Ngā mea kōaro o ngā wā tamarikitanga, Te taumahatanga o aua mea Me ētahi mahi whakaora hinegaro mō ngā wāhine Māori

Adverse childhood experiences, HPA axis functioning and culturally enhanced mindfulness therapy among Māori women in Aotearoa New Zealand.

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Ko Tongariro me Tararua ngā pāe maunga,

Ko Taupo-nui-ā-Tia te moana

Ko Manawatū te awa

Ko Te Arawa me Tainui ngā waka

Ko Ngāti Tūwharetoa me Ngāti Raukawa ngā iwi

Ko Ngāti Rongomai, Ngāti Hine, Ngāti Whakatere, me Ngāti Takihiku ngā hapū

Ko Rongomai, Korohe, Whakawehi-Poutu, me Kereru ngā marae

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Tihei Mauri ora

Nā tō rourou, nā taku rourou ka ora ai te iwi

With your food basket and with my food basket, the people will thrive

ABSTRACT

Chronic health conditions such as obesity, type II diabetes, cardiovascular disease, depression and anxiety are prevalent among Māori women in New Zealand, as are adverse experiences in childhood and chronic stress. Recent studies have shown a link between adverse childhood experiences (ACEs) and chronic health problems later in life. Many of those studies propose that dysregulation in the stress response system - specifically the hypothalamic-pituitary-adrenal (HPA) axis - mediates that link. Cortisol is the primary corticosteroid released by the HPA axis and is commonly used as a biomarker for assessing HPA axis functioning. Mindfulness-Based Stress Reduction (MBSR) is a therapy that uses a range of breathing techniques, stretches, formal meditations and awareness exercises designed to help regulate the stress response by changing the way the brain manages and relates to stress. Due to its Eastern roots, MBSR therapy assumes an holistic view of health that mirrors some of the key concepts promoted in Te Ao Māori. This research tested the HPA axis functioning of eight adult Māori women who had experienced high ACEs, and explored associations between cortisol dysregulation, visceral obesity (a risk factor for many chronic health conditions) and psychological distress. This research also tested the clinical effectiveness and cultural responsiveness of an MBSR course that had been enhanced to suit a Māori audience. Participants provided pre, mid and post-treatment salivary cortisol samples that measured changes to their acute stress cortisol response, as well as changes to their daily cortisol slope, their cortisol awakening response and their overall cortisol levels. They also provided pre and post-treatment waist circumference measurements. Self-report data assessing depression and anxiety levels, PTSD levels, stress eating habits, perceived stress levels and mindful awareness levels, was collected, as was qualitative data in the form of pre and post-treatment interviews. The results indicated that culturally enhanced MBSR therapy was well received with this sample of Māori women and that the participants reported a wide range of benefits as a result of practicing mindfulness meditation.

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Glossary of Māori words

Māori	Indigenous New Zealander
Pākeha	New Zealander of European descent
Aotearoa	The Māori name for New Zealand
Te Reo Māori	The Māori language
Whānau	Family, extended family, kin networks
Tangi	Traditional Māori funeral that lasts 3-days
Whanaungatanga	Togetherness, relationship
Tangata whaiora	Mental health consumer
Te tiriti o waitangi	Māori version of the Treaty of Waitangi
Reo me ona tikanga	Māori language and traditions
Te kohanga reo	Māori language immersion early childhood care
The waitangi tribunal	Entity charged with addressing Treaty breaches
Tāne	Men, man, male
Marae	Māori meeting ground
Karanga	Ceremonial call performed by women
Ia	He, she, him, her, it
Tipuna	Ancestor(s)
Koro	Grandfather, old man
Kaupapa maori	Māori approach, Māori agenda
Te rau puawai	Mentorship programme for Māori studying health
He korowai oranga	The Māori health strategy
Te whare tapa wha	Model of Māori health
Whare	House
Te taha tinana	The physical side of being
Te taha wairua	The spiritual side of being
Te taha hinengaro	The mental side of being
Te taha whanau	The social side of being
Io	Supreme being
Mauri	Life principle, energy
Ātua	Gods, deities
Papatuanuku	Earth mother
Ranginui	Sky father
Whakapapa	Ancestry, lineage, genealogy, history
Hui	Meeting, gathering
Kaumatua	Elder, wise person
Tikanga	Māori traditions, protocols, practices, rituals
Pōwhiri	Traditional Māori welcome onto a marae
Karakia	Prayer, incantation
Mihimihi	Formal way of greeting another
Kai	Food, eating
Manaakitanga	Sharing, kindness, hospitality, collaboration
Awhi	Support, help
Whakamā	Shame, embarrassment
Tangata whenua	People of the land (Māori)
Tohunga	Expert, healer

Kura kaupapa	Māori immersion special character school
Waiata	Song, singing
Awhinatanga	Ongoing support
Pepeha	Way of introducing yourself in Māori
Karakia kai	Blessing the food before eating it
Koha	Gift
Kaitiaki	Guardian
Wharenui	Māori meeting house
Hau	Breath of spirit
Hongi	Ritual involving pressing noses together
Te ao māori	The Māori world
Tinana	Body
Ha a kui ma a koro ma	Breath of our ancestors living on through us
Ha taonga tuku iho	Breath handed down across generations
Utu	Reciprocity
Aroha	Love
Hariru	Greeting one another with hongi or handshake
Tapu	Sacred
Whakamā	Shame

Chapter 1 - Pākeha New Zealanders live longer than Māori

1.1 Outline and Aims

This chapter introduces the research project and uses personal experience to provide context for the investigations that follow. The chapter briefly discusses the current health status of Māori[1] in relation to Pākeha[2] New Zealanders, it introduces the content of each subsequent chapter and provides a summary of the research questions explored within this study.

1.2 Personal context

As the third born daughter of a Māori man and a Pākeha woman, I have spent many years making connections between the many disparate worlds that inform my existence. My mother is the middle of three children who grew up in 1950's rural Aotearoa[3] New Zealand at a time when all pubs closed at 6:00pm, and some refused to serve drinks to Māori (Christoffel, 2013; Hutt, 2003). My father is the eldest of eight children who were also raised at that time - a time when te reo Māori[4] was not even recognised as an official language of Aotearoa New Zealand (New Zealand Government, 2018). On my mother's side of the family, we recently lost an aunt who lived to the age of 105 and an uncle who lived to the age of 98. Mum's own mother (my grandmother) lived until the age of 82. However Dad's mother, (my Nana), like 15 of her 20 siblings, died before the age of 60 at a time when the average Pākeha New Zealander was expected to live for at least 70 years (Ministry of Health, 2018e).

Te reo Māori was the first language spoken by both of my paternal grandparents, yet my father barely heard a word of it growing up, because when his parents were at school, they, like many other Māori, had been beaten by their teachers for speaking Te reo Māori and for engaging in traditional Māori practices (Selby, 2014).

[1] Māori = Indigenous New Zealander
[2] Pākeha = New Zealander of European descent
[3] Aotearoa = The Māori name for New Zealand
[4] Te Reo Māori = The Māori language, made an official language of New Zealand in 1987

Thus, he never learned to speak his native language. However, Dad was raised with traditional, collectivistic Māori values, which placed family loyalty above all other pursuits. This largely explains why 60 years later, he and six of his siblings still live in or near their hometown of Shannon, Horowhenua (pop.1506) (Statistics New Zealand, 2013).

Through my father, I am connected to a large whānau[5] of Māori, most of whom are expected to live an average of seven years less than the family members on my mothers' side - simply because they are Māori (Ministry of Health, 2018e). The statistics imply that most of their deaths will be preceded by chronic disease (Ministry of Health, 2018f).

As an adolescent, I watched as over the course of several years, my father changed from being a relatively healthy 41 year old Māori male, to becoming obese, being diagnosed with Type II diabetes, developing hypertension and heart disease, and battling serious mental health issues. He was eventually diagnosed with Cushing's Disease – an illness characterised by excess levels of the steroid hormone, cortisol (Adina et al., 2018). Following this, he underwent transphenoidal surgery to remove a pituitary adenoma, which stopped his body from producing too much cortisol - after which most of his symptoms were reversed. In the twenty years since his operation it has become widely known that cortisol plays an important part in regulating almost every major system in the body. Notably, cortisol is produced in response to waking, in response to exercise, and in response to acute stress (Bianchi & Esposito, 2012).

Three years prior to becoming sick, my father had resigned from his job and taken over the leadership of a prominent local church. At the same time, he had enrolled as a student at Bible college. Notably, his change in vocation prompted a significant drop in income for the family, for the church leadership position was an unpaid one. One month after starting his position at the church, his grandmother died. Eight weeks after that, his wife gave birth to their fourth child. Ten days after the baby

[5] Whānau = Family, extended family, kin networks

arrived, his mother died suddenly, and being a church minister, he presided over her tangihanga.[6] Suffice it to say, he experienced more stress in that one year than some might experience in a decade.

In the years since his surgery, Dad has for the most part, enjoyed reasonable health. However, two years ago he was diagnosed with end stage renal failure, as well as prostate cancer, and he now spends four and a half hours per day attached to a dialysis machine. He is 65 years old.

Consistent with the nationwide Māori health statistics, chronic disease and premature death has featured prominently in my Māori family history and continues to do so. Even while writing the final draft of this thesis we received news that Dad's youngest brother had died suddenly of a stroke. He was 51. The average life expectancy of a Māori man is presently 73 years. The average life expectancy of a Pākeha man is 80 years (Ministry of Health, 2018e).

1.3 Health and social disparities between Māori and Pākeha New Zealanders

Health and social disparities between Māori and Pākeha New Zealanders mirror those of indigenous in other countries (Oetzel et al., 2017). Like First Nations people in Canada, aboriginal people in Australia and the Torres Strait Islands, American Indian, Native Alaskan and Native Hawaiian men and women in the United States, the indigenous people of Aotearoa New Zealand are also over-represented in the prison population, in rates of unemployment, in levels of homelessness and poverty, in low rates of educational attainment and, in high rates of alcoholism, drug addiction, and mental health problems (Anderson et al., 2006; Jackson-Pulver, Haswell, Ring, Waldon, & Clark, 2010; Reading & Wien, 2009; Ring & Brown, 2003). However, nowhere are disparities more clearly seen than in the life expectancy rates between the two ethnic groups.

[6] Tangihanga = Māori funeral ceremony that typically lasts for three days.

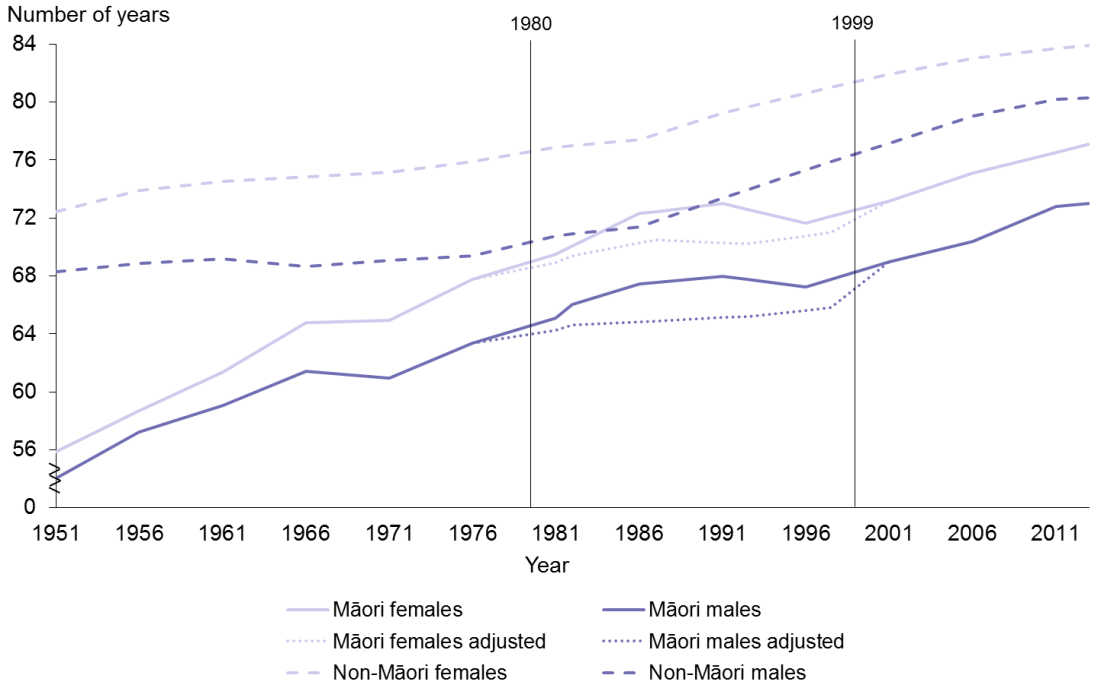


Figure 1.1 Life expectancy rates for Maori and non-Maori. Dotted line shows adjustments for undercounting during the years 1980-1999. Reprinted from Ministry of Health (2018e).

Historically, such knowledge has been used to argue that negative indigenous health and social outcomes must be genetic in origin (Lundy, 2002; Paradies, Montoya & Fullerton, 2007) or that indigenous peoples experience poor health simply because they make poor lifestyle choices, such as eating nutrient-deficient foods and smoking (Whelan & Wright, 2013). Such explanations are convenient because they absolve those in power of the responsibility to prioritise the wellbeing of indigenous communities (Abdolhosseini et al., 2016). In the case of Māori however, the genetic argument simply does not hold. Early records suggest that prior to colonisation, Māori showed exemplary health characterised by 'great muscular strength' (Nicholas & Marsden, 1817, p.230) and an absence of any 'eruption upon the skin or the least mark which indicated that such a mark had formerly existed' (Kippis, 1842, p.81). Moreover, the life expectancy of Māori in the early 1800's of approximately 30 years, was considered equal to or greater than that of Europeans (Pool, 2011). But within 100 years of regular colonial contact, the life expectancy from birth for Māori women had decreased to 23 years, while the life expectancy from birth for Pākeha women had increased to 55 years of age (Pool &

Jackson, 2011). Although most of this disparity is attributable to communicable diseases, 128 years later in 2018, Māori women still live an average of seven years less than non-Maori and most of that disparity is because of preventable, chronic disease (Ministry of Health 2018e; Ministry of Health, 2018f).

1.4 Factors influencing disparity

While it is widely accepted that the health and social disparities in New Zealand are in some way linked to the devastating effects of British colonisation (frequently known as *historical trauma*), the exact mechanisms through which colonisation continues to exert its effects upon Māori are not explicitly known. This has caused some health professionals to question the relevance of historical trauma as a contributing agent (Oetzel et al., 2017).

Life-style choices and poverty are obvious targets for justifying disparities because Māori are three times more likely than non-Maori to smoke cigarettes and two times more likely to drink heavily (Ministry of Health, 2018a; Ministry of Health, 2018k). Māori are also two times more likely to become obese and they are also more likely to self harm (Ministry of Health, 2018i; Ministry of Health, 2018j). Combined with statistics showing that disproportionately more Māori are homeless, unemployed or living in crowded housing conditions (Marriott & Sim, 2014), it is easy to assume that the reason Māori do not live as long as their Pākeha counterparts is because of their neglectful health behaviours and unfortunate life circumstances.

However, a growing body of evidence indicates that there may be another factor underlying many of these health disparities. Emergent research from Australia suggests that chronic exposure to *psychosocial stress* might be one of the defining differences between indigenous and non-indigenous peoples the world over (Berger et al., 2017). In addition, *chronic psychosocial stress* may be the point at which historical trauma, social conditions and health risk behaviours all converge to promote chronic disease, ultimately leading to early death.

1.5 My own positioning

My father's illness sparked a long term interest in the steroid hormone cortisol and in the role it plays in maintaining physical and mental health. Indeed, that experience largely contributed to my decision to become a Clinical Psychologist. Having recently completed a clinical psychology training programme however, I am now trained to view the world through a clinical lens that encourages researchers to be impartial, to view behaviours as clusters of symptoms, then to frame them as evidence of psychopathology and see people as individuals who are solely responsible for the quality of their lives and health. While the clinical paradigm has many merits and has helped countless individuals find resolution to their health problems, it is also a paradigm that contrasts with the collectivistic cultural orientation in which I was raised - an orientation that places relationships and whanaungatanga[7] ahead of cost-saving and career advancement.

I did not want this study to perpetuate models of health that blame Māori for their social status. Nor did I want to ignore the contribution that adopting health risk behaviours has had on the health of many Māori. For that reason, this study represents a unique integration of both Western and indigenous ways of seeing the world, and ways of gathering and analysing knowledge. My position recognises the value of multiple methods of data collection. To that end, this study uses biological markers of health to assess physiological well-being and combines that with knowledge and insight gained from self-report psychological measures as well as in-depth interviews, which honor the lived experience of each participant. My hope is that by conducting research in this way, the relationships built during this study will last well beyond the life of this project.

1.6 A word on language

In the service of promoting bi-cultural research practices, this thesis utilises both English and Māori terms, some of them interchangeably. Terms that are commonly

[7] Whanaungatanga = From the root word whānau meaning togetherness, relationship

used throughout include *wāhine* (the Māori word for woman or women), *kōrero*, (which means talk or speech), and *whānau,* (the word Māori use to denote family). The term Pākeha is used to denote a New Zealander of European descent. The term non-Māori is used when referring to a New Zealander who is not Māori, but who may not necessarily be of European descent. In recognition of the fact that our country has two names, the term *Aotearoa New Zealand* is used throughout. Translations of all Māori terms are provided in the glossary, and definitions of Māori words that are used infrequently, can be found in footnotes at the bottom of the page on which they are used.

Of note for this work, the term psychopathology has been largely discarded in favor of the term *psychological distress*, to challenge the assumption that mental illness resides solely within the individual and necessarily represents a 'fault' within them. In line with a growing number of clinicians who are adopting more compassionate language when working with tangata whaiora[8], psychological distress is used herein to describe persistent and distressing mental experiences which often follow from extremely adverse life circumstances - regardless of whether or not they meet DSM-5 criteria for mental disease (Drapeau, Marchand, & Beaulieu-Prevost, 2012).

1.7 Thesis structure

Unlike most scientific PhD dissertations, this thesis breaks form by placing the personal context alongside discussions of societal-level problems. This thesis also begins and ends with direct references to myself and my family. While this might invite criticism from those immersed in traditional modes of scientific research, it is worth noting that the status quo is failing the indigenous people of Aotearoa New Zealand, and that continuing to conduct and present research the way it has always been done, may not necessarily be in the best interest of many Māori. Therefore, this study offers a novel approach to both research presentation and service delivery that prioritises Māori well-being ahead of Western ideals of impartiality.

[8] Tangata whaiora = Mental health consumer

1.8 The present study

The present study is comprised of two parts - both of which build on knowledge gained from watching my father's health journey. The first part explores links between stress exposure and poor health outcomes, and draws on emergent evidence which suggests that stress is not equally distributed across sectors of society i.e., those who are socially disadvantaged are not only exposed to more stress throughout the lifespan but they are often also more vulnerable to the adverse psychological and physiological effects of that stress (Gibson et al., 2014; Hammen, 2006).

The second part acknowledges that poor health is only a partial contributor to the problem of chronic disease and early death among Māori. For alongside the health disparities, there are differences in the quality of health care offered to Māori, as well as differences in the way that health services are delivered to Māori. Several researchers have documented that the pathway for Māori through the public health system is longer and slower than it is for non-Maori (Reid & Robson, 2006; Jansen & Smith, 2006) because Māori face barriers at every level of the health-care system (Russell, Smiler, & Stace, 2013).

The present study attempts to address these issues using multiple investigations to examine different aspects of the problem. One investigation looks at associations between adverse childhood experiences, cortisol dysregulation, and psycho-physiological determinants of health. The other investigation tests the effectiveness of a novel mind-body intervention that has been infused with Māori tikanga.

This study uses the adverse childhood experiences (ACE) model to detail the progression from historical trauma through to chronic disease and early death. It also uses the allostatic load model to argue that factors such as historical trauma, health-risk behaviours and childhood adversity all converge on a common theme, namely chronic, cumulative psychosocial stress. Building on the hypothesis that

chronic activation of the neuroendocrine stress response system contributes to long-lasting physiological damage, this study also tests the effectiveness of a culturally enhanced mindfulness intervention designed to reduce stress activation by calming the arousal response. To that end, this study presents the findings from an experiment in which eight Māori women with histories of childhood adversity completed a culturally enhanced mindfulness based stress reduction course.

At its essence, this is a Māori centred research project that draws on my experience as a wāhine of both Māori and Pākeha descent, as a Clinical Psychologist who was raised with highly collectivistic values, as a member of a whānau bereft of elders, and as a New Zealander who has worked in three different government agencies that all provided inadequate services for Māori. My experience has taught me that there is an urgent need for research that can offer immediate benefits to Māori, and for health services that prioritise Māori wellbeing. For those reasons the following project sought to answer the following three research questions.

1. How frequently would the following outcomes co-occur in Māori women who have reported a high number of adverse childhood events (ACEs):

a. chronic life stress
b. cortisol dysregulation
c. visceral obesity
d. psychological distress

2. How would a group of Māori women with high ACE scores respond to a culturally enhanced Mindfulness Based Stress Reduction course?

3. How would a culturally enhanced mindfulness-based intervention influence the psychological and physiological profiles of Māori women with high ACE scores?

1.9 Chapter outline

Chapter 2 offers a brief foundation for understanding key concepts such as stress, the stress response system and cortisol dysregulation. It also introduces the two main models upon which this study is built, namely the adverse childhood experiences (ACE) pyramid and the allostatic load model. Chapter 3 takes recent figures released from Statistics New Zealand and uses them to show how the two models are useful in understanding disparities between Māori and non-Māori today. Chapter 4 outlines problems within the New Zealand health-care system that contribute to high rates of chronic disease and early death among Māori. Chapter 5 offers potential solutions to those problems and introduces the concept of mindfulness meditation. Chapter 6 outlines the research questions in more detail and provides an overview of the methods used to answer each question. Chapter 7 presents the structure and content of the culturally enhanced mindfulness intervention tested within this project. Chapter 8 details the methods used in conducting the study. Chapter 9 presents the case studies of the eight Māori women who participated in the project. Chapter 10 draws together their results and discusses them in context of the research questions. It also outlines the strengths and limitations of the project and points to future directions for research. Chapter 10 ends with a personal reflection that discusses the process of completing this project.

Chapter 2 - Chronic stress contributes to early death

2.1 Outline and Aims

This chapter provides an overview of stress and the stress response system and discusses the importance of the body's primary steroid hormone, cortisol. It also introduces the adverse childhood experiences (ACE) pyramid and the allostatic load model, both of which aid understanding of how chronic stress can contribute to early death.

2.2 The stress response system

The human stress response system is comprised of two neuroendocrine systems that serve complimentary functions aimed at maintaining homeostasis (balance) within the body (Fink, 2016; Friedman, 2002; Kalat, 2007). When those systems are compromised - as sometimes happens under conditions of extreme stress - the health consequences can be devastating (McEwen, 2016). Those two systems are the sympathetic nervous system (SNS) and the hypothalamic-pituitary-adrenal axis (HPA axis) (Kalat, 2007). Where the SNS is fast acting and provides an immediate, brief, emergency response to stress, the HPA axis is slower acting and dominates in conditions of prolonged stress (Fink, 2016; Kalat, 2007).

2.2.1 The short term-stress response

Whenever humans appraise a situation as threatening, their emergency response system (the SNS) is activated (McEwen, 2016). That activation triggers the release of a complex sequence of hormones that includes the catecholamine agents epinephrine and norepinephrine, as well as corticotrophin-releasing-factor (CRF). CRF prompts the pituitary gland (located at the base of the brain) to release adrenocorticotrophin hormone (ACTH), which then triggers the adrenal glands to secrete cortisol (Buckingham, Cowell, Gillies, Herbison, & Steel, 1997).

Cortisol prepares the body for fight/flight/faint/freeze behaviours by flooding the bloodstream with glucose (sugar), which then supplies the large muscles of the body with an immediate source of energy (Kalat, 2007). Cortisol also inhibits insulin production, which encourages the body to use up the excess glucose (Friedman, 2002). Cortisol helps the body to fight inflammation by suppressing functions that are not immediately essential (such as reproduction) and inhibiting the release of cytokines (proteins that tell other cells to fight infection), which in the short term, has an anti-inflammatory effect (Friedman, 2002; Sapolsky, Romero, & Munck, 2000). Cortisol elevations enhance memory formation, which is thought to help an individual remember situations that have proved to be threatening or dangerous (Sapolsky, 2002). Cortisol also causes the arteries to narrow, which contributes to the blood being pumped harder and faster (Friedman, 2002). This increase in vascular responsiveness enables the body to move more quickly (McEwen, 2016). Negative feedback loops ensure that when the stressful situation has resolved, hormone levels return to normal, which protects the body and the brain from damage caused by prolonged steroid exposure (Buckingham, Cowell, Gillies, Herbison, & Steel, 1997).

Figure 2.1 The hypothalamic-pituitary-adrenal axis. Reprinted from Kalat (2007).

In the event of a near miss car accident, one might recognise this cascade of events is happening when their heart starts thumping loudly, their hands become clammy as blood is drawn away from the extremities and directed towards their vital organs, they feel light-headed or faint, and/or they experience that familiar ‘rush’ of adrenalin, which provides a surge of energy that enables them to run from, or fight the imminent danger. This sequence of events is usually experienced psychologically as either anxiety or excitement (Kalat, 2007).

Notably, many people experience those same sensations when standing in front of a group of people giving a talk. The reason for this, is that even though the risk of imminent physical threat is generally low when speaking in public, for humans, social acceptance and belonging is as critical to our survival as physical safety is, and there are few situations where one is more vulnerable to being evaluated negatively than when they have the full attention of an audience (Dickerson & Kemeny, 2004). Thus, the human brain appraises situations that present a major physical threat (e.g., a car crash) and situations which present a major social evaluative threat (e.g., public speaking) in similar ways (Zoccola, Woody, Dickerson, & Hooker, 2018). Once a threat to survival has been appraised, a physiological, neuroendocrine response is triggered regardless of whether that threat is physical or psychosocial (Dickerson & Kemeny, 2004). This has implications for groups of people who tend to experience more of both types of threat than others, such as Māori.

2.2.2 The long term stress response

As mentioned, the second part of the stress response system - the HPA axis - dominates under conditions of ongoing stress, such as living with an abusive partner (Kalat, 2007). The HPA axis regulates levels of cortisol in the bloodstream (Sapolsky, 2002). Recall that cortisol is vital for maintaining many of the body’s regulatory functions. As such, cortisol can influence weight gain, obesity, blood sugar levels and diabetes development, as well as impact the immune system, gastrointestinal and cardiovascular health (Sapolsky, Romero, & Munck, 2000).

2.2.3 An introduction to cortisol

Cortisol exerts many effects over the body. It can influence the types of food a person is likely to crave when they feel stressed, as well as how much of that food they are then likely to eat (Dallman, Pecoraro, & Warne, 2006). Cortisol levels can influence the way in which food is metabolised making it more likely that food will be stored as fat (Tomiyama, Dallman, & Epel, 2011). Cortisol can also influence where on the body that fat is stored (namely, around the middle), which is particularly hazardous, because too much of that type of fat (visceral obesity) drastically increases the risk of developing metabolic diseases like Type II diabetes - a chronic health condition in which Māori are especially overrepresented (Dallman, Pecoraro, & Warne, 2006; Ministry of Health, 2017a).

2.2.4 Prolonged cortisol exposure

While exposure to an acute stressor triggers a highly adaptive increase in cortisol levels (resulting in high blood sugar, increased insulin resistance, enhanced inflammatory capability, reduced cytokine release, enhanced memory and increased vascular responsiveness), prolonged cortisol exposure damages the machinery of the body and the brain (McEwen, 2016). Long term cortisol exposure suppresses the immune system, making the body less resilient to bugs and increasing cancer risk (McEwen, 2008), it damages hippocampal neurons leading to memory loss (Sapolsky, Uno, Rebert, & Finch, 1990), it causes plaque to build up in the arteries increasing risk of heart disease and stroke (Cortisol, 2018), it increases insulin resistance and maintains high blood sugar contributing to weight gain and Type II diabetes (McEwen, 2008). It can also irritate the lining of the stomach, increasing the risk of developing gastrointestinal illnesses (Wallace et al., 2011). Thus, high cortisol levels can be said to be adaptive only in the short term.

Under conditions of chronic or repeated stress, the stress response system may sometimes ‘wear out’ in order to prevent damage to the brain and body resulting in

stress-induced *hypo-cortisolism*, or it may maintain high levels of cortisol, which results in *hyper-cortisolism* – the condition my father had.

Chronically high levels of cortisol are commonly associated with mood and anxiety-related issues, visceral obesity, high blood pressure and insulin resistance (Tabarin, 2018). Chronically low levels of cortisol are associated with post-traumatic stress disorder, visceral obesity, chronic fatigue syndrome, fibromyalgia, chronic pain, depression, and rheumatoid arthritis (Heim, Ehlert, & Hellhammer, 2000; Maripuu, Wikgren, Karling, Adolfsson, & Norrback, 2016).

Thus, when cortisol levels become dysregulated too often and for too long, the body is placed at increased risk of becoming obese, developing certain cancers, developing Type II diabetes, hypertension, heart disease and cerebrovascular disease (McEwen, 2008). Those are all chronic health conditions that disproportionately affect Māori (Ministry of Health, 2017b). Moreover, cancer, diabetes, heart disease and stroke account for 77% of all Māori deaths (Ministry of Health, 2018f). The implication of this, is that over three quarters of premature Māori deaths are preventable, and might be linked to chronic stress and subsequent disruption of the neuroendocrine stress response system.

Cortisol dysregulation can be measured using saliva samples, which are non-invasive and provide an accurate way of assessing HPA axis functioning (Bozovic, Racic, & Ivcovic, 2013). The three HPA axis measurements most commonly used in neuroendocrine research are the *cortisol awakening response*, the *diurnal slope* and the cortisol response to *acute stress*.

2.2.5 Cortisol awakening response (CAR)

In healthy individuals, cortisol levels start to rise during the late stages of sleep, then rapidly increase in response to waking (Miller, Shapiro, Han, Margolin, & Arbel, 2018). This is known as the cortisol awakening response (CAR). Levels typically increase from 50-160%, reaching their daily peak approximately 30-40 minutes after

waking (Miller et al., 2016). Approximately 60-75 minutes after reaching that peak, cortisol levels return to baseline across the day (Wolkowitz & Rothschild, 2003). As yet, the exact function of the CAR remains unclear. However it is speculated that the rise in cortisol levels helps to stimulate waking (Ice & James, 2007). Among stress researchers there is wide agreement that the CAR represents a discrete aspect of the circadian rhythm of cortisol that appears to be moderately stable within individuals over time. However the CAR can vary in relation to short-term influences such as acute stress or shift-work, as well as long term influences such as chronic stress, burnout and depression (Luecken & Gallo, 2008). A blunted cortisol awakening response (<50% increase in levels in the first 30 minutes of waking) is typical of a hypo-cortisolemic profile and is often associated with work stress (Fries et al., 2005), atypical depression (Bremmer et al., 2007), chronic fatigue syndrome (Torres-Harding et al., 2008) fibromyalgia (Riva, Mork, Westgaard, Ro, & Lundberg, 2010), post traumatic stress disorder (Heim, Meinlschmidt, & Nemeroff, 2003) hyperthyroidism, rheumatoid arthritis (Edwards & Guilliams, 2010), visceral obesity (Tomiyama, Dallman, & Epel, 2011), burnout (Juster et al., 2011) and metabolic syndrome (Luecken & Gallo, 2008).

2.2.6 Cortisol daily slope (DS)

Another measure of HPA axis functioning is the daily cortisol slope. In healthy individuals following normal daily schedules, cortisol levels reach their morning peak 30-40 minutes after waking then fall throughout the day, reaching an evening nadir between 2000hr and 0200hr (see Figure 2.2) (Luecken & Gallo, 2008). This diurnal pattern of cortisol provides important clues as to the functioning of the HPA axis. Specifically, a lack of steepness (flattening) in the decline of cortisol levels from morning to evening has been shown to reliably reflect a variety of disorders, including those mentioned above in section 2.2.5 (Ice & James, 2007).

Figure 2.2. Average cortisol levels over three days for 48 volunteers aged over 65 and living in the Twin Cities Greater Metropolitan area, Minnesota, USA. Reproduced from Luecken & Gallo, (2008).

2.2.7 Cortisol response to acute stress (AS)

In healthy individuals cortisol levels show a rapid increase upon exposure to acute stress (Luecken & Gallo, 2008). Within five minutes of exposure to a stressor, ACTH levels start to rise. They peak approximately 11-20 minutes from the time of stressor onset. In concert with this, cortisol levels also increase, reaching a plasma peak 20-40 minutes after stress exposure (Dickerson & Kemeny, 2004). This rise often appears in saliva samples approximately ten minutes after stress exposure (Bozovic, Racic, & Ivkovic, 2013). After termination of the stressor, cortisol levels return to baseline - a process which takes approximately one hour (Leucken & Gallo, 2008). In hypo-cortisolism, cortisol levels fail to rise leading to an inadequate physiological stress response. Other patterns of dysregulation include failure of cortisol shut-down once the stressor has resolved, and excessive output of cortisol in response to acute stress exposure (hyper-cortisolism) (McEwen, 2016).

To summarise, cortisol dysregulation in the form of hyper-cortisolism (too much) or hypo-cortisolism (too little) can often follow exposure to chronic stress. Both conditions are associated with visceral obesity (fat around the middle of the body) and psychological distress. Cortisol dysregulation can be measured by examining

the cortisol awakening response, the cortisol daily slope and the cortisol response to acute stress, using saliva samples.

2.3 Stress definitions

Defining stress is a complex task because stress means different things to different people, at different times, under different circumstances (Fink, 2016). When the term *stress* was first published by Hans Selye in the mid-1930's, it was used to reference both the cause and effect of stress (Szabo, Tache, & Samogyi, 2012). Because of the confusion that caused, clear distinctions were later drawn between factors considered to be stressors (e.g., demands) and the body's physiological response to stress. Yet in spite of this, confusion remains. For while some researchers define stress by describing its nature and its qualities (e.g., psychosocial stress, traumatic stress) others define stress in terms of how it affects the body (e.g., good stress, tolerable stress and toxic stress (Dickerson & Kemeny, 2004; McEwen, 2016).

Commonly, stress is divided into categories such as *major life events* and *daily hassles* (Wethington, 2016). Major life events can include both happy events such as a wedding, and sad events like the loss of a spouse (Holmes & Rahe, 1967). Daily hassles are comprised of stressors like driving to work in traffic (Wethington, 2016). *Chronic stress* can be used to reference stress experiences that are ongoing, such as never having enough money to pay the rent, as well as to frequently occurring stressors such as repeated exposure to physical abuse (Dallman, Pecoraro, & Warne, 2006). Chronic stress can also refer to adverse experiences in childhood, which continue to influence the stress response system long after initial exposure (Felitti et al., 1998). While all of these forms of chronic stress are known to activate the HPA axis, chronic psychosocial stress in particular (i.e., stress which involves social evaluative threat or interpersonal stress) is thought to uniquely influence the HPA axis, as opposed to the SNS (Dickerson & Kemeny, 2004).

Key attributes of any stressful experience are uncontrollability and unpredictability (McEwen, 2016). Thus, recent definitions of stress have included situations in which 'one's environmental demands exceed one's perception of the ability to cope' (Fink, 2016, p.5). Stress has also been defined as the 'state of an organism when reacting to challenging new circumstances' (Friedman, 2002, p.423), which, like Selye's definition, refers only to biological reactions. Integrating both ideas, Kim and Diamond (2002) propose that stress comprises three elements: 1) an observable increase in neuronal activity as measured by neurochemical levels, motor activity or electroencephalogram, 2) subjective perceptions of the experience as aversive and 3) a sense of lack of control. Thus, they offer the following definition, which can be applied across species and paradigms to describe stress – whether real or perceived, environmentally or exogenously driven:

Stress: 'a condition in which an individual is aroused and made anxious by an uncontrollable aversive challenge' (p.454).

The current research uses Kim and Diamond's (2002) definition because it encompasses components that are central to all of the previous definitions.

2.4 Effects of stress

How stress affects an individual depends on many factors including the age at which they are exposed to the stress (Berens et al., 2017), how frequently the stress occurs (McEwen, 2016), how prolonged and severe, the stress is (Felitti et al., 1998), how much support the person has around them when the stress occurs (Dickerson & Kemeny, 2004; Lazarus, 2006) and how resilient or sensitised they are to that particular type of stress (McCarty, 2016). The exact nature of the stress is also a factor, for exposure to a psychosocial stressor (such as sexual assault) will often have different long-term consequences for the stress response system as compared with surviving a natural disaster, because of the difference in meaning attached to those events. Thus, the way in which stress is appraised and interpreted also influences how stress is then managed (Lazarus, 2006).

McEwen (2016) has proposed the terms *good stress*, *tolerable stress* and *toxic stress* to describe the effects that different kinds of stress can have on the body. Good stress is the kind experienced when one is exposed to a new challenge that ultimately fosters growth, such as starting a new course. Tolerable stress refers to experiences that induce a moderate amount of challenge, but which the individual adapts to because they have adequate resources. For example, needing to fix a broken down car but having the money and time to do so. Toxic stress refers to experiences where the demands clearly outweigh the individual's resources to cope, such as a child experiencing parental abuse and being unable to access support (Felitti et al., 1998). Toxic stress is the kind that most contributes to allostatic load, as discussed further in Chapter 3. The younger the brain, the more damaging the effects of toxic stress (McEwen, 2016).

This study hypothesizes that chronic stress is a particularly salient feature in the lives of many Māori women for a number of reasons: 1) because Māori tend to belong to large families and hold collectivistic values, which means they are likely to be at increased risk of experiencing a high number of *major life event*s (weddings, funerals, births), as well as frequent *daily hassles*; 2) because Māori women are twice as likely as Pākeha women, to experience domestic violence in adulthood (i.e., chronic stress) (Ministry for women, 2015); and 3) because Māori women report high rates of sexual and violent abuse in childhood (Hirini, Flett, Long, & Millar, 2005) (i.e., toxic stress). Additionally, Māori women are more likely to be living in poverty than Pākeha women (Marriott & Sim, 2014) and they are more likely to experience the daily paradigm clash of holding collectivistic values in a society that is highly individualistic (Ketu-McKenzie, 2011), both of which can be viewed as chronic psychosocial stressors.

2.5 The adverse childhood experiences study (ACE)

Evidence of a relationship between childhood adversity and chronic disease was firmly established by the adverse childhood experiences (ACE) study published in 1998 (Felitti et al., 1998). The ACE study was a project in which 8,506 American

patient volunteers answered a ten item questionnaire about adverse childhood experiences. The survey asked participants to mark '1' in a checkbox if, prior to the age of 18, they had lived through experiences from seven different categories of adversity. Those categories included witnessing violence against their mother, directly experiencing psychological, physical or sexual abuse, and/or living with household members who were suicidal, substance abusers, imprisoned, or mentally ill. Those experiences were chosen because they represent psychosocial stressors – i.e., the type of stress considered to be most toxic for a child and the kind most likely to exert long-lasting physiological effects (Dube et al., 2003)

After analysing the completed surveys, the ACE study authors reported a powerful graded exposure relationship between adverse experiences in childhood and risk factors for the leading causes of premature death. In short, the higher the number of adverse childhood experiences a person endorsed, the more likely they were as adults to experience alcoholism, drug abuse, depression, and to attempt suicide (Felitti et al., 1998).

Additionally, the higher a person's ACE score, the more likely they were to smoke cigarettes, be physically inactive, be severely obese, have had more than fifty sexual partners across their lifetime, and to have contracted a sexually transmitted disease. Moreover, the higher a person's ACE score, the more likely they were to develop ischemic heart disease, cancer, chronic lung disease, skeletal fractures and liver disease - in other words, the more likely they were to develop the leading causes of early death (Dube et al., 2003; Felitti, 1998). Notably, the ACE study participants were largely comprised of white Americans, not African-American or Hispanic individuals.

Given that several studies have shown that Māori experience a high number of those same adverse events in childhood, and that the associated later life conditions and health-risk behaviours reported in the ACE study are also disproportionately represented among Māori, the ACE framework could provide a

useful way of understanding the current health status of Māori (Marie, Fergusson, & Boden, 2009; Ministry of Health, 2018f).

Based on their findings, Felliti et al. (1998) proposed ‘the ACE pyramid’ to explain the mechanisms through which early life adversity might lead to the development of chronic disease and early death.

Figure 2.3 ACE pyramid showing proposed progression from ACE to early death via adoption of health risk behaviours. Reprinted from Felitti et al. (1998).

The ACE pyramid (see Figure 2.3) posits that adverse childhood experiences can disrupt neurodevelopment, which can then lead to impairments in social, emotional and/or cognitive processes, which can in turn lead to the formation of health risk behaviours (such as stress eating), which in turn increase the likelihood of premature death, either directly (in the case of suicide) or indirectly, through the development of a chronic health disorder (such as Type II diabetes) (Felitti et al., 1998).

2.5.1 The extended ACE Pyramid

In the 20 years since the original ACE pyramid was published, developments in the areas of molecular genetics, epigenetics, and fMRI technology, as well as increased

acceptance of socio-ecological perspectives in health have led to an acknowledgement that for some populations, adverse childhood experiences can begin long before a child is even born (Center, 2015). In recognition of this, an extended ACE pyramid was proposed by RYSE Center in Richmond, California in 2015.

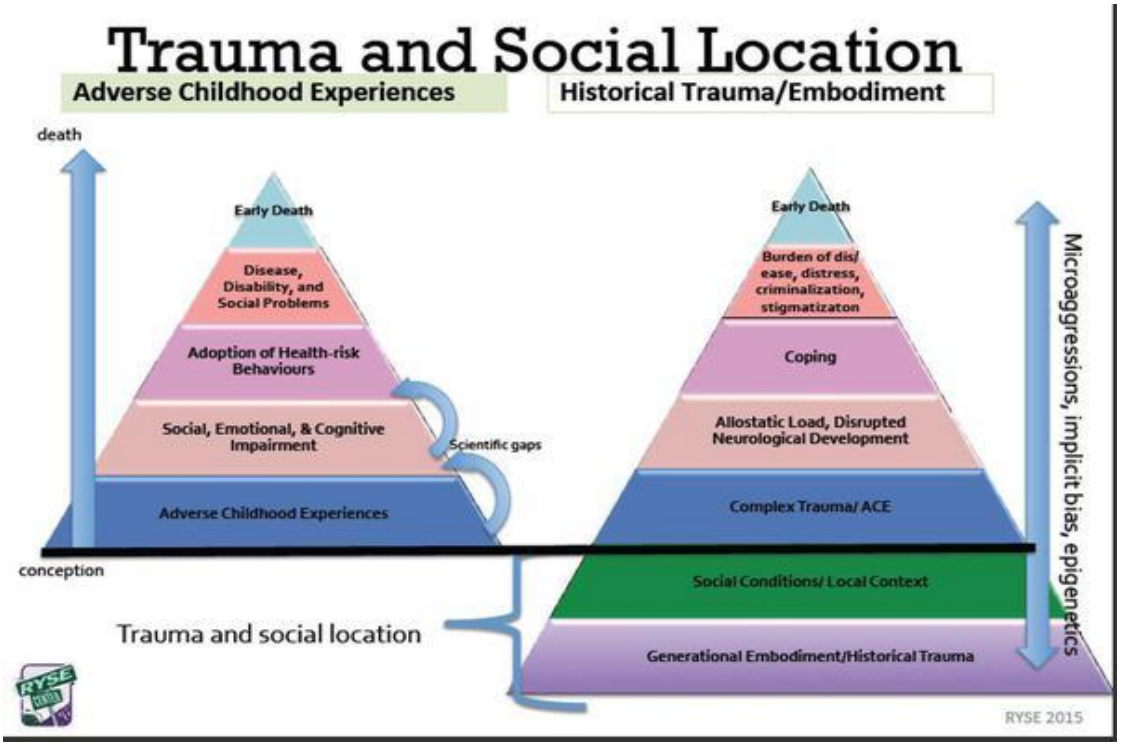


Figure 2.4. Model of Extended ACE pyramid constructed by RYSE Center, Richmond, California. Reprinted by permission.

The extended ACE pyramid (see Figure 2.4) includes two more tiers placed below *adverse childhood experiences* to acknowledge the influence that historical trauma and social conditions can have on the occurrence of adverse childhood events. Building on scientific advancements, the extended ACE pyramid also provides more accurate labels for some of the existing tiers. For instance, *complex trauma* has been added to the third tier alongside *adverse childhood experiences*, acknowledging that the deleterious effects of ACEs are amplified when they result in complex trauma (van der Kolk, 2005). On the fourth tier, *allostatic load* has been added to *social and cognitive impairment*, acknowledging emergent research which suggests that long standing changes in the stress response system

might mediate the relationship between ACEs and poor health (McEwen, 2016). *Adoption of health risk behaviours* has been re-labelled *coping,* acknowledging that the relationship between chronic stress and adoption of health risk behaviours is perhaps more usefully viewed as attempts to cope with and attenuate the chronic stress response (Center, 2015; Tomiyama, Dallman, & Epel, 2011). Lastly, the tier closest to the top has been changed from *disease, disability and social problems* to *burden of disease, distress, criminalisation, stigmatisation,* acknowledging that ACEs likely contribute to more social problems than just chronic disease i.e., they might also contribute to anti-social behaviours.

Running alongside the extended ACE pyramid is an arrow labelled *microaggressions, implicit bias, epigenetics*, which acknowledges that the progression from historical trauma to chronic disease and early death is likely to be mediated by additional factors that require further investigation. The current project applies the extended ACE pyramid to Māori living in Aotearoa New Zealand.

2.5.2 Personal context

While completing this project my father chose to complete the ACE survey. His ACE score was 9 out of 10.

2.6 The allostatic load model

The allostatic load model extends knowledge that activation of the stress response system is adaptive in the short term but that prolonged or repeated activation leads to poor health outcomes in the long term. This concept (and the concept of homeostasis) is central to understanding allostatic load and overload (McEwen, 2016).

2.6.1 Homeostasis

Homeostasis is often described as the body's equilibrium or *set point*. It refers to the stable set of internal conditions the body maintains in order to preserve balance

(Friedman, 2002). Homeostasis is commonly referenced in relation to heart rate and body temperature. For instance, homeostasis of body temperature in humans means that the body seeks to maintain a body temperature of 37 degrees celsius at all times. When the body's internal temperature starts to increase, a series of responses (e.g., sweating) are triggered that serve to return the body to its set point temperature of 37 degrees celsius (Kalat, 2007).

2.6.2 Allostasis

While homeostasis maintains stability and the parameters of life, *allostasis* is the process through which the body achieves stability through change (McEwen, 2016). Using the temperature example again, if a person's internal temperature drops below 37 degrees celsius, their blood vessels will constrict to prevent unnecessary heat loss and involuntary shivering might ensue in order to generate heat that can warm the body and thus return it to homeostasis (Friedman, 2002). Allostasis is what enables the body to adapt to a challenge and then return to its pre-set equilibrium following challenge exposure.

While a certain amount of adaptation is normal, frequent demand on the stress response system can cause lasting damage (McEwen, 2016). A common metaphor used to describe the process of allostasis, is that of a car constantly braking and accelerating in order to maintain a stable speed. For a finely tuned engine, such behaviour can cause wear and tear on the motor, damaging its internal machinery - as allostasis does to the body (Friedman, 2002).

The cumulative effect of allostatic processes on the body is known as *allostatic load* and common examples of it include weight gain, fatigue, hypertension and depression (McEwen, 2016). Excessive exposure to allostatic processes can lead to pathophysiological conditions, or *allostatic overload*. Common examples of allostatic overload include Type II diabetes, ischemic heart disease, metabolic syndrome, high cholesterol, chronic pain, chronic fatigue and arthritis - in short, the same

chronic diseases that are prevalent in the Māori population and which contribute to early death (McEwen, 2016; Ministry of Health, 2018f).

2.7 Summary

The relationship between stress and illness is enormously complex. Exposure to stress invokes a whole-body, neuroendocrine response which is adaptive in the short term but which leads to wear and tear on the body in the long term, resulting in allostatic load. Because frequency of exposure to stress is unique for every person, allostatic load is accumulated at different rates for people across the lifespan. This makes untangling the psychological and physiological correlates of chronic stress a difficult endeavour. To illustrate, although post traumatic stress disorder is considered a ‘psychological disorder’, it also has circulatory, respiratory and musculoskeletal associations - as does depression. Although the allostatic load model cannot account for every illness encountered by Māori, it provides a useful framework for understanding how stress negatively affects health. Combined with findings from the adverse childhood events study, which found a strong link between high ACE scores and the very same chronic diseases that affect Māori, the allostatic load model offers a novel explanation as to why Pākeha New Zealanders live longer than Māori.

Chapter 3 - From historical trauma to early death

3.1 Outline and aims

This chapter applies the extended ACE pyramid and the allostatic load model to Māori today. It follows the format of the tiers described by the extended ACE pyramid in Chapter 2, from historical trauma to early death and presents a brief summary of Māori history along the way. This chapter intersperses personal examples with national statistics to enhance understanding and give context to each of the tiers of the extended ACE pyramid.

3.2 Tier One: Historical trauma

Historical trauma is a specific form of stress that refers to the 'cumulative emotional and psychological wounding over the lifespan and across generations, emanating from massive group trauma experiences' (Wirihana & Smith, p.198; Yehuda et al., 2009). For Māori, the term historical trauma has been used to reference both the genetic changes that resulted from colonisation by the British during the 1800's, as well as the systemic consequences of colonisation, such as institutionalised, interpersonal and internalised racism (Reid & Robson, 2006; Walters et al., 2011). Historical trauma has also been used in reference to alterations in Māori identity resulting from the decline of the Māori language, loss of cultural practices/knowledge, disconnection between Māori and the environment due to land loss/economic and workforce requirements, and the loss of entire communities due to the land wars, which followed the signing of Te Tiriti o Waitangi[9] (King, 2003; Liu & Temara, 1998; Smith, 1999; Taylor-Moore & Varona, 2014).

When John Nicholas wrote in 1814, that the Māori people showed exemplary health characterised by 'great muscular strength' (Nicholas & Marsden, 1817, p.230), Māori are believed to have outnumbered Pākeha by around 750:1 (approximately

[9] Te Tiriti o Waitangi = Māori version of The Treaty of Waitangi, a governance agreement signed between British and Māori in 1840

150,000 Māori to 200 Europeans) (NZ History, 2014). In short, Māori were the dominant inhabitants of Aotearoa New Zealand. Over the next 100 years however, the Māori population declined by more than two thirds, with estimates suggesting that by 1896 only 42,000 Māori remained in existence. By 1921, Pākeha outnumbered Māori by 100:4.2 (Pool & Kukutai, 2018). That rapid decline in numbers could be considered the first major attack on Māori health and wellbeing, for had it continued there would not now be any Māori health to speak of.

Population decreases were closely followed by concerted efforts to eradicate the pillars of Māori culture, like reo Māori me ōna tikanga[10], which from a social justice perspective, could be viewed as a second major attack on Māori health and wellbeing. For by extinguishing the cultural identifiers of Māori and forcing Māori to assimilate into Pākeha culture, the idea of 'Māori health' as distinct from Pākeha health became irrelevant (Tawhai & Gray-Sharp, 2011; Walker, 2004). Had it not been for the Māori renaissance of the 1970's and 1980's, during which time institutions such as Te kōhanga reo[11] and The Waitangi Tribunal[12] were established, Māori views, customs, and practices, along with 'Māori health' might have ceased to exist (Derby, 2011).

Although the effects of historical trauma are diffuse and hard to measure, several researchers have argued that the current health and social status of Māori is a reflection of the trauma imposed by colonisation, which has been transmitted across many generations (Farrelly, Rudegeair, & Rickard, 2006; Reid & Robson, 2006; Wirihana & Smith, 2014). This thesis supports that position and uses the extended ACE pyramid to show exactly *how* historical trauma contributes to a third, less explicit attack on Māori health and wellbeing in the form of systemic economic, health, education, social and justice inequities, that cumulatively add to the discrepant life expectancy rates between Māori and Pākeha New Zealanders.

[10] Reo Māori me ōna tikanga = Māori language and Māori traditions
[11] Te kōhanga reo = Māori language immersion early childhood care
[12] The Waitangi Tribunal = Government agency tasked with addressing breaches to Te Tiriti o Waitangi

3.2.1 Historical trauma contributes to adverse social conditions

The extended ACE pyramid posits that one of the ways in which historical trauma influences health, is by contributing to poor social conditions and marginalisation. Applied to the Aotearoa New Zealand context, this progression can be clearly seen in the flow on effects for those Māori whose land was illegally confiscated or otherwise lost following the signing of Te Tiriti o Waitangi in 1840 (King, 2003). To illustrate, in the South Island, within 23-years of the signing of Te Tiriti, 99% percent of land had been acquired by Pākeha (Keane, 2010). The Māori who lost their land during that time not only lost access to a major food source but also to future wealth. Those losses forced many of them into conditions of poverty where they lived in dwellings that were overcrowded and unhygienic, which increased the likelihood of disease development. By 1886, the burden of disease upon Māori was so great, that 25% of all Māori girls died in their first year of life and half of all Māori girls died by age 7 (Pool, 2011). For some Māori whānau, those historic losses have contributed to ongoing, intergenerational struggles with inadequate housing, unemployment and economic deprivation – in part because they've been unable to acquire new capital in a system that unevenly rewards those from dominant social groups (Kennedy, 2017).

From a social perspective, the effects of historical trauma are especially evident for wāhine Māori (Māori women), who in traditional Māori society were considered sacred because of their unique role as child bearers (Higgins & Meredith, 2017). Prior to colonisation, wāhine Māori held roles that were considered as important (in some cases more important) than those held by tāne Māori[13] (Mikaere, 1994; Mikaere, 2005). Wāhine Māori were tasked with the important job of opening ceremonies and calling newcomers onto marae[14] with karanga[15] (Tauroa, Tauroa, & Hanley, 1986). Reverence for the inherent dignity of the female form, as well as female energy, was promoted through Māori mythology, where women were

[13] Tane Māori = Māori men, Māori man, male
[14] Marae = Māori meeting ground
[15] Karanga = Ceremonial call performed by women

portrayed as the protectors of life and the bearers of great power (Higgins & Meredith, 2017). Gender equality was embedded in the social milieu, with some Māori women holding leadership positions within their tribes and others fighting alongside the men in battle (Mikaere, 1994). Furthermore, the family role of caregiver was shared between Māori men and women, with men sharing the cooking and women also hunting for food (Mikaere, 2005). It has been argued that gender equality is even built into the Māori language, for Te reo Māori has no word that distinguishes between 'him' or 'her', there is only the word ia[16], which is used to reference 'he', 'she', 'him' and 'her', as well as 'it' (Mikaere, 1994; Ryan, 2012). In short, the evidence implies a high degree of equality between Māori men and women in traditional Māori society. However, all that changed with the imposition of English laws during the process of colonisation.

After the arrival of British in Aotearoa New Zealand, wāhine Māori were forced to endure the trauma of having their status reduced to that of a man's property and over many generations - their worth cumulatively degraded to that of chattels, in some cases less worthy than a man's horse (Mikaere, 1994; Mikaere, 2005). Such a radical change in social status over so short a period of time, has likely contributed to the high rates of sexual and violent abuse experienced by Māori women today.

To summarise, historical trauma in the form of land losses, population decline, changes in social status and economic requirements has resulted in many Māori (especially women) being forced to live in social conditions (e.g., poverty, abusive relationships) that compromise their health.

3.2.2 Personal context: From land loss to poor social conditions

My Nana (dad's mother), the eldest girl in a family with 21 children, was born in the Māori settlement of Matakarapa in 1933 (C. Ketu, personal communication, November 11, 2018). Matakarapa is located just south-west of Foxton (pop. 2643) (Parker, 2015; Stats NZ, 2013). For many years during the 19th century Matakarapa

[16] ia = he, she, him, her, it

was home to my tīpuna[17] (L. Ketu, personal communication, November 11, 2018). In 1943, this small settlement effectively became an island, when a flood swept through a spillway built by Pākeha and created a direct channel between the upper and lower parts of the Foxton loop (a loop created around the township of Foxton by the Manawatu river) (Parker, 2015). Unable to sustain life separated from the nearby townships and villages that were home to their whānau and their extended whānau, the family soon left Matakarapa island in search of a new home and work (L. Ketu, personal communication, November 11, 2018). They eventually settled in Opiki, near the township of Shannon - where families (some with 15 or more children) lived in army huts located on farmland belonging to a local Pākeha farmer (C. Ketu, personal communication, November 11, 2018). Families earned the right to live in those huts by picking potatoes, onions and carrots for the owner's market garden business. Nana left that home in late adolescence to travel further north. While away, she met my Koro[18] and brought him back to live with her family in the Opiki huts, along with their two-month-old baby, my Dad. Thus, his first home was a crowded army hut shared with his cousins, aunts, uncles and grandparents.

3.3 Tier Two: Social conditions

The second tier of the extended ACE pyramid posits that poor social conditions and marginalisation are often a precursor to adverse childhood experiences (Hughes & Tucker, 2018). In this model, social conditions refer to structural processes that allow unequal distribution of resources across members of the same society. It highlights the fact that those who belong to minority or indigenous groups are often marginalised and therefore have less access to resources (Metzler, Merrick, Klevens, Ports, & Ford, 2017; United Nations, 2018). This is particularly salient for Māori women of child-bearing age, for whom poor social conditions can often mean disproportionately higher levels of prenatal stress, which then increases the likelihood that their children will be predisposed to enduring ACEs (Signal et al., 2017).

[17] Tīpuna = Ancestor(s)
[18] Koro = Grandfather

In Aotearoa New Zealand there can be little doubt that historical land losses have contributed to the high number of Māori living in adverse social conditions relative to Pākeha. Data from the 2013 census showed that 20% of Maori were living in crowded housing conditions compared with 4% of Pākeha (Le Lievre & Griffin, 2014). Similarly, the proportion of Māori who are homeless compared with Pākeha is 5:1 (Amore, 2016). Moreover, of all the children in Aotearoa New Zealand who are living in extreme hardship, 33% are Māori, though Māori comprise only 14% of the Aotearoa New Zealand population (Webb, 2017; Statistics NZ, 2013). Taken together, this data implies that disproportionately more Māori than Pākeha New Zealanders are living in social conditions where their health and well-being is likely to be compromised.

Consistent with the extended ACE pyramid model it is argued that this inequality reflects the institutional, interpersonal and internalised racism that followed colonisation, preventing Māori from accessing the same number of resources as Pākeha (Reid & Robson, 2006).

3.3.1 Social conditions contribute to adverse childhood experiences

Poor social conditions are linked with adverse childhood experiences through the effects of stress on family dynamics and especially on expectant mothers (Signal et al., 2017). Of particular importance, stress during pregnancy is known to increase the risk of low birth weight, which is associated with poorer mental health outcomes and cognitive performance for the child (Dunkel, Schetter, & Tanner, 2012).

Research comparing the incidence of stress and worry among Māori and non-Māori women during pregnancy shows that Māori women not only report significantly higher amounts of life stress than their non-Māori counterparts, but they are also much less likely to seek help from professional services - which in itself could be attributed to systemic barriers (Signal et al., 2017). In their study, Signal et al. (2017)

showed that socio-economic status was thought to contribute to high levels of stress and dysfunctional worry for Māori women, which implies a direct link between adverse social conditions and prenatal stress.

In short, the research implies that due to the social conditions of their mother, some Māori children may enter the world with stress response systems that are already compromised, only to be faced with additional stressors that create further challenge.

3.3.2 Personal context: From poor social conditions to high ACEs

Because of the circumstances under which she had become pregnant with my dad, reports from family members suggest that Nana attempted to have an abortion. Thus, my father was exposed to stress before he had even entered the world. Whatever the reason, he was born prematurely in Taumarunui Hospital and weighed less than 5-pounds. After my Nana and Koro returned to Opiki with Dad (aged two months), they continued labouring for the Pākeha landowner. As a young child, Dad was often sick (perhaps a consequence of the living conditions). Because the family could not afford visits to the doctor, Nana often kept him at home. As a result of this, Dad did not start school until he was seven years old. That same year (1960), his grandparents were offered Shannon's first four bedroom state house to live in. A total of 16 people moved into the house, including Dad and his three younger siblings, Dad's parents, Dad's grandparents and six of their children (who were Dad's Aunts and Uncles) (C. personal communication, November 11, 2018). Soon after moving into the house however, Dad's grandfather suddenly died. This became one of many adverse experiences that Dad endured as a child.

3.4 Tier Three: Adverse childhood experiences

The stressors surveyed in the ACE questionnaire represent a unique form of stress because the negative effects of childhood adversity can become preferentially embedded in a range of physiological systems (Berens et al., 2017). This is

because of both the type of stress experienced (psychosocial) and the stage of life during which the stress occurs (e.g., childhood) (Danese et al., 2009). As mentioned previously, psychosocial stress refers to negative interpersonal experiences involving others. Such stress (especially when it involves negative evaluation) is known to provoke a strong physiological stress response in humans, which is why public speaking is a source of anxiety for so many (Dickerson & Kemeny, 2004).

Adversity for a child can appear in many forms. At one end of the continuum it can include having a caregiver who suffers from psychological distress, or simply living in an unstable or depriving care environment. At the other end of the spectrum it can include major childhood trauma such as maltreatment and exposure to violence or death (Berens et al., 2017). The fact that psychosocial stress in childhood usually involves caregivers and family members means that its effects are often severe and enduring because that is exactly when attachment systems are most responsive (Benoit, 2004).

As well as influencing attachment style, another reason that adverse childhood experiences can have long-lasting physiological effects is because periods of rapid growth occur in the brain at various intervals throughout childhood. During those times the nervous system is in a state of heightened responsiveness, which means that certain experiences are more likely to embed themselves in neural networks (Berens et al., 2017). Similar periods of plasticity (heightened responsiveness) have also been found to occur in other bodily systems such as the immune and metabolic systems, which implies that early life adversity may exert long-lasting effects not only on psychological health, but on fat metabolism and illness resistance as well (McEwen, 2016).

For many Māori, knowledge that adverse childhood experiences can contribute to long term physiological and psychological health problems is salient because several studies have reported that Māori children are on average, exposed to more trauma and abuse than non-Māori children (Hirini, Flett, Long, & Millar, 2005; Marie, Fergusson, & Boden, 2009).

Marie, Fergusson and Boden's (2009) findings from a longitudinal study conducted in Christchurch showed that Māori participants experienced greater exposure to childhood maltreatment including higher rates of physical punishment and exposure to acts of interpersonal violence than non-Māori. Furthermore, participants who identified as having sole Māori identity were at greater risk for exposure to such events, and adjustments for socioeconomic status and family dysfunction did not fully account for those findings. This implies that poverty alone was not responsible for the adverse events they experienced, but identifying as Māori in a society dominated by Pākeha, might have been. Consistent with this, Hirini, Flett, Long and Millar (2005) conducted a retrospective study into the frequency of traumatic events experienced by Māori and showed that Māori adults reported experiencing a relatively high number of traumatic events in childhood. Additionally, Cooper and Wharewera-Mika (2009) reported that Māori children are more likely to be assessed by health professionals as having been abused or neglected than non-Māori children and despite recent decreases in the figures, infant mortality rates for Māori remain 1.3 to 1.9 times those of non-Māori (Ministry of Health, 2018d). Moreover, rates of hospital admissions for intentional injury to children aged 0-5 have been recorded as roughly twice those of non-Māori (Cooper & Wharewera-Mika, 2009).

Of note, the study by Hirini, Flett, Long and Millar (2005) showed that Māori women in particular, reported a high frequency of sexual abuse experiences as children, as well as violence at the hands of a family member. Consistent with the extended ACE pyramid model, their study also showed that those traumatic experiences were linked with the development of post-traumatic stress disorder (PTSD) in later life. Supporting this finding, Marie, Fergusson and Boden (2009) found that childhood sexual abuse among Māori women prior to the age of 16 was associated with increased rates of depression, anxiety, suicidal ideation and attempts, alcohol dependence, illicit drug dependence, PTSD symptoms, increased medical contacts for physical health problems, decreased self-esteem, and decreased life satisfaction at age 30. At the very least, those findings lend further support to the probability of

causal links between adverse childhood experiences and both mental and physical health problems later in life, especially for Māori women.

3.4.1 Adverse childhood experiences contribute to allostatic load

Biological embedding is the term commonly used to describe ways in which adverse childhood experiences create long lasting physiological changes in bodily systems. Such changes are often associated with dysregulation in the HPA axis as measured by hyper-cortisolism (too much cortisol) or hypo-cortisolism (too little cortisol), leading some to hypothesise that dysregulation in the stress response system mediates the relationship between ACEs and allostatic load (McEwen, 2016). Hypo-cortisolism, which is frequently found in individuals who have experienced trauma in early life and who have been chronically exposed to stressful environments in adulthood (Bevans, Cerbone, & Overstreet, 2008) is particularly salient to this study because as discussed, Māori women experience high amounts of childhood trauma and might also experience high amounts of chronic stress in adulthood. Thus, it is possible that hypo-cortisolism underlies many of the chronic health problems reported by Māori women.

Several variations in the hypo-cortisolemic profile have been reported in the literature, but all share the common feature of a daily cortisol slope that flattens out throughout the day (Heim, Ehlert, & Hellhammer, 2000). Figure 3.1 shows three different types of diurnal rhythm loss characteristic of hypo-cortisolism. In Pattern 1, the HPA axis fails to shut down over time. This type of rhythm might indicate the presence of an ongoing stressor. In Pattern 2, evening cortisol levels elevate. This type of curve is frequently associated with persons suffering from major depression, and individuals who have this diurnal slope usually experience severe sleep disturbances. In Pattern 3, a slight diurnal curve is produced but overall levels of cortisol are so low that the HPA axis fails to respond adequately during the sleep cycle and is not triggered by awakening (Guilliams & Edwards, 2010).

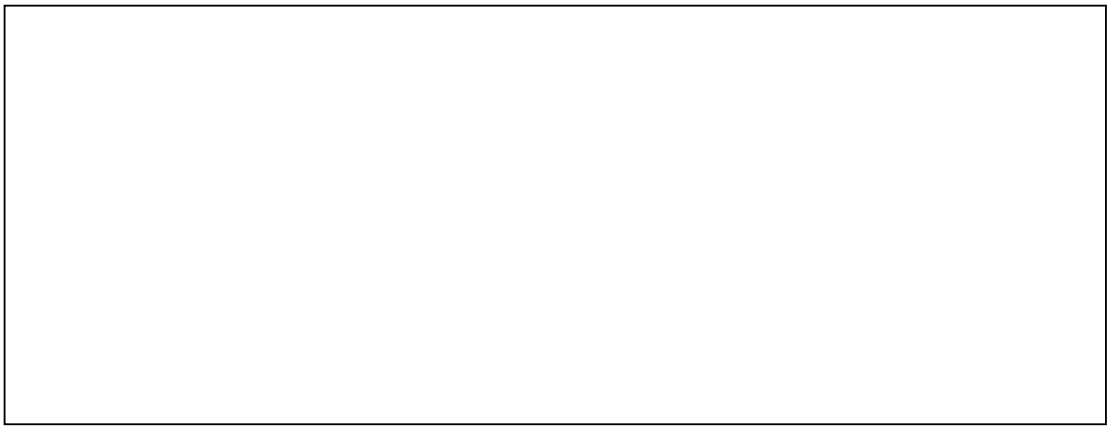


Figure 3.1. Three common hypo-cortisolemic curves. In Pattern 1, cortisol release does not shut down. Pattern 2 shows a daily curve characterized by increasing evening levels. Pattern 3 shows a typical hypo-cortisol curve in which the overall production of cortisol is so low that it is of little consequence. Reproduced from Edwards and Guilliams (2010).

Another example of how a hypo-cortisolemic profile differs from a healthy cortisol profile can be seen in Figure 3.2. Nater et al. (2008) compared the diurnal salivary cortisol profiles of 28 people with chronic fatigue syndrome (CFS) with the cortisol profiles of 39 people from the general population. Consistent with previous research, their study showed that individuals with CFS demonstrated both lower salivary cortisol levels in the morning and higher salivary cortisol concentrations in the evening compared with community controls, indicating a flattening of the diurnal cortisol profile.

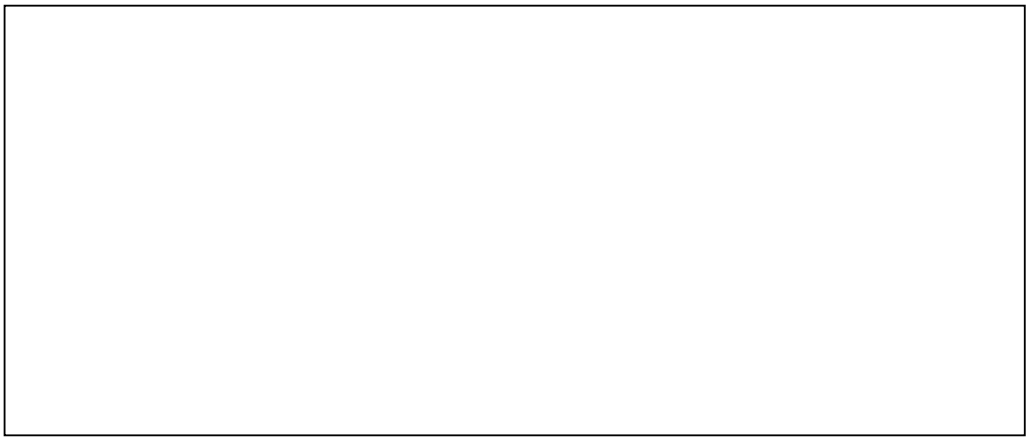


Figure 3.2. Diurnal salivary cortisol concentrations in cases with chronic fatigue syndrome and non-fatigued controls. Reproduced from Nater et al. (2008).

To summarise, hypo-cortisolism is a pattern commonly associated with adverse

experiences in early childhood, as well as with chronic stress exposure in adulthood (Heim, Ehlert, & Hellhammer., 2000). Although the exact patterns of cortisol secretion under conditions of repetitive stress exposure are poorly defined, it is widely accepted that hypo-cortisolism develops secondary to the hyper-secretion of cortisol – which occurs as part of the adaptive stress response. Cortisol dysregulation is a precursor to allostatic load. Evidence that many Māori women experience high amounts of childhood stress, and speculation that many might also experience chronic stress in adulthood suggests that Māori women with high ACE scores would be expected to show dysregulated cortisol profiles characterised by blunted cortisol awakening responses and flat cortisol daily slopes.

3.4.2 Personal context: From high ACEs to allostatic load

The first 18 years of my father's life were characterised by adverse experiences that included frequent exposure to violence. The family also lived in such great poverty at times, that hunger once drove my Dad to try stealing food scraps from a pig that lived under their house. Dad was so viciously attacked by the pig during that incident, that the scar from where it bit his eyelid is still visible more than 60-years later (C. Ketu, personal communication, November 11, 2018).

3.5 Tier Four: Allostatic load

As previously discussed, allostatic load refers to the cumulative effects of chronic and acute stress on the body. In other words, it is the product of wear and tear on the body and brain, and results from dysregulation of the physiological systems involved when adapting to challenge (McEwen, 2005; 2016). Allostatic load can manifest in both physical and psychological outcomes, but most commonly presents as visceral obesity, metabolic syndrome, high cholesterol levels, psychological distress, high blood pressure and insulin resistance (McEwen, 2008). In other words, allostatic load represents the precursors to pathophysiological conditions such as Type II diabetes and heart disease. Those conditions are collectively known as allostatic overload (McEwen, 2016).

McEwen (2016) has documented four dysregulated stress responses that contribute to allostatic load (Figure 3.3). They include: repeated exposure to stressors that invoke a physiological stress response (such as frequent exposure to violence); lack of adaptation to stress such that a full blown stress response is triggered every time a person is exposed to the same stress; a prolonged physiological response in which the stress response system does not shut down after the stress has resolved; and an inadequate response to stress in which a physiological stress response is not triggered at all when the individual is exposed to stress.

Figure 3.3 Types of allostatic load. The top panel illustrates the normal allostatic response. e.g. a response is initiated by a stressor, sustained for an appropriate interval, and then turned off. The remaining panels illustrate four conditions that lead to allostatic load: repeated “hits” from multiple stressors; lack of adaptation; prolonged response due to delayed shutdown; and inadequate response leading to compensatory activity in other systems. Reproduced from McEwen, (2016).

In essence, this means that allostatic load and overload among Māori women can be measured by examining their exposure to chronic stress, evaluating their daily cortisol patterns, and measuring their levels of visceral obesity and psychological distress. Additionally, allostatic load can be evidenced by inadequate cortisol response to acute stress, lack of cortisol adaptation to acute stress or lack of cortisol shut down following acute stress exposure.

Recent health statistics demonstrate that *visceral obesity* is prevalent among Māori women (Ministry of Health, 2017a), but there is debate about the accuracy of *psychological distress* rates among Māori. Official statistics report that mental illness rates are 1.5 times greater for Māori than for non-Māori, with 9.6% Māori females reporting lifetime prevalence of a disorder (Ministry of Health, 2018h).

However, Baxter's (2008) summary of the findings from Te Rau Hinengaro (The New Zealand Mental Health Survey) (Oakley Browne, Wells, & Scott, 2006) showed that 'mental disorders' were 'common' among Māori (p.121), with over half of the Māori participants claiming to have experienced at least one disorder during their lifetime. Despite those high prevalence rates however, less than a third of the respondents had been in contact with a mental health service - which implies that the official rates might under represent the actual number of Māori experiencing psychological distress. Contrasting this, research by Linscott, Marie, Arnott and Clarke (2006) implies that Māori are over diagnosed with certain mental disorders because of the way that symptoms are categorised. In short, it is difficult to gain a clear picture of whether Māori mental health rates are disproportionately high, and thus whether or not they can be considered to reflect high prevalence of allostatic load.

To the best of the authors knowledge, *chronic stress* among Māori women has never been explicitly studied. Moreover, no studies have explicitly studied *cortisol patterns* among New Zealand Māori. However, a recent study in Australia compared associations between chronic psychosocial stress (in the form of interpersonal racism) and cortisol profiles among indigenous and non-indigenous students, and

showed clear differences in the overall CAR, the cortisol daily slope and the cortisol response to acute stress between the two groups. As expected, the indigenous students showed a largely hypo-cortisolemic profile that correlated with the degree of interpersonal racism experienced across their lifetime (Berger et al., 2017). The implication of this is that allostatic load might occur in indigenous peoples even in the absence of exposure to discrete ACEs, and that chronic exposure to psychosocial stress in itself, might be enough to trigger allostatic load. However, the possibility that ACEs might have contributed to the indigenous profiles cannot be ruled out because adverse childhood experiences were not controlled for in that study.

If indeed, frequent exposure to interpersonal racism (e.g., chronic psychosocial stress) is associated with hypo-cortisolemic profiles, then it is also possible that perpetual values-clashes between traditional indigenous ways of being (i.e., collectivistic) and the values of modern society (i.e., individualistic) might also be viewed as a chronic psychosocial stressor that could independently contribute to allostatic load.

To illustrate this theory, many Aotearoa New Zealand Māori (especially those living in rural areas) are raised within a collectivistic paradigm in which their definitions of ‘self’, their dominant cognitions, their goals and relationships are all focused around the central theme of whānau and interconnectedness (Ketu-McKenzie, 2011). Yet they live in a society where the central theme of most relationships and goals relates to personal achievement and individual fulfilment (Black & Huygens, 2007). On a daily basis, this means they are likely to encounter some form of cultural values-clash, whereby their innermost values are challenged or in conflict with mainstream norms - i.e., providing yet another social evaluative threat. For example, many Māori studying at universities are put in positions where they have to choose between studying for exams (i.e., following an individualistic pursuit) or attending a three day tangihanga (funeral), which is a collectivistic, cultural expectation. Many Māori are also conflicted when potential employers ask them to recall their achievements at interview, but their collectivistic culture views this as ‘showing off’

(i.e., putting the individual's needs above the collective). For many Māori, the process of continually negotiating between those two conflicting worldviews can be a never-ending source of psychosocial stress - one to which few Pākeha are ever exposed.

Related to this is the double burden of not only holding collectivistic values which foster loyalty to the needs of the whānau, but belonging to whānau that are comprised of many members – (i.e., up to 500) which can mean a vast number of relationships to maintain and negotiate (Wilson, 2005). While belonging to large families can be a protective factor for some, for others it adds to the burden of stress.

Yet another factor contributing to chronic stress for some Māori, is the stress generation hypothesis proposed by (Hammen, 2006). This hypothesis proposes that those who experience symptoms of psychological distress in the form of depression, tend to then generate ongoing stressful life events as a result of developing personality characteristics that disrupt their social support networks. Examples of such behaviour could involve actively pushing loved ones away or being hostile to those offering their help. Other examples include engaging in coping behaviours such as gambling, or drinking heavily, which in and of themselves can generate stressful life events – events that can then chronically activate the stress response system. This is the point at which chronic stress and allostatic load start to overlap with coping behaviour.

3.5.1 Allostatic load contributes to coping behaviour

Allostatic load can influence coping behaviour and in turn, coping behaviour can influence allostatic load. This dynamic relationship is clearly articulated in research showing that cortisol dysregulation in the form of hypo-cortisolism contributes to urges to eat food that is high in fat and sugar (i.e., calorie dense) in an attempt to attenuate the physiological stress response (Tomiyama, Dallman, & Epel, 2011). Such behaviour contributes to visceral obesity (i.e., abdominal fat), and visceral

obesity can in turn, contribute to lowered cortisol levels (Dallman, Pecoraro, & Warne, 2006). To illustrate this, Dallman, Pecoraro and Warne (2006) conducted a range of animal experiments investigating relationships between cortisol, chronic stress, and eating behaviour. Their findings demonstrated that when placed in conditions of chronic stress, laboratory rats would not only reliably select sucrose (i.e., comfort food) over lard, but they also showed preferential storage of abdominal fat (i.e., visceral obesity). Additionally, their research showed that the greater the abdominal fat pad, the lower the rats cortisol response to acute stress. Dallman, Pecoraro and Warne (2006) have labeled this process the *chronic stress response network*.

Extending those findings to humans, Tomiyama, Dallman, & Epel (2011) conducted a study in which the emotional eating and truncal obesity scores of 17 high-stress women with blunted cortisol profiles were compared with 13 women in a low stress condition who had typical cortisol daily slopes. Results showed that those with flattened daily cycles not only had greater body mass index (BMI) and sagittal diameter (visceral obesity) scores, but they also reported greater emotional eating scores. In short, Tomiyama's research mirrored the animal studies, which showed that for those experiencing chronic stress, high visceral obesity was associated with low cortisol output in response to acute stress, as well as a high number of self-reported hypo-cortisolemic conditions like chronic fatigue and chronic pain. Although the study did not imply direction of causality, it was the first to provide evidence that the chronic stress response network observed in animals might also exist in humans.

In short, when considered alongside findings from Berger et al. (2017) - which showed that interpersonal racism was associated with cortisol dysregulation among indigenous Australians - as well as the *cultural values-clash* and the *stress generation hypotheses*, it is reasonable to speculate that chronic stress might feature prominently in the lives of many Māori women. Knowing that cortisol dysregulation caused by chronic stress, can influence coping behaviours such as overeating, which in turn can increase visceral obesity, which can in turn lead to

chronic elevation or chronic suppression of cortisol levels, might also help to explain some of the differences in visceral obesity between Māori and Pākeha New Zealanders.

3.5.2 Personal context: From allostatic load to coping

Dad's childhood was characterised by a high number of ACEs. Consistent with the ACE pyramid model, which posits that coping behaviours driven by ACEs can lead to criminalisation, at the age of 16 my father began prospecting for the Mongrel Mob - a renowned Aotearoa New Zealand gang. Unimpressed with some of the violence he saw during that time, Dad left Shannon to pursue trade training as an electrician - a venture made possible due to the Apprenticeship Act 1948, which saw many Māori encouraged into the trades after World War II. While he was away, Dad was introduced to evangelical Christianity. This had a profound influence on the trajectory of his life and led him to turn away not only from behaviours considered to be 'sinful', but also from traditional Māori practices and beliefs. Effectively, Christianity gave him a new way of coping with the difficulties of life. When he returned to Shannon after completing his training, he met my mother. They soon married and moved away from the whānau, taking their two children with them - much to the dismay of my Māori Nana. Letters written between Nana and Dad while he was away raising his own kids, paint a picture of financial hardship and heavy drinking back home in Shannon. Nana's letters are infused with longing for Dad to return home to his whānau.

Meanwhile, Dad was faced with the difficult task of raising his children away from the support of whānau and settling into life as a tradesman, in a world where he was often the sole Māori electrician working in dairy factories dominated by older Pākeha men. The instability of the dairy industry at that time meant that the family often had to relocate in order to find stable work, but eventually my parents settled in the township of Morrinsville (pop. 7000) (Stats NZ, 2013) - a six hour drive away from Shannon - where they continued to pursue a Christian agenda and lived as one of the few mixed-race couples in the town. Discussions with my mother

revealed that their life together was made more difficult because of these facts. For instance, within weeks of marrying and moving into their first flat together in 1973, Mum (who had to sign the lease because Dad was in hospital with pneumonia at the time) was informed by the landlords, that the flat would never have been leased to them if they had known that Dad was of Māori descent.

Suffice it to say, psychosocial stress was a prominent feature of their lives - for on-top of the usual stress associated with raising children away from the support of family, they experienced frequent relocations, job insecurity, implicit and explicit racism, as well as cultural-values clashes, while trying to balance the tensions between the collectivistic expectations of Dad's Shannon whānau (e.g., the expectation that he would travel home every time there was a major tangihanga or birthday celebration) and the individualistic values of the society in which they'd chosen to live (e.g., one in which they had a mortgage to pay off). The cumulative effect of this stress, led to allostatic load for Dad in the form of visceral obesity and psychological distress. For while most of the time, he drew on his Christian spirituality to help him cope with life's difficulties, at the times when he didn't, he was prone to violent outbursts, mental breakdowns, high caloric eating and gambling.

3.6 Tier Five: Coping

In the original ACE pyramid this tier was named *adoption of health risk behaviours* because it argued that the cognitive, social and emotional impairments caused by ACEs, compromise effective coping, thereby accelerating and exacerbating the progression from ACEs to chronic disease (Felitti et al., 1998). The health risk behaviours associated with adverse childhood experiences in the original ACE pyramid included smoking, alcoholism, drug abuse, physical inactivity, suicide attempts and a high number of sexual partners (>50) (Felitti et al., 1998). However, instead of *adoption of health risk behaviours*, the extended ACE pyramid reframes such behaviours as *coping*, acknowledging that for many people with high ACEs, engagement in such behaviours is a strategy employed in the service of stress management, irrespective of how effective those strategies are (Tomiyama,

Dallman, & Epel, 2011). Thus, *coping* is used to reflect the belief that individuals who adopt health risk behaviours are often trying to cope with stress.

As mentioned, the resources a person uses to help them adapt to or cope with stress, can either ameliorate or exacerbate that stress (Stephenson, King, & DeLongis, 2016). However, many factors are known to influence the way in which a person copes with stress at any given moment. This includes the nature of the stress (e.g., whether the stress is psychosocial or biological) (Fink, 2016), previous stress exposure (whether this is a new stress or a frequently occurring stress) (McCarty, 2016), personality factors (such as Type A tendencies) (Stephenson, King, & DeLongis, 2016), psychological resources (e.g., ability to problem-solve) (Folkman, Lazarus, Dunkel-Schetter, DeLongis, & Gruen, 1986), social resources (e.g. connection to others) (DeLongis & Holtzman, 2005), severity of stress (which matters because persons experiencing high levels of cortisol usually find it difficult to utilise executive functioning (Stephenson, King, & DeLongis, 2016), as well as appraisal of the stress (e.g., how it is interpreted) (Folkman, Lazarus, Dunkel-Schetter, DeLongis, & Gruen, 1986).

An example of this dynamic process can be seen when imagining a working Māori woman receiving news that her cousin has been diagnosed with a terminal illness and has only weeks to live. If that Māori wāhine is emotionally close to that cousin but lives far away geographically, she may struggle to find the support she needs from Pākeha friends and colleagues, because in individualistic societies, family members are usually ordered in terms of their proximity e.g., Pākeha families have ‘second’ and ‘third’ cousins, and bereavement leave from most jobs does not extend to losses outside of the immediate, nuclear family. Under such conditions and in the absence of social support she might be more likely to reach for ‘comfort food’ to reduce her feelings of stress, or she might return to habits like smoking or drinking (Black & Huygens, 2007; Employment New Zealand, 2019).

3.6.1 Coping behaviour contributes to the burden of chronic disease

The statistics indicate that over one quarter of all Māori experience substance misuse and other addictions in their lifetime (Oakley-Browne, Wells & Scott, 2006). More recent data shows that Māori are twice as likely as non-Māori to consume large amounts of alcohol at least weekly (Ministry of Health, 2018a) and that Māori are three times more likely to smoke cigarettes than non-Māori (Ministry of Health, 2018k). Notably, Māori females are more than three times as likely to smoke than non-Māori females (Ministry of Health, 2018k). Māori rates of suicide are almost twice as high as they are for non-Māori and Māori are also significantly more likely than non-Māori to be hospitalised for intentional self-harm (Ministry of Health, 2018j).

While some would argue that the health disparities between Māori and non-Māori are simply a reflection of Māori failing to adopt health-promoting behaviours, the extended ACE pyramid posits that many of those behaviours may be more accurately viewed as coping mechanisms, driven by the desire to ameliorate the stress response. This is particularly true in the case of stress eating, which is absent from the health status indicators mentioned above, but which may play a central part in the development of allostatic load resulting in visceral obesity - a major risk factor for many of the chronic health conditions that contribute to early death for Māori (Ministry of Health, 2017a; Tomiyama, Dallman, & Epel, 2011).

3.6.2 Personal context: From coping mechanisms to early death

For the most part, it seems that Dad's Christian beliefs prevented him from drinking alcohol or from using drugs - behaviours typically considered to be *health risk* or *coping* behaviours. However, in the early years of my parents marriage (the most stressful years by some accounts) Dad developed a gambling habit and Mum was frequently exposed to intimate partner violence. In the years immediately prior to being diagnosed with Cushing's Disease (hyper-cortisolism), Dad also began to crave excessive amounts of sugar and he satisfied those urges by drinking litres of

coca-cola every day. This accelerated his obesity and ultimately led to the development of Type II diabetes (recall that this was reversed after his body stopped producing cortisol).

Looking back at my Nana's life through the letters she sent to Dad, it seems clear that she too coped with the chronic stress in her life, by drinking heavily and smoking.

3.7 Tier Six: Burden of chronic disease

As mentioned previously, Māori are negatively overrepresented in preventable chronic diseases that lead to early death. This includes, Type II diabetes, kidney disease (which is often a complication of diabetes), cancers, and cardiovascular disease (Ministry of Health, 2018f). Visceral obesity is a major risk factor for most of those diseases (Ministry of Health, 2017a).

Māori are also overrepresented in statistics related to psychological distress - yet another factor that can lead to early death by way of suicide, self-harm, addictions, violence, and poverty. Data from Te Rau Hinengaro, a nationwide survey exploring Māori mental health (Oakley-Browne, Wells, & Scott, 2006) showed that Māori are 1.4 times more likely than non-Māori to have suffered from symptoms related to anxiety in the previous 12-months, and 1.6 times more likely to experience symptoms associated with depression. This data is supported by a recent study published in the New Zealand Medical Journal which showed that Māori and Pacific communities experience the highest rates of depression and anxiety in the country, but are also the least diagnosed (Lee, Duck, & Sibley, 2017). Under-diagnosing could be explained by factors relating to lack of engagement with health services. It could also be explained by implicit bias in the health system, and it could also be explained by Māori not presenting with symptoms that necessarily 'fit' with the clinical picture outlined in the DSM-5 (Association, 2013; Reid & Robson, 2006).

Of particular interest to this study, are findings from Te Rau Hinengaro (Oakley Browne, Wells, & Scott, 2006) which showed Māori women reporting 12 month prevalence rates of psychological distress that were significantly greater than Māori men (33.6% and 24.8%, respectively). Additionally, among Māori women, psychological distress symptoms were most commonly related to PTSD, anxiety and depression. One in 10 Māori women (11.3%) reported symptoms considered to be *severe*, and 36.7% reported having been diagnosed with an anxiety condition compared with 25% of Māori men. Half of those wāhine had developed the symptoms before age 11. PTSD was reported as having the greatest impact on quality of life, affecting 13.1% of Māori wāhine.

The classification of disorder symptoms and categories of severity in Te Rau Hinengaro (Oakley Browne, Wells, & Scott, 2006) were based on Western definitions of mental illness. Thus, the high prevalence of psychological disorders among Māori could be considered the result of over-diagnosing and pathologising of behaviours that might otherwise be considered normal responses to extremely abnormal circumstances. Regardless though, these findings do give an indication of the types of distress that Māori women commonly experience. Notably, they are entirely consistent with the psychological distress symptoms reported by those with high ACEs in the study by Felliti et al. (1998).

When those statistics are considered within the framework of the extended ACE pyramid, a clear and predictable pathway outlining the steps that lead from historical trauma to early death is observed. That is not to say that every Māori person is destined to follow this pathway, but that relative to Pākeha in this country, many Māori face the double burden of being both exposed to more stress across the lifetime and being more vulnerable to the deleterious effects of that stress due to overwhelmed stress response systems. On top of this, Māori face the triple burden of disparities in the way in which they progress through the health-care system (that is the focus of the next chapter).

Within the Māori population, the burden of chronic physical and mental disease appears to fall unevenly upon the shoulders of Māori wāhine, for whom stroke mortality rates, rheumatic heart disease rates, cancer mortality rates and 12 month prevalence rates of psychiatric illness, are all higher than they are for Māori men (Oakley Browne, Wells, & Scott, 2006; Ministry of Health, 2018f). One possible reason for this is that the pathway outlined in the extended ACE pyramid (see figure 2.3) may be heightened for Māori women as a result of both the historical and societal factors previously mentioned.

3.7.1 Burden of chronic disease contributes to early death

While cardiovascular disease is the leading cause of death for all New Zealanders, accounting for more than 40% of all deaths annually, the mortality rate for Māori is almost twice as high as that for non-Māori (Oetzel et al., 2017). Māori are more than 1.5 times as likely to be hospitalised for cardiovascular disease compared with non-Māori. Ischemic heart disease accounts for 40.2% of deaths among Māori <65 years with the condition, compared with only 10.5% of non-Māori (Ministry of health, 2018b). More than one quarter of Māori deaths can be attributed to cancer, and the cancer mortality rate among Māori adults is more than 1.5 times as high as non-Māori (Ministry of Health, 2018e). Similarly, mortality rates for diabetes are *seven* times higher for Māori than for non-Māori (Harwood & Tipene Leach, 2007). Moreover, Māori deaths related to chronic lower respiratory disease are higher than for non-Maori (Ministry of Health, 2018f). Taken together, the statistics paint a grim picture of inequality, but more importantly, inequity – defined as ‘differences, which are unnecessary and avoidable, but in addition are considered unfair and unjust’ (Reid & Robson, 2006, p. 4)

3.7.2 Personal context

My father’s diabetes, obesity, mood and anxiety symptoms were reversed following surgery that prevented his body his body from producing cortisol. For the last 20 years he has had to compensate for that fact by ingesting cortisol orally in the form

of hydrocortisone. Over that time, he has frequently ingested his medication in the wrong amounts due to mistakes made with his prescriptions (for both he and his father have the same first and last name). Two years ago, Dad was diagnosed with end stage renal failure at the age of 63.

3.8 Tier seven: Early death

As previously mentioned, inequities between Māori and Pākeha New Zealanders are evident in almost every social domain. Nowhere though, are those inequities more clearly seen than in the differences in average life expectancy between Māori and Pākeha New Zealanders due to chronic disease (Ministry of Health, 2018f).

3.8.1 Personal context

Like the majority of her siblings, my Māori Nana died early because of a cerebrovascular event. She was 57 years old. Nana was one of 15 children in her family who survived into adulthood. Six of her siblings died of heart attacks before the age of 60. Three of her siblings died of cancer before the age of 60. Three of her remaining four siblings are still living in or near their home town of Shannon. One of them is living with the effects of a major stroke. The oldest is currently 83. Fourteen out of 15 either had or currently have, Type II diabetes.

Also living in Shannon right now, is my father with his second wife and their three grandchildren, of whom they have legal custody. He and his wife preside over a small community church and live a life dedicated to their Christian faith. Were it not for his strong sense of spirituality and the close relationship he has with his wife and his wider whānau, it is possible that Dad might not have outlived the prognosis given to him when he was originally diagnosed with Cushing's Disease all those years ago, a prognosis that estimated he would only live for another five years.

3.9 Summary

Twenty years ago, after establishing a link between adverse childhood experiences and premature death Felitti et al. (1998) introduced the ACE pyramid to the literature - a pyramid comprised of five tiers that outlined the progression from ACEs to chronic disease and early death. Advancements in technology and social understandings drove an expansion of the ACE pyramid that incorporated new evidence. That model (known as the extended ACE pyramid) can be applied to Māori as a way of understanding the progression from the historical trauma of colonisation, to their current health and social status. That model argues that dysregulation in the HPA axis is the central mechanism linking past experiences of stress to current disease.

By applying this model to Māori, this chapter showed that for some, adversity begins long before exposure to adverse events in childhood. Once exposure begins however, longstanding changes in a range of bodily systems, especially the neuroendocrine systems, can overlap to cause allostatic load, which in the absence of intervention often results in the development of health risk behaviours, which can in turn cause chronic disease and lead to early death. This pathway is especially true for Māori women because of historical factors that reduced their social status, while at the same time, increased their burden of responsibility.

This literature implies that adult Māori women with high ACE scores are (in the absence of major intervention) likely to present with cortisol dysregulation, chronic stress, visceral obesity, and psychological distress. Given evidence that the New Zealand health care system largely offers treatments that clash with Māori ways of viewing the world, and is comprised of a work-force of health professionals that are not responsive to Māori needs and values, the likelihood of many Māori experiencing a major intervention is small. Therefore, the need for new therapies that incorporate Māori worldviews, and for novel ways of delivering those therapies has never been more urgent or needed.

Chapter 4 - Systemic contributors to early death

4.1 Outline and aims

This chapter outlines some of the systemic contributors to differences in health outcomes for Māori and Pākeha including institutionalised racism and interpersonal racism. The chapter presents an overview of the barriers preventing Māori from receiving the same quality of health care as non-Māori at all levels of the health-care system and shows how they could be overcome by implementing approaches that are more inclusive of Māori views of health, more responsive to Māori ways of relating, and to Māori ways of seeing the world. It argues that in the absence of such change, disparities in Māori and Pākeha physical and mental health are likely to continue.

4.2 An overview of inequity

The health care system at present, is not working well for Māori. This is evident in the recent Mental Health report released by the Ministry of Health, which showed that outcomes for Māori are worse than they are for the rest of the population and that Māori seek a health system which values indigenous knowledge/worldviews and acknowledges intergenerational deprivation and cultural alienation (Government Inquiry into Mental Health & Addiction, 2018). It is also evident in findings that Māori experience more adverse events (such as falls) in hospital than Pākeha (Davis et al., 2006). Māori rates of hospitalisation are disproportionately low in disease categories where they have high mortality rates (Reid & Robson, 2006). Many Māori who face lung cancer diagnoses are not seen on time, their care is not managed within the recommended timeframes, they experience delays in receiving treatment and they are four times less likely than Pākeha to be offered curative treatment (Stevens, 2008). Differences in screening for and treatment of ischaemic heart disease have been recorded between Māori and non-Māori (Bramley, Herbert, Tuzzio & Chassin, 2004; Miner-Williams, 2017). Differences in the level of pain relief offered to Māori women at childbirth have been documented (Nelson, 2006). As

have differences in the diagnosis and treatment of depression (Arroll, Goodyear-Smith & Lloyd, 2002). Just recently, an article was published showing that Māori babies are less likely to be resuscitated than Pākeha babies (James, 2018). Together, those findings present a bleak picture of institutionalised racism, described as 'differential access to the goods, services, and opportunities of society by race' (Jones, 2002, p.10).

4.3 Barriers at the level of governance

Barriers preventing Māori from accessing equitable healthcare have been identified at all levels of the health care system (Reid & Robson, 2006). And although some might argue that the health disparities are best explained by the fact that many Māori fail to practice health-promoting behaviours (Ministry of Health, 2017b), it could also be argued that the reason Māori are overrepresented in negative health statistics is because the Crown has failed in its duty to ensure equitable health care by partnering with and protecting Māori (two key promises outlined in Te Tiriti o Waitangi) (Orange, 2015). The reader is referred to Claudia Orange's book 'The Treaty of Waitangi' for an in depth examination of the principles of Te Tiriti o Waitangi. However for context, a brief outline is offered below.

Two translations of Te Tiriti o Waitangi were signed in 1840 – an English translation in which Māori unwittingly ceded their sovereignty to the Crown, and a Māori translation in which Māori retained governance over things Māori (Orange, 2015). The Māori agreement emphasised access to equal opportunities and outcomes between Māori and Pākeha. Therefore, the Aotearoa New Zealand government is in breach of its agreement as long as inequity remains.

Historically, where breaches to Te Tiriti o Waitangi have occurred, the Aotearoa New Zealand government has attempted to provide redress through the Treaty of Waitangi Act 1975 and its concomitant commission of inquiry, The Waitangi Tribunal (Waitangi Tribunal, 2018). As a result of that legislation, many iwi have been offered monetary compensation in response to claims that they have brought forward

against the Crown. One such claim has recently been lodged against the profession of Psychology in Aotearoa New Zealand (New Zealand Psychological Society, 2018). Two similar claims citing inequities in health care as breaches of Te Tiriti o Waitangi have also been brought before the Waitangi Tribunal by Māori health leaders, and are currently in the process of being heard (Waitangi Tribunal, 2018).

Attempting to address the substantial healthcare needs of their people, some iwi have used a proportion of their compensatory funds to subsidise medical costs for their iwi members (e.g., Ngāti Whātua Ōrākei, 2018). However, the government itself has led one of the greatest efforts to address inequities, by introducing the Primary Health Care Strategy (PHCS) in 2001 (Abel, Gibson, Ehau, & Tipene-Leach, 2005). The PHCS enabled the development of kaupapa Maori[19] health services (health services targeted toward Māori with licence to use Māori based models of health and wellbeing), which operate under the umbrella of Primary Health Organisations (PHO's) (Raymont & Cumming, 2013). While in theory this strategy could be seen as a necessary step toward increasing Māori engagement in health care, in practice, many kaupapa Māori health services have experienced limited success in improving Māori health outcomes because they are funded by models that continue to privilege Western models of health over indigenous ones - which has resulted in them being chronically underfunded (Abel, Gibson, Ehau, & Tipene Leach, 2005; Russell, Smiler, & Stace, 2013).

Thus, although the Primary Health Care Strategy has occurred alongside other initiatives such as Te Rau Puawai[20] - a programme dedicated to increasing the number of Māori professionals in the health work-force (Te Rau Puawai, 2018) - and He Korowai Oranga[21] (the government's 10-year plan for reducing health disparities) (Ministry of Health, 2018c), it could be argued that one-off compensatory iwi payouts and financial support for more Māori health professionals are proving insufficient to resolve the problem of inequity. For neither monetary compensation

[19] Kaupapa Maori = By Māori, for Māori; Māori approach, Māori agenda
[20] Te Rau Puawai = Mentorship programme for Māori studying health
[21] He Korowai Oranga = The Māori Health Strategy

nor individual Māori practitioners can resolve the fact that the health care system at present, is dominated by non-Māori professionals who are not incentivised to practice in a culturally responsive way (Sheridan et al., 2011).

4.4 Barriers in the way health care is structured

Barriers at the organisational and structural levels of health care include high costs (both direct and indirect), lack of suitable appointments (e.g., outside of work hours), long wait times, inflexibility of healthcare systems, lack of choice of healthcare providers, and poor experiences of healthcare (e.g., lack of response to complaints) (Jansen, Baca,l & Buetow, 2011; Russell, Smiler, & Stace, 2013). Direct costs of care include appointment fees and prescription charges. Indirect costs include loss of wages due to time off work to attend appointments during work hours, as well as costs related to travel and childcare, (Jansen, Bacal, & Crengle, 2009). Those living rurally or in low-socioeconomic areas (areas in which Māori are overrepresented) are disproportionately affected by indirect costs, meaning that those with the fewest resources often find it hardest to access adequate care (Jansen & Smith, 2006).

For example, to access psychological health care, a private appointment with a therapist can range from $60.00 per hour to $185.00 per hour depending on the therapist's location and level of qualification/experience (Careers NZ, 2018; Psychology Associates, 2019). Part of the reason psychology appointments cost so much is because therapists will typically dedicate one hour of their time to work on a client's presenting problem. In public health, where access to psychological services is free but often limited to those with severe illness or those posing a risk of harm to themselves or others, high demand and lack of therapists means that many people in need of psychological services are unable to access the support they require. This is due in part to the fact that therapists can only see a limited number of people in a day if they dedicate one full hour to each person. Thus, mental health care is structured in a way that privileges those with ample resources (e.g., time and money) over those who have neither (Jansen & Smith, 2006).

4.4.1 Potential solutions

These barriers could be overcome if more health services actively promoted group based therapies. Group based therapy allows many more people to receive support at a fraction of the time and financial cost (Trahey, 1991). Group based therapy has also been shown to be more culturally responsive for those who hold collectivistic cultural values and who have experienced cumulative trauma (like many Māori), because it draws on the power of the collective - whereas individual therapy does not (Kira, Ahmed, Mahmoud, & Wassim, 2010). Additionally, by changing the way in which appointments are typically structured e.g., offering low-cost group-based therapy to Māori outside of work hours as an alternative to one-to-one counselling between the hours of 9-5, Māori living rurally might find treatment more readily accessible.

4.5 Barriers due to conflicting views of health

Another barrier to engagement occurs at the level of cultural values and modes of treatment. Mainstream health services promote a mechanistic, bio-medical model of health that views the individual as comprised of different parts, which can be taken apart and fixed – much like a mechanic would repair a car (Friedman, 2002). That model promotes a dualistic view of the body and mind, which has led to the systematic separating of those with mental health disorders, from those who present with diseases of the body. Effectively, people with mental health and physical health issues, are treated as though they were separate beings (Mehta, 2011).

The bio-medical perspective of health contrasts sharply with Māori ways of viewing health, which are generally holistic and hold that wairua (spirit) is the most important requirement for health (Durie, 1995; Russell, Smiler, & Stace, 2013). Traditional Māori approaches to health promote a centrifugal way of thinking that acknowledges the interrelatedness of the mind, the body, the spirit, the wider environment (including the land) and relationships (Durie, 2011).

The most widely promoted of all Māori health models is Te Whare Tapa Whā[22], which uses the analogy of a whare[23] (house) to demonstrate the interrelatedness of domains considered to be important in the development and maintenance of Māori wellbeing (Rochford, 2004). The analogy holds, that just as a strong house requires strength and symmetry in all four of its walls in order to function well, Māori too, need to be equally strong in all four dimensions of wellbeing in order to be healthy. Illness or decay in any one of those four domains will cause their being (whare) to weaken or become diseased (Durie, 1995). Those four domains are: *te taha tinana* [24] (physical health), *te taha wairua*[25] (spiritual health), *te taha hinengaro*[26] (mental health) and *te taha whānau*[27] (family health) (Durie, 1995; Rochford, 2004). While other models of Māori health have also gained attention (see *Te Wheke*) (Pere, 2009) and *Te Pae Mahutonga* (Durie, 1999) the current research draws heavily upon Te Whare Tapa Whā because it is the most widely promoted (Ministry of Health, 2018g). Part of Te Whare Tapa Whā's successful promotion has been its emphasis on a holistic, as opposed to mechanistic, view of health (Durie, 1995).

In mental health, an example of the mechanistic approach can be seen in the theory underpinning Cognitive Behavioural Therapy (CBT) – the primary therapy recommended for use in Aotearoa New Zealand, England and Scotland (Gaudiano, 2008; Te Pou o te Whakaaro Nui, 2012). CBT combines principles of Behaviour Therapy (Wolpe, 1958) with those of Cognitive Therapy to produce treatments that have been shown to be effective for many different people, with many different problems (Westbrook, Kennerly, & Kirk, 2007). Of all the commonly used therapeutic modalities (e.g., schema therapy, behaviour therapy, acceptance and commitment therapy), CBT is the only one to have generated research supporting its effectiveness with a Māori population (Te Pou o Te Whakaaro Nui, 2009; Bennett, Flett, & Babbage, 2014).

[22] Te whare tapa whā = Model of Māori health proposed by Mason Durie in 1987
[23] Whare = House
[24] Te taha tinana = The physical side of being
[25] Te taha wairua = The spiritual side of being
[26] Te taha hinengaro = The mental side of being
[27] Te waha whānau = The social side of being

Like most Western-derived treatment modalities, CBT assumes an individualistic worldview in which an individual's psychological afflictions are caused by the way in which they interpret and react to the events around them (Morris, 2011). Thus, the therapy typically encourages an individual to identify problematic thoughts, use logic and reasoning to dispute the content of those thoughts, and then replace those thoughts with more rational, balanced cognitions (Westbrook, Kennerly, & Kirk, 2007). Essentially, it assumes that the cause of mental illness, is faulty thinking and behaving. While CBT therapy does acknowledge that thoughts, behaviour, feelings and physical sensations are interrelated and that change in one area will often trigger change in the other areas, CBT can be said to be most effective for those who are already cognisant of their thoughts, who already have some skill in identifying and articulating their feelings, who can use rationality to dispute their faulty cognitions and are familiar with the language needed to explore those domains (Westbrook, Kennerly, & Kirk, 2007).

Critics of this approach highlight the inefficient nature of providing treatment in a one to one setting, given the shortage of therapists and the costs of treatment (Gaudiano, 2008). They also draw attention to the fact that CBT originated from a Western perspective of health that contrasts with the collectivistic worldviews favoured by many indigenous peoples (Kantrowitz & Ballou, 1992). Given those facts, it is argued that interventions which espouse an holistic view of wellbeing (such as mindfulness meditation) might be better suited to individuals from collectivistic societies.

Knowledge that health services focus primarily on relieving symptoms and neglect to treat the whole person, serve as a barrier to Māori engagement for three reasons: 1) because of the clash in cultural views of wellbeing (e.g., in Western medicine good health is the absence of disease but for Māori, good health means wellbeing across many domains) (Russell, Smiler, & Stace, 2013); 2) because it causes some Māori to question whether a visit to the doctor actually provides 'value for money', as only one part of the body is treated at a time (Jansen, Bacal, & Crengle, 2009); 3) because for some Māori, the devastating loss of cultural resources that followed

the passing of the Tohunga Suppression Act in 1907 (a law that made it illegal to practice traditional Māori healing and philosophies) is amplified when they encounter a health care system that clashes with their own beliefs at so many levels (C. Ketu, personal communication, November 11, 2018).

In summary, the primary treatment modality offered to Māori seeking mental health support (e.g., CBT) assumes that the pathway to wellbeing is through changing faulty thought patterns within the individual (Te Pou o te Whakaaro Nui, 2009; Westbrook, Kennerley, & Kirk, 2007). While this approach is known to be highly effective for some, for those unwilling or unable to participate in talking therapy, who have neither the time nor the money to invest in one to one therapy, and who believe that the whole person (including their spiritual self) needs to be treated in order to become well, CBT might not be the best treatment. Given the emphasis Māori traditionally place on holistic views of health, it is unsurprising that the dualism of mainstream health and its focus on removing people from society in order to analyse their parts and make them well again, is a key contributor to the lack of willingness with which Māori typically engage with health services.

4.5.1 Potential solutions

If indeed, the mechanistic approach to health, and dualistic views of the mind and body prevent Māori from both seeking and maintaining working relationships with health professionals, then a psycho-physiological (mind-body) perspective of health might help to bridge that divide. Such an approach would acknowledge the evidence outlined in Chapter 2, which suggests that experiences of psychological distress are often closely related to physiological processes, and that the brain communicates with the body through the various neuroendocrine systems (Friedman, 2002). From a Māori perspective, a psycho-physiological approach to health could be considered an improvement on the bio-medical model, but to gain wide acceptance with a Māori audience, the essential domains of wairua and whānau would still need to be integrated deeply and genuinely into it (Kennedy, Cram, Paipa, Pipi, & Baker, 2015; Valentine, Tassell-Mataamua, & Flett, 2017).

This barrier could be overcome by utilising therapies that already fit well with Māori perspectives of health. As mentioned previously though, a system-wide barrier to utilising new therapies, is funding models that seem to privilege Western, clinical perspectives of health over Māori views of health (Russell, Smiler & Stace, 2013). This inequity stems from funders requiring strong, empirical evidence in support of favoured treatments before they are willing to provide funds for those treatments (Hammersley, 2005). The problem is that without the funds to even grow an evidence base, traditional Māori ways of healing cannot ever be legitimately endorsed.

Funding for the use of kaupapa Māori methodologies and co-design methods to systematically build an evidence base that supports Māori treatments is an ideal way to address this problem (Durie, 2011). However this approach is time consuming and could take decades before it produces therapies that are ready to be implemented and applied. Given the urgency with which Māori need better services, another option is to draw upon treatment models and perspectives that have already been validated empirically – and which fit well with Māori perspectives – then to partner with Māori to adapt those treatments for a Māori audience.

Consistent with such an approach, Durie (1994) contends that acceptance of his Te Whare Tapa Whā model within Māori communities has had less to do with its status as a traditional model of Māori health and more to do with how it resonates with contemporary understandings of Māori thinking about health. This suggests that in the absence of access to traditional Māori therapies, locating existing therapies that fit well with Māori worldviews may be an effective way to bridge the divide between Māori and dominant mainstream paradigms that require a strong evidence base in order to attract funding.

4.6 Barriers due to the absence of spirituality

As mentioned previously, for many Māori, the importance of spirituality and whānau connectedness cannot be underestimated (Durie, 2011; Te Pou o te Whakaaro Nui,

2010; Kennedy, Cram, Paipa, Pipi, & Baker, 2015; Valentine, Tassell-Mataamua, & Flett, 2017). One main criticism of mainstream health approaches is that they fail to recognise this, and their neglect is reflected in the low numbers of Māori who engage well with health services (Durie, 2011).

In traditional Māori philosophy, Māori are considered to be spiritual beings, who are connected to the environment, to one another and to Io[28] - the supreme being (Harmsworth & Awatere, 2013). Their connection exists through the presence of *mauri*[29], which can be translated as 'essence' or 'life principle' (Marsden, 2003, p.6, p.40). In this way of thinking, every object, both animate and inanimate, holds mauri, and because of that, no single object is ever isolated or cut off from another (Marsden & Royal, 2003). An analogy used to describe this way of thinking is that, if you were to point to your toe and ask 'is that me?' the answer would be 'yes', because it is connected to and is a part of, you. In a similar way, if one were to point to a tree, or to the sky and ask 'is that Io?' the answer would be yes, because everything is a part of Io and therefore everything is connected (O. Ohlson, personal communication, September 9, 2018).

Traditionally, Māori also hold that they are connected to the earth and to the heavens through multiple ātua[30] (gods) (Marsden & Royal, 2003). Most importantly, this includes Papatuanuku[31] (earth mother) and Ranginui[32] (sky father). Traditional Māori philosophy holds that elements of nature like the sea, the forest, and the wind, are the children of Papātuanuku and Ranginui, and that they too are gods who should be respected, nurtured and feared (O. Ohlson, personal communication, September 9, 2018).

Another concept central to Māori spirituality, is the concept of whakapapa[33] (genealogy), which connects Māori to their ancestors, to the gods and to future

[28] Io = The supreme being
[29] Mauri = Essence, life-force, life principle
[30] Ātua = Gods, deities
[31] Papatuanuku = Earth mother
[32] Ranginui = Sky father
[33] Whakapapa = Genealogy

generations (Barlow, 1991; Metge, 1995). Whakapapa is key to understanding the concept of whānau, for Māori believe that the individual cannot exist independently of their whānau (Tibble & Ussher, 2012).

A discussion on Māori spirituality would be incomplete if it failed to address the influence of missionaries during the process of colonisation, for during the assimilation process, many Māori abandoned their traditional spiritual beliefs in favour of those promoted by Christian religions (Barlow, 1994). For those Māori in particular, spirituality is every bit as important as it is to Māori who hold to traditional beliefs, though the content of their beliefs may differ.

Because of its emphasis on spirituality and whānau, Te Whare Tapa Whā has garnered much attention since it was introduced into the literature nearly forty years ago. Notably, the model grew out of a hui[34] that took place between health care professionals and Māori kaumatua,[35] who in the 1980's, were responding to claims that the health care system was failing Māori (Durie, 1994). However, because Te Whare Tapa Whā is a content-free framework, it is open to being used in a disingenuous and superficial manner by those without a deep understanding of Māori values and spirituality (McLachlan & Huriwai, 2016). This might help explain that fact, that forty years after Te Whare Tapa Whā was introduced into the health community, and despite it being a major feature of the cultural safety programme taught to nursing students in New Zealand (Papps & Ramsden, 1996), the health care system is still largely failing Māori. Thus, while Te Whare Tapa Whā goes some way towards promoting an holistic view of health, absent of any content, it does not necessarily help those who are unfamiliar with traditional Māori concepts, to serve Māori well.

4.6.1 Potential solutions

For genuine change to occur, Māori urgently need access to psycho-physiological therapies that treat the whole person, and which do not treat Māori in isolation from

[34] Hui = Meeting, gathering
[35] Kaumatua = Elder, wise person

their environment or from those around them. This can be achieved by offering therapies that uphold an holistic approach to health and wellbeing, which acknowledge the importance of relationships with others, that incorporate traditional Māori ways of seeing the world (e.g., emphasise interconnectedness with the environment) and that promote spirituality as a central tenet of wellbeing (e.g., Rangihuna, Kopua, & Tipene-Leach, 2018).

4.7 Barriers due to lack of tikanga Māori

Recent findings reported by Slater (2016) showed that many Māori felt unsafe in mainstream health services because the providers did not follow tikanga[36] Māori principles. Consistent with this, Masters-Awatere and Nikora (2017) report that efforts to ensure mainstream health services are appropriate for Māori, and take into account their unique cultural needs, are virtually non-existent. In mainstream services, cultural competency and responsivity occurs primarily at an individual-level and when present, involves a dedicated minority of highly motivated health professionals choosing to complete Te reo and tikanga Māori courses outside of work hours (Sheridan et al., 2011). This is because cultural competency is not an incentivised part of employment (Masters-Awatere & Nikora, 2017). While this could be improved with increased numbers of Māori health professionals entering the work-force, the number of Māori needed to match the demand for their services is unlikely to be achieved in the near future.

4.7.1 Potential solutions

One way to resolve the insufficient numbers of Māori health care workers relative to the number of Māori patients requiring health services, is to increase initiatives such as Te Rau Puawai – a mentoring programme within Massey University that provides support for Māori who are studying to enter the mental health work-force. Alongside such initiatives however, it is argued that urgent change also needs to occur in the way that mainstream services are currently offered to Māori.

[36] Tikanga = Māori traditions, protocols, practices, rituals

In some areas of health, this kind of change is already occurring. For instance, several Pākeha medical doctors - in partnership with Māori - have taken it upon themselves to ensure that cultural responsivity is as important to their practice as professional competence is. The indigenous health framework promoted by the Māori and Indigenous Health Initiative (MIHI) encourages doctors to incorporate powhiri[37], karakia[38], mihimihi[39] and kai[40] processes into health service delivery as a way of improving Māori engagement in health. MIHI promotes a model of health assessment that draws on the powhiri process and highlights the importance of mihimihi (greeting one another), whanaungatanga (sharing of background knowledge), and opening and closing meetings with karakia (prayer) to acknowledge that consumers are entering into a special space when they visit a health professional. Given emergent evidence that such adaptations to delivery can dramatically increase Māori engagement (Jones et al., 2010), it is argued that such practice ought to be made compulsory for every health professional. Until such time as that occurs however, one way to increase engagement in the interim is to incorporate tikanga Māori into the therapies already being used with Māori - as Bennett (2009) did when he adapted CBT for use with Māori clients.

4.8 Barriers at the level of individual health professionals

Evidence has shown that even among Primary Health Organisations that offer low fees as part of their strategy to increase equity, improvements in Māori health are not always seen (Russell, Smiler, & Stace, 2013). One reason for this could be engagement difficulties at the level of the individual health provider, which contribute to Māori not complying with treatments and not seeking help in a timely fashion (Jansen & Smith, 2006; Harris et al., 2006).

Late presentation to services (e.g., not seeking help until symptoms are unbearable), often also means late identification of symptoms, which increases the

[37] Powhiri = Traditional Māori welcome onto a marae
[38] Karakia = Prayer, incantation
[39] Mihimihi = Formal way of greeting another
[40] Kai = food, eating

severity and complexity of many illnesses, and increases the risk of chronic disease (Scott, 2014). One reason many Māori do not present to health services as soon as they become unwell, is because they do not feel comfortable talking to or engaging with Pākeha health professionals (Jansen & Smith, 2008; Scott, 2014). Thus relationships are paramount to engaging Māori in health services (Jansen & Smith, 2008).

Put a different way, if Māori perceive that they are being judged negatively by a health professional, or they find that a health professional regularly uses terms and concepts that they don't understand or agree with, low costs may not be enough of an incentive to foster their engagement. At this level of the health system, perceptions of negative or racist attitudes (interpersonal racism), being patronised, disrespected or *talked down to* by staff, have all been identified as barriers to engagement (Jansen & Smith, 2006; Scott, 2014; Harris et al., 2006; Russell, Smiler, & Stace, 2013). Thus, for Māori who place a high value on relationships and the principles of manaakitanga[41] (hospitality) and awhi[42] (support), such experiences can cause them to be reticent to challenge authority and to adopt attitudes of shyness or whakamā[43] (shame) (Jansen, Bacal & Buetow, 2011).

Thus, while late presentation is sometimes used to place the responsibility for unequal health outcomes squarely in the hands of Māori, given the barriers discussed, it is easy to understand why many Māori would not make it a priority to visit a health professional at the very first sign of illness.

4.8.1 Potential solutions

Engagement and relatability on a personal level is critical for fostering trust and engagement with Māori. Although this applies regardless of whether or not the health practitioner is Māori, the fact remains that the majority of clinicians working

[41] Manaakitanga = hospitality
[42] Awhi = support
[43] Whakamā = shame

with Māori, are non-Māori. Therefore, Māori are at increased risk of being exposed to health practitioners whose cultural values differ from their own, and who may be more susceptible to practicing behaviours and attitudes that are offensive to Māori. In short, the likelihood of ongoing engagement difficulties is high.

In the absence of a Māori workforce that can adequately service the needs of all Māori, one way to foster engagement would be to introduce the option of partnering Māori health workers and non-Māori clinicians together when delivering group based health services. This concept, which builds on the braided rivers framework proposed by Macfarlane, Macfarlane and Gillon (2015) could have multiple benefits for all involved: 1) it could increase the cultural competency of the non-Māori clinician, 2) it could increase the level of engagement experienced by tangata whaiora and 3) it could increase the clinical skill of the Māori health worker.

4.9 Summary

Although efforts to repair the inequity caused by colonisation have been made by the Aotearoa New Zealand government (e.g., enabling iwi to set up their own health services), barriers preventing Māori from accessing equitable healthcare remain at every level of the system. Taken together, the research suggests that mainstream health care does not respond well to the needs of Māori (Slater, 2016; Russell & Smith, 2006; Harris et al., 2006) and that Māori health is compromised as a result.

Previously identified barriers suggest that Māori engagement in services might improve if there were more Māori clinicians providing health care services to Māori, if the non-Māori practitioners providing care were more culturally responsive, if models of health that fit with Māori views of wellbeing were promoted and if treatments that have been shown to be effective with Māori were utilized.

In short, there is a need for better access to and promotion of health care models that fit with Māori ways of viewing the world. To be effective, such models need to be collectivistic (rather than individualistic) in nature, endorse holistic ways of

viewing health (rather than mechanistic views), foster experiential change over Western derived talking therapies, and honour cultural practices with enduring evidence of efficacy (such as spiritual connection to the environment, which has remained an integral part of Māori wellbeing for hundreds of years) as on par with other evidence based practices. Improving access to such models might lead to improved engagement of Māori with health services, which could lead to Māori presenting earlier when they notice symptoms, which could in turn mean receiving treatment sooner, thus reducing the risk of illness complication, and minimising the development of chronic disease and subsequent early death.

Chapter 5 - Mindfulness therapy for Māori

5.1 Outline and aims

This chapter introduces the concept of mindfulness meditation and argues that mindfulness based interventions could provide a much needed bridge between traditional Māori understandings of health and the current bio-medical medical. While Chapter 4 highlighted problems with current models of health and treatments offered to Māori using mainstream services, this chapter argues that mindfulness meditation could offer a way of resolving many of those issues, in part because many of the principles inherent in mindfulness overlap with Māori ways of seeing the world.

This chapter also outlines the ways in which mindfulness meditation fits with a psycho-physiological approach to health care that is consistent with the allostatic load model detailed in Chapter 2. It introduces evidence suggesting that mindfulness works by decreasing arousal in the stress response system, which could offer specific benefits for those who have experienced adverse events in childhood. The chapter ends with an overview of the evidence base surrounding mindfulness meditation, as well as its current status as a treatment modality in Aotearoa New Zealand.

5.2 Meditation and the relaxation response

Various forms of meditation have been practiced for over 2500 years (Germer, Siegel, & Fulton, 2005). At its most basic level, meditation involves finding a quiet environment, taking a comfortable position (to minimise muscular effort), adopting a passive attitude in which no judgement about performance is made, and locating a mental device to focus attention on – such as a word or a sound. More advanced levels of meditation practice can involve chanting, walking, doing yoga movements, or meditating while completing tasks (such as eating) (Friedman, 2002).

Meditation practice is a central focus of the present study because evidence has linked meditation with improved ability to cope with stress, and one of the core arguments of this thesis is that chronic stress and adverse childhood experiences contribute to premature death among Māori through dysregulation of the stress response system. Meditation is thought to reduce arousal of the stress response system by activating the *relaxation response*, which is associated with the *parasympathetic nervous system* (PNS), resulting in decreased blood pressure, reduced respiration rate, and slowed pulse rate (Friedman, 2002). The PNS is responsible for restoring balance after the sympathetic nervous system (SNS) has been triggered (McEwen, 2016). Thus, meditation could be said to work by helping to regulate the neuroendocrine stress response system. The implication of this, is that it might be especially effective for those who have experienced chronic stress.

5.3 Mindfulness meditation

Mindfulness meditation is a specific form of meditation that draws from the traditions of Buddhism, but is considered to be a secular spiritual practice that requires no affiliation to an organised religion (Germer, Siegel, & Fulton, 2005). Since the first standardised, group-based protocol of delivery was developed in 1979, mindfulness-based therapies have gained increased acceptance in the medical and psychological worlds as viable treatments for a range of chronic mental and physical diseases (Kabat-Zinn & Hanh, 2013).

5.3.1 Mindfulness Based Stress Reduction (MBSR)

The principle of mindfulness involves paying attention to the present moment, with full awareness, and without judgment (Kabat-Zinn & Hanh, 2013). Although records suggest that this *particula*r form of meditation has been practiced for over two millenia (Siegel, Germer, & Olendzki, 2009), Western medical professionals have only endorsed mindfulness as a treatment for chronic disease since Dr. Jon Kabat-Zinn at the University of Massachusetts Medical School developed it into a structured, therapeutic intervention (Kabat-Zinn & Hanh, 2013; Siegel, Germer, &

Oldenzki, 2009; Niazi & Niazi, 2011). The course he developed, known as mindfulness-based stress reduction (MBSR), uses mindfulness to alleviate the suffering associated with a variety of physical, psychosomatic and psychiatric disorders and is one of several *third wave* health interventions that integrate traditional Eastern practices with the principles of Western medicine (Kabat-Zinn & Hanh, 2013; Niazi & Niazi, 2011).

The MBSR programme utilises a group format and consists of eight weekly meetings of 2.5-hr duration, with an additional one day retreat (Santorelli, 2014). During meetings participants receive training in formal mindfulness meditation techniques and learn simple stretches and postures aimed at cultivating their moment-to-moment present awareness. The goal of those techniques is to help participants disengage from strong attachment to beliefs, thoughts, or emotions, thereby fostering clear thinking and open heartedness (Ludwig & Kabat-Zinn, 2008; Niazi & Niazi, 2011). In keeping with its Buddhist traditions, the ultimate purpose of mindfulness meditation is to cultivate compassion, whilst inviting participants to take greater responsibility for their life choices (Ludwig & Kabat-Zinn, 2008).

5.3.2 Benefits of MBSR therapy

MBSR has been shown to provide improvements for individuals diagnosed with asthma (Pbert et al., 2012), chronic pain (Reiner, Tibi, & Lisitz, 2013), cancer (Carlson, 2016), diabetes (Hartmann et al., 2012), immune disorders (Black & Slavich, 2010) bulimia (Proulx, 2008), skin diseases (Rosenkranz et al., 2013), HIV/aids (Duncan et al., 2012), fibromyalgia (Lauche, Cramer, Dobos, Langhorst, & Schmidt, 2013; Schmidt et al., 2011), gastrointestinal disorders (Zernicke et al., 2013), hot flushes (Carmody et al., 2011), sleep disturbances (Andersen et al., 2013), as well as stress disorders (Boyd, Lanius, & McKinnon, 2017). Most notably, MBSR therapy has been shown to be effective in the treatment of pulmonary arterial hypertension, palpitations and heart disease (Owens et al., 2016; Tulloh et al., 2016). Given knowledge that cardiovascular disease is responsible for almost half of all Māori deaths (Ministry of Health, 2018b), it is argued that MBSR therapy might

be of particular value to Māori. One factor that sets MBSR apart from other treatments is its whole body approach to health. As such, participants who complete an MBSR course often report experiencing both psychological and physiological benefits (Kabat-Zinn & Hanh, 2013).

Psychologically, participants frequently experience enriched interpersonal relationships and social networks, increased motivation to initiate and maintain significant lifestyle changes such as exercising, eating healthily and quitting smoking, enhanced responsibility for their illnesses, which enables them to become more proactive in their recovery and relieves them from the need to take medication, which has the added benefit of a reduction in adverse side effects (Ludwig & Kabat-Zinn, 2008).

Consistent with this, many studies report significant improvements in symptoms of psychological distress at the eight week follow up. For instance, improvements in depression, anxiety and stress have been reported in both community samples (Chiesa et al., 2015; Hoge et al., 2013; Thurston, Goldin, Heimberg, & Gross, 2017), as well as among those who have comorbid physical health conditions including Type II diabetes, (Priya & Kaira, 2018) multiple sclerosis (Simpson, Mair, & Mercer, 2017), HIV (Jam et al., 2010), and breast cancer (Lengacher et al., 2014).

Consistent with a psycho-physiological model of health, studies investigating reductions in chronic pain following MBSR therapy, attribute health improvements to alterations in both the experience of pain and increased tolerance to pain. However, it remains unclear whether mindfulness practice improves conditions like fibromyalgia by reducing perceptions of pain severity (Su et al., 2016; Tibi, Reiner, & Lipsitz, 2013; Zeidan et al., 2012) or by increasing the ability to *tolerate* pain or disability (Mohammed, Pappous, & Sharma, 2018). In the first condition, pain actually reduces. In the second condition the pain still exists but no longer causes distress. Irrespective of whether it exerts a greater influence over the mind or the body, the evidence strongly suggests that mindfulness meditation has benefits for

both, and that those benefits are associated with the areas that contribute to chronic disease.

5.3.3 Mindfulness meditation reduces risk factors for chronic disease

Mindfulness meditation is known to influence key bodily systems linked to chronic disease. This includes the immune system, the metabolic system and the neuroendocrine systems. More than 20 studies have shown that mindfulness training reduces proinflammatory cytokine levels (the signalling molecules that make diseases worse) (e.g., Black & Slavich, 2016; Sanada et al., 2017). For MBSR participants, this means an improved immune system response to illness.

A recent randomised control trial that compared the fasting glucose levels of overweight women completing an MBSR course with those completing a health education course, found that those in the MBSR group recorded significant reductions in fasting glucose levels and perceived stress levels at both eight week and 16-week follow up, but those in the health education group did not (Raja-khan et al., 2017). The implication of this was reduced risk of developing Type II diabetes for those in the mindfulness group, but not for those in the health education group. Similarly, mindfulness meditation has been shown to increase activity in sedentary individuals, thereby contributing to weight loss, and potentially reducing visceral obesity, which is another major risk factor for chronic disease (Meyer et al., 2017).

Studies which have used objective measures such as magnetic resonance imaging (MRI) technology to monitor changes in psychological health, show that mindfulness meditation is linked with improvements in selective and executive attention, working memory, executive functioning and cognitive flexibility, all of which are linked with improved ability to regulate emotions and adapt to stress (Gallant, 2016; Willekens, Perrotta, Cras, & Cools, 2018). This implies improvements in psychological distress.

Of importance to this study, evidence also suggests that MBSR training has a favourable influence on the cortisol profiles of individuals suffering from chronic

disease (Sanada et al., 2016). Of note, two studies have reported that early-stage cancer sufferers showed systematic decreases of overall cortisol levels after completion of an MBSR program, as well as significant improvements in overall quality of life, perceived stress and quality of sleep (Carlson, Speca, Patel, & Goodey, 2003; Witek-Janusek et al., 2008). In addition, prolonged increases in the cortisol awakening response (CAR) following MBSR therapy, have been reported among women diagnosed with breast cancer (Matousek, Pruessner, & Dobkin, 2011), as well as patients receiving treatment for substance abuse, who would typically show hypo-cortisolemic profiles (Marcus et al., 2003). Similar improvements in cortisol regulation have been reported in studies investigating the relationship between MBSR and acute stress exposure (Rosenkranz et al., 2013). Furthermore, Brand, Holsboer-Trachsler, Naranjo and Schmidt (2012) reported reductions in the CAR of 20 novice MBSR participants eight weeks after starting mindfulness training. Although the evidence linking mindfulness based interventions to cortisol regulation cannot yet be considered conclusive (O'Leary, O'Neill, & Dockray, 2016), taken together, the results of such studies suggest that MBSR training might aid in the regulation of adult cortisol profiles, whilst at the same time reducing the adverse and diffuse psychological and physiological effects of chronic stress and disease.

5.4 Criticism of mindfulness

In the last ten years, both exposure to and the study of mindfulness-based interventions has exponentially increased (Didonna, 2016). In the absence of regulatory bodies ensuring integrity to the principles of mindfulness meditation however, many variations of the MBSR course have arisen, though not all have participant well-being at their core. Referring to businesses that have commercialised mindfulness practices in order to enhance worker productivity, the founder of the MBSR programme, Jon Kabat-Zinn, has coined the term ‘superficial McMindfulness’ (Sherwood, 2015). Criticism of claims that mindfulness is a panacea for all mental and physical health problems (which it most clearly is not) have also emerged in the literature, as has awareness that some people experience an

increase in distress during meditation because they are finally allowing their bodies and minds to experience sensations that they would normally ignore (Farias & Wikholm, 2016).

One problem with many studies of mindfulness, is that they rely heavily upon cross-sectional, self-report data. Self-report data is highly amenable to effects such as experimenter bias and researcher cues (i.e., saying what they think researchers want to hear), therefore there is a need for more studies that use objective biomarkers (such as cortisol levels) as the determinants of health (Althubaiti, 2016; Simpson & Mapel, 2011). An additional problem is that in the absence of multiple methods of assessing treatment effectiveness, when health outcomes do improve following MBSR therapy, it is unclear whether mindfulness (i.e., increased awareness) in itself was directly responsible for the improvements experienced by participants, or whether improvements were the result of concurrent improvements in relationships, activity levels or generally positive lifestyle changes (Farias & Wikholm, 2016). Regardless, self-reported improvements in relationship quality and activity levels can be considered beneficial in and of themselves.

To summarise, many of the studies mentioned above imply that the effectiveness of mindfulness meditation can be attributed to both psychological and physiological processes. Psychological changes can occur through altered perceptions of lived experience, improvements in relationship quality, and improvements in cognitive functioning. Mindfulness can also improve physiological health by directly influencing the biological pathways that affect health e.g., the immune system, the metabolic system, and neuroendocrine systems - all of which are associated with chronic disease (Ludwig & Kabat-Zinn, 2008)

5.5 MBSR fits well with Māori worldviews

There are many reasons to believe that mindfulness might be of value to Māori experiencing chronic stress. Chapter 4 argued that barriers to engagement for Māori exist at every level of the healthcare system, but it also offered ways in which those

barriers could be overcome. Based on that information, the following section shows how MBSR therapy could be an appropriate intervention for use within the New Zealand health-care system.

5.5.1 MBSR is informed by an holistic view of health

As discussed previously, traditional Māori views of health are holistic in nature, meaning many Māori believe, that the mind, body, spirit and whānau are all interconnected and changes in one domain lead to changes in the others (Marsden & Royal, 2003). Given this, many Māori also believe that treatments are most effective when they treat the whole person, not just 'parts' of the person (e.g., when they don't treat the mind and body independently of one another the way the bio-medical model does) (Jansen & Smith, 2006). Māori worldviews fit well with the Eastern philosophy that underpins mindfulness meditation, in that mindfulness is an integrated psycho-physiological practice that requires the active participation of both the mind and the body in order to be effective. Consistent with this, the MBSR programme utilises both sitting and moving meditations that aim to increase awareness of how the body and mind are interconnected. This implies that it could be widely accepted by Māori using mainstream health services.

5.5.2 MBSR therapy promotes spirituality

One of the main barriers outlined in Chapter 4 was that mainstream health neglects the importance of spirituality (Durie, 2011). For Māori, spiritual health is the most crucial element of wellbeing (Durie, 1994). In the 1800's, when healing from Western diseases and illnesses proved beyond the capability of Māori tohunga[44], it was the belief that illness was caused by spiritual violations, that prompted many Māori to convert to Christianity (Owens, 1968). As mentioned previously, traditional Māori spirituality emphasised connection to the land of Aotearoa New Zealand, connection to whakapapa and connection to mauri (Harmsworth & Awatere, 2013). Sharing this view, mindfulness meditation is a secular spiritual practice that fosters

[44] Tohunga = Expert, healer

connection to oneself, connection to the environment and connection to others. In short, mindfulness does not claim allegiance to any particular religion, but it does encourage spirituality (Didonna, 2008).

Assertions of overlap between mindfulness and Māoritangacan be seen in the following excerpts, taken from promotional material advertising the International Conference on Mindfulness 2019:

“For Māori, mindfulness practices for healing and wellbeing enhance the connection to Te Ao Wairua (the spiritual world) and Te Ao Turoa (the natural world).”

“Papatuānuku (earth mother) is our protector, provider, nurturer and teacher. Mindfulness helps us to stay grounded and connected to Papatuānuku. When we walk on Papatuānuku with our bare feet, not only do we feel connected to her, we also feel protected. When we look towards the hills, mountains and sea, we take in the beauty around us that fills the spirit, nourishes the mind and strengthens the body” ("International Conference on Mindfulness," 2019).

5.5.3 MBSR is group based therapy

MBSR consists of eight weekly sessions run in a group format (Santorelli, 2017). As such, classes can be scheduled outside of work hours. As outlined in Chapter 4, given the structural level barriers to health care that make it difficult for some Māori to access treatment (e.g., work hours and high costs), group based therapy might be a viable way of keeping operational costs down, while maximising time efficiency. More importantly, offering group based therapy might be a more attractive option to some Māori than one to one counselling is. This is especially true for those who would prefer to learn and practice in the company of others and who enjoy the benefits of a collective.

5.5.4 MBSR is experiential therapy

Where the CBT model of treatment typically asks participants to analyse their individual thoughts (such as 'I'm unlovable') and dispute them (while at the same time changing their behaviour) (Westbrook, Kennerley, & Kirk, 2007), mindfulness promotes consideration of the thought process itself (Kabat-Zinn & Hanh, 2013). This fosters detachment from the content of thoughts altogether. This process disrupts the habit of becoming 'caught up' in thoughts by effectively uncoupling the thought from the physiological response or behaviour that would normally accompany it (Ludwig & Kabat-Zinn, 2008). For example, if the thought 'I've failed' typically produces feelings of sadness and an experience of tightness in the chest for an individual, CBT would encourage the adoption of a more balanced view that was less global in nature – which might then lead to a reduction in tension and sad feelings.

Mindfulness meditation on the other hand, would encourage observation of the thought, without attaching any meaning to that thought. Thus, a mindfulness teacher might encourage their student to notice that the thought exists, but not to engage with the thought i.e., simply to watch it and then wait until a new thought crosses the mind and then to observe that thought in the same way. In effect, mindfulness practice trains the brain to focus on simply being present and observing moment-to-moment experiences, without judging those experiences – much like watching clouds pass through the sky (Kabat-Zinn & Hanh, 2013).

Practicing 'being present' in this manner is considered a form a spirituality, in that it trains the ability to connect with direct experience, rather than to avoid or evaluate or analyse that experience. It is this experiential component that could make mindfulness meditation an ideal therapy for Māori, especially for those who have struggled or might struggle to engage with talking therapies like CBT.

5.5.5 MBSR concepts overlap with concepts in Te Ao Māori

Chapter 4 highlighted the fact that some Māori do not feel safe within mainstream services because of the lack of Māori tikanga practiced by health professionals (Slater, 2016). Consistent with this, evidence suggests that the contrast between dominant Western worldviews and traditional Māori ways of seeing the world act as a further barrier to Māori engagement (Russell, Smiler, & Stace, 2013). Links between traditional Māori concepts and concepts inherent in mindfulness have recently been made by others interested in promoting mindfulness meditation. For example:

“Meditation in the world of Tāne was practised by our tupuna (ancestors) to help them achieve greater levels of learning, awareness and understanding. Through this they were able to gain, retain, recite and teach knowledge in their area of expertise, be it whakapapa (genealogy), navigation by the stars, gardening, composition of waiata (songs and chants) or whaikorero (oratory). Māori cultural practices that support mindfulness include manaakitanga (respect, generosity and care for others); aroha (love, compassion and deep affection); kaitiakitanga (look after, care for and protect) and karakia (recite blessings, forgiveness and compassion.) In a mindfulness context, mauri is the potential tangible and intangible energy that lies within a person (Mauri Noho), the energy that provides the awakening of acknowledgment of cognitive and spiritual processes (Mauri Oho), and the energy that moves towards a healthy state of well-being (Mauri Ora)” (“International Conference on Mindfulness” 2019).

Thus, there appears to be a high degree of overlap between concepts embedded in Te Ao Māori and concepts inherent in mindfulness meditation.

5.5.6 MBSR can be adapted for minority groups

The standardised MBSR course has been shown to be effective with several minority populations, including Latino (Ortiz, 2015), African-American (Proulx, 2018;

Szanton, 2011) and Native American Indians (Proulx, 2018). Furthermore, the standardised course has been adapted to make it more suitable for Spanish speaking participants (e.g., relating mindfulness concepts to concepts in Latino culture) (Roth & Robbins, 2004), as well as participants in Hong Kong (Hue, 2011) and participants with acquired brain injuries (Johansson, Bjuhr, & Ronnback, 2012). Those adaptations have shown that the course remains effective even after small changes are made, as long as the structure of the programme remains intact i.e., eight weekly group sessions of 2-2.5 hr duration and one full day workshop between weeks six and seven. Thus, the evidence suggests that MBSR shows promise as an effective intervention for a diverse range of people, and can withstand small changes made in the service of enhancing communication of ideas.

5.5.7 MBSR promotes non-judgmental practitioners

Research into the effectiveness of MBSR therapy shows that the authenticity and experience level of the teacher can have a large influence on the outcomes experienced by participants (McCown, Reibel & Micozzi, 2011). For this reason, Kabat-Zinn and Hanh (2013) specify that teachers of the MBSR programme need to have practiced mindfulness meditation themselves for a minimum of one year before even starting their teacher training. This is to increase the likelihood that the teacher will embody the qualities promoted by MBSR therapy. Those qualities include non-judging, patience, a beginners mind, trust, non-striving, acceptance and letting go (Kabat-Zinn & Hanh, 2013). Recall from Chapter 4, that some of those same qualities are likely to appeal to a Māori audience (e.g., non-judging), because of past negative experiences they might have had with health professionals. Thus, teacher selection is of utmost importance. Furthermore, because MBSR therapy is run in a group format, it is an ideal setting in which to partner culturally proficient Māori health workers with expert mindfulness practitioners who are non-Māori, to ensure integrity to the course curriculum integrity, as well as cultural responsivity - in the absence of Māori health professionals who can independently fulfil both roles.

5.5.8 MBSR bridges between Māori and bio-medical model

As discussed in Chapter 4, one way to immediately increase access to evidence based treatments that are effective for Māori, is to draw from models with an existing evidence base and then partner with Māori to ensure they are a suitable fit with Māori worldviews. Mindfulness meditation has a strong evidence base supporting its effectiveness with a diverse range of people and a number of psychological and physiological health conditions (Germer & Siegel, 2005). The fact that mindfulness based interventions are already being implemented in numerous primary schools around Aotearoa New Zealand supports its acceptance in the wider community. Jase Te Patu's *M3* primary school programme draws heavily on the concepts of Te Whare Tapa Whā, and integrates them with principles of mindfulness as described in the following excerpt:

"Through the mindfulness we tackle hinengaro and wairua, through movement obviously Tinana, and then through doing it together in the sense of whakapapa and learning our stories, that sense of whakawhanaungatanga" (Te Kārere, 2014).

Additionally, an organisation known as the *Mindfulness Education Group* in the Bay of Plenty, is trialling a mindfulness-based programme in primary schools named 'pause, breathe, smile'. The developers are currently collecting data related to its effectiveness in increasing attention and concentration in the classroom setting (Mindfulness Education Group, 2018). A mindfulness-based programme is also currently being co-designed with students at a kura kaupapa[45] Māori immersion special character school, which involves utilising Māori practices the children are already fluent in (such as karakia and waiata[46]) and helping them to use those skills to regulate their breathing, focus attention and become more present (McDonald, 2017).

[45] Kura kaupapa = Māori immersion special character school
[46] Waiata = song, singing

To the best of the author's knowledge, only one study has thus far published findings from an MBSR programme with Aotearoa New Zealand participants. Simpson and Mapel (2011) collected data from twenty-nine patients with chronic health problems who completed a waitlist control study. Findings showed statistically significant improvements and clinically meaningful change on all measures, which included the Depression, Anxiety, and Stress Scale (DASS), the Short Form-36 Health Survey (SF-36) and the Kentucky Inventory of Mindfulness Skills. Their research suggested that MBSR could be an effective adjunctive therapy for those with chronic health problems, lessening the need for medical intervention.

5.6 Summary

Current interventions offered to Māori have emerged from Western perspectives of health that perpetuate a mechanistic view of the mind and body. Such models conflict with Māori ways of viewing health and as such, contribute to the barriers facing Māori at every level of the health system. Mindfulness meditation assumes an holistic view of wellbeing, it is a spiritual practice comprised of concepts that overlap with traditional Māori beliefs about connection to the wider world, it utilises both mental and physical exercises to calm the arousal response of the SNS which makes it an ideal intervention for those experiencing chronic stress, it utilises a group format which makes it an ideal therapy for those with highly collectivistic cultural values, it is experiential which makes it suitable for those who find it difficult to articulate their thoughts and feelings, it has a strong evidence base which makes it an attractive option for funding models that require practitioners to use evidence based practices, it has been successfully adapted for minority groups in other countries and there is strong evidence that it leads to physical and psychological health benefits, especially in areas considered to increase risk for development of chronic disease, such as visceral obesity, psychological distress and hypertension.

Thus, by implementing MBSR therapy and making the connections between mindfulness and Māoritanga explicit, as well as consulting with Māori and partnering with them to ensure integrity of tikanga concepts, barriers at the levels of

governance, as well as structural, cultural, organisational and health provider levels of the health system, could be overcome. For these reasons it is predicted that mindfulness might find acceptance with many Māori and as such, could provide a bridge between Māori worldviews and mainstream health care. If successfully applied, such an intervention could lead to increased engagement of Māori in health services and a reduced risk of Māori dying early from chronic disease.

Chapter 6 – The present study

6.1 Outline and aims

This chapter outlines the three research questions guiding this project. The first research question examines associations between adverse childhood experiences (ACEs) and a constellation of physiological and psychological health outcomes among a group of Māori women. The second research question examines the women's responses to the course. The third research question examines the effectiveness of a culturally enhanced mindfulness based stress reduction programme with those same women using empirically validated measurements. Each question is followed by a brief rationale, which places it within the context of the extant literature. The chapter ends with an outline of the methodological underpinnings of this project.

6.2 Research question one

1. *How frequently would the following outcomes co-occur in Māori women who have reported adverse childhood experiences (ACEs):*

a. *chronic life stress*
b. *cortisol dysregulation*
c. *visceral obesity*
d. *psychological distress*

Given evidence linking exposure to adverse childhood experiences with poor health outcomes in adulthood, this question sought to examine factors associated with that link (Felliti et al., 1998). It has been proposed that adverse childhood experiences cause pervasive and enduring changes in the stress response system (i.e., cortisol dysregulation), which in turn contributes to chronic life stress, visceral obesity and psychological distress (i.e., allostatic load), which together, increase the risk of developing chronic disease.

Adverse childhood experiences and poor health outcomes feature prominently in Māori communities, therefore one aim of this research question was to expand existing research and investigate associations between cortisol dysregulation and allostatic load among Māori women specifically. If the investigation showed that the above constellation of features were prevalent among a sample of adult Māori women who experienced adversity in childhood, it would warrant further investigation in a larger population based study. To the best of the author's knowledge, this is the first study to investigate associations between these variables with a sample of Māori women.

To answer this question, eight Māori women who reported childhood adversity, completed questionnaires measuring life stress exposure over the past 12-months, as well as psychological distress in the form of depression, anxiety and trauma symptoms. Waist circumference measurements (used as indicators of visceral obesity) and repeated salivary cortisol sampling, provided in depth information about their HPA axis functioning.

6.3 Research question two

2. *How would a group of Māori women with high ACE scores respond to a culturally enhanced Mindfulness Based Stress Reduction course?*

Given the range of chronic health problems faced by Māori and the urgency with which effective and time-efficient treatments are needed, an intervention shown to have benefits for a variety of both physical and mental health problems is worthwhile studying. This was but one reason for selecting Jon Kabat-Zinn's Mindfulness Based Stress Reduction (MBSR) course as the intervention for this study. Additional reasons are outlined in Chapter 5.

This research question was prompted by section 1.4.1 of the Code of Ethics, which requires that 'Psychologists seek to be responsive to cultural and social diversity and as a consequence, obtain training, experience and advice to ensure competent

and culturally safe service' (Code of ethics review group, 2012). To that end, this research question sought to introduce into the literature, several cultural enhancements to a standardised mindfulness intervention that could act as a guide for future practitioners interested in utilising this approach with their Māori clients. Those enhancements are outlined in detail in Chapter 7.

Exploring each participants' lived experience of the course was considered worthwhile both for the purposes of this project and for the enhancement of future programmes. To do this, individual interviews were conducted both at the start and at the end of the course. The pre-treatment interview asked participants to outline any initial conceptions of mindfulness, which enabled the researchers to examine how understandings of mindfulness would change as a result of course attendance. The pre-treatment interview also assessed participant's initial expectations of the course and its potential benefits, which provided a baseline for measuring how successful and effective the programme was from their perspective. The post-treatment interview explored participant's receptiveness to the non-Māori teacher, as well as their responses to the group setting, the course content and structure. Additionally, the post-treatment interview explored factors that acted as barriers and incentives to participation.

6.4 Research question three

3. *How would a culturally enhanced Mindfulness Based intervention influence the psychological and physiological profiles of Māori women with high ACE scores?*

This research question was prompted by a review of 13 evidence-based interventions currently offered to Māori by psychologists in Aotearoa New Zealand, which showed that only one of them had been validated for use with a Māori population (Te Pou o te Whakāaro Nui, 2010). This is problematic for several reasons: Psychologists who practice in Aotearoa New Zealand are required under section 2.1.2 of the Code of Ethics, 'to use the most respectful and *effective*

interventions or strategies for those with whom they are working' (Code of ethics review group, 2012). At present, Cognitive Behavioural Therapy for depression is the only mainstream intervention that has been empirically tested with Māori participants (Te Pou o te Whakaaro Nui, 2010). This implies that psychologists working with Māori who present with other diagnoses, are utilising strategies that have not been shown to be effective for them. If Māori are being treated with interventions that have not been shown to be effective for them, and the rates of mental illness among Māori are increasing (as evidenced by recent data released by the Ministry of Health), then the absence of evidence supporting the use of current interventions leaves psychologists open to the accusation that their treatments might be doing more harm than good. At the very least, this suggests that the need for studies investigating the effectiveness of interventions with Māori populations is not only vitally important, but also urgent.

To answer this question, a group of wāhine Māori were invited to participate in an eight week MBSR course that had been culturally enhanced to make it more suitable for a Māori audience. Participants completed a range of empirically validated psychological and physiological tests before, during and after the course to enable accurate assessment of clinically meaningful change.

6.5 Rationale for selecting Māori women with childhood adversity

As discussed in Chapter 3, rates of chronic mental and physical disease among Māori are concerning both because of their prevalence and because of the intensity with which Māori experience them. Of added concern, within the Māori population the burden of chronic physical and mental distress appears to fall unevenly upon the shoulders of wāhine Māori, for whom stroke mortality, rheumatic heart disease, cancer mortality rates and 12-month prevalence rates of psychiatric illness, are all higher than for Māori men (Ministry of Health, 2018f; Oakley Browne, Wells, & Scott, 2006). One factor contributing to this might be the progression from historical trauma to chronic disease as outlined in the Extended ACE pyramid (see Figure

2.4), which is more salient for Māori women as a result of the historical and societal factors described.

Considered within the framework of the extended ACE pyramid, the progression for some Māori women from historical trauma, to poor social conditions, to adverse experiences in childhood, to high allostatic load, to engaging in health-risk behaviours (such as overeating), to experiencing chronic disease and early death, seems not only understandable, but in the absence of a major intervention, perhaps even inevitable. As the bearers of children, the health of wāhine Māori directly impacts the health of the next generation of Māori, which makes Māori women a priority for urgent health interventions.

The reason for setting adverse childhood experiences as a key criterion for participation is because research which uses cortisol levels as an indicator of HPA axis functioning sometimes produces inconsistent findings. One possible reason for this is that researchers often fail to account for the important role that adverse childhood experiences plays in setting up the adult cortisol profile. By proactively selecting participants who reported experiencing adverse events in childhood, that potential confound was minimised in this study. Also, by choosing to study participants of the same sex, any potential confounds relating to sex-related hormone differences were eliminated.

6.6 Rationale for focus on chronic stress

Evidence associating childhood adversity with cortisol dysregulation, visceral obesity and psychological distress often includes chronic stress as a variable of interest. There are a number of reasons for this.

Firstly, adverse childhood experiences can prime individuals for engaging in behaviours that generate ongoing stress across the life span (e.g., the stress generation hypothesis) (Hammen, 2006). To illustrate, a Māori woman who experienced frequent abuse as a child might start drinking alcohol at a young age to

help her cope with ongoing feelings of stress related that abuse. The effects of drinking heavily might then contribute to her becoming an early school leaver, which could prevent her from being able to secure, stable work, which might in turn affect her ability to secure stable accommodation. The flow on effects of unstable accommodation and addiction are likely to contribute to ongoing difficulties maintaining relationships, as well as negatively affect her self worth, and perpetuate chronically stressful life conditions.

Secondly, adverse childhood experiences are often associated with PTSD, which in turn is associated with hypo-cortisolism (Swopes, Simonet, Jaffe, Tett, & Davis, 2013; Thaller, Vrkljan, Hotujac, & Thakore, 1999). It is hypothesised that this association is due to the person re-experiencing traumatic events through flashbacks, or nightmares, or by ruminating on past events over the course of many months/years (Nursey & Phelps, 2016). Each time a person re-experiences previous trauma, a physiological stress response is triggered, which contributes to perceptions of chronic stress, as well as to wear and tear on the body (Iffland & Neuner, 2016).

For Māori women in particular, any experiences of chronic stress are likely to be compounded if they also belong to a whānau that is comprised of many members (e.g., up to 500) (Tibble & Ussher, 2012), or if they hold collectivistic values which conflict with the messages promoted by mainstream society (Ketu-McKenzie, 2011), and/or if they (like other indigenous minorities) regularly experience interpersonal racism (Berger et al., 2017). Thus, it was expected that the women in this study would report experiencing chronic exposure to stressful events, and that they would also score highly on a measure of perceived stress.

6.7 Rationale for focus on cortisol profiles

Cortisol profiles were of primary interest for this project because of evidence that dysregulation in the HPA axis is the underlying mechanism through which many of the psychological and physical health problems experienced by Māori, are both

initiated and maintained (McEwen, 2016). Given that many of the factors contributing to chronic disease likely converge on psychosocial stress, and that cortisol output is an important physiological indicator of psychosocial stress, focusing on each participant's cortisol profiles was an appropriate way to ascertain the current functioning of each individual's HPA axis (Dickerson & Kemeny, 2004). The ease with which cortisol samples can be procured using non-invasive sampling techniques, made it possible to collect multiple saliva samples from every person in the study. This enabled accurate measurement of baseline cortisol profiles as well as changes in their profiles across time.

As mentioned previously, one limitation faced by studies testing the effectiveness of psychological interventions in adults, is that they lack physiological data to triangulate the information provided by self-report measures (Simpson & Mapel, 2011). Although the importance of honoring the lived experiences of participants by gaining insight into their self-perceptions cannot be underestimated, to avoid such criticism and to increase the robustness of this study's findings, cortisol output (a biomarker of health) was used to evaluate both baseline HPA axis functioning and to measure the intervention's effectiveness, alongside self-report.

One final consideration when selecting cortisol profiles as a variable of interest was that, because cortisol levels are sensitive to psychosocial stress, the dysregulated HPA axis hypothesis could be tested from two opposite angles. For instance, the cortisol data could help answer research question one by indicating whether or not chronic activation of the HPA axis (as a result of adversity in childhood and chronic stress) would result in baseline hypo- or hyper-cortisolism for each participant. Additionally, the cortisol data could help answer research question two by showing whether or not the converse was also true, that reducing arousal of the HPA axis through mindfulness meditation, could lead to regulation of the HPA axis, as evidenced by normal cortisol output post-intervention.

Thus, the decision to focus this investigation on the cortisol profiles of each participant was informed by knowledge that triangulating the self-report data with

physiological data would increase the robustness of the research findings. It was also considered that capturing cortisol profiles with salivary assays would provide the best and most accurate physiological data to test the theory on which this project was built.

6.8 Rationale for focus on visceral obesity

Prevalence rates of overall adiposity (as measured by Body Mass Index) are higher for Polynesian adults when compared with European/Other adults in Aotearoa New Zealand (Ministry of Health, 2018i). However, within those measurements there appears to be a difference in how body fat is distributed across those groups, with Pacific groups tending to show greater levels of visceral obesity. Visceral obesity is considered particularly unfavourable because of its association with many chronic diseases that disproportionately affect Māori women, including insulin resistance, diabetes, hypertension and cardiovascular disease (Oetzel et al., 2017; Theodore, McLean, & Te Morenga, 2015).

Building on animal models, Tomiyama, Dallman and Epel (2011) have shown evidence of a *chronic stress response network* in chronically stressed women that might explain some of the disparate patterns of body fat distribution between women of Polynesian descent and women of European descent. As discussed in Chapter 3, Tomiyama, Dallman and Epel (2011) showed that women who self-reported experiencing high levels of stress were found to have significantly greater visceral obesity measurements. They also showed a blunted cortisol response to a lab stressor, had flatter daily cortisol slopes and reported greater urges to eat in response to stressful events. This finding is consistent with the hypothesis that prolonged exposure to gluccocorticoids (i.e., cortisol) as a result of chronic stress, leads to *stress eating* as a means of coping, which then promotes abdominal fat deposition. This hypothesis is strongly supported by animal experiments conducted by Dallman, Pecoraro and Warne (2006), who reported that highly stressed rats would repeatedly choose high calorie dense foods following exposure to an uncontrollable stressor, but showed greater abdominal obesity when

compared with non-stressed rats who ate the same amounts and types of food, but under non-stressful conditions.

Therefore, the rationale for choosing visceral obesity as a key variable in this project was to allow testing of a number of hypotheses. Firstly, the hypothesis that both childhood adversity and chronic life stress would result in high visceral obesity in a sample of Māori women; secondly, the theory that women with high visceral obesity would also show dysregulated cortisol output; thirdly, the hypothesis that women with high visceral obesity would also report high emotional eating and/or external eating; fourth, the hypothesis that mindfulness meditation would improve levels of visceral obesity through the introduction of mindful eating.

To summarise, visceral obesity is a major risk factor for chronic diseases in which Māori women are disproportionately represented (Ministry of Health, 2017b). It has been suggested that visceral obesity is triggered through activation of the chronic stress network (Dallman, Pecoraro, & Warne, 2006). Given the hypothesis that dysregulation in the HPA axis might mediate between childhood adversity and chronic disease among Maori women, focusing attention on visceral obesity was appropriate for this study.

6.9 Rationale for focus on psychological distress

Evidence that psychological distress is particularly high among Māori women, led to the adoption of several measurements designed to assess symptoms of depression, anxiety and trauma as defined by the DSM-5 (American Psychiatric Association, 2013). Although it is acknowledged that those categories refer to Western categories of mental disorder that may not be at all relevant to Māori, in the service of generating evidence to evaluate the effectiveness of the MBSR therapy from a Western clinical perspective, a range of questionnaires commonly used to assess mental health were used.

The rationale for choosing depression, anxiety and PTSD symptoms as the outcome measurements for assessing psychological distress was due to the strong associations each has with both early adverse life experiences as well as with chronic stress (Felitti et al., 1998). Evidence has also linked those particular forms of distress with the high rates of suicide recorded for Māori (Baxter, 2007). Additional research has shown links between those specific forms of distress and cortisol output, such that hypo-cortisolism is a common feature of PTSD (Thaller, Vrkljan, Hotujac, & Thakore, 1999), and both hypo- and hyper-cortisolism have been associated with depression (Bremmer et al., 2007). As such, this study expands the literature surrounding cortisol dysregulation and psychological distress.

In short, the focus on three different types of psychological distress seemed warranted because of the high prevalence rates reported for Māori women and because of their associations with cortisol dysregulation and adverse childhood experiences.

6.10 Rationale for focus on MBSR

As noted in Chapter 5, research investigating the influence that third wave interventions such as MBSR therapy can have on both the psychological and physiological health profiles of participants is rapidly expanding (Didonna, 2008). Although numerous interventions have incorporated mindfulness meditation into their treatment programmes (e.g., Acceptance and Commitment Therapy, Dialectical Behavioural Therapy, Mindfulness Based Cognitive Therapy) (Simpson & Mapel, 2011), the MBSR course developed by Jon Kabat-Zinn (Kabat-zinn & Hanh, 2013) was chosen as the preferred modality for this project for the following reasons.

Firstly, MBSR is a standardised course that can be successfully adapted to suit the needs of a diverse range of people, and evidence suggests that it might be particularly effective for women who belong to ethnic and/or racial minorities (Witkiewitz, Greenfield, & Bowen, 2013). Also, the fact that MBSR therapy has been

widely studied in the literature provides a baseline against which the findings from this study can be compared.

Secondly, the MBSR course was specifically designed to help people manage issues associated with chronic physical disease, so it promotes gentle body movements as well as mindful meditation practice (Kabat-Zinn & Hanh, 2013). This means it actively exercises both the mind and the body. Given that MBSR therapy embodies an integrative philosophy of mind-body connectedness, it would appear to fit well with popular Māori models of health and wellbeing.

Thirdly, MBSR is presented in a group format, which given the collectivistic orientation of Māori, might make it more appealing and appropriate than other mainstream treatment models. Group based interventions are also arguably more cost effective than therapies that are provided in a one to one setting (as is promoted in many other mainstream therapies). For this project, the cost of participation for each individual was $300.00. Individualised Cognitive Behavioural Therapy for the same number of hours (24) could range from between $3,120.00 to $4,200.00 (i.e., 24 sessions at $175.00) (Psychology Associates, 2019).

Lastly, MBSR is not considered a talking therapy, which means it may have additional impact with populations for whom clinical nomenclature and/or literacy are known to be potential barriers to engagement (Wratten-Stone, 2016)

In short, MBSR therapy was selected as the intervention of choice for this project because many of its elements fit closely with those promoted by Te Ao Māori. If accepted by Māori participants, MBSR therapy might also prove to be more time efficient and cost effective than current mainstream interventions.

6.11 Methodology and design

The broad aims of this project were to extend previous research linking adverse childhood experiences with chronic health problems, to explore clinically meaningful

change for Māori participants who had completed a mindfulness intervention, and to examine the responses of wāhine Māori to a culturally enhanced MBSR program. Therefore, conducting detailed and thorough analyses using a small *n* approach with just a few Māori participants was considered preferable to collecting data with a larger number of participants. To that end, this Māori centred research project uniquely integrated Western research paradigms and kaupapa Māori methodologies to assess the value of a mainstream intervention for use with Māori women, and examined associations between variables thought to contribute to chronic disease.

The selection of a mainstream intervention and a Western research paradigm for this study occurred after much discussion regarding the merits of utilising only kaupapa Māori methodologies. Research conducted with minority populations is often criticised for its over-reliance on the use of Western methodologies (Smith, 1999). The dominance of such research with indigenous populations is easily evident, leading some to argue that their use is another way in which colonisation disempowers indigenous peoples (Smith, 1999; Bishop & Glynn, 2003). In Aoteraroa New Zealand, critics of the status quo recommend that researchers use kaupapa Māori methodologies when conducting research with Māori to ensure the authentic voice of Māori is both protected and nurtured (Smith, 1999; Durie, 1994).

For this reason, several kaumatua were approached for discussion around this topic during the consultation period of this study. In those discussions, it was agreed that the need for Māori to have access to more culturally responsive psychological treatments was of urgent importance. Given that the majority of psychologists in Aotearoa New Zealand are non-Māori, and the likelihood of a Māori client seeing a non-Māori psychologist is very high, it was considered that the most practical option at this juncture was to use empirical methods to test whether or not a culturally responsive intervention administered by a non-Māori practitioner would be effective from a Western perspective, while at the same time investigating whether such a therapy would be considered acceptable and successful from the view of the Māori participants.

An alternative would have been to develop a kaupapa Māori treatment programme using solely kaupapa Māori methodologies. However, such a programme would likely only be used and endorsed by Māori practitioners, of which there are currently too few to match the demand for services. Additionally, there is evidence that not all Māori benefit from kaupapa Māori research (Eketone & Gibbs, 2006).

For those reasons, this project utilised a case study design and employed a mixed-methods approach to data collection and analysis. The rationale for this design was informed first and foremost by the desire to gain insight into the individual experiences of each wāhine as she completed the course.

Although the gold standard approach for a treatment effectiveness study is to use a randomised controlled trial design that employs a control group, limited access to Māori participants prevented any possibility of conducting such a trial (Coolican, 2004). Moreover, such an approach would have been conducted at the expense of depth and quality of data relating to each participant's experiences. That approach would also have conflicted with the central focus of this project, to place the wellbeing of Māori participants at the forefront of data collection. Therefore, using a case study design enabled repeated sampling of measurements, adding richness and depth to the results - while also enabling the researcher to build strong relationships with the participants, in line with the principles of whanauangatanga, awhinatanga[47] and manaakitanga. In prioritising relationships with the participants, and placing tikanga Māori at the centre of the research process, both kaupapa Māori and Western methodologies were integrated.

The decision to make cultural enhancements to the standardised MBSR course occurred in light of growing criticism that mainstream approaches have been negligent in their testing of therapies with minority populations (Cram, 2014). As such, it is argued that many therapies are not responsive to the needs of unique populations. As mentioned previously, MBSR has been successfully adapted with several minority populations without sacrificing the content or structure of the

[47] Awhinatanga = Ongoing support

original program. Therefore, this study also aimed to provide a map for other practitioners (especially non-Māori clinicians who comprise the majority of the health workforce), interested in using MBSR therapy with their Māori clients.

6.12 Summary

The present study is comprised of three research questions that each investigate a different area of interest. The first research question explores associations between childhood adversity and risk factors for chronic disease. The second research question examines participant responses to the culturally enhanced programme using semi-structured interviews. The third research question assesses the impact of a culturally enhanced mindfulness intervention on the psychological and physiological profiles of a group of Māori women who experienced childhood adversity. Rationale for the selection of each variable of interest, along with an outline of the study's methodology and design show that this is a unique study that integrates several different research paradigms in the service of contributing to the growing need for treatments that appeal to Māori, are effective for Māori and can be delivered immediately to Māori by both Māori and non-Māori practitioners.

Chapter 7 – Cultural enhancements to MBSR

7.1 Outline and aims

This chapter presents an overview of standardised MBSR treatment and outlines the process involved in culturally enhancing the MBSR programme. In standardised MBSR therapy, each session is characterised by a central theme. In this study, each of those themes were integrated with Māori concepts to create a culturally enhanced MBSR programme aimed at engaging a Māori audience. Each of the cultural enhancements is presented in detail, alongside the overall course structure and its content.

7.2 Standardised MBSR therapy

As described, standardised mindfulness-based stress reduction (MBSR) uses a group format and consists of eight weekly classes each of 2-2.5hr duration, with an additional one day retreat that occurs between weeks six and seven (Santorelli, Meleo-Meyer, & Koerbel, 2017). During classes, participants receive intensive training in both formal and informal mindfulness meditation techniques and learn simple stretches and postures derived from Hatha Yoga (Kabat-Zinn & Hanh, 2013). All of the practices aim to cultivate participant's moment-to-moment present awareness. The collective goal of those techniques is to help participants disengage from strong attachment to beliefs, thoughts, or emotions (Ludwig & Kabat-Zinn, 2008; Niazi & Niazi, 2011).

7.3 Culturally enhancing MBSR therapy – Consultation

In adapting the MBSR course to better suit a Māori audience, several individual consultations with local kaumatua and the teacher of the MBSR program were held over a six-month period. In the first instance, the designated theme for each of the eight weekly classes was discussed in depth with the MBSR course teacher to ensure concrete understanding. Once the MBSR teacher was satisfied that the

primary researcher had internalised an adequate understanding of each theme, the researcher met with local kaumatua to discuss concepts in Te Ao Māori that related to each of those themes. The following sections offer detailed explanations of each enhancement.

7.3.1 Integrating tikanga Māori and MBSR therapy

Following agreement between kaumatua and the MBSR teacher regarding how to interpret each theme from a Māori perspective, attention was then turned to other necessary enhancements (e.g., tikanga Māori) that would make the programme more culturally responsive.

The first of these enhancements came in the form of opening and closing each class with relevant karakia. Given that the MBSR teacher himself was not Māori, it was decided that the primary researcher would be responsible for opening and closing each class in the customary manner (i.e., with karakia and mihimihi in te reo Māori). Partnering a Māori health professional with a Pākeha mindfulness teacher to deliver the course was considered ideal because it ensured integrity of the mindfulness content, as well as integrity of the cultural enhancements and adherence to tikanga.

A second enhancement to the standardised MSBSR format involved spending 10-15 minutes of the first class conducting whakawhanaungatanga with the class. This involved having each participant, as well as the researcher and the MBSR teacher, orate their pepeha[48] in front of the group, introducing themselves in a semi-formal way using te reo Māori.

A third enhancement involved having the primary researcher perform karakia kai[49] prior to eating food that had been laid out for participants during the break.

[48] Pepeha = Way of introducing yourself in Māori
[49] Karakia kai = Blessing the food before eating it

A fourth enhancement involved removing the need for an orientation class, given that the researcher would be meeting with each participant numerous times prior to starting the intervention. Final enhancements involved the use of reo Māori during group discussions, and the presentation of koha[50] (gifts) to each of the participants following completion of the course, to acknowledge their involvement and commitment to the project.

The primary researcher (a Māori clinical psychologist) was present at each class and acted as a kaitiaki[51] for participants, to ensure their safety and to facilitate the cultural enhancements to the programme. In practice, this involved having the researcher perform various karakia, introduce the Māori concepts at appropriate times and regularly check in with each participant to ensure they felt comfortable. At no time did any of the participants who attended the course, express a desire to withdraw from it prematurely.

7.4 The therapist

The programme was led by Kovido Maddick, a local Mindfulness practitioner with over 30-years of experience teaching MBSR. Kovido was granted permission to teach the MBSR program by Jon Kabat-Zinn directly, after contacting him in 1995. Locally, he is considered an expert in the field of mindfulness. Kovido is a Pākeha male in his fifties who had no prior experience of teaching mindfulness to a group of Māori women, despite having led mindfulness courses in Aotearoa New Zealand for more than two decades. This disconnect is likely linked to reasons outlined in Chapter 3 regarding many Māori feeling mistrustful of many Pākeha practitioners and Pākeha practitioners being unable to relate to or engage with Māori. It might also be linked to many Māori viewing mindfulness as not relevant to them because it is commonly marketed by Pākeha for Pākeha as a method to increase office productivity (Sherwood, 2015).

[50] Koha = gift
[51] Kaitiaki = guardian

The rationale for choosing a non-Māori male practitioner to lead the course was twofold. First, it is widely accepted that the quality of results experienced by participants in MBSR courses worldwide, is directly related to the experience and authenticity of the teacher leading the programme. Second, given the predominance of non-Māori practitioners offering psychological therapies to Māori clients in Aotearoa New Zealand it was considered worthwhile to test whether or not a non-Māori teacher could elicit significant improvements from a sample of Māori women. As discussed previously, to ensure adherence to the cultural enhancements outlined below and to ensure tikanga Māori was followed, the primary researcher sat in on all MBSR sessions as a co-facilitator. This added another layer of support for any wāhine who might have felt uncomfortable at any time. The offer of additional support was made explicit to each participant when they agreed to join the project.

7.5 Study Settings

The culturally enhanced MBSR course was run from a room at Community House in central Dunedin City. Classes were run on a Thursday evening from 7pm until 9pm for eight consecutive weeks between the months of September and November. This location was chosen because of its centrality and ease of access for the majority of participants. Between weeks six and seven of the programme, a full-day mindfulness workshop was held on a Saturday at a Scout Hall in Hooper's Inlet, Dunedin. Prior to booking this location, two local Marae were contacted to see if a wharenui[52] would be available to run the one-day workshop but neither were available on that particular day.

7.6 Outline of course content and cultural enhancements

A summary of the content and structure of the standardised programme is outlined below as it is presented in the Mindfulness-Based Stress Reduction Authorised Curriculum Guide (Santorelli, Meleo-Meyer, & Koerbel, 2017). Each section is

[52] Wharenui = Māori meeting house

followed by an overview of the cultural enhancements this study made to the programme.

Orientation Session

The main aim of this session is to:

- Familiarise participants with what MBSR is and is not
- Provide participants with an opportunity to practice mindfulness in a non-judgmental environment
- Educate participants about the programme procedures
- Allow each participant to meet one another and determine whether or not the program is a good match for them
- Meet with each participant for a screening interview and to elicit their commitment to participate in the full program, which includes 45 minutes to an hour of formal practice each day

7.7 Class One

The theme of this class is that 'as long as you are breathing, there is more right with you than wrong with you, no matter what challenges you are facing.' (Santorelli, Meleo-Meyer, & Koerbel, 2017, p.12). The first formal mindfulness exercise is introduced during this session and involves the mindful eating of a raisin. Homework consists of practicing a body scan exercise (provided in the form of an mp3 file or on CD) six or more times during the week, with the option of engaging in informal practice in 'small doses, many times' (Santorelli, Meleo-Meyer, & Koerbel, 2017, p.14).

7.7.1 Cultural enhancement of Class One: Hau and Mauri

Discussion with kaumatua regarding the theme for this class, as well as reading of Māori texts, touched on two relevant concepts: The concept of hau[53] and the

[53] Hau = Breath of spirit

concept of mauri. In Te Ao Māori, Hau is a term that describes the 'breath of spirit' (Marsden & Royal, 2003, p.40; McKenzie, 2018; Rose et al., 2009; Barlow & Royal, 1994). Hau is sometimes used in reference to Hineahuone, the first woman, who was brought to life when Tāne (god of the forest) pressed his nose against hers and breathed life into her through his nostrils (Pohatu, 2000). From that moment on, the sharing of breath with one another through the use of hongi[54] became a ritualised way for Māori to connect with the wairua of another person and it has also been seen as a way of connecting back to nga ātua, the gods (Barlow, 1994; O. Ohlson, personal communication, September 9, 2018). Given that class one emphasises the importance of the breath in developing awareness of the present, it seemed an appropriate step to introduce the concept of *hau* during that class.

The concept of mauri (life principle) was discussed in relation to the 'mindfulness of eating' exercise, because traditional Māori worldviews consider that everything, including food, is endowed with mauri. Barlow (1994) writes that the mauri of an object or an entity is what joins it to the spiritual realm as well as to the material realm. For this reason, mauri ought to be acknowledged when a person comes into contact with it. This is one of the reasons that performing karakia prior to eating kai is so important to Māori. The act of mindfully eating a raisin in this class was likened to the act of acknowledging the object's mauri, because the exercise requires taking time to consider all of the elements that enabled that raisin to exist. For instance, mindful eating involves contemplation of the fact that land was prepared in order for someone to plant the grape vine that produced the raisin; rain was needed to water that plant in order for it to grow; sunshine was required in order for the vine to photosynthesise; a person(s) had to pick each grape and take it to be dehydrated etc. All of those processes influence the mauri of a raisin in different ways, and mindful eating encourages acknowledgement of that fact.

[54] Hongi = Ritual of pressing noses together and sharing breath

7.8 Class Two

The theme of this class is that 'how you see things (or don't see them) determines how you will react or respond to them' (Santorelli, Meleo-Meyer, & Koerbel, 2017, p.15). This ties in with discussions suggesting that the *way* in which you handle stress influences the short and long-term consequences of stress on your health, not the stressors themselves. Homework for the week involves choosing a routine activity, such as brushing one's teeth, and mindfully completing that activity the next time you engage in it. Homework also includes completing a record of pleasant events experienced during the week.

7.8.1 Cultural enhancement of Class Two: Te taha hinengaro

The discussion for interpreting the theme of this class resulted in application of the concept *Te taha hinengaro*, as described in Te Whare Tapa Whā (Durie, 1985; Rose et al., 2009). *Te taha hinengaro* refers to the psychic side of health, which encompasses different styles of thinking and acknowledges that one's thoughts and feelings are a vital part of one's health. In Te Ao Māori[55], healthy thinking is integrative, not analytical. As such, mental wellbeing involves being able to synthesise and contextualise information (centrifugal thinking), not break it down into its component parts for analysis (centripetal thinking). Therefore, the idea of viewing thoughts from a distance and accepting them as they are without trying to change them could be said to align closely with Māori perspectives of thinking (Durie, 1985; Durie, 2011; Harmsworth & Awatere, 2013; O. Ohlson, personal communication, September 9, 2018).

7.9 Class Three

The theme of this class is that there is pleasure and power in being present. This class introduces hatha yoga and walking meditation, inviting participants to investigate the way things are in their mind and body at the present moment.

[55] Te Ao Māori = The Māori world

Homework includes completing an unpleasant events calendar for the week and alternating yoga with body scan practice every day of the week (Santorelli, Meleo-Meyer, & Koerbel, 2017).

7.9.1 Cultural enhancement of Class Three: Te taha tinana

The emphasis in class three on using the body to experience mindfulness, led to the interpretation of this theme as *Te taha tinana* – the physical side of wellbeing (Durie, 1985; Rose et al., 2009). In Te Ao Māori, the tinana[56] (especially the head) is considered sacred and this is expressed most clearly in traditional rituals surrounding care of the body. Given that the theme of this class involves paying close attention to how the body is used and explores how gentle stretching movements can affect the way the body feels, it seemed appropriate to relate this to the importance that Māori place on caring for *Te taha tinana* (Barlow, 1994; O. Ohlson, personal communication, September 9, 2018).

7.10 Class Four

The theme of this class explores how our perceptions and conditioning shape our experience of the world. The physiological and psychological basis of stress is reviewed and homework is given, inviting participants to notice their automatic habitual stress reactions during the week, without changing them.

7.10.1 Cultural enhancement of Class Four: Ha, a kui mā, a koro mā[57]

The corresponding Māori concept for this class centered upon *Ha, taonga tuku iho*[58] *,* which literally refers to the way in which the breath of our ancestors lives on through us (Rose et al., 2009). One interpretation of this concept is that the habitual patterns of our ancestors live on in us too, through our conditioning and through the

[56] Tinana = Body
[57] Ha a kui ma a koro ma = Breath of our ancestors living on through us
[58] Ha taonga tuku iho = Breath handed down across generations

ways in which we repeat their patterns. This class draws attention to the automatic reactions we default to when faced with a stressor and asks us to question whether or not they are in fact useful. In some cases it could be argued that habitual reactions to stress are passed down through generations. This class encourages a closer look at those reactions and invites participants to question whether their health might improve if they were able to choose a different way of responding to the stressors in their lives.

7.11 Class Five

The theme of this week explores different ways in which people habitually respond to stress in their lives. The emphasis is on increasing their capacity to respond, rather than *react* to stressful situations. Homework consists of practicing new guided meditations given in CD format and filling out a record of difficult communications experienced during the week (Santorelli, Meleo-Meyer, & Koerbel, 2017).

7.11.1 Cultural enhancement of Class Five: Te taha wairua

Te taha wairua can be broadly translated to mean the spiritual aspects of wellbeing (Durie, 1985; Rose et al., 2009). This is important because traditional Māori believe the spirit connects the mind to the body and to all living things (Barlow, 1994). The theme of class five emphasises that we have the capacity to choose how we respond to events. In effect, it strengthens the ability to pause and connect to oneself before acting. The idea of pausing and connecting in this way, is inextricably linked to the concept of *wairua* in that wairua is seen as the meeting point between the mind and the body (Barlow, 1994). In Te Ao Māori, a person without spiritual awareness is considered to be lacking in wellbeing (Durie, 2011). Therefore, it could be argued that class five promotes spiritual wellbeing.

7.12 Class Six:

The theme of this class explores stressful communication and knowing your feelings, expressing your emotions accurately and noticing patterns associated with interpersonal communication. Content includes using techniques from Aikido to explore the effects of aggressive, passive and submissive styles of conflict. Homework involves practicing a guided meditation daily (Santorelli, Meleo-Meyer, & Koerbel, 2017).

7.12.1 Cultural enhancements of Class Six: Te taha whānau

The theme of class six emphasises communication and relationships. This is the domain of *Te taha whānau* (Durie, 1985). Traditionally, the concept of *whānau* related to an extended general kinship system rather than a nuclear family, and that is the definition emphasised in this class (Tibble & Ussher, 2012). Within this domain, it can be considered that all social relationships are linked to *whānau* because the principles of *utu*[59] (reciprocity), manaakitanga (hospitality), and *aroha*[60] (love) apply to all people regardless of their social status or family links (Barlow, 1994; Rose et al., 2009). The focus of class six is on developing awareness of how we communicate with, and affect others. Such awareness goes hand in hand with developing healthy relationships, which is the ultimate goal of *Te taha whānau.*

7.13 Full day workshop: Silent retreat

The theme of this workshop is to cultivate moment-to-moment awareness in preparation for utilizing the methods far beyond the conclusion of the program. All of the previously introduced formal practices are reviewed during this workshop and a silent lunch is included (Santorelli, Meleo-Meyer, & Koerbel, 2017). The only cultural enhancements added to this day involved karakia at the beginning and end of the day, as well as before kai.

[59] Utu = reciprocity
[60] Aroha = love

7.14 Class Seven

The theme of this class is to integrate mindfulness practice more fully into daily life and to reflect upon lifestyle choices that are nourishing and adaptive, as well as those that are maladaptive and self-limiting. Loving kindness meditation is introduced during this class and homework consists of regular daily mindfulness practice (Santorelli, Meleo-Meyer, & Koerbel, 2017).

7.14.1 Cultural enhancements to Class Seven: Atawhai and Aroha

In class seven participants are introduced to loving kindness meditation – a formal practice that emphasises the development of compassion and kindness toward self and others. The concepts of *atawhai* and *aroha* in Te Ao Māori encourage a similar quality and were therefore considered a close interpretation of the theme for this class (Barlow & Royal, 1994). Traditionally, atawhai and aroha were linked with the collectivistic values of Māori which prize relationships, reciprocity and generosity above individual pursuits (Mead, 2003). In practice, this could mean sharing kindness to others by offering them kai and by treating them hospitatably, or it could mean extending kindness to oneself by putting in needed boundaries with others or by giving oneself a break by taking time to meditate.

7.15 Class Eight

The theme of this class is to review the contents of the course and to discuss ways to keep up the momentum and discipline developed over the previous seven weeks. Each participant is given the opportunity to share their experiences and the course ends with a meditation and acknowledgement of the ending of this particular group (Santorelli, Meleo-Meyer, & Koerbel, 2017).

7.15.1 Cultural enhancements of Class Eight: Te Whare Tapa Whā

The theme of the final class focuses on drawing together the concepts introduced in each of the previous classes, by reviewing them in turn. This seemed an appropriate class in which to review the overall model of *Te Whare Tapa Whā* and to further discuss the additional elements of *atawhai, mauri,* and *ha, a koro ma, a kui ma.* In practice, this session ended with waiata and hariru[61] to acknowledge the shared completion of a unique journey.

7.16 Summary

This chapter presented an overview of the standardised MBSR programme as presented in the manual produced by Santorelli, Meleo-Meyer, and Koerbel (2017). Alongside summaries of the standardised course content, this chapter outlined the cultural enhancements that were developed in consultation with local kaumatua and added to each class for use within this study. This chapter also presented an overview of the process through which the cultural enhancements were developed and integrated into the programme, and offers a detailed account of how those enhancements were applied in practice. The chapter also presented an overview of the course setting, the qualifications of the therapist and the tikanga Māori practices that were added to the course.

[61] Hariru = greeting one another with hongi or handshake

Chapter 8 – Method

8.1 Outline and aims

This chapter provides an overview of how the study was conducted. It introduces each of the instruments used to answer the research questions and measure the effectiveness of the intervention. Participant characteristics are discussed, as are procedures and ethical considerations.

8.2 Recruitment of participants

Recruitment of participants took a significant portion of the available time for this project due to difficulties locating eligible Māori participants in the Dunedin area (the Otago region houses just 1.5% of the Māori population in Aotearoa New Zealand) (Statistics New Zealand, 2013). Recruitment started in November 2016 with posters advertising the project in several prominent locations, including Dunedin Hospital, Arai Te Uru Hauora (a local kaupapa based health provider), and the city campus of Te Wananga o Aotearoa. After five months of advertising, only one participant had expressed interest in the research.

Following this, a snowball sampling method was adopted in which participants were recruited using word of mouth and social media. Within six weeks of using this strategy, sixteen participants had contacted the researcher expressing interest in the project. Of those, two did not meet the ACE threshold and were ineligible to participate in the data collection. Those two participants were however, invited to attend the MBSR sessions but neither could attend due to conflicting time commitments. Three other potential participants were unable to commit to the entire eight weeks of the course due to conflicting time commitments, which included work-related travel and relocation. Three people declined to participate in the study after reading through the information sheet. No other explanations were provided. In

total, eight women met the eligibility criteria for the study and agreed to participate in the MBSR course in its entirety.

8.2 Participant characteristics

Eight women of Māori descent participated in this study. All of the women identified as wāhine Māori, meaning they both supported and felt connected to, values and traditions associated with Māori culture, such as whanaungatanga. Participants were aged between 30 and 50 years with a mean age of 43.8 years. All participants lived in or near Dunedin city. Each wāhine reported an Adverse Childhood Events (ACE) score that was equal to or higher than 4 out of 10. Overall ACE scores ranged from 4-8. The mean ACE score was 5.6 out of 10.

Most participants were of Kai Tahu descent. Kai tahu are the predominant iwi in the South Island (note that in some parts of Aotearoa New Zealand, Kai Tahu are known as Ngāi Tahu). Four participants reported having experienced health conditions commonly associated with cortisol dysregulation and chronic disease including rheumatoid arthritis, cancer, depression, anxiety and heart palpitations. Three reported having suffered from addiction in the past. Two reported having experienced major behavioural transformations as a result of exposure to past interventions.

Table 1 presents demographic characteristics for each participant. Note that one wāhine did not attend any of the mindfulness classes. Seven attended at least four classes. The average number of classes attended was 6.6 out of 9 mindfulness classes.

Name	Age	Iwi	Medication for a health condition	ACE	Sessions Completed
Ripeka	48	Ngāi Takoto, Te Rarawa, Ngāpuhi	Yes	4	7
Ani	49	Ngāti Maniapoto	No	8	8
Hararutu	41	Kai Tahu, Kāti Mamoe, Waitaha	Yes	8	4
Kiri	50	Kai Tahu, Kāti Mamoe, Waitaha	Yes	4	8
Arohia	39	Ngāti Maniapoto	No	4	6
Wairata	39	Ngāi Tahu, Ngāti Ruanui, Ngā Ruanui, NgāRauru, Te Ātiawa	Yes	7	0
Marama	36	Tuhoe	Yes	6	7
Ngāpaki	48	Kai Tahu, Kāti Mamoe, Waitaha	No	4	6

Table 1: Participant demographics

8.3 Ethical considerations

This project was reviewed and approved by the Massey University Human Ethics Committee (MUHEC: SOA 16/14). The letter affirming ethical approval is provided in Appendix D.

The procedures in this study required a number of adaptations to be made before the threshold for ethical approval could be satisfied. Firstly, the acute stress test used in this study recommends that researchers deliberately mislead participants about the purpose of the test in order to obtain an authentic stress response (Kirschbaum, Pirke, & Hellhammer, 1993). The protocol also recommends that researchers deceive participants about the audio-visual recording of their performance, telling them that it will be recorded and reviewed by a panel of experts, when in reality this is not true. In the interest of gaining the trust of each

participant and respecting their mana (inherent dignity), the standardised protocol of the TSST was altered to minimise deception of any kind. In the current study every TSST performance was actually recorded and then offered back to the participant at the end of the study. This was consistent with the notion of reciprocity, a key concept in kaupapa Māori research. Prior to consenting to participate, every participant was also briefed about the purpose and structure of the test and given the option to withdraw from it at any time.

While those adaptations might have resulted in attenuated cortisol responses, they were considered worthwhile given that each participant was going to be completing the test a second time. Having pre-intervention as well as post-intervention acute stress cortisol data meant that any changes which occurred as a result of the intervention would still be relevant.

Secondly, during the initial meetings with each participant, contingency plans were constructed to ensure that saliva samples (which are considered tapu[62] in Te Ao Māori) (Barlow, 1994), would not be stored in freezers next to food items, thereby disrespecting tikanga. In instances where the researcher had to store saliva samples prior to transporting them to LabPlus, they were kept in a freezer dedicated solely for that purpose. Prior to sending samples away to be analysed, karakia were performed by the researcher.

Thirdly, both the group format of the MBSR programme and the introduction of a non-Māori, male practitioner to lead it, required several safety measures to be put in place. In the first instance, participants were briefed about Kovido prior to meeting him and were told that the primary researcher would be present during every phase of the study, and that should they feel uncomfortable or want to withdraw at any time, they could contact her directly without threat of repercussion from the University.

[62] Tapu = Sacred

Next, participants were given the details of other support services they could access at no cost, if they wanted to obtain additional support at any time during or after the study was completed. Lastly, the issue of whakamā[63] (shame) was addressed with each participant, as it was acknowledged that the group format had the potential to increase such feelings, and Dunedin is a small city where people are often closely connected. Prior to starting the intervention, each participant was asked if there was anyone that they would find it difficult to be in a group with and those names were then screened against the other members of the group. No conflicts of interest resulted from this process.

8.4 Outcome Measures

This study used both psychological and physiological measures to answer research questions one and three (RQ1, RQ3), and semi-structured interviews to address the second research question (RQ2). Recall that research question one examined whether or not Māori women with high ACE scores would also report chronic life stress, dysregulated cortisol profiles, visceral obesity and a high degree of psychological distress. Research question two queried how a culturally enhanced mindfulness programme would be received by a group of Māori women. Research question three examined whether or not exposure to an eight week mindfulness intervention would influence outcomes on any of the baseline measures for participants.

To assess associations between ACE scores, chronic stress, visceral obesity, psychological distress and mindful awareness, a range of empirically validated psychological tests were used. Together they measured indicators of mindful awareness, cortisol levels, stressful life events, physical symptoms of stress, waist circumference, eating behaviour, depression, anxiety and trauma.

Baseline measurements were taken for two weeks before participants started the intervention. This included completing a semi-structured interview with the

[63] Whakamā = Shame

researcher and participating in an acute stress test. Mid-way through the MBSR course, measurements on all outcomes were again taken. After completing the course, participants again took part in an acute stress test, completed all of the outcome measures, as well as a post-intervention interview. Every week for the duration of the course participants completed measurements of mindful awareness and psychological distress.

8.5 Measuring adverse childhood experiences

To gather information about the number of adverse events experienced in childhood, the ACE questionnaire was used. As mentioned in Chapter 2, the ACE questionnaire is a 10-item survey in which respondents read a statement then mark '1', if they experienced that event prior to the age of 18. Example questions include 'were your parents ever separated or divorced?' and 'did a household member go to prison?'. Items are based on experiences known to adversely affect children because they are psychosocial in nature (Felitti et al., 1998).

Wāhine completed this measure in a one-to-one setting with the researcher, over coffee. They were told well in advance of the meeting that they would be asked to complete the ACE survey prior to starting the course and were reminded that they could bring along a whānau member or friend for support. None of the wāhine accepted this offer. One attractive feature of this measure, is that it provides an indication of adversity experienced in childhood, but does not require participants to provide details about those experiences. Once the survey has been completed, respondents simply add their total number of marks and give that score to the researcher.

In this study, a score equal to or greater than 4 out of 10 was considered to be high, as this is the number at which the instrument's author's began to find a link with chronic health problems among their participants (Felitti et al., 1998). Wāhine needed to report a score of 4 or higher, in order to participate in the other parts of

data collection (e.g., stress test and saliva sampling). Those who did not meet that criteria were still invited to attend the classes.

8.5 Measuring mindful awareness

8.5.1 Mindful Attention and Awareness Scale (MAAS)

To assess changes in mindful attention and awareness across the treatment period, the MAAS was used. The MAAS is a 15-item self-report measure that assesses a distinct form of awareness and attention associated with a number of wellbeing indicators (Brown & Ryan, 2003). Wāhine initially completed this measure over coffee with the researcher during the baseline phase of testing, and then again immediately prior to starting each mindfulness class. This provided weekly data points across the entire treatment period.

Example items for the measure include ‘I snack without being aware that I’m eating’ and ‘I rush through activities without being really attentive to them.’ Wāhine rated items according to their everyday experience on a scale from 1 (almost always) to 5 (very infrequently).

The MAAS has good reliability (Cronbach’s alpha 0.82) and has been validated for use with a variety of populations including college students, French (Jermann et al., 2009), Chinese (Black, Sussman, Johnson, & Milam, 2012), and Persian (Abdi, Ghabeli, Abbasiasi, & Shakernagad, 2015) groups, as well as adults with cancer (Carlson & Brown, 2005). Confirmatory factor analysis has shown that all 15 items were significantly related to the latent factor, which suggests it has internal consistency. The MAAS has also been shown to discriminate between groups expected to differ in levels of mindfulness (Brown & Ryan, 2003). Convergent and discriminant scales show positive correlations with other measures of wellbeing and little to no relation to unrelated scales, As such, it is an appropriate choice for use in the current study.

8.6 Measuring chronic stress

8.6.1 Social Readjustment Rating Scale (SRRS)

To examine whether or not high ACE scores would be associated with chronic life stress, exposure to stressful life events was measured using the SRRS. The SRRS is a 43-item measure which provides a measure of frequency and intensity of life events experienced. It does this by assigning a score to various life events, that reflects the subjective intensity and length of time needed to adapt that event - regardless of its desirability (e.g., both getting married and losing a job are stress inducing life events). The measure is based on interviews that were conducted with over 5000 people. After analysing the data, the author's assigned a Life Change Unit (LCU) to each of the stressful events measured. The Life Change Units reportedly reflect the degree of adjustment required as a result of that event. Higher scores reflect greater amounts of readjustment. Items include 'Death of a spouse' (100 LCU - the maximum possible) and 'Pregnancy' (40 LCU). The author's claim that scores of > 300 in a 12-month period indicate an 80% chance of developing a stress-related illness (Noone, 2017). However a follow up study conducted by Holmes and Rahe (1970) showed that there was significant variability among groups in their perceptions of life events and in reports of their occurrence, which implies that the scores should be interpreted with caution.

This measure was completed by wāhine during the baseline phase of the course, as well as at the end of the course to provide an indication of how many major life events they had experienced in the year prior to starting the course and during the eight weeks of the treatment period. Wāhine completed it either at home or in their workplace over coffee with the researcher.

The SRRS has been used in a number of cross-cultural comparison studies that included Japanese and White American (Masuda, 1967), African American and Mexican (Komaroff, Masuda, & Holmes, 1968), Malaysian and Western European adults (Woon, Masuda, Wagner, & Holmes, 1971).

8.6.2 Perceived Stress Scale (PSS)

To test whether or not the wāhine in this study would report *feeling* chronically stressed, the PSS was used. The PSS is the most widely used inventory for measuring perceptions of stress (Cohen, 1988) because it assesses *perceptions* of stress as opposed to physical symptoms of stress, like tight shoulders. Wāhine completed this 10-item measure at the start, in the middle and at the end of the course because it measured the degree to which they appraised their life as being stressful over the past month. Unlike the Stress subscale of the DASS (section 8.9.1), which measures physical stress symptoms (i.e., tension), the PSS assessed how uncontrollable, unpredictable and overloaded wāhine found their lives.

The PSS items are easy to understand and were constructed for use with community samples. Examples include 'in the last month, how often have you felt nervous and 'stressed?' and 'in the last month, how often have you felt that things were going your way?' Responses can range from 0 (never) to 4 (very often). It takes approximately 5-minutes to complete. Reverse scoring is required for responses to positively worded items. All other items are summed to produce a total score.

Confirmatory factor analysis has shown the PSS to have a two-factor structure comprised of *perceived stress* (Cronbach's alpha = 0.81) and *perceived coping* (Cronbach's alpha = 0.72). The scale was normed on the responses of 2,387 respondents in the United States and was informed by Lazarus' (1993) model of stress, which held that stress represents an imbalance between situational demands and one's perception of their resources. The PSS has been used with a range of populations including psychiatric inpatients (Hewitt, Flett, & Mosher, 1992) and Mexican adults (Flores, Tschann, Dimas, & Bachen, 2008; Matheny, Roque-Tovar, & Curlette, 2008, Ramirez & Hernandez, 2007).

8.7 Measuring cortisol dysregulation

To examine whether or not the wāhine would present with dysregulated cortisol patterns given their high ACE scores, numerous salivary cortisol samples were collected throughout the course of the study.

All salivary cortisol samples were collected using Salivette devices comprised of a small cotton roll inside a clear plastic tube (see Appendix E). To obtain a valid saliva sample, wāhine were instructed to remove the cap on the tube, then to tip the cotton swab into their mouths (avoiding contact with their fingers) and to roll it around in their mouths for at least 1-minute until saturated. Participants were then instructed to place the swab back into its plastic tube, replace the tube cap and then store the device in a freezer at <18 degrees Celsius until such time as the primary researcher could collect it (within 48 hours). This procedure was demonstrated to them by the researcher prior to data collection. At that time they were also provided with three days worth of labelled sterile Salivette devices and shown how to correctly collect and store each sample. Each wāhine was also given a poster that demonstrated the correct technique for producing a valid sample. Once collected, each sample was transported (frozen in a Bio-bottle) to LabPlus at Auckland City Hospital. Upon receipt of each shipment, LabPlus notified the primary researcher. The results of each analysis were then received in a report by the researcher approximately 2-3 weeks later. The assay used for analysing the samples was the CORT-II, which is an electrochemiluminescence immunoassay.

8.7.1 Cortisol awakening response (CAR)

The first measurement of HPA axis functioning involved evaluating the cortisol awakening response. Recall that a healthy CAR is characterised by a sharp increase in cortisol levels occurring in the first half hour of waking (Stalder et al., 2015). To obtain an accurate measurement of the CAR each wāhine was asked to provide a saliva sample upon waking, then to set a timer for 30-minutes to remind them to take their next sample. The night before providing their samples, wāhine

were reminded via text message, to avoid smoking, brushing their teeth, eating food or drinking coffee within 30-minutes of providing their saliva samples. At each data collection point (e.g., baseline, mid-treatment, post-treatment), CAR samples were taken for a minimum of three consecutive days, and on the same weekdays to minimise confounds.

8.7.2 Cortisol daily slope (DS)

To obtain accurate readings of the cortisol daily slope for each participant, best practice guidelines recommended by Granger, Johnson, Szanton, Out and Schumann (2012) were followed. This involved asking wāhine to take saliva samples at four separate points during the day (upon waking, 30-minutes after waking, at 1600hrs and 2200hrs), for three consecutive days (Monday, Tuesday, Wednesday) to avoid changes in routine that could occur over a weekend. Wāhine were asked to follow this exact procedure at four separate time points throughout the study (e.g., for the two weeks prior to starting the intervention, mid-way through the treatment period and after the treatment had finished). Saliva samples for all participants were taken on the same dates to minimise any possible fluctuations due to seasonal or temperature variation.

Once the samples had been analysed, an average result for each three day period was calculated to give an accurate indication of each woman's cortisol daily slope. The main calculation derived from this data was the area under the curve with respect to ground measurement (AUCg). The AUCg measurement gives an indication of absolute cortisol levels. This was to foster consistency of measurement across other studies in this field (Pruessner, Kirschbaum, Meinlschmidt & Hellhammer, 2003).

8.7.3 Cortisol response to acute stress (AS)

To measure the cortisol response to acute stress, the Trier Social Stress Test (TSST) was employed. The TSST is a standardised laboratory stress test that has

been shown to reliably induce a cortisol response in participants from a range of populations (Kirschbaum, Pirke, & Hellhammer, 1993). The test was developed at the University of Trier, Germany in 1993 and is considered to be the most effective protocol for triggering a physiological stress response. It has been argued that the test's effectiveness is due to it being comprised of two elements believed to cause psychosocial stress in humans: namely uncontrollability and negative social evaluation (Dickerson & Kemeny, 2004).

The standardised TSST protocol involves inviting participants to a laboratory and asking them to wait comfortably for 15-minutes while baseline tests are conducted. Once the specified amount of time has passed, participants are asked to enter a testing room where they are told to stand in front of two unknown examiners (actors wearing white laboratory coats) who are seated at a table with a video camera, and who have been instructed to maintain neutral facial expressions throughout the experiment.

A pre-recorded message providing instructions for a public speaking task are then played to the participant, outlining that they have three minutes to leave the room and to prepare a speech for delivery. After the three minutes has passed, the participant is led back to the testing room and asked to deliver their speech to the examiners for a total of five minutes. If they stop speaking during this time, they are prompted to 'continue' by the examiners until the five minutes is up.

After 5-minutes, the examiners ask the participant to answer a set of maths questions that get progressively harder as the experiment continues. This phase continues for further 5-minutes, after which the participant is led back to the waiting room for further physiological testing.

To assess the cortisol responses of each participant in this experiment, participants were asked to provide saliva samples at the following intervals:

- Two minutes prior to entering the testing room

- One minute after leaving the testing room
- Ten minutes after leaving the testing room
- 30 minutes after leaving the testing room (Kirschbaum, Pirke, & Hellhammer, 1993)

At each of those time points, participants were also asked to complete a Visual Assessment Scale (VAS) to give a subjective indication of how stressed they felt at each time point, and to provide blood pressure and pulse readings for the purpose of triangulating physiological data. Blood pressure and pulse rate measurements were taken using the Bauer automatic blood pressure monitor.

In the current study, TSST examinations were timed to occur during the luteal phase of each participant's menstrual cycle to minimise cortisol fluctuations related to variations in other hormone levels. Participants were asked not to eat, smoke or drink coffee in the three hours prior to their examination to minimise the influence of stimulants on hormone levels and tests were scheduled for the hours between 1300hrs and 1600hrs, which is a time of day when cortisol slopes are relatively quiet.

8.8 Measuring visceral obesity

8.8.1 Waist circumference (WC)

To examine whether high ACE scores would be associated with visceral obesity among the wāhine in this study, the waist circumference measurement was used. Waist circumference is known to provide a simple estimate of visceral obesity that falls within acceptable levels of agreement with measurements of abdominal fat provided by laboratory-based techniques such as DEXA (Ministry of Health, 2017a). Additionally, visceral obesity is an important risk factor for Type II diabetes and cardiovascular disease - both of which disproportionately affect Māori women. Reliability of the waist circumference measurement was increased by following guidelines provided by the Ministry of Health (2017a). Although Body Mass Index is the most widely used measure of obesity, Czernichow, Kengne, Stamatakis, Hamer,

and Batty (2011) followed 11,140 men and women for a period of 4.8 years and found that BMI was one of the *worst* predictors of cardiovascular events and mortality in patients with Type II diabetes and that waist circumference was a much better predictor.

To obtain accurate WC measurements, the researcher met with each wāhine during the baseline and post-treatment phases of the study (while collecting other baseline and post-treatment measurements) and wrapped a tape measure around the woman's waist at the point midway between the last rib and the iliac crest. Best practice recommendations were followed, which suggested that each measurement be taken twice to ensure accuracy and when a difference was found, to calculate the average value of the two measurements. Czernichow, Kengne, Stamatakis, Hamer and Batty (2011) recommend recording each measurement to the nearest half centimetre.

8.8.2 Dutch Eating Behaviour Questionnaire (DEBQ)

To examine whether visceral obesity would be associated with stress eating or external eating (mindless eating because food is in sight), the emotional eating and external eating subscales of the DEBQ were used.

In its full form, the DEBQ is a 33-item self-report instrument that measures three distinct types of eating behaviour: emotional eating, external eating and restricted eating (van Strien, Frijters, Bergers, & Defares, 1986). Items for the emotional eating subscale draw upon psychosomatic theory, which posits that stress eating is triggered as a result of dysregulated emotions. Items for the external eating subscale are based on externality theory, which describes persons who eat because of proximity to food and other food cues, irrespective of internal sensations of hunger. Thus, those low in mindful awareness would be expected to score highly on the external eating subscale. The DEBQ was chosen for this study because of evidence linking stress eating with hypo-cortisolemic profiles and chronic stress.

Wāhine completed these two questionnaires at the same time as they completed other baseline, mid-treatment and post-treatment measurements.
To reduce participant burden, the *restricted* eating subscale items were removed from this questionnaire when presented to the wāhine. This resulted in a 23 item instrument with questions such as 'Do you have the desire to eat when you are irritated?' and 'Do you have a desire to eat when you have nothing to do?' Wāhine rated their answers on a Likert scale that ranged from 1 (never) to 5 (very often). Item scores for each subscale were summed to produce an emotional eating and an external eating total score. The measure took approximately ten minutes to complete.

Cronbach's alpha for the DEBQ has shown adequate internal consistency for the subscales used and confirmatory factor analysis has shown that two dimensions are assessed by the emotional eating subscale – one dealing with eating in response to diffuse emotions and one showing eating in response to clearly labelled emotions. High dimensional stability of the scales has been reported (van Strien, Frijters, Bergers, & Defares, 1986). Furthermore, the DEBQ has been validated with people from a range of different ethnic groups including those of Malay (Subramaniam, Low, Chinna, Chin, & Krishnaswamy., 2017), Maltese (Dutton & Dovey, 2016), Turkish (Bozan, Bas, & Asci, 2011) and French ethnicity (Lluch et al., 1996).

8.9 Measuring psychological distress

8.9.1 Depression, Anxiety and Stress Scale (DASS)

To measure psychological distress in the form of depression and anxiety, the Depression Anxiety and Stress Scale was selected because of its good psychometric properties, its ease of administration (10-20 minutes) and its practicality (measuring three relevant variables at once). The DASS is a 42 item self-report instrument that measures three negative emotional states (Lovibond & Lovibond, 1995). Each emotional scale is comprised of 14 items, which divide into subscales of two to seven items. Items on the measure are scored using a

four-point severity/frequency scale. Examples of questions include ‘I felt that I had nothing to look forward to’ and ‘I found it difficult to relax.’

Upon reading each item, the wāhine rated the extent to which they experienced that state over the past week, from 0 (did not apply to me at all) to 3 (applied to me very much, or most of the time). Scores for each of the three scales were obtained by summing the points for the relevant items. Participants first completed the DASS during the baseline phase of data collection (i.e., either in their home or at their workplace), then again before the start of every MBSR class. Completion took approximately ten minutes.

The Depression subscale of the DASS assesses seven factors: hopelessness, devaluation of life, self-depreciation, lack of interest/involvement, anhedonia, inertia and dysphoria. The Anxiety subscale measures four factors: autonomic arousal, situational anxiety, anxious affect and skeletal muscle effects. The Stress subscale assesses five factors: nervous arousal, difficulty relaxing, agitation, irritability, over-reactiveness and impatience. Of note, items on the Stress subscale emphasise physical signs of stress, not perceptions of stress.

Each of the DASS subscales has been shown to have high internal consistency. Cronbach’s alpha for the Depression subscale is reportedly 0.96 to 0.97; Cronbach’s alpha for the Anxiety subscale is 0.84-0.92. Cronbach’s alpha for the Stress subscale is 0.90 to 0.95 (Antony, Cox, Enns, & Bieling, 1998; Brown, Chorpita, Korotitsch, & Barlow, 1997; Clara, Cox & Enns, 2001). Research has shown the scales to be stable across time and responsive to treatment (Ng et al., 2007). Evidence for construct and convergent validity has been found for both the Anxiety and Depression subscales (Crawford & Henry, 2003; Lovibond & Lovibond, 1995).

8.9.2 PTSD Checklist – Civilian Version (PCL-C)

To measure symptoms of trauma, the PCL-C was used because it has good psychometric properties and because it has been used with a range of ethnic

groups including Hispanics (Hoyt & Yeater, 2010; Miles, Marshall, & Schell, 2008), Han and Tibetan ethnic groups (Xu et al., 2011), as well as a variety of minority and immigrant groups in New York (Wang & Vivek, 2013). The PLC-C is a 17-item self-report questionnaire comprised of items that match each of the domains outlined in the DSM-5 indicating Post-traumatic stress disorder (PTSD) (American Psychiatric Association, 2003; Blanchard, Jones-Alexander, Buckley, & Forneris, 1996; Conybeare, Behar, Solomon, Newman, & Borkovec, 2012).

This measure was completed at the start, middle and end of the treatment period. It asked wāhine to rate their levels of distress on a five-point scale ranging from 1 (not at all distressed) to 5 (extremely distressed), alongside each PTSD symptom experienced over the past 30 days. Item examples include 'feeling very upset when something reminded you of a stressful experience from the past' and 'feeling jumpy or easily startled.' The instrument took approximately ten minutes to complete.

Strong correlations between symptom ratings on the PCL-C and the Clinician Administered PTSD Scale (CAPS) (r = 0.93) suggest the measure has high convergent validity. High diagnostic accuracy has also been reported, with four factor models that match the four DSM-5 criteria supported in the majority of structural validity studies (Ruggiero, Del Ben, Scotti, & Rabalais, 2003; Wilkins, Lang, & Norman, 2011). The PCL-C shows good temporal stability and reports of internal consistency from 14 different studies have shown total score values above 0.75, indicating adequate internal consistency. Wilkins, Lang, and Norman (2011) report good test-retest reliability after one week. Item scores range from 17-85 and a cut off score of 30 is suggested for a community sample.

8.10 Measuring how culturally enhanced MBSR was received

8.10.1 Semi-structured interviews

All participants agreed to complete an interview with the researcher prior to starting the course and upon completing the course. Each interview lasted between five and forty-five minutes long and was audio recorded, with pre-treatment interviews being

much shorter on average than post-treatment interviews. The interview questions were designed by the researcher to elicit greater depth of insight into how each participant had perceived the course, how they responded to the teacher, how well the course fit with their worldviews as Māori wāhine and how well the course matched their expectations.

The structured but open-ended interview method, which consists of asking each interviewee pre-set questions in a predetermined order (Coolican, 2004) was chosen because of both its ease of use and because a high degree of rapport needed to be established with each participant. The purpose of conducting interviews both before and after completing the intervention was to enable an assessment of how participant views might have changed after they had attended the course. Most interviews were conducted either in the homes of each participant or at their workplace. They were relaxed and informal in the sense that the researcher did not read questions off a piece of paper - they were memorised in order to maximise flow of conversation.

Interviews were recorded using GarageBand software and interviews were transcribed verbatim, then presented to each wāhine to check for accuracy and ensure approval of its use. Following approval from wāhine to use their texts, each transcript was analysed for evidence regarding 1) whether or not wāhine viewed mindfulness as a spiritual practice, 2) whether or not they made explicit mention of MBSR being a holistic therapy, 3) whether or not they made connections between concepts in Te Ao Māori and concepts embedded in mindfulness, 4) whether or not their understandings of mindfulness changed from when they started the course, to when they finished the course, 5) whether or not the course matched their expectations in terms of the benefits they thought it would provide, 6) how they found the teacher, given that he was a Pākeha male and 7) what factors encouraged them to practice outside of class and what factors discouraged them from practicing.

8.11 Study procedure

8.11.1 Baseline assessment phase

The baseline phase of cortisol data collection took place over a number of weeks prior to starting the intervention.

Two baseline points of CAR and DS data were collected for each participant over the two weeks immediately prior to starting the intervention. Each of those points were comprised of three consecutive days of saliva sampling (Monday, Tuesday, Wednesday), collected at four times across the day (upon waking, 30-minutes after waking, 4:00p.m and 10:00p.m or at bedtime if going to sleep before 10:00p.m). Those same three weekdays were used throughout the study to minimise variation in cortisol patterns due to changes in routine. All samples were immediately stored in freezers set at approximately -18 degrees Celsius until collected by the researcher. Although best practice in small *n* research recommends that a minimum of three baseline points of data be collected (Yin, 2009; Coolican, 2004), due to the cost of salivary cortisol analysis, this study only allowed for two points of baseline data to be collected. However, each baseline point was comprised of three days of saliva sampling.

Single baseline measurements of blood pressure, pulse rates and cortisol responses to an acute stressor were also collected during this phase. As were one measurement each of depression, anxiety, stress, perceived stress, emotional eating, external eating, post-traumatic stress and mindful awareness scores. Additionally, a semi-structured interview was conducted prior to each participant starting the intervention to obtain a baseline measure of what they believed mindfulness to be prior to participating in the course, and what their expectations of the course's benefits were.

8.11.2 Treatment phase

Prior to starting each weekly MBSR session participants were invited to complete the DASS and the MAAS instruments. Mid-intervention data was collected during week four of the intervention, whereby participants were asked to provide three consecutive days of salivary cortisol tests (using the previously described protocol), as well as to complete self report measures of depression, anxiety, stress, perceived stress, emotional eating, external eating, post traumatic stress and mindful awareness.

8.11.3 Post-treatment assessment phase

Immediately following completion of the 8-week intervention, participants were asked to provide three consecutive days of salivary cortisol samples to collect a post-intervention measure of the interventions success. At that time they were also asked to complete self-report measures of depression, anxiety, stress, perceived stress, emotional eating, external eating, post-traumatic stress and mindful awareness.

Each participant also repeated the TSST as described in section 8.7.3, although several key changes were added to reduce practice effects. For instance, the post-intervention TSST took place in a psychiatric hospital and the examiners were older Pākeha males (instead of a younger Pākeha male and female), and a different set of maths questions were asked.

8.12 Summary

This chapter presented a summary of each of the measures used to record relevant data in this study and outlined the procedures that were followed when collecting that information. The study used a total of five self-report instruments to measure the psychological health of each participant, two instruments for measuring visceral obesity and three different measures to obtain an indication of HPA axis functioning.

In addition, the study used a qualitative strategy to obtain and analyse data relating to how well each wāhine received the culturally adapted MBSR intervention. A summary of the ethical considerations raised prior to collecting data was provided, as were explanations for how each concern was managed.

Overall this study promoted high ethical standards that prioritised the building of relationships with the women involved and ensured their safety throughout. The unique blending of indigenous and empirical methods likely contributed to the high rates of engagement from the wāhine involved. Despite being asked to complete a large number of tests - some of which were designed to make them uncomfortable - all eight wāhine completed the study. The next chapter presents their case studies.

Chapter 9 - Results: Individual case studies

9.1 Outline and aims

This chapter presents the findings from the present research in the form of eight individual case studies. In consultation with each wāhine, a pseudonym has been provided. A summary of the collective findings and their implications is outlined in Chapter 10.

9.2 Case Study One: Ripeka

'karakia, you could say it's a form of meditation'

Ripeka

Ripeka is a 48-year old woman of Ngāi Takoto, Te Rarawa, and Ngāpuhi descent who works in the area of Māori mental health. Ripeka joined the study with the intention to learn about mindfulness primarily for work purposes, as she was "really keen" to know what she might be referring clients to. However, she also expressed a desire for self-development, saying "I reckon I need to learn more tools, follow an actual strategy, plan, rather than be a bit mish mash about it sometimes and not really achieve a state of mindfulness". She initially proposed that mindfulness practice would entail "being mindful of your thoughts and emotions and finding ways to stay connected with yourself".

Before even starting the course, Ripeka had begun to make connections between concepts inherent in mindfulness and concepts embedded in Te Ao Māori. When asked how she thought the two might or might not fit together she answered "oh, it's the connectedness, and the relationships, the relationship with yourself, your relationship with the environment you know, mind, body, spirit stuff". This supports the assertion in Chapter 4 that many Māori continue to view wellbeing as the integration of several different elements, not merely as the absence of disease. Ripeka's acknowledgement that mindfulness and Māori share "mind, body, spirit

stuff" in common, also supports the hypothesis from Chapter 5 that the Māori women in this study would likely view mindfulness as a spiritual practice.
Ripeka recorded an ACE score of 4 out of 10. She was not taking any medication during the study period.

9.2.1 Findings from research question one: Baseline results

Chronic Stress (SRRS) past year >300	**578**
Perceptions of stress past month (PSS) >15	9
Cortisol Awakening Response (CAR) (increase by 50% or 2.5nmol/l)	**Hypo**
Daily Slope (DS) (Night time rise or slow decline i.e. high afternoon levels)	**Hypo**
Cortisol response to acute stress (<2.5nmol/l increase, high perceived stress)	**Blunted**
Waist Circumference >80-cm	**116cm**
Stress Eating >24	**31**
External Eating >22	**34**
Depression	Low
Anxiety	Low
Post-traumatic stress disorder >30	**31**
Mindful Awareness (Low= Mid-low = Mid-high= High=)	High

Table 2: Baseline results for Ripeka. Bolded results show scores that indicate a significant health issue.

9.2.1.1 Mindful awareness

Ripeka's mindful awareness score at baseline was already in the **high range** (79 out of 90), despite her having never previously participated in any formal mindfulness training. It is unclear how Ripeka developed such high baseline levels of mindfulness, but given her assertions of overlap between mindfulness principles and Māori worldviews, it's possible that her high baseline levels of mindfulness were a by-product of her having spent many years engaging in Māori cultural practices such as karakia, chanting and waiata.

9.2.1.2 Chronic stress

Ripeka recorded a 12-month stress events score of 578, which was almost **2-times greater** than the cut-off recommended by the authors of the SRRS. One of the reasons Ripeka's stress score was so high, was that her husband passed away suddenly the year before. However, Ripeka's *perceived* stress score was *low* at baseline.

This could indicate several things: 1) that stressful life events occur so often for her, that she no longer experiences them as stressful (evidence of adaptation); 2) that she is so out of touch with her lived experiences that she is unaware of how stressed she feels (unlikely given her high mindfulness score) or 3) the SRRS measure is not accurate in capturing life events that are stressful to a Māori woman. Given that the SRRS is made up of events thought to be stressful for people from many different cultures (such as marriage, moving house, illness, loss of a spouse), the most likely explanation is that Ripeka is highly resilient to the adverse psychological effects of stress.

9.2.1.3 Cortisol dysregulation

Ripeka's baseline cortisol results showed a hypo-cortisolemic pattern in which all three indices of HPA axis functioning were blunted.

9.2.1.4 Visceral obesity

Ripeka's baseline waist circumference measurement was 116cm, which is almost **40cm higher** than the cut off indicating high risk for developing diabetes and cardiovascular disease. As hypothesized, Ripeka also scored above the cut off on a measure of stress eating.

9.2.1.5 Psychological distress

Although Ripeka reported experiencing both high amounts of adversity and chronic stress in adulthood, this was **not** reflected in her baseline mental health profile. Ripeka scored in the **low range** on the measures investigating depression and anxiety symptoms, which further implies a high degree of psychological resilience. Given evidence linking psychological health to high levels of trait mindfulness, Ripeka's high baseline mindfulness score might help explain her low scores on the psychological distress measures.

9.2.2 Findings from research question two: Response to the course

Ripeka's response to the course was overwhelmingly positive "I needed it. It's been really f*****g useful in terms of my grieving." Additionally she described it as "hugely beneficial" - which was an unexpected result for her - "I'm a bit surprised actually, at how deep if you like, you can get, how deep the reach can be". Ripeka reported experiencing a "massive shift" during the treatment period, as well as other changes that she had not anticipated "I think in my head, I was just doing this thing, but actually, it got done to me. It was done to me. It was great, I was just yeah, fully shocked at the impact it had on me."

Ripeka described the whole day workshop as "mindblowing" and she attributed her "moment of shift" to the experiences she felt that day, "just a whole lot of stuff disappeared, or got lighter, and um, I don't feel like I worked too hard, I wasn't in a sweat, I wasn't bleeding, but something huge has just shifted". At post-treatment, Ripeka re-iterated the view that mindfulness involved reaching a particular state, however she likened that state to the kind achieved during certain Maori practices, such as *Ringatu* karakia:

> When I think of different um, Ringatu, those, particularly those karakia go forever, miles and miles and miles, early hours of the morning, on particular

> days, you know, there's particular dates, for different things, you know, but what are you doing at those times? You're not just spitting out words, you actually are in a state of meditation, so um, yeah, it's there, there's definitely a link.

Ripeka repeatedly linked mindfulness concepts with concepts embedded in Te Ao Māori, asserting that mindfulness "fully does" fit with Māori worldviews and that "it's already there", implying mindfulness is not something new for Māori "There's definitely you know, that's the other part, what we already have, what our tūpuna always ever did before there were all the other distractions of the world, so it's not new to us."

> Not saying everything in what is mindfulness training, that is in Te Ao Māori, but certainly, that if you think about karakia and how we recognize that karakia were designed, what they were designed for, so you can have a different karakia, for whatever purpose. Think about whakatauki, there's so much inside of our whakatauki that link.
>
> What I know about our worldview is that everything's for a purpose and I think a lot of what's in the mindfulness stuff, keeping yourself clear, being aware of what's happening and what it is and why, where it comes from and what your reaction is, there's definitely a link.

However, Ripeka also noted that several aspects of the course acted as barriers to her full participation. They included the cultural proficiency of the teacher "I wish he could say our names better. There was a whole group of us for a long time". As well as physical properties of the room,

> I found the chairs uncomfortable. Maybe I'm too short for those chairs, or something was uncomfortable for me, and I was willing to sit on the ground, but then, if I were to lie on the ground, I'd probably fall asleep and sometimes being too comfortables also not a good idea.

And also, difficulty practicing outside of the group,

> I need boundaries, I need rules and I actually need other people. I just don't manage it by myself, I've gotta work really, really really hard, and even though I have no one at home, there's no one in the house so I don't have all these distractions of other people or the obligations to be somewhere else and do other things, I still couldn't manage it. I was shocked by that.

Her statement regarding the inability of the Pākeha facilitator to pronounce Māori names correctly is entirely consistent with criticisms presented in Chapter 4 regarding the impact that lack of cultural competency can have on Māori users of health services. Alongside her criticisms however, Ripeka also highlighted many positive qualities of the teacher:

> He was really neutral, responded to people's differences really well I thought, didn't get too sucked in to too much of anything, I thought he was great working with us, there was some pretty strong personalities in that group and he just kept it focused.

Ripeka's acknowledgement that aspects of the space were uncomfortable, led directly to the suggested improvement of "having it on a marae, or in a different kind of space, and you know, you've got all that different influence around you". Finally, her acknowledgement that she also needs people around her in order to practice, directly supports the claims outlined in Chapter 4, that many Māori prefer group-based practice to individual-based therapy.

One noteworthy discovery Ripeka made, was that the course allowed her to connect with people in a meaningful way, without her having to share her "backstory":

> On that full day workshop, I realized that you get real deep, well I got real deeply in touch with myself, with those other people just sitting right next door to me, so I was kind of quite vulnerable in that space. I did quite a lot of

> holding it back, my tangi, cause I didn't know these people and I didn't wanna have to go through all that, but after a while I worked out, I didn't have to, cause I could still have this process happening, yeah I had all this stuff happening internally, and maybe it was the way it was facilitated, that it was just enough to share about a particular part, which meant you didn't have to dig down and share all the deep stuff, but you could still get maximum benefit from that work.
>
> There was no risk. The whole thing about sharing backstory stuff, is just the thing we've come to do, you know. I dunno where it actually comes from. Different groups that I've been in, there's been really full on stuff that's been like, this is where I come from, this is my story, this is how I came to be where I am today, with all the twists and turns and changes that have come since whenever. It's how we get to know each other, we talk about different trauma that's going on, that's happened. It's become real normal to talk about your backstory, so to go to a space like that, which I thought 'ooh man, we're digging real deep with this stuff', but if you are open, the meditations work and you can go with them and just, you know, being deep but you can do that without having to share your backstory and that was a shock.

Ripeka's concern that the whole day workshop would require her to share 'backstory stuff', combined with her surprise and delight when she realized she could get "maximum benefit" from the work without having to talk about it, supports the assertions made in Chapter 5, that some Māori might prefer an experiential therapy to a talking therapy.

In sum, Ripeka's feedback implied that the course was beneficial to her, and it also pointed to some areas that could be improved. Of interest to this particular study, many of Ripeka's assertions about the course highlighted that its strengths included: 1) that fact that it was delivered in a group format with other Māori, 2) its holistic approach (which assumes that wellbeing involves an integrated 'mind, body, and spirit'), 3) the fact that many of its concepts and practices overlap with concepts and

practices already embedded in Te Ao Māori and 4) the fact that it is an experiential therapy, which doesn't require one to talk about or share details of their past experiences in order to heal from them.

Ripeka attended a total of six of the eight mindfulness classes, as well as the whole day workshop. She also reported practicing formal mindfulness one to two times per week for less than 30 minutes at a time during the study period.

9.2.3 Findings from research question three: Clinical change

9.2.3.1 Mindful Awareness

Ripeka's mindful awareness scores fluctuated during the course but always stayed in the mid-high range, finishing 1-point higher than at baseline.

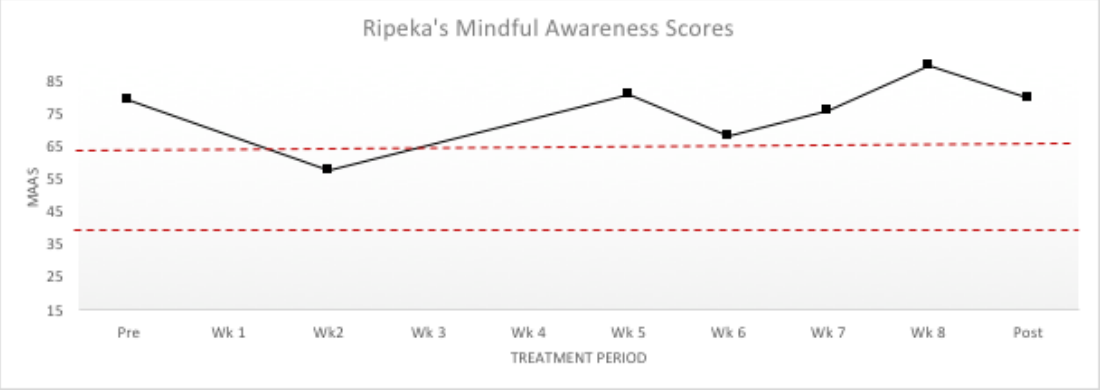


Figure 1: Ripeka's MAAS score. Her score was one point higher at post-treatment than at baseline.

9.2.3.2 Chronic stress

Ripeka's chronic stress (SRRS) score for the 8-week treatment period was 74. A score above 50 is indicative of exposure to a high number of stressful events during the treatment period. In spite of this, Ripeka's perceived stress score (PSS) remained **low** throughout the study.

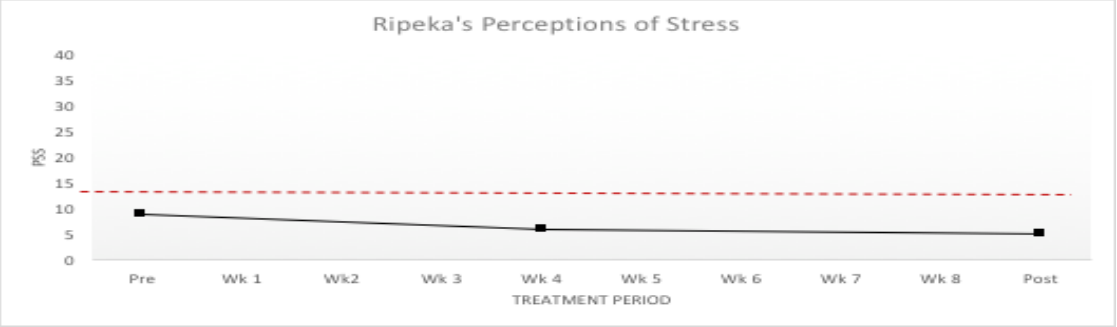


Figure 2: Ripeka's PSS score. Her scores remained low throughout the treatment period.

9.2.3.3 Cortisol dysregulation:

Cortisol awakening response (CAR)

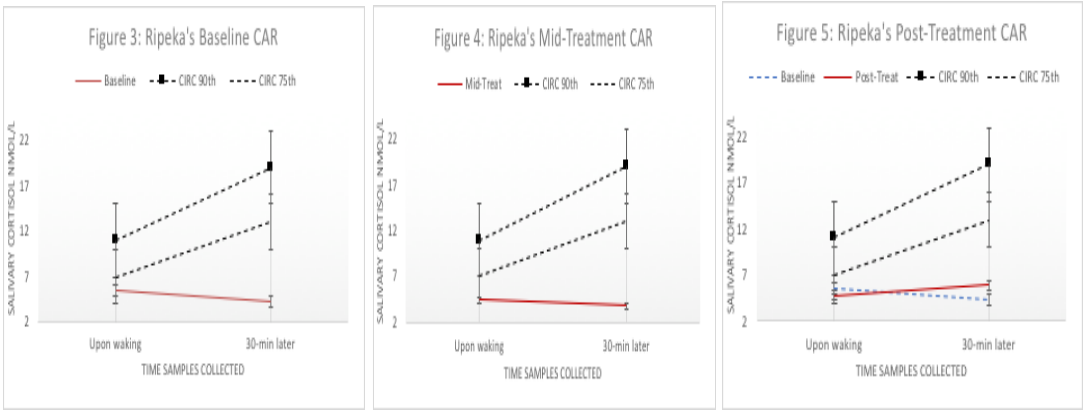
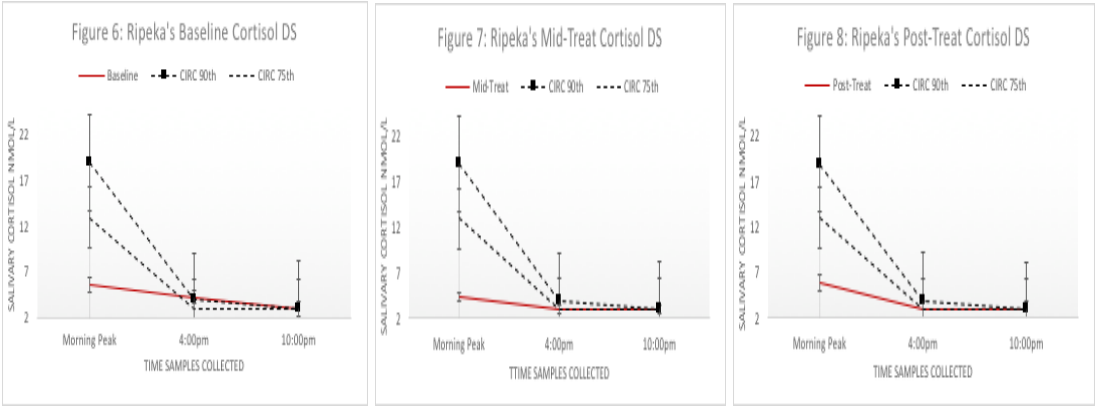


Figure 3 shows the average cortisol morning measurements taken from 6-days of baseline saliva testing (e.g., the Monday, Tuesday and Wednesday of two consecutive weeks in September). Note the lack of cortisol rise typical of a hypo-cortisolemic profile. Figure 4 shows the average of 3-days of saliva sampling at mid-intervention. Note further flattening of the CAR. Figure 5 shows the average of 3-days of sampling at post-treatment. Note that for the first time, **cortisol levels start to increase** after waking. CAR reference levels are provided by the CIRCORT database (Miller et al., 2017) and have been added for comparison.

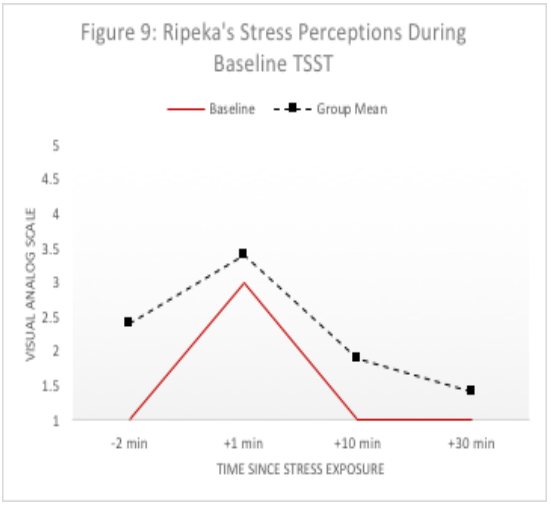
Cortisol daily slope (DS)



Figures 6 shows Ripeka's baseline average DS. Note the slow decline in levels across the day indicative of hypo-cortisolism (i.e., her afternoon levels are above the 90th percentile). Figure 7 shows her DS at

mid-treatment. Note further flattening of the cortisol slope. Figure 8 shows Ripeka's DS at post-treatment. Note the **improvement** in cortisol decline at post-treatment, (i.e., afternoon levels are well below the 3nmol/l threshold). DS reference levels are provided by the CIRCORT database (Miller et al., 2017) and have been added for comparison.

Acute stress response (AS)



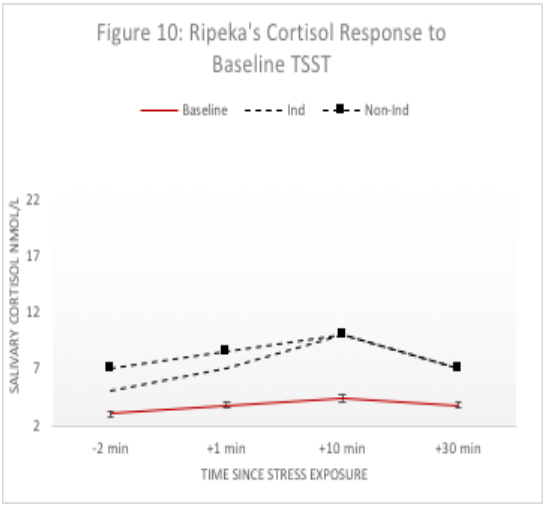
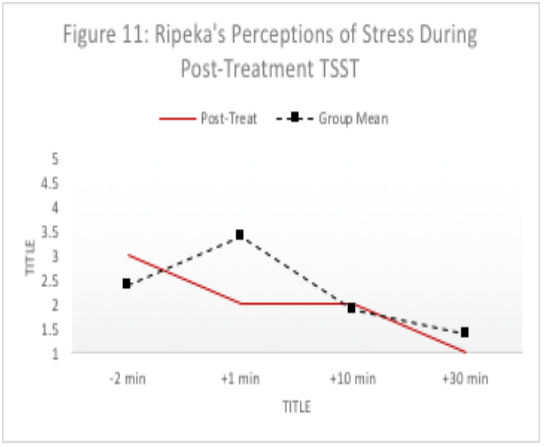


Figure 9 shows Ripeka's self-reported feelings of stress during the baseline TSST. Note the increase in stress levels 1-min after leaving the testing room. Figure 10 shows Ripeka's salivary cortisol output response to the baseline TSST. Note the minimal increase in cortisol levels typical of a hypo-cortisolemic profile. Reference ranges are provided by the Berger et al., (2017) study which used the same test to compare the cortisol responses of indigenous and non-indigenous Australians.



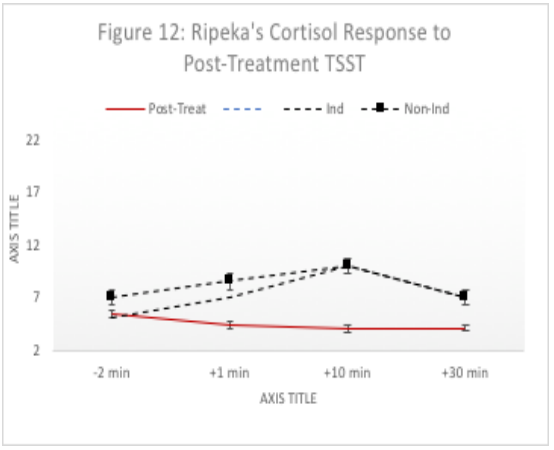


Figure 11 shows Ripeka's perceptions of stress during the post-intervention TSST. Note the lack of increase in stress levels indicating that she had adapted well to the test. Figure 12 shows Ripeka's cortisol response to the post-treatment TSST. Note that her cortisol levels match her perceptions of stress and do not increase at all during the test. This could be interpreted as **evidence of adaptation.** It is also noteworthy that the post-treatment TSST took place on the day that would have been her late husband's 50th birthday. This might explain the fact that Ripeka's stress levels appeared higher before the test started than during it.

9.2.3.4 Visceral obesity

The course cannot be said to have had much influence over Ripeka's overall metabolic health profile as her **WC increased** 2-cm from pre-treatment to post-treatment (116cm-118cm). Although there was an overall decrease in her stress eating scores during the course, at post-treatment her scores remained **above the cut off**.

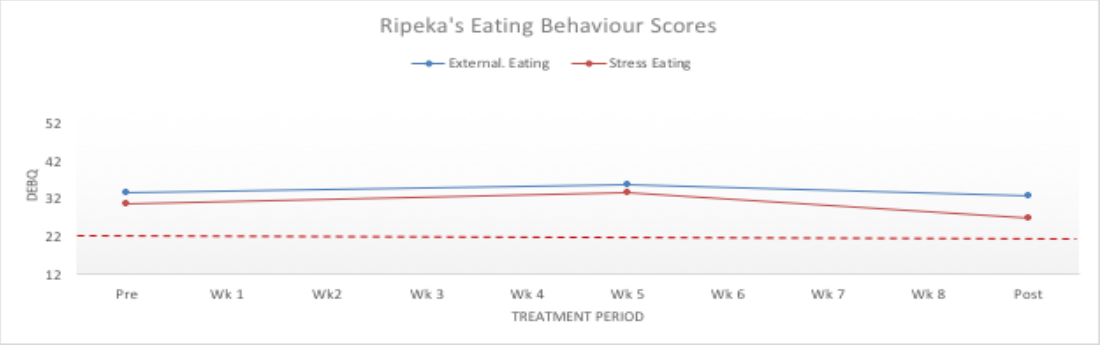


Figure 13: Ripeka's emotional eating and external eating behaviour score across the treatment period. Her scores remained above the cut off but were trending downward.

9.2.3.5 Psychological distress

Ripeka's depression, anxiety and stress (DASS) scores remained low across the study and her PTSD score remained unchanged at post-treatment

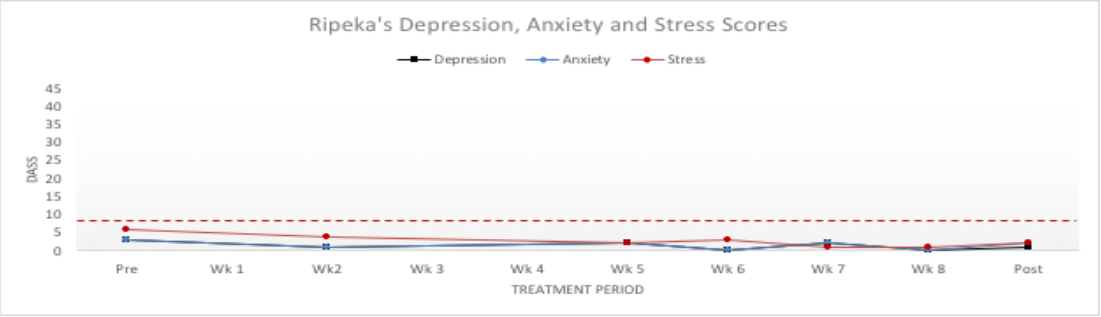


Figure 14: Ripeka's weekly depression, anxiety and stress scores during the treatment period.

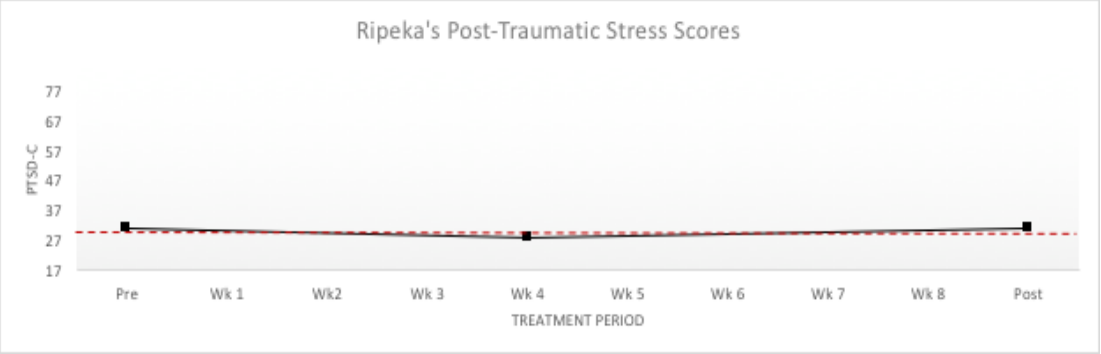


Figure 15: Ripeka's PTSD scores across the treatment period. Note there was little change across the course and they remained above the cut off at post-treatment.

9.2.4 Summary

Ripeka's baseline results supported the majority of the hypotheses put forward in Chapter 6. Her cortisol profile showed hypo-cortisolism on all three indices, she reported a high chronic stress score, high waist circumference and high stress eating scores – all of which are indicators of allostatic load. Contrary to expectations however, Ripeka did not show impairment on any of the mental health measures, and she reported a high mindfulness score at baseline. Both of those could be viewed as indications of a high degree of psychological resilience. Her responses to the post-treatment TSST support this conclusion by showing that she adapted well when exposed to an acute stressor. In spite of high psychological resilience however, the findings suggest that Ripeka's physical health may be paying the price for being chronically exposed to stress. Although Ripeka reported that she received many benefits from the course, and those benefits were reflected in small improvements in her cortisol profile, the course did not appear to influence her metabolic health in a clinically meaningful way. Given that her stress eating scores were trending downwards across the study period, it may be that Ripeka required longer than 8-weeks of mindfulness exposure in order to see greater improvements in her biological markers of health.

9.3 Case Study Two: Ani

"*I've really enjoyed it, I've really enjoyed the connection with other Maori women"*

Ani

Ani is a 49-year of woman of Ngati Maniapoto descent who works as a Registered Nurse. Ani joined the study hoping to learn "techniques" that would help her "not become anxious too quickly, for too long, over small things". She described work as "the most stressful area" of her life and held hope that mindfulness would help her "be more placid or patient in that area" of her life.

Prior to starting the course, Ani believed that mindfulness involved having "a sense of self-awareness" and "the ability to detract yourself from a situation that might be making you feel anxious or stressed, perhaps seeing that situation without any emotional attachment and then being able to deal with it better." Her main incentive to participate in the course stemmed from her desire to grow, evidenced by the statement "I love learning and if there's some part of my development, spiritually, mentally, emotionally, that I can learn to do well or better, then yeah, I'm keen". In referencing her development by using the terms "spiritually, mentally, emotionally," Ani's kōrero supported the hypothesis proposed in Chapter 4, that many Māori still view health in holistic terms – even those who work as health professionals and who have been trained in Western models of health.

In her pre-treatment interview, Ani also made connections between concepts in mindfulness and concepts in Maoridom, and as predicted, spirituality emerged as a common theme. Her kōrero also highlighted a belief that Māori are collectivistic in orientation.

> It [mindfulness] connects us to a... being Māori, I believe I'm part of a collective anyway, the Māori mind, the Māori world, we see things that aren't there, we hear things that others can't hear, we're guided by an ethereal source. So being part of a, being more mindful of the world around me, not

just the physical world but the other world as well, is part of who I am as a Māori.

Ani recorded one of the highest ACE scores of the group - 8 out of 10. She was not taking any medication during the treatment period.

9.3.1 Findings from research question one: Baseline results

Chronic Stress (SRRS) past year >300	**435**
Perceptions of stress past month (PSS) >15	11
Cortisol Awakening Response (CAR) (increase by 50% or 2.5nmol/l)	**Hyper**
Daily Slope (DS) (Night time rise or slow decline i.e. high afternoon levels)	**Hyper**
Cortisol response to acute stress (<2.5nmol/l increase, high perceived stress)	Normal
Waist Circumference >80cm	**105.5cm**
Stress Eating >24	19
External Eating >22	**28**
Depression	Low
Anxiety	Low
Post-traumatic stress disorder >30	**31**
Mindful Awareness (Low=15-40; Moderate=40-65; High=65-90)	Mid

Table 2: Baseline results for Ani. Bolded results show scores that indicate a significant health issue.

9.3.1.1 Mindful awareness

Ani's mindfulness score at baseline was 62 out of 90, indicating that she experienced a **moderate** degree of mindfulness before starting the course.

9.3.1.2 Chronic stress

Ani's chronic stress events score was 435, nearly **1.5 times greater** than the cut-off indicating high stress exposure. Contrary to expectations, she did not score highly

on the measure of *perceived* stress, which could be indicative of psychological resilience.

9.3.1.3 Cortisol dysregulation

As predicted, Ani's cortisol profile showed dysregulation on 2 of the 3 indices of HPA-axis functioning. Ani's CAR and DS showed that she produced excessive levels of cortisol in the morning and throughout the day (i.e., **hyper-cortisolism**). Her acute response to stress appeared to be healthy.

9.3.1.4 Visceral obesity

Consistent with expectations, Ani's baseline WC measurement was **25.5cm greater** than the recommended cut off, indicating that she is at high risk of developing diabetes and cardiovascular disease. Ani also scored highly on a measure of stress eating.

9.3.1.5 Psychological distress

Contrary to expectations given her high ACE score, Ani scored below the cut off on measures of depression, anxiety and stress. However, her baseline PTSD score was higher than the cut off, indicating that difficult experiences from her past may have been bothering her when she joined the study. Overall, Ani's mental health profile suggested she is highly psychologically resilient. This could be attributable to an intervention she experienced two decades ago (discussed in the summary).

9.3.2 Findings from research question two: Response to the course

Ani's response to the course was favorable. In her post-treatment interview she described mindfulness as "a real gift" and highlighted how much she "enjoyed the connection with other Māori women". Whereas initially, Ani described mindfulness as having "a sense of self-awareness", after completing the course she described it

as “more a discipline really, it’s not like going out and getting a massage where it’s done to you and you just relax, it requires you to actively be present.” Ani likened mindfulness to “other practices” that encourage you to be “in touch with yourself”, but she also repeatedly described mindfulness as an active process that requires you to “fully focus on who you are or what you’re doing” and to “pay attention”. Ani’s post-treatment descriptors of mindfulness are very similar to the definitions put forward by the programme’s author, Jon Kabat-Zinn, which would suggest that Ani both internalised and processed key messages from the course.

> There’s an acknowledgement that our minds will wander and that’s perfectly alright, just come back to the present moment. There’s nothing about denying it, or trying to overcome it or override it, or think pink butterflies out of it, it’s there, it’s happening, so acknowledge it and come back to the moment.

With regard to benefits received, Ani noted that the course was “157 percent” successful in terms of giving her what she wanted. She reported that she “learnt some new techniques”, some “new ways of thinking” and “more importantly, some new ways of watching and listening”. Specifically, Ani described that mindfulness became “a habit”, “a way of nurturing” herself, especially at work:

> Probably the most stressful situation in my life would be at work, but now, previously eight weeks, or even six weeks ago, a situation that even today faced, it almost seems like I’m standing beside myself now and I’m thinking ‘well, previously you would have been thinking this way or feeling this way, or going to act this way’, so now that I know about mindfulness, I’m just going to do this differently. While time doesn’t stop, it does feel like it does, because you’re stopping yourself in the midst of all this and saying to yourself, ‘let’s do it differently this time round, don’t just go on automatic pilot’.

Ani also highlighted the enjoyment she got from being part of a mindfulness group comprised of wāhine Māori.

> I've enjoyed the connection with other Māori women, women I've never met before, and the ones I have met, I've gotten to know them better, and as I've said, there's a special bond now that we've got.

Highlights for Ani included "the group dynamic, the welcome of course, the karakia, the introduction," as well as "the gentleness of it all, the gentleness of being part of that group." She attributed this quality to the teacher specifically.

> I loved how there was this gentle coaching, I mean, his voice helps but also the fact that the coaching itself is very gentle.

Ani noted that Kovido's gender and personality were not as important as his personal qualities.

> His spirit, his essence, his authenticity, his experience with mindfulness shone through strongly right from the start, right from the start. And that gentleness about 'just try it if you're not certain'. You don't tell us what to do, don't even *try* tell us to do it, but the fact that he just suggested it, gently, no he was wonderful, great.

> Even the fact that Kovido is a man, that didn't make a difference really, it was for me, tuning into the spirit of the person, and as a Māori woman, it fitted well because of the philosophy. I think the philosophy is that it honors the individual spirit as they are, there's no judgement, there's not even any interest in where we've come from or what's happened, there was no focus on status or anything like that, just as we came, that's how we were, I liked that.

Ani's assertions that Kovido's "spirit" and "authenticity" were more important than his gender and ethnicity, both contradict and support claims posited in Chapter 4. On the one hand they support the claim that Māori are more inclined to engage with providers who are "non-judgemental" and "authentic". On the other hand they

contradict assumptions that Māori necessarily struggle to engage with non-Māori providers, which implies that the qualities non-Māori bring to their interactions with Māori might be a greater barrier to engagement than their ethnicity per se.

Ani recalled that one of the exercises had a particularly profound impact on her. The exercise required participants to enter into pairs and repeatedly ask each other the question "*what nourishes you*?" then reply with "*thankyou".*

> Sitting there with Kiri that time, it was the beautiful way she said thankyou to me, it was genuine! Then when you are continually thanked that way you think 'wow, this is, I'm really sharing, this person is really hearing me, I'm sharing some big s**t and there's no judgement, there's no sympathy, there's nothing coming back – not like those guys [referring to the mental health unit] – it's a different kind of, it's just a really authentic listening and hearing with no judgement and it was very powerful, very powerful.

In sum, Ani reported receiving many benefits from participating in the course. Among them were a sense of connection with other wāhine Māori, a greater ability to choose how she responded in certain situations, a greater emphasis on being gentle and non-judgemental, as well as increased ability to cope with stress at work – which is what she hoped she would gain from it. Her last comment at the post-treatment interview expressed her view of how mindfulness could be used in future.

> Can't wait for it to become the norm, I can't wait for it to be part of the hospital, I can't wait for it to be just part of you know, 'so Mrs Smith, today you've got your physio, your OT and your mindfulness group, right, so come on, let's get up and get dressed.

Ani entered the study with one of the highest ACE scores of the group, yet did not show a hypo-cortisolemic profile or psychological distress. At a follow up meeting four months after data had been collected, Ani revealed that in the past, she had

coped with the stress of her childhood by becoming an alcoholic at 14 years of age. This is entirely consistent with the findings from the ACE study. Ani also reported that 23 years ago, she experienced a major therapeutic intervention in the form of Alcoholics Anonymous and has been sober ever since that time. Ani attributed the success of her AA intervention to the collective of the group and the fact that it is a spiritual programme.

In total, Ani attended seven of the eight mindfulness sessions, as well as the whole day workshop. She also reported practicing formally for 30 mins, three times per week for the duration of the course.

9.3.3 Findings from research question three: Clinical change

9.3.3.1 Mindful Awareness

Ani's mindfulness scores steadily increased across the treatment period. Post-intervention, Ani recorded one of the highest mindfulness scores of the group, 86 out of 90.

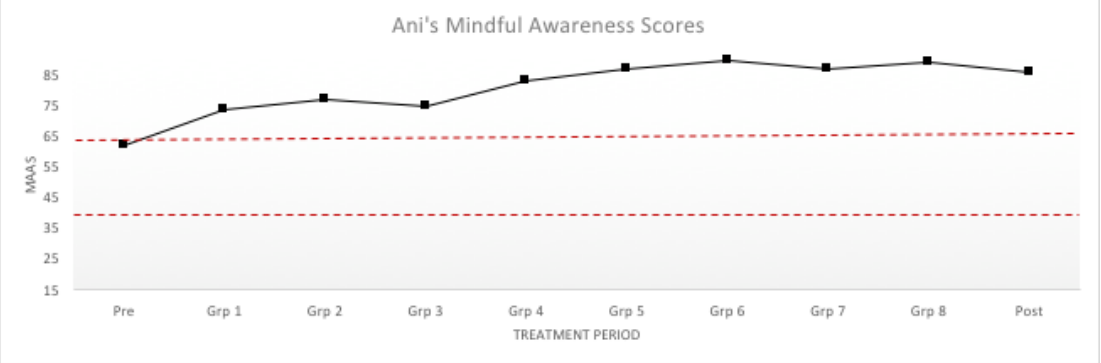


Figure 1: Ani's MAAS score. Her post-intervention score was 24 points higher than her baseline score.

9.3.3.2 Chronic stress

Ani recorded a stressful events score of **328** during the eight weeks of the course. The authors of the SRRS consider that a stress score of 300 or above during any

12-month period is indicative of high stress, which would suggest that Ani endured more stress during the two months of this study than many people might experience in one year (Holmes & Rahe, 1967). Despite this, Ani's *perceived* stress score (which measures how stressed she actually felt over past month) and her weekly stress scores (on the Depression, Anxiety and Stress Scale) both remained below the cut off throughout the entire treatment period, which suggests she did not *feel* particularly stressed. Figure 2 shows that her perceived stress scores steadily decreased over the treatment period.

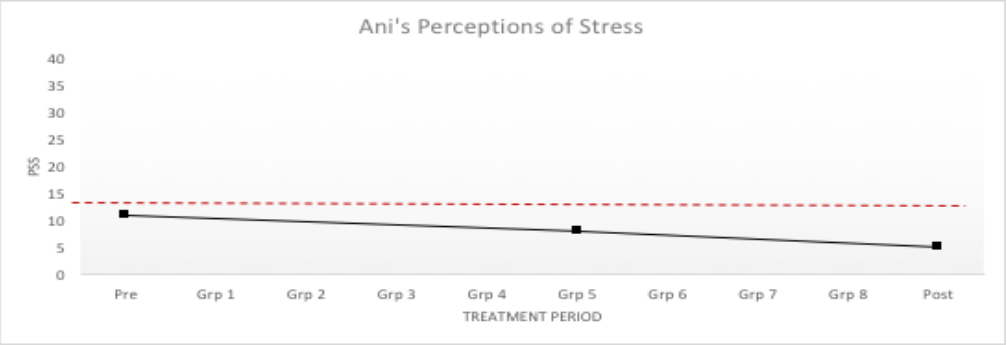
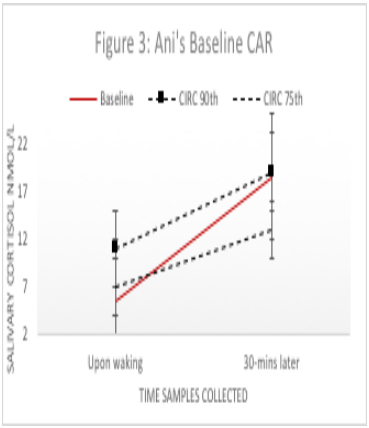
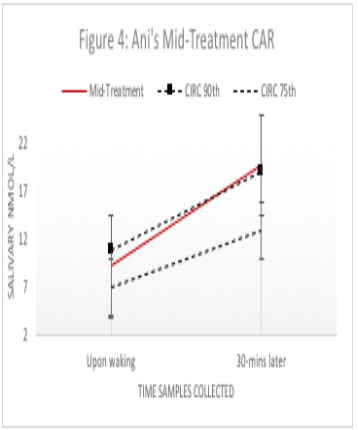


Figure 2: Ani's PSS score. Her scores remained low throughout the treatment period despite having been exposed to a high number of stressful events, as evidenced by the SRRS.

9.3.3.3 Cortisol dysregulation:

Cortisol awakening response (CAR)





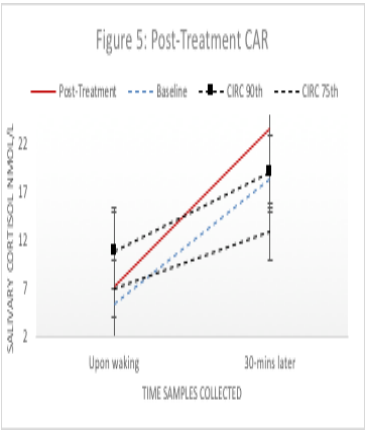


Figure 3 shows the average cortisol morning measurements taken from 6-days of baseline saliva testing (e.g., the Monday, Tuesday and Wednesday of two consecutive weeks in September). To obtain an accurate CAR, saliva samples were taken immediately upon waking and 30-minutes after waking. Note that her morning

increase in cortisol levels peaks at the 90th percentile cut off point indicating a hyper-cortisolemic CAR. Figure 4 shows the average of 3-days of saliva sampling at mid-intervention. Note slight flattening of the CAR and an increase in overall levels. Figure 5 shows the average of 3-days of sampling at post-treatment. Note the strong cortisol rise in the first 30-mins of waking, and peak cortisol levels that are well above the 90th percentile cut-off. CAR reference levels are provided by the CIRCORT database (Miller et al., 2017) and have been added for comparison.

Cortisol daily slope (DS)

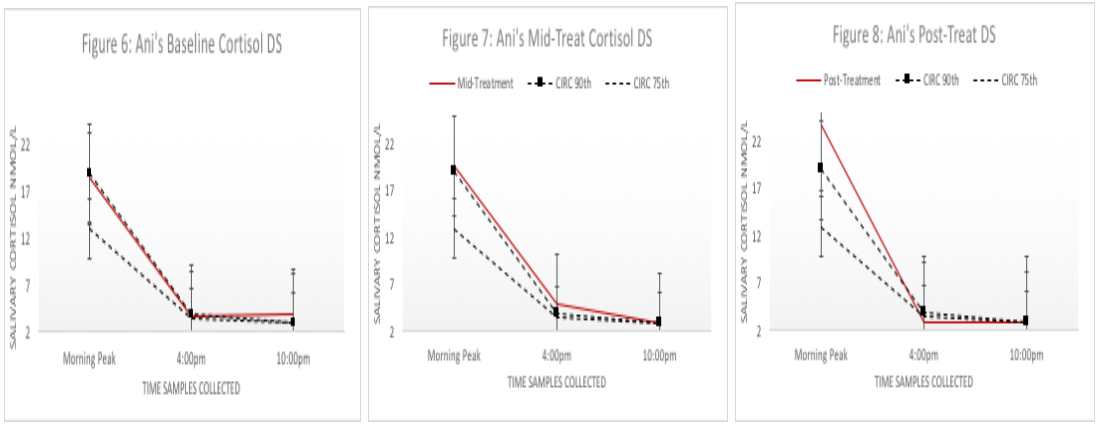


Figure 6 shows Ani's baseline average DS. Note the increase in levels at night-time indicative of a hyper-cortisolemic profile. Figure 7 shows her DS at mid-treatment. Note resolution of the night-time rise, but high afternoon levels. Figure 8 shows Ani's DS at post-treatment. Note the **improvement** in cortisol decline at post-treatment, (i.e., afternoon levels are well below the 3nmol/l threshold). DS reference levels are provided by the CIRCORT database (Miller et al., 2017) and have been added for comparison.

Acute stress response (AS)

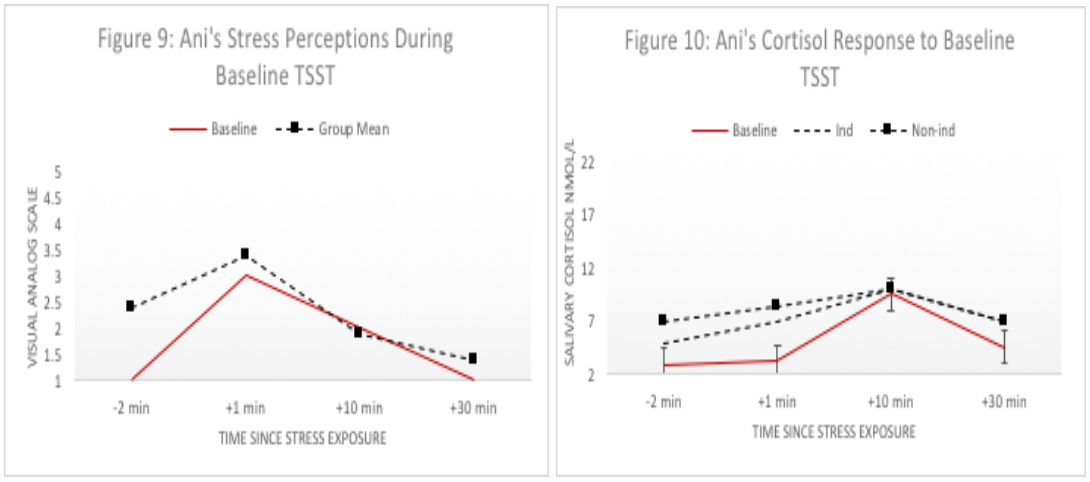
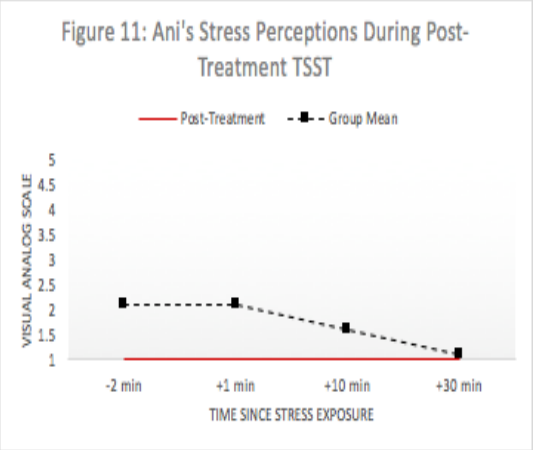


Figure 9 shows Ani's self-reported feelings of stress during the baseline TSST. Note the increase in stress levels 1-min after leaving the testing room. Figure 10 shows Ani's salivary cortisol output in response to the baseline TSST. Note the strong increase in cortisol levels matches her self-reported stress levels. Reference ranges are provided by the Berger et al., (2017) study which used the same test to compare the cortisol responses of indigenous and non-indigenous Australians.



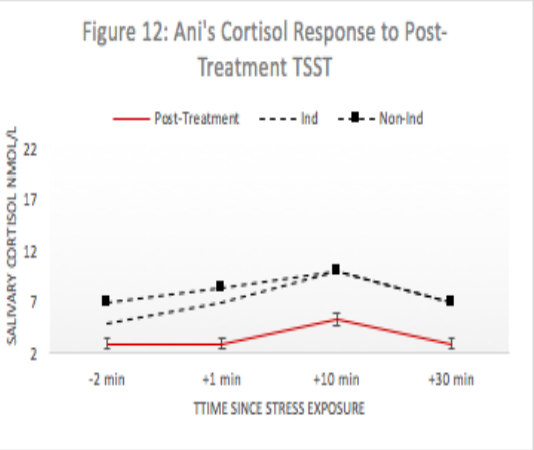


Figure 11 shows Ani's perceptions of stress during the post-treatment TSST. Note the lack of increase in stress levels indicating that she had adapted well to the test. Figure 12 shows Ani's cortisol response to the post-intervention TSST. Note that her cortisol levels show a much smaller increase during the second test, which could be further interpreted as **evidence of adaptation.**

9.3.3.4 Visceral obesity

Ani's WC remained **unchanged** throughout the treatment period. However, both her stress eating and external scores scores reduced.

Figure 13 shows Ani's emotional eating and external eating behaviour score across the treatment period. Her stress eating scores reduced, however her external eating scores remained above the cut off.

9.3.3.5 Psychological distress

Ani's depression and anxiety scores remained low across the study (with the exception of week seven when her anxiety levels increased). Her stress scores

were above the cut off at pre-treatment and well below the cut off at post-treatment. Her PTSD scores also **reduced** across the treatment period.

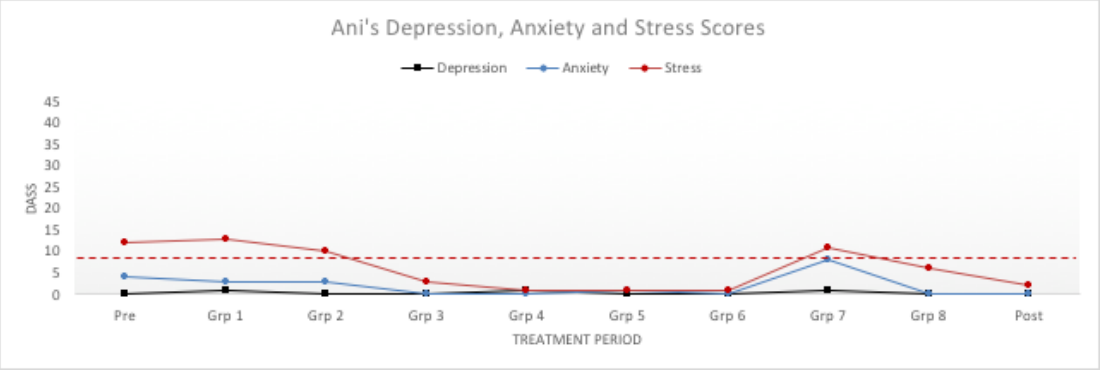


Figure 14 shows Ani's weekly depression, anxiety and stress scores during the treatment period.

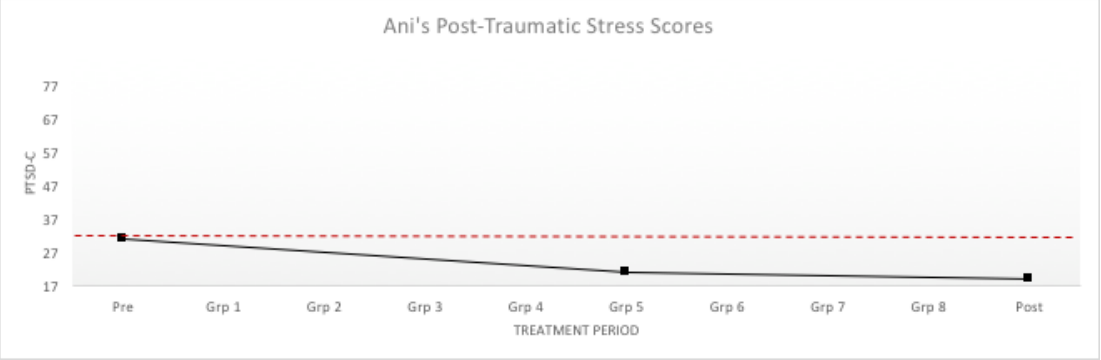


Figure 15 shows Ani's PTSD scores across the treatment period.

9.3.4 Summary

The majority of Ani's baseline findings supported the hypotheses put forward in Chapter 6. Ani recorded a very high chronic stress score, a high waist circumference and emotional eating score, high CAR and DS, and moderate levels of mindfulness. Contrary to expectations, Ani did not score highly on many of the measures of mental distress, which indicates a high degree of psychological resilience. Notably, Ani showed a pattern of hyper-cortisolism instead of hypo-cortisolism. This might be linked to her having experienced a major therapeutic intervention two decades ago (e.g., AA).

Post-treatment, Ani showed improvements in her response to the acute stressor (i.e., lower cortisol output indicative of adaptation). However, her CAR and DS continued to increase as the course progressed, which for someone who already has high cortisol levels, may not indicate improvement. Increases in the steepness of cortisol increase and decline on the measures could be seen as improvements trending toward a healthier profile though. While Ani recorded significant improvements on the stress eating scale, those improvements were not matched by decreases in her waist circumference measurement post-treatment. Thus Ani's quantitative results show a mixed pattern of improvement in response to mindfulness practice. This could be related to the fact that Ani had such a high ACE score i.e., her cortisol levels might not be as amenable to change following an eight week mindfulness course. Ani did however, show major improvements on the mindful awareness attention scale and on the PTSD scale. Also, her perceptions of stress remained low despite a high degree of stress exposure, which could be attributed to the mindfulness practice.

9.4 Case Study Three: Hararutu

"I've noticed a whole different me, like calmer, more observant."

Hararutu

Hararutu is a 41-year old Maori woman of Kai Tahu, Kāti Mamoe and Waitaha descent. She is the primary caregiver for a number of children and grandchildren. Hara joined the study after seeing an advertisement inviting wāhine Māori to participate in a mindfulness course designed for Māori women.

Hara did not complete a formal pre-treatment interview, however she advised that her reasons for participating included a desire to reduce her dependence on medication. Prior to starting the course, Hara was prescribed Venlafaxine, Olanzepine and Epilim (to stabilise moods), Atorvastin and Metroprolol (to reduce cardiovascular disease risk) and Metformin to reduce risk for developing Type II diabetes.

Hara expressed hope that the study might contribute to improving the services available to Māori in future. In the years before joining the study, Hara had spent time as an inpatient at a psychiatric hospital and she had also completed a community sentence with the Department of Corrections. She underwent surgery two years ago to be fitted with a cardiac defibrillator to prevent spontaneous cardiac arrest.

Hara entered the course with an ACE score of 8 out of 10 - one of the highest ACE scores in the group.

9.4.1 Findings from research question one: Baseline results

Chronic Stress (SRRS) past year >300	**1244**
Perceptions of stress past month (PSS) >15	**29**
Cortisol Awakening Response (CAR) (increase by 50% or 2.5nmol/l)	**Hypo**
Daily Slope (DS) (Night time rise or slow decline i.e. high afternoon levels)	**Hypo**
Cortisol response to acute stress (<2.5nmol/l increase, high perceived stress)	**Inadequate**
Waist Circumference >80-cm	**108.5cm**
Stress Eating >24	14
External Eating >22	**24**
Depression	**Severe**
Anxiety	**Severe**
Post-traumatic stress disorder >30	**60**
Mindful Awareness (Low= Mid-low = Mid-high= High=)	**Low**

Table 2: Baseline results for Hararutu. Bolded results indicate a significant health issue.

9.4.1.1 Mindful awareness

Hara's mindful awareness scores were in the **low** range (32 out of 90) prior to starting the course.

9.4.1.2 Chronic stress

Hara's 12-month stress exposure score was 1244, more than **4 times** greater than the cut off indicative of high stress. In line with expectations, Hara's *perceived* stress score was also well above the cut-off, which suggests that she experienced a high degree of *feeling* stressed.

9.4.1.3 Cortisol dysregulation

Consistent with expectations, Hara showed a pattern of **hypo-cortisolism** on all three indices of HPA axis functioning.

9.4.1.4 Visceral obesity

As expected given her high ACE score, Hara's baseline WC measurement was **28cm above** the cut off indicating a high risk of developing type II diabetes and cardiovascular disease. In addition, Hara scored above the cut off on the measure indicating high levels of external eating behaviour, but not eating in response to stress.

9.4.1.5 Psychological distress

In line with expectations, Hara scored in the **severe** range for depression, anxiety and stress symptoms on the DASS measure. In addition, her score on the PTSD measure was **extremely high.**

9.4.2 Findings from research question two: Response to the course

Hararutu's response to the course was positive. She described the course as being "totally" successful in terms of what she wanted from it, however she was not entirely free of medication when the programme ended. Seven months after completing the course however, Hara reported that she was no longer prescribed Olanzepine and her dosages of Venlafaxine and Epilim had been reduced.

Regarding changes in understandings of mindfulness post-treatment, Hararutu described mindfulness as being "about taking notice of myself, my inner peace, what's around me and my good and bad feelings." She noted that changes in her self awareness had improved her anger reactivity, as well as her enjoyment of the

world around her “I’m more aware of myself, and my temper, you know and I actually notice stuff”, “I actually, really didn’t take notice of like, going for a walk, it was ‘oh I’m going there’, and that when I get angry, my leg shakes! I didn’t know that.” Those changes also increased her self-nurturance “I think it’s like, helped me to have to clearer views. Think about myself, I don’t do that very often so yeah, it has made me more aware that I need to think of me too.”

Consistent with the hypothesis that high ACEs are associated with chronic stress, Hara reported being exposed to a high amount of stress over the study period. That stress included that sudden death of her *taua* (grandmother), the death of a close Aunt, legal trouble involving one of her nephews and allegations of assault. Understandably, that stress prevented her from attending some classes.

> My last eight weeks have been really, really stressful, to the point where I really wanna give up on everything. But this course has made me, helped me like check myself, look at myself from a different point of view, slow down and think about things and yeah, stop and breathe. I don’t think I, you know, used to breathe or take notice of anything, but now, like doing this course it’s like helped me not to lose my rag you know, not get angry cause I tend to breathe.

Hara did not attend classes when she was “feeling like crap, not wanting to see anybody”, for her habitual way of coping with stress was to “sort of keep myself sheltered away”. However, Hara stayed connected to the group in spite of all that she had going on in her life, which is testament to the strength of the group dynamic.

Hara made specific mention of previous negative experiences she’d had in other groups “If you go into some groups with some white people they stare down at ya”, and she contrasted that with her experience of being part of a treatment group with other Māori women, saying “it’s easy being able to be who you are in a group like that” “cause they’re all sort of like on the same sort of waka, you know.” Hara’s

comment that “some white people stare down at ya” validates the claims made in Chapter 4, that some Māori might engage better with health services if they were offered in group settings and led by Māori ways of thinking, behaving and being.

Also consistent with assertions made in Chapter 4 that the qualities and characteristics of a health professional are more important than their ethnicity, Hara did not seem at all phased by the fact that the group was led by a Pākeha male, “I actually really like, liked him, and I listen to him on soundcloud all the time!”

In total, Hara attended four classes and she reported that she practiced mindfulness “every day” during the treatment period.

> I’d make it a thing before I go to bed, or when I first get up, so I put sitting down, having some mindfulness time, before my coffee and cigarette in the morning and at night before I go to bed, cause I could see that it was benefitting me.

Follow up discussions with Hara about the ACE framework confirmed that it resonated highly with her individual experiences. At the age of 15, Hara’s *poua* (grandfather) and his brother left their marae because of trauma they had experienced there. That decision ultimately resulted in a loss of connection to Te Ao Māori, which led her poua’s son (Hara’s father) to seek a sense of belonging elsewhere. He found it within a gang. Growing up with a father affiliated to a gang, contributed to the high number of ACEs Hara and her siblings endured when they were young. The expectation that her family members would also join gangs only changed when her brother died suddenly at the age of 15. However the enduring effects of ACEs in their lives is still evident.

According to Hara, this course was the first psychological intervention that she had responded well to.

9.4.3 Findings from research question three: Clinical change

9.4.3.1 Mindful Awareness

Hara's mindful awareness scores steadily **increased** after week 4 of the MBSR course. At post-treatment, her score was in the moderate range (56 out of 90).

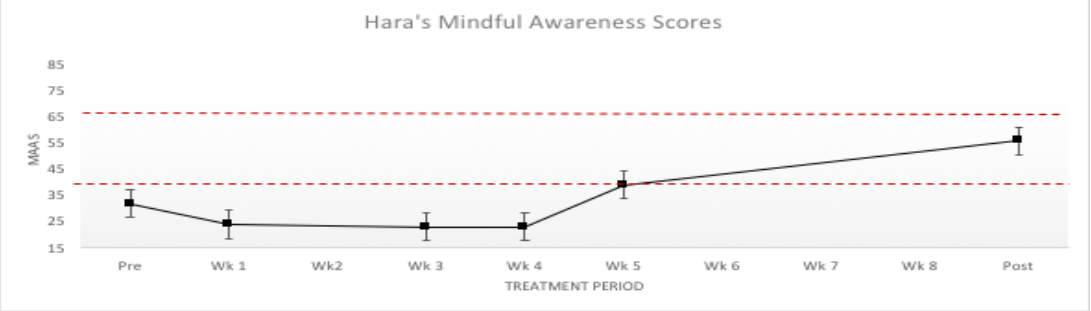


Figure 1: Hara's MAAS score. Her score was 24 points higher at post-treatment than at baseline.

9.4.3.2 Chronic stress

Hara's chronic stress (SRRS) score during the eight weeks of the MBSR course was 582 - almost **2-times** greater than the cut-off score indicating high stress exposure over a *12-month* period. Although Hara's *perceived* stress levels (PSS) **decreased** (Figure 2) during the treatment period, at the end, they were 4-points higher than they were at baseline. This could be explained by the extremely high number of stressful events she was exposed to during the treatment period.

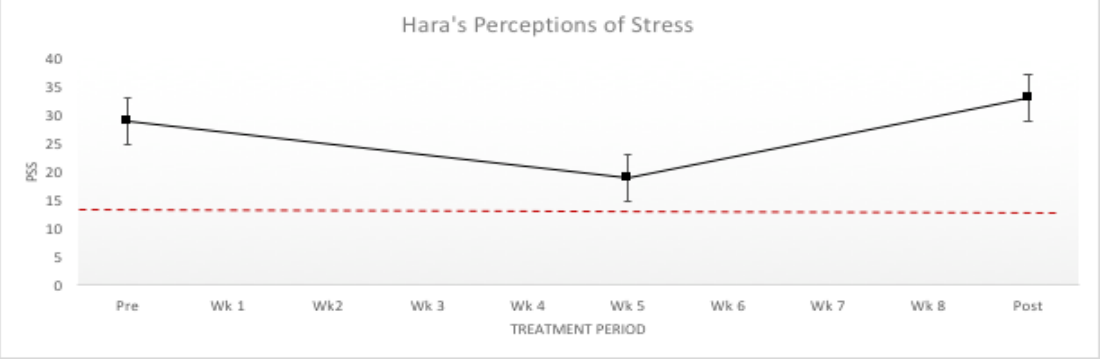


Figure 2: Hara's PSS score. Her scores decreased at mid-treatment, but at post-treatment were higher than they were at baseline.

9.4.3.3 Cortisol dysregulation:

Cortisol awakening response (CAR)

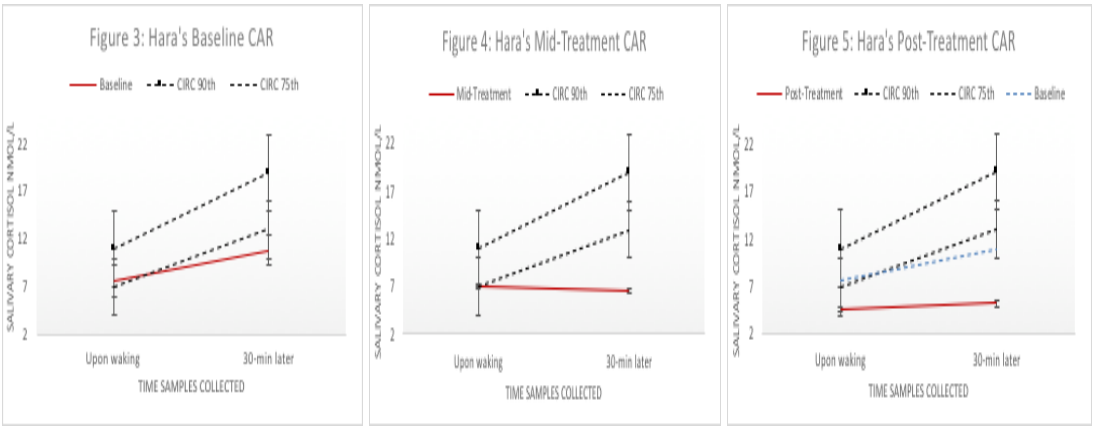
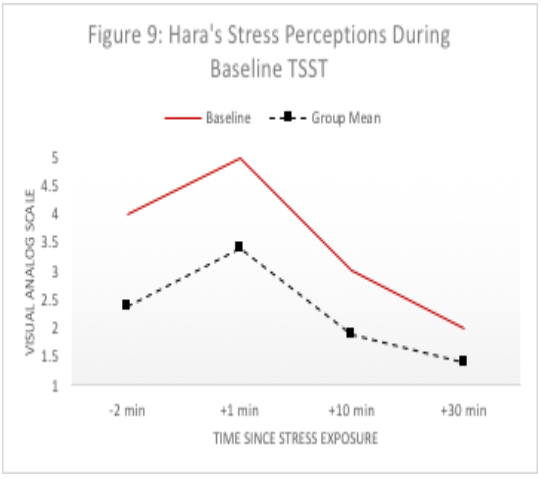


Figure 3 shows the average cortisol morning measurements taken from 6-days of baseline saliva testing (e.g., the Monday, Tuesday and Wednesday of two consecutive weeks in September). To obtain an accurate CAR, saliva samples were taken immediately upon waking and 30-minutes after waking. Note the lack of cortisol rise typical of a hypo-cortisolemic profile. Figure 4 shows the average of 3-days of saliva sampling at mid-intervention. Note further flattening of the CAR. Figure 5 shows the average of 3-days of sampling at post-treatment. Note that her overall CAR levels are even lower than they were at baseline and do not rise at all after waking. This likely reflects the extremely high amount of stress Hara experienced during the 8-week treatment period. CAR reference levels are provided by the CIRCORT database (Miller et al., 2017) and have been added for comparison.

Cortisol daily slope (DS)

Figures 6 shows Hara's baseline average DS. Note the slow decline in levels across the day indicative of hypo-cortisolism (i.e., her afternoon levels are well above the 90th percentile). Figure 7 shows her DS at mid-treatment. Note further flattening of the cortisol slope, but faster decline (e.g., afternoon levels are now low). Figure 8 shows Hara's DS at post-treatment. Note even further flattening at post-treatment. DS reference levels are provided by the CIRCORT database (Miller et al., 2017) and have been added for comparison.

Acute stress response (AS)



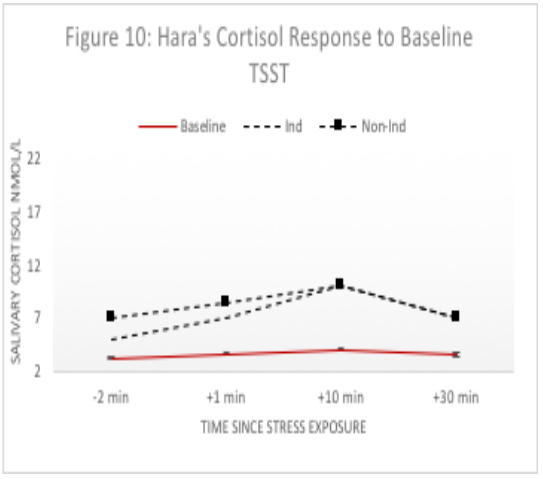
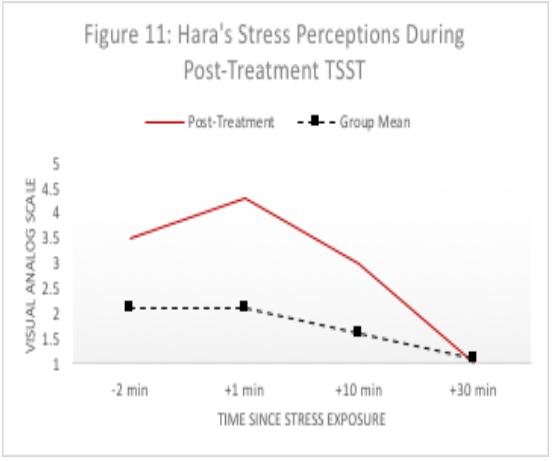


Figure 9 shows Hara's self-reported feelings of stress during the baseline TSST. Note the increase in stress levels 1-min after leaving the testing room. Figure 10 shows Hara's salivary cortisol output response to the baseline TSST. Note the lack of cortisol increase typical of a hypo-cortisolemic profile. Reference ranges are provided by the Berger et al., (2017) study which used the same test to compare the cortisol responses of indigenous and non-indigenous Australians.



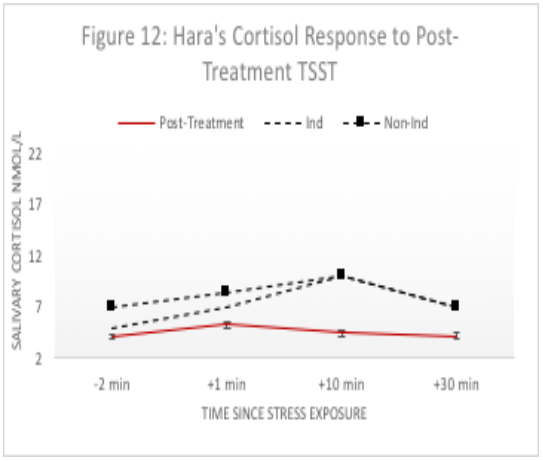


Figure 11 shows Hara's perceptions of stress during the post-treatment TSST. Note that although she reports feeling a high level of stress during the test, her self-reported levels are not as high as they were in the baseline test (Figure 9), indicating a small degree of adaptation. Figure 12 shows Hara's cortisol response to the post-treatment TSST. Note that her cortisol levels now show a small increase. This could be interpreted as further **evidence of adaptation.**

9.4.3.4 Visceral obesity

Hara's WC **decreased** by almost 2-cm during the treatment period. Notably, both her stress eating and external eating scores increased at mid-treatment (likely

reflecting the high levels of stress she encountered during the treatment period) but at post-treatment, they were **both below the cut-off.**

Figure 13 shows Hara's stress eating and external eating behaviour score across the treatment period. Her scores were below the cut off at post-treatment.

9.4.3.5 Psychological distress

Hara's depression, anxiety and stress scores varied across the treatment period, remaining **above the cut off** at post-treatment. Note that in week five, when her stress levels were highest, her stress eating and external eating scores were also at their highest - but her depression score had decreased. Hara's PTSD scores steadily **decreased** across the treatment period but remained **above the cut-off** at post-treatment.

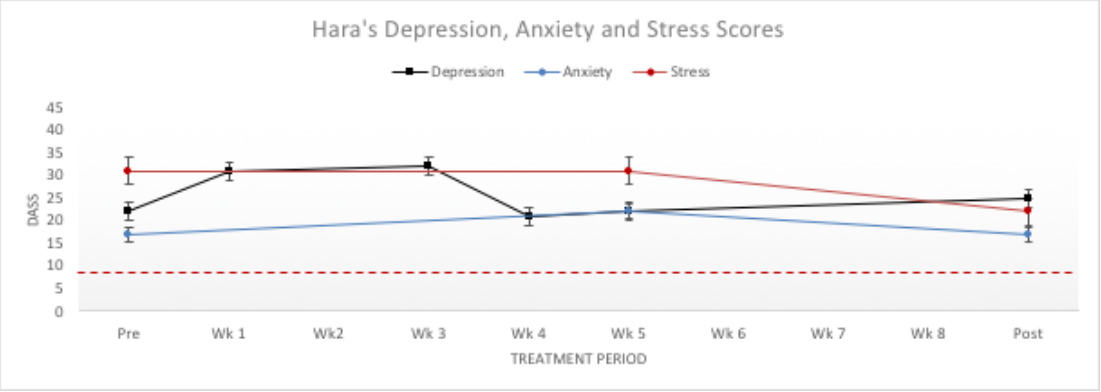


Figure 14 shows Hara's weekly depression, anxiety and stress scores during the treatment period.

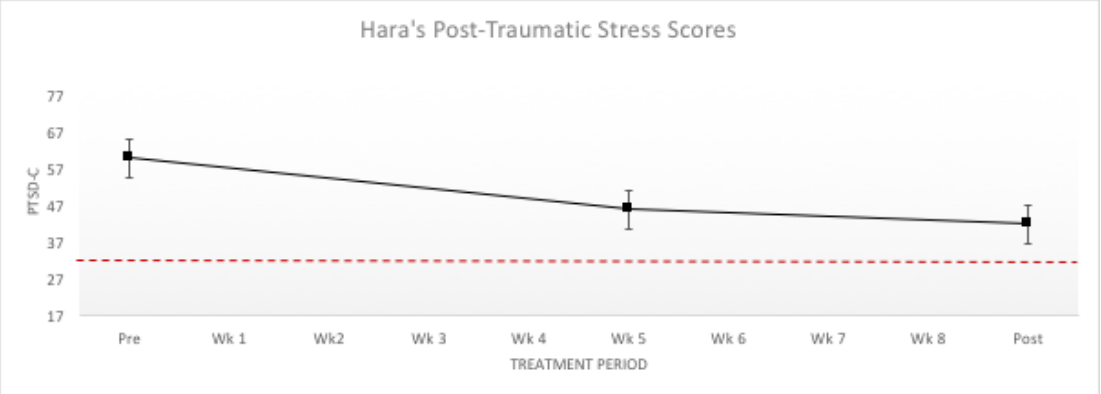


Figure 15 shows Hara's PTSD scores across the treatment period. Note that they remained above the cut off at post-treatment.

9.4.4 Summary

Hararutu's baseline findings supported all of the hypotheses outlined in Chapter 6, that Māori women with high ACE scores would report experiencing high chronic stress, visceral obesity, cortisol dysregulation and psychological distress. Although Hararutu attended only half of the classes, her results showed an improved cortisol response to the acute stressor, reductions in waist circumference and stress-related eating behaviours, as well as decreases in trauma symptoms – despite experiencing extremely high levels of stress during that period. Hararutu did not show post-treatment improvements on the DS and CAR measures, nor the weekly stress and perceived stress measures. This could be attributed to the high external stress she faced during the course, but it is also possible that her high ACE score made it less likely that her cortisol profile would be amenable to brief mindfulness intervention. Her post-treatment interview confirmed that she had experienced a high amount of stress during the treatment period and that participating in the MBSR course had helped her to cope well with that stress.

9.5 Case Study Four: Kiri

"I know a lot of this stuff, but I just think over the years, I just forget about it."

Kiri

Kiri is a 49-year old Maori woman of Kai Tahu, Kāti Mamoe and Waitaha descent, who works in Māori mental health. Prior to starting the course, Kiri described mindfulness as a "way of learning to control your emotions" and to "keep them grounded." She expected that the programme would offer her "another way of controlling" her emotions, and "learning to relax". She hoped that the course might "help with the stress of work as well." The reason she sought new methods of relaxation was because "you can't always go for a walk along the beach in Dunedin."

Consistent with the hypotheses outlined in Chapter 5, that Māori might engage better with treatments they perceive to be holistic, Kiri chose to participate because the course content aligned well with her worldviews.

> It appeals to me because it's the holistic approach, rather than the medical one, and I'm all about the holistic. If you can do something holistically to help, then it's worth it.

When she started the study Kiri was prescribed Fluoxetine (for depression), Seretide (for asthma), and Flixonase and Ceterizine hydrochloride (for Hayfever).

She entered the study with an ACE score of 4 out of 10.

9.5.1 Findings from research question one: Baseline results

Chronic Stress (SRRS) past year >300	**676**
Perceptions of stress past month (PSS) >15	**24**
Cortisol Awakening Response (CAR) (increase by 50% or 2.5nmol/l)	**Hypo**
Daily Slope (DS) (Night time rise or slow decline i.e. high afternoon levels)	Normal
Cortisol response to acute stress (<2.5nmol/l increase, high perceived stress)	Normal
Waist Circumference >80-cm	**102cm**
Stress Eating >24	**26**
External Eating >22	**41**
Depression	Low
Anxiety	**Extremely severe**
Post-traumatic stress disorder >30	**47**
Mindful Awareness (Low= Mid-low = Mid-high= High=)	Moderate

Table 2: Baseline results for Kiri. Bolded results show scores that indicate a significant health issue.

9.5.1.1 Mindful awareness

Kiri's mindfulness score was in the **moderate** range at baseline (50 out of 90).

9.5.1.2 Chronic stress

Consistent with expectations, Kiri's 12-month stress exposure score (SRRS) was 676 - more than **3-times greater** than the cut-off indicating high stress. Her *perceived* stress score (PSS) was also well above the cut-off.

9.5.1.3 Cortisol dysregulation

Kiri showed dysregulation in the form of **hypo-cortisolism** on only 1 of the 3 indices of HPA axis functioning. Her DS and cortisol response to the acute stressor were healthy at baseline, however her CAR was blunted.

9.5.1.4 Visceral obesity

Consistent with expectations, Kiri's WC was **22cm** above the cut off indicating a high risk of developing Type II diabetes and cardiovascular disease. Additionally, her external eating and stress eating scores were also above the cut-off.

9.5.1.5 Psychological distress

Kiri's depression, anxiety, stress and PTSD scores at baseline were all above the cut off.

9.5.2 Findings from research question two: Response to the course

Kiri's response to the course was favorable. She reported that the course had helped her in a number of ways and had been "110%" successful" - as it made her want to do things differently in future.

> It's benefitted me heaps because I've been able to see how much stressing I was doing and how much running around, and not taking time out for myself, and how that's probably impacted a lot on my physical health as well. So I've made that connection and it's been very beneficial.

After completing the course Kiri's conceptions of mindfulness had changed from being a way of "controlling your emotions" to "making you aware of what's going on in your life and giving you some strategies around how to deal with that." She also described it as "living in the moment." This supports the prediction that course participants would develop understandings of mindfulness that matched the definition outlined by Jon Kabat-Zinn.

Kiri gave mixed feedback regarding the fit between mindfulness and Te Ao Māori. On the one hand she highlighted how the course had enabled her to see how busy

and stressed she was, and how that type of chronic stress is often normalised for Māori women "I think most of it does fit in there because it makes us aware of how much we do, do. A lot of Māori women would say 'but that's what we're meant to do.' On the other hand, she noted that she had difficulty eating in silence during the whole day retreat because that is *not* what Māori do.

> The keeping quiet while eating, that one…it was a challenge. That just goes against everything we do, and when I think about how we sit around the table and have kai here, you know, we're always talking and we're loud, and doing it quietly, it was a really different experience.

The fact that Kiri did not draw explicit links between concepts embedded in mindfulness and concepts inherent in Te Ao Māori (such as spirituality) could either reflect a belief that she did not see many links between the two or that she had limited knowledge of Te Ao Māori.

Outside of class, Kiri tended to practice mindfulness informally and tried to live the message "slow down what you're doing."

> It's just really, really made me sit back and take a look at my life and go right, you're not a spring chicken anymore. You need to start working on this before your hair completely goes grey.
>
> When I say that I practice it, it's when I'm doing things. I'm more mindful of it now, like when I'm preparing a meal I'm more mindful of what I'm doing. It's not just automatic, chucking everything in and yeah. I'm enjoying it more too by doing that.

When asked what she would change about the course, Kiri's only improvement would be to extend the whole day workshop so that it occurred for "more than one whole day".

I would have liked to have done that at least a couple of times I think. That was the big awakening for me, was that one day course.

Kiri reported no difficulties with the teacher, saying “I found him good”. She attended a total of seven out of eight classes, as well as the whole day workshop.

9.5.3 Findings from research question three: Clinical change

9.5.3.1 Mindful Awareness

Kiri’s mindful awareness scores increased 11-points across the treatment period, remaining in the **moderate** range at post-treatment (61 out of 90).

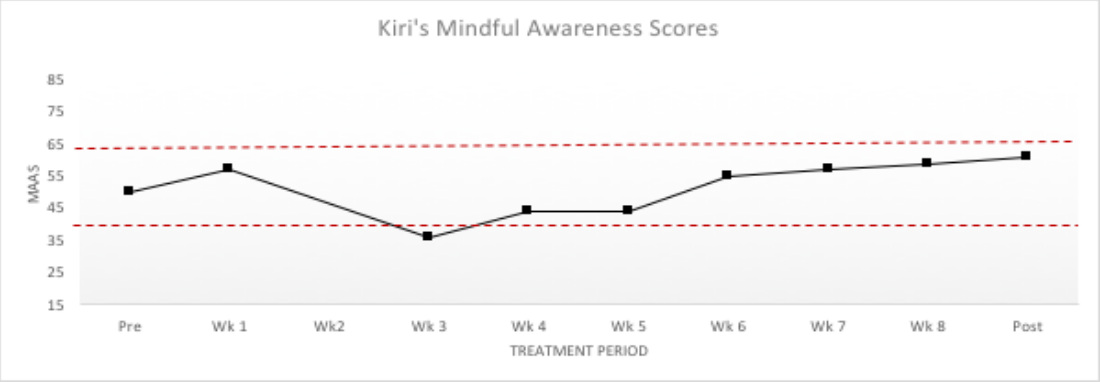


Figure 1: Kiri’s MAAS score. Her score was 11-points higher at post-treatment than at baseline.

9.5.3.2 Chronic stress

In line with expectations given an ACE score of 4, Kiri’s chronic stress exposure score (SRRS) during the eight weeks of the treatment period, was **205.** A score greater than 50 would be considered high stress for a period of eight weeks. Consistent with this, Kiri’s *perceived* stress scores (PSS) remained above the cut off during the treatment period.

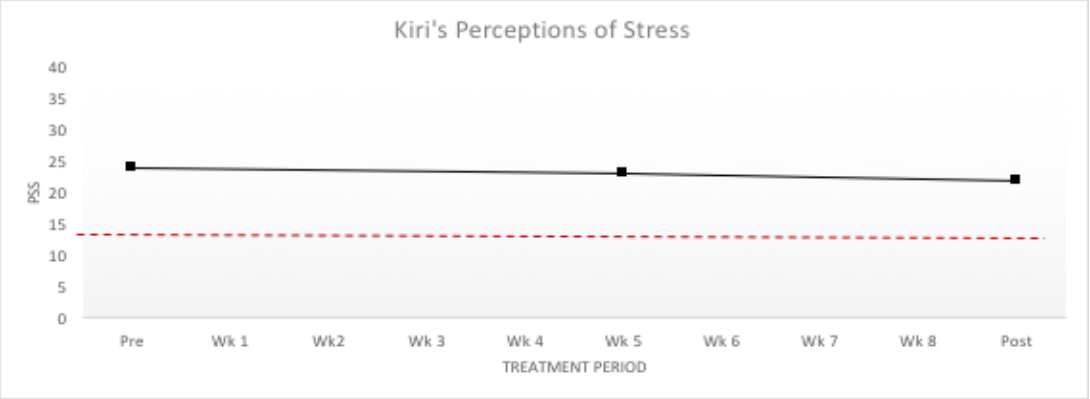


Figure 2: Kiri's PSS score. Her scores remained above the cut off throughout the treatment period, likely as a result of being exposed to a high number of stressful events, as evidenced by the SRRS.

9.5.3.3 Cortisol dysregulation:

Cortisol awakening response (CAR)

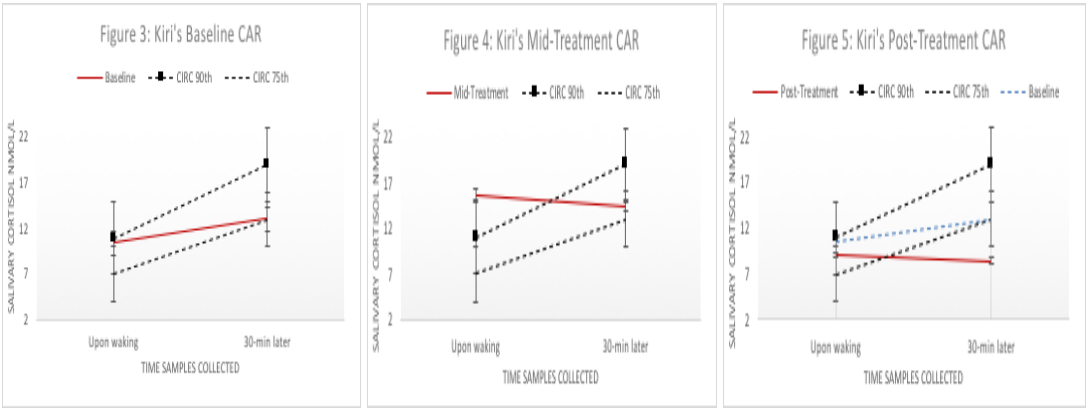
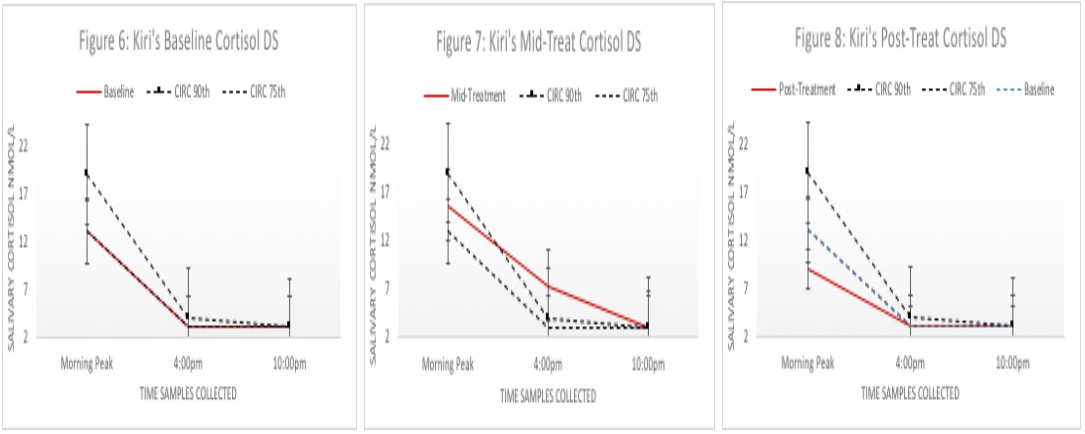


Figure 3 shows the average cortisol morning measurements taken from 6-days of baseline saliva testing (e.g., the Monday, Tuesday and Wednesday of two consecutive weeks in September). To obtain an accurate CAR, saliva samples were taken immediately upon waking and 30-minutes after waking. Note the lack of cortisol rise typical of a hypo-cortisolemic profile. Figure 4 shows the average of 3-days of saliva sampling at mid-intervention. Note higher overall levels, but further flattening post-waking. Figure 5 shows the average of 3-days of sampling at post-treatment. Note even further flattening of the CAR. CAR reference levels are provided by the CIRCORT database (Miller et al., 2017) and have been added for comparison.

Cortisol daily slope (DS)



Figures 6 shows Kiri's baseline average DS. Note that it closely matches the 75th percentile line. Figure 7 shows her DS at mid-treatment. Note the slow decline in cortisol levels throughout the day - likely reflecting high stress exposure during the treatment period. Figure 8 shows Kiri's DS at post-treatment. Note the **improvement** in cortisol decline at post-treatment, (i.e., afternoon levels are well below the 3nmol/l threshold). DS reference levels are provided by the CIRCORT database (Miller et al., 2017) and have been added for comparison.

Acute stress response (AS)

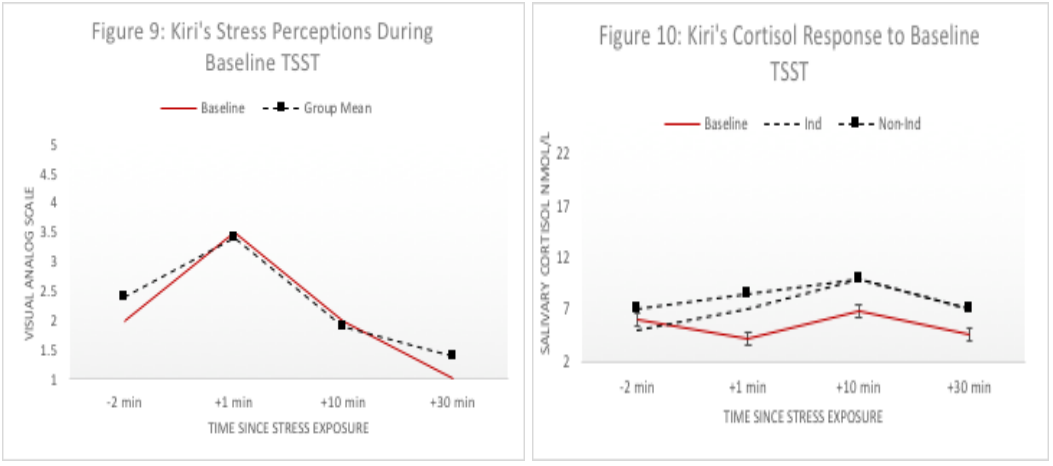
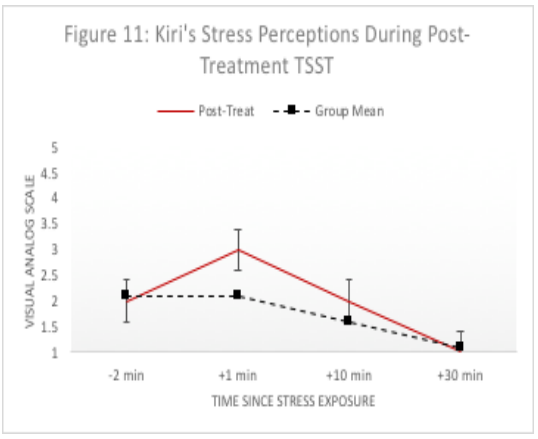


Figure 9 shows Kiri's self-reported feelings of stress during the baseline TSST. Note the increase in stress levels 1-min after leaving the testing room. Figure 10 shows Kiri's salivary cortisol output response to the baseline TSST. Note the healthy increase in cortisol levels. Reference ranges are provided by the Berger et al. (2017) study which used the same test to compare the cortisol responses of indigenous and non-indigenous Australians.



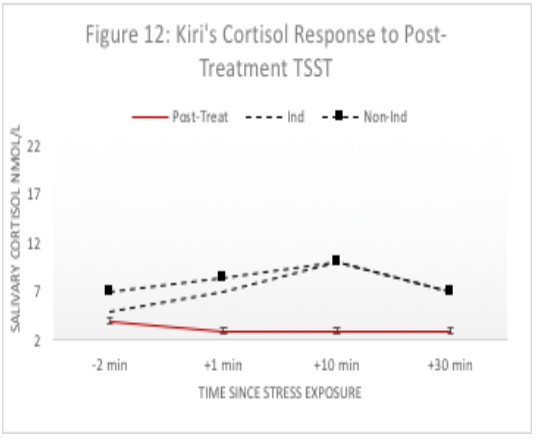


Figure 11 shows Ripeka's perceptions of stress during the post-intervention TSST. Note the reduction in self-reported stress levels (compared with Figure 9) indicating that she had adapted to the test. Figure 12 shows Kiri's cortisol response to the post-intervention TSST. Note that her cortisol levels do not increase at all during the test. This could be interpreted as further **evidence of adaptation.**

9.5.3.4 Visceral obesity

Kiri's WC **decreased** by 3cm during the treatment period. However, her stress eating and external eating scores both increased at mid-treatment, then decreased at post-treatment. This could be a reflection of her high stress exposure during the treatment period. Her external eating scores remained above the cut off at all times.

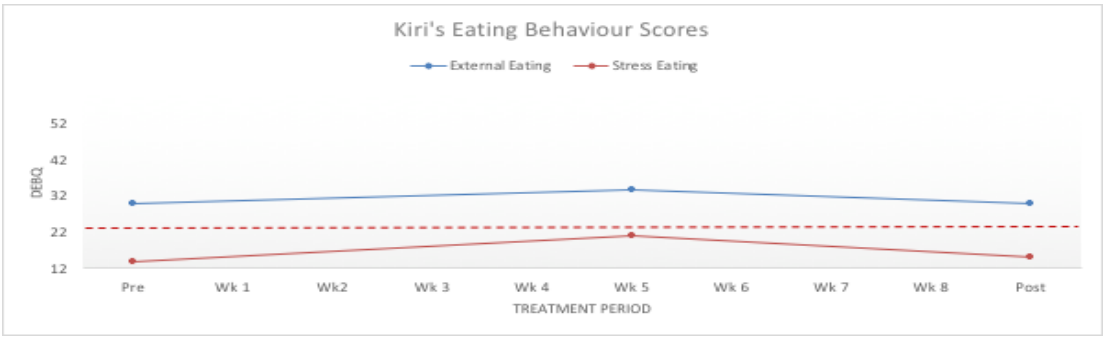


Figure 13 shows Kiri's stress eating and external eating behaviour scores across the treatment period. Her external eating scores remained above the cut off.

9.5.3.5 Psychological distress

Kiri's depression, anxiety and stress scores fluctuated throughout the treatment period but showed decreases overall.

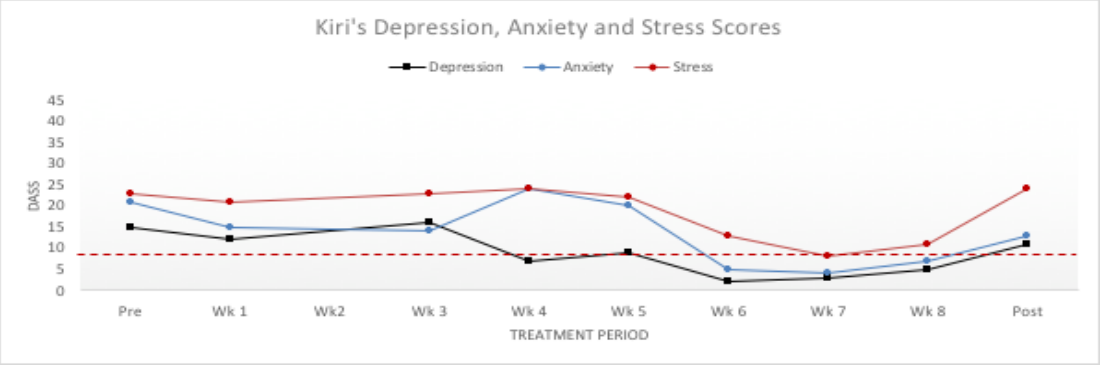


Figure 14 shows Kiri's weekly depression, anxiety and stress scores during the treatment period.

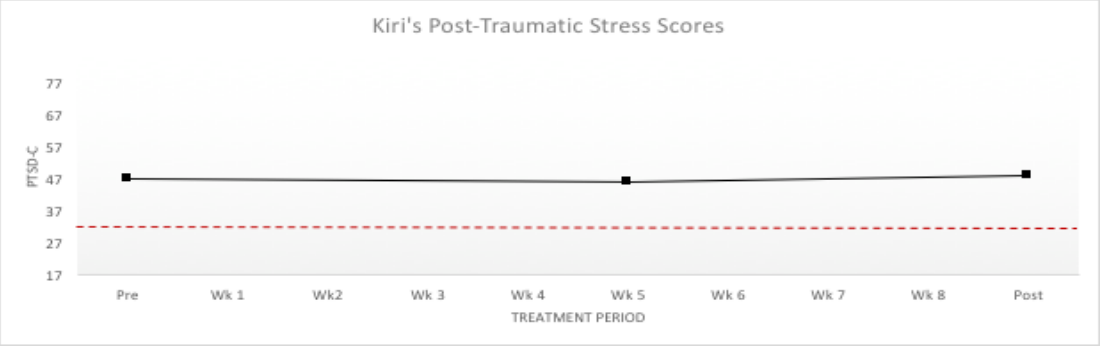


Figure 15 shows Kiri's PTSD scores across the treatment period. Note that they remained above the cut off at post-treatment.

9.5.4 Summary

Kiri's baseline findings supported all of the hypotheses outlined in Chapter 6, that Māori women with high ACE scores would report experiencing high chronic stress, visceral obesity, HPA axis dysregulation and psychological distress. Consistent with a dose-response relationship between ACEs and health outcomes outlined in Chapter 2, Kiri had a low ACE score relative to the rest of the group and she also showed dysregulation on only one of the three measures of HPA axis functioning. Although Kiri attended almost every mindfulness class, no improvements in her CAR nor her cortisol response to acute stress were found at post-treatment, however a small improvement in her cortisol daily slope was observed. Additionally, a 3cm reduction in waist circumference was seen at post-treatment, though this was not matched by overall decreases in external eating. Post-treatment improvements were seen in Kiri's depression and anxiety levels, but not in her weekly stress score on the DASS. Her PTSD levels did not improve following MBSR therapy.

9.6 Case Study Five: Arohia

"*Mindfulness is a really awesome viewing platform for you, to look at you".*

Arohia

Arohia is a 39-year old Maori woman of Ngāti Maniapoto descent. She was treated for pancreatic cancer 2-years ago and has since been diagnosed with rheumatoid arthritis. She is employed in the area of Māori health. Arohia joined the study believing that there were different kinds of mindfulness, including "mindfulness of present time" and "mindfulness of future", but that they all involved "awareness" and "being present". Initially, she posited that mindfulness would involve "projecting your vision onto the future and then mapping that consistently in your day to day, to get to that future" – a process that she claimed, was part of Māori heritage:

> Our tīpuna were dreaming for a future for us before we were even here. They had a mindfulness that was on different levels, in the whenua[64], rangi[65], in the wairua, their mindfulness was *on*. But when colonization came and interrupted that relationship with everything, so our mindfulness was lost.

Relating mindfulness to the present, Arohia stated that she was interested in the course because "there's aspects of me that I'm very present, but then there's really, there's quite a bit that is not". When asked what she wanted from the course, Arohia replied "the mindfulness that I would like out of that is, routine". By this, she meant "I hope the mindfulness, it helps me um, put things into perspective, into a nice little package, cause my stuff has um, a library that's not very well catalogued." Several of Arohia's statements suggested she wanted help ordering her thoughts. For instance:

> There's some things that I hold on and store in my library so that when I meet people of the same thing, same 'ism', same situation and they're looking

[64] Whenua = Land
[65] Rangi = Sky

through their list of options, I go ‘bam, bam’ and pull it out, somebody else’s experience and relate it, and it could sit really well with them. But out of that context I want to be able to do that for me, I want it for me. I can do it for everyone else, but I can’t do it for me.

She also outlined hope that the “strategies” and “techniques” of mindfulness might improve the “the consistency” of her thought process and enable her to use “mindfulness in action”, instead of just identifying when she’s “on a bad tangent” or “off” – such as when she’s “in cycle” and “vicious as a mofo”, and “unable to stop the ism”.

Arohia entered the study with an ACE score of 4 out of 10. She was not taking any medication during the treatment period.

9.6.1 Findings from research question one: Baseline results

Chronic Stress (SRRS) past year >300	**541**
Perceptions of stress past month (PSS) >15	**26**
Cortisol Awakening Response (CAR) (increase by 50% or 2.5nmol/l)	Normal
Daily Slope (DS) (Night time rise or slow decline i.e. high afternoon levels)	**Hypo**
Cortisol response to acute stress (<2.5nmol/l increase, high perceived stress)	**Inadequate**
Waist Circumference >80-cm	**+35cm**
Stress Eating >24	**24**
External Eating >22	**36**
Depression	Low
Anxiety	Low
Post-traumatic stress disorder >30	**41**
Mindful Awareness (Low= Mid-low = Mid-high= High=)	Moderate

Table 2: Baseline results for Arohia. Bolded results show scores that indicate a significant health issue.

9.6.1.1 Mindful awareness

Arohia's mindful awareness score at baseline was in the **moderate** range (54 out of 90).

9.6.1.2 Chronic stress

In line with expectations given her high ACE score, Arohia recorded a 12-month stress exposure (SRRS) score of 541, which is almost **2-times** greater than the cut off indicating high stress. As expected, Arohia's *perceived* stress score (PSS) was also above the cut off.

9.6.1.3 Cortisol dysregulation

Consistent with expectations given her high ACE score, Arohia showed dysregulation in the form of **hypocortisolism** on 2 of the 3 indices of HPA axis functioning.

9.6.1.4 Visceral obesity

Arohia's WC was **35cm greater** than the cut off indicating high risk of developing type II diabetes and cardiovascular disease. She also scored highly on the measure of external eating, but not stress eating.

9.6.1.5 Psychological distress

Arohia's depression and anxiety scores were **below** the cut off at baseline. However, her stress scores and her PTSD scores were in the **very high range.**

9.6.2 Findings from research question two: Response to the course

Arohia reported that the course "exceeded" her expectations of "how well it would work". She described mindfulness as "like keys, keys to doors within yourself, and those doors open into observations about yourself". In referencing a newfound understanding that "mindfulness allows you to have a conversation with you, to just connect, listen to you", Arohia demonstrated that she had internalised a very different interpretation of mindfulness to that outlined during her initial interview – which is evidence that learning took place.

As she hoped it would, Arohia reported that the course did increase her self awareness, "I thought I was pretty aware, um yeah, and like really on, and on a lot of things I am, honestly, but ah, for me, yeah, blind as a bat, yeah, serious. I didn't realise." She noted an increase in "just the awareness of um, what's going on on the inside, even though something else is going on on the outside". Which led to the following statement:

> You're in the midst of it and you catch yourself doing things, then you realise how long you've been thinking about that for that day, or that time and then you catch yourself repeating the cycle three or four, five times throughout the day, and you think 'what the f***k?' I went out to the same argument but with different people, but all the same 'ism', the same heart rate, the same anger, the same type of confrontation.

A major theme of Arohia's kōrero, was that during the course she began noticing how harsh her habitual self talk was, and this newfound awareness enabled her to start changing it:

> What I wanted out of this course, a lot of it was to find a quicker way, an easier way of coping with stress, my previous way is working, but it was too slow, and um, it was harsh. It was harsh, I was harsh on me. So I wanted to be kinder in that approach, and be consistent you know, be a lot kinder with

me and not have any leftover residue in me after – replaying that, whatever the situation was and re-thinking it and re-thinking it and re-thinking it, 'I coulda done it better, coulda done it better, coulda, maybe if I'd done this' you know, all of those things.

I seen it on the 6th week or the 7th week of me, having to go 'cut your shit out, get your ass', even on the last day, the last, so the pattern was still there within me but it didn't win. I beat it you know, otherwise this aura, when you hear it you go 'yeah', you agree with the voice and go 'yeah, I should stay home' and then you know, it's so easy for that but then you go 'hey, get! It's only one, really? You act like this is tortuous you know', so the dialogue is different. Instead of 'get off your f******g ass you fat b***h, you're f*****g lazy eh, that's the dialogue. That's the realness of it, so the kōrero's changed, not as aggressive, like I was, that's always been me, to always, it's like a military you know.

The dialogue is different 'you're acting like it's painful' you know, which is more how I would talk if it was a friend, 'cut it out girl' You're acting like you're bloody old! You're running like you got your husband that's just given you a hiding, cut it out'.

Alongside changes in her self talk, Arohia noted positive changes in the way she used to judge herself after certain actions. She described learning "not to have the *hara* (violation) around it eh, not to have the guilt and "the 'you shoulda been this and you shoulda been that, why are you this? You shoulda been this way', you know. There's none of that. There's no judgement in it and like I used to, there's none of that 'dirty dialogue' in it, that dirty, dirty dialogue that comes along with it, so that's great too."

Answering her hope that the course would help her to experience "mindfulness in action", an additional benefit for Arohia was that she found herself utilising it informally during moments of stress:

> That's what mindfulness has done to me. It's been able to make me present enough to be able to catch me in the time that I'm going off, you know, before it gets way, way, out of way. It's catching me then and being able to dial back. Dial back before I, cause I'm really pendulum. I'm really pendulum man, all the way. I'm head first, all in or all out you know, so it gives me pause to, gives me the pause sometimes that I need before I get it, or get overwhelmed.

The ability to pause before acting also helped Arohia realise that to avoid becoming overwhelmed in response to the many requests she receives for awhi, she needed to start putting in boundaries. This stemmed from her acknowledging "I don't have to feel responsible for the whole lot you know":

> Instead of just going straight in there and thinking 'that's the way it should be cause that's the way Māori do it and that's what love is' you know, see now it's different, and mindfulness helps me with that, time out and go 'hey, can you handle this?' 'Actually I can, but only this bit.' 'Well, start putting in some boundaries, girl'. So it's in there.

With regard to how mindfulness would fit within Te Ao Māori, Arohia noted that mindfulness "sits across hinengaro and wairua" and from the perspective of Māori, it is "natural, integrated". She even went so far as to assert that "at the start of the world and when people came, then there was religion and then there was mindfulness. One picked this, and left that, left mindfulness behind:"

> If they had picked mindfulness, or wairua and hinengaro, we would've seen the gods that we are, cause we would have understood the power of thought, and how we could project it into reality, from spirituality, *te kore* (nothingness) to *te ao marama* (the world of understanding) All of those elements we could have really understood it about that power within us, as creators, especially women.

With regard to how she found the teacher, Arohia stated:

> He was lovely. He's lovely, and patient and um secure. That was what made it, helped, that's what really sealed it. He was secure, secure in himself, secure with um, being amongst that, that people that he didn't realise, know, yeah, unfamiliar – and the whole lot, not just one, the whole lot I mean, there was so many things in the way he received us. He certainly follows his words, but secureness and balanced is the key.

This led into a discussion about the group as a whole and improvements that could be made to the course for future wāhine Māori:

> The girls were great. I missed Hara, I missed her, I really liked seeing her. It was good to see the realness and the difference, a variation of women, the variation of women and how it was affecting at all levels and each and every one of us differently, but it was working you know, and that was really good.

In spite of her positivity towards Kovido, Arohia reported that she would have preferred to have listened to a female Māori voice leading the meditations, because it's "more familiar":

> The way we're connecting as women, and our rhythms and our vernacular, our flow. I would rather that coz, think it's easier to relate to, it's easier when you're with your girls you know.

In all, Arohia's interview data supports the main hypotheses of this part of the study. Her feedback suggested that she responded well to the course and that she enjoyed many benefits as a result of participating in it. Those benefits included increased self-awareness, kinder self-talk and less harsh self-judgements, increased ability to pause before acting and increased awareness of the need to put boundaries in place to protect her wellbeing. Of note, Arohia described a high degree of overlap between concepts in mindfulness and concepts in Te Ao Māori.

She also reported that the group dynamic was a highlight for her. The fact that the course was led by a Pākeha male did not deter her from engaging with the material, nor from learning new skills and techniques. Although it is noted that she would have preferred to listen to a female Māori voice during the meditation practices.

In total, Arohia attended six of the eight classes and reported that outside of the course, she would often informally practice mindfulness, usually for less than one minute at a time.

9.6.3 Findings from research question three: Clinical change

9.6.3.1 Mindful Awareness

Arohia showed significan**t improvements** on the mindful awareness measure, with her score ending in the high range at post-treatment (84 out of 90).

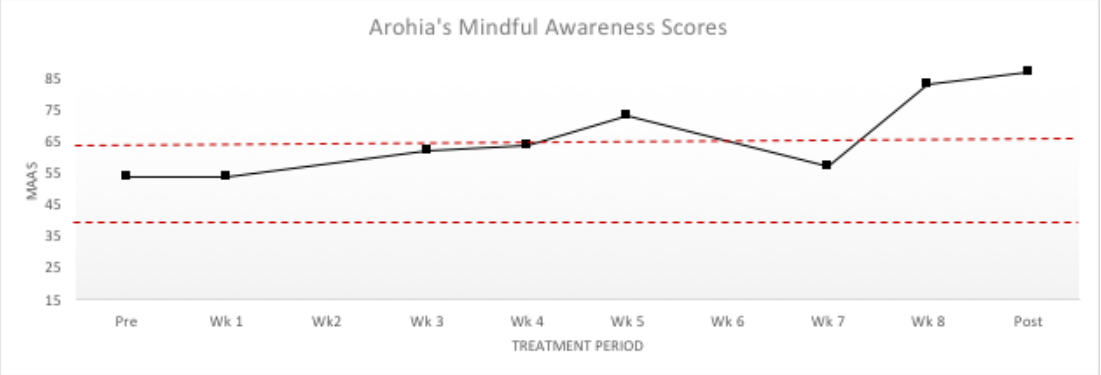


Figure 1: Arohia's MAAS score. Her score at post-treatment was 34 points higher than at baseline.

9.6.3.2 Chronic stress

Consistent with expectations, Arohia recorded a stress exposure score (SRRS) of **393** during the 8-weeks of the treatment period, which is greater than the cut off for high stress over a *12-month* period. Her *perceived* stress scores (PSS) showed

significant reductions during the treatment period, ending below the cut off at post-treatment.

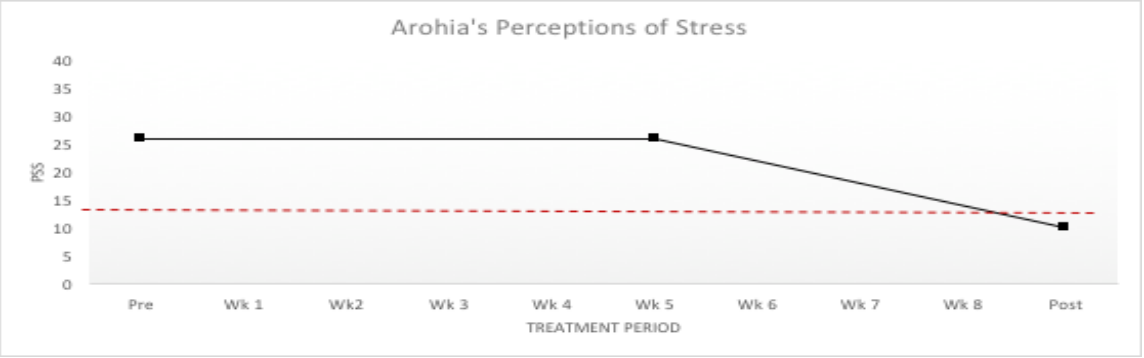


Figure 2: Arohia's PSS score. Her score was below the cut off at post-treatment.

9.6.3.3 Cortisol dysregulation:

Cortisol awakening response (CAR)

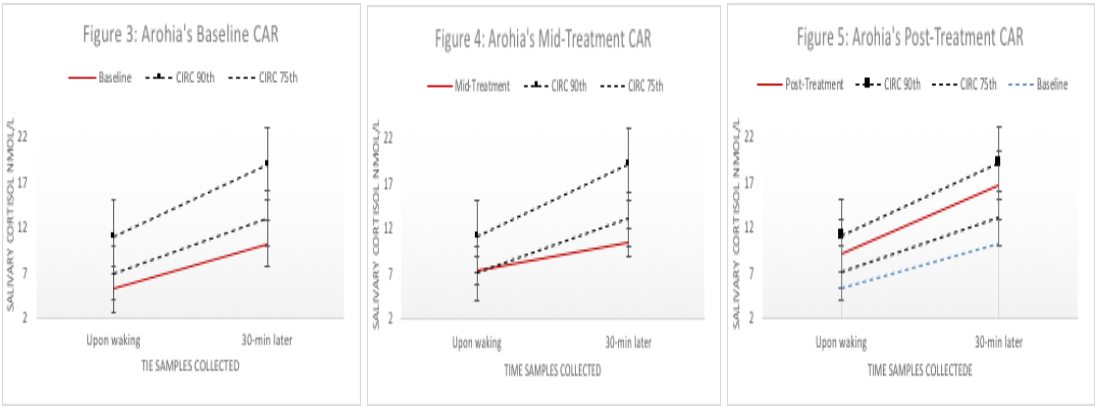
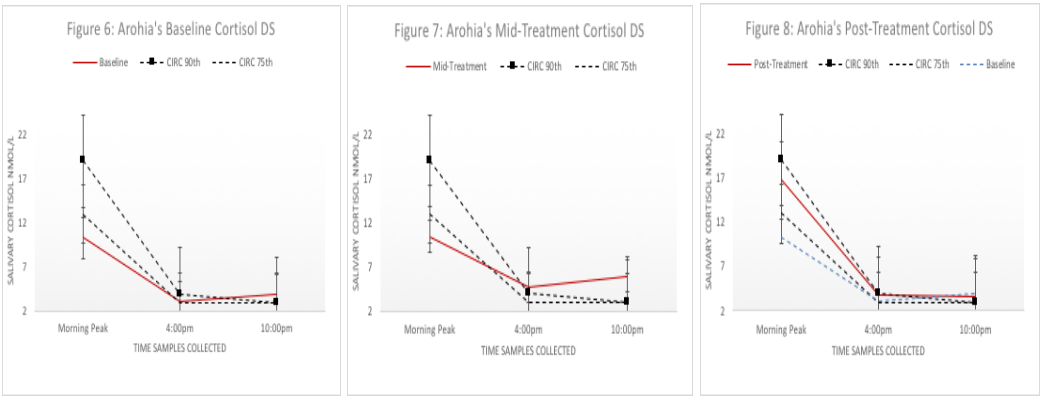


Figure 3 shows the average cortisol morning measurements taken from 6-days of baseline saliva testing (e.g., the Monday, Tuesday and Wednesday of two consecutive weeks in September). To obtain an accurate CAR, saliva samples were taken immediately upon waking and 30-minutes after waking. Note the increase in cortisol levels indicative of a **healthy CAR**. Figure 4 shows the average of 3-days of saliva sampling at mid-intervention. Note that her CAR shows flattening. Figure 5 shows the average of 3-days of sampling at post-treatment. Note that cortisol levels show an overall increase and as well as a strong morning rise. CAR reference levels are provided by the CIRCORT database (Miller et al., 2017) and have been added for comparison.

Cortisol daily slope (DS)



Figures 6 shows Arohia's baseline average DS. Note the night-time rise indicative of dysregulation. Figure 7 shows her DS at mid-treatment. Note an even greater night-time rise. Figure 8 shows Arohia's DS at post-treatment. Note the **improvement** in cortisol decline at post-treatment, (i.e., afternoon levels are well below the 3nmol/l threshold) and her night-time rise has resolved. DS reference levels are provided by the CIRCORT database (Miller et al., 2017) and have been added for comparison.

Acute stress response (AS)

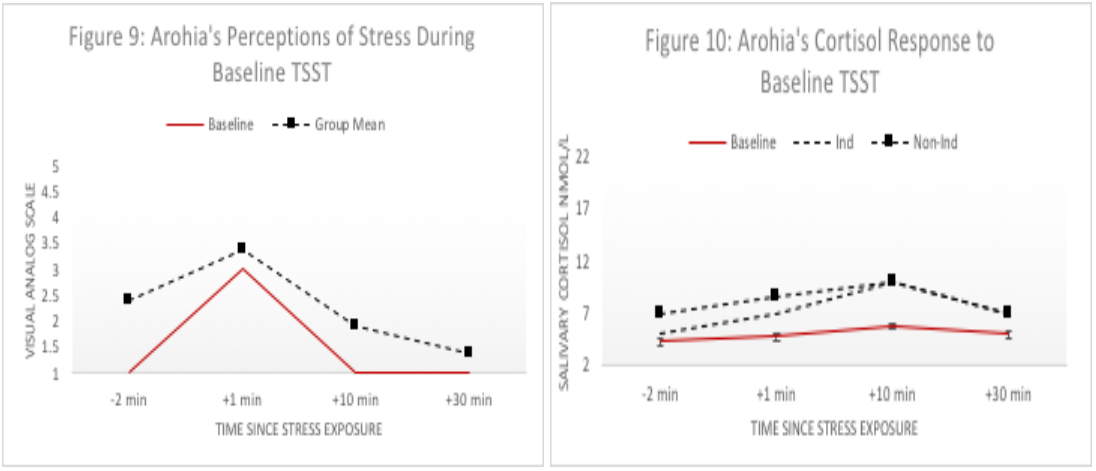
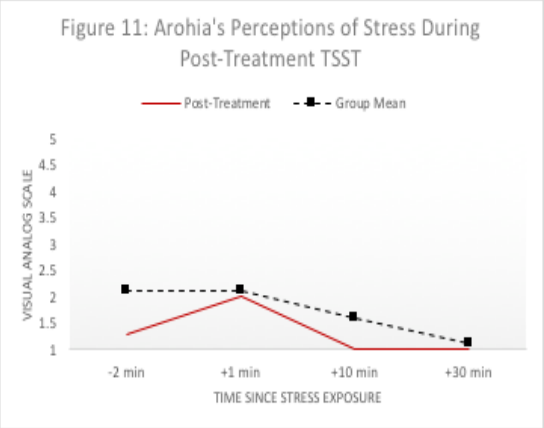


Figure 9 shows Arohia's self-reported feelings of stress during the baseline TSST. Note the increase in stress levels 1-min after leaving the testing room. Figure 10 shows Arohia's salivary cortisol output response to the baseline TSST. Note the minimal increase in cortisol levels typical of a hypo-cortisolemic profile. Reference ranges are provided by the Berger et al. (2017) study which used the same test to compare the cortisol responses of indigenous and non-indigenous Australians.



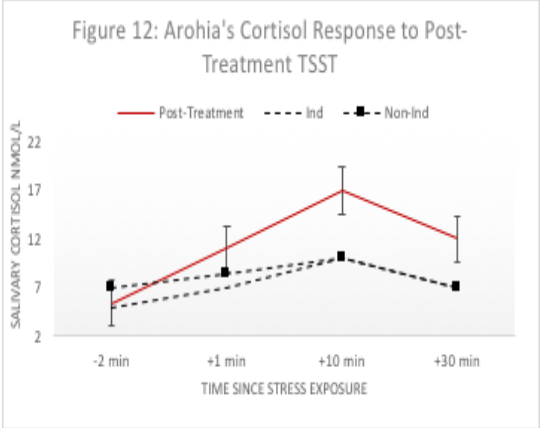


Figure 11 shows Arohia's perceptions of stress during the post-intervention TSST. Note the lack of increase in stress levels indicating that she had adapted well to the test. Figure 12 shows Arohia's cortisol response to the post-intervention TSST. Note that she shows a heightened cortisol output. Given her blunted profile during the baseline TSST, this could be viewed as **evidence of adaptation.**

9.6.3.4 Visceral obesity

Arohia's WC measurements **decreased** by 1.5cm during the treatment period. This coincided with **decreases** in both her external and stress eating scores.

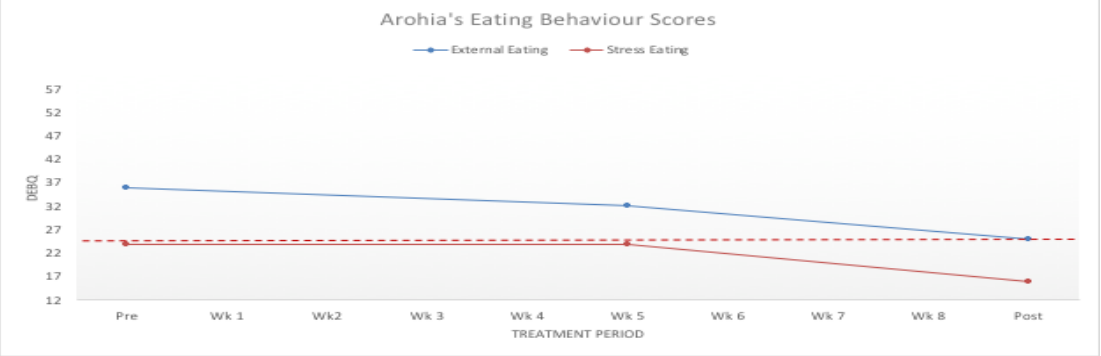


Figure 13 shows Arohia's stress eating and external eating behaviour scores across the treatment period.

9.6.3.5 Psychological distress

Arohia's stress symptom scores **decreased** overall during the treatment period. Her depression and anxiety levels remained below the cut off. Notably, her PTSD scores showed clinically significant decreases across the treatment period.

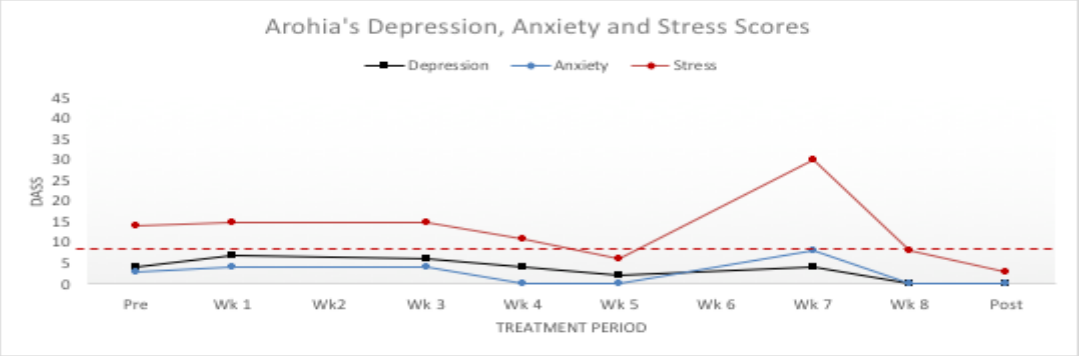


Figure 14 shows Arohia's weekly depression, anxiety and stress scores during the treatment period.

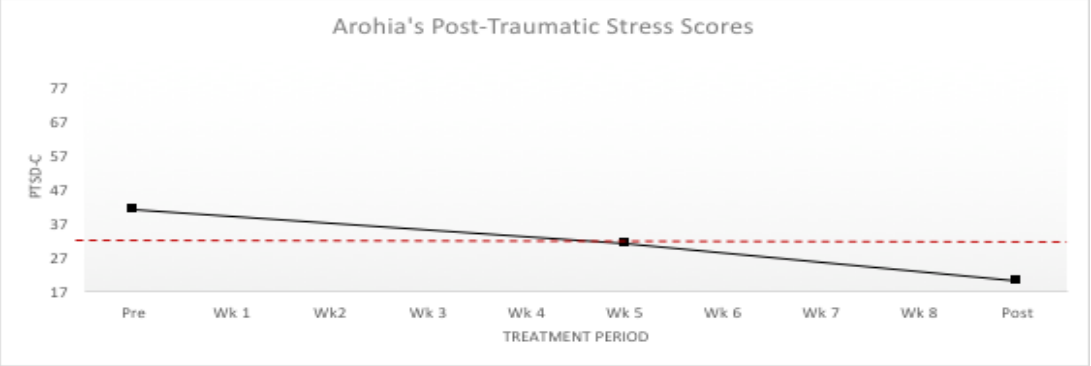


Figure 15 shows Arohia's PTSD scores across the treatment period.

9.6.4 Summary

Arohia's baseline data supports most of the hypotheses put forward in Chapter 6. She reported a high chronic stress score, high waist circumference and external eating scores, a night-time rise in cortisol levels indicative of a hypo-cortisolemic profile, a blunted cortisol response to the stress test and a high PTSD score. Contrary to expectations, Arohia did not report high scores on the depression and anxiety measures, which suggests she experiences a high degree of psychological resilience. Arohia's post-treatment findings indicated improvements on all three indices of HPA axis functioning. Her daily cortisol slope no longer showed a night-time rise, her cortisol awakening response was steeper and higher than at baseline and her cortisol response to the stress test was much greater than at

baseline. Additionally, she reported significant improvements in trauma symptoms, perceptions of stress, emotional eating and waist circumference – despite being exposed to a high degree of stress during the eight weeks of the course. Compared to the rest of the group Arohia showed the greatest improvement in mindful awareness levels and she also showed the greatest amount of improvement on all of the psychological and physiological measures.

9.7 Case Study Six: Wairata

"I find the mindfulness thing, it's a bit of a trip, commonsense for me"

Wairata

Wairata is a 39-year old Maori woman of Ngāi Tahu, Ngāti Ruanui, Ngā Ruanui, NgāRauru, and Te Ātiawa descent. She also works in the area of Māori health. Wairata joined the study because she thought she could benefit from having more time to herself.

> I'm actually a really quiet person and so I actually need a lot of um, alone time. And if I don't get that alone time to just sort of relax, I tend to get a wee bit upset over things, little minimal things like burnt toast, or my bloody poached eggs going hard, that sort of thing.

Initially, Wairata conceptualised mindfulness as "taking care of yourself, making sure you don't burn yourself out". This would involve "undertaking activities that you like, stress relievers like exercise or just really having more time out to read a book or something like that, yeah. Just having a break, not only from work but also from your family life."

By framing mindfulness that way, Wairata saw it as a common sense, practical form of self-nurturing.

> Isn't mindfulness just looking after yourself? And making sure that you're okay in order to make sure that your interactions with your family and the wider community are a lot better?

In referencing the importance of family and the wider community, Wairata's kōrero supported assertions made in Chapter 5, that many Māori perceive the world from a collectivistic viewpoint in which people and their actions are interconnected.

When asked how she thought the course might benefit her, Wairata was unsure that it would. “I don’t know really, I think I don’t tend to really get stressed out a lot about a lot of things, I sort of laugh a lot of things off.”

Wairata entered the study with an ACE score of 7 out of 10.

9.7.1 Findings from research question one: Baseline results

Chronic Stress (SRRS) past year >300	**494**
Perceptions of stress past month (PSS) >15	**18**
Cortisol Awakening Response (CAR) (increase by 50% or 2.5nmol/l)	**Hyper**
Daily Slope (DS) (Night time rise or slow decline i.e. high afternoon levels)	**Hyper**
Cortisol response to acute stress (<2.5nmol/l increase, high perceived stress)	**Hyper**
Waist Circumference >80-cm	**+5cm**
Stress Eating >24	21
External Eating >22	12
Depression	Low
Anxiety	Low
Post-traumatic stress disorder >30	22
Mindful Awareness (Low= Mid-low = Mid-high= High=)	High

Table 2: Baseline results for Wairata. Bolded results show scores indicating increased health risk.

9.7.1.1 Mindful awareness

Wairata’s mindful awareness scores were in the **high** range at baseline (79 out of 90). When questioned about this, Wairata attributed her high levels of mindfulness to the amount of time she spends being quiet and taking care of herself.

9.7.1.2 Chronic stress

In line with expectations, Wairata's chronic stress exposure score (SRRS) was **494**. More than **1.5 greater** than the cut-off for high stress. Notably, her *perceived* stress score was above the cut off (PSS).

9.7.1.3 Cortisol dysregulation

Wairata showed dysregulation in the form of excess cortisol levels (**hyper-cortisolism**) on all three indices of HPA axis functioning.

9.7.1.4 Visceral obesity

As expected given her high ACE score, Wairata's WC was **5-cm higher** than the cut off indicating high risk for developing Type II diabetes and cardiovascular disease. Her stress eating and external eating behaviour scores were **below the cut off.**

9.7.1.5 Psychological distress

Contrary to expectations, Wairata **did not score highly** on the depression, anxiety, stress or PTSD measures (DASS and PTSD-C). All of her scores on these measures remained below the cut off thresholds, suggesting a high degree of psychological resilience.

9.7.2 Findings from research question two: Response to the course

Wairata was the only participant who did not attend any of the mindfulness classes. While initially, she reported that she was unable to attend due to illness, Wairata later advised that she had decided not to participate after learning that a Pākeha male would be leading the course. In spite of not attending classes, Wairata chose to remain a participant in the study and to that end, she completed all aspects of the data collection.

9.7.3 Findings from research question three: Clinical change

9.7.3.1 Mindful Awareness

Wairata's mindful awareness scores were already in the high range at baseline, but they continued to increase across the treatment period - even though she **did not attend** any of the classes.

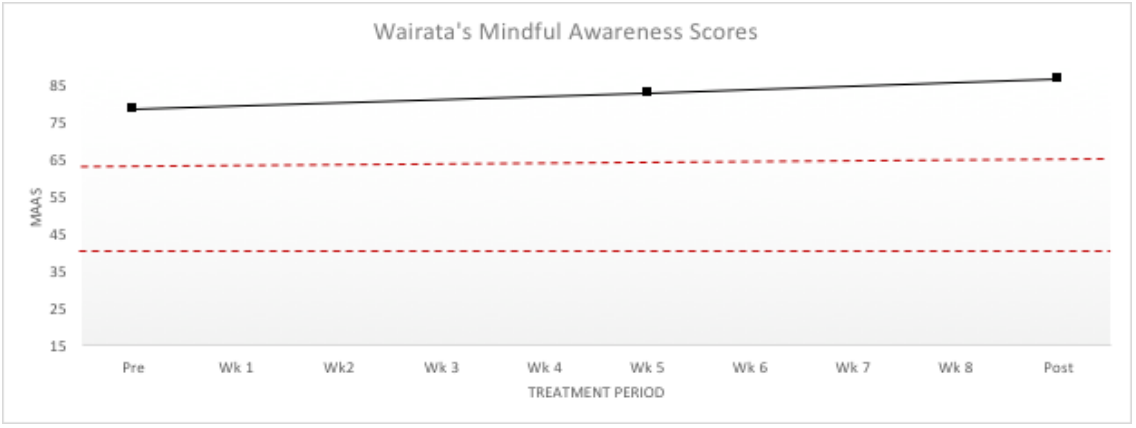


Figure 1: Wairata's MAAS scores across the treatment period.

9.7.3.2 Chronic stress

Consistent with expectations, Wairata's chronic stress exposure score (SRRS) across the treatment period was as high as her *12-month stress* score, **494**. Notably though, her *perceived* stress (PSS) levels decreased across the treatment period - even though she **did not attend** any of the mindfulness classes.

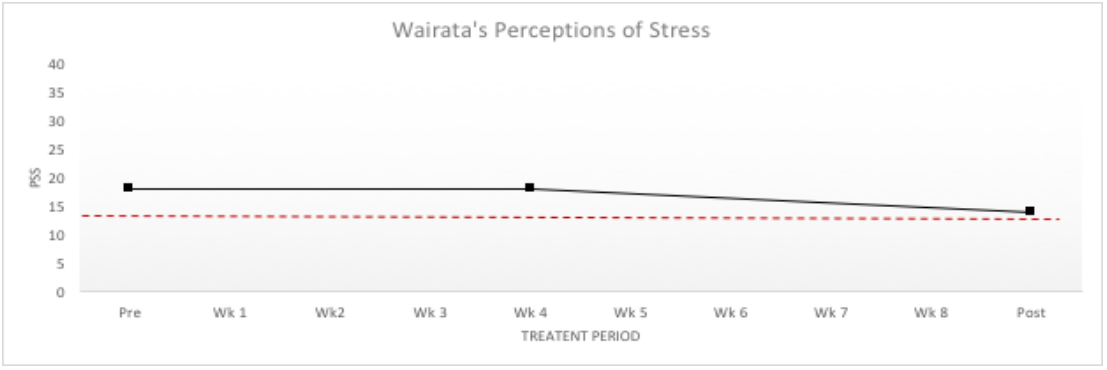


Figure 2: Wairata's PSS score. Her scores decreased throughout the treatment period despite having been exposed to a high number of stressful events, and not attending any classes.

9.7.3.3 Cortisol dysregulation:

Cortisol awakening response (CAR)

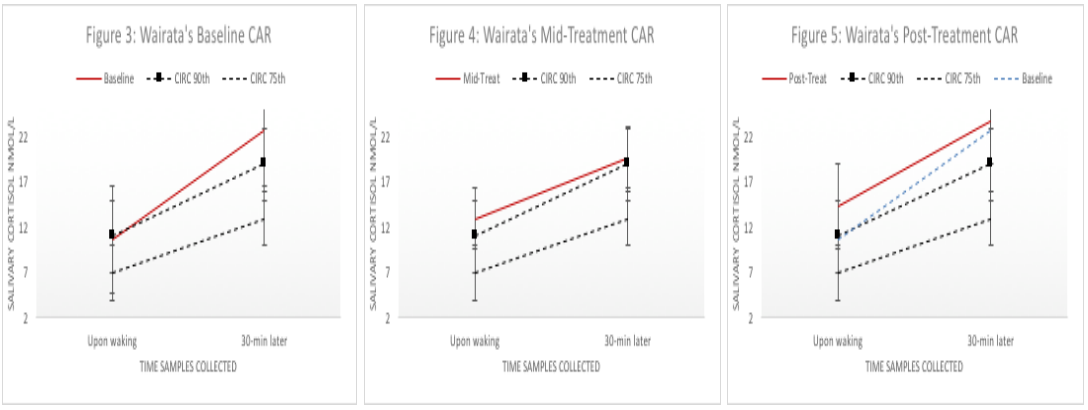
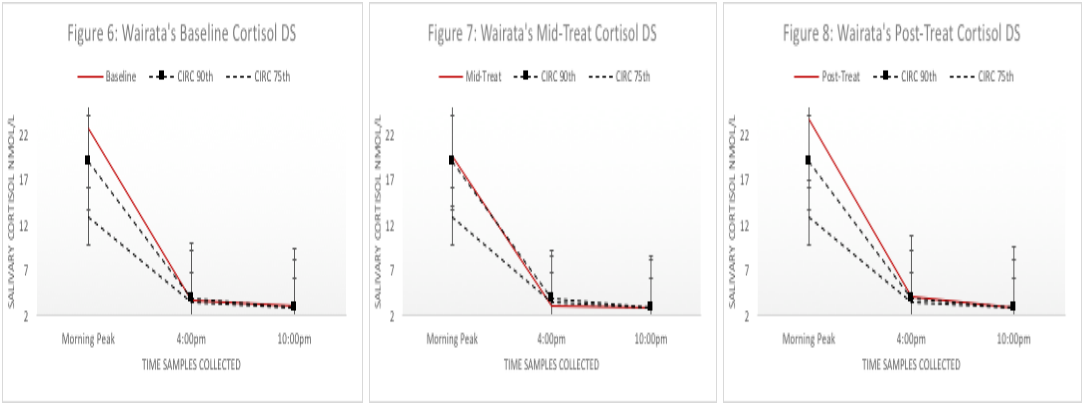


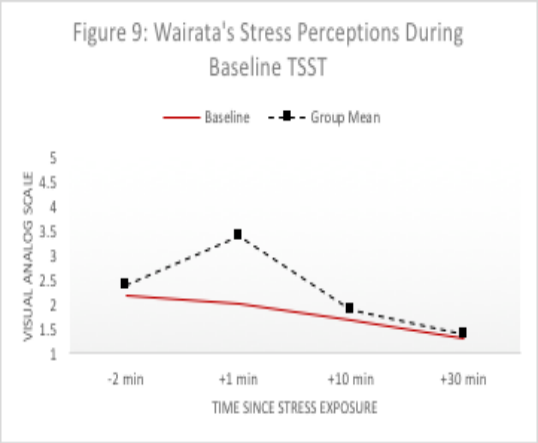
Figure 3 shows the average cortisol morning measurements taken from 6-days of baseline saliva testing. Note that her cortisol levels are well above the 90th percentile level. Figure 4 shows the average of 3-days of saliva sampling at mid-intervention. Note that her CAR has flattened. Figure 5 shows the average of 3-days of sampling at post-treatment. Note that her CAR levels are even higher than they were at baseline. CAR reference levels are provided by the CIRCORT database (Miller et al., 2017) and have been added for comparison.

Cortisol daily slope (DS)



Figures 6 shows Wairata's baseline average DS. Note that although levels decine strongly across the day, they are well above the 90th percentile. Figure 7 shows her DS at mid-treatment. Note that levels have decreased and are now in line with the 90th percentile. Figure 8 shows Wairata's DS at post-treatment. Note that DS levels are even higher than they were at baseline. For someone whose profile is hyper-cortisolemic, this does not constitute an improvement. DS reference levels are provided by the CIRCORT database (Miller et al., 2017) and have been added for comparison.

Acute stress response (AS)



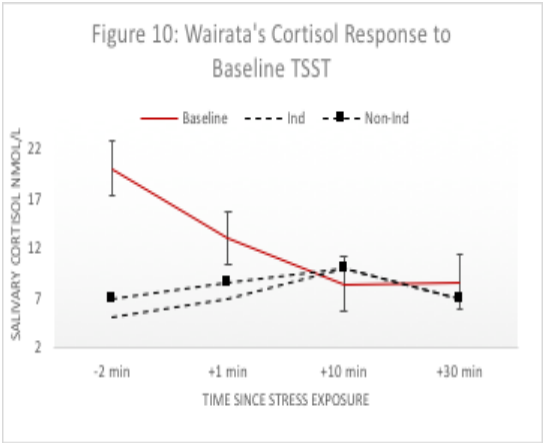
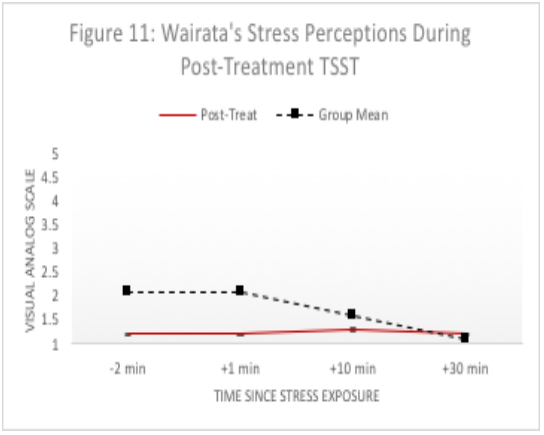


Figure 9 shows Wairata's self-reported feelings of stress during the baseline TSST. Note the **lack of increase** in stress levels 1-min after leaving the testing room. Figure 10 shows Wairata's salivary cortisol output response to the baseline TSST. Note that her levels match her self-report, and decrease throughout the test. This indicates that she did not find the test at all stressful - but may have suffered a high degree of anticipatory anxiety prior to starting the test. Reference ranges are provided by the Berger et al. (2017) study which used the same test to compare the cortisol responses of indigenous and non-indigenous Australians.



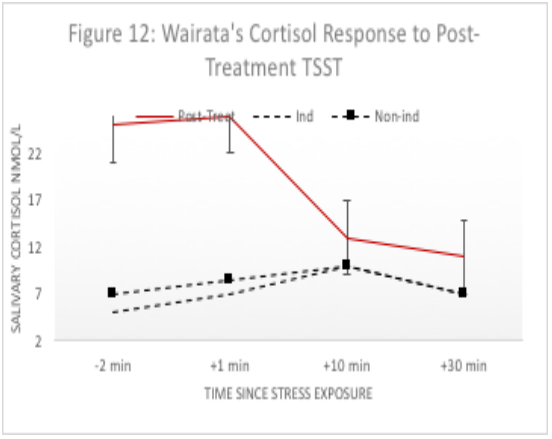


Figure 11 shows Wairata's perceptions of stress during the post-intervention TSST. Note the lack of increase in stress levels indicating that she did not find it stressful. Figure 12 shows Wairata's cortisol response to the post-intervention TSST. Note that her cortisol levels are even higher at post-treatment than they were at baseline, indicating that she did not adapt well to the test.

9.7.3.4 Visceral obesity

Wairata's WC was unchanged at post-treatment and her external scores **increased** across the treatment period. Recall that she **did not attend** any of the classes.

Figure 13 shows Wairata's stress eating and external eating behaviour scores across the treatment period. Her external eating scores increase from pre- to post-treatment.

9.7.3.5 Psychological distress

Wairata's depression, anxiety and stress scores remained below the cut off throughout the treatment period - as did her PTSD scores. Given the high amount of stress she experienced during the eight weeks of the course, this suggests that Wairata is highly psychologically resilient.

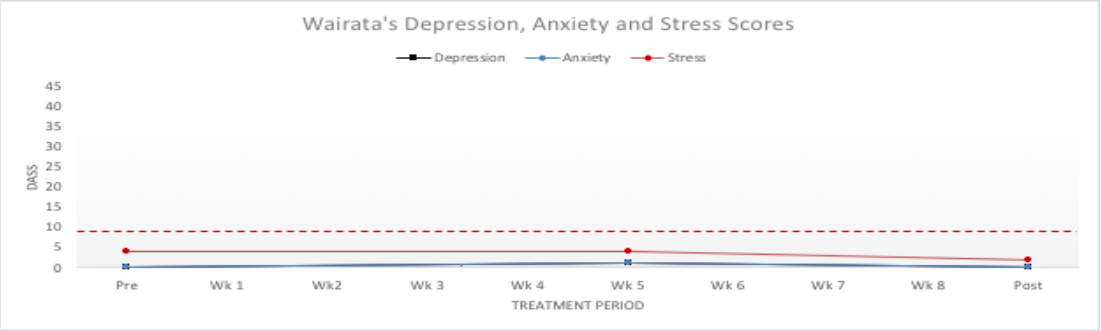


Figure 14 shows Wairata's depression, anxiety and stress scores during the treatment period.

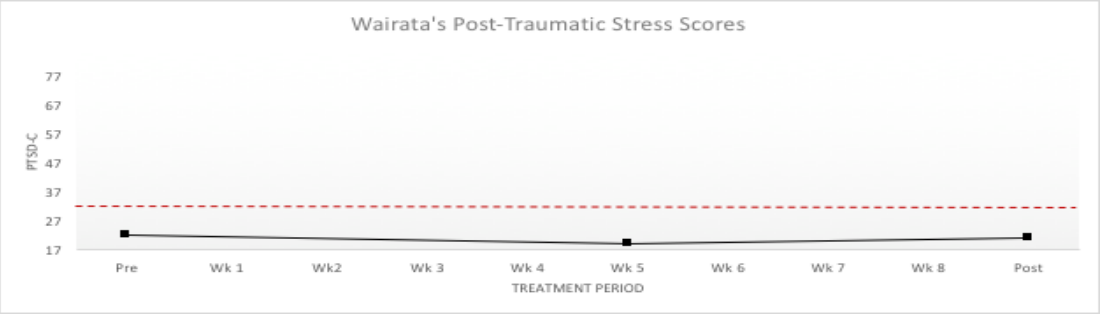


Figure 15 shows Wairata's PTSD scores across the treatment period.

9.7.4 Summary

As expected given her high ACE score, Wairata's baseline findings showed a high chronic stress score, high waist circumference, high CAR, high DS and extremely high output when exposed to a stressor. She did not however, score above the cut off on any of the measures indicating mental distress, which might be a reflection of the fact that she had high mindfulness scores throughout. Following treatment (in which Wairata did *not* participate), she showed an increase in external eating, no change in waist circumference, and increased levels of cortisol on all three HPA axis indices (which is not an improvement given that she already had high levels at baseline). Despite being exposed to a high number of stressful events during the treatment period, her perceptions of stress decreased, and her levels of mindful awareness increased. The fact that Wairata showed such high levels of cortisol contradicts the prediction that women with high ACE scores would show hypo-cortisolism. However, like Ani (who also showed hypercortisolism and had an ACE score of 8 out of 10), Wairata too, found a way of coping with the difficulties of her life. When she was in early adolescence, Wairata became selectively mute, and did not talk to anyone for approximately two years. Wairata reported that being in that silence helped her to cope with the stressful circumstances of her life back then.

9.8 Case Study Seven: Marama

"the world's totally different when you're in a mindful space"

Marama

Marama is a 36-year old Maori woman of Tūhoe descent, who works in the area of criminal justice. Marama joined the study after seeing the advertisement inviting wāhine Māori to participate in a mindfulness course aimed at Māori women. In the year prior to starting this course, Marama had spent a brief period of time as an inpatient at a psychiatric hospital due to an anxiety-related illness. During her time there, Marama encountered the concept of mindfulness, so she entered the course with some prior knowledge of the work. Marama's job also required that she learn about and teach mindfulness skills to others, so she was highly familiar with some of the course content. At her initial interview, Marama described mindfulness as "doing nothing". She predicted that the benefits of participation would include "being more aware your surroundings and your thoughts, and your feelings, and letting them go and doing nothing. Not reacting". Marama hoped to gain "some extra skills on mindfulness" and to "brush up on the stuff" she already knew, as well as to gain "more awareness".

> I don't think you can get enough awareness - I'm pretty aware of stuff anyway, but it's all, it's always when you get caught up in the chaos of life and stuff, you forget to be mindful and you miss s**t, you know.

Marama believed that mindfulness would fit into the "wairua" aspect of Maoritanga, saying "to be connected to your wairua, you need to have some kind of peace or, total acceptance."

Marama entered the study with an ACE score of 6 out of 10.

9.8.1 Findings from research question one: Baseline results

Chronic Stress (SRRS) past year >300	120
Perceptions of stress past month (PSS) >15	8
Cortisol Awakening Response (CAR) (increase by 50% or 2.5nmol/l)	**Hypo**
Daily Slope (DS) (Night time rise or slow decline i.e. high afternoon levels)	**Hypo**
Cortisol response to acute stress (<2.5nmol/l increase, high perceived stress)	**Blunted**
Waist Circumference >80-cm	**85cm**
Stress Eating >24	12
External Eating >22	**29**
Depression	Low
Anxiety	Low
Post-traumatic stress disorder >30	**38**
Mindful Awareness (Low= Mid-low = Mid-high= High=)	High

Table 2: Baseline results for Marama. Bolded results show scores that indicate a significant health issue.

9.8.1.1 Mindful awareness

Marama's mindful awareness scores were in the **high range** prior to starting the MBSR course (75 out of 90). This was attributed to the fact that her job had required her to undergo mindfulness training in the past.

9.8.1.2 Chronic stress

Marama was the only participant who did not have a high chronic stress events score at baseline (SRRS). Consistent with this, her *perceived* stress score (PSS) was **below the cut off.**

9.8.1.3 Cortisol dysregulation

As expected given her high ACE score, Marama showed a pattern of **hypocortisolism** on all three indices of HPA axis functioning.

9.8.1.4 Visceral obesity

Marama's WC at baseline was **5cm greater** than the cut off indicating high risk of type II diabetes and cardiovascular disease.

9.8.1.5 Psychological distress

Contrary to expectations, but not surprising given her high baseline mindful awareness score, Marama did not score highly on the depression, anxiety or stress measures. She did however, score highly on the PTSD measure.

9.8.2 Findings from research question two: Response to the course

Post-treatment, Marama's conceptualisation of mindfulness at baseline remained "the same", but her learning had deepened.

> The biggest thing that stood out for me was the 'clean discomfort' and 'dirty discomfort' bit. I could really relate to that. To give people an understanding that it's okay to have discomfort, but it's what you turn it into. That was my biggest thing, and I just relate that round to my anxiety and how dirty I used to make it, and then it would feed itself, be something that it didn't necessarily need to be.

Marama reported a number of benefits from the course that included gaining "more knowledge of the skills I already have." However, she felt that the facilitator "didn't always explain why we're doing what we're doing and the purpose". While she acknowledged that this did not affect or impact her experience directly, she thought others might have found it difficult. "I think if I had no knowledge of mindfulness I would have found it very confusing because I like answers or reasons why, or how it's gonna benefit me." She also thought that the teacher came across as nervous "I would say he was quite anxious quite a lot through it." In his defence, Marama attributed his lack of confidence to the dynamic of the group "I think it was due to the

personalities in the room" and she acknowledged that he taught the mindfulness programme well "I couldn't facilitate mindfulness like that, s**t no". "He's great at that, the actual mindfulness itself, it's just that the explaining and the reason why. But he probably has groups where he doesn't have to do that".

Reflecting on Ripeka's kōrero in class one day, Marama also expressed surprise that people could feel connected to one another without needing to share their backstory "we're all connected but we're not, cause we haven't had to go over you know, mihi, pepeha, you know, it was just, we know that we are Māori and that was enough for us to connect."

Regarding fit with Te Ao Māori, Marama reported "I think mindfulness can get you to a place I guess, in order to connect into the Māori world and if you're not mindful, you can't. So I think it serves that purpose." Marama described practicing 'all day every day, all the time" as well as regularly completing formal meditation sessions lasting "ten to fifteen" minutes "on my own".

When asked about incentives to practicing on her own, Marama stated that she already knew mindfulness worked because of her prior exposure to it.

> Going through the horrific, ah, heightened anxiety moment, panic/breakdown – I don't know if you'd call it a breakdown, I don't know – as heightened as my anxiety was, and knowing that the mindfulness skills helped, so I kinda already knew the benefits, but I had to get to the lowest in order to use them.

Regarding general feedback for the course, Marama would have like to see it start a little earlier so that she could spend more time talking to the others in the group.

> Seven till nine is pretty late. Maybe even like six o' clock, like meet and have a feed together, I like food, have a feed together and bring it like half an hour forward. So to 6:30. Cause there wasn't much 'oh what do you do bro? Oh eh? Oh what industry? Oh, same...do you know…there wasn't time for that'

Extending this, Marama spoke highly of her experience of being part of that group of Māori women, describing it as “Mean bro. Mean, they like, that lady dropped stuff off about my whakapapa”. Marama also mentioned connecting with another wāhine whose advice she had asked for and later followed - “just, nice bunch of people.”

Marama attended a total of seven out of nine mindfulness sessions and reported practicing mindfulness “all day, every day”.

9.8.3 Findings from research question three: Clinical change

9.8.3.1 Mindful Awareness

Marama’s mindfulness scores **increased** throughout the treatment period, remaining in the **high** range at all times.

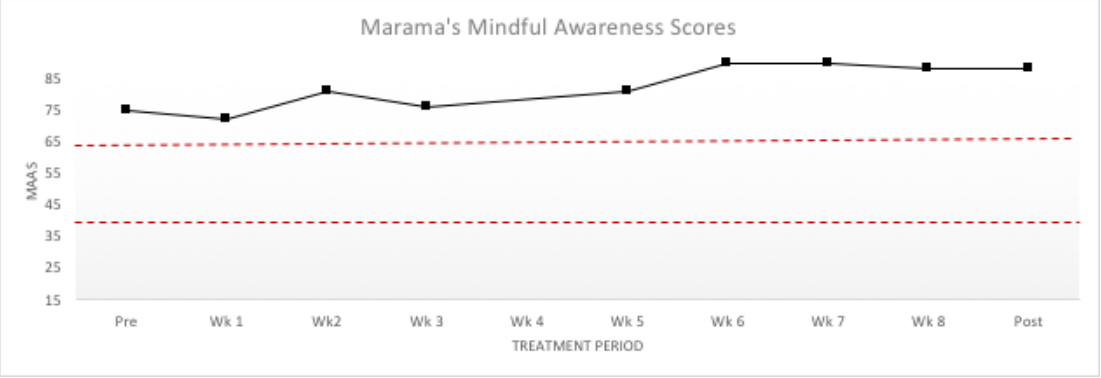


Figure 1: Marama’s MAAS score. Her scores remained in the high range throughout the treatment period.

9.8.3.2 Chronic stress

Marama’s stress events score (SRRS) during the 8-weeks of the treatment period was below the cut off, indicating that she was not exposed to a high number of

stressful events during the study. Nevertheless, her *perceived* stress (PSS) scores **decreased** over the 8-weeks of the treatment period.

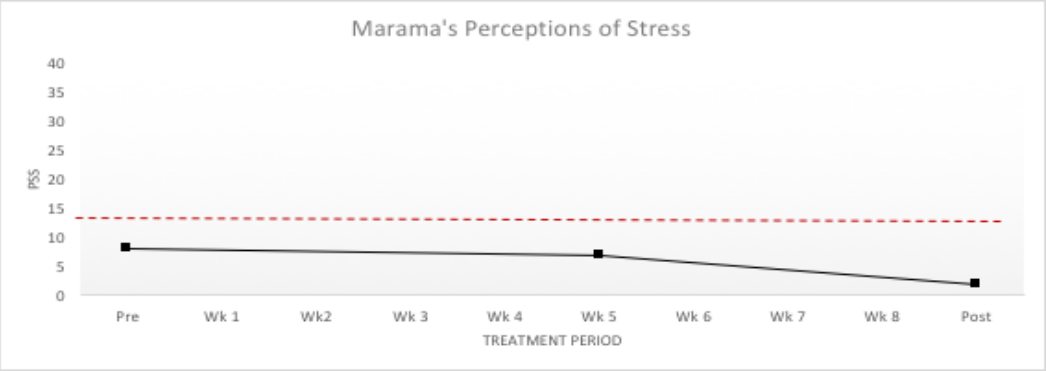


Figure 2: Marama's PSS scores. Her scores remained low throughout the treatment period.

9.8.3.3 Cortisol dysregulation:

Cortisol awakening response (CAR)

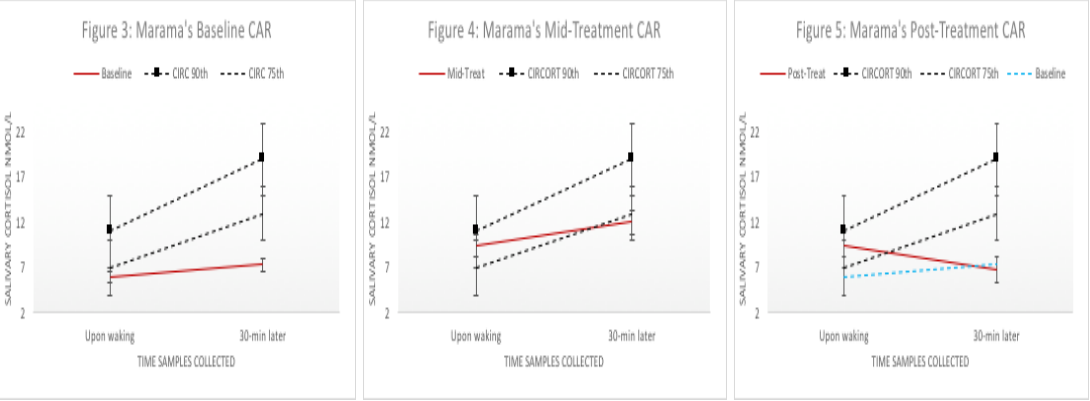
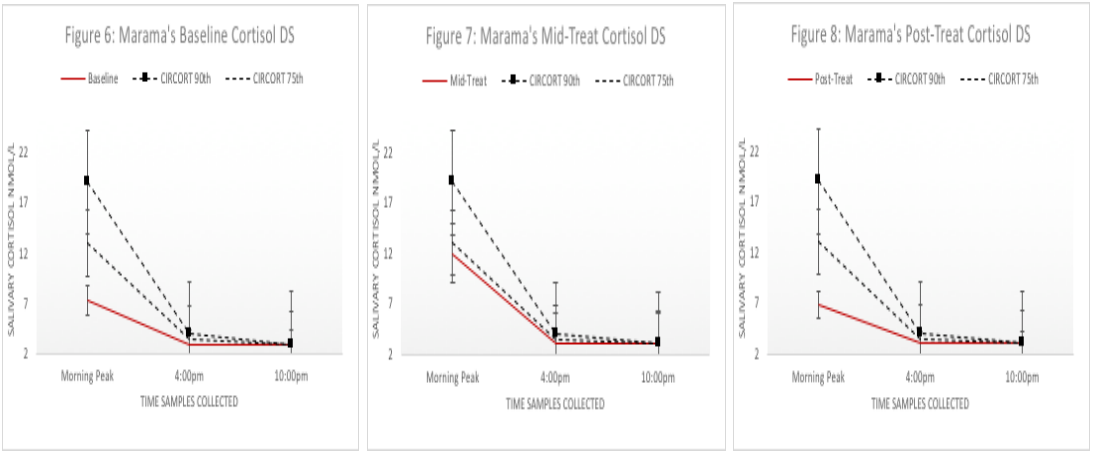


Figure 3 shows the average cortisol morning measurements taken from 6-days of baseline saliva testing (e.g., the Monday, Tuesday and Wednesday of two consecutive weeks in September). To obtain an accurate CAR, saliva samples were taken immediately upon waking and 30-minutes after waking. Note the lack of cortisol rise typical of a hypo-cortisolemic profile. Figure 4 shows the average of 3-days of saliva sampling at mid-intervention. Note the increase in overall cortisol levels, but a lack of cortisol increase after waking. Figure 5 shows the average of 3-days of sampling at post-treatment. Note that there is no cortisol increase at all after waking. Reference levels are provided by the CIRCORT database (Miller et al., 2017) and have been added for comparison.

Cortisol daily slope (DS)



Figures 6 shows Marama's baseline average DS, which appears to be healthy. Figure 7 shows her DS at mid-treatment. Note that appears to be even healthier (e.g., the cortisol decline is steeper). Figure 8 shows Marama's DS at post-treatment. Note that it has started to flatten. DS reference levels are provided by the CIRCORT database (Miller et al., 2017) and have been added for comparison.

Acute stress response (AS)

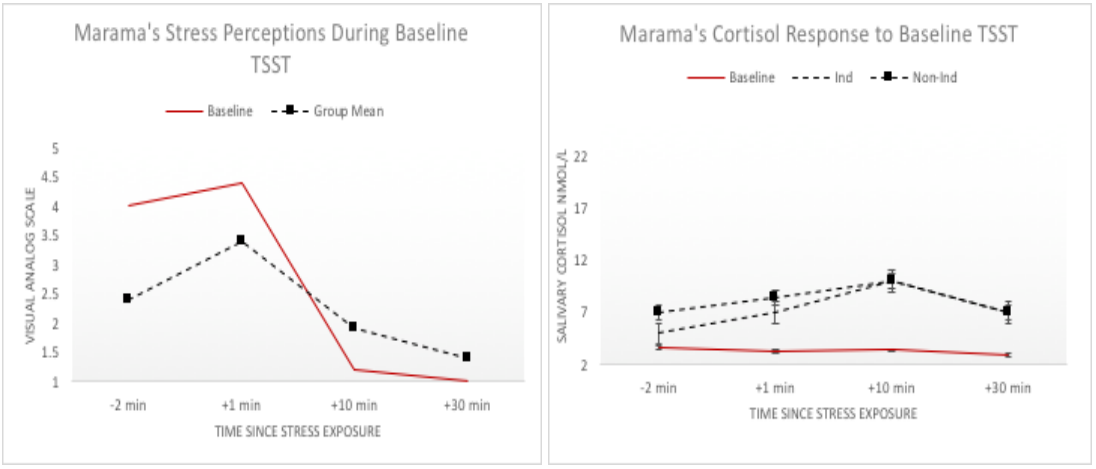
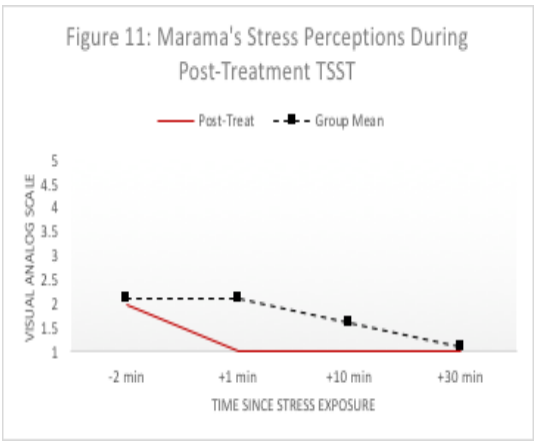


Figure 9 shows Marama's self-reported feelings of stress during the baseline TSST. Note the sharp decrease in reported stress levels 10-min after leaving the testing room. Figure 10 shows Marama's salivary cortisol output response to the baseline TSST. Note the minimal increase in cortisol levels typical of a hypo-cortisolemic profile. Reference ranges are provided by the Berger et al. (2017) study which used the same test to compare the cortisol responses of indigenous and non-indigenous Australians.



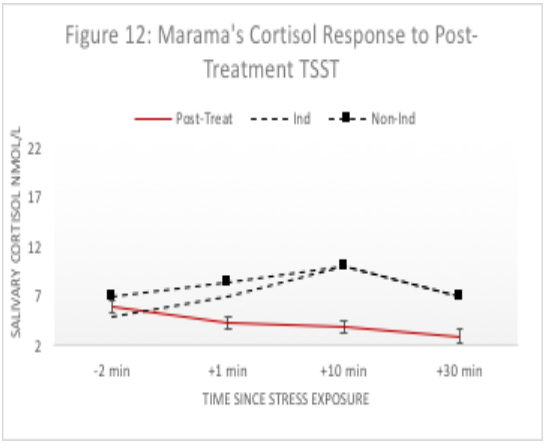


Figure 11 shows Marama's perceptions of stress during the post-intervention TSST. Note the lack of increase in stress levels indicating that she had adapted well to the test. Figure 12 shows Marama's cortisol response to the post-intervention TSST. Note that her cortisol levels match her perceptions of stress and do not increase at all during the test. This could be interpreted as **evidence of adaptation.** Her overall levels are slightly higher during the post-treatment test.

9.8.3.4 Visceral obesity

Post-treatment, Marama's WC showed an increase of **1.5cm**, in spite of the fact that her external eating scores had **decreased** during the study period**.**

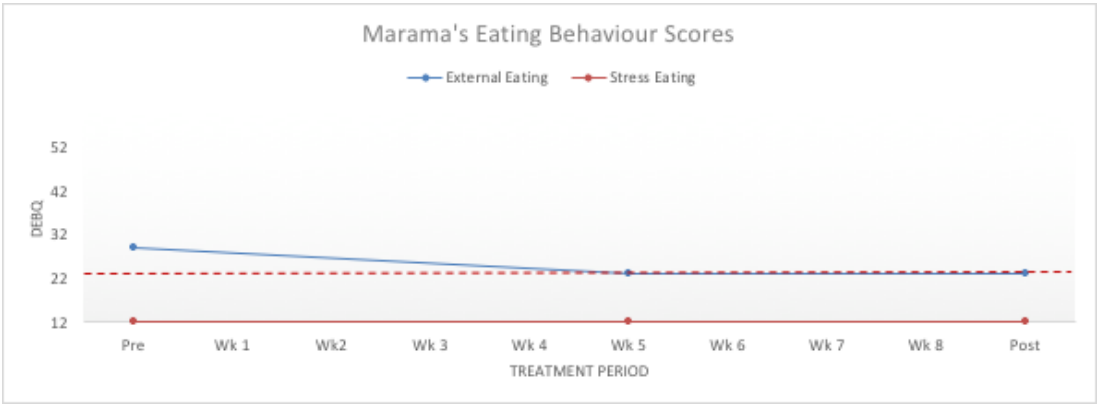


Figure 13 shows Marama's stress eating and external eating behaviour scores across the treatment period.

9.8.3.5 Psychological distress

Marama's depression, anxiety and stress scores remained low throughout the treatment period. Notably, her PTSD scores showed clinically significant **decreases**.

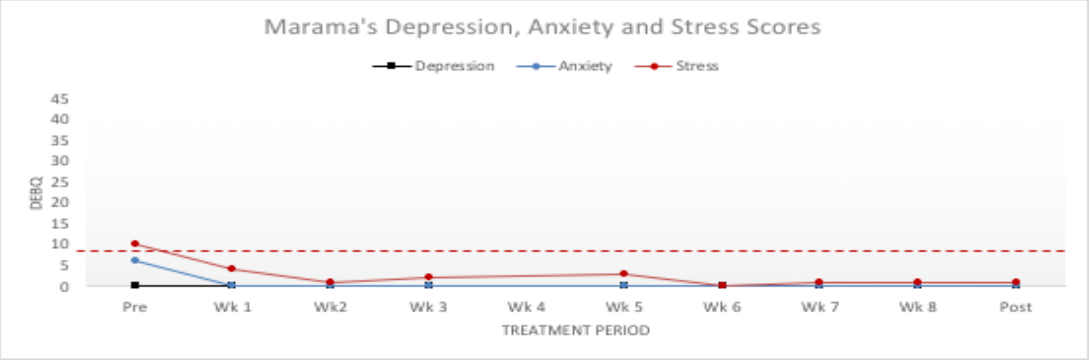


Figure 14 shows Marama's weekly depression, anxiety and stress scores during the treatment period.

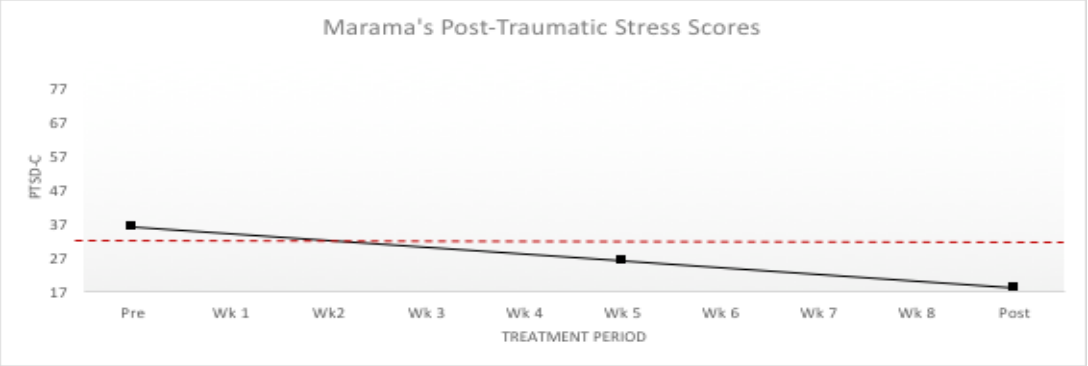


Figure 15 shows Marama's PTSD scores across the treatment period. Note that they remained above the cut off at post-treatment.

9.8.4 Summary

In sum, Marama was the only person in the study who did not report a high chronic stress score. As predicted given her high ACE score, Marama did show high waist circumference and high external eating scores, a high PTSD score, as well as a flattened CAR and blunted cortisol response to the acute stressor. However, her DS was healthy at baseline. At post-treatment, her PTSD score and external eating scores had greatly improved, and her mindfulness score had further increased. However, her CAR, DS and and acute stress responses became more blunted across the study period indicating that the mindfulness did not attenuate her hypo-cortisolemic profile. In addition, Marama recorded a higher waist

circumference measurement at post-treatment than at baseline, in spite of decreases on the external eating measure.

9.9 Case Study Eight: Ngāpaki

"As a Maori woman I've got quite a spiritual, deeper connection to the world".

Ngāpaki

Ngāpaki is a 48-year old Māori woman of Kai Tahu, Waitaha, Kāti Māmoe descent and is employed as an administrator. Ngāpaki joined the study after seeing the advertisement inviting wāhine Māori to participate in a mindfulness course aimed at Māori woman. Ngāpaki initially conceptualised mindfulness as a way of improving awareness "I think it's about *being*, consciously making decisions, and being in the moment." Consistent with this, her main reason for participating was "because I don't live in the moment currently. I'm trying to do too many things, and thinking about too many things at once and not really taking notice or appreciating what I've got and where I am now". Ngāpaki hoped that the course would enable her to enjoy and appreciate life more and she believed that many things would improve if the course were successful for her.

> I think I'd be more appreciative. I constantly find myself wanting to be somewhere else and to want more, you know. I concentrate too much on material things and I think I just need to stop and enjoy what I've got, and I think that'll make me a better parent.

Ngāpaki also expressed a desire for all people to become more aware, "I think we should all be mindful and conscious of the, you know, energy and the vibes that we are putting out and receiving". When she entered the study, Ngāpaki had been prescribed hormone replacement therapy to help manage mood swings, but she was choosing not to take it.

Ngāpaki entered the study with an ACE score of 4 out of 10.

9.9.1 Findings from research question one: Baseline results

Chronic Stress (SRRS) past year >300	**502**
Perceptions of stress past month (PSS) >15	**25**
Cortisol Awakening Response (CAR) (increase by 50% or 2.5nmol/l)	Normal
Daily Slope (DS) (Night time rise or slow decline i.e. high afternoon levels)	Normal
Cortisol response to acute stress (<2.5nmol/l increase, high perceived stress)	**No shut down**
Waist Circumference >80-cm	**116cm**
Stress Eating >24	**33**
External Eating >22	**30**
Depression	**Moderate**
Anxiety	**Mild**
Post-traumatic stress disorder >30	**46**
Mindful Awareness (Low= Mid-low = Mid-high= High=)	Low

Table 2: Baseline results for Ngāpaki. Bolded results show scores that indicate a significant health issue.

9.9.1.1 Mindful awareness

Ngāpaki's mindful awareness score at baseline was in the **low** range (41 out of 90).

9.9.1.2 Chronic stress

As expected given her high ACE score, Ngāpaki's chronic stress exposure score (SRRS) for the past 12-months was **502** - almost **2 times** greater than the cut off indicating high stress exposure. Consistent with this, her *perceived* stress score (PSS) was also **above the cut off**.

9.9.1.3 Cortisol dysregulation

Ngāpaki's CAR and DS were normal, however her cortisol response to the acute stressor showed that her HPA axis **did not shut down** after the stressor had resolved. This pattern was highlighted in Chapter 2 as a direct contributor to allostatic load.

9.9.1.4 Visceral obesity

Ngāpaki's WC measurement was **36cm** above the cut off indicating that she is at high risk of developing type II diabetes and cardiovascular disease. In addition to this, her **external and stress eating** scores were above the cut off.

9.9.1.5 Psychological distress

Ngāpaki scored in the moderate range on the depression measure, the mild range on the anxiety scale and the severe range on the stress scale of the DASS. She also scored in the **extremely high** range on the PTSD measure.

9.9.2 Findings from research question two: Response to the course

Ngāpaki's response to the course was very positive.

> It's been a really unexpected change for me. Now I think mindfulness is, what I initially thought it was, it's more about being present, being in the moment and what's been really important for me is, you know, I'm learning now, how not to dwell on the past or the future, just concentrate on the moment and it's a lot less stressful.

She described a range of benefits and reported that the course had "exceeded" her expectations.

> It's definitely benefited me. I still find myself in those moments where I think

> that something has happened and I will just find myself, you know, going over and over it, but most of the time I'll think 'oh nah, there's no point. It's gone, that moments gone'. I just have to make sure the next moments better. So, that's just eased my anxiety a lot, so much.

Ngāpaki's reference to "going over and over it," could be viewed as evidence of ruminating. Recall that ruminating is a behaviour that can contribute to chronic stress because it re-activates the stress response system. Consistent with the assertion in Chapter 3, that many Māori view the world in terms of their spiritual connection to the earth and to each other, Ngāpaki drew on her own spiritual beliefs when outlining connections between mindfulness concepts and Te Ao Māori.

> It's something that's always at the forefront because it's just part of you know, it's just part of your life, is to think of your ancestors and be more in touch with things that you can't see. It's about being more in touch I think, and I think as Māori we, we are. We have to be, if we want to honour our culture and our ancestors.

Ngāpaki travelled 30km to attend each class, which was one of several barriers that prevented her from being at every class. Other barriers included "busy life", "work commitments" and commitments to her son. Though she called these "temporary barriers" because most of the time she did make it in. On one occasion Ngāpaki didn't attend because of illness, and on another occasion she was absent because she had just been notified of redundancy. "I could have come but I probably talked myself out of it. I wasn't, in the headspace". This response gives insight into how she typically copes with stress - by withdrawing from support.

Ngāpaki reported that outside of class, she practiced mindfulness "every day", though the sessions tended to be "pretty quick, probably 10-15 minutes". "If there's too much stuff going on I'll do a wee session at night before I go to bed, when everyone else has gone to bed, on most days."

A discussion of barriers to finding time to formally practice prompted Ngāpaki to describe her typical day:

> I'm either here, running around getting myself ready in the morning, getting Nathan[66] off to school, getting breakfast, lunches made and then getting home, getting dinner made, getting homework done and Nathan off to bed, getting housework done, then an hour in front of telly, then sending my husband out of the room and then, then I've got some time.

Given how busy her life is, it was perhaps no surprise that Ngāpaki reported benefitting from the whole day retreat.

> I really, I really loved that day retreat, I felt um, more connected. I was able to connect more to the other participants and I became more comfortable with them after that. That was quite an amazing experience. It's a shame that others, some of them missed out.

Like others in the group, Ngāpaki also found the teacher "a bit nervous at the start" but she too, warmed to his approach.

> I found him really gentle, a gentle kind of soul. Just found him nice and slow and gentle and not too um, intimidating cause I get quite intimidated by people that are teaching me something. Non-judgemental, very intuitive too. He kind of knew you know, how far we could go and how, when to pull things back.

Regarding the group, at first Ngāpaki found it "really uncomfortable" because she was really out of her "comfort zone". However, this did not prevent her from completing the course.

> I do like to push myself outside of my comfort zone so it was a really good way to do it, a good non-threatening way to do it. Everyone's on the same

[66] Not her son's real name

kind of, everyone's on their own journeys, they're obviously all there for the same reason I am, so that was good, yeah.

In response to participating in the course, Ngāpaki ended her kōrero by saying "I'm really grateful" – which was a sentiment that at the start of the study, she hoped she would feel more often.

9.9.3 Findings from research question three: Clinical change

9.9.3.1 Mindful Awareness

Ngāpaki's mindful awareness scores increased by **27 points** on the MAAS, ending in the **high** range at post-treatment.

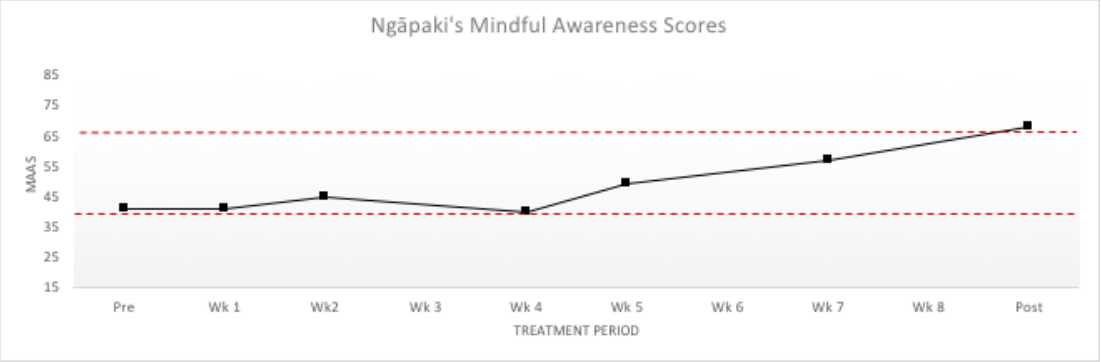


Figure 1: Ngāpaki's MAAS scores across the treatment period.

9.9.3.2 Chronic stress

During the 8-weeks of the treatment period, Ngāpaki's stress exposure score (SRRS) was **336,** which is greater than the cut off for high stress over a *12-month period*. During that time Ngāpaki received news that she was going to be made redundant later in the year. Ngāpaki's *perceived* stress scores (PSS) **decreased** across the study period.

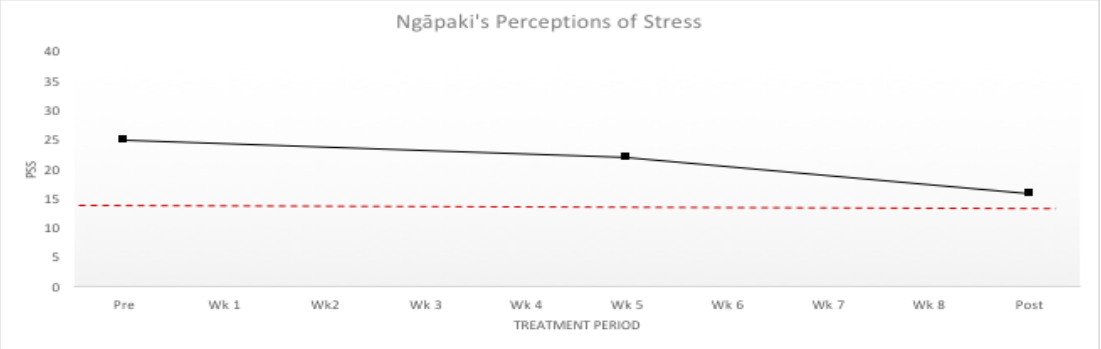


Figure 2: Ngāpaki's PSS score. Her scores remained low throughout the treatment period despite having been exposed to a high number of stressful events, as evidenced by the SRRS.

9.9.3.3 Cortisol dysregulation

Cortisol awakening response (CAR)

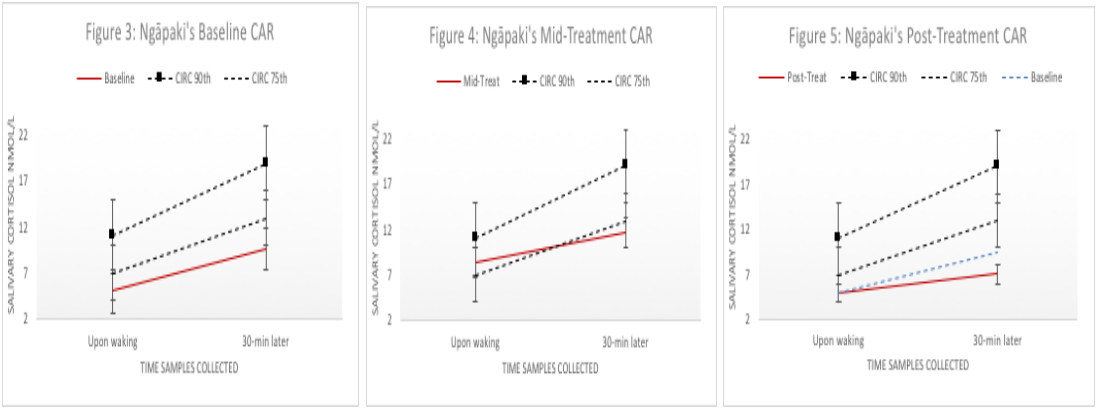
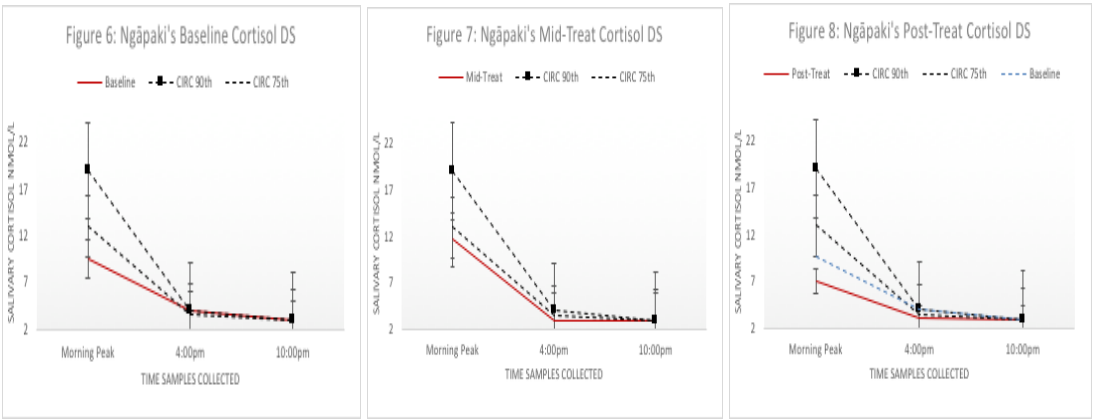


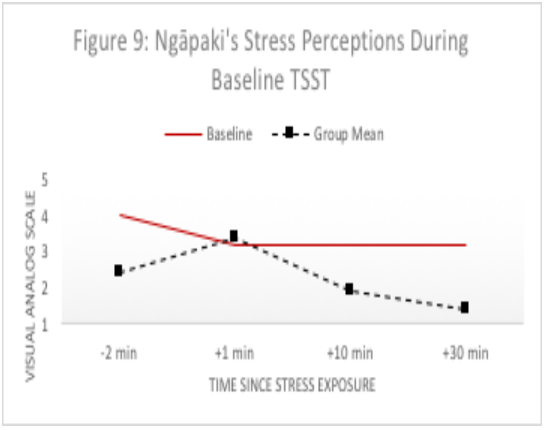
Figure 3 shows that Ngāpaki has a healthy CAR. Figure 4 shows the average of 3-days of saliva sampling at mid-intervention. Note that her CAR has started to flatten. Figure 5 shows the average of 3-days of sampling at post-treatment. Note further flattening of the CAR.

Cortisol daily slope (DS)



Figures 6 shows Ngāpaki's baseline average DS. Note the slow decline in levels across the day indicative of hypo-cortisolism (i.e., her afternoon levels are above the 90th percentile). Figure 7 shows her DS at mid-treatment. Note an even stronger decline in cortisol levels. Figure 8 shows Ngāpaki's DS at post-treatment. Note further flattening of the CAR indicating that MBSR therapy did not attenuate a trend toward hypo-cortisolism. DS reference levels are provided by the CIRCORT database (Miller et al., 2017) and have been added for comparison.

Acute stress response (AS)



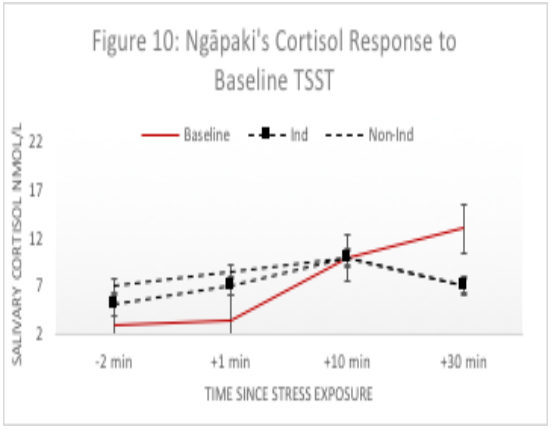
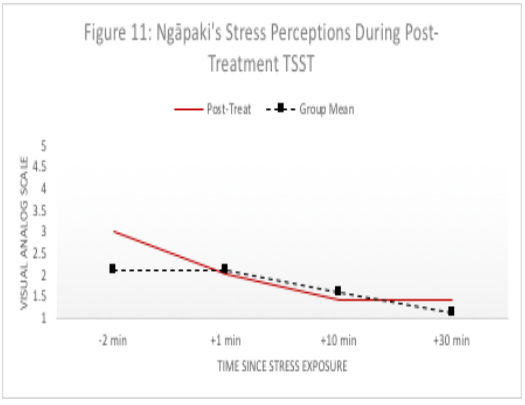


Figure 9 shows Ngāpaki's self-reported feelings of stress during the baseline TSST. Note the **decrease** in stress levels 1-min after leaving the testing room. Figure 10 shows Ngāpaki's salivary cortisol output response to the baseline TSST. Note the **lack of cortisol shut down after the stressor has resolved**, another pattern associated with allostatic load. Reference ranges are provided by the Berger et al. (2017) study which used the same test to compare the cortisol responses of indigenous and non-indigenous Australians.



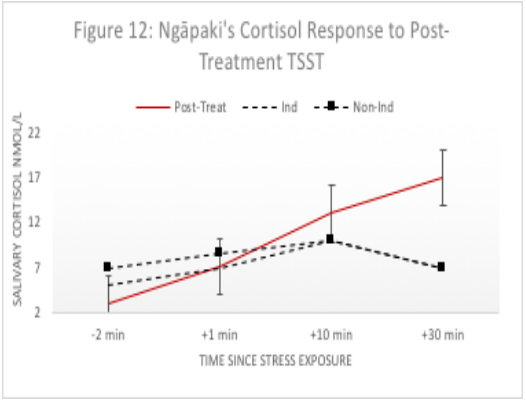


Figure 11 shows Ngāpaki's perceptions of stress during the post-intervention TSST. Note the decrease in stress levels indicating that she had adapted well to the test. Figure 12 shows Ngāpaki's cortisol response to the post-intervention TSST. Note that her cortisol levels **do not match** her perceptions of stress and continue to increase after the stressor has resolved (i.e., **failure to shut down**).

9.2.3.4 Visceral obesity

Ngāpaki's WC measurements **decreased** by **5cm** over the treatment period. Little improvement was observed in her external eating scores, however her **stress eating** scores showed clinically meaningful **decreases.**

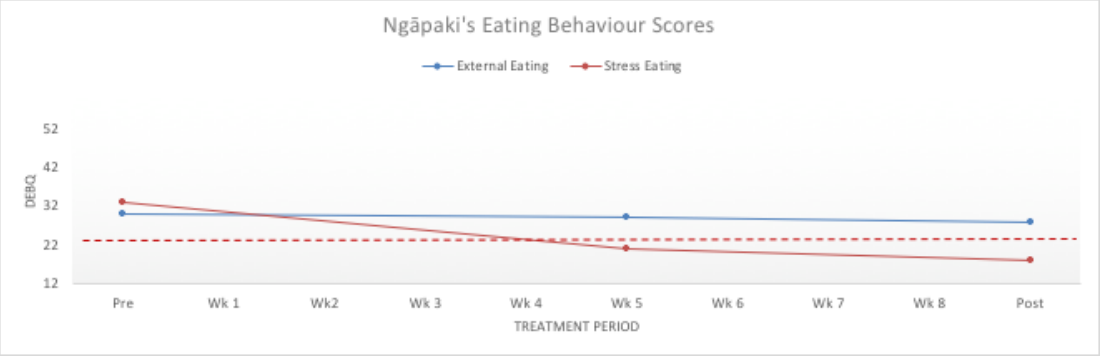


Figure 13 shows Ngāpaki's stress eating and external eating behaviour scores across the treatment period. Her external eating scores remained above the cut off but were trending downward.

9.2.3.5 Psychological distress

Across the treatment period, Ngāpaki's depression, anxiety and stress scores **decreased,** with the exception of an increase during week 4 - the week she learned of her redundancy. Her PTSD scores showed clinically meaningful **decreases.**

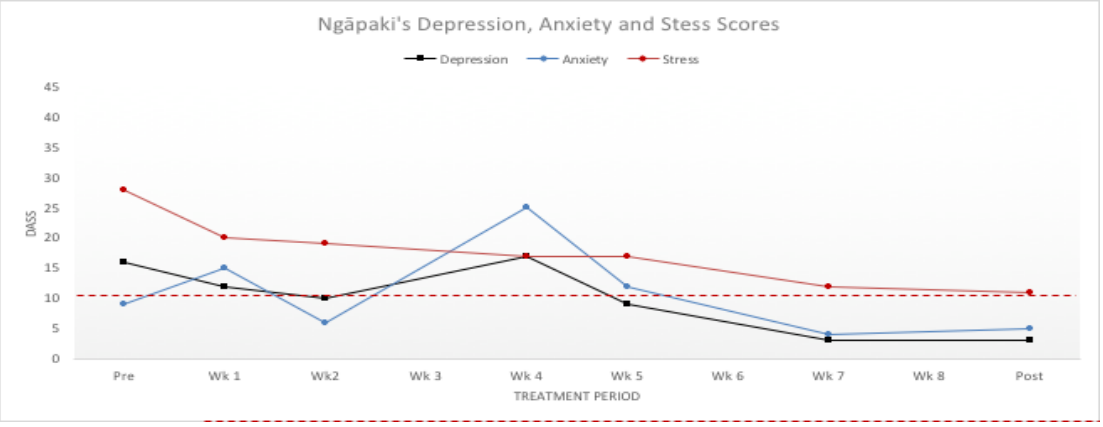


Figure 14 shows Ngāpaki's weekly depression, anxiety and stress scores during the treatment period.

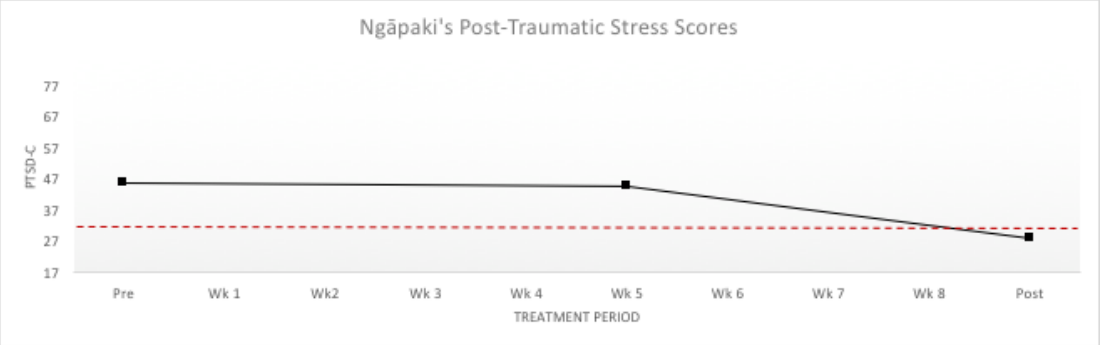


Figure 15 shows Ngāpaki's PTSD scores across the treatment period.

9.9.4 Summary

Ngāpaki's findings at baseline supported many of the hypotheses posed in Chapter 6. She reported a high chronic stress score, high waist circumference and external/stress eating scores, she reported a high degree of psychological distress and she showed a dysregulated cortisol response to an acute stressor. During the course, Ngāpaki received news that she would be losing her job. This caused significant stress for her, which might in part explain the lack of improvement on all of the cortisol indices at post-treatment. On all of the other measures, especially mental health, eating behaviour, waist circumference and stress perceptions, Ngāpaki showed clinically significant improvements that were matched by increases in her mindful awareness score at post-treatment

Chapter 10 – Discussion

10.1 Outline and aims

This chapter reviews the findings from the present study and discusses their implications in the context of each research question. It addresses the strengths and limitations of this project, suggests future areas for exploration and ends with a personal reflection of the PhD process.

10.2 Research questions one

The first research question hypothesised that adult Māori women who had experienced adversity in childhood would score highly on measures of chronic stress, show dysregulated cortisol profiles characterised by either blunted or exaggerated CAR, DS and cortisol responses to an acute stressor, would show visceral obesity (which would be associated with certain types of eating behaviour) and psychological distress. A latent assumption of this examination was that poorer outcomes would also be associated with low levels of mindful awareness. Baseline measurements affirmed that those outcomes were present for the majority of wāhine in the study.

10.2.1 Chronic stress

Seven of the eight participants scored very highly on the measure of chronic stress (over the past 12-months), with most scoring two to four times above the cut off. The SRRS assessed exposure to events considered to be stressful, not *feelings* of stress. Consistent with hypotheses made in Chapter 6, follow up interviews with the wāhine revealed that in the year before they joined the study, they had all experienced a high number of life events considered to be stressful. Most of those events involved immediate family or members of extended whānau. Those events included the sudden death of a spouse, hospitalisation due to psychological illness, legal trouble, relocations, and poverty - which is entirely consistent with assertions

made in Chapter 3, that because of large families and highly collectivistic values, many Māori women are likely to be exposed to many stressful events in adulthood. In contrast to expectations, only half of the women scored highly on a measure of perceived stress, which could indicate high psychological resilience. Those who *did* report feeling highly stressed at baseline tended to also score more highly on measures of psychological distress. Those who did *not* report feeling stressed tended to have higher baseline levels of mindful awareness, be more connected to Te Ao Māori, and experience good psychological health.

10.2.2 Cortisol dysregulation

The results of repeated cortisol sampling over multiple days (six in total) showed that all eight wāhine recorded cortisol dysregulation. While not every participant showed dysregulation on every measure, seven of eight showed either a hyper-cortisolemic or hypo-cortisolemic profile on at least two different indices of HPA axis functioning.

Only two of the wāhine showed cortisol profiles that were hyper-cortisolemic. The other six showed characteristics indicative of hypo-cortisolism (e.g., blunted CAR, flattened DS and minimal cortisol response to acute stress despite subjective reports of *feeling* stressed). Notably, the two wāhine with excess levels of cortisol had both experienced therapeutic interventions earlier in their lives and they also reported two of the three highest ACE scores (7/8 out of 10). This raises the possibility that those previous interventions might have prevented their HPA axis from ‘wearing out’ and becoming hypo-cortisolemic. It also raises the possibility that their extremely high ACE scores on their own, might have contributed to ongoing production of excess cortisol. However, given that a third wāhine who also had an extremely high ACE score (Hara), showed all of the expected negative outcomes (i.e., blunted CAR, DS and acute stress response, high WC etc), but had not yet experienced a successful therapeutic intervention, the earlier hypothesis seems more likely.

c) Visceral obesity

As hypothesised, all eight wāhine recorded waist circumference measurements that were above the cut off indicating increased risk of developing Type II diabetes and cardiovascular disease. Six wāhine recorded waist circumference measurements that indicated they were at *high* risk of developing those illnesses. Although all eight wāhine also scored above the cut off on at least one of the two eating behaviour questionnaires, contrary to expectations most scored more highly on the measure of external (mindless) eating than the measure of stress eating. Those who scored highly on the external eating measure, tended to score lower on the baseline measure of mindful awareness.

d) Psychological distress

It was hypothesised that the women in this study would score highly on measures of psychological distress comprised of depression, anxiety and trauma scales. Contrary to expectations, only three of the wāhine scored highly (above the cut off) on the depression and anxiety scales. However six scored above the cut off on the measure of PTSD symptoms. The three who reported high levels of depression and anxiety, scored the lowest on the measure of mindful awareness at baseline. Those levels did not appear to support a dose-response relationship between ACE score and psychological distress, for two of those wāhine had ACE scores of 4/10 and only one had an ACE score of 8/10.

10.2.1 Summary

The findings from research question one largely supported the hypothesis that there would be associations between high ACE scores, chronic stress, cortisol dysregulation, visceral obesity. Contrary to expectations, an association was not found between those variables and high levels of psychological distress. The implication of this, is that the women who had high ACE and high chronic stress

scores, but who did not report psychological distress were highly psychologically resilient.

Taken together, these results lend support to the ACE pyramid and allostatic load models of chronic disease development, which posit that adverse childhood experiences increase the risk of cortisol dysregulation through multiple mechanisms – both direct and indirect. Cortisol dysregulation then contributes to allostatic load (e.g., high WC), which then increases risk for developing chronic disease.

10.3 Research question two

This research question used pre- and post-treatment interviews to examine how the wāhine would respond to a culturally enhanced MBSR course, that was co-facilitated by a Pākeha man and a Māori woman. The research predicted that the wāhine Māori would receive the course well, would rate the interpersonal qualities of the teacher more highly than his ethnicity and gender, would engage well with group based therapy comprised of other Māori women, would view mindfulness meditation as a spiritual practice, would value the holistic approach to health espoused by mindfulness meditation, and would find that concepts in mindfulness overlapped with concepts in Te Ao Māori.

10.3.1 Perceived benefits

As expected, the course was well received by all of the wāhine who attended it, with most reporting that it exceeded their expectations of how well it would work for them. Comparisons of pre- and post-treatment interviews showed that the women's conceptualisations of mindfulness changed in ways which suggested they had both learned from and internalised the teachings of the course. Some of the benefits reported by wāhine at post-treatment included increased ability to pause in stressful situations and choose how they wanted to respond, increased awareness of personal patterns and habits that were not helpful to them, increased understanding of the importance of self-care and self-nurturance, gentler and kinder ways of

relating to themselves and others, as well as increased feelings of gratitude and non-judgement.

10.3.2 Qualities of the teacher

Given evidence that many Māori are reluctant to engage with health professionals because of previous interactions in which they felt judged and disrespected, it was expected that the wāhine in this study would value the interpersonal qualities of the teacher more highly than his gender or his ethnicity (i.e., Pākeha male) - if he proved to be non-judgemental and genuine.

One wāhine did not attend any of the classes because of the fact that the course would be led by a Pākeha male. Unfortunately, this fact did not come to light until after the course had finished. Thus, the prediction that gender and ethnicity would not be as important as personal qualities cannot be said to have been entirely accurate. However, all of the wāhine who *did* attend classes, spoke highly of Kovido and his ability to gently guide the classes without raising his voice, his genuineness and the authenticity of his practice, but most importantly, his embodiment of the quality of non-judgement when it came to working with the wāhine.

To illustrate this in practice, a key moment of learning occurred one night, when one of the wāhine suddenly noticed that Kovido's toenails were painted. Kovido's unruffled response to her immediate reaction of shock, revealed his sense of his unshakeable secureness in himself and his robustness to social challenge. After Kovido calmly disclosed that his nine year old daughter had painted them earlier that day, the wāhine acknowledged that her automatic assumptions had triggered a strong reaction in her, and thus a learning moment was shared by all on account of Kovido's ability to live his practice moment by moment.

Notably though, some criticisms were raised. The first related to Kovido's inability to correctly pronounce the names of some wāhine - a criticism that ought to be shouldered by the researcher. Another wāhine raised the fact that she didn't think

he communicated the ideas of mindfulness clearly. One wāhine would have preferred to listen to the voice of a Māori female during guided meditations, and several wāhine noted that he seemed highly anxious at the start of the first mindfulness class. However, none of these factors prevented wāhine from continuing to attend classes, which suggests one of two things. Either Kovido's positive qualities and the benefits they were receiving from the course outweighed their criticisms of him, or they stayed connected to the project for another reason, such as a sense of loyalty to the researcher. Although both are plausible, given the enthusiasm with which the wāhine praised Kovido and the course itself, the earlier hypothesis seems more likely.

10.3.3 Group based therapy

It was expected that the wāhine would find group based therapy favorable because many Māori hold collectivistic values that place a high value on relationships and connectedness. Taken together, the post-treatment interviews suggested that this aspect of the course was one of its most highly prized elements. Several women noted that they really enjoyed being part of a group with other Māori women because they had made new friendships, some had renewed old friendships and the whanaungatanga session held at the start of the course ensured that interpersonal connection was placed at the forefront of the courses aims. Thus, the group element of MBSR therapy can be said to have been highly successful for this group of wāhine.

10.3.4 Mindfulness as a spiritual practice

It was hypothesised that wāhine Māori would take to mindfulness meditation because it would be viewed as a spiritual practice. As such, it could present an alternative to psychological therapies such as CBT, which do not typically promote the idea of spirituality as being central to well being. As expected, spirituality was a common theme across the interviews - from wāhine claiming that they themselves were strongly spiritual beings, to wāhine stating that mindfulness fitted well within

the Te Whare Tapa Whā model of health *because* it involves connection to wairua (spirit), which helps connect them to their tipuna. Thus, it can be argued that the kōrero of wāhine in this study lent support to previous claims that Māori readily accept therapies that promote spiritual practices and that mindfulness meditation is one such therapy.

10.3.5 An holistic approach

It was also expected that the wāhine would readily accept a therapy which promoted an holistic view of health as opposed to therapies which perpetuate mechanistic approaches to wellbeing. In line with predictions, several wāhine reported that the holistic approach of mindfulness was one of the key reasons they had chosen to participate in the study. Consistent with this, many of the wāhine also reported that mindfulness meditation fitted well with commonly used Māori models of health and well being like Te Whare Tapa Whā. One wāhine in particular, noted that as a health worker, she sometimes found it difficult to use Te Whare Tapa Wha because it is an open framework, void of content. However, the concepts explored in each week of the MBSR programme helped her to understand how she could apply each of those frameworks in practice. Therefore, it can be argued that this prediction was accurate.

10.3.6 Congruence with Māori concepts

Lastly, it was argued that the wāhine in the study would find overlap between concepts inherent in mindfulness and concepts embedded in Te Ao Māori. This prediction was largely supported by the women's kōrero, which showed that those who were most deeply steeped in knowledge of traditional views of Te Ao Māori, readily drew links between mindfulness concepts and traditional Māori concepts. To be specific, concepts such as mauri (life force), karakia (prayer), and tikanga (right ways of doing things), which are values considered important to Māori, were reported to be linked with mindfulness meditation practice and principles. Thus, it is

argued that congruence with Māori concepts was a theme common to several of the women's kōrero.

10.3.7 Summary

The findings from the qualitative data strongly suggested that the culturally enhanced MBSR therapy outlined in this study, was well received by the wāhine who participated in it and that it provided a range of benefits for them - some expected, some not so. From the perspective of indigenous research, the self-perceived and reported benefits of the course for each wāhine, are the *most* valid form of evidence endorsing its effectiveness, thus the course can be said to have been highly effective for all of the women who attended the course.

10.4 Research question three

The third research question examined the effectiveness of the culturally enhanced MBSR programme using empirically validated psychological and physiological instruments. It was expected that eight weeks of mindfulness meditation would have a positive influence on the stress levels, cortisol levels, visceral obesity and psychological distress levels of wāhine in the study.

a) *Chronic stress*

Six of the eight wāhine reported scores on the SRRS during the eight week treatment period, that were above the cut off recommended for an entire year. This suggests that frequent exposure to stressful events was commonplace for these wāhine.

While at baseline, three of the wāhine scored above the cut off on the measure of perceived stress, at post-treatment, only one scored above the cut off - despite most all of them having experienced stressful events during the course. This would indicate that the course was beneficial in terms of reducing stress perceptions.

b) Cortisol dysregulation

Overall, the quantitative data was inconclusive in showing whether or not MBSR had any effect on the CAR or diurnal profiles of most participants, because all of them showed dysregulation at baseline, but only half showed improvements in CAR at post-treatment. Similarly, only half showed improved DS at post-treatment.

However, mindfulness meditation may have had an influence on their cortisol responses to an *acute stress*, for five of the eight showed improved cortisol output during the post-treatment stress test. Notably, those who recorded the most improvements tended to be those who had lower ACE scores, which suggests that ACE score might contribute to the physiological effectiveness of MBSR therapy.

c) Visceral obesity

Baseline measurements showed that all of the wāhine recorded waist circumference measurements that were above the cut off indicating increased risk of cardiovascular disease. Six were considered to be at high risk because of their WC. Despite mindfulness meditation being marketed as a psychological therapy, the post-treatment evaluation showed that five of the eight women recorded decreases of 2cm-5cm after completing the culturally enhanced MBSR course. Although those improvements were small, they lend support to the hypothesis that MBSR therapy is effective as a mind-body intervention, simultaneously providing benefits for the mind as well as the body. Linked with this, the eating behaviour scales showed, that of those who scored highly on the emotional eating scale at baseline (3 out of 8), all three showed decreased scores at post-treatment and two were below the cut off. Together, this supports the hypothesis that MBSR therapy contributed to healthier metabolic profiles for the women in the study.

d) Psychological distress

The quantitative data showed that the MBSR course had a positive influence on symptoms of psychological distress for the wāhine Māori. Notably, of the five who scored above the cut off on a measure of PTSD, none scored above the cut off at post-treatment, indicating that the therapy was beneficial for those experiencing symptoms of trauma. Also, two of the three wāhine who scored highly on measures of depression and anxiety at baseline, showed improvements at post-treatment. The one wāhine who did not show improvements on these measures, experienced an extremely high number of stressful events during the eight weeks of the course.

All of the wāhine showed increases in levels of mindful awareness from baseline to post-treatment.

10.4.1 Summary

Overall the results can be said to lend support to the hypothesis that MBSR therapy leads to meaningful and positive change in self-report measures relating to psychological health, stress perceptions, eating behaviour and mindful awareness. The greatest improvements were seen in the reduction of trauma-related symptoms. As expected, increases in mindful awareness coincided with improvements in health outcomes, including decreases in WC, which is a major risk factor for chronic disease. Some moderate improvements in depression, anxiety, stress scores and eating behaviour were seen, with most wāhine scoring below the cut off at post-treatment (despite experiencing high amounts of stress throughout) Although some small improvements in CAR, DS and acute stress responses were recorded, the intervention cannot be said to have had a major influence over the cortisol profiles of the wāhine. However, the improvements that were seen, were meaningful (i.e., reductions in night-time cortisol rise)

10.5 Strengths and limitations of the study

This study had many limitations and strengths. Together, they contribute to a view that this research offers a unique addition to the literature on allostatic load and effective treatments for Māori.

10.5.1 Design limitations

The study's design allowed for repeated sampling of multiple variables with a small group of Māori women. Although this has allowed conclusions about factors which commonly co-occur among these Māori women to be drawn, many more questions remain. This is a limitation only insofar as the study design made it impossible to draw conclusions about causality and to generalise the results to women outside of the context of this project. Nevertheless, the results appear to have raised more questions than they answered. Associations between high ACE scores, chronic stress, cortisol dysregulation and visceral obesity were found, but whether or not the baseline cortisol dysregulation results were the result of adversity in childhood or another factor, such as WC (which all participants also had), remains uncertain.

Without a comparison control group (e.g., a group of Māori without high ACEs) to compare treatment effectiveness, it remains unclear why only half of the wāhine showed improvements in cortisol dysregulation after the course but half did not. Although a control group comparison is no guarantee that those questions would be answered, such a design would have increased the possibility that stronger conclusions could be made. The small number of participants involved means that findings from the study cannot be said to apply to other Māori women in Aotearoa New Zealand. However, the results were robust enough that they might warrant a larger scale population based study that can accommodate the limitations presented here.

Another design limitation was that participants were asked to complete the weekly psychological distress (DASS) and mindful awareness (MAAS) measures prior to

starting each class, but for those who did not attend every class, no data was captured on those weeks. This resulted in gaps of data that made it difficult to draw conclusions about whether increases in mindfulness from week to week correlated with decreases in self reported psychological distress from week to week. Given that all wāhine completed pre-, mid- and post- measures however, this was a minor limitation.

Small *n* research typically requires a minimum of three points of baseline data points in order to establish an accurate degree of change. This study collected only two baseline points (e.g., two weeks) of salivary cortisol samples, but those points were the average taken from six days of sampling, therefore they are considered to be robust.

Using the same stress test at the start and at the end of the course to measure changes in the acute stress response leaves this study open to the accusation that any improvements were due to practice effects instead of due to changes resulting from attending the MBSR course. Although this remains a possibility, efforts were taken to minimise the impact of practice effects e.g., the tests were conducted two months apart, the second stress test was held in an environment likely to induce a greater stress response from wāhine (e.g., a psychiatric institution), and the actors in the second test were two older Pākeha males instead of a young male and female in the first test. The wāhine were unaware that the format of the test would be largely the same at the post-treatment test. Thus, if practice effects were present they were likely to have had minimal impact on the results.

Having the primary researcher attend each MBSR class raises the possibility that engagement in the programme was due to the participants relationship with her and not to the content of the course. Although this possibility cannot be entirely dismissed, there was no evidence from interviews with the wāhine, that this was the case. In fact, most wāhine were highly enthusiastic about the course content and the male mindfulness practitioner leading the project, which suggests that their

relationship with the researcher played a minor role (if any) in influencing their engagement.

A major limitation of the study is that it did not explicitly measure psychological resilience, thus it is unknown why some of the women did not experience psychological distress despite having been exposed to extremely high amounts of stress. This is clearly an area for future research.

10.5.2 Design strengths

A strength of this design was that it enabled deep and meaningful relationships to be built with each of the wāhine in the study. This way of researching is entirely consistent with the principles of tikanga Māori. Their well being was always at the forefront of the project and this was made possible *because* it was small *n* research.

Another strength of the design was that it allowed repeated sampling of a large number of variables, which means that the findings are robust and can be said to accurately represent changes that occurred for each woman throughout the study period. Using a case study approach meant that each woman's results were interpreted in the context of their individual stories. This added depth, richness and complexity to the interpretations of their results.

Choosing this study design enabled numerous hypotheses to be tested, making the study an efficient way of gathering data. Two major theories relating to allostatic load and treatment effectiveness were able to be examined simultaneously, which meant the wāhine involved only had to commit eight weeks of their time to the project. This was a strength for everyone involved.

Another major strength of the design was that it combined a kaupapa Māori approach to data collection (e.g., meeting wāhine in their homes face to face, and incorporating tikanga Māori) with Western principles of scientific research (hypothesis testing, repeated sampling with empirically validated instruments). To the best of the author's knowledge, this is the first study of its kind to integrate so

many different paradigms and research methods in the service of Māori centred research.

10.5.3 Cortisol measurement limitations

One limitation of the cortisol data was that it had a floor of 3 nmol/L due to LabPlus being unable to detect lower amounts. This obscured accuracy of the AUCg (see Appendix A, B & C) measurements and also makes it possible that the current research inflates the absolute cortisol values of this group of women (as any values <3nmol/L are recorded as 3nmol/L). Future studies would benefit from ensuring that cortisol levels can be detected as low as 1nmol/L. Additionally, a lack of reference values for Māori women specifically, meant that international reference ranges had to be employed in order to provide context for the values provided by this group of women. Future studies will benefit from having the data from this research to compare values against.

10.5.4 Cortisol measurement strengths

One strength of this study was the rigor of the cortisol testing. Best practice guidelines provided by Granger et al. (2012) for the collection of saliva in obtaining accurate CAR and DS measurements were followed, with the average of at least three days of sampling being used when interpreting results. Care was taken to ensure that all participants provided their saliva samples on the same days to minimise the possibility of confounds such as seasonal variation (which is known to exert an effect over cortisol levels) and work day stress (all samples were collected on the first three days of the work week) and participants were asked to avoid eating, flossing and drinking coffee in the five minutes prior to sampling.

Although steps were taken to increase adherence to the sampling schedule (e.g., the researcher prompted each participant via text message prior to sampling) no other external aids were employed to ensure that sampling times were strictly adhered to. Although this could be seen as a threat to the validity of the results,

given that multiple samples were taken at each data point and that the mean of those measures was used in all of the analyses, it is likely that any intra-individual variation due to late sampling was adequately captured in the mean measurements shown on the graphs.

An additional strength of this study was that it used multiple indices of the cortisol profile (CAR, DS and acute stress response), and childhood adversity was controlled for. Criticisms of research in this field have raised concern that many studies test just one aspect of HPA axis functioning (e.g., just the CAR or just the acute stress response), and many do not consider the influence of early life stress on cortisol profiles in adulthood when there is strong evidence that they are linked. This study avoids such criticism by controlling for childhood adversity, using multiple indices of cortisol regulation and ensuring rigorous sampling across multiple times and multiple days.

10.5.5 Construct validity limitations

One limitation of the ACE questionnaire is its reliance on retrospective self report, which raises the possibility that recording of ACE scores is not accurate. Short of experimentally inducing ACEs however (which can never be done), such a possibility remains true of all studies using the ACE questionnaire.

Additionally, the measure used to capture chronic stress data (SRRS) is a highly subjective instrument known to produce a wide variation in scores across some populations. Thus, it was recommended that those scores be interpreted with caution. While the study might have benefitted from the use of a better measure, the fact remains that the information was only needed to give an indication of whether or not the women in this study would often experience events considered to be highly stressful - not to determine whether they *felt* chronically stressed. Given that, it is considered that the measure was adequate for the purposes of this study

10.5.6 Construct validity strengths

To minimise the influence of confounding variables during the acute stress test, standardised protocols were adhered to in accordance with the TSST manual and the researcher oversaw collection of samples to ensure accuracy of timing. Furthermore, stress tests were conducted during 1pm and 4pm when the diurnal cortisol slope is at its most quiet, and when participants were in the luteal phase of their menstrual cycle. This is a strength of the research insofar as it increases the probability that the results presented accurately reflect cortisol responses to an acute laboratory stress.

10.5.7 Cultural limitations

Interviews with wāhine post-treatment revealed several areas of concern that ought to be resolved in any future research. The first related to the mindfulness teacher's inability to pronounce Māori names proficiently. This could have been avoided if more attention had been paid to helping him upskill prior to starting the course. Also, uncomfortable chairs made it difficult for one wāhine to completely focus on the exercises, which suggests that more attention needs to be paid to the attributes of the venue in future groups. Several wāhine mentioned that they would like to have attended the course at a marae setting, and while efforts to make this happen were made, they were not successful in this study.

Although this study went through a rigorous ethics process, from a cultural perspective, inviting wāhine to participate in a course and then subjecting them to experiences that were designed to make them uncomfortable (e.g., the acute stress test) could be considered a violation of the principle of manaakitanga. Although the researcher took efforts to ensure the safety of wāhine throughout each test, the fact remains that they were caused to feel anxious in the name of science. This is a limitation insofar as this project was not intended to perpetuate the sins of past research and further disempower Māori. It is hoped that the long term benefits

wāhine gained from participating in the MBSR therapy outweighed the temporary discomfort they experienced during the stress tests.

A final cultural limitation of the project was the lack of use of whakatauki[67], to help reinforce the messages and themes of each mindfulness class. While this did not prevent Māori concepts from being used and communicated in the programme, the addition of whakatauki and perhaps waiata, might have helped to cement certain ideas more firmly in their minds.

10.5.8 Cultural strengths

One of the greatest strengths of this project was that it drew on principles of tikanga such as whanaungatanga and kanohi ki te kanohi[68] before data collection started and after it was completed. Consultation with Māori occurred at every level of the study's construction and this is thought to have contributed to the high levels of engagement experienced by the wāhine, as well as added to the integrity of the research. This is evidenced by the fact that 12 months after finishing data collection, the researcher still meets with the wāhine in the project and talks to them about updates with the project.

Another strength was its integration of Māori principles with a mainstream intervention, that has a large body of evidence supporting its effectiveness for a range of health problems. This integration meant that the mindfulness teacher benefited from being exposed and introduced to concepts inherent in Te Ao Māori, and the women also benefited from participating in a therapy that fitted well with their worldviews and valued their traditions and rituals.

Perhaps the main strength of this research was that the participants themselves received the greatest gains. The results were not just used for the benefit of the wider research community.

[67] Whakatauki = Māori proverbs
[68] Kanohi ki te kanohi = Face to Face

10.6 Implications and future research

The findings support the application of the ACE pyramid and allostatic load models with a group of Māori women. They also support the use of culturally enhanced MBSR therapy with such women. Additionally, the findings suggest that MBSR therapy can successfully be co-facilitated with a Māori health professional proficient in tikanga Māori, and a Pākeha mindfulness practitioner proficient in teaching MBSR therapy. In the absence of a Māori health professional who can facilitate mindfulness independently, it is recommended that future iterations of the course invite a kaumatua into the group to discuss the application of Māori principles and to ensure that tikanga Māori is upheld. Additionally, future courses would benefit from the introduction of whakatauki to further illustrate concepts in Te Ao Māori. They would also benefit from being conducted in a marae setting.

The research raised many more questions than it answered. Those questions could form the basis of future research because as yet, it remains unclear why psychological distress was *not* associated with the other variables for some women, or why only two women showed patterns of excess cortisol when all the others showed too little, or why only five women showed improvements in cortisol output in response to the acute stress test. Also, what was it that contributed to decreases in visceral obesity? Was it increased mindful awareness when eating, increases in self-nurturing or another unrelated factor?

A notable finding was the relationship between high levels of mindfulness at baseline and low levels of psychological distress. This was consistent across the treatment period such that, as mindfulness levels increased for all participants, symptoms of psychological distress appeared to decrease. This is a relationship worth exploring further.

10.7 Conclusion

Māori in Aotearoa New Zealand live an average of seven years less than Pākeha New Zealanders. Most of this discrepancy is linked with the development of chronic disease. This thesis drew on the ACE pyramid and allostatic load models to illustrate relationships between adversity in childhood, chronic stress exposure and the development of chronic disease later in life (the key contributor to early death). Māori are also represented in childhood trauma statistics, which made it likely that the ACE and allostatic load models would apply to them.

This thesis presented the findings from a study in which eight Māori women who reported high levels of childhood adversity, provided baseline data assessing chronic stress, cortisol dysregulation, visceral obesity, and psychological distress. Those women then participated in a culturally enhanced MBSR course that was co-facilitated by a Pākeha male and a Māori female. Data was collected at mid-treatment and again at post-treatment. This included asking wāhine to complete a range of empirically validated self report measures, as well as provide numerous salivary cortisol samples, endure an acute stress test, and complete face to face interviews with the researcher.

The study integrated principles of Western science with principles of Māori tikanga to gather the data and also to present it. The findings showed that seven of the eight women attended the course and benefited greatly from doing so. They also showed that there were strong associations between high ACE scores, chronic stress, cortisol dysregulation, visceral obesity and psychological distress among this group of women. Together, this suggests that culturally enhanced MBSR therapy might be a useful alternative to CBT for health professionals seeking novel ways of engaging and helping Māori in need. The findings also suggest that the extended ACE and allostatic load models are useful for understanding the progression from historical trauma to early death.

The major implications of this are that 1) Pākeha can work effectively with Māori, if they are non-judgemental and authentic in their interactions with Māori, 2) Maori can benefit from participation in mainstream interventions that fit well with their worldviews, 3) that the burden of chronic disease faced by Māori, might be best explained by dysregulations in their stress responses systems, which then contribute to individual behaviours, 4) interventions which increase psychological resilience and reduce arousal in the stress response system might prove to be beneficial in the long term for Māori already at risk of developing chronic disease, 5) Māori women might be far more psychologically resilient than is presently recognised.

Unfortunately, the study did not directly address the wider societal influences (such as racism) that likely impact on Māori health. Instead, the study focused on changing Māori behaviour, rather than changing society's behaviour toward Māori. But given the urgent need for new ways of understanding Māori health problems and for health services that Māori can and will engage with, the current research does offer a viable therapy model for delivering services to Māori (i.e., tandem facilitation) and presents a novel therapy that the Māori women in this study found to be an acceptable match with their cultural worldviews (MBSR). An additional bonus is that this model can be implemented immediately, thus contributing to the reduction of chronic disease and early death among Māori.

10.8 Personal reflection

The foundation for this study grew out of my experiences as an adolescent, watching my father's health deteriorate before me. The impetus for it grew after I was accepted into the Clinical Psychology training programme at Massey University, where during my internship year, I realised that many of the skills I had honed, in order to be considered a 'good' clinical psychologist by my teachers and by the Department of Corrections (where I was completing my internship), were exactly the same skills that were likely to disengage Māori from seeking my help and prevent them from benefiting from the knowledge I had to share.

An early iteration of this project began in 2012, the year I started my Clinical Psychology training. Three months into the Clinical Programme, I became pregnant with my first child. I gave birth during my second year, continued studying and then became pregnant with a second child at the start of my third year.

I gained registration as a Clinical Psychologist in 2015 and resumed work on this project. Then six months later, my husbands work led us to relocate the family from Tauranga to Dunedin - a city in a region that houses just 1.5 % of the Māori population. This made recruitment of Māori women a particularly difficult task. That task was made worse because I did not have any family connections in Dunedin and Māori relationships are all about whānau. Because of this fact, I am extremely proud of the knowledge that eight Māori women, unknown to me before the project started, were pursuaded to not only join this project, but to stay right until the end and to complete every aspect of it. This says a lot about their remarkable integrity and perseverance.

Initially, this study was conceptualised through a purely Western, scientific lens owing to my immersion in the Clinical Programme, but it changed as the course progressed. Somewhere during the write up in 2018, I realised that by removing myself and ignoring the relevance of this work to my own family history, I was perpetuating ideas of science that deny the value and validity of indigenous voices.

So I decided to bring my family into the presentation of the thesis. For this improvement I credit both my husband, Andrew, and my supervisors Wendy and Michael - both of whom came on board with this project just eight months ago.

I am not immune to the irony that I completed this examination of stress and Māori women while raising two young children, working two jobs in completely different specialisations, relocating to a new island (far away from my whānau), and giving birth to a third child (just 12 months ago). None of my children have ever known a mother who was not preoccupied with the business of completing her PhD.

I hope that my efforts with this endeavour will be of value to those working as health professionals in Aotearoa New Zealand and might in some small way contribute to a future in which the next generation of Māori (i.e., my children) will once again live as long, if not longer than Pākeha.

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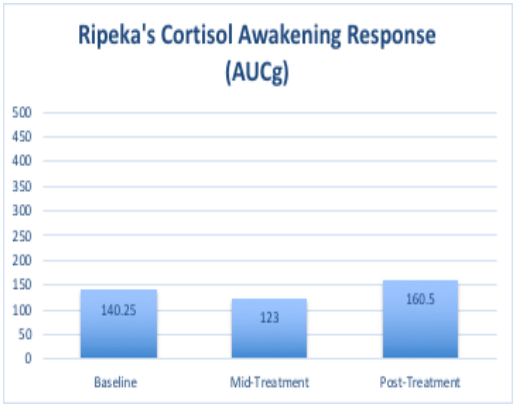
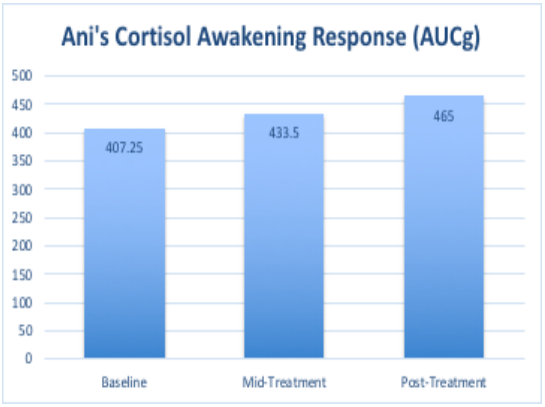
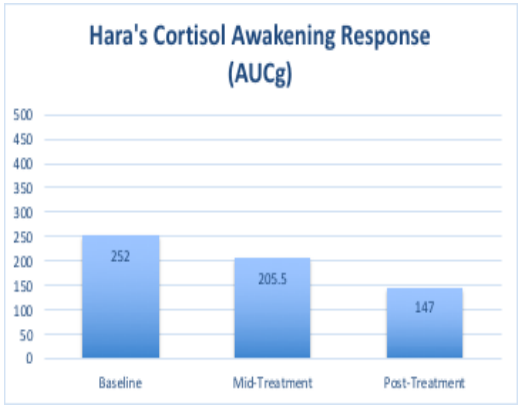
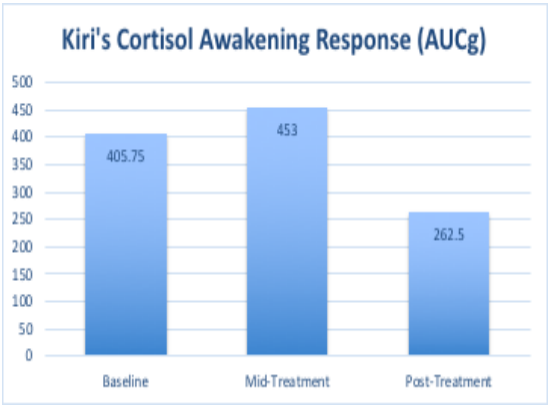
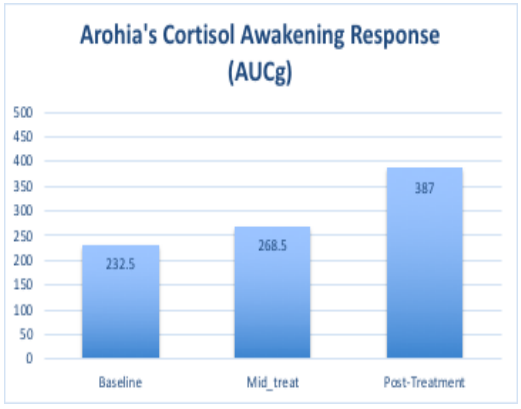
Appendix A - AUCg cortisol awakening response

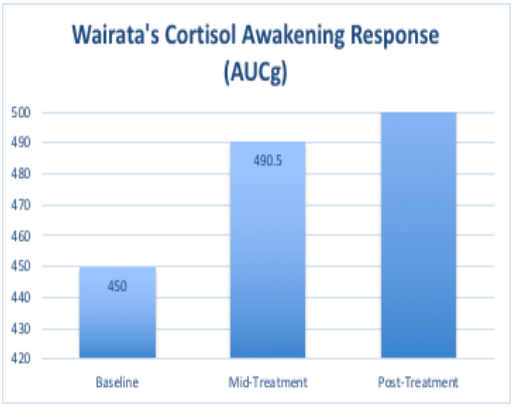


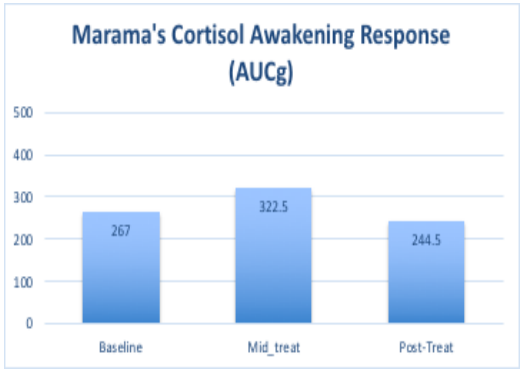


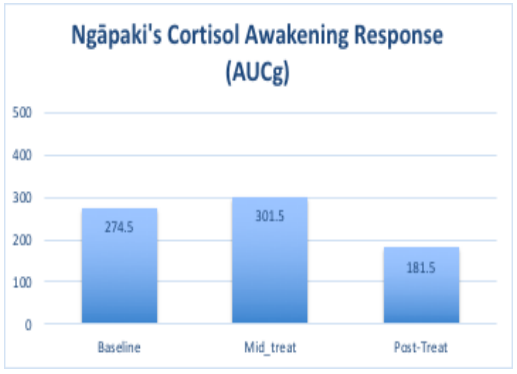




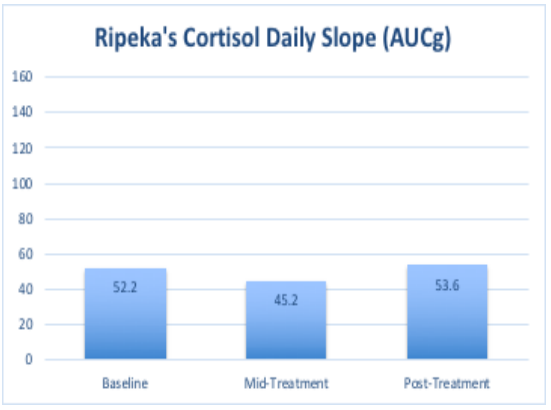


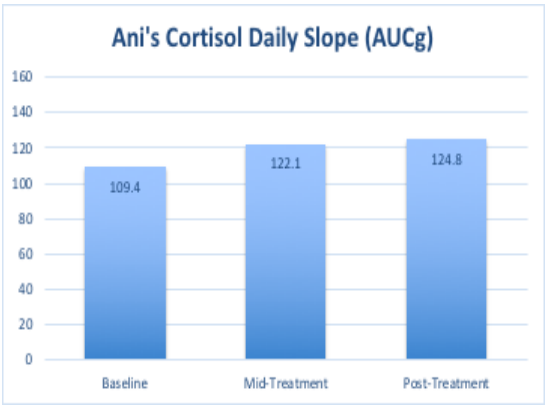


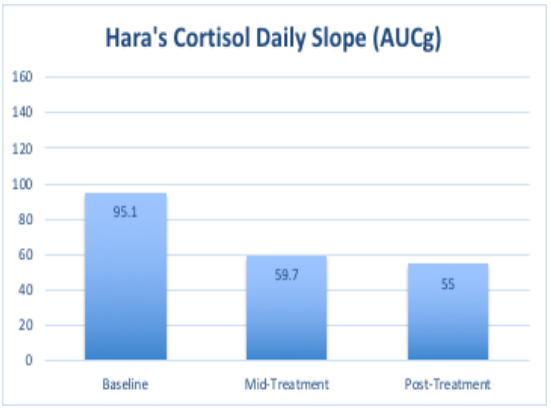


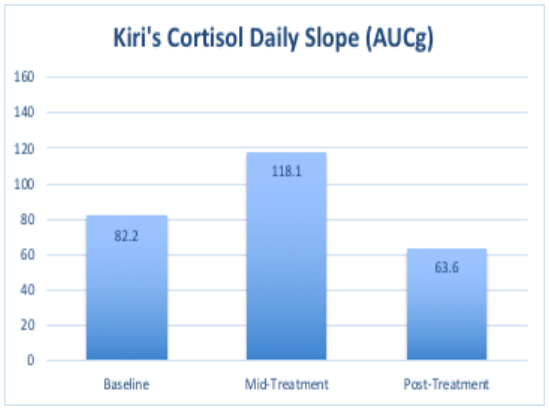


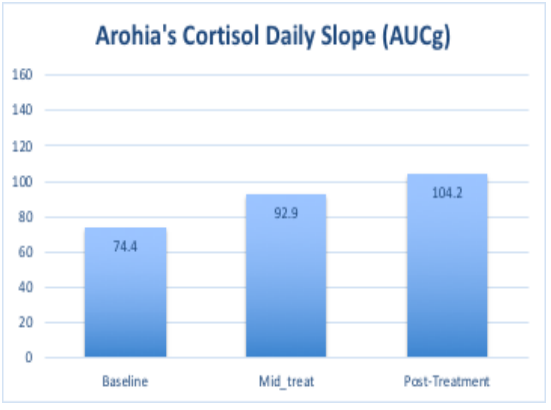
Appendix B - AUCg cortisol daily slope

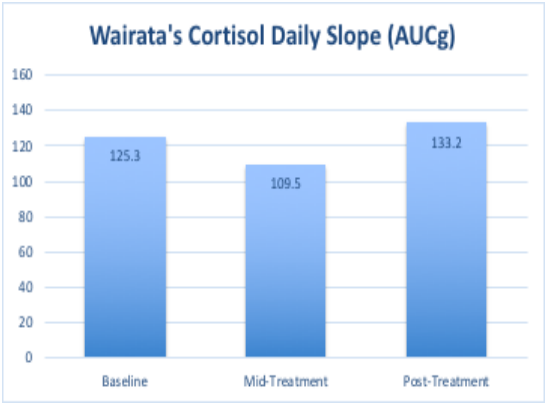


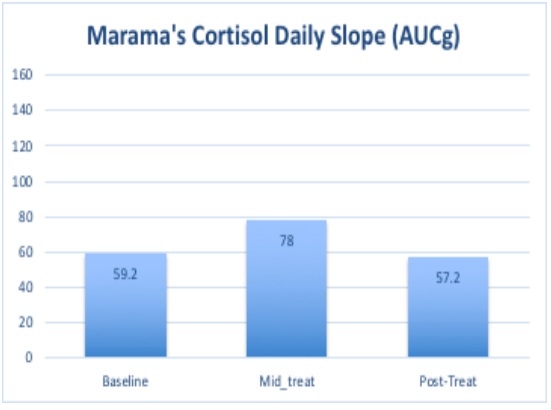


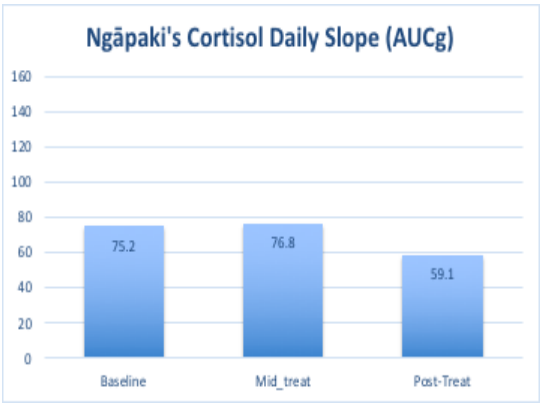












Appendix C - AUCg acute stress test