

Matariki

A Monograph Prepared by

Te Mata o te Tau
The Academy for
Māori Research and Scholarship



Office of the Deputy Vice-Chancellor Māori
Massey University

September 2026

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About Te Mata o te Tau

*Matariki atua,
ka eke mai i te rangi e roa,
e whāngai iho ki te mata o te tau,
e roa e,
hei tuku i ngā wānanga
i ngā kai ki te ao mārama.*

Te Mata o te Tau; The Academy for Māori Research and Scholarship was launched in 2003 to provide a forum for fostering Māori academic advancement and creating new knowledge. The Academy is interdisciplinary and intersectoral and unites Māori scholars from several disciplines, departments, and centres of research. It has strong links with other academic and research bodies in Massey University, in New Zealand, and with indigenous scholars overseas.

The **broad aims** of the Academy are:

- the advancement of Māori scholarship
- the provision of a forum for Māori scholars to collaborate across academic disciplines and subject areas
- the promotion of high-quality research that will contribute to new knowledge and positive Māori development
- the provision of leadership for Māori academics at Massey University.

The name of the Academy is linked to Matariki, the star cluster also known as the Pleiades, and symbolises the promise of a fruitful year and the advancement of knowledge.

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FOREWORD

Professor Chris Cunningham
Tātai Hono Pukeahu

Matariki atua, ka eke mai i te rangi e roa, e whāngai iho ki te mata o te tau, e roa e, hei tuku i ngā wānanga, i ngā kai ki te ao mārama. Ka nui taku mihi ki ngā kairangahau, ki ō rātou whānau, me ngā hapori i tautoko i tēnei kohinga tuhinga kairangi.

This ninth volume of Matariki brings together an extraordinary ‘constellation’ of doctoral journeys that extend and deepen Māori and Indigenous scholarship across multiple disciplines. As with previous volumes, the aim is not to reduce these theses to a single story, but to hold them in composition so that each contribution can stand in its own right, while being read alongside others as part of a broader movement in Māori research and practice.

We open with theses focused on whānau, mental health, and wairua. **Dr Jeanette Hastie** explores *Māori mothers’ experiences of raising tamariki and rangatahi with autism (takiwātanga)*, showing how mana wahine, prauka, and concepts such as manaakitanga, whakawhanaungatanga, and tuakana-teina transform deficit-based Western models into strengths-based, Māori-informed understandings. **Dr Deanna Haami’s** *Te Pū* traces a spiralling journey from intergenerational trauma toward intergenerational healing, guided by wairua and grounded in whakapapa and wānanga, and articulates a framework for releasing inherited wounds in ways that are both personally and collectively significant.

A second grouping of theses engages with whenua, reo, toi, and future foods. **Dr Stephan Gibbs’** *Te Hoe Nuku Roa* reconnects

hoe waka traded in the late eighteenth century to ancestral makers, design systems, and tribal narratives, challenging colonial museum logics and affirming iwi-led curation. **Dr Hone Morris'** *He kura whenua, he kura reo, he kura tangata* examines land-block narratives and Native Land Court records in Tamatea, demonstrating the inseparability of land, language, and people, and showing how kupu on the land continue to carry identity and authority. Complementing these, **Dr Summer Wright's** work on Māori future foods focuses on plant-based enterprises, place branding, and Indigenous rights, arguing that Māori-led food systems can protect taonga, support collective wellbeing, and resist ongoing cultural appropriation.

Other theses speak to indicators, disasters, artificial intelligence, and precarity. **Dr Francis Hubbard** interrogates the selection and ordering of “Build Back Better” indicators in post-disaster response and recovery, proposing a clearer, staged process that aligns resilience ambitions with actual decision-making. **Dr Petera Hudson** explores whānau engagements with AI-related technologies to identify mātauranga and tikanga that could be woven into algorithms, opening possibilities for Māori-led, culturally grounded AI systems. **Dr Ahnya Martin** theorises precarity with Māori households, treating it as a cultural–economic assemblage and documenting everyday practices of whanaungatanga and manaakitanga, from which concrete recommendations for policy emerge.

The volume also includes work on tribal self-governance, health, and Indigenous development. **Dr Mara Andrews** draws on Native American and Alaska Native experiences to refine a critical success factor framework for tribal self-governance in health care, and considers its application in Aotearoa, aligning structural stages of commitment, operationalisation, and sustainability with Kaupapa

Māori and tino rangatiratanga. Later in the volume, **Dr Mahina-a-rangi Baker's** *Te Kete Tua-Ātea* extends Māori modelling of future scenarios for wai and kaitiakitanga, pointing to the growth of Indigenous-led environmental planning and governance.

Basic science and professional practice are strongly represented. **Dr Sarah Wilson's** neurobiological work characterising the gene CG5846 “Peep” in *Drosophila* documents its role in glial survival, brain development, and stress-related pathways, establishing a platform for future investigations into neural function and disease. **Dr Linda Clarke's** multi-phase study of early childhood professional learning and development shows that coaching is under-used and often misunderstood, and demonstrates how practice-based coaching can sustain changes in pedagogy that support toddlers' social-emotional learning. **Dr Jessica Steadman's** thesis on “the perfect gay man” examines perfectionism among gay men in Aotearoa, situating perfectionistic striving within heteronormative pressures and reframing it both as burden and resource in the pursuit of self-acceptance and relational wellbeing.

Alongside these are theses that address suicide loss, access to veterinary education, and performing prauka. **Dr Amber McAllister's** work with Māori whānau bereaved by suicide illuminates the long-term, intergenerational effects of loss, the protective roles of wairuatanga and connection to te ao Māori, and the gaps in formal support. **Dr Eloise Jillings' Rapua te mea ngaro** offers the first systematic account of Māori access to veterinary education, identifying barriers and enablers and arguing for changes that honour Indigenous rights and develop more equitable pathways into the profession. **Dr Helen Pearse-Otene's** research on Theatre Marae and performing prauka uses the narratives of Hinetiāma/Hinenui Te Pō to explore incest, sexual trauma, and healing, demonstrating how embodied,

culturally grounded performance can liberate bodies, heal wairua, and reclaim ancestral wisdom.

Questions of work, stress, and complex organisations arise in studies of ambulance personnel and defence nursing. **Dr Tayla Reti's** thesis on ambulance personnel documents operational and organisational stressors and shows how organisational stress and perceived social support relate to symptoms of depression and post-traumatic stress, urging greater attention to organisational conditions and meaningful support structures. **Dr Maree Sheard's** Foucauldian analysis of New Zealand Defence Force nursing officers examines how military nurses navigate tensions between defence imperatives and professional nursing accountabilities, tracing how ethical care is maintained within disciplinary systems.

Education, identity, and sport feature strongly. **Dr Vicky Lawson's** work on Māori Catholic education examines life histories at the intersection of Te Ao Māori and Te Ao Katorika, highlighting disconnections between Catholic policy and Māori aspirations and suggesting a specifically Māori Catholic sense of justice in schooling. **Dr Douglas King's** epidemiological study of injury incidence and physiological demands in domestic amateur women's rugby union provides foundational data on match and training injuries, positional differences, and concussion patterns, with clear implications for conditioning, safety, and governance. Further theses by **Dr Malcolm Mulholland** on New Zealand flags and changing notions of identity, and **Dr Nikki Renall** on diet, the gut microbiome and metabolic health, deepen current debates about representation and chronic disease in contemporary Aotearoa.

The realities and aspirations of rangatahi and whānau are central to several theses. **Dr Madeleine Haerewa** investigates the wellbeing needs of Māori youth attending alternative education,

foregrounding their own accounts of challenge and possibility. **Dr Felicity Ware** examines the experiences of young Māori parents raising a whānau, illuminating both structural constraint and the relational strengths that sustain parenting under pressure. **Dr Amelia Backhouse-Smith's** work on Māori mental health service engagement weaves narratives from tāngata whaiora, whānau members and Māori kaimahi to show how whanaungatanga can align services more closely with Māori ways of being. **Dr Pita King's** study of Māori ways-of-being explores everyday socio-cultural practices of reconnection that address cultural disruption, reminding us that hauora is continually produced in ordinary acts of relationality.

Finally, the volume reaches into marine ecology and agricultural productivity. **Dr Elisabeth Myers** investigates the functional biodiversity of New Zealand's marine fishes across depth and latitude, offering insights with direct implications for environmental management and marine conservation. **Dr Kate Griffiths'** epidemiologic investigation of wastage and productivity in commercial ewe flocks provides new knowledge for improving animal welfare and farm performance. Read together with the AI and future foods research, these studies show Māori and allied scholarship engaging across domains from oceans and farms to servers and whānau networks.

As Matariki rises again, this volume stands as a marker of the breadth, acuity, and generosity of Māori and Indigenous scholars and their supporters. Each thesis is a whare of knowledge in its own right; held together in this collection, they form another long stroke of the paddles that carry us into futures where Te Tiriti, te ao Māori, and wider scholarly worlds are actively held in relation within the world of reality.

Nō reira, e ngā rangatira, e ngā whānau, e ngā hapū, e ngā iwi –
tēnei te mihi maioha ki a koutou katoa. Kia ū, kia manawanui, kia
toitū te ara rangahau Māori.

Nākū, nā

Professor Chris Cunningham

Tātai Hono Pukeahu

Te Mata o te Tau – The Academy for Māori Research and Scholarship

FOREWORD

Paora Ammunson,
Puna Tātai Hono
Deputy Vice-Chancellor Māori

Whakarongo mai e tama
Kotahi tonu te hiringa i kake ai Tāne ki Tikitikiorangi
Ko te hiringa i te mahara
Ka kitea i reira ko Io Matua te Kore anake
I a ia te toi ariki, te toi uru rangi, te toi uru tapu, te toi uru roa
Ka whakaputa Tāne i ia ki te waitohi na Pūhaorangi,
na Ohomairangi
Te wai whakaata no Hine kauorohia, kauorohia ngā rangi tūhāhā
Ka karangatia e Tāne ki te paepae tapu, i a Rehua,
i te hikumutu o Rangi
Ka turuturu i kōnei, te tawhito uenuku, te tawhito uerangi,
te tawhito atua
Ka rawe Tāne i te hiringa taketake ki te ao marama
Ka waiho hei ara mo te tini e whakaruaike nei, e tama e

It is with deep pride and aroha that I write this foreword to the ninth volume of *Matariki*, a collection that again brings together the achievements of Māori doctoral graduates and their communities. This publication is more than a record of academic success; it reflects an enduring commitment to Māori research and knowledge, and to the responsibilities that come with carrying those kete into the world of reality.

The graduates featured here embody the wairua of Matariki – the constellation that marks renewal, remembrance, and the setting of intentions for the year ahead. As Matariki signals the Māori New Year, these scholars mark new chapters in advancing understanding and practice across diverse fields, from whānau and hauora, to whenua and taiao, to technology, policy, and science. Their work is deeply connected to whakapapa, whānau, and whenua, and grounded in mātauranga Māori, while also engaging critically and creatively with wider bodies of knowledge. They carry on the work that began when Tane ascended to the heavens in the pursuit of knowledge for our collective well-being.

In this volume we see research that sits close to the lives of whānau – journeys through takiwātanga, trauma and healing, suicide loss, rangatahi education, and young Māori parenting – alongside studies that trace the long arcs of our relationships with land, language, and taonga. We see doctoral work that interrogates precarity and policy, that refines frameworks for tribal self-governance in health, and that models futures for wai and kaitiakitanga. We also see kaupapa that carry Māori presence into laboratories, hospitals, emergency services, classrooms, defence forces, farms, and fisheries – places where decisions made each day shape the wellbeing of our people and our environment. I am particularly struck by the alignment of the work of our researchers have prioritised and Massey’s new strategy to ensure that what we do supports **People, Place and Possibility**. It is our innate Māori calling to ensure that what we commit our endeavours to eventually benefits our people.

Te Kunenga ki Pūrehuroa Massey University remains committed to creating an environment where Māori knowledge is respected, nurtured, and allowed to lead. *Te Mata o te Tau – The Academy*

for Māori Research and Scholarship – continues to provide a supportive space for Māori academic growth, interdisciplinary collaboration, and strong connections between the university, iwi, and the wider Indigenous world. This monograph shows what can be achieved when Māori perspectives are valued, when Māori ways of knowing and being are central rather than peripheral, and when doctoral journeys are understood as collective as well as individual achievements.

I also want to acknowledge the collective effort that underpins every thesis in this volume. The unwavering support of whānau, hapū, iwi, and communities is the foundation upon which these successes are built. Supervisors, advisors, examiners, and academic departments have walked alongside our graduates, offering guidance and challenge, while kaumātua, peers, and friends have held the wairua of these journeys. Each thesis carries the imprint of many hands and hearts.

As you read these accounts of research and discovery, I hope you find inspiration in the dedication, resilience, and creativity of our graduates. Their achievements remind us that the pursuit of knowledge is not only an individual endeavour, but a collective project – one that strengthens identity, supports aspirations, and helps to ensure the wellbeing of Māori and our relations for generations to come. In that spirit, I invite you to join us in recognising these graduates and reaffirming our shared commitment to advancing Māori research and scholarship as a foundation of Te Mata o te Tau.

Nō reira, e ngā rangatira, e ngā whānau, e ngā hapū, e ngā iwi – tēnei te mihi nui ki a koutou katoa. Kotahi tonu te hiringa nui i kake ai Tāne ki Tikitiki-o-ngā-Rangi, ko te hiringa tērā i te mahara. Kia kaha, kia māia, kia manawanui tātou ki te whai atu i taua hiringa

rā. Mā te mātauranga e arataki, mā te kotahitanga e whakakaha,
mā te aroha e whakakotahi.

Tēnā koutou, tēnā koutou, tēnā tātou katoa.

Paora Ammunson

Puna Tātai Hono

Deputy Vice-Chancellor Māori

Te Kunenga ki Pūrehuroa – Massey University

MĀORI WOMEN'S PERSPECTIVES OF RAISING A LOVED ONE WHO HAS AUTISM (TAKIWĀTANGA)

Dr Jeanette Louise Hastie
PhD (2025), Massey University

This thesis presents research that explored the understandings, worldviews, and approaches of eight Māori māmā (mothers) with children (tamariki) or adolescents (rangatahi) who have been diagnosed with autism (takiwātanga) in Aotearoa New Zealand. An interpretivist qualitative research design was utilised that combined methods from Western methodologies and Kaupapa Māori and Mana Wahine theory and research. The methodology was transformative (whakaahua) in nature, as the concepts behind the Western methodological tools were transformed into the concepts of te ao Māori (the Māori worldview) through the application of Kaupapa Māori and Mana Wahine theory.

Eight Māori māmā attended one of four small focus groups consisting of two māmā and the researcher, during which they were encouraged to create an artwork while telling their lived experience of takiwātanga through pūrākau (narratives). Over approximately four hours, the māmā were asked to describe how they navigated the New Zealand education and health systems, and their home and community, with their tamariki and rangatahi with takiwātanga.

The pūrākau revealed that the māmā had brought about a transformation of their own by resisting the Western deficit-based model of autism and drawing on their cultural understanding of

takiwātanga to change their negative Western-based experiences into positive Indigenous-based ones. This led to the development of a model inspired by the taiaha, a Māori weapon of war, that demonstrates how a deficit-based Western ideology about autism can be transformed into a strengths-based Indigenous ideology about takiwātanga, from both the researcher's perspective and that of the participants.

The findings also identified strong connections between the māmā and those professionals and others who supported them, whom they called “game changers”. Professionals who were not supportive were circumnavigated or dismissed as the māmā held onto their own expertise and developed their own knowledge about takiwātanga.

The te ao Māori concepts of whakawhanaungatanga (relationship building), manaakitanga (showing respect, generosity and care for others) and tuakana-teina (the relationship between an older [tuakana] person and a younger [teina] person) were woven throughout the pūrākau, which the māmā drew on to strengthen their mana wahine (power as women) and mātauranga wahine (female knowledge). The thesis concludes that cultural competence for registered professionals in education and health should include formal assessments of their knowledge of te ao Māori concepts such as manaakitanga, whakawhanaungatanga, and tuakana-teina in relation to takiwātanga.

TE PŪ: TRACING THE ORIGINS OF INTERGENERATIONAL TRAUMA THROUGH WHAKAPAPA TO ATTAIN INTERGENERATIONAL HEALING

Dr Deanna Haami
PhD (2025), Massey University

Hinengaro, The Obscured Daughter, knows the darkness well. She has been living within it for so long, grown up within it, been shaped by the shadows and sharp thorns that comprise it. She entered this space of darkness as a child, a consequence of her inheritance of Intergenerational Trauma.

One day, while lying in her cocoon, a light appeared in the distant horizon, a light so piercing and bright that no matter what she did she could not ignore it. So, she crawled her way up onto shaky legs, pushed her way through the opening of her thorny cocoon, and began walking towards that little bright light, hoping to make it disappear from her sight.

This walk turned into a long and intense journey – one that was led by wairua (referring to spirit, spirituality, the spiritual realm), grounded in whakapapa (genealogy), and expressed through wānanga (a process of intergenerational discussions occurring in the physical and spiritual realms).

By spiralling through Te Pūtake (An Origin Analysis) and exploring the different dimensions of reality – Te Ao Mārama (the external world), Te Pō (the internal world), Te Kore (the origin experiences), and Te Ao Wairua (the spiritual world) – of both her and her tūpuna (ancestors), Hinengaro was able to release and let go of the trauma, the soul wounds, she had become bound to.

She was able to transform herself and her circumstances. From Hinengaro she transformed into Hineoho, The Awakened Daughter. From Hineoho she transformed into Hinewetewete, The Daughter Set Free. And finally, from Hinewetewete she transformed into Hineora, The Daughter of Healing. Her spiralling journey out of her cocoon, became a journey of Intergenerational Healing – of finally being free.

TE HOE NUKU ROA: THE LONG STROKE OF THE PADDLES THAT HAVE TRAVERSED THE GLOBE: A SURVEY ON THE DEVELOPMENT OF MĀORI PAINTING FROM HOE TO WHARE AND INTO THE CONTEMPORARY WORLD

Dr Stephan Gibbs
PhD (2025), Massey University

This dissertation, “Te Hoe Nuku Roa: The Long Journey of the Hoe,” investigates the whakapapa, visual language, and cultural significance of hoe waka (Māori paddles) traded in 1769, with a primary focus on those with stylistic links to Tūranganui-a-Kiwa. Applying a Whakapapa-a-hoe methodology, developed to activate genealogical links to tīpuna responsible for these taonga, the research complements Kaupapa Māori principles, ensuring Māori conceptual, design, methodological, and interpretive control. Central to this approach is the honouring of Māori values, emphasising whakapapa, Kaupapa Māori principles, and the integration of tikanga-a-iwi.

Through extensive museum visits, sensory engagement, creative practice, and design analysis, 23 hoe waka were documented, with 14 traced back to the 1769 exchange off Whareongaonga, south of Te Kuri-Pāoa peninsula. Key findings include the identification of distinctive Tūranganui-a-Kiwa design features, such as the taratara-a-kae surface pattern, and insights into the kōwhaiwhai systems of symmetry. The research also revealed Parkinson’s edits of kōwhaiwhai paintings and the role of Ngāti Rangiwhaho as key

artists responsible for most of the hoe waka exchanged on the Endeavour with at least three associated with Rongowhakaata.

Contributions to the field include establishing the Whakapapa-a-hoe methodology, expanding knowledge of Tūranganui-a-Kiwa kōwhaiwhai, facilitating the return of taonga, and challenging colonial narratives. The curatorial approach emphasised manaakitanga and whakawhanaungatanga, integrating tikanga-a-iwi into exhibition practices. This study highlights exhibitions such as Toi Tāmanuhiri and Tū Te Whaihanga as platforms for reclaiming mana and promoting Māori voices in museums and academic discourse.

This research journey, culminating in this dissertation, has been a deeply personal and transformative experience. Te Hoe Nuku Roa: The Long Journey of the Hoe has explored the whakapapa of hoe waka traded in 1769, the visual language that animates them, and their continuing cultural significance.

HE KURA WHENUA, HE KURA REO, HE KURA TANGATA: RELATIONSHIPS OVER TIME BETWEEN THE LAND, THE LANGUAGE, AND THE PEOPLE

Dr Hone Waengarangi Morris
PhD (2025), Massey University

Taipitopito

Kei tua o te kupu tā he kura whenua, he kura reo, he kura tangata is the fundamental inspiration of this research. The phrase implies beyond the written word, there lies another realm, another experience, another perspective. This research will explore the relationships over time between the land, he kura whenua, the language, he kura reo, and the people, he kura tāngata within the narratives pertaining to the lands and waterways, the language on the land and the tūpuna connected to the land blocks, Rākau-tātahi, Ōtāwhao, Whenuahou and Waikōpiro, in the Tamatea Central Hawke's Bay tribal district, incorporating the townships of Takapau, Waipukurau, Waipawa, Porangahau and surrounding areas.

The ultimate wish in pursuing this area of research is to provide access to the historical account of how the hapū of the Rākautātahi, Takapau regions are connected to the land and each other. Through providing a detailed account of the ancestors movements, their settling of the lands, the daily activities and the intimate connection reflected in the kupu and the origins of place names left on the land, the present generation and future generations will forever be connected to the land and the language used by the

ancestors to strengthen individual and collective identity fulfilling the fundamental aim of this thesis, he kura whenua, he kura reo, he kura tangata.

The relationship between the land the language and the people is the primary focus of this research drawing on traditional Indigenous lore and natural order: from time immemorial Māori have believed, as with many Indigenous peoples, that they belong to the whenua rather than the colonised concept of the whenua which belonged to them.

Reference to written law feeding the public domain and constraint of sovereign order will be applied for comparison and contrast through the unique narratives articulated by tūpuna from 1883 – 1892—when the four land blocks in this research were investigated—within the proceedings of the Native Land Court, Te Kōti Whenua Māori borne out of statutes, Native Lands Act of 1862 and given authoritative power under the Native Lands Act on 30 October 1865.

The moods of the land, the river, and its tributaries, conveyed by the stories and the perspectives of tūpuna underlie this research. For centuries narratives were conveyed orally by tūpuna, from generation to generation through the lens of traditional Indigenous lore and of the natural order to strengthen understandings that all living things are connected; within that understanding Māori possessed an inseparable collective connection to the land, the waterways, and the stories.

Rereata Makiha (2021) refers to a whakatauākī by Tūkākī Waititi sharing the same reasoning as tūpuna regarding inseparable collective connection to the land, the waterways, and their respective stories, “Kāhore he aha i hangatia, i ahu noa mai rānei kia noho wehe i tēnei ao, ahakoa matangaro ka mōhiotia te

mauri” Nothing was ever created or emerged in this world to live in isolation, even a hidden face can be detected by its impact on something.

This research dives into narratives expressed during times of peace and times of conflict, quintessentially revealing a mindset that once walked side by side with the Gods and communicated to all living things as a brother or a sister, a guardian or parent. This is the story of the hapū of Tamatea-Heretaunga district and their lived experiences with the land. The research draws largely on the evidence provided by tūpuna in Native Land Court cases from 1883 through to 1892.

Fundamentally, this research embodies the adage that, “the land is in the language and the language is in the land”, *kei te whenua te reo, kei te reo te whenua*, a phrase borne out of initial discussions with Professor Cynthia White, Pro Vice Chancellor, College of Humanities and Social Sciences about my research which can be articulated together with the phrase, “the land remembers” Logan (1975). To this I add the following thought, “*tukua te whenua kia kōrero*”, let the land speak, a statement I made to a group of tourist operators 23/06/19 when explaining the Te Waha-o-te-Kurī educational kiosk based at the eastern end of the Manawatū gorge, at Ferry Reserve. This thesis answers the following question, “What was the relationship over time between the land, the language and the people within the specific land blocks bordering Te Awa Pokere-a-Tama-kuku and its tributaries?”

20 *He kura whenua, he kura reo, he kura tangata: relationships over time
between the land, the language, and the people*

PLACE, PROVENANCE, PROTECTION: ALIGNMENTS, CHALLENGES, AND OPPORTUNITIES FOR MĀORI FUTURE FOODS

Dr Summer Rangimaarie Wright
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This thesis examines key alignments, challenges, and opportunities for Māori future foods, conceptualised as food production processes and outcomes that positively impact Māori and kinship networks.

Beginning with a focus on plant-based future foods, a scoping interview study with Māori enterprise revealed strong alignment with Māori aspirations, including fulfilling kinship responsibilities, bringing together multiple forms of value, advancing collective wellbeing, and protecting and expressing Māori rights and interests - particularly in cultural and intellectual property.

Participants identified place branding as a promising avenue to protect and develop cultural landscapes and enable future foods.

The second study developed a content analysis protocol to explore the branding of Māori food and beverage packaging, with a focus on the prevalence and potential functions of place elements.

Findings show that place branding is widely used by Māori enterprises, affirming its relevance to Māori future foods, while also highlighting a need to understand perceptions of Indigenous place elements.

The third study used means-end chain laddering interviews to examine how critical consumers in Aotearoa New Zealand and Singapore perceive Māori place elements. It found a range of positive and negative perceptions across both contexts, which suggest viable approaches to place branding by Māori food enterprise.

The thesis presents three key messages: plant-based future foods are relevant to Māori on multiple levels; Māori future foods can be enabled through place branding; and Māori place branding can support enterprise development and the protection of Māori rights and cultural property.

These findings have implications for advancing Māori future foods and for growing the research and practice of decolonial Māori and Indigenous place branding. By exploring these interconnections, the thesis contributes to a deeper understanding of how Māori aspirations can shape and benefit from future food systems. It also critiques the ongoing appropriation of Māori culture by government and industry to advance broader agricultural and economic agendas. This research offers a transdisciplinary approach, addressing gaps at the intersection of Māori enterprise, future foods, Indigenous place branding, and consumption studies.

PRIORITISING INDICATORS OF SUCCESS IN ‘BUILD BACK BETTER’ POST-DISASTER FRAMEWORKS

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This study explores the challenges and significance of indicator selection for key decision-makers in post-disaster response, recovery, and reconstruction efforts.

When a community is overwhelmed in the aftermath of a disaster - various entities, including aid organisations, local authorities, and national agencies, are mobilised to provide emergency response and support in the subsequent response and recovery phases. These decision-makers rely on choosing appropriate indicators to evaluate the effectiveness of their interventions, track progress, and decide on appropriate actions and activities.

Guided by the principle of “Build Back Better,” which advocates for a comprehensive and holistic approach to resilience, practitioners need to comprehend the intricate relationships and dependencies among indicators to make informed decisions regarding their selection.

This aspect has been identified as a significant weakness in the implementation process for all stakeholders. Employing a novel methodology, this thesis utilises the Hierarchical Decomposition Algorithm to analyse the priority of and the relationship between indicators proposed by the 2016 ‘Build Back Better Framework’, a synthesised framework reflecting a unified approach in disaster management.

Empirical evidence from forty case studies examining key decision makers experiences of implementing disaster response efforts validates these findings. The study concludes with a rational process and workflow for determining indicator selection which considers the diverse nature of response and recovery in the pursuit to effectively build back better.

WHĀNAU IDENTIFICATION OF MĀTAURANGA AND TIKANGA MĀORI THROUGH THE ENGAGEMENT AND INTERACTION WITH EMERGING TECHNOLOGIES THAT ARE GENERATED BY AI

Dr Petera Whaiao Hudson
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This research is strategically positioned to demonstrate whānau connections to one another as an extended whānau, to our lands, to our socioeconomic situation, and to our emotional identity as Māori people raised in the Whakatōhea (see Prologue and Chapter 1).

The purpose of this research was to identify mātauranga Māori and tikanga Māori that have the potential to, when woven into algorithms, inform next-generation AI systems, that have the propensity to promote cultural well-being for our whānau and their futures.

A critical review of selected literature was undertaken to understand the dialectic between te ao Māori and AI (see Chapter 2). The eclectic methodologies according to Kaupapa Māori theorising were outlined to aid in the identification of potential issues confronted when undertaking this research. These methodologies justify the selection of specific methods and their suitability for understanding Māori in AI-related development and their beliefs and practices (see Chapter 3).

Following this, the findings are presented by addressing each question with supporting data. Subsequently, the aggregation of this data revealed critical elements and factors of transformation that would enable the promotion of cultural well-being for our whānau and their futures (see Chapter 4).

Finally, this research supported the conclusion that Māori can develop transformative practices of change that has the potential to decolonise imperial-dominated AI systems. The research provided an opportunity for further exploration around developing knowledge-sharing interventions to help understand the prominence of the Western perspectives and to confront contemporary AI-related issues for our whānau (see Chapter 5).

EXPERIENCES OF PRECARITY FOR MĀORI IN AOTEAROA NEW ZEALAND

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Socioeconomic precarity and in-work poverty are associated with increased exposure to ill-health and untimely death. Presently in Aotearoa New Zealand (NZ), there are many conversations in public discourse about the precariat, or people experiencing in-work poverty, and what “they” need. There are fewer conversations with households experiencing precarity to understand the insecurities they face in relation to inadequate incomes and associated insecurities in housing, food, and leisure, and how various policies designed by more affluent groups frustrate or improve their precarious situations.

Successive governments have continued to act without adequate dialogue with the precariat, with less than desirable outcomes. These outcomes are particularly stark for Māori who as a result of ongoing processes and the legacies of colonisation are overrepresented within the precariat. Understanding precarity for Māori from the perspectives of those who are directly impacted is imperative if we are to ensure policy measures are successful in preventing and alleviating in-work poverty.

This thesis contributes to current Indigenous efforts to theorise the contemporary and lived experiences of precarity for Māori. I have approached precarity as a cultural and economic assemblage that can be reassembled to enhance the lives of members of the precariat.

Speaking to methodological pluralism, I have employed a qualitative methodology of enhanced interviewing using mapping and photo elicitation guided by Kaupapa Māori (KM) praxis to enact this culturally centred approach that is informed by tikanga (protocols/customs) Māori.

Four consecutive engagements with one Cook Island Māori and nine Māori households (40 interviews in total) informed the development of various policy initiatives to address issues of precarity. Chapter 1 serves to historicise and situate the evolution of precarity within Aotearoa NZ: particularly for Māori.

Chapter 2 (Publication 1) reflects on this application of KM praxis to document and respond to the everyday experiences of households living in precarity in Aotearoa NZ. I outline the relationally ethical and community-engaged methodology informed by key cultural principles which I have employed in my research design and fieldwork. The findings inform my recommendations for policy which responds to household needs.

The third chapter (Publication 2) draws on assemblage theory to document the participants' everyday experiences of precarity and how policy initiatives emerge as key elements within the everyday lives of the precariat.

The fourth chapter (Publication 3) shifts the focus to householders' engagement in leisure as they cope with and respond agentively to situations of precarity. I document how core Māori principles and processes of whanaungatanga (cultivating positive relationships) and manaakitanga (caring for self and others) are foregrounded in household engagements in contemporary leisure practices.

Overall, this thesis contributes to current Indigenous theorising of precarity by providing insights into the lived experiences of the consequences of policy efforts to alleviate the multifaceted insecurities associated with household precarity. Recommendations to inform policy settings are outlined at the final discussion chapter.

TESTING NINE CRITICAL SUCCESS FACTORS FOR TRIBAL SELF-GOVERNANCE IN HEALTH CARE IN THE UNITED STATES

Dr Mara Kathleen Andrews
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This study examines a Critical Success Factor (CSF) Framework for Tribal Self-Governance (TSG) in health care, drawing on the experiences of Native American and Alaska Native Tribes in the United States. The research aims to validate, refine and critique this framework to support Indigenous development, including Tribal Self-Governance and self-determination in Aotearoa/New Zealand.

The study employed a mixed-methods approach, comprising documentary analysis, observation, literature review, and expert interviews (n=10). Member-checking interviews with U.S. Tribal Self-Governance practitioners provided additional validation. A deductive analytical framework based on the author's original CSFs guided the analysis, which broadly followed the U.K. National Centre for Social Research's Framework Analysis Model.

Results confirm the validity of the nine-factor CSF Framework, with refinements to sequence, content and structure. The factors were reorganised into three sets/stages: commitment and initiation, operationalisation, and sustainability to suggest a preferred order for those embarking on the Tribal self-governance developmental journey. The research process led to redefining the factors and prioritising them based on assessment of their relative importance and member feedback.

While no major omissions were identified by the research process, a critical analysis of study data provided some cautions and contextual issues for practitioners and governors to be aware of when implementing the framework.

The refined CSF Framework aligns favourably with Kaupapa Māori principles, and an implementation plan for the New Zealand context is proposed. This research contributes to our understanding of effective Tribal Self-Governance models and their potential application in diverse Indigenous contexts, including for indigenous Māori in New Zealand.

CHARACTERISING CG5846 (PEEP) IN DROSOPHILA MELANOGASTER NEURAL FUNCTION

Dr Sarah Jean Wilson
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Histone deacetylase 4 (HDAC4) is a transcriptional regulator that has been implicated in a number of neurodevelopmental and neurodegenerative diseases that are associated with intellectual disability, cognitive defects, and/or memory loss. Both the accumulation of nuclear HDAC4 and its loss-of-function have been linked to these conditions, therefore exploring HDAC4's role in neuronal function is essential to understand the molecular mechanisms underlying these diseases.

In *Drosophila*, overexpression of HDAC4 results in defects in morphogenesis of axons in the mushroom body, a structure essential for memory formation, as well as long-term memory defects and disruption to the development of the compound eye. The molecular mechanisms underlying these HDAC4-induced phenotypes are currently unknown. RNA-sequencing on fly heads in which HDAC4 was overexpressed has previously been performed and showed few genes were transcriptionally regulated by HDAC4. In addition, an enhancer/suppressor rough eye phenotype screen has also been performed which identified a number of genes that interact genetically in the same molecular pathway as HDAC4.

To further investigate the molecular mechanisms underlying HDAC4 dysfunction, an RNA interference (RNAi) based candidate screen for potential HDAC4-interactors was performed, which involved quantification of developmental defects in the

mushroom body and eye following RNAi knockdown of each candidate. It was hypothesised that if a phenotype resulting from RNAi knockdown was similar to that induced by HDAC4 overexpression, that candidate may function in similar molecular pathways. A single candidate-interactor was selected (CG5846, named Peep) for further investigation. On overexpression, Peep and HDAC4 co- distribute in nuclei of mushroom body neurons, however no physical interaction was detected. Furthermore, overexpression of Peep did not rescue the HDAC4-induced mushroom body or eye defects.

Due to the uncharacterised nature of Peep, a thorough investigation was performed to assess the importance of Peep in survival, longevity, motor function, brain development, courtship learning and memory, and wing development. Peep was observed to be essential for survival of glial cells and for normal mushroom body development, which warrants further investigation.

Reduced expression of Peep also resulted in a unique severe necrotic eye phenotype, and through this, Peep was shown to play a potential role in processes involved in regulating mitochondrial and proteasomal function, apoptosis and oxidative stress.

These data provide the first documented characterisation of the functional role of Peep in *Drosophila* development and provide the basis for further investigation into the underlying molecular mechanisms involved in mushroom body and eye development.

TRANSFORMING EARLY CHILDHOOD TEACHERS' PROFESSIONAL LEARNING AND DEVELOPMENT: A STUDY OF RESEARCH, PROVISION, AND POTENTIAL

Dr Linda Rose Clarke
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Effective professional learning and development (PLD) is recognised as a key mechanism to strengthen teachers' knowledge and pedagogical practice and improve the quality of education. However, PLD is not always effective for its intended purpose. Effectiveness depends on the match between the PLD approach, the participating teachers, and the desired outcomes. Although it is important to have a range of approaches to PLD, it is also important to be aware that different approaches will serve different purposes. In recent years, coaching has been increasingly evidenced as a PLD approach that supports teachers to develop knowledge and effectively implement new pedagogical practices. Yet, coaching is under-utilised and under-researched in the Aotearoa New Zealand early childhood education sector. The multiphase study in this thesis with publications investigated PLD in Aotearoa New Zealand early childhood education settings, with a focus on coaching as a component of the PLD. The research included a further focus on pedagogy to foster toddlers' social-emotional learning. There were three successive research phases, designed to investigate: 1) early childhood education PLD research literature; 2) the PLD provision that early childhood teachers have received

in recent years; and 3) a PLD coaching intervention to support early childhood teachers in their implementation of teaching practices to foster toddlers' social-emotional learning.

The first phase of the investigation was a study of PLD research. Preferred Reporting Items for Systematic Review and Meta-analyses (PRISMA) protocols were used to guide a systematic literature review of PLD research in the Aotearoa New Zealand early childhood education field. Fifty-six studies were reviewed with the intention of identifying key characteristics of the research, including how or whether coaching had been studied. The results identified Aotearoa New Zealand ECE PLD research as predominantly qualitative and descriptive, characterised by practitioner-researcher partnerships and models of PLD based on collaborative inquiry or action research. Overall, there was limited attention paid to how PLD interventions were implemented, including the strategies that facilitators used to support teachers' professional learning. There was limited attention to coaching. Within the studies that reported using coaching as a PLD component, there were multifarious coaching definitions and descriptions. Results of the systematic literature review suggest coaching is under-researched and possibly misunderstood in Aotearoa New Zealand early childhood education. The first research phase has identified a need for a stronger and more intentional focus on a range of PLD interventions and research, including who is involved, what content is covered, and how interventions are delivered.

The second research phase was a study of teachers' PLD experiences. A nationwide survey was completed by 345 early childhood teachers who answered questions about their recent PLD experiences. A key finding was that isolated workshops predominated as a PLD model. Many teachers also engaged in

reflective discussions with PLD facilitators, however, facilitation strategies that are associated with coaching, such as observation and feedback, were not common. Overall, the survey's findings indicate there is limited emphasis on PLD models that are designed to support teachers in their implementation of new pedagogical practices. The second research phase has identified a need to support teachers' and leaders' access to evidence-informed PLD that promotes shifts in teaching practice and fosters positive learning outcomes for children.

The third research phase was a study of coaching as a component of PLD. Practice-based coaching protocols were adapted for use in an Aotearoa New Zealand early childhood education setting, and a PLD intervention was developed. The PLD intervention combined practice-based coaching with workshops, with the intention of supporting a teaching team's implementation of teaching practices to foster toddlers' social-emotional learning. The relationship between the coaching and the implementation of teaching practices was analysed using single-subject multiple-baseline methods. The single-subject experiment demonstrated a functional relation between the PLD intervention and teachers' implementation of the social-emotional teaching practices. Results suggest that some teaching practices were maintained 9 weeks after the intervention, despite staff changes. The participating teachers were interviewed to seek their perspectives of the PLD and coaching. Teachers reported that coaching with a focus on social-emotional teaching was a positive experience that improved their teaching which, in turn, improved toddlers' social-emotional skills. The third research phase has foregrounded the potential of coaching to support and strengthen early childhood teaching. This phase has also identified pathways for further research into, and application of, coaching in the Aotearoa New Zealand early childhood sector.

The findings from this thesis with publications challenge current approaches to PLD, emphasising the need for a more coherent and informed approach. The unique professional learning needs of toddler teachers and the importance of PLD that effectively supports social-emotional teaching are highlighted throughout the thesis. Coaching is affirmed as a PLD approach to promote shifts in teaching, enabling teachers to implement new pedagogical practices. Numerous recommendations are made for further PLD research, provision, and potential for maximising positive outcomes. These recommendations include the development of a shared PLD definition and conceptual framework to support rigorous PLD research and application in Aotearoa New Zealand, and to support teachers and leaders to select and engage in PLD experiences that meet their needs. There is an identified need for further research that investigates how, why, and under what conditions PLD works. The thesis advocates for greater attention to evidence-informed and coaching-driven PLD. The research and recommendations within this thesis have been developed to advance and strengthen PLD systems and programmes in Aotearoa New Zealand early childhood education.

THE ‘PERFECT’ GAY MAN: AN EXPLORATION OF PERFECTIONISM WITH GAY MEN IN NEW ZEALAND

Dr Jessica Steadman
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This study explores the experiences of gay men in New Zealand who self-identify as perfectionists. The research had three aims: to explore how perfectionism is experienced throughout participants’ day-to-day lives, to understand how participants perceived their perfectionism to develop and change over time, and to investigate the self-perceived effects of perfectionism on participants’ relationships.

Recruitment of participants was conducted with the support and assistance of Lesbian, Gay, Bisexual, Transgender, Queer plus (LGBTQ+) organisations using the snowballing method. Six individuals who identified as male, gay and perfectionistic participated in semi-structured interviews. The data was analysed using interpretative phenomenological analysis, with participants’ voices located centrally throughout the research.

Participants’ accounts were integrated to form three overarching themes: Contributions to Perfectionism, Living with Perfectionism and Journey towards (Im)perfection.

It was found that most participants viewed their sexual orientation as contributing to the development of perfectionism, as they sought to compensate for not fulfilling heteronormative standards.

Further, participants reported that their perfectionism changed over their lifetime, shifting from being central to their identity to simply being a part of who they are. Participants also reiterated sub-themes related to both positive and negative effects of perfectionism, as well as increased acceptance of their perfectionism over time that mirrored their self-acceptance.

These findings challenge current understandings of perfectionism through the inclusion of wider societal and cultural impositions in the development of perfectionism. Further, the way in which participants reported that perfectionism has shifted for them over their lifetimes provides a unique understanding of perfectionism as being potentially changeable in nature.

THE WHĀNAU EXPERIENCE OF SUICIDE LOSS: WHAT CONTRIBUTES TO RESILIENCE AND WELLBEING?

Dr Amber McAllister
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The aim of this research was to explore and understand Māori whānau experiences of suicide loss and factors that increase resilience and wellbeing within this context.

Māori have the highest suicide rates in New Zealand, yet there is limited literature that focuses exclusively on Māori whānau bereaved to suicide. Furthermore, there is limited literature that views Māori suicide bereavement through a family/whānau resilience lens.

The present study took a Kaupapa Māori approach that validated Māori knowledge and tikanga and was cognisant of social structures and power imbalances that surround whānau.

Six whānau bereaved by suicide were interviewed, as well as five Māori key informants who have extensive experience working with whānau in their various roles within community mental health, mental health services, and suicide prevention.

Findings pointed to the ripple effect that a suicide has on a whānau and its members over the long term and intergenerationally. This is hindered by the stigma that is still evident in the dominant society and within Māori culture that creates a barrier to resilience and wellbeing. Resilience was enacted within whānau units, through

wairuatanga, and connection to Te Ao Māori and mātauranga Māori. The current formal support available did not adequately support whānau resilience and wellbeing. The findings have implications at a societal level and for therapists or services engaged in supporting suicide bereaved whānau.

RAPUA TE MEA NGARO: EXPLORING THE ACCESS OF MĀORI TO VETERINARY EDUCATION IN AOTEAROA NEW ZEALAND

Dr Eloise Katherine Puia Jillings
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Currently there is no research literature regarding the ethnicity of veterinary applicants, veterinary students, or the veterinary workforce in New Zealand. Recent unpublished data indicates only 2% of veterinarians identify as Māori, despite Māori comprising 16.5% of the New Zealand population. This PhD is the first step in addressing this gap and bringing to light the important issues of Māori representation and inclusion in veterinary education and subsequently the veterinary profession in New Zealand. The thesis has two overarching goals. The first is to explore how the access of Māori to veterinary education, and therefore the veterinary workforce, is influenced by sociodemographic factors under three separate admission processes. The second is to explore the impact of sociodemographic factors and academic achievement prior to admission on the academic success of Māori once selected into the program.

The studies in this thesis were conducted with Kaupapa Māori research positioning. The thesis presents a quantitative analysis of veterinary applicant and selected student data from 2003 to 2019. Descriptive statistics and linear and logistic regression are utilised to explore the representation of Māori in the veterinary applicant and selected student cohorts, the association of sociodemographic

variables and selection assessments, and academic outcomes of Māori and non-Māori once selected.

From this thesis it has been shown that Māori were underrepresented in the veterinary applicant pool and experienced more educational barriers than non-Māori. Māori are also underrepresented in the selected student cohort, and had 0.37 times the odds of selection than non-Māori prior to introduction of an equity process for Māori student selection. Scores on five of the six selection assessments were associated with ethnicity, with Māori receiving lower scores. However, once selected into the veterinary programme, there was no difference in the academic outcomes of Māori and non-Māori. Introduction of the equity process for Māori was not associated with a decrease in academic outcomes post-selection, and introduction of non-academic criteria into the selection process was associated with an improvement in academic outcomes.

The veterinary profession is not representative of New Zealand. Māori underrepresentation is also seen in the veterinary applicant and selected student cohorts. This needs to be addressed for reasons of Indigenous rights, social justice, social mobility, and to ensure the veterinary profession benefits from Māori worldviews and therefore is relevant to a growing Māori population. Enacting initiatives aimed to widen access to the veterinary programme, with the eventual goal of improving representation of Māori in the veterinary workforce, needs to be a priority for Massey University, the sole provider of veterinary education in Aotearoa, and the wider profession.

PERFORMING PŪRĀKAU: LIBERATING BODIES, HEALING WAIRUA, AND RECLAIMING ANCESTRAL WISDOM

Dr Helen Pearse-Otene
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Studies by government agencies and advocacy groups report that Māori women and children are more vulnerable to experiencing family violence, sexual abuse, and incest than Pākehā. They acknowledge colonisation and historical trauma as contributing factors, and call for a systems-focused response to tackling sexual violence. This includes providing access to contextually responsive and culturally appropriate interventions.

This study initially aimed to explore traditional Māori understandings of incest and healing from sexual trauma that are embedded in the pūrākau (ancestral story) of Hinetītama/Hinenui Te Pō, and her parents, Hineahuone and Tānemahuta.

As it would apply a unique Māori theatre pedagogy called Theatre Marae, the project was then expanded to investigate the utility and potential of this innovative approach, which draws together Māori and non-Māori performance traditions, therapeutic models, Māori language, and customs in a process for creative inquiry.

In pursuing these two activities, the resulting thesis comprises three publications. In the first article (chapter 2), I unpack the conceptual framework of Theatre Marae pedagogy as a suitable approach for kaupapa Māori (by Māori, for Māori) arts-based research against

the backdrop of growing scholarship in Indigenous research and psychologies.

In the second article (chapter 3), I deepen this exploration into Theatre Marae and its core methods within an historical account of the theatre company most associated with the practice, Te Rākau.

The third article (chapter 4) builds on the preceding chapters by returning to the initial focus of this study and describing how Theatre Marae was applied in a performance-based analysis of this ancient pūrākau as a narrative of survival and healing.

The analysis revealed new themes that highlight the collectivist customs of traditional Māori society as protective factors against the proliferation of sexual violence and incest. When drawn together in this thesis, these articles and contextualising discussion illustrate how Māori ancestral knowledge can inform the development of more culturally responsive therapies for recovery from historic sexual trauma.

Furthermore, in presenting Theatre Marae to the realm of kaupapa Māori research, this thesis contributes to an international agenda to decolonise research in ways that are emancipatory, healing, and transformative for Indigenous communities.

RISK FACTORS, WORK-RELATED STRESSORS AND SOCIAL SUPPORT FOR AMBULANCE PERSONNEL IN NEW ZEALAND: AN EXPLORATION OF ORGANISATIONAL AND OPERATIONAL STRESSORS AND THE IMPORTANCE OF PERCEIVED SOCIAL SUPPORT

Dr Tayla Reti
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Ambulance personnel have one of the most stressful jobs across a wide range of occupations, and frequently experience operational and organisational stressors and are exposed to an increased level of traumatic events. As a result of these work-related stressors, ambulance personnel can experience psychological distress, specifically, posttraumatic stress symptoms (PTSS) and depression. A frequently researched coping strategy used to protect against psychological distress is social support. Thus, this research provides an exploration of work-related stressors, psychological distress and the impact social support can have on psychological distress for New Zealand ambulance personnel.

A total of 183 ambulance personnel participated in the current research by completing an online survey. The final sample consisted of 125 ambulance personnel. Results showed that direct traumatic exposure, organisational stressors, male gender, and perceived support significantly associated with psychological distress. Operational stress did not relate to psychological distress, and organisational stress was more strongly related to depression.

Perceived social support predicted both depression and PTSS, whereas received support did not predict either type of psychological distress. Perceived support was mildly associated with received support, depression and all three sources of support (spouse/family, colleagues and supervisors). Received support was not associated with either type of psychological distress, although did show a relationship with spouse/family support and supervisor support. Spouse/family support was perceived as the strongest source of support, followed by colleague support and lastly supervisor support. Social support did not impact the relationship between direct traumatic exposure and PTSS. Implications of these results are discussed.

This research contributes to the literature focused on work-related stressors, and perceived support, highlighting the important impact both organisational stressors and perceived support can have on ambulance personnel. It is hoped that conclusions drawn from this research will have beneficial implications for ambulance personnel, their families and the organisations in which they work in.

MĀORI, CATHOLIC, EDUCATION IN AOTEAROA NEW ZEALAND

Dr Vicky Lawson
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This thesis investigates Māori participation in Catholic education in Aotearoa New Zealand. The purpose of this study is to provide a specific understanding on the Māori perspective of Catholic education, that involves the identification of cultural values and beliefs in relation to Māori practices of tikanga. The intention of this thesis is not to suggest how Catholic educational institutions of Aotearoa New Zealand should govern, manage, or operate themselves. Rather, it provides a snapshot of the Māori Catholic perspective of ‘tika’ or rightness.

With the vast majority of Catholic primary and secondary schools legislated as State-integrated schools under the Private School Conditional Integration Act, 1975, the Roman Catholic Church has an obligation to monitor the reasonable steps that school boards, proprietors and diocese education offices are taking to ascertain and consider the views and concerns of Māori communities (Education Act, 1989).

Both historical and contemporary trends and patterns are analysed in this thesis, including legislation and State policy, in order to identify the reasons why there is a disconnection between Catholic educational policies and the educational aims of and for Māori. Major educational policies are reviewed alongside the wider political ideologies in order to illustrate the connections between the position of Māori in Aotearoa New Zealand and the likelihood that the educational aspirations of Māori will be met.

A life history approach using oral narratives was used to examine the reality of the participants' lives growing up, being educated, and navigating through the dual worlds of Te Ao Māori (Māori world) and Te Ao Katorika (Catholic world). This approach adds a personal element that brings life to the findings.

INJURY INCIDENCE AND PHYSIOLOGICAL REQUIREMENTS OF A DOMESTIC AMATEUR WOMEN'S RUGBY UNION TEAM IN NEW ZEALAND

Dr Douglas King
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Women's rugby union has undergone a period of transition to become, reportedly, the fastest growing form of the game worldwide. Although the game is played nationally and internationally, it was not until 1991 that the first Rugby World Cup for women (RWC(W)) was held. Despite increased popularity and growth, the published studies investigating the epidemiological aspects of match and training in women's rugby union is limited. Of the published studies to date, none have reported on aspects related to women's rugby union participants in New Zealand. Therefore, the overall aim of this thesis was to explore and document the epidemiology of injuries in an amateur women's rugby union team in New Zealand. As fatigue has been indicated as a possible injury risk factor, the physiological demands of match participation in amateur women's rugby union were also assessed.

Specific aims of the thesis were (1) The identification of the physiological and heart-rate demands of match participation for amateur women rugby union players; (2) The identification of the most common site, type, severity, and frequency of injuries that occur to women in rugby union training and match related activities (Systematic Review); (3) The identification of the most

common site, type, severity, and frequency of injuries that occur to women in rugby union training and match related activities in New Zealand. The methodological approaches utilised in this thesis included an epidemiological analysis (Chapter 3), and a prospective observational cohort analysis (Chapters 2, 4 and 5).

In measuring the movement demands of amateur domestic women's rugby union (Chapter 2), player movements were monitored using microtechnology GPS devices. Players' heart rates were also continuously monitored during match participation using a portable monitor. A mean total distance per match of $3,546.6 \pm 1,329.2$ m was recorded over 28 matches. This resulted in a mean distance of 38.3 ± 13.7 m.min⁻¹ which was less than women's football (79.3 to 118.0 m.min⁻¹: mean 101.0 ± 11.9 m.min⁻¹), hockey (79.0 to 115.0 m.min⁻¹: mean: 98.5 ± 15.6 m.min⁻¹) and women's elite rugby union (54.8 to 68.0 m.min⁻¹; mean: 61.4 ± 9.3 m.min⁻¹). Although Forwards recorded a lower total distance ($3,409.7 \pm 1,201.9$ m vs. $3,692.3 \pm 1,440.5$ m) and m.min⁻¹ (36.7 ± 12.4 m.min⁻¹ vs. 40.0 ± 14.9 m.min⁻¹) than Backs, they had a similar player-load (PL) (3.8 ± 1.3 au.min⁻¹ vs. 3.9 ± 1.4 au.min⁻¹), PL 2-dimensional (2.9 ± 1.0 au.min⁻¹ vs. 2.9 ± 1.1 au.min⁻¹), PL Forward (1.8 ± 0.7 au.min⁻¹ vs. 1.7 ± 0.7 au.min⁻¹), PL side (1.9 ± 0.7 au.min⁻¹ vs. 1.9 ± 0.7 au.min⁻¹) and PL vertical (2.9 ± 1.0 au.min⁻¹ vs. 3.0 ± 1.2 au.min⁻¹) when compared to Backs. Forwards recorded a higher maximum heart rate than Backs (191 b.min⁻¹ vs. 188 b.min⁻¹), indicating a higher cardiovascular stress and physiological strain for Forwards compared with Backs. The results of this study suggested that the physical and physiological profile of the playing group, at the amateur domestic level of women's rugby union, were quite similar and may be suggestive of generalised, rather than specialised, training regimes that fail to prepare players for the position specific demands needed at higher levels of competition.

The systematic review (Chapter 3) of literature reporting on women's rugby union incorporated both rugby-15 and rugby-7s match and training related published studies. Only 10 articles identified through systematic searches of PubMed, SPORTDiscus, Web of Science Core Collection, Scopus, CINAHL(EBSCO) and ScienceDirect databases using keywords were included in the review. The incidence of injuries in rugby-15s varied from 3.6 (95% CI: 2.5-5.3) per 1,000 match-hr (including training and games) to 37.5 (95% CI: 26.5-48.5) per 1,000 match-hr, with a pooled incidence of 19.6 (95% CI: 17.7-21.7) per 1,000 match-hr. For rugby-7s, the injury incidence varied from 46.3 (95% CI: 38.7-55.4) per 1,000 match-hr to 95.4 (95% CI: 79.9-113.9) per 1,000 match-hr with a pooled incidence of 62.5 (95% CI: 54.7-70.4) per 1,000 player-hr. The tackle was the most commonly reported injury cause, with the ball carrier recording more injuries than the tackler at the collegiate, and RWC(W) levels of participation. Concussions and sprains/strains were the most commonly reported injuries at the collegiate level of participation. The incidence of injury in women's rugby-15s and rugby-7s was lower than in men's professional rugby-15s and rugby-7s competitions, but similar to male youth rugby-15s players. Differences in reporting methodologies limited comparisons of results between studies. Of note, the systematic review failed to identify any New Zealand based studies in women's rugby union.

A key finding of the systematic review was that there were no women's rugby union training-specific studies identified. By conducting a prospective cohort observational study on the training sessions of an amateur women's rugby union team, over two-years (Chapter 4), it was identified that the total injury incidence was 11.4 (95% CI: 8.3 to 15.6) per 1,000 training hrs. There were 12 injuries that resulted in a time-loss injury incidence of 3.6 (95% CI: 2.0 to 6.3) per 1,000 training-hrs. The tackle was the

most common cause for total (3.0 [95% CI: 1.6 to 5.6] per 1,000 training-hrs.) injuries, but collisions (1.5 [95% CI: 0.6 to 3.6] per 1,000 training-hrs.) with the ground or another person were the most common cause for time-loss injuries. The training injuries occurred most often to the lower limb and during the latter part of training sessions. These injuries were mostly minor in nature, resulting in minimal time-loss away from training. The time-loss injury incidence (3.6 [95% CI: 2.0 to 6.3] per 1,000 training-hrs.) for the amateur women's rugby 15s team players was higher than that reported for National (1.2 [95% CI: 0.4 to 3.1] per 1,000 training-hrs.) and RWC(W) (0.2 [95% CI: 0.0 to 2.2] to 3.0 [95% CI: 1.8 to 5.0] per 1,000 training-hrs.) competitions.

The incidence of match injuries (Chapter 5) was conducted utilising a prospective cohort observational study on an amateur women's rugby union, over two consecutive seasons. A total of 138 injuries were recorded resulting in an injury incidence of 247.0 (95% CI: 209.1 to 291.9) per 1,000 match-hrs. A total of 57 injuries resulted in a time-loss injury incidence of 102.0 (95% CI: 78.7 to 132.3) per 1,000 match-hrs. Although Forwards (261.8 [95% CI: 209.7 to 326.9] per 1,000 match-hrs.) recorded a higher total injury incidence than Backs (230.2 [95% CI: 178.7 to 296.4] per 1,000 match-hrs.), Backs recorded higher time-loss injury incidence (107.4 [95% CI: 74.2 to 155.6] per 1,000 match-hrs.) than Forwards (97.3 [95% CI: 67.6 to 140.1] per 1,000 match hrs). The lower limb sustained the highest injury incidence, with the knee having the greatest proportion of these injuries for both total (48.3 [95% CI: 33.1 to 70.5] per 1,000 match-hrs.) and time-loss (21.5 [95% CI: 12.2 to 37.8] per 1,000 match-hrs.) injuries. Sprains and strains recorded the highest incidence of all the injuries recorded and the lower limb body region recorded the most days lost and had the highest mean days lost per injury. The incidence of concussion (16.1 [95% CI: 8.4 to 31.0] per 1,000 match-hrs.) over the study

was higher than previous studies reporting on women's rugby union at the RWC(W) (3.5 [95% CI: 1.7 to 7.0] per 1,000 match hrs) and collegiate rugby union (1.6 [95% CI: 1.1 to 2.3] per 1,000 player match-hrs.) levels of participation. The tackle was recorded as being the most common injury cause and this was expected. Upon further analysis, it was identified that the action of being the ball carrier, rather than the tackler, during a tackle situation was associated with a notably higher injury incidence than any other match event. Future research is warranted to identify risk factors involved in the tackle unique to women participants.

This PhD thesis has contributed knowledge regarding the incidence of injuries in amateur women rugby union players in New Zealand which has not been undertaken before. In addition, this PhD thesis has contributed further knowledge regarding the physiological demands of amateur women's rugby union match participation (see Chapter 6).

NEW ZEALAND DEFENCE FORCE NURSING OFFICERS' NAVIGATION OF PROFESSIONAL ACCOUNTABILITIES AND ROLE EXPECTATIONS: AN EXPLORATION INFORMED BY FOUCAULDIAN CONCEPTS

Dr Maree Sheard
PhD (2021), Massey University

Nurses in armed forces are responsible to their defence employers for meeting the expectations of their roles, but they also are accountable to nursing regulatory authorities for maintaining the standards expected of members of the nursing profession. Inherent dichotomies exist for those delivering healthcare in defence forces which are known to create challenges for nurses. This research examines the previously unexplored ways in which nurses serving in the New Zealand Army navigate their dual responsibilities. A qualitative approach was employed in the study using information provided by 11 experienced serving and immediate past members of the Royal New Zealand Nursing Corps. Foucauldian theoretical concepts underpinned a thematic analysis to reveal patterns in the techniques used by this group of military nurses to maintain professional standards whilst performing their roles.

Complex interactions between a range of New Zealand Defence Force policies and nursing practice behaviours were found to impact upon the decisions that military nurses make and the degree of autonomy they possess. Institutional governmentalities drive

a focus on combat ideologies and competition which for nurses, compels the suppression of interprofessional collaboration and affects the maintenance of nursing competence. Efforts by nurses to prioritise patient wellbeing and to comply with international humanitarian law are factors in the marginalisation of nurses. Ways in which nurses work to counteract the subordinating effects of an historic but enduring discourse of nurses not being needed has a consequence in that when nurses are needed, they may not be clinically prepared to deliver the care required. Paradoxically, the importance of nurses being operationally deployable positions those who work in clinical practice as holding higher status than more senior ranking nurses who work in management and leadership.

This study found that nurses monitor practice environments to ensure that leadership in care delivery follows a congruent model and not the organisationally endorsed transformational leadership style. Consequently, military nurses vociferously resist any perceived interference by general military personnel into professional nursing domains. Problematisation of nursing in the Army can delay nurses' transition into the organisation but ultimately serves to motivate the construction of a strong military nurse identity.

PROMINENT NEW ZEALAND FLAGS AND CHANGING NOTIONS OF IDENTITY

Dr Malcolm Mulholland
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Prominent flags have played an important role in signalling and generating collective identities in New Zealand's history, but to date there has been little scholarly research in this field.

This thesis investigates factors that have shaped attitudes towards prominent flags in New Zealand, and to what extent have they changed over time. It does so with reference to their role in promoting national identity in general, as well as investigating the role of flags in Māori communities. As such, there is also a particular focus on the role of flags acting as symbols of unity and dissent.

The thesis argues that flags were adopted early by Māori and have continued to reflect a spectrum of Māori identities; that transnational influences are present regarding prominent flags in New Zealand, especially the influence of Australia; that the New Zealand Flag and Union Jack reflect a dual identity and a period of New Zealand identity coined as 'recolonization'; that the New Zealand Flag is an example of an 'invented tradition' that was particularly prominent in arguing against changing the New Zealand Flag during the 2015/2016 flag referenda; and finally, it argues that New Zealand could be identified as a 'teenager' of 'Mother Britain', given the increasing number of citizens who are comfortable replacing the current New Zealand Flag.

GETTING INSIGHT INTO THE WELLBEING NEEDS OF MĀORI YOUTH: PERSPECTIVES OF STUDENTS ATTENDING ALTERNATIVE EDUCATION

Dr Madeleine Amy Haerewa
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This research seeks to explore the wellbeing needs of rangatahi Māori (Māori youth) who attend alternative education (AE) in New Zealand (NZ). Rangatahi Māori have a significant disadvantage compared to non-Māori due to disparities in educational attainment and mental health standing. Rangatahi Māori who attend AE are at an even greater disadvantage as they have been excluded from mainstream education, and in attending AE, are identified as a population of youth displaying the highest proportion of health-risk behaviours in NZ. This research produces evidence that holistic approaches to wellbeing are needed to improve outcomes for rangatahi Māori.

The study develops a methodological framework for a Māori-centred research praxis, using pūrākau as a form of narrative inquiry and photo-elicitation as an ancillary tool in facilitating rangatahi Māori voices. Both rangatahi Māori and their AE tutor's perspectives are collected through kanohi-ki-te-kanohi (face-to-face interviews) and focus groups. Key findings identify a range of wellbeing needs for rangatahi Māori, in their whānau (family), school and personal life, after they have navigated mainstream education and are placed within AE environments. Findings demonstrate the importance of rangatahi Māori feeling connected in their relationships and with their environment. This includes

relationships with their whānau, tutors, romantic relationships, friendships and connection to their school environment. Rangatahi Māori need to have positive connections with the people in their life and their environment to best support their wellbeing. Findings indicate that whānau-like environments within AE promote school engagement. Furthermore, rangatahi Māori are advantaged when their connections and networks in the greater community are facilitated through their whānau-like relationships within AE. This thesis contributes new knowledge about the wellbeing needs of rangatahi Māori and concludes that a wider pūnaha hauropi (socio-ecological system) approach should be considered to optimise the wellbeing of rangatahi Māori who have or are at risk of experiencing school disenfranchisement.

FUNCTIONAL BIODIVERSITY OF NEW ZEALAND'S MARINE FISHES VERSUS DEPTH AND LATITUDE

Dr Elisabeth Myers
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Understanding patterns and processes governing biodiversity along broad-scale environmental gradients requires an assessment of not only taxonomic richness, but also morphological and functional traits of organisms. The deep sea is the largest habitat on earth and provides many important ecosystem services. Decreases in light, temperature, and trophic resources, along with increases in pressure that occur with greater depth, renders the deep sea one of the most constraining environments for supporting life. However, little is known about how biodiversity, and especially functional biodiversity, changes along the depth gradient. This thesis aimed to fill this gap by using a combination of traits associated with food acquisition and locomotion to quantify and characterise patterns of functional diversity across large-scale depth and latitude gradients and to investigate potential mechanisms driving biodiversity.

First, to identify the major selective forces acting on morphology, I documented patterns of variation in the traits of fishes at broad spatial scales. I found that with increasing depth, fishes, on average, became larger and more elongate, and had a larger oral gape and eye size. With increasing depth, fish morphology shifted towards body shapes that enable energy-efficient undulatory swimming styles and an increased jaw-length versus mouth width to aid opportunistic feeding.

Second, I investigated the role of environmental filters versus biotic interactions in shaping the functional space of communities along depth and latitude gradients by measuring the intra- and inter-specific richness, dispersion and regularity in functional trait space. I found that functional alpha diversity was unexpectedly high in deep-sea communities, but decreased with increasing latitude, and that competition within and among species shaped the multi-dimensional functional space for fishes at the local alpha diversity level.

Third, I described spatial patterns in functional beta diversity for New Zealand marine fishes versus depth and latitude, and delineated functional bioregions. The functional turnover in fish communities was greater across depth than latitude, and latitudinal functional turnover decreased with increasing depth. I surmise that environmental filtering may be the primary driver of broad-scale patterns of beta diversity in the deep sea.

Overall, this thesis contributes new knowledge regarding broad-scale functional biodiversity patterns across depth and latitude via the morphological and functional traits of New Zealand's marine fishes. Through the measurement of individual trait variation, and the quantification of functional alpha and beta diversity, this thesis characterised variation in the traits of fishes over large spatial scales, determined the spatial turnover of functional traits, and described the relative importance of environmental versus biotic drivers in shaping the functional space of deep-sea communities. These contributions provide foundational understanding for future research on the functional diversity of marine fishes, biodiversity patterns across the depth gradient, and the monitoring of biodiversity change across New Zealand's latitudinal and depth gradients.

MĀ TŌ TĀTOU WHANAUNGATANGA E WHAKATAKI I TE RITENGA TIKA: MĀORI MENTAL HEALTH SERVICE ENGAGEMENT: A NARRATIVE WOVEN BY TĀNGATA WHAIORA, WHĀNAU MEMBERS, AND MĀORI KAIMAHI

Dr Amelia Jade Backhouse-Smith
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Uplifting Māori mental wellbeing is a priority in Aotearoa with major national studies revealing Māori experience persistent and growing disparities in mental health outcomes. Notably, the mental health sector lacks explanations for the significant finding that Māori seek less help from mental health services despite the prevalence of psychological problems.

Following a Kaupapa Māori Research approach, this research sought to understand why service engagement was incommensurate with mental wellbeing needs among pakeke Māori and offer recommendations for how mental health practice could evolve to address this outcome. Semi-structured interviews were carried out with five tāngata whaiora, three whānau members, and four Māori kaimahi. The perspectives of these three rōpū were privileged as they reflected those with lived experience of engaging with, or carrying out mahi in, mental health services. Interview kōrero was analysed and developed into themes using thematic analysis. The collective perspectives of tāngata whaiora, whānau members, and

Māori kaimahi were integrated within a narrative about how mental health care experiences influenced Māori service engagement.

Findings spoke to the importance of practicing within Te Ao Māori which involved upholding tikanga and mātauranga Māori, acknowledging cultural identity, facilitating reconnection with Māoritanga, and being whānau-centred in mental health care; developing genuine and meaningful relationships with tāngata whaiora and whānau; encouraging openness, support, and literacy around mental wellbeing; empowering Māori voices in assessment and intervention; and appropriate mental health sector resourcing. This research can help the mental health sector begin to understand why Māori seek less help from services and provide culturally and clinically responsive solutions for how mental health practice can support and improve service engagement to uplift Māori mental wellbeing.

“IT’S HARD BEING A YOUNG PARENT, IT’S EVEN HARDER BEING A YOUNG MĀORI PARENT”: YOUNG MĀORI PARENTS’ EXPERIENCES OF RAISING A FAMILY

Dr Felicity Ware
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Young Māori parents play a significant part in growing the indigenous population of Aotearoa New Zealand and helping to raise the country’s future. Despite Māori only being about 15 percent of New Zealand’s total population, about half of all young parents in this country are Māori. While parents at any age may require support, being young and Māori while also needing support may present additional challenges. The disproportionate representation of young parents and of Māori in socioeconomic disadvantage has dual implications. These disparities fuel a deficit understanding of early parenting, indigeneity, and requiring assistance. The ongoing impacts of colonisation and racism further exacerbate these disparities and marginalise Māori.

This research examines the historical, cultural, political and social contexts that influence early parenting for Māori. Key principles of Māori research, oral traditions and narrative inquiry were employed to explore the distinct experiences of young Māori parents. Māori principles were implemented throughout all of the research process; in the design, methodology and organisation of the research. A Māori narrative approach was developed to gather, present and analyse the perspectives of 19 young Māori parents from the Manawatū, New Zealand about support during pregnancy,

birth and parenting. Their stories were examined using a Māori analytical framework. This approach identified interrelated layers of *kōrero* (story) that revealed how young Māori parents construct their own changing identity and contextualise their stories within significant relationships, a Māori worldview, and society. A cross-examination of their *kōrero* revealed that their experiences were also shaped by what it means to be a young person, a young parent, Māori and from disadvantage. This Māori narrative approach revealed a more complex and nuanced understanding of the interrelatedness and influence of societal expectations, indigeneity, Māori culture and *whānau*, on personal experience.

The findings of the research demonstrate that support for young Māori parents in Aotearoa New Zealand is constrained by prevailing and intersecting ideas about being young, early childbearing, Māori identity and receiving welfare. For example, young Māori women are framed as more likely to become pregnant at a young age, have their education disrupted, require welfare assistance, and pass on socioeconomic disadvantage to their children. This deficit perception of their parenting potential is perpetuated in many different ways in society. This stigma and stereotyping has real consequences for the way young Māori parents construe their experience of parenting and how they are supported. This thesis discusses the consequences of deficit-based research, government rationalities for welfare provision, and the potential role of *whānau*.

The *kōrero* from the young Māori parents resisted the assumptions that having a child at a young age and being Māori contribute to negative outcomes. As Māori they could draw on counter narratives about early parenting that may not be available to non-Māori. Māori understandings of reproduction, raising children and *whānau* celebrate a new baby as an extension of *whakapapa* (genealogy) and do not necessarily frame the age of the parents as

an issue. However, young Māori parents also felt that taking up a Māori identity meant that their parenting was subject to increased scrutiny and there was added pressure to prove themselves as competent parents. Young Māori parents continuously navigate the tension between Māori beliefs and societal expectations in their own accounts of raising children. Whilst dominant narratives constrain whether they are treated as a suitable parent, Te Ao Māori beliefs help them to feel valued in their role as whakapapa nurturers and contributing whānau members.

Support for young Māori parents would be helped by the authentic promotion of Māori knowledge, practices, language, identity and experiences associated with pregnancy, birth and parenting guaranteed in Te Tiriti o Waitangi and the United Nations Declaration of the Rights of Indigenous Peoples. Privileging the lived experiences of young Māori parents, such as those included in this thesis helps to critically deconstruct the negative assumptions about young parents and Māori, particularly those who are overrepresented in requiring assistance. The findings of this research are relevant to all people responsible for the outcomes of young Māori parents and will help to inform better research, policy and practice. Government, community, health and supporting professionals, iwi, and whānau all have important roles in supporting young Māori parents to develop positive identities, to reach full potential and to raise their children.

MĀORI WAYS-OF-BEING: ADDRESSING CULTURAL DISRUPTION THROUGH EVERYDAY SOCIO-CULTURAL PRACTICES OF [RE]CONNECTION

Dr Pita Richard Wiremu King
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Within the discipline of psychology, many Indigenous scholars have endeavoured to rethink and re-theorise the foundations, focus, and methods used in an effort to construct psychologies that are more reflective of their own cosmologies and contexts.

The presented thesis contributes to this Indigenous project by exploring the ways in which the ruling psychology of our times, and its underlying philosophical assumptions, can disrupt Indigenous peoples' attempts to articulate our own understandings of being.

Drawing on emic and etic approaches and grounded within Kaupapa Māori approach, this thesis engages with the complexities of what it means to be Māori today through two theoretically-focused articles (chapters 2 and 3) and two community-based publications (chapters 4 and 5).

In the first article (chapter 2), I decentre the dominance of ruling psychology by challenging the idea of a single disciplinary space within the discipline and introduce the notion of multiple sphericules that carry numerous cultural philosophical perspectives that combine to make up the discipline of psychology. Building on these ideas in the second article (chapter 3), I contribute to efforts to theorise Māori ways-of-being by drawing on Māori cultural

understandings and associated literature, ideas from the European continental philosophical tradition, and personal reflections.

Taken together, chapters 2 and 3 carve out conceptual space within psychology that is then explored through culturally immersive and auto-ethnographic techniques in chapters 4 and 5. Specifically, chapter 4 is set within the context of the low socio-economic urban landscape in which I grew up. Chapter 5 speaks more to issues of [re]connecting with ancestral homelands, communities, and ways-of-being. In chapters 4 and 5, I document how Māori cultural selves are preserved amidst histories of colonisation and urbanisation by paying particular attention to the role of culturally-patterned social practices evident in the conduct of everyday life.

Overall, this thesis contributes to present understandings of the ongoing development of Māori subjectivities that often shift in response to the socio-cultural conditions and structural inequalities that many of our communities continue to face. This thesis provides some insights into how urban Māori, such as myself, construct and reproduce novel, creative, and culturally grounded strategies for dealing with the disruptions that have come with colonisation. These efforts work to strengthen and preserve cultural connectedness and distinct Māori ways-of-being.

NEW PATHWAYS TO OBESITY PREVENTION AND METABOLIC HEALTH: THE RELATIONSHIP BETWEEN DIET AND THE GUT MICROBIOME

Dr Nikki Renall
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Diet is one of the key drivers of the global obesity epidemic. Based on the results of rodent experiments, the gut microbiota may play an important role in this multifaceted disease. Additionally, the microbiota is known to be influenced by the habitual diets consumed by humans.

The aim of this PhD research was to characterise the habitual dietary intake of two New Zealand populations (Pacific and New Zealand European (NZE) women) with different metabolic disease risk and body fat profiles (lean and obese). The first objective of the research was to explore the relationship between habitual macronutrient intake in relation to body fat content and metabolic health markers. The second objective was to characterise a posteriori dietary patterns (derived from multiple days of dietary assessment) and to explore the association with body fat content and metabolic health markers. The third objective was to explore the characteristics of microbiota composition in relation to habitual diet (dietary patterns, foods, and nutrients), body fat content and metabolic health markers.

Between July 2016 and September 2017, Pacific (n=126) and NZE (n=161) women, aged 18-45 years, living in Auckland, New

Zealand, were recruited to a cross-sectional study, based on their body mass index (lean and obese) and stratified as having low (<35 % body fat) or high (≥ 35 % body fat) body fat percentage (BF%). Dietary intake was assessed using a 5-day estimated, non-consecutive, food record and a validated semi-quantitative food frequency questionnaire, which were used to calculate habitual dietary intake using the National Cancer Institute (NCI) method. Body composition and BF% were assessed by dual-energy x-ray absorptiometry. Fasting blood samples were analysed for metabolic biomarkers (lipid and glucose profiles). Bulk DNA was extracted from faecal samples and the metagenomic sequences associated with the microbiota were analysed using MetaPhlAN and QIIME2 software. Enterotypes characterising the microbiotas of the participants were predicted in R and the species that defined enterotypes were determined using STAMP software. *A posteriori* dietary patterns were identified using principal component analysis. Adjusted multivariate regression models were conducted to explore the association between BF% and habitual macronutrient intake and adherence to dietary patterns, as well as the association between microbiota composition and habitual diet.

There were no significant differences in BF% between Pacific and NZE women ($p=0.498$). Higher energy adjusted habitual dietary fibre (DF) intake was associated with lower BF% ($\beta = -0.35$, $p \leq 0.001$) for both Pacific and NZE women, and this relationship became stronger after further adjustments for protein (g/day), total carbohydrate (g/day), and total fat (g/day) intake ($\beta = -0.47$, $p \leq 0.001$). Women in the highest tertile of DF intake were older, had lower concentrations of fasting plasma insulin, and lower socioeconomic deprivation levels. Four dietary patterns that explained 30.9 % of the observed variance in habitual diet were identified. Higher adherence to dietary patterns characterised by core foods (the “colourful vegetable, plant protein, and dairy”

and “fruit, starchy vegetables, and nuts” patterns) were inversely associated with BF%. In contrast, patterns characterised by more ‘discretionary’ foods (“sweet and fat rich carbohydrate”) and less diversity of core foods (“animal meat and fat”) were positively associated with BF% for both Pacific and NZE women. Three enterotypes were identified by higher relative abundance of specific bacterial species: enterotype 1 was characterised by Pacific and NZE women (n=146) and the abundances of *Faecalibacterium prausnitzii* and *Eubacterium rectale*. Enterotype 2 (n=70) was characterised by Pacific women.

Bifidobacterium adolescentis, *Bifidobacterium bifidum*, and *Lactobacillus ruminis*; and by higher BF%, visceral adipose tissue, and concentrations of fasting insulin. Enterotype 3 (n=70) was predominately found in older NZE women with lower deprivation, and characterised by *Akkermansia muciniphila*, *Ruminococcus bromii*, *Subdoligranulum species*, and *Methanobrevibacter smithii*. Adherence to the “colourful vegetables, plant protein, and dairy” dietary pattern was positively associated with enterotypes 1 and 3 and negatively with enterotype 2.

Consuming more core foods rich in dietary fibre was associated with enterotypes 1 and 3, including lower adiposity and metabolic disease risks. In contrast, consuming more discretionary foods was associated with enterotype 2, higher adiposity and metabolic disease risks. This PhD research highlights habitual diet-microbiota-host associations, which are similar for a population of women with different metabolic disease risk, body fat profiles, and deprivation levels. Whether the microbiota is a cause or consequence of metabolic health has yet to be elucidated. However, habitually consuming more core foods rich in dietary fibre is associated with microbiota composition, and lower metabolic disease risks.

TE KETE TUA-ĀTEA, MĀORI MODELLING OF THE FUTURE AND THE KAITIAKITANGA OF WATER

Dr Mahina-a-rangi Baker
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This research arose from the experience of our iwi, Te Āti Awa ki Whakarongotai, struggling to control the future trajectory of the health of our water and the health of our people. We came to recognise that our political aspiration to realise our tino rangatiratanga in relation to water was strongly dependent on our knowledge capability, in particular, our capability to identify, examine and communicate the likely effects of future scenarios on our water.

The aim of this thesis was to propose and operationalise a mātauranga Māori framework and futuring tools that iwi can apply in decision-making to assist them in realising the futures they wish to see for water systems.

Ngā Kete o te Wānanga has been presented as a complete mātauranga Māori theoretical framework, and each kete or component has informed the generation and application of specific aspects of knowledge and the tools that are required for the kaitiakitanga of water.

Te Kete Tua-uri has informed the production of a rich iwi ontology of water that provides a more in-depth understanding of what water 'is' from a Te Āti Awa perspective. Te Kete Aronui has informed the development and application of tools to facilitate observations across the broad iwi values of water. These include novel tools

for monitoring the integrity of decision-making processes, and a survey tool for monitoring the well-being attributes of wairua and whakapapa connectivity in our rohe.

The research has shown how the recognition and revitalisation of Te Kete Tua-ātea knowledge and tools as a distinct field of mātauranga Māori is particularly crucial to the practice of kaitiakitanga. This has involved developing and applying futuring tools such as quantitative models to generate knowledge about the infinite possible future scenarios for our water catchments that can be used to inform decision-making processes.

The application of Ngā Kete o te Wānanga can make a significant contribution to improving the way that water is cared for in Aotearoa. The research has demonstrated the power of returning to the enduring wisdom of mātauranga Māori, and the benefits of a kaupapa/values-based, whole-of-system, future-oriented approach to water care.

Description

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Appendix B: Iwi Kaitiakitanga Plan is re-used with the permission of Ātiawa ki Whakarongotai Charitable Trust. Figure 2.6 was removed for copyright reasons but is available as Carriger et al., 2016, Fig 5. Figure 5.6 is Copyright © 2018 Rosa, Profice and Collado, and licensed under the Creative Commons Attribution License (CC BY). Rosa, C.D., Profice, C.C. & Collado, S. (2018). Nature experiences and adults' self-reported pro-environmental behaviors: The role of connectedness to nature and childhood nature experiences. *Frontiers in Psychology*, 9, 1055. <https://doi.org/10.3389/fpsyg.2018.01055>

AN EPIDEMIOLOGIC INVESTIGATION OF WASTAGE AND PRODUCTIVITY OF EWES IN A SAMPLE OF NEW ZEALAND COMMERCIAL FLOCKS

Dr Kate Jade Griffiths
PhD (2020), Massey University

Until recently, little was known about ewe wastage in commercial New Zealand ewe flocks, or indeed, internationally. This PhD was undertaken with the broad objective of establishing the extent, timing and cause (premature culling or mortality) of ewe wastage in New Zealand ewe flocks, while also identifying factors associated with increased ewe wastage including pre-mating body condition score (BCS), failure to rear a lamb and, linked with the latter, impact of ewe udder defects on productivity.

To the authors' knowledge, this is the first study that reports both lifetime wastage and detailed annual wastage in a sample of New Zealand commercial flocks. Of the 13,142 enrolled ewes, 50.4% exited their respective flocks due to premature culling (where a ewe is culled from the flock prior to the potential end of her productive lifespan) and 40.0% due to on-farm dead/missing, giving a total of 90.4% that exited due to wastage. In all years, pre-mating BCS could be used as a predictor of ewe wastage with odds of wastage lower with increasing BCS.

In Year 1, wastage for each cohort ranged from 7.6% - 45.4% of ewe lambs enrolled, while wastage due to dead/missing accounted for 26.8% - 100.0% of ewe lamb wastage across cohorts, and

premature culling was primarily due to poor reproductive performance (dry at pregnancy diagnosis or dry at docking when 3-6-week-old lambs are yarded for ear marking, tail removal and castration of males). Hence, other than the cull sale-value for those that were prematurely culled, the farmer received no productive or economic benefit from these wasted ewe lambs. Ewe lambs with heavier conceptus adjusted liveweight (CALW) and those that gained greater CALW between pregnancy diagnosis and pre-lambing were less likely to be dry at docking. Similarly, for two-tooth ewes (18-months of age at breeding), heavier ewes and those that gained CALW were less likely to be dry at docking than lighter ewes or those that lost CALW.

Pre-mating udder palpation scores of hard or lump were associated with increased odds of lambs not surviving to weaning compared with normal scores. Additionally, surviving offspring of ewes with pre-mating udder palpation scores of hard had lower growth to weaning.

Commercial farmers can use the information presented in this thesis to identify ewes within their flocks that have increased risk of wastage or poor productivity. They can then alter management of these at-risk ewes to both improve ewe productivity and reduce likelihood of wastage.

Description

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