonmeditators' Psychological Functioning Across Time

A central question concerning meditation researchers is whether or not meditation experience increases (or decreases) an individual's ability to behave adaptively in daily life. This thesis has discussed the apparent association that meditation experience has with psychologically adaptive variables, such as increases in wellbeing, happiness, and self-compassion, and reductions in perceived stress, anxiety, and rumination (Baer, 2008; Grossman et al., 2004; Hollis-Walker & Colosimo, 2011; Kabat-Zinn, 1982, 1990; Sharma, 2006; Williams et al., 2007). Building on extant literature, the final objective (addressed in Chapters 3 and 4) was first to investigate if meditation experience affects how an individual interprets mindfulness scale items (i.e. exploring measurement equivalence between groups), and second, to compare the psychological functioning of meditators and nonmeditators across time.

Previous research has suggested that meditators may view mindfulness scale items differently to that of nonmeditators, hence, yielding different relationships to some psychological constructs (Baer et al., 2006, 2008; Grossman, 2008; Van Dam et al., 2009). Longitudinal tests of invariance presented in Chapter 3 of this thesis (Table 3.23 through 3.28) yielded notable findings that were inconsistent with the aforementioned group of authors' propositions. On a sample with both meditators and nonmeditators, it was found that meditators viewed items designed to measure mindfulness (as measured by the FFMQ and Trait TMS) across time in much the same way as nonmeditators, with the exception of one covariance between two factors on the FFMQ that was noninvariant at Time 2 and Time 3 between the two groups. It was therefore concluded that although subtle differences between the two groups' models may exist across time, they were not sufficient to reject the invariance hypothesis. This implies that irrespective of meditation history, individuals in this sample did not significantly differ in their interpretation of mindfulness scale items.

To explore differences in group membership further, convergent validity between the two measures of mindfulness and group membership was investigated. Results revealed invariance between the items of the FFMQ and Trait TMS at Time 1, though at Time 2 and Time 3, partial invariance was evidenced between meditators and nonmeditators. All significantly different (i.e., noninvariant) covariances were seen to be higher in the group of meditators when compared with nonmeditators at both time points. These results suggested that items designed to tap into the mindfulness construct may become more consolidated or co-aligned for individuals who possess more meditation experience, and particularly so over time. It is plausible, that the sample of meditators in the present study may have become more

familiar with the wording of items and their understanding of such terms with each assessment, more so than nonmeditators. With each exposure, meditators might have evidenced a greater convergence among the various subfactors of mindfulness.

To help interpret these results, current research from Baer (2011) claims that although there is some empirical support to suggest that meditators and nonmeditators may interpret the meaning of items in different ways, it does not necessarily imply that differences will always exist, or be problematic if they do. Baer further suggests that similar concerns would apply when using self-report instruments to investigate other psychological characteristics with different groups⁶⁸. Baer (2011) argues that in order to help refine the conceptualisation and interpretation of a construct, measurement tools need to be continuously empirically tested. The results from the present research demonstrate the importance of rigorous statistical examination of measures if anomalies are expected in the interpretation of scale items depending on group membership. In this sample, little difference between the two groups was evidenced, suggesting that the FFMQ and Trait TMS were answered very similarly by individuals from these two groups.

In support of previous literature mentioned, Chapter 4 of this thesis addressed the premise that meditators are in general more mindful as a consequence of skills and techniques learnt through meditation practice. Multivariate analysis of variance revealed that meditators in this particular sample consistently scored higher on all mindfulness factors (as measured by the FFMQ and Trait TMS) than nonmeditators. According to existing research (Baer, 2011; Carmody & Baer, 2008; Kabat-Zinn, 1990; Segal et al., 2002), participants who complete MBSR and MBCT programmes⁶⁹ show significant increases in mindfulness scores during the intervention, which researchers have concluded is due to participant's learning *how* to be more mindful in daily life. Hence, mindfulness is seen to be a skill that is enhanced through practice (Kabat-Zinn). Results from the present thesis lend support to the above proposition – that mindfulness is a skill that can be cultivated through practice – by identifying an association between meditation experience and increased mindfulness scores. To explore this area further, future researchers could build on the present findings by conducting a randomised control trial experiment that explicitly tests causality between meditation experience and increases in mindfulness.

⁶⁸ Baer (2011, p. 253) provides the example of comparing responses on depression questionnaires between depressed and nondepressed participants.

⁶⁹ See Chapter 1 for a discussion of these two mindfulness-based modes of therapy.

As previously discussed, a large number of research studies currently exist on the efficacy of psychotherapies employing core mindfulness components, though how naturally occurring mindfulness (or mindfulness that has been enhanced through informal individual meditation practice) influences an individual's daily life has received much less attention. Moreover, longitudinal research designs that explore differences between individuals with and without meditation experience are rare. Chapter 4 of this thesis aimed to address this gap, predicting that meditators when compared to nonmeditators would report an overall enhanced sense of psychological wellbeing, which would be represented by more positive outcomes and less negative outcomes across time. As expected, MANOVAs revealed that meditators reported significantly more positive outcomes, such as happiness, life satisfaction, and savouring, and less negative outcomes, such as depression, anxiety, and negative affect, than nonmeditators at all three time points.

However, contrary to predictions and the findings reported above, equality constraints on longitudinal path models between mindfulness and positive and negative outcomes revealed no significant differences between meditators and nonmeditators in strengths of relationships in the models across time (see Tables 4.8 and 4.9). In Chapter 4 it was suggested that the complexity of the longitudinal path models between meditation experience, mindfulness, and psychological outcomes, may have skewed these findings. In particular, it is plausible that equality constraint analyses may have been too conservative an assessment to yield group differences, and was therefore considered worthy of further statistical exploration. LGCM, then, was considered to be the methodology of choice due to its statistically advanced, robust, and flexible method of analysing the course of naturalistic longitudinal data (Duncan & Duncan, 2004; Hardy & Thiels, 2009).

In support of earlier reported MANOVAs (and hypotheses), LGCM analyses revealed that at initial baseline assessment, meditators' scores on both the FFMQ and Trait TMS were higher than nonmeditators' scores, suggesting that individuals who meditate report higher mindfulness in daily life than nonmeditators (Table 4.13). Across time, however, findings were mixed. When measured by the FFMQ, the average growth rate for mindfulness did not appear to differ between meditators and nonmeditators (contrary to what was expected), though, when mindfulness was measured with the Trait TMS, both the Curiosity and Decentering factor scores were seen to decrease over time in the nonmeditators group only (Figures 4.14 and 4.15). This latter finding suggests that levels of curiosity and decentering diverged between groups over time (as was expected for mindfulness in general); specifically,

these two facets of mindfulness remained stable across time for meditators, though they were seen to lessen over time in individuals without meditation experience.

Results were seen to partially support further predictions, finding group differences for both positive and negative outcome scores. For instance, LGCM analyses revealed that meditators reported more positive outcomes at the initial time point than nonmeditators (Table 4.13), as expected, though a nonsignificant slope indicated meditation experience did not appear to influence the trajectory of this variable. A similar trend in the opposite direction was revealed for negative outcomes between these two groups. At baseline assessment, meditators reported less negative outcomes (Table 4.13) than nonmeditators, but change in this variable, as measured by the slope, did not appear to be influenced by meditation experience.

To conclude this section, although the growth trajectories of individuals with and without meditation experience were, in general, not seen to significantly diverge across time, group means for the meditators in this sample were significantly higher for mindfulness, happiness, life satisfaction, and savouring, and significantly lower for depression, anxiety, and negative affect when compared with the nonmeditating group. Furthermore, results suggest meditation experience may influence the developmental trajectory of some elements of mindfulness and not others. Specifically, the attitude of wanting to learn more about one's experiences (Curiosity), and the shift in perspective from one of personal identification with thoughts and feelings to relating to an experience from a wider field of awareness (Decentering), were seen to be higher in the sample of participants with meditation experience, when compared to individuals without experience in meditation, with this pattern continuing across time.

Applications to Scientific Research

Supporting traditional meditation ideology and current empirical literature, results from the present research suggest that mindfulness (and meditation experience) may act as a protective factor against psychological outcomes such as depression and anxiety, while increasing feelings of subjective happiness and life satisfaction. These findings are of particular relevance to the therapeutic and clinical domains looking for ways to promote optimal psychological functioning, as mindfulness appears to influence both positive and negative aspects of an individual's life. One way that mindfulness is thought to counter maladaptive emotional responding is by allowing thoughts and feelings to arise without applying any evaluative attachment to them (Hofmann & Asmundson, 2008). Establishing ways to amplify the naturally occurring trait of mindfulness may, therefore, prove fertile

when looking for alternate ways to aid and improve traditional psychological interventions. As discussed in Chapter 1, some current psychotherapies (for example, MBSR, MBCT, ACT and DBT), have clinically incorporated mindfulness components to aid in improving certain maladaptive symptoms and to enhance an individual's psychological wellbeing. The present findings lend support to the efficacy of these mindfulness-based interventions, as robust statistical analyses conducted in this thesis suggest there is a strong positive association between mindfulness, meditation, and positive outcomes and a reverse relationship to negative outcomes. Ongoing research exploring the naturally occurring dispositional trait of mindfulness and how it impacts on psychological functioning is warranted.

This research highlights the importance of using multi-faceted instruments to measure a multidimensional construct such as mindfulness, as some elements may play more of a role on the developmental trajectory of another variable than others. Cumulatively, findings across three empirical studies in the present research suggest that there were identified strengths and weaknesses to both mindfulness measures employed, and these were illuminated by different statistical analyses performed. Strong psychometric properties of the FFMQ were evidenced, and the measure withstood robust psychometric testing in comparison to the Trait TMS, though interestingly, the latter measure appeared to be able to distinguish subtle differences between meditators and nonmeditators more strongly than the former. Collectively, the findings evidenced in this thesis caution future researchers to give considerable thought when selecting psychometric instruments, as every construct measure offers unique strengths and vulnerabilities that may impact on results depending on the population with which it is used.

Although the Trait TMS requires much further psychometric analysis and validation, results to emerge from this research suggest that it should not be discounted for future mindfulness assessment purposes. At bare minimum, if researchers or clinicians employ only one instrument to assess a given variable, the present research highlights the need to be explicitly aware of that measure's abilities and limitations, and to test the data broadly within a range of statistical frameworks. According to some researchers (Baer, 2011; Cayoun, 2011; Grossman, 2008), the assessment of mindfulness deserves and requires much more focused attention than it has been given to date. If well constructed and replicated, Baer argues that self-report questionnaires can be useful tools for use in both research and clinical settings due to their convenience, cost-effectiveness and efficiency for measuring thoughts, emotions, and other mental processes. However, it is only following thorough empirical study that one can confidently employ such instruments.

Some of the patterns that emerged over time in this research were noteworthy findings. For instance, as Chapter 3 discussed, several of the expected patterns (namely that mindfulness would be positively predictive of positive outcomes and negatively predictive of negative outcomes) did not appear to be manifested until the second and third time points. It was suggested that reliable patterns in the data may take time to fully consolidate. It would be illuminating to build on the current research by employing a similar methodology to that seen in this thesis, in order to examine the relationships between a third and fourth time point to assess if this trend continues. It is intuitive to expect that more salient patterns would emerge, given more time. Results from this research highlight the importance of longitudinal study designs and the benefits of adopting this type of methodology when available, as some associations may not be clarified by using concurrent data alone.

This thesis also reminds researchers and clinicians alike to exercise caution when comparing different populations with a given measure, and to not automatically assume measurement equivalence. The assumption that different sample groups will function equally is a common pitfall in empirical research (Byrne & van de Vijver, 2010), though only through skilled psychometric testing will bias be noted, and thus, be significantly reduced. The personal meaningfulness of items in mindfulness scales have been found to differ according to experience with mindfulness and/or meditation practice (Baer et al., 2004, 2006; Grossman, 2011; Van Dam et al., 2009), though in Chapter 3 of this thesis, measurement invariance between two samples tested the above assertion, and found no significant differences in responses between a group of meditators and a group of nonmeditators. Although the results did not support differential relationship patterns concerning meditation experience, it is quite plausible that individuals with meditation experience may differ in their interpretation of mindfulness items compared to individuals without meditation experience. As previously mentioned, the concepts underpinning some of the measures' items are likely to be more familiar to individuals experienced in meditative practice, hence, causing this group to differentially relate to some items. Determining whether a scale has equivalent meaning across different groups, should be considered integral for research that is interested in discerning possible group differences in item functioning.

A final noteworthy area that was explored in this research concerns the examination of different aspects of mindfulness. One of the objectives from Chapter 2 was to examine the relationships between psychological outcomes and different facets of mindfulness. The factors of mindfulness found to positively predict positive outcomes and negatively predict negative outcomes were the FFMQ's Nonjudging and Acting with Awareness factors

(combined for the purpose of this study as Nonjudging Awareness). These results were consistent with Baer et al.'s. (2006, 2008) findings, that showed the Nonjudging factor was most strongly associated with both psychological maladjustment and psychological wellbeing in meditating and nonmeditating samples. Recent empirical research (Wahbeh et al., 2011) assessed group differences between participants with and without posttraumatic stress disorder (PTSD) in mindfulness factors, and found mindful nonjudging was significantly lower in the PTSD group. The results from Wahbeh and colleagues' research indicate that individuals displaying PTSD symptoms are less likely to view their experiences without judgement, and are more likely to judge their memories, thoughts, and feelings more negatively.

Discerning which aspect of mindfulness to emphasise when designing therapeutic interventions would be beneficial for clinicians, and may, according to Wahbeh et al. (2011), determine or improve treatment outcomes. As results yielded from the present research evidenced support for Baer et al. (2006, 2008) and Wahbeh and colleagues, it would be illuminating to extend this research by examining the facet level of mindfulness further. Future research may find that the nonjudgmental acceptance of internal processes aspect of mindfulness (Baer et al., 2004), may be sufficient in itself at helping individuals reduce aversive affect when faced with unwanted experiences – a proposition recently put forth by Wahbeh et al. (2011).

Strengths and Contributions of this Research

Although over the past two decades, research exploring the use of mindfulness in reducing psychological symptoms in clinical populations has proliferated, research investigating the enhancement of positive psychological outcomes from mindfulness among community samples is less prevalent. The present research addressed this gap in knowledge and confirmed a positive relationship existed between nonclinical individuals high in dispositional mindfulness and positive outcomes, as well as demonstrating that individuals high in trait mindfulness showed a negative relationship to negative outcomes. It is realistic to surmise, therefore, that enhancing the dispositional trait of mindfulness in an individual may result in positive gains to their psychological functioning.

As increasing happiness and life satisfaction, for example, are valued goals for most individuals (Sin & Lyubomirsky, 2009), findings from this research may provide guidance to clinical practitioners designing positive psychological interventions that look for ways to enhance individual wellbeing. As mentioned briefly in Chapter 2, there has been one meta-analysis (Sin & Lyubomirsky) that has investigated positive psychology techniques (which

included mindfulness) and their role in enhancing subjective wellbeing, as well as the amelioration of maladaptive symptoms. This meta-analysis found that positive psychological interventions significantly enhanced wellbeing across 49 studies, and 25 out of 51 studies were found to be effective for treating psychological symptoms (Sin & Lyubomirsky, 2009). If positive emotions are indeed increased through mindfulness techniques, now supported by a growing body of empirical literature, then enhancing the naturally occurring trait of mindfulness would appear to be of great worth.

It has been said that mindfulness is an inherent human capacity that varies between individuals (Brown & Ryan, 2003; Kabat-Zinn, 2003), so the ability to capture this naturally occurring trait longitudinally, as this research does, provides valuable insight into individual differences in mindfulness' influence on other life domains. Interrelationships between a range of psychological variables, such as happiness, life satisfaction, anxiety, and depression were explored alongside mindfulness, to assess if the mindfulness construct influenced these psychological constructs. Results did indicate that individuals varied in their tendency to be mindful in everyday life situations, with associations between high mindfulness scores and increased positive outcomes and reduced negative outcomes evidenced. There are few longitudinal empirical studies that investigate mindfulness' influence on naturally occurring psychological outcomes, hence, the present research helped to address this gap in the scientific body of mindfulness literature.

For this thesis, mindfulness was measured with comparable yet distinct trait mindfulness scales, which enabled a variety of different components of mindfulness to be explored. As mentioned, only one other study (Davis et al., 2009) has compared and contrasted these two particular measures, with results showing that they were moderately positively related. The FFMQ was the first scale of mindfulness chosen for the present research due to its broad-based psychometric design. Derived from 112 pooled items from five existing mindfulness scales (Baer et al., 2006), this measure has demonstrated sound internal consistency and convergent and discriminant validity across a range of different populations⁷⁰. On the other hand, prior to the current study, the Trait TMS had not been previously validated for its factor structure or scale invariance across time. The authors of the Trait TMS changed each item from the original State TMS (Lau et al., 2006) into the present tense, to create a trait version of the original state measure. Overall, the present research supports the FFMQ's continued use in future mindfulness research, whilst providing much

⁷⁰ See empirical studies that have employed the FFMQ in their research, such as Baer et al. (2006, 2008); Bohlmeijer et al. (2011); Davis et al. (2009); and Thompson & Waltz (2007).

needed empirical study of the Trait TMS. The strengths and limitations for each measure were noted and discussed over the course of this research.

Findings to emerge from Chapter's 3 and 4 in this thesis contributed to existing meditation research, by comparing the psychological functioning between meditators and nonmeditators across time. As mentioned previously in Chapter 1, according to a meta-analysis by Ospina et al. (2007), scientific research on meditation practices to date has largely been flawed by poor methodological quality, therefore, sound empirical examination into the effects of meditation is sparse. To address this issue, statistical analyses across two studies rigorously examined group differences between meditators and nonmeditators, resulting in some expected and some unexpected findings, as have been discussed. Often meditation is used to manifest a disposition of calm, detached, and clear observation, which helps to reduce reactive (and sometimes adverse) ways of responding to one's life experiences (Kabat-Zinn, 1982; Wallace, 2005). In general, the benefits of meditation were apparent in this research, with results showing that individuals with meditation experience were: a) more mindful and b) reported more positive outcomes and less negative outcomes over time.

To conclude this section, it is worth noting the range of statistically advanced, robust, and flexible methods through which data in this thesis was analysed. These methods have not commonly been employed in mindfulness research, or more broadly in meditation research, which has largely lacked sound empirical analysis. Of particular methodological strength is the decision to employ LGCM techniques, rarely evidenced in existing mindfulness and meditation literature to date. A series of sensitive LGCM techniques determined whether an increase in one variable (such as mindfulness) was related to an increase, decrease, or no change in another variable (such as happiness); and further, compared growth patterns across time between meditators and nonmeditators, in order to see whether group membership influenced change in the relationships of psychological constructs. It is hoped that the robust psychometric testing seen in this research inspires further longitudinal research to employ similar techniques, as the skills to enhance the psychological wellbeing of an individual or group through mindfulness, grow exponentially in both research and clinical domains.

Limitations and Future Directions

This thesis does not presume to provide for every possible explanation for the findings evidenced across three complex empirical studies. All scientific research is constrained in some degree by resources, tools, and human ability (and error). Each of which may result in limitations. This research was restricted by the sole employment of Western self-report mindfulness questionnaires (claiming to capture a traditionally Buddhist

phenomenon), that, according to Baer (2011), are often validated by researchers untrained in mindfulness practices. Authors such as Baer, Cayoun (2011), Grossman (2011), and Grossman and Van Dam (2011), purport that the Western operational definition of the mindfulness phenomenon may fail to represent the true character and meaning of the original Buddhist perspective of the construct (which posits that mindfulness is a characteristic that is difficult to extract and analyse in isolation). For instance, *Sati* (the ancient Pali language word for mindfulness) means ‘to remember’ and to hold in mind from moment to moment the awareness that the present experience is impermanent (Cayoun).

According to Cayoun (2011), if we conceive of a mindfulness trait, then we should be measuring an individual’s ability to hold in mind from moment to moment the awareness that the present experience is fleeting and impersonal, therefore not worth personally identifying with. To measure this process though is challenging, states Cayoun, as it is more a *way of being* than a construct that can be objectified. In order to conduct empirical research on this process, a typical psychometric approach using the currently existing definitions and tools available to capture the empirical concepts of mindfulness, was adopted in the present research. According to Cayoun (2011) and Grossman and Van Dam (2011), however, this scientific approach to empiricism may not adequately capture this elusive construct. Though the robust psychometric analysis undertaken in the current research, does suggest that the mindfulness construct is stable across time, supporting construct validity of the instruments employed.

Alternatives to self-administered rating scales offer fruitful avenues for future research. For example, Grossman (2011) and Grossman and Van Dam (2011) suggest that one-on-one interviews with skilled interviewers may provide greater insight into the mechanisms and characteristics associated with mindfulness, despite being both costly and labour-intensive. Furthermore, rather than assessing mindfulness per se, the above authors suggest that researchers might choose to assess related self-attributed psychological qualities or outcomes, and to use terms that are descriptive of what the individual mindfulness scales actually represent – for example, sustained attention, lapses of attention, and perceived self-competency of verbal expressiveness (Grossman & Van Dam). Although widely accepted that there is no “gold-standard” measure with which to define a mindful person (Baer, 2011; Grossman, 2011; Grossman & Van Dam, 2011; Van Dam, Earleywine, & Borders, 2010), the existing scales are currently all we have until further developments. Because the mindfulness phenomenon has become so topical over the past decade, future research will no doubt

continue to explore the complexities surrounding its measurement, and different modes of measurement may in time result.

A methodological weakness that may have hindered the present research is seen in sample selection. For example, Study 1 employed a group of relatively young university students, which is not, in general, representative of New Zealand's wider population. In addressing this limitation, Studies 2 and 3 employed a larger community sample with an average age of 39 years, including around a third claiming to have experience in meditation. Although improving on Study 1's methodology, the two groups (represented by individuals with and without meditation experience) were not randomly assigned, so may still be prone to selection bias, although this method of recruiting is consistent to previous meditation/mindfulness research (Baer et al., 2006, 2008; Davis et al., 2009; Josefsson, Larsman, Broberg, & Lundh, 2011). Furthermore, with self-reported global mindfulness there is also potential for biased responses, especially for those experienced in meditation (Grossman, 2011). For example, according to Grossman, meditators may harbour desires for gains in performance from time and effort spent in meditation practice.

A final potential concern to the present research concerns sample sizes and length of assessment. Although in general there was sufficient statistical power for this thesis' purposes, to build on this research, future sample sizes could be both larger and assessed over a longer period of time. For example, and as mentioned previously, illuminating findings may be evidenced if time point assessments were extended across a 12 month period, as well as employing a large randomly distributed group of meditators and nonmeditators. Continued research into this multifaceted construct is highly desirable, and I am certain that there will be on-going attempts to both objectify and quantify the concept. Because mindfulness research is still in its infancy, there are numerous paths for exploration, and in particular, I would like to see the dispositional nature of mindfulness explored in more depth in order to establish ways that are conducive to manifesting a mindful state.

As findings from this research suggest that naturally occurring everyday mindfulness offers substantial overall gains in psychological functioning, continued robust exploration will benefit both the academic and therapeutic domains. Bodner and Langer (2001) were interested in establishing whether there are stable, individual differences in achieving an everyday mindful state – in other words, are there characteristics evident in people with a natural tendency to be more mindful? Findings from Bodner and Langer's research revealed that "the individual who has a greater (versus lesser) propensity to be mindful is more likely to entertain multiple perspectives, be open to experience, actively process information, think

liberally, and be intelligent and slightly less likely to desire quick or simple explanations” (p. 5). One of the challenges for future mindfulness research is to explore ways that promote the natural occurrence of being more mindful (with the ultimate goal of replacing or ameliorating rigid, maladaptive modes of thinking), in order to help people lead happier and more adaptive lives. Investigating individual characteristic traits, like the ones mentioned above, may aid in this challenge.

And finally, it would be illuminating to build on the present research and further investigate the area recently explored by Grossman’s (2011) research. This author posits that the absence of a given trait does not necessarily imply or translate into that trait’s opposite. Grossman (2011) claims that because an individual may score low on some mindfulness items, it does not necessarily mean that what is captured is the trait of *mindlessness* – “when in a mindless state, an individual operates much like a robot” (Bodner & Langer, 2001, p. 1). For example, employing an individual difference measure of the propensity to be mindful, such as the Mindfulness/Mindlessness scale (MMS; Bodner & Langer, 2001), will assist future researchers who are interested in teasing apart these two opposing cognitive processes in order to understand this continuum better.

Concluding Comments

Mindfulness’ popularity in mainstream scientific research and psychotherapeutic domains has exponentially expanded over the past three decades, in large part through accumulation of empirical evidence supporting its use for improving health and wellbeing, and alleviating psychological suffering. Findings that emerged from the present research provided support to extant research by showing the phenomenon to be multidimensional, and intriguingly, both complex and subtle. Psychometric analysis of two trait mindfulness measures evidenced strengths and weaknesses of both scales, serving to warn future researchers to strongly consider psychometric examination of their measures before employing them in research or clinical practice. For instance, the FFMQ yielded sound psychometric qualities and appears to be a valid measure of trait mindfulness, whereas, the Trait TMS was found to be lacking in psychometric investigation. Both these measures warrant further study, though findings from the current research do suggest that the TMS scale may discern differences in mindfulness between meditators and nonmeditators better than the FFMQ.

Supporting and contributing to existing mindfulness research, results of this thesis suggest that the association between mindfulness and a range of positive and negative psychological outcomes is significant and stable. Not only does it appear that dispositional

mindfulness positively predicts negative outcomes experienced by an individual, but it also seems to predict positive outcomes in an individual's life (or at least some elements of mindfulness do). And finally, consistent with existing literature, and evidenced in this research, meditation experience seems to increase (or at least be associated with) mindfulness, and may protect against psychological outcomes such as depression and anxiety while increasing feelings of subjective happiness and life satisfaction. Convincing empirical support for the benefits of this traditional Buddhist phenomenon should encourage researchers, to continue their interest in acquiring a deeper understanding of this ancient practice. Establishing ways to amplify the naturally occurring trait of mindfulness, although challenging, will prove fertile within Western clinical psychology which looks to influence an individual's psychological wellbeing. I, for one, am eagerly waiting to see what scientific research discovers about this fascinating *way of living*.

References

- Anderson, E. (1993). Analysing change in short-term longitudinal research using cohort-sequential designs. *Journal of Consulting and Clinical Psychology*, 61, 929-940. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/8113494>
- Anderson, J. (1982). Acquisition of cognitive skill. *Psychological Review*, 89(4), 369-406. doi:10.1037/0033-295X.89.4.369
- Antony, M., & Rowa, K. (2005). Evidence-based assessment of anxiety disorders in adults. *Psychological assessment*, 17(3), 256-66. doi:10.1037/1040-3590.17.3.256
- Arbuckle, J. (2009). *AMOS 18 User's Guide*. Crawfordville, FL: AMOS Development Corporation.
- Astin, J. (1997). Stress reduction through mindfulness meditation: Effects on psychological symptomatology, sense of control, and spiritual experiences. *Psychotherapy and Psychosomatics*, 66, 97-106. Retrieved from https://www.crfdl.org/bitstream/handle/10838/929/Meditation_ASTIN_Stress_Reduction_Mindfulness_Meditation.pdf?sequence=1
- Bach, P., & Moran, D. (2008). *ACT in practice: Case conceptualisation in Acceptance & Commitment Therapy*. Oakland, CA: New Harbinger Publications, Inc.
- Baer, R. (2003). Mindfulness training as a clinical intervention: A conceptual and empirical review. *Clinical Psychology: Science and Practice*, 10, 125-143. doi:10.1093/clipsy/bpg015
- Baer, R. (2011). Measuring mindfulness. *Contemporary Buddhism*, 12(1), 241-261. doi:10.1080/14639947.2011.564842
- Baer, R., Smith, G., & Allen, K. (2004). Assessment of mindfulness by self-report: The Kentucky Inventory of Mindfulness Skills (KIMS). *Assessment*, 11, 191-206. doi:10.1177/1073191104268029
- Baer, R., Smith, G., Hopkins, J., Krietemeyer, J., & Toney, L. (2006). Using self-report assessment methods to explore facets of mindfulness. *Assessment*, 13, 27-45. doi:10.1177/1073191105283504
- Baer, R., Smith, G., Lykins, E., Button, D., Krietemeyer, J., Sauer, S., . . . Williams, M. (2008). Construct validity of the five facet mindfulness questionnaire in meditating and nonmeditating samples. *Assessment*, 15, 329-342. doi:10.1177/1073191107313003

- Barlow, D., Craske, M., Cerny, J., & Klosko, J. (1989). Behavioural treatment of panic disorder. *Behaviour Therapy*, 20, 261-282. doi:10.1016/S0005-7894(89)80073-5
- Beck, A. Rush, A., Shaw, B., & Emery, G. (1979). *Cognitive therapy of depression*. New York, NY: Guilford Press.
- Beck, A., Epstein, N., Brown, G., & Steer, R. (1988). An inventory for measuring clinical anxiety: Psychometric properties. *Journal of Consulting and Clinical Psychology*, 56, 893-897. Retrieved from http://www.musc.edu/psychiatry/research/cns/upadhyayareferences/Beck_1988.pdf
- Beck, A., Steer, R., & Brown, G. (1996). *Beck Depression Inventory* (2nd ed.). San Antonio, CA: The Psychological Corporation.
- Bishop, S. (2002). What do we really know about mindfulness-based stress reduction? *Psychosomatic Medicine*, 64, 71-84. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/17582872>
- Bishop, S., Lau, M., Shapiro, S., Carson, L., Anderson, N., Carmody, J., . . . Devins, G. (2004). Mindfulness: A proposed operational definition. *Clinical Psychology: Science and Practice*; 11(3). 230-241. doi:10.1093/clipsy/bph077
- Blozis, S. (2004). Structural Latent curve models for the study of change in multivariate repeated measures. *Psychological Methods*, 9, 334-353. doi:10.1037/1082-989X.9.3.334
- Bodner, T., & Langer, E. (2001). Individual differences in mindfulness: The mindfulness/mindlessness scale. *Poster presented at the 13th annual American Psychological Society Convention, Toronto, Ontario, Canada.*
- Bohlmeijer, E., ten Klooster, P., Fledderus, M., Veehof, M., & Baer, R. (2011). Psychometric properties of the five facet mindfulness questionnaire in depressed adults and development of a short form. *Assessment*, 18(3), 308-320. doi:10.1177/1073191111408231
- Booyesen, F. (2002). An overview and evaluation of composite indices of development. *Social Indicators Research*, 59, 115-151. Retrieved from <http://www.springerlink.com/content/tf44f781ymphlwea/fulltext.pdf>
- Borders, A., Earleywine, M., & Jajodia, A. (2010). Could mindfulness decrease anger, hostility, and aggression by decreasing rumination? *Aggressive Behavior*, 36(1), 28-44. doi:10.1002/ab.20327
- Bowen, S., Chawla, N., Collins, S. E., Witkiewitz, K., Hsu, S., Grow, J., . . . Marlatt, A. (2009). Mindfulness-based relapse prevention for substance use disorders: A pilot

- efficacy trial. *Substance Abuse*, 30(4), 295-305.
doi:10.1080/08897070903250084
- Bränström, R., Kvillemo, P., Brandberg, Y., & Moskowitz, J. (2010). Self-report mindfulness as a mediator of psychological well-being in a stress reduction intervention for cancer patients: A randomized study. *Annals of Behavioral Medicine*, 39(2), 151-161.
doi:10.1007/s12160-010-9168-6
- Brefczynski-Lewis, J., Lutz, A., Schaefer, H., Levinson, D., & Davidson, R. (2007). Neural correlates of attentional expertise in long-term meditation practitioners. *Proceedings of the National Academy of Sciences of the United States of America*, 104(27), 11483-8. doi:10.1073/pnas.0606552104
- Breslin, F., Zack, M., & McMain, S. (2002). An information-processing analysis of mindfulness: Implications for relapse prevention in the treatment of substance abuse. *Clinical Psychology: Science and Practice*, 9(3), 275-299. Retrieved from <http://onlinelibrary.wiley.com/doi/10.1093/clipsy.9.3.275/pdf>
- Brown, K., & Ryan, R. (2003). The benefits of being present: Mindfulness and its role in psychological wellbeing. *Journal of Personality and Social Psychology*, 84, 822-848. doi:10.1037/0022-3514.84.4.822
- Brown, K., & Ryan, R. (2004). Perils and promise in defining and measuring mindfulness: Observations from experience. *Clinical Psychology: Science and Practice*, 11, 242-248. doi:10.1093/clipsy/bph078
- Brown, K., Ryan, R., & Creswell, J. (2007). Mindfulness: Theoretical foundations and evidence for its salutary effects. *Psychological Inquiry*, 18, 211-237. Retrieved from http://www.psych.rochester.edu/SDT/documents/2007_BrownRyanCreswell_PI.pdf
- Brown, T. (2006). *Confirmatory factor analysis for applied research*. New York, NY: The Guilford Press.
- Bryant, F. (2003). Savoring Beliefs Inventory (SBI): A scale for measuring beliefs about savouring. *Journal of Mental Health*, 12(2), 175-196.
doi:10.1080/0963823031000103489
- Bryant, F., & Yarnold, P. (1995) Principal components analysis and exploratory and confirmatory factor analysis. In L. G. Grimm, & P. R. Yarnold (Eds.). *Reading and Understanding Multivariate Statistics* (p. 99-137). Washington, DC: American Psychological Association.
- 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, 11–34. Retrieved from <http://www.smmr.de/cms/index.php?menuid=21&reporeid=30>
- Byrne, B. (2010). *Structural equation modeling with AMOS: Basic concepts, applications, and programming* (2nd ed). New York, NY: Routledge.
- Byrne, B., & van de Vijver, F. (2010). Testing for measurement and structural equivalence in large-scale cross-cultural studies: Addressing the issue of nonequivalence. *International Journal of Testing*, 10(2), 107–132. doi:10.1080/15305051003637306
- Byrne, B., Shavelson, R., & Muthén, B. (1989). Testing for the equivalence of factor covariance and mean structures: The issue of partial measurement in variance, *Psychological Bulletin*, 105(3), 456–466. doi:10.1037/0033-2909.105.3.456
- Carlson, L., Ursuliak, Z., Goodey, E., Angen, M., & Specia, M. (2001). The effects of a mindfulness meditation-based stress reduction program on mood and symptoms of stress in cancer outpatients: 6-month follow-up. *Supportive Care in Cancer*, 9(2), 112–123. doi:10.1007/s005200000206
- Carmody, J., & Baer, R. (2008). Relationships between mindfulness practice and levels of mindfulness, medical and psychological symptoms and well-being in a mindfulness-based stress reduction programme. *Journal of Behavioral Medicine*, 31, 23–33. doi:10.1007/s10865-007-9130-7
- Carter, O., Presti, D., Callistemon, C., Ungerer, Y., Liu, G., & Pettigrew, J. (2005). Meditation alters perceptual rivalry in Tibetan Buddhist monks. *Current Biology*, 15(11), 412–413. doi:10.1016/j.cub.2005.05.043
- Cayoun, B. (2011). *Mindfulness-integrated CBT: Principles and practice*. West Sussex, UK: Wiley-Blackwell.
- Chadwick, P., Hember, M., Symes, J., Peters, E., Kuipers, E., & Dagnan, D. (2008). Responding mindfully to unpleasant thoughts and images: Reliability and validity of the Southampton Mindfulness Questionnaire. *British Journal of Clinical Psychology*, 47, 451–455. doi:10.1348/014466508X314891
- Chang, V., Palesh, O., Caldwell, R., Glasgow, N., Abramson, M., Luskin, F., . . . Koopman, C. (2004). The effects of a mindfulness-based stress reduction program on stress, mindfulness self-efficacy, and positive states of mind. *Stress and Health*, 20(3), 141–147. doi:10.1002/smi.1011

- Cheong, J., MacKinnon, D., & Toon Khoo, S. (2003). Investigation of mediational processes using parallel process latent growth curve modeling. *Structural Equation Modeling*, 10, 1-25. doi:10.1207/S15328007SEM1002_5
- Cheung, G., & Rensvold, R. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling*, 9, 233- 255. doi:10.1207/S15328007SEM0902_5
- Cisler, J., Amstadter, A., Begle, A., Resnick, H., Danielson, C., Saunders, B., & Kilpatrick, D. (2011). PTSD symptoms, potentially traumatic event exposure, and binge drinking: A prospective study with a national sample of adolescents. *Journal of Anxiety Disorders*, 25, 978-987. doi:10.1016/j.janxdis.2011.06.006
- Coffey, K., Hartman, M., & Fredrickson, B. (2010). Deconstructing mindfulness and constructing mental health: Understanding mindfulness and its mechanisms of Action. *Mindfulness*, 1(4), 235-253. doi:10.1007/s12671-010-0033-2
- Cohen, J. (1992). A Power Primer. *Psychological Bulletin*, 112(1), 155-159. doi:10.1037/0033-2909.112.1.155
- Cohen, S., & Herbert, T. (1996). Health psychology: Psychological factors and physical disease from the perspective of human psychoneuroimmunology. *Annual review of psychology*, 47, 113-42. doi:10.1146/annurev.psych.47.1.113
- Cohen-Katz, J., Wiley, S., Capuano, T., Baker, D., Deitrick, L., & Shapiro, S. (2005). The effects of mindfulness-based stress reduction on nurse stress and burnout: A qualitative and quantitative study, part II. *Holistic Nursing Practice*, 19(2), 78-86. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/15871591>
- Cole, D., & Maxwell, S. (2003). Testing mediational models with longitudinal data: Questions and tips in the use of structural equation modeling. *Journal of Abnormal Psychology*, 112(4), 558 -577. doi:10.1037/0021-843X.112.4.558
- Conze, E. (1972). *Buddhist Meditation*. London, UK: Unwin books.
- Costa, P., & McCrae, R. (1992). *NEO PI-R. Professional Manual*. Odessa, FL: Psychological Assessment Resources, Inc.
- Craske, M., & Hazlett-Stevens, H. (2002). Facilitating symptom reduction and behaviour change in GAD: The issue of control. *Clinical Psychology: Science and Practice*, 9(1), 69-75. Retrieved from <http://home.earthlink.net/~wendylliles/articles/craske.pdf>
- Creswell, J., Way, B., Eisenberger, N., & Lieberman, M. (2007). Neural correlates of dispositional mindfulness during affect labeling. *Psychosomatic Medicine*, 69(6), 560-5. doi:10.1097/PSY.0b013e3180f6171f

- Cullen, M. (2011). Mindfulness-based interventions: An emerging phenomenon. *Mindfulness*, 2(3), 186-193. doi:10.1007/s12671-011-0058-1
- Cunningham, W., Preacher, K., & Banaji, M. (2001). Implicit attitude measures: Consistency, stability, and convergent validity. *Psychological Science*, 12(2), 163-170. doi:10.1111/1467-9280.00328
- Dane, E. (2010). Paying attention to mindfulness and its effects on task performance in the workplace. *Journal of Management*, 37(4), 997-1018. doi:10.1177/0149206310367948
- Davis, J., Fleming, M., Bonus, K., & Baker, T. (2007). A pilot study on mindfulness based stress reduction for smokers. *BMC Complementary and Alternative Medicine*, 7(2), 1-7. doi:10.1186/1472-6882-7-2
- Davis, K., Lau, M., & Cairns, D. (2009). Development and preliminary validation of a trait version of the Toronto Mindfulness Scale. *Journal of Cognitive Psychotherapy: An International Quarterly*, 23, 185-197. doi:10.1891/0889-8391.23.3.185
- Davidson, R. (2000). Affective style, psychopathology, and resilience: Brain mechanisms and plasticity. *American Psychologist*, 55(11), 1196-1214. doi:10.1037/0003-066X.55.11.1196
- Davidson, R. (2003). Alterations in brain and immune function produced by mindfulness meditation. *Psychosomatic Medicine*, 65(4), 564-570. doi:10.1097/01.PSY.0000077505.67574.E3
- Davidson, R. (2010). Empirical explorations of mindfulness: conceptual and methodological conundrums. *Emotion*, 10(1), 8-11. doi:10.1037/a0018480
- Davidson, R., & Harrington, A. (2001). *Visions of compassion: Western scientists and Tibetan Buddhists examine human nature*. New York, NY: Oxford University Press.
- Diener, E., Emmons, R., Larsen, R., & Griffin, S. (1985). The satisfaction with life scale (SWLS). *Journal of Personality Assessment*, 49, 71-75. Retrieved from <http://www.unt.edu/rss/SWLS.pdf>
- Dimeff, L., & Koerner, K. (2007). *Dialectical behaviour therapy in clinical practice: Applications across disorders and settings*. New York, NY: The Guilford Press.
- Dimidjian, S., Kleiber, B., & Segal, Z. (2010). *Cognitive and behavioural theories in clinical practice*. New York, NY: The Guilford Press.
- Dimidjian, S., & Linehan, M. (2003). Defining an agenda for future research on the clinical application of mindfulness practice. *Clinical Psychology: Science and Practice*, 10, 166-171. doi:10.1093/clipsy.bpg019

- Duncan, T., & Duncan, S. (2004). An introduction to latent growth curve modeling. *Behavioural Therapy*, 35, 333-363. doi:10.1016/S0005-7894(04)80042-X
- Duncan, T., & Duncan, S. (1999). *An introduction to latent variable growth curve modeling: Concepts, issues, and applications*. Mahwah, NJ. Lawrence Erlbaum Associates, Inc.
- Emanuel, A., Updegraff, J., Kalmbach, D., & Ciesla, J. (2010). The role of mindfulness facets in affective forecasting. *Personality and Individual Differences*, 49(7), 815-818. doi:10.1016/j.paid.2010.06.012
- Engle, A. (2009). *The inner science of Buddhist practice*. Ithaca, NY. Snow Lion Publications.
- Feldman, G., Hayes, A., Kumar, S., Greeson, J., & Laurenceau, J. (2007). Mindfulness and emotion regulation: The development and initial validation of the Cognitive and Affective Mindfulness Scale-Revised (CAMS-R). *Journal of Psychopathology and Behavioral Assessment*, 29(3), 177-190. doi:10.1007/s10862-006-9035-8
- Fisak, B., & von Lehe, A. (). The Relation between the Five Facets of Mindfulness and worry in a non-clinical sample. *Mindfulness*, 3(1), 15-21. doi:10.1007/s12671-011-0075-0
- Fink, S., Foran, K., Sweeney, A., & O'Hea, E. (2009). Sexual body esteem and mindfulness in college women. *Body Image*, 6, 326-329. doi:10.1016/j.bodyim.2009.07.003
- Floyd, F., & Widaman, K. (1995). Factor analysis in the development and refinement of clinical assessment instruments. *Psychological Assessment*, 7(3), 286-299. doi:10.1037//1040-3590.7.3.286
- Fraser, D. (2008). *Mindfulness, stress, and self: An ontological shift*. (Unpublished PhD Thesis). The University of Auckland, New Zealand.
- Fredrickson, B. (1998). What good are positive emotions? *Review of General Psychology*, 2, 300-319. doi:10.1037/1089-2680.2.3.300
- Fredrickson, B., Mancuso, R., Branigan, C., & Tugade, M. (2000). The undoing effect of positive emotions. *Motivation and Emotion*, 24(4), 237-258. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/21731120>
- Fredrickson, B., Cohn, M., Coffey, K., Pek, J., & Finkel, S. (2008). Open hearts build lives: positive emotions, induced through loving-kindness meditation, build consequential personal resources. *Journal of Personality and Social Psychology*, 95(5), 1045-62. doi:10.1037/a0013262
- Frewen, P., Evans, E., Maraj, N., Dozois, D., & Partridge, K. (2007). Letting go: Mindfulness and negative automatic thinking. *Cognitive Therapy and Research*, 32(6), 758-774. doi:10.1007/s10608-007-9142-1

- Frewen, P., Lundberg, E., MacKinley, J., & Wrath, A. (2011). Assessment of response to mindfulness meditation: Meditation breath attention scores in association with subjective measures of state and trait mindfulness and difficulty letting go of depressive cognition. *Mindfulness*, 2(4), 254-269. doi: 10.1007/s12671-011-0069-y
- Garland, E., Gaylord, S., & Park, J. (2009). The role of mindfulness in positive reappraisal. *Explore*, 5(1), 37-44. doi:10.1016/j.explore.2008.10.001
- Gilbert, B., & Christopher, M. (2009). Mindfulness-based attention as a moderator of the relationship between depressive affect and negative cognitions. *Cognitive Therapy and Research*, 34(6), 514-521. doi:10.1007/s10608-009-9282-6
- Goldberg, L. R. (1999). A broad-bandwidth, public domain, personality inventory measuring the lower-level facets of several five-factor models. In I. Mervielde, I. Deary, F. De Fruyt, & F. Ostendorf (Eds.). *Personality Psychology in Europe* (vol. 7, p. 7–28). Tilburg, The Netherlands: Tilburg University Press.
- Goleman, D. (1988). *The meditative mind: The varieties of meditative experience*. New York, NY: Tarcher.
- Greenberg, L., & Safran, J. (1987). *Emotion in psychotherapy: Affect, cognition, and the process of change*. New York, NY: Guilford Press.
- Gregg, J., Callaghan, G., Hayes, S., & Glenn-Lawson, J. (2007). Improving diabetes self-management through acceptance, mindfulness, and values: A randomized controlled trial. *Journal of Consulting and Clinical Psychology*, 75(2), 336-43. doi:10.1037/0022-006X.75.2.336
- Gross, J. (1998). The emerging field of emotion regulation: An integrative review. *Review of General Psychology*, 2(5), 271-299. doi:10.1037/1089-2680.2.3.271
- Grossman, P. (2008). On measuring mindfulness in psychosomatic and psychological research. *Journal of Psychosomatic Research*, 64, 405–408. doi:10.1016/j.jpsychores.2008.02.001
- Grossman, P. (2011). Defining mindfulness by how poorly I think I pay attention during everyday awareness and other intractable problems for psychology's (re)invention of mindfulness: Comment on Brown et al. (2011). *American Psychological Association*, 23(4), 1-7. doi:10.1037/a0022713
- Grossman, P., Niemann, L., Schmidt, S., & Walach, H. (2004). Mindfulness-based stress reduction and health benefits: A meta-analysis. *Journal of psychosomatic research*, 57(1), 35-43. doi:10.1016/S0022-3999(03)00573-7

- Grossman, P., Tiefenthaler-Gilmer, U., Raysz, A., & Kesper, U. (2007). Mindfulness training as an intervention for fibromyalgia: Evidence of postintervention and 3-year follow-up benefits in wellbeing. *Psychotherapy and Psychosomatics*, 76(4), 226-33. doi:10.1159/000101501
- Grossman, P., & Van Dam, N. (2011). Mindfulness, by any other name...: Trials and tribulations of *Sati* in Western Psychology and science. *Contemporary Buddhism*, 12(1), 219-239. doi:10.1080/14639947.2011.564841
- HH Dalai Lama., & Cutler, H (1998). *The art of happiness: A handbook for living*. New York, NY: Riverhead Book.
- Hardy, S., & Thiels, C. (2009). Using latent growth curve modeling in clinical treatment research: An example comparing guided self-change and cognitive behavioral therapy treatments for bulimia nervosa. *International Journal of Clinical and Health Psychology*, 9(1), 51-71. Retrieved from <http://redalyc.uaemex.mx/src/inicio/ArtPdfRed.jsp?iCve=33712020004>
- Hayes, A., Feldman, G., & Gables, C. (2004). Clarifying the construct of mindfulness in the context of emotion regulation and the process of change in therapy. *Clinical Psychology: Science and Practice*, 11, 255-262. doi:10.1093/clipsy/bph080
- Hayes, S., Strosahl, K., & Wilson, K. (1999). *Acceptance and commitment therapy: An experiential approach to behaviour change*. New York, NY: The Guilford Press.
- Hayes, S., Wilson, K., Gifford, E., Follette, V., & Strosahl, K. (1996). Experimental avoidance and behavioral disorders: A functional dimensional approach to diagnosis and treatment. *Journal of Consulting and Clinical Psychology*, 64(6), 1152-68. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/8991302>
- Heidenreich, T., Tuin, I., Pflug, B., Michal, M., & Michalak, J. (2006). Mindfulness-based cognitive therapy for persistent insomnia: a pilot study. *Psychotherapy and Psychosomatics*, 75(3), 188-189. doi:10.1159/000091778
- Hofmann, S., & Asmundson, G. (2008). Acceptance and mindfulness- based therapy: New wave or old hat? *Clinical Psychology Review*, 28, 1-16. doi:10.1016/j.cpr.2007.09.003
- Hofmann, S., Sawyer, A., Witt, A., & Oh, D. (2010). The effect of mindfulness-based therapy on anxiety and depression: A meta-analytic review. *Journal of Consulting and Clinical Psychology*, 78(2), 169-83. doi:10.1037/a0018555

- Hollis-Walker, L., & Colosimo, K. (2011). Mindfulness, self-compassion, and happiness in non-meditators: A theoretical and empirical examination. *Personality and Individual Differences*, 50(2), 222-227. doi:10.1016/j.paid.2010.09.033
- Hu, L., & Bentler, P. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, 6(1), 1-55. doi:10.1080/10705519909540118
- Hurley, A., Scandura, T., Schriesheim, C., Brannick, M., Seers, A., Vandenberg, R., & Williams, L. (1997). Exploratory and confirmatory factor analysis: Guidelines, issues, and alternatives. *Journal of Organizational Behavior*, 18(6), 667-683. doi:10.1002/(SICI)1099-1379(199711)18:6<667::AID-JOB874>3.0.CO;2-T
- Ingram, R., Atchley, R., & Segal, Z. (2011). *Vulnerability to depression: From cognitive neuroscience to prevention and treatment*. New York, NY: Guilford Press.
- Jain, S., Shapiro, S., Swanick, S., Roesch, S., Mills, P., Bell, I., & Schwartz, G. (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: A publication of the Society of Behavioral Medicine*, 33(1), 11-21. doi:10.1207/s15324796abm3301_2
- Jöreskog, K. G. (1993). Testing structural equation models. In K. A. Bollen & J. S. Long (Eds.), *Testing structural equation models*. Newbury Park, CA: Sage.
- Jöreskog, K. G. (1999). How large can a standardised coefficient be? Retrieved from <http://www.ssicentral.com/lisrel/techdocs/HowLargeCanaStandardizedCoefficient-be.pdf>
- Jose, P., Cafasso, L., & D'Anna, C. (1994). Ethnic group differences in children's coping strategies. *Sociological Studies of Children*, 6, 25-53.
- Jose, P., & Huntsinger, C. (2005). Moderation and mediation effects of coping by Chinese American and European American adolescents. *The Journal of Genetic Psychology*, 166, 16-43. doi:10.3200/GNTP.166.1.16-44
- Josefsson, T., Larsman, P., Broberg, A., & Lundh, L. (2011). Self-reported mindfulness mediates the relation between meditation experience and psychological well-being. *Mindfulness*, 2, 49-58. doi:10.1007/s12671-011-0042-9
- Kabat-Zinn, J. (1982). An out-patient 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. doi:10.1016/0163-8343(82)90026-3

- Kabat-Zinn, J. (1990). *Full catastrophe living: Using the wisdom of your body and mind to face stress, pain, and illness*. New York, NY: Delacorte Press.
- Kabat-Zinn, J. (2003). Mindfulness-based interventions in context: Past, present, and future. *American Psychological Association, 10*, 144-156. doi:10.1093/clipsy/bpg016
- Kaplan, K., Goldenberg, D., & Galvin-Nadeau, M. (1993). The impact of a meditation-based stress reduction program on fibromyalgia. *General Hospital Psychiatry, 15*, 284-289. doi:10.1016/0163-8343(93)90020-O
- Kabat-Zinn, J., Massion, A., Kristeller, J., Peterson, L., Fletcher, K., Pbert, L., . . . Santorelli, S. (1992). Effectiveness of a meditation-based stress reduction program in the treatment of anxiety disorders. *American Journal of Psychiatry, 149*(7), 936-943. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/1609875>
- Kashdan, T., Rose, P., & Fincham, F. (2004). Curiosity and exploration: Facilitating positive subjective experiences and personal growth opportunities. *Journal of personality assessment, 82*, 291-305. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/15151805>
- Katz, L., Cox, B., Gunasekara, S., & Miller, A. (2004). Feasibility of dialectical behaviour therapy for suicidal adolescent inpatients. *Journal of the American Academy of Child and Adolescent Psychiatry, 43*(3), 276-282. doi:10.1097/01.chi.0000106854.88132.4f
- Kaufman, M. (2005, January 3). Meditation gives brain a charge, study finds. *The Washington Post*, p. A.05. Retrieved from <http://search.proquest.com/docview/409733920?accountid=14782>
- Kazantzis, N., Reinecke, M., & Freeman, A. (2010). *Cognitive and behavioural theories in clinical practice*. New York, NY: The Guilford Press.
- Kee, Y., & Wang, C. (2008). Relationships between mindfulness, flow dispositions and mental skills adoption: A cluster analytic approach. *Psychology of Sport and Exercise, 9*(4), 393-411. doi:10.1016/j.psychsport.2007.07.001
- Keltner, D., & Kring, A. (1998). Emotion, social function, and psychopathology. *Review of General Psychology, 2*(3), 320-342. doi:10.1037/1089-2680.2.3.320
- Kiken, L., & Shook, N. (in press). Mindfulness and emotional distress: The role of negatively biased cognition. *Personality and Individual Differences*. doi:10.1016/j.paid.2011.10.031
- Kline, R. B. (2005). *Principles and practices of structural equation modeling* (2nd ed.). New York, NY: The Guilford Press.

- Kornfield, J. (1993). *A path with heart: A guide through the perils and promises of spiritual life*. New York, NY: Bantam Books.
- Kornfield, J., & Breiter, P. (1985). *A still forest pool: The insight meditation of Achaan Chah*. Wheaton, Illinois: The Theosophical Publishing House.
- Krech, P. (2006). *Development of a state mindfulness scale*. (Unpublished Master's Thesis). Arizona State University, US.
- Kristeller, J., & Hallett, C. (1999). An exploratory study of a mediation-based intervention for binge eating disorders. *Journal of Health Psychology*, 4, 357-363.
doi:10.1177/135910539900400305
- Kumar, S., Feldman, G., & Hayes, A. (2008). Changes in mindfulness and emotion regulation in an exposure-based cognitive therapy for depression. *Cognitive Therapy and Research*, 32(6), 734-744. doi:10.1007/s10608-008-9190-1
- Langer, E. (1989). *Mindfulness*. Reading, Massachusetts: Addison-Wesley Publishing Company, Inc.
- Langer, E. (2000). Mindful learning. *Current Directions in Psychological Science*, 9(6), 220-223. Retrieved from
http://content.ebscohost.com/pdf14_16/pdf/2000/6fj/01dec00/4518869.pdf
- Langer, E., & Piper, A. (1987). The prevention of mindlessness. *Journal of Personality and Social Psychology*, 53(2), 280-287. doi:10.1037/0022-3514.53.2.280
- Lau, M., Bishop, S., Segal, Z., Buis, T., Anderson, N., Carlson, L., . . . Devins, G. (2006). The Toronto Mindfulness Scale: Development and validation. *Journal of Clinical Psychology*, 62, 1445-1467. doi:10.1002/jclp
- Lenth, R. (2001). Some practical guidelines for effective sample size determination. *The American Statistician*, 55(3), 187-193. Retrieved from
<http://www.stat.uiowa.edu/techrep/tr303.pdf>
- Little, T., Cunningham, W., Shahar, G., & Widamon K. (2002). To parcel or not to parcel: Exploring the question, weighing the merits. *Structural Equation Modeling*, 9, 151 - 173. doi:10.1207/S15328007SEM0902_1
- Little, T., Preacher, K., Selig, J., & Card, N. (2007). New developments in latent variable panel analyses of longitudinal data. *International Journal of Behavioral Development*, 31(4), 357-365. doi:10.1177/0165025407077757
- Linehan, M. (1984). *Dialectical behaviour therapy for treatment of parasuicidal women: Treatment manual*. Seattle, Washington: University of Washington.

- Linehan, M. (1993). *Cognitive-behavioral treatment of borderline personality disorder*. New York, NY: The Guilford Press.
- Linehan, M., Armstrong, H., Suarez, A., Allmon, D., & Heard, H. (1991). Cognitive-behavioural treatment of chronically parasuicidal borderline patients. *Archives of General Psychiatry*, 48, 1060-1064. Retrieved from <http://archpsyc.ama-assn.org/cgi/content/abstract/48/12/1060>
- Linehan, M., Tutek, D., Heard, H., & Armstrong, H. (1994). Interpersonal outcome of cognitive behavioral treatment for chronically suicidal borderline patients. *The American journal of psychiatry*, 151(12), 1771-6. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/7977884>
- Low, G., Jones, D., Duggan, C., Power, M., & Macleod, A. (2001). The treatment of deliberate self-harm in borderline personality disorder using dialectical behavioural therapy: A pilot study in a high security hospital. *Behavioural and Cognitive Psychotherapy*, 29, 85-92. doi:10.1017/S1352465801001096
- Lutz, A., Slagter, H., Dunne, J., & Davidson, R. (2008). Attention regulation and monitoring in meditation. *Trends in Cognitive Sciences*, 12(4), 163-9. doi:10.1016/j.tics.2008.01.005
- Lykins, E., & Baer, R. (2009). Psychological functioning in a sample of long-term practitioners of mindfulness meditation. *Journal of Cognitive Psychotherapy*, 23, 226-241. doi:10.1891/0889-8391.23.3.226
- Lyubomirsky, S., & Lepper, H. (1999). A measure of subjective happiness: Preliminary reliability and construct validation. *Social Indicators Research*, 46, 137-155. Retrieved from <http://www.faculty.ucr.edu/~sonja/papers/LL1999.pdf>
- Ma, S., & Teasdale, J. (2004). Mindfulness-based cognitive therapy for depression: Replication and exploration of differential relapse prevention effects. *Journal of Consulting and Clinical Psychology*, 72, 31-40. doi:10.1037/0022-006X.72.1.31
- Marlatt, G. (2002). Buddhist philosophy and the treatment of addictive behaviour. *Cognitive and Behavioural Practice*, 9(1), 44-50. doi:10.1016/S1077-7229(02)80039-6
- Marlatt, G., & Gordon, J. (1985). *Relapse prevention: Maintenance strategies in the treatment of addictive behaviours*. New York, N.Y: Guilford Press.
- May, S., & O' Donovan, A. (2007). The advantages of the mindful therapist. *Psychotherapy in Australia*, 13(4), 46-53. Retrieved from <http://search.informit.com.au/fullText;dn=544853380365181;res=IELHEA>

- McArdle, J., & Epstein, D. (1987). Latent growth curves within developmental structural equation models. *Child Development*, 58, 110-133. Retrieved from <http://web.ebscohost.com/ehost/pdfviewer/pdfviewer?vid=3&hid=110&sid=a4a5828a-7f91-47b2-9a61-792c7f1de487%40sessionmgr111>
- McCracken, L., Vowles, K., & Eccleston, C. (2005). Acceptance-based treatment for persons with complex, long standing chronic pain: A preliminary analysis of treatment outcome in comparison to a waiting phase. *Behaviour Research and Therapy*, 43, 1335-1346. doi:10.1016/j.brat.2004.10.003
- Michalak, J., Hölz, A., & Teismann, T. (2010). Rumination as a predictor of relapse in mindfulness-based cognitive therapy for depression. *Psychology and Psychotherapy: Theory, Research, and Practice*, 84, 230-236. doi:10.1348/147608310X520166
- Milfont, T., Fischer, R. (2010). Testing measurement invariance across groups: Applications in cross-cultural research. *International Journal of Psychological Research*, 3(1), 112-131. Retrieved from <http://mvint.usbmed.edu.co:8002/ojs/index.php/web/article/view/465/449>
- Miller, J., Fletcher, K., & Kabat-Zinn, J. (1995). Three-year follow-up and clinical implications of a mindfulness meditation-based stress reduction intervention in the treatment of anxiety disorders. *General Hospital Psychiatry*, 17, 192-200. Retrieved from <http://www.brainresearch.us/meditation.pdf>
- Muthén, B., & Curran, P. (1997). General longitudinal modeling of individual differences in experimental designs: A latent variable framework for analysis and power estimation. *Psychological Methods*, 2(4), 371-402. doi:1082-989X/97/83.00
- Nolen-Hoeksema, S. (1991). Responses to depression and their effects on the duration of the depressive episode. *Journal of Abnormal Psychology*, 100, 569-582. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/1757671>
- Nolen-Hoeksema, S., Morrow, J., & Fredrickson, B. (1993). Response styles and the duration of episodes of depressed mood. *Journal of Abnormal Psychology*, 102, 20-28. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/8436695>
- Obradović, J., Pardini, D., Long, J., & Loeber, R. (2007). Measuring interpersonal callousness in boys from childhood to adolescence: an examination of longitudinal invariance and temporal stability. *Journal of Clinical Child and Adolescent Psychology*, 36(3), 276-92. doi:10.1080/15374410701441633

- Ong, J., Shapiro, S., & Manber, R. (2008). Combining mindfulness meditation with cognitive-behavior therapy for insomnia: A treatment-development study. *Behavior Therapy, 39*(2), 171–182. doi:10.1016/j.beth.2007.07.002
- Orsillo, S., Roemer, L., & Barlow, D. (2003). Integrating acceptance and mindfulness into existing cognitive-behavioural treatment for GAD: A case study. *Cognitive and Behavioral Practice, 10*(3), 222-230. doi:10.1016/S1077-7229(03)80034-2
- Ospina, M., Bond, K., Karkhaneh M., Tjosvold, L., Vandermeer, B., Liang, Y., . . . Klassen, T. (2007). Meditation practices for health: State of the research. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/17764203>
- Pavot, W., Diener, E., & Suh, E. (1998). The Temporal Satisfaction With Life Scale. *Journal of Personality Assessment 70*(2), 340-354. doi:10.1207/s15327752jpa7002_11
- Peters, J., Erisman, S., Upton, B., Baer, R., & Roemer, L. (2011). A preliminary investigation of the relationships between dispositional mindfulness and impulsivity. *Mindfulness, 2*(4), 228-235. doi:10.1007/s12671-011-0065-2
- Ramel, W., Goldin, P., Carmona, P., & McQuaid, J. (2004). The effects of mindfulness meditation on cognitive processes and affect in patients with past depression. *Cognitive Therapy and Research, 28*(4), 433-455. doi:10.1023/B:COTR.0000045557.15923.96
- Riskind, J. (1997). Looming vulnerability to threat: A cognitive paradigm for anxiety. *Behaviour Research and Therapy, 35*(8), 685-702. doi:10.1016/S0005-7967(97)00011-9
- Roemer, L., & Orsillo, S. (2003). Mindfulness: A promising intervention strategy in need of further study. *Clinical Psychology: Science and Practice, 10*, 172-178. doi:10.1093/clipsy/bpg020
- Rosenzweig, S., Reibel, D., Greeson, J., Edman, J., & Jasser, S. (2007). Mindfulness-based stress reduction is associated with improved glycemic control in type 2 diabetes mellitus: A pilot study. *Alternative Therapies 13*(5), 36-38. Retrieved from http://sites.duke.edu/greesonlab/files/2011/07/Rosenzweig_etal_2007_ATHM-MBSR-outcomes-diabetes.pdf
- Roth, B., & Robins, D. (2004). Mindfulness-based stress reduction and health-related quality of life: Findings from a bilingual inner-city patient population. *Psychosomatic Medicine, 66*(1), 113-123. doi:10.1097/01.PSY.0000097337.00754.09

- Rude, S., Maestas, K., & Neff, K. (2007). Paying attention to distress: What's wrong with rumination? *Cognition & Emotion*, 21(4), 843-864.
doi:10.1080/02699930601056732
- Schwartz, S., Mason, C., Pantin, H., & Szapocznik, J. (2008). Longitudinal relationships between family functioning and identity development in Hispanic adolescents: Continuity and change. *The Journal of Early Adolescence*, 29, 177-211.
doi:10.1177/0272431608317605
- Segal, Z., Williams, J., & Teasdale, J. (2002). *Mindfulness-based cognitive therapy for depression: A new approach to preventing relapse*. New York, NY: Guilford Press.
- Shapiro, S., Brown, K., Thoresen, C., & Plante, T. (2011). The moderation of mindfulness-based stress reduction effects by trait mindfulness: Results from a randomized controlled trial. *Journal of Clinical Psychology*, 67(3), 267-77.
doi:10.1002/jclp.20761
- Shapiro, S., & Carlson, L. (2009). *The art and science of mindfulness: Integrating mindfulness into psychology and the helping professions*. Washington, DC: American Psychological Association.
- Shapiro, S., Carlson, L., Astin, J., & Freedman, B. (2006). Mechanisms of mindfulness. *Health Care*, 62(3), 373-386. doi:10.1002/jclp
- Shapiro, S., Oman, D., Thoresen, C., Plante, T., & Flinders, T. (2008). Cultivating mindfulness: Effects on wellbeing. *Online*, 64(7), 840-862. doi:10.1002/jclp
- Shapiro, S., Schwartz, G., & Bonner, G. (1998). Effects of mindfulness-based stress reduction on medical and premedical students. *Journal of Behavioral Medicine*, 21, 581-99. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/9891256>
- Sharma, R. (2006). Review article: Meditation and mental wellbeing. *Indian Journal of Physiology and Pharmacology*, 50(3), 205-214. Retrieved from http://www.ijpp.com/vol50_3/205-214.pdf
- Siegel, D. (2007). Mindfulness training and neural integration: Differentiation of distinct streams of awareness and the cultivation of wellbeing. *Social Cognitive and Affective Neuroscience*, 2(4), 259-263. doi:10.1093/scan/nsm034
- Sin, N., & Lyubomirsky, S. (2009). Enhancing wellbeing and alleviating depressive symptoms with positive psychology interventions. *Online*, 65(5). doi:10.1002/jclp

- Singh, N., Lancioni, G., Wahler, R., Winton, A., & Singh, J. (2008). Mindfulness approaches in cognitive behavioural therapy. *Behavioural and Cognitive Psychotherapy*, 36, 659-666. doi:10.1017/S1352465808004827
- Smalley, S., Loo, S., Hale, T., & McGough, J. (2009). Mindfulness and attention deficit hyperactivity disorder. *Journal of Clinical Psychology*, 65(10), 1087-1098. doi:10.1002/jclp
- Smith, G., Fischer, S., & Fister, S. (2003). Incremental validity principles in test construction. *Psychological Assessment*, 15, 467-477. doi:10.1037/1040-3590.15.4.467
- Smith, G., & McCarthy, D. (1995). Methodological considerations in the refinement of clinical assessment instruments. *Psychological Assessment*, 7, 300-308. doi:10.1037//1040-3590.7.3.300
- Specia, M., Carlson, L., Goodey, E., & Angen, M. (2000). A randomized, wait-list controlled clinical trial: The effect of a mindfulness meditation-based stress reduction program on mood and symptoms of stress in cancer outpatients. *Psychosomatic medicine*, 62(5), 613-22. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/11020090>
- Spielberger, C. D. (1979). *Preliminary Manual for the State-Trait Personality Inventory (STPI)*. Unpublished manuscript. University of South Florida, Tampa. Retrieved from <http://dionysus.psych.wisc.edu/lit/articles/SpielbergerC1994a.pdf>
- Spielberger, C. D. (1983). *Manual for the State-Trait Anxiety Inventory (Form Y)*. Palo Alto, CA: Consulting Psychologists Press.
- Sternberg, R. (2000). Images of mindfulness. *Journal of Social Issues*, 56(1), 11-26. doi:10.1111/0022-4537.00149
- Stewart, T. (2004). Light on body image treatment: Acceptance through mindfulness. *Behaviour Modification*, 28(6), 783-811. doi:10.1177/0145445503259862
- Strauss, M., & Smith, G. (2009). Construct validity: Advances in theory and methodology. *Annual Review of Clinical Psychology*, 5, 1-25. doi:10.1146/annurev.clinpsy.032408.153639
- Sullivan, M., Wood, L., Terry, J., Brantley, J., Charles, A., McGee, V., . . . Cuffe, M. (2009). The Support, Education, and Research in Chronic Heart Failure Study (SEARCH): A mindfulness-based psychoeducational intervention improves depression and clinical symptoms in patients with chronic heart failure. *American Heart Journal*, 157(1), 84-90. doi:10.1016/j.ahj.2008.08.033

- Tacón, A., McComb, J., Caldera, Y., & Randolph, P. (2003). Mindfulness meditation, anxiety reduction and heart disease: A pilot study. *Family and Community Health*, 26(1), 25–33. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/12802125>
- Teasdale, J., Segal, Z., & Williams, M. (1995). How does cognitive therapy prevent relapse and why should attentional control (mindfulness) training help? *Behaviour Research and Therapy*, 33, 225-239. doi:10.1016/0005-7967(94)E0011-7
- Teasdale, J., Segal, Z., Williams, J., Ridgeway, V., Soulsby, J., & Lau, M. (2000). Prevention of relapse/recurrence in major depression by mindfulness-based cognitive therapy. *Journal of Consulting and Clinical Psychology*, 68, 615-623. doi:10.1037//0022-006X.68.4.615
- Telch, C., Agras, W., & Linehan, M. (2001). Dialectical behavior therapy for binge eating disorder. *Journal of Consulting and Clinical Psychology*, 69, 1061-1065. doi:10.1037//0022-006X.69.6.1061
- Thompson, B., & Waltz, J. (2007). Everyday mindfulness and mindfulness meditation: Overlapping constructs or not? *Personality and Individual Differences*, 43(7), 1875-1885. doi:10.1016/j.paid.2007.06.017
- Thomsen, D. (2006). The association between rumination and negative affect: A review. *Cognition and Emotion*, 20, 1216-1235. doi:10.1080/02699930500473533
- Vandenberg, R., & Lance, C. (2000). A review and synthesis of the measurement invariance literature: Suggestions, practices, and recommendations for organizational research. *Organizational Research Methods*, 3(1), 4-70. doi:10.1177/109442810031002
- Van Dam, N., Earleywine, M., & Danoff-Burg, S. (2009). Differential item function across meditators and non-meditators on the Five Facet Mindfulness Questionnaire. *Personality and Individual Differences*, 47(5), 516-521. doi:10.1016/j.paid.2009.05.005
- Van Dam, N., Earleywine, M., & Borders, A. (2010). Measuring mindfulness? An item response theory analysis of the mindful attention awareness scale. *Personality and Individual Differences*, 49, 805-810. doi:10.1016/j.paid.2010.07.020
- Voelkle, M. (2007). Latent growth curve modeling as an integrative approach to the analysis of change. *Psychology Science*, 49, 375-414. Retrieved from <http://search.proquest.com/docview/212191545/fulltextPDF/132C2C3982D1E969A4B/7?accountid=14782>

- Wahbeh, H., Lu, M., & Oken, B. (2011). Mindful awareness and non-judging in relation to posttraumatic stress disorder symptoms. *Mindfulness*, 2(4), 219-227. doi:10.1007/s12671-011-0064-3
- Walach, H., Buchheld, N., Butenmuller, V., Kleinknecht, N., & Schmidt, S. (2006). Measuring mindfulness: The Freiburg Mindfulness Inventory (FMI). *Personality and Individual Differences*, 40, 1543-1555. doi:10.1016/j.paid.2005.11.025
- Wallace, B. (2005). *Genuine happiness: Meditation as the path to fulfillment*. Hoboken, New Jersey, NJ: John Wiley & Sons, Inc.
- Wallace, B., & Shapiro, S. (2006). Mental balance and wellbeing: Building bridges between Buddhism and Western Psychology. *American Psychologist*, 61(7), 690-701. doi:10.1037/0003-066X.61.7.690
- Walsh, R., & Shapiro, S. (2006). The meeting of meditative disciplines and western psychology: A mutually enriching dialogue. *American Psychologist*, 61(3), 227-239. doi:10.1037/0003-066X.61.3.227
- Watkins, E., & Teasdale, J. (2004). Adaptive and maladaptive self-focus in depression. *Journal of Affective Disorders*, 82(1), 1-8. doi:10.1016/j.jad.2003.10.006
- Watson, D., Clark, L., & Tellegen, A. (1988). Development and validation of brief measure of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology*, 54, 1063-1070. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/3397865>
- Wayment, H., Wiist, B., Sullivan, B., & Warren, M. (2010). Doing and Being: Mindfulness, health, and quiet ego characteristics among Buddhist practitioners. *Journal of Happiness Studies*, 12(4), 575-589. doi:10.1007/s10902-010-9218-6
- Weiss, M., Nordlie, J., & Siegel, E. (2005). Mindfulness-based stress reduction as an adjunct to outpatient psychotherapy. *Psychotherapy and Psychosomatics*, 74(2), 108-12. doi:10.1159/000083169
- Wells, A. (2002). GAD, metacognition, and mindfulness: An information processing analysis. *Clinical Psychology: Science and Practice*, 9(1), 95-100. doi:10.1093/clipsy/9.1.95
- Wilber, K. (2000). *Integral psychology: Consciousness, spirit, psychology, therapy*. Boston, MA: Shambhala.
- Williams, J. (2008). Mindfulness, depression, and modes of Mind. *Cognitive Therapy and Research*, 32(6), 721-733. doi:10.1007/s10608-008-9204-z

- Williams, J., Duggan, D., Crane, C., & Fennell, M. (2006). Mindfulness-based cognitive therapy for prevention of recurrence of suicidal behavior. *Online*, 62(2), 201-210. doi:10.1002/jclp
- Williams, M., Teasdale, J., Segal, Z., & Kabat-Zinn, J. (2007). *The mindful way through depression: Freeing yourself from chronic unhappiness*. New York, NY: The Guilford Press.
- Witkiewitz, K., & Marlatt, G. (2004). Relapse prevention for alcohol and drug problems: That was Zen, this is Tao. *American Psychologist*, 59(4), 224-235. doi:10.1037/0003-066X.59.4.224
- Witkiewitz, K., Marlatt, G., & Walker, D. (2005). Mindfulness-based relapse prevention for alcohol and substance use disorders. *Journal of Cognitive Psychotherapy*, 19(3), 211-228. Retrieved from <http://proquest.umi.com/pqdweb?index=6&did=913174401&SrchMode=3&sid=1&F>
- Zylowska, L., Ackerman, D., Yang, M., Futrell, J., Horton, N., Hale, S., . . . Smalley, S. (2008). Mindfulness meditation training in adults and adolescents with ADHD: A feasibility study. *Journal of Attention Disorders*, 11(6), 737-746. doi:10.1177/1087054707308502

Appendix A:

Five-Facet Mindfulness Questionnaire

Please rate each of the following statements using the scale provided. Choose the option that best describes your own opinion of what is generally true for you.

1	2	3	4	5
Never or very rarely true	Rarely true	Sometimes true	Often true	Very often or always true

- ___ 1. When I'm walking, I deliberately notice the sensations of my body moving
- ___ 2. I'm good at finding words to describe my feelings
- ___ 3. I criticize myself for having irrational or inappropriate emotions
- ___ 4. I perceive my feelings and emotions without having to react to them
- ___ 5. When I do things, my mind wanders off and I'm easily distracted
- ___ 6. When I take a shower or bath, I stay alert to the sensations of water on my body
- ___ 7. I can easily put my beliefs, opinions, and expectations into words
- ___ 8. I don't pay attention to what I'm doing because I'm daydreaming, worrying, or otherwise distracted
- ___ 9. I watch my feelings without getting lost in them
- ___ 10. I tell myself I shouldn't be feeling the way I'm feeling
- ___ 11. I notice how foods and drinks affect my thoughts, bodily sensations, and emotions
- ___ 12. It's hard for me to find the words to describe what I'm thinking
- ___ 13. I am easily distracted
- ___ 14. I believe some of my thoughts are abnormal or bad and I shouldn't think that way
- ___ 15. I pay attention to sensations, such as the wind in my hair or sun on my face
- ___ 16. I have trouble thinking of the right words to express how I feel about things
- ___ 17. I make judgments about whether my thoughts are good or bad
- ___ 18. I find it difficult to stay focused on what's happening in the present
- ___ 19. When I have distressing thoughts or images, I "step back" and am aware of the thought or image without getting taken over by it
- ___ 20. I pay attention to sounds, such as clocks ticking, birds chirping, or cars passing
- ___ 21. In difficult situations, I can pause without immediately reacting
- ___ 22. When I have a sensation in my body, it's difficult for me to describe it because I can't find the right words
- ___ 23. It seems I am "running on automatic" without much awareness of what I'm doing
- ___ 24. When I have distressing thoughts or images, I feel calm soon after
- ___ 25. I tell myself that I shouldn't be thinking the way I am thinking
- ___ 26. I notice the smells and aromas of things
- ___ 27. Even when I'm feeling terribly upset, I can find a way to put it into words
- ___ 28. I rush through activities without being really attentive to them
- ___ 29. When I have distressing thoughts or images, I am able to just notice them without reacting

- ___ 30. I think some of my emotions are bad or inappropriate, and I shouldn't feel them
- ___ 31. My natural tendency is to put my experiences into words
- ___ 32. When I have distressing thoughts or images, I just notice them and let them go
- ___ 33. I do jobs or tasks automatically without being aware of what I'm doing
- ___ 34. When I have distressing thoughts or images, I judge myself as good or bad, depending on what the thought/image is about
- ___ 35. I pay attention to how my emotions affect my thoughts and behavior
- ___ 36. I can usually describe how I feel at the moment in considerable detail
- ___ 37. I find myself doing things without paying attention
- ___ 38. I disapprove of myself when I have irrational ideas
- ___ 39. I notice visual elements in art or nature, such as colours, shapes, textures, and patterns of light and shadow

Appendix B:

Beck Depression Inventory

For each item indicate (by ticking on the line) which statement describes the way you have been feeling RECENTLY (in the past month or so).

<p>1*. ☐ I do not feel sad ☐ I feel sad much of the time ☐ I am sad all the time ☐ I am so sad or unhappy that I can't stand it</p> <p>2*. ☐ I'm not discouraged about my future ☐ I feel more discouraged about my future than I used to be ☐ I do not expect things to work out for me ☐ I feel my future is hopeless and will only get worse</p> <p>3*. ☐ I do not feel like a failure ☐ I have failed more than I should have ☐ As I look back, I see a lot of failures ☐ I feel I am a total failure as a person</p> <p>4*. ☐ I get as much pleasure as I ever did from the things I enjoy ☐ I don't enjoy things as much as I used to ☐ I get very little pleasure from the things I used to enjoy ☐ I can't get any pleasure from the things I used to enjoy</p> <p>5*. ☐ I don't feel particularly guilty ☐ I feel guilty over many things I have done or should have done ☐ I feel quite guilty most of the time ☐ I feel guilty all of the time</p> <p>6. ☐ I don't feel I am being punished ☐ I feel I may be punished ☐ I expect to be punished ☐ I feel I am being punished</p> <p>7*. ☐ I feel the same about myself as ever ☐ I have lost confidence in myself ☐ I am disappointed in myself ☐ I dislike myself</p>	<p>8*. ☐ I don't criticise and blame myself more than usual ☐ I am more critical of myself than I used to be ☐ I criticise myself for all of my faults ☐ I blame myself for everything bad that happens</p> <p>9. ☐ I don't cry anymore than I used to ☐ I cry more than I used to ☐ I cry over every little thing ☐ I feel like crying, but I can't</p> <p>10. ☐ I am no more restless or wound up than usual ☐ I feel more restless or wound up than usual ☐ I am so restless or agitated that it's hard to stay still ☐ I am so restless or agitated that I have to keep moving or doing something</p> <p>11*. ☐ I have not lost interest in other people or activities ☐ I am less interested in other people or things than before ☐ I have lost most of my interest in other people or things ☐ It's hard to get interested in anything</p> <p>12*. ☐ I make decisions about as well as ever ☐ I find it more difficult to make decisions than usual ☐ I have much greater difficulty making decisions than I used to ☐ I have trouble making any decisions</p> <p>13. ☐ I do not feel I am worthless ☐ I don't consider myself as worthwhile and useful as I used to</p>
---	---

<p>14*. ☐ I have as much energy as ever</p> <p>☐ I have less energy than I used to have</p> <p>☐ I don't have enough energy to do very much</p> <p>☐ I don't have enough energy to do anything</p> <p>15. ☐ I have not experienced any change in my sleeping pattern</p> <p>☐ I sleep somewhat more OR less than usual</p> <p>☐ I sleep a lot more OR less than usual</p> <p>☐ I sleep most of the day OR I wake up 1-2 hours early and can't get back to sleep</p> <p>16. ☐ I am no more than irritable than usual</p> <p>☐ I am more irritable than usual</p> <p>☐ I am much more irritable than usual</p> <p>☐ I am irritable all the time</p> <p>17*. ☐ I have not experienced any change in my appetite</p> <p>☐ My appetite is somewhat less than usual OR my appetite is somewhat greater than usual</p> <p>☐ My appetite is much less than usual OR my appetite is much greater than usual</p> <p>☐ I have no appetite at all OR I crave food all the time</p>	<p>☐ I feel more worthless as compared to other people</p> <p>☐ I feel utterly worthless</p> <p>18. ☐ I can concentrate as well as ever</p> <p>☐ I can't concentrate as well as usual</p> <p>☐ It's hard to keep my mind on anything for long</p> <p>☐ I find I can't concentrate on anything</p> <p>19*. ☐ I am no more tired or fatigued than usual</p> <p>☐ I am more tired or fatigued more easily than usual</p> <p>☐ I am too tired or fatigued to do a lot of things I used to do</p> <p>☐ I am too tired or fatigued to do most of the things I used to do</p> <p>20. ☐ I don't have any thoughts of killing myself</p> <p>☐ I have thoughts of killing myself, but I would not carry them out</p> <p>☐ I would like to kill myself</p> <p>☐ I would kill myself if I had the chance</p> <p>21. ☐ I have not noticed any recent change in my interest in sex</p> <p>☐ I am less interested in sex than I used to be</p> <p>☐ I am much less interested in sex now</p> <p>☐ I have lost interest in sex completely</p>
--	---

Note. * = items from the shortened version of this scale used in Study 1 (Chapter 2).

Appendix C:

State-Trait Anxiety Scale

Please indicate which number best describes the extent of how you generally feel.

Almost never	Sometimes	Often	Almost always
1	2	3	4

- ___ 1. I feel pleasant
- ___ 2. I feel nervous and restless
- ___ 3. I feel satisfied with myself
- ___ 4. I wish I could be as happy as others seem to be
- ___ 5. I feel like a failure
- ___ 6. I feel rested
- ___ 7. I am “calm, cool and collected”
- ___ 8. I feel that difficulties are piling up so that I cannot overcome them
- ___ 9. I worry too much over something that doesn’t matter
- ___ 10. I am happy
- ___ 11. I have disturbing thoughts
- ___ 12. I lack self-confidence
- ___ 13. I feel secure
- ___ 14. I make decisions easily
- ___ 15. I feel inadequate
- ___ 16. I am content
- ___ 17. Some unimportant thoughts run through my mind and bother me
- ___ 18. I take disappointments so keenly that I can’t put them out of my mind
- ___ 19. I am a steady person
- ___ 20. I get in a state of tension or turmoil as I think over my recent concerns and interests

Appendix D:

Response Styles Questionnaire

Directions: Think about the negative events that you listed earlier. We are interested in how you responded to those events. Please indicate which number best described how you responded to the events you listed.

Remember there are no right or wrong answers.

	Strongly agree		Neutral		Strongly disagree
1. Thought about how alone you felt	1	2	3	4	5
2. Thought you wouldn't be able to do your job if you didn't snap out of your feelings	1	2	3	4	5
3. Thought about your feelings of fatigue and achiness	1	2	3	4	5
4. Thought about how hard it was to concentrate	1	2	3	4	5
5. Thought "What am I doing to deserve this?"	1	2	3	4	5
6. Thought about how passive and unmotivated you felt	1	2	3	4	5
7. Analysed recent events to try to understand why you felt depressed	1	2	3	4	5
8. Thought about how you didn't seem to feel anything anymore	1	2	3	4	5
9. Thought "Why can't I get going?"	1	2	3	4	5
10. Thought "Why do I always react this way?"	1	2	3	4	5
11. Went away by yourself and thought about why you felt this way	1	2	3	4	5

Appendix E:

Negative Life Events Scale

Below is a list of events that can happen to anyone. Please indicate “Yes” if one of these events has happened to you in the LAST TWO MONTHS, and how much you considered each event to be a problem. If the event DID NOT happen, please indicate “NONE” for the “How much of a problem was this event?” question.

Has this event happened to you in the last two months?		How much of a problem was this event?			
		None	A little	Some	A lot
1. You left home where you grew up	Yes No	1	2	3	4
2. You changed to a new school	Yes No	1	2	3	4
3. Someone in your family got very sick or was badly injured	Yes No	1	2	3	4
4. Your parents separated or divorced	Yes No	1	2	3	4
5. Your Mum or Dad lost their job	Yes No	1	2	3	4
6. A family member or relative died	Yes No	1	2	3	4
7. You experienced difficulty enrolling	Yes No	1	2	3	4
8. A close friend got very sick or was badly injured	Yes No	1	2	3	4
9. A family member got into trouble with the police	Yes No	1	2	3	4
10. A close friend stopped being a friend	Yes No	1	2	3	4
11. You had conflict with flatmates	Yes No	1	2	3	4
12. You realised that you were short of money	Yes No	1	2	3	4
13. You broke up with your boyfriend or girlfriend	Yes No	1	2	3	4
14. You had a bad experience with alcohol or drugs	Yes No	1	2	3	4
15. You got very sick or were badly injured	Yes No	1	2	3	4
16. You had a bad experience on a date	Yes No	1	2	3	4
17. Someone yelled at you	Yes No	1	2	3	4
18. You fought or argued with your parents	Yes No	1	2	3	4
19. You had a serious disagreement with a friend	Yes No	1	2	3	4
20. Someone you liked very much moved away	Yes No	1	2	3	4
21. You were avoided by someone	Yes No	1	2	3	4
22. You were rushed, you couldn't relax or take it easy	Yes No	1	2	3	4
23. You were discriminated against because of your ethnic group or skin colour	Yes No	1	2	3	4
24. Classmates(s) was/were mean to you	Yes No	1	2	3	4
25. Not liking the way you look	Yes No	1	2	3	4

Negative Life Events Scale

We are interested in what negative events have happened to you recently. Please think about the worst things that have happened to you over the past month when you answer the below question. Please be as honest as you can.

Please list the three most negative events that have happened to you over the past month, with 1 being the most negative.

1.
2.
3.

Appendix F:

Adolescent Coping Efforts Scale

Think about all of the stressful events you have experienced recently. What did you do in response to these events? Please indicate how much you used each of these ways of dealing with the problems.

1	2	3	4
Not at all	A little	Some	A lot

- ___ 1*. I watched TV, listened to music, or played sports or games in order to feel better
- ___ 2. I ignored or tried to get away from the problem
- ___ 3. I pretended that it wasn't a problem
- ___ 4. I went off by myself to get away from other people
- ___ 5. I tried to tough it out until the problem went away
- ___ 6. I got into a fight
- ___ 7. I let my feelings out: cried, yelled, looked sad, or other things
- ___ 8*. I prayed or asked God for help
- ___ 9. I smoked cigarettes, took drugs, or drank alcohol in order to deal with the problem
- ___ 10*. I talked to someone in order to feel better
- ___ 11*. I asked someone to give me help to solve the problem
- ___ 12*. I thought about the problem in a different way and tried to see the good side
- ___ 13*. I tried to solve the problem
- ___ 14*. I accepted the way things were
- ___ 15. I didn't do anything
- ___ 16*. I tried to get more information about the problem
- ___ 17*. I thought about all the things I could do to make the situation better
- ___ 18. I blamed myself for the problem
- ___ 19. I blamed someone else, lied, gave excuses, or cheated
- ___ 20*. I tried to control my feelings, calm down, and relax
- ___ 21*. I laughed or joked in order to deal with the problem

Note. * = items measuring adaptive coping strategies; No asterisk = items measuring maladaptive coping strategies.

Appendix G:

Subjective Happiness Scale

Please indicate (by circling a number) which statement you feel is most appropriate in describing you.

1. I consider myself:

Not a very happy person					A very happy person	
1	2	3	4	5	6	7

2. Compared to most of my peers, I consider myself:

Less happy					More happy	
1	2	3	4	5	6	7

3. Some people are generally very happy. They enjoy life regardless of what is going on, getting the most out of everything. To what extent does this characterisation describe you?

Not at all					A great deal	
1	2	3	4	5	6	7

4. Some people are generally NOT very happy. Although they are not depressed, they never seem as happy as they might be. To what extent does this characterisation describe you?

Not at all					A great deal	
1	2	3	4	5	6	7

Appendix H:

Satisfaction With Life Scale

Please indicate (by circling) your agreement with each item.

	Strongly disagree		Neutral			Strongly agree	
1. In most ways my life is close to my ideal	1	2	3	4	5	6	7
2. The conditions of my life are excellent	1	2	3	4	5	6	7
3. I am satisfied with my life	1	2	3	4	5	6	7
4. So far I have gotten the important things I want in life	1	2	3	4	5	6	7
5. If I could live my life over, I would change almost nothing	1	2	3	4	5	6	7

Appendix I:

Positive Life Events Scale

Below is a list of events that can happen to anyone. Please indicate “Yes” if one of these events has happened to you in the LAST TWO MONTHS, and how much you considered each event to be a positive experience. If the event DID NOT happen, please indicate “NONE” for the “How positive was this event?” question.

Has this event happened to you in the last two months?		How positive was this event?			
		None	A little	Some	A lot
1. A stranger was nice to you for no reason	Yes No	1	2	3	4
2. You got some unexpected money	Yes No	1	2	3	4
3. You had a romantic/sexual time with your boyfriend/girlfriend	Yes No	1	2	3	4
4. You made a new friend	Yes No	1	2	3	4
5. Something you dreaded turned out to be easier than expected	Yes No	1	2	3	4
6. Your fitness or health improved	Yes No	1	2	3	4
7. You had a stimulating conversation with someone	Yes No	1	2	3	4
8. You experienced something new that was interesting	Yes No	1	2	3	4
9. You laughed hard out at something funny	Yes No	1	2	3	4
10. You had a really wonderful meal	Yes No	1	2	3	4
11. You shared something fun with a friend	Yes No	1	2	3	4
12. You did something that made you feel good/proud about yourself	Yes No	1	2	3	4
13. You did something that made you feel like you’ve grown up	Yes No	1	2	3	4
14. You made a good decision	Yes No	1	2	3	4
15. Someone complimented you	Yes No	1	2	3	4
16. Something happened to make you excited about the future	Yes No	1	2	3	4
17. You shared a good time with your parents	Yes No	1	2	3	4
18. You cleared up a disagreement with someone	Yes No	1	2	3	4
19. You moved into a better living place	Yes No	1	2	3	4
20. You listened to music that you really like	Yes No	1	2	3	4
21. You read a book that excited you	Yes No	1	2	3	4
22. You saw a movie that was very good	Yes No	1	2	3	4
23. You helped someone	Yes No	1	2	3	4
24. You were grateful for someone in your life	Yes No	1	2	3	4
25. You were grateful for your upbringing	Yes No	1	2	3	4

Positive Life Events Scale

We are interested in the positive events that have happened to you recently. Please think about the best things that have happened to you over the past month when you answer the below question. Please be as honest as you can.

Please list the three most positive events that have happened to you over the past month, with 1 being the most negative.

1.
2.
3.

Appendix J:

Trait Toronto Mindfulness Scale

Below is a list of ways that people experience things that happen in their life. Please indicate the extent to which you agree with each statement. In other words, how well does the statement describe your experience? There are no “right” or “wrong” answers, so please answer in a way that reflects your own experiences.

1	2	3	4	5
Not at all	A little	Moderately	Quite a bit	Very much

- ___ 1. I experience myself as separate from my changing thoughts and feelings
- ___ 2. I am more concerned with being open to my experiences than controlling or changing them
- ___ 3. I am curious about what I might learn about myself by taking notice of how I react to certain thoughts, feelings or sensations
- ___ 4. I experience my thoughts more as events in my mind than as a necessarily accurate reflection of the way things ‘really’ are
- ___ 5. I am curious to see what my mind is up to from moment to moment
- ___ 6. I am curious about each of my thoughts and feelings as they occur
- ___ 7. I am receptive to observing unpleasant thoughts and feelings without interfering with them
- ___ 8. I am more invested in just watching my experiences as they arise, than in figuring out what they could mean
- ___ 9. I approach each experience by trying to accept it, no matter whether it is pleasant or unpleasant
- ___ 10. I remain curious about the nature of each experience as it arises
- ___ 11. I am aware of my thoughts and feelings without overidentifying with them
- ___ 12. I am curious about my reactions to things
- ___ 13. I am curious about what I might learn about myself by just taking notice of what my attention gets drawn to

Appendix K:

Meditation History Questionnaire

The following questions ask about your experience with meditation.

1. Do you currently partake in any form of meditative practice?

___ Yes

___ No

Below is a list of categories representing a variety of meditation practices that you may have experience with. Please circle the number that best represents the amount of time you have ever spent with these practices. If you currently DO NOT take part in meditative practices, please go on to the next page.

	0 – 6 months	6 months – 2 years	2 – 5 years	5 – 10 years	11 or more years
1. Tai Chi/Qui Gong	1	2	3	4	5
2. Hatha yoga	1	2	3	4	5
3. Mindfulness/Vipassana meditation	1	2	3	4	5
4. Transcendental Meditation	1	2	3	4	5
5. Devotional Practices	1	2	3	4	5
6. Other practices*	1	2	3	4	5

7*. Please list these practices here

Appendix L:

Factor Items for the FFMQ

Factor 1: Nonreacting

- Item 4. I perceive my feelings and emotions without having to react to them
 - Item 9. I watch my feelings without getting lost in them
 - Item 19. When I have distressing thoughts or images, I “step back” and am aware of the thought or image without getting taken over by it
 - Item 21. In difficult situations, I can pause without immediately reacting
 - Item 24. When I have distressing thoughts or images, I feel calm soon after
 - Item 29. When I have distressing thoughts or images I am able just to notice them without reacting
 - Item 33. When I have distressing thoughts or images, I just notice them and let them go
-

Factor 2: Observing

- Item 1. When I’m walking, I deliberately notice the sensations of my body moving
 - Item 6. When I take a shower or a bath, I stay alert to the sensations of water on my body
 - Item 11. I notice how foods and drinks affect my thoughts, bodily sensations, and emotions
 - Item 15. I pay attention to sensations, such as the wind in my hair or sun on my face
 - Item 20. I pay attention to sounds, such as clocks ticking, birds chirping, or cars passing
 - Item 26. I notice the smells and aromas of things
 - Item 31. I notice visual elements in art or nature, such as colours, shapes, textures, or patterns of light and shadow
 - Item 36. I pay attention to how my emotions affect my thoughts and behaviour
-

Factor 3: Acting with awareness

- Item 5*. When I do things, my mind wanders off and I’m easily distracted
 - Item 8*. I don’t pay attention to what I’m doing because I’m daydreaming, worrying, or otherwise distracted
 - Item 13*. I am easily distracted
 - Item 18*. I find it difficult to stay focussed on what’s happening in the present
 - Item 23*. It seems I am “running on automatic” without much awareness of what I’m doing
 - Item 28*. I rush through activities without being really attentive to them
 - Item 34*. I do jobs or tasks automatically without being aware of what I’m doing
 - Item 38*. I find myself doing things without paying attention
-

Factor 4: Describing

- Item 2. I am good at finding words to describe my feelings
- Item 7. I can easily put my beliefs, opinions, and expectations into words
- Item 12*. It’s hard for me to find the words to describe what I’m thinking
- Item 16*. I have trouble thinking of the right words to express how I feel about things
- Item 22*. When I have a sensation in my body, it’s difficult for me to describe it because I can’t find the right words
- Item 27. Even when I’m feeling terribly upset, I can find a way to put it into words
- Item 32. My natural tendency is to put my experiences into words

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

Factor 5: Nonjudging

Item 3*. I criticize myself for having irrational or inappropriate emotions

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

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

Item 17*. I make judgements about whether my thoughts are good or bad

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

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

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

Item 39*. I disapprove of myself when I have irrational ideas

Note. *Reverse-scored items.

Appendix M:

Parcelled Items of the FFMQ

FFMQ	Parcel 1	Parcel 2	Parcel 3
Factor 1: Nonreacting	<p>Item 33. When I have distressing thoughts or images, I just notice them and let them go</p> <p>Item 24. When I have distressing thoughts or images, I feel calm soon after</p> <p>Item 21. In difficult situations, I can pause without immediately reacting</p>	<p>Item 29. When I have distressing thoughts or images I am able just to notice them without reacting</p> <p>Item 4. I perceive my feelings and emotions without having to react to them</p>	<p>Item 9. I watch my feelings without getting lost in them</p> <p>Item 19. When I have distressing thoughts or images, I “step back” and am aware of the thought or image without getting taken over by it</p>
Factor 2: Observing	<p>Item 15. I pay attention to sensations, such as the wind in my hair or sun on my face</p> <p>Item 26. I notice the smells and aromas of things</p> <p>Item 31. I notice visual elements in art or nature, such as colours, shapes, textures, or patterns of light and shadow</p>	<p>Item 6. When I take a shower or a bath, I stay alert to the sensations of water on my body</p> <p>Item 20. I pay attention to sounds, such as clocks ticking, birds chirping, or cars passing</p> <p>Item 36. I pay attention to how my emotions affect my thoughts and behaviour</p>	<p>Item 1. When I’m walking, I deliberately notice the sensations of my body moving</p> <p>Item 11. I notice how foods and drinks affect my thoughts, bodily sensations, and emotions</p>
Factor 3: Acting with awareness	<p>Item 13*. I am easily distracted</p> <p>Item 28*. I rush through activities without being really attentive to them</p> <p>Item 38*. I find myself doing things without paying attention</p>	<p>Item 5*. When I do things, my mind wanders off and I’m easily distracted</p> <p>Item 23*. It seems I am “running on automatic” without much awareness of what I’m doing</p>	<p>Item 8*. I don’t pay attention to what I’m doing because I’m daydreaming, worrying, or otherwise distracted</p> <p>Item 18*. I find it difficult to stay focussed on what’s happening in the</p>

		Item 34*. I do jobs or tasks automatically without being aware of what I'm doing	present
Factor 4: Describing	Item 2. I'm good at finding words to describe my feelings Item 22*. When I have a sensation in my body, it's difficult for me to describe it because I can't find the right words Item 32. My natural tendency is to put my experiences into words	Item 7. I can easily put my beliefs, opinions, and expectations into words Item 12*. It's hard for me to find the words to describe what I'm thinking Item 27. Even when I'm feeling terribly upset, I can find a way to put it into words	Item 16*. I have trouble thinking of the right words to express how I feel about things Item 37. I can usually describe how I feel at the moment in considerable detail
Factor 5: Nonjudging	Item 17*. I make judgements about whether my thoughts are good or bad Item 25*. I tell myself that I shouldn't be thinking the way I'm thinking Item 35*. When I have distressing thoughts or images, I judge myself as good or bad, depending what the thought/image is about	Item 3*. I criticize myself for having irrational or inappropriate emotions Item 30*. I think some of my emotions are bad or inappropriate and I shouldn't feel them Item 39*. I disapprove of myself when I have irrational ideas	Item 10*. I tell myself I shouldn't be feeling the way I'm feeling Item 14*. I believe some of my thoughts are abnormal or bad and I shouldn't think that way

Note. *Reverse-scored items.

Appendix N:

Factor Items for the Trait TMS

Factor 1: Curiosity

- Item 3. I am curious about what I might learn about myself by taking notice of how I react to certain thoughts, feelings or sensations
- Item 5. I am curious to see what my mind is up to from moment to moment
- Item 6. I am curious about each of my thoughts and feelings as they occur
- Item 10. I remain curious about the nature of each experience as it arises
- Item 12. I am curious about my reactions to things
- Item 13. I am curious about what I might learn about myself by just taking notice of what my attention gets drawn to
-

Factor 2: Decentering

- Item 1. I experience myself as separate from my changing thoughts and feelings
- Item 2. I am more concerned with being open to my experiences than controlling or changing them
- Item 4. I experience my thoughts more as events in my mind than as a necessarily accurate reflection of the way things 'really' are
- Item 7. I am receptive to observing unpleasant thoughts and feelings without interfering with them
- Item 8. I am more invested in just watching my experiences as they arise, than in figuring out what they could mean
- Item 9. I approach each experience by trying to accept it, no matter whether it is pleasant or unpleasant
- Item 11. I am aware of my thoughts and feelings without overidentifying with them
-

Appendix O:

Parcelled Items of the Trait TMS

Trait TMS	Parcel 1	Parcel 2	Parcel 3
Factor 1: Curiosity	<p>Item 5. I am curious to see what my mind is up to from moment to moment</p> <p>Item 10. I remain curious about the nature of each experience as it arises</p>	<p>Item 3. I am curious about what I might learn about myself by taking notice of how I react to certain thoughts, feelings or sensations</p> <p>Item 6. I am curious about each of my thoughts and feelings as they occur</p>	<p>Item 12. I am curious about my reactions to things</p> <p>Item 13. I am curious about what I might learn about myself by just taking notice of what my attention gets drawn to</p>
Factor 2: Decentering	<p>Item 1. I experience myself as separate from my changing thoughts and feelings</p> <p>Item 4. I experience my thoughts more as events in my mind than as a necessarily accurate reflection of the way things ‘really’ are</p> <p>Item 9. I approach each experience by trying to accept it, no matter whether it is pleasant or unpleasant</p>	<p>Item 7. I am receptive to observing unpleasant thoughts and feelings without interfering with them</p> <p>Item 11. I am aware of my thoughts and feelings without overidentifying with them</p>	<p>Item 2. I am more concerned with being open to my experiences than controlling or changing them</p> <p>Item 8. I am more invested in just watching my experiences as they arise, than in figuring out what they could mean</p>

Appendix P:

Beck Anxiety Inventory

For each item below please indicate how much you have been bothered by that symptom during the past month by writing the number in the corresponding space next to each symptom.

0	1	2	3
Not at all	Mildly – but it didn't bother me much	Moderately – it wasn't pleasant at times	Severely – it bothered me a lot

- ___ 1. Numbness or tingling
- ___ 2. Feeling hot
- ___ 3. Wobbliness in legs
- ___ 4. Unable to relax
- ___ 5. Fear of worst happening
- ___ 6. Dizzy or lightheaded
- ___ 7. Heart pounding/racing
- ___ 8. Unsteady
- ___ 9. Terrified or afraid
- ___ 10. Nervous
- ___ 11. Feeling of choking
- ___ 12. Hands trembling
- ___ 13. Shaky
- ___ 14. Fear of losing control
- ___ 15. Difficulty in breathing
- ___ 16. Fear of dying
- ___ 17. Scared
- ___ 18. Indigestion
- ___ 19. Faint/lightheaded
- ___ 20. Face flushed
- ___ 21. Hot/cold sweats

Appendix Q:

Demographic Characteristics

1. What is your unique code number?
2. How old are you?
3. Are you male or female?
4. What is your ethnic background? (tick all that apply)

☐ Pakeha/European/New Zealander

☐ Maori

☐ Pacific Nations

☐ Asian

☐ Other
5. If you ticked other, please state your ethnicity:
6. What are you currently doing? (tick all that apply)

☐ School/Education

☐ Training

☐ Working

☐ Other
7. If you are studying, where are you studying?
8. If you ticked other, please list what you are currently doing:
9. What is your income range? If you're living as part of a family unit, please indicate (tick) your total household income:

☐ \$0 - \$25,000

☐ \$25,000 - \$50,000

☐ \$50,000 - \$75,000

☐ \$75,000 - \$100,000

☐ Above \$100,000

10. Where were you born?

___ New Zealand

___ Another country

11. If you ticked another country, where were you born?

12. If you were NOT born in New Zealand, how long have you lived in New Zealand?

13. Are you:

___ A New Zealand citizen

___ A New Zealand resident

___ Neither a NZ citizen or resident

14. Circle the option below that best represents how you rate your overall health at this present time

Very poor			Average			Excellent
1	2	3	4	5	6	7

Appendix R:

Positive and Negative Affect Scale

This scale consists of a number of words that describe different feelings and emotions. Read each item and then choose the appropriate answer next to that word (by circling the appropriate number). Indicate to what extent you have felt this way during the past week.

	Very slightly or not at all	A little	Moderately	Quite a bit	Extremely
1. Interested	1	2	3	4	5
2*. Distressed	1	2	3	4	5
3. Excited	1	2	3	4	5
4*. Upset	1	2	3	4	5
5. Strong	1	2	3	4	5
6*. Guilty	1	2	3	4	5
7*. Scared	1	2	3	4	5
8*. Hostile	1	2	3	4	5
9. Enthusiastic	1	2	3	4	5
10. Proud	1	2	3	4	5
11*. Irritable	1	2	3	4	5
12. Alert	1	2	3	4	5
13*. Ashamed	1	2	3	4	5
14. Inspired	1	2	3	4	5
15*. Nervous	1	2	3	4	5
16. Determined	1	2	3	4	5
17. Attentive	1	2	3	4	5
18*. Jittery	1	2	3	4	5
19. Active	1	2	3	4	5
20*. Afraid	1	2	3	4	5

Note. * = items measuring negative affect.

Appendix S:

Temporal Satisfaction With Life Scale

These statements concern your past, present, or future. Using the scale below, indicate your agreement with each statement by circling the appropriate number.

	Strongly disagree			Neutral			Strongly agree	
1. If I had my past to live over, I would change nothing	1	2	3	4	5	6	7	
2. I am satisfied with my life in the past	1	2	3	4	5	6	7	
3. My life in the past was ideal for me	1	2	3	4	5	6	7	
4. The conditions of my life in the past were excellent	1	2	3	4	5	6	7	
5. I had the important things I wanted in my past	1	2	3	4	5	6	7	
6. I would change nothing about my current life	1	2	3	4	5	6	7	
7. I am satisfied with my current life	1	2	3	4	5	6	7	
8. My current life is ideal for me	1	2	3	4	5	6	7	
9. The current conditions of my life are excellent	1	2	3	4	5	6	7	
10. I have the important things I want right now	1	2	3	4	5	6	7	
11. There will be nothing that I will want to change about my future	1	2	3	4	5	6	7	
12. I will be satisfied with my life in the future	1	2	3	4	5	6	7	
13. I expect my future life will be ideal for me	1	2	3	4	5	6	7	
14. The conditions of my future life will be excellent	1	2	3	4	5	6	7	
15. I will have the important things I want in the future	1	2	3	4	5	6	7	

Appendix T:

Savouring Beliefs Inventory

For each statement listed below, please circle the number that best indicates how true the particular statement is for you. There are no right or wrong answers. Please be as honest as you can.

	Strongly disagree		Neutral			Strongly agree	
1. Before a good thing happens, I look forward to it in ways that give me pleasure in the present	1	2	3	4	5	6	7
2. I feel a joy of anticipation when I think about upcoming good things	1	2	3	4	5	6	7
3. I can enjoy pleasant events in my mind before they actually occur	1	2	3	4	5	6	7
4. I can make myself feel good by imagining what a happy time that is about to happen will be like	1	2	3	4	5	6	7
5. I know how to make the most of a good time	1	2	3	4	5	6	7
6. When something good happens, I can make my enjoyment of it last longer by thinking or doing certain things	1	2	3	4	5	6	7
7. I feel fully able to appreciate good things that happen to me	1	2	3	4	5	6	7
8. It's easy for me to enjoy myself when I want to	1	2	3	4	5	6	7
9. I enjoy looking back on happy times from my past	1	2	3	4	5	6	7
10. I can make myself feel good by remembering pleasant events from my past	1	2	3	4	5	6	7
11. I like to store memories of fun times that I go through so that I can recall them later	1	2	3	4	5	6	7
12. It's easy for me to rekindle the joy from pleasant memories	1	2	3	4	5	6	7

Appendix U

Table U.1

Correlations between the FFMQ, Trait TMS, and Positive and Negative Outcome Measures at Time 1

	NJ	Des	Awa	Obs	NR	Dec	Cur	Dep	Anx	NA	SH	LS
NJ	-											
Des	.35**	-										
Awa	.40**	.40**	-									
Obs	.09	.36**	.22**	-								
NR	.41**	.29**	.35**	.30**	-							
Dec	.21**	.19**	.16**	.34**	.46**	-						
Cur	-.15	.20**	-.02	.36**	.07	.39**	-					
Dep	-.53**	-.29**	-.46**	-.08	-.43**	-.24**	.03	-				
Anx	-.47**	-.13*	-.46**	.03	-.35**	-.18**	.21**	.63**	-			
NA	-.46**	-.16**	-.40**	-.06	-.44**	-.21**	.13*	.70**	.67**	-		
SH	.51**	.27**	.39**	.20**	.44**	.29**	.02	-.63**	-.43**	-.49**	-	
LS	.40**	.23**	.35**	.19**	.36**	.31**	.07	-.57**	-.39**	-.40**	.63**	-
Sav	.20**	.28**	.19**	.31**	.21**	.15**	.14*	-.37**	-.16**	-.23**	.54**	.43**

Note. * $p < .05$, ** $p < .01$. All significant tests were one-tailed. NJ = nonjudging; Des = describing; Awa = acting with awareness; Obs = observing; NR = nonreacting; Dec = decentering; Cur = curiosity; Dep = depression; Anx = anxiety; NA = negative affect; SH = subjective happiness; LS = life satisfaction; Sav = savouring.

Table U.2

Correlations between the FFMQ, Trait TMS, and Positive and Negative Outcome Measures at Time 2

	NJ	Des	Awa	Obs	NR	Dec	Cur	Dep	Anx	NA	SH	LS
NJ	-											
Des	.28**	-										
Awa	.43**	.36**	-									
Obs	.08	.41**	.17**	-								
NR	.31**	.38**	.34**	.39**	-							
Dec	.17**	.21**	.09	.40**	.58**	-						
Cur	-.13*	.21**	-.05	.43**	.26**	.54**	-					
Dep	-.43**	-.29**	-.41**	-.12*	-.37**	-.17**	-.003	-				
Anx	-.36**	-.15**	-.41**	.09	-.29**	-.10	.13*	.58**	-			
NA	-.41**	-.17**	-.34**	-.09	-.34**	-.13*	.09	.68**	.58**	-		
SH	.47**	.33**	.35**	.25**	.38**	.28**	.09	-.58**	-.41**	-.48**	-	
LS	.34**	.23**	.29**	.26**	.35**	.29**	.17**	-.50**	-.34**	-.35**	.62**	-
Sav	.12*	.28**	.08	.33**	.20**	.15**	.14*	-.26**	-.08	-.11*	.47**	.43**

Note. * $p < .05$, ** $p < .01$. All significant tests were one-tailed. NJ = nonjudging; Des = describing; Awa = acting with awareness; Obs = observing; NR = nonreacting; Dec = decentering; Cur = curiosity; Dep = depression; Anx = anxiety; NA = negative affect; SH = subjective happiness; LS = life satisfaction; Sav = savouring.

Table U.3

Correlations between the FFMQ, Trait TMS, and Positive and Negative Outcome Measures at Time 3

	NJ	Des	Awa	Obs	NR	Dec	Cur	Dep	Anx	NA	SH	LS
NJ	-											
Des	.35**	-										
Awa	.46**	.34**	-									
Obs	.14*	.32**	.13*	-								
NR	.42**	.37**	.38**	.42**	-							
Dec	.24**	.23**	.11	.45**	.59**	-						
Cur	-.10	.22**	-.14*	.41**	.23**	.52**	-					
Dep	-.40**	-.34**	-.41**	-.11	-.36**	-.15**	.02	-				
Anx	-.39**	-.22**	-.46**	.02	-.30**	-.11	.15**	.65**	-			
NA	-.44**	-.23**	-.45**	-.10	-.33	-.16**	.10	.65**	.59**	-		
SH	.46**	.35**	.42**	.23**	.41**	.27**	.09	-.54**	-.37**	-.46**	-	
LS	.39**	.26**	.42**	.20**	.37**	.27**	.14*	-.45**	-.29**	-.39**	.59**	-
Sav	.19**	.32**	.14*	.24**	.21**	.12*	.18**	-.30**	-.08	-.23**	.49**	.40**

Note. * $p < .05$, ** $p < .01$. All significant tests were one-tailed. NJ = nonjudging; Des = describing; Awa = acting with awareness; Obs = observing; NR = nonreacting; Dec = decentering; Cur = curiosity; Dep = depression; Anx = anxiety; NA = negative affect; SH = subjective happiness; LS = life satisfaction; Sav = savouring.

Appendix V

Table V.1

Goodness-of-Fit Statistics for the Positive and Negative Outcome Variables Predicting Mindfulness

	χ^2	RMSEA	sRMR	CFI
Positive outcomes → FFMQ	14.01	.20	.04	.91
Positive outcomes → Decentering	5.03	.11	.03	.95
Positive outcomes → Curiosity	3.27	.08	.02	.98
Negative outcomes → FFMQ	7.99	.15	.03	.94
Negative outcomes → Decentering	2.48	.07	.02	.98
Negative outcomes → Curiosity	1.77	.05	.02	.99

Note. χ^2 = chi-square; RMSEA = Root Mean Square Error of Approximation; sRMR = standardised Root Mean Square Residual; CFI = Comparative Fit Index; Decentering and Curiosity are the two factors of the Trait TMS.

Table V.2

Parameter Estimates for Parallel Processing Latent Growth Curve Models for Positive and Negative Outcomes Predicting Mindfulness

	Estimate	SE	β	Significance
Positive outcomes → FFMQ				
1. Intercept → intercept	.41	.03	.67	$p < .001$
2. Intercept → slope	.01	.02	.05	$p = .51$
3. Slope → intercept	.31	.15	.15	$p < .01$
4. Slope → slope	.25	.07	.37	$p < .001$
Positive outcomes → Decentering				
1. Intercept → intercept	.32	.05	.44	$p < .001$
2. Intercept → slope	-.01	.03	-.04	$p = .74$
3. Slope → intercept	.45	.48	.12	$p = .35$
4. Slope → slope	.31	.25	.29	$p = .22$
Positive outcomes → Curiosity				
1. Intercept → intercept	.18	.07	.16	$p < .05$
2. Intercept → slope	.03	.03	.14	$p = .33$
3. Slope → intercept	.45	.71	.08	$p = .52$
4. Slope → slope	.34	.27	.33	$p = .21$
Negative outcomes → FFMQ				
1. Intercept → intercept	-.41	.04	-.63	$p < .001$
2. Intercept → slope	-.01	.02	-.01	$p = .41$
3. Slope → intercept	.11	.36	.03	$p = .77$
4. Slope → slope	-.25	.15	-.24	$p = .11$
Negative outcomes → Decentering				
1. Intercept → intercept	-.24	.06	-.33	$p < .001$
2. Intercept → slope	.02	.03	.12	$p = .38$
3. Slope → intercept	.36	.57	.09	$p = .54$
4. Slope → slope	-.15	.29	-.15	$p = .60$
Negative outcomes → Curiosity				
1. Intercept → intercept	.22	.08	.20	$p < .01$
2. Intercept → slope	-.02	.03	-.10	$p = .52$
3. Slope → intercept	.41	.82	.07	$p = .62$
4. Slope → slope	-.01	.32	-.01	$p = .99$

Note. Decentering and Curiosity are the two factors of the Trait TMS; SE = standard error; β = standardised regression coefficients.