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NZ Psychological Society Inc.
P.O. Box 10536, The Terrace,
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Ph (04) 473 4884
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Editor's Introduction

First up, let me acknowledge the delay in publication of this issue. In reality it has been ready for several months, needing only this piece written. The University space is a challenging one at present, and this is reflected in several ways, including difficulty obtaining reviews for manuscripts (I understand this isn't an issue NZJP alone faces), uneven patterns of manuscript submissions (I shall come back to this) and, as an academic myself, finding the time to do the work when the workforce is living with uncertainty, or actual job cuts.

That said, here is the December 2023 issue of the *New Zealand Journal of Psychology*. It includes six papers, and I am signalling that I shall be aiming for six papers per issue to give each issue a feeling of substance. We have had several issues in the past several years that haven't actually 'felt' like an issue because they have included two or three papers. What can you do to help us? Submit your work. As well as the world-leading work that you will see in this issue, I'm particularly keen on publishing work that lives up to the Journal requirement to speak to our own context, that is student-led, and that generally showcases our expertise.

I think this issue embodies that aspiration. It is somewhat accidental that five out of the six works touch on ethnicity and racism. It is no accident that I've presented the work of the WERO Team upfront. Their work presents analysis of an audit of integration of Māori-focused content in Clinical Psychology Programmes across the country, and update of Abbott and Durie's (1987) own report on this subject. This paper is also a first, opening with the first abstract presented in both English and Te Reo Māori. I would love to get to a point where all of the manuscripts published in NZJP open similarly.

The theme continues in Ioane and colleagues' reflection on clinical psychology training for Pacific people. Next, though not focusing on clinical programmes or minority students' experiences of them, Fakapulia et al. present an empirical study investigating stress, sleep, and sleep hygiene among Pacific students. The fourth paper in this almost-thematic section presents Hsu and Akuhata-Huntington's programme of development of a digital tool for addressing medical students' biases regarding Māori. Though Osborne and colleagues zoom out of the university, their NZAVS-based work gives me hope for hinting at potential mechanisms for the finding that community-level diversity ameliorates important ideological predispositions that have long been shown to provide a foundation for racism.

On the subject of racism, it is worth noting that NZJP has had an open call for papers on the subject of 'Unmarking Racism and Oppression in Psychology'. While the call for expressions of interest has closed, the editors received an overwhelming response, and will be looking forward to the final submissions of those work invited for full consideration by the end of May.

Finally, and rounding out the six but unrelated to ethnicity or race, a classic piece of psychometrics, focusing on a commonly-used measure of perfectionism among adolescents.

Advice to authors: Consistent with the imperative of the Journal, *any* submission must clearly articulate relevance in the context of Aotearoa New Zealand. Information about the Journal, and general author guidelines can be found here.

Additionally, the Covid-19 pandemic has dramatically affected the ways that academics work, and this can be seen in much greater difficulty securing reviews (for example, we have experienced significantly more declines of review invitations compared to pre-Covid times). Feel free to suggest reviewers with appropriate expertise (while being aware of conflicts of interest) and we will draw off that list when supplementing the invitations we extend. Finally, **please ensure that you submit a deidentified manuscript**! It inevitably causses delays if we have to ask for a manuscript to be de-identified.

For now, we wish you all the best for 2024, and look forward to seeing the fruits of your labours submitted for consideration with NZJP.

Marc Wilson

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CONTENTS

Four Decades after a 'Whiter Shade of Pale': An Update on Professional Psychology Programme Responsiveness to Indigenous Māori in Aotearoa New Zealand

Waikaremoana Waitoki[1], Kyle Tan[1], Ottilie Stolte[2], Joanna Chan[3], Logan Hamley[2], and Damian Scarf[3]

[1]Te Pua Wānanga ki te Ao (Faculty of Māori and Indigenous Studies), University of Waikato
[2]Te Kura Whatu Oho Mauri (School of Psychology), University of Waikato
[3]Te Tari Whakamātau Hinekaro (Department of Psychology), University of Otago

I te tau 1987, i whakaputaina e Max Abbott rāua ko Mason Durie te pepa, 'A Whiter Shade of Pale' i tiro whānui ai i ngā taunakitanga mō te mahi whakatuanui ahurea tahi (te arotūāpori rātō) i waenga i ngā hōtaka whakangungu kia huri te ākonga hei kaimātai hinengaro rēhita. E whā ngā ngahurutau (2023) i muri mai, ka tāruatia e mātou te rangahau, ā, i tonoa ngā kaihautū hōtaka (n = 15) kia whakahoki kōrero mai mō ngā kaimahi o te hōtaka; ngā ranga tohutohu Māori; ngā ākonga o te hōtaka; me ngā kaupapa ako o te hōtaka. I whakaaturia e ngā tātari whakataurite te whakapiki ake o ngā nama o ngā kaiako Māori, ngā kaupapa aronga Māori, me te whakapūmautanga o ngā hononga ki ngā ranga tohutohu Māori. Heoi anō, ko te nuinga o ngā kaihautū i whakapuaki mai i ngā āwangawanga mō te iti haere o ngā ākonga Māori e tono ana ki ngā hōtaka ngaio. Ko tā mātou rangahau e miramira nei, ahakoa ngā whakapikinga, nā ngā tauārai mauroa i whakaaweawe ai ngā urupare whai tikanga ki Te Tiriti o Waitangi i ngā wāhi katoa o te akoranga.

In 1987, Max Abbott and Mason Durie published the 'A Whiter Shade of Pale' paper that outlined evidence of monocultural (Eurocentric) dominance within training programmes to become a registered psychologist. Four decades (2023) later we replicated the study and invited programme directors (n = 15) to comment on programme staff; Māori advisory bodies; programme students; and programme content. Comparative analyses revealed improvements in the number of Māori teaching staff, Māori-focused content, and established links with Māori advisory bodies. However, most directors (77%) expressed concerns about the limited number of Māori students applying to the professional programmes. Our study highlights that despite improvements, ongoing barriers impact meaningful responses to Te Tiriti o Waitangi in all areas of the discipline.

Keywords: *Psychology; Indigenous; Māori; decolonising psychology*

INTRODUCTION

Psychology in Aotearoa New Zealand has a colonial history that reflects Western psychological concepts, ideals, models, theories, and practices (Groot et al., 2018; Love, 2002; Levy & Waitoki, 2016; Older, 1978). The dominance of these settler-colonial ideologies is not unique to Aotearoa and has been well-documented by Indigenous scholars in Australia (Dudgeon & Walker, 2015), Canada (Ansloo et al., 2019) and the United States (Fish et al., 2023). In the past four decades, Māori scholars and their allies have highlighted the impact of internationalised (Eurocentric) and monocultural knowledge production within psychology (Nikora, et al., 2016). This critique emphasises the need to recognise and value Māori knowledge - mātauranga Māori and to address systemic racism to improve the relevance of the discipline for Māori (Groot et al., 2018; Hamley & Le Grice, 2021; Lawson-Te Aho, 1994; Levy, 2007; Levy & Waitoki, 2016; Love, 2002).

In the late 1980s in Aotearoa, concerns about racism in psychology reflected several important historical points. These included the Māori Language Act in 1987, enacted to protect and promote the Māori language; the Pūao-te-Āta-tū Report, published in 1986, which highlighted the role of institutional racism in social services; and the establishment of the Waitangi Tribunal in addressing historical grievances and promoting treaty settlements between the Crown and Māori (The Māori Perspective Advisory Committee, 1998). Together, these developments highlighted the efforts in Aotearoa to recognise and uphold Māori rights, language, culture, and economic and social well-being. Importantly, the developments offered insights into how psychology should consider its relevance to Māori.

In 1985, Abbott and Durie (1987) conducted a seminal study that surveyed directors of professional psychology programmes, including clinical, educational, and community programmes. The study reported that none of the programmes had any Māori graduates in the preceding two years and lacked Māori staff members. The findings revealed a significant absence of Māori perspectives among both staff and students, as well as limited inclusion of culturally relevant material in curriculum delivery. Compared to other professional programmes such as medicine and social work, psychology was found to lag behind in incorporating Māori-focused content and establishing links with Māori advisory bodies. Abbott and

Durie's study exposed the presence of institutional racism within professional psychology programmes, highlighting the discipline's monocultural nature.

In a replication study conducted by Siaan Nathan a decade later (1999) with clinical psychology directors (*n* = 5), the concerns regarding inadequate training and support for Māori-focused content were still present. Nathan's study revealed little progress, with only one Māori academic staff employed and just two programmes incorporating substantial Māori-focused content. Despite advocacy to recognise Te Tiriti o Waitangi[1] obligations in the field, curriculum change was minimal. Subsequent studies that monitored the growth of the Māori psychologist workforce and examined the presence of Māori-focused content within professional programmes revealed the persistent dominance of monocultural psychology (Levy, 2007; Levy & Waitoki, 2015; NSCBI, et al. 2018; Scarf et al. 2019; Waitoki, et al. 2023). In 2002, Dr. Catherine Love described three long-standing issues affecting Māori development within the psychology discipline in Aotearoa. These issues were reported to include: 1) the lack of Māori-focused content in psychology courses, which leads to inadequate culturally-responsive knowledge amongst psychologists to work with, or for Māori; 2) workforce issues, such as the low number of Māori professionals in psychology; and 3) the dominance of Eurocentric psychology, which resists the legitimate inclusion of Indigenous knowledge bases within the discipline (p.13-14).

Since 1985, mainstream psychology had shown limited commitment to fulfilling its responsibilities in fully implementing changes to align with Te Tiriti. In 2018, Dr. Michelle Levy filed a claim with the Waitangi Tribunal highlighting substantial breaches of Te Tiriti by the Crown and its agencies in the areas of regulation, training, and employment of psychologists. Furthermore, the 2018 commissioned report titled "Reaching our Highest Peaks" (NSCBI et al., 2018) highlighted the concerning fact that key seminal documents intended to provide guidance for the psychology profession were not being utilised as intended. The report emphasised the necessity for systemic change to be initiated and driven by Māori themselves, highlighting the importance of self-determination and empowerment in shaping the future of Indigenous psychology.

The New Zealand Psychologists Board (2018) currently mandates all registered psychologists in Aotearoa to demonstrate an understanding of the significance of Te Tiriti in the provision of psychology. This requirement is also outlined in the Code of Ethics for Psychologists Working in Aotearoa (2004). However, it is important to assess whether significant changes have occurred in the profession since Abbott and Durie's report to gauge the responsiveness to Te Tiriti o Waitangi.

Objective

Our study offers a timely analysis that builds upon the research conducted by Abbott and Durie (1987), which focused on surveying directors of professional psychology programmes to assess the level of cultural responsiveness to Māori. Through this examination, we aim to identify areas of improvement and guide future developments in psychology education, ensuring that cultural responsiveness to Māori and the articles of Te Tiriti are central to the training of psychologists in Aotearoa.

METHOD

This study constitutes part of the larger WERO project that examines three dimensions of racism in psychology in Aotearoa: its costs, systems, and the potential responses that exist. The project comprises both Māori and tauiwi (non-Māori), and Pākehā (scholars who are informed by a Tiriti o Waitangi and antiracist agenda. Our research approach is guided by the overall project's Takarangi framework2 which centers a decolonising and anti-racist objective. We drew data from the first series of the Kia Whakapapa Pounamu3 Survey that focused on the responses of professional psychology programme directors. Questions included in the survey were primarily adapted from previous questionnaires which challenged monocultural psychology in Aotearoa (Abbott & Durie, 1987; Nathan, 1999), as well as additional questions to capture content relevant to the contemporary context (e.g., cultural competency training). We also revised the survey based on consultation with both Māori and tauiwi (non-Māori) researchers in psychology. The final survey comprised both open- and closed-ended questions that were categorised into four sections: programme staff; Māori advisory group; programme students; and programme content.4 Ethics approval for this study was granted by Te Kāhui Manu Tāiko: Human Research Ethics Committee, Faculty of Māori and Indigenous Studies at the University of Waikato.

[1] Te Tiriti o Waitangi is the founding document of Aotearoa New Zealand that establishes the bicultural foundation of the nation. Te Tiriti was signed between the British Crown and Māori hāpu (collectives of family related through a shared ancestor) in 1840 (Jackson & Mutu, 2016). Te Tiriti confers the Crown the right to kāwanatanga or authority to govern its own settlers (Article I). In return, Te Tiriti warrants tino rangatiratanga (absolute and paramount power and authority including sovereignty) of the rangatira (chief), of the hapū and of the people (Article II). Article III of Te Tiriti guarantees Māori the equal rights and privileges (mana ōrite) of British subjects. Article IV, as an oral article, promises a commitment to wairuatanga that includes spiritual and religious freedom.

[2] Takarangi encompasses diverse strata of a dual spiral pattern that encapsulates how the underlying assumptions of research (positioning, ontology, axiology, ethics, epistemology, and research goals) impact pivotal phases within the research process (see The WERO Research Team, forthcoming). Alongside this, a set of values (such as mana orite for power sharing and taonga tuku iho for acknowledging ancestral knowledge) and ethics (including āta for humility and mana aki for empowerment) work in conjunction with foundational constitutional documents like Matike Mai to shape our research approaches. Link: https://wero.ac.nz/research/takarangi-wero-values-and-roadmap/

[3] Kia Hora te Marino, Kia Whakapapa Pounamu te Moana was a tongi (saying) uttered in 1884 as a blessing for Kingi Tawhiao who travelled to England to petition Queen Victoria to establish an independent Māori parliament. The survey was gifted the name 'Kia Whakapapa Pounamu' to accentuate our aspiration to end racial oppression in psychology.

[4] The survey questions can be found on https://wero.ac.nz/resources/research-material/

Purposive sampling was used to recruit current directors of professional programmes from seven universities in Aotearoa. These programmes are accredited (including provisionally) by the New Zealand Psychologists Board (2023) to provide registration pathways for students training as a psychologist across sub-disciplines including Behaviour Analysis, Clinical, Counselling, Educational, Health, Community, Child and Family, Organisational, and General Psychology Practice. A personal email was sent to all directors of professional programmes (N = 17) in September 2022 to inform them of the survey and to extend the invitation to participate.

We also attended a hui (meeting) with clinical psychology directors and hosted individual hui with directors who showed interest in understanding more about the survey. This process centred around core Māori relational values of aroha (love), manaakitanga (care, hospitality) and whanaungatanga (establishing relationships), built on respect, kindness and generosity. The relational encounter with directors aimed to foster a safe and empowering space for constructive dialogue, trust, and sharing experiences. The research approach focused on being non-judgmental and strengths-based, allowing directors to address existing issues in professional programmes and the challenges of training culturally competent psychologists. The response rate was high, with 15 (88.2%) directors returning the survey before February 2023. All completed the survey online on Qualtrics except for one who requested a paper-survey.

Participants

On average, participants had been in the role of programme director for four years (range = less than one year to 12 years). A majority (93.4%) identified as Pākehā (NZ European). Two-thirds (n = 10; 66.7%) completed their psychology training at a university in Aotearoa. For those who received training from an overseas university (including the United States, Australia, and South Africa), the average number of years involved in psychology training in Aotearoa was 11 (range = three to 19 years). Two training programmes did not enrol any students in 2022; one programme was suspended and the other was newly established and provisionally accredited. These directors were asked to share their experiences retrospectively, their vision for the programme, and/or skip questions irrelevant to their situation.

Analysis

We undertook descriptive analyses in IBM SPSS version 29. Statistical findings were derived from the responses of all directors (n = 15) and we conducted comparative analyses with statistics from Abbott and Durie's (1987) study using chi-squared tests in MedCalc (MedCalc Software Ltd, 2023). Qualitative responses were restricted to directors of non-clinical psychology backgrounds (n = 9) as there is a forthcoming study (Chan et al., forthcoming) that specifically examines the responses of directors of the clinical psychology programme (the largest branch of psychology in Aotearoa). Not all directors responded to the open-text box. Where possible (when sufficient details were provided), an inductive content analysis (Vears & Gillam, 2022) was utilised to categorise the open-text responses based on the questions asked. The aim was not to produce content categories that are generalisable to all programmes; rather, we wanted to capture the breadth of the content within the dataset. The details of the directors and the specificity of the programmes were anonymised to protect the interest of the programmes.

RESULTS

Table 1. *Description of attributes and perceptions of programmes, 1985/1986 and 2022/2023*

Data collection period:	'85/'86, *n* (%)	'22/'23, *n* (%)
Programme staff		
Programmes incl. Māori staff	0	13 (86.7)
Māori advisory group		
Link to at least a Māori advisory body	0	11 (73.3)
Programme students		
Perception that number of Māori applying is inadequate	7 (77.8)	10 (76.9)[a]
Perception that number of Māori graduating is inadequate	7 (77.8)	7 (53.8)[a]
Took steps to address imbalance of Māori students	3 (33.3)	9 (69.2)[a]
Prerequisite in Māori culture[b] for entrance into programmes	0	8 (53.3)
Programme content		
Instruction on Māori culture[b]	4 (44.4)	15 (100.0)
Took initiatives to incorporate Māori culture[b] into professional psychology programmes	3 (33.3)	15 (100.0)
Endorsement on contracting part of the programme to Māori educational organisations	6 (66.7)	15 (100.0)

Note: Nine directors contributed to the Abbott & Durie (1987) study. Fifteen directors contributed to the 2022/2023 study.

[a]Two directors did not respond to this question as their programmes did not enrol students in 2022.

[b]Aspects of Māori culture that we provided as examples include tikanga (protocol), te reo (language) and health models.

Table 1 outlines the statistics for four components of the professional psychology programmes that draw on findings from Abbott and Durie's analysis in 1985 and the present study (2022). Our findings are grouped into four topics: programme staff; Māori advisory body; programme students; and programme content.

PROGRAMME STAFF

1a. Prerequisite for hiring staff

When asked about the prerequisites pertaining to knowledge of Māori culture and customs that are required of teaching staff prior to their appointment, 12 (80.0%) directors selected "Te Tiriti o Waitangi (The Treaty of Waitangi)", seven (46.7%) selected tikanga Māori, three (20.0%) selected Kaupapa Māori and Indigenous psychologies, and one (6.7%) selected te reo Māori. However, the directors informed us that these prerequisites are difficult to uphold as there is a small pool of staff competent in Māori culture and that *"we have not been able to recruit staff that fit these criteria"* (Director 1). Director 2 noted the greater leniency of these prerequisites for staff employed from overseas: *"I doubt a candidate would be excluded if they had no knowledge (such as if they were from overseas); however, the candidate would be guided toward increasing their knowledge once they accepted the position."*

1b. Ongoing training for staff

All programmes offered ongoing training for staff to familiarise themselves with Māori culture and customs; although Director 2 alluded that *"none are REQUIRED, but many or all would be encouraged if not outright recommended."* Training opportunities included workshop(s) delivered by an external faculty (n = 12; 80.0%); workshop(s) delivered by Māori staff from the same department or faculty (n = 9; 60%); and workshop(s) delivered by an external Māori organisation (n = 9; 60%). Some of these workshops were catered to tauiwi staff, as Director 1 noted *"tauiwi and non-Māori staff will be required to constantly develop their knowledge of Te Ao Māori and be able to demonstrate that appropriately. These staff will be encouraged to develop good ally/accomplice skills."* A majority (n = 12; 80.0%) of directors also supported staff members undertaking tertiary teaching courses that include kaupapa Māori content.

1c. Number of Māori staff

Compared to 1985, when there were no Māori staff in any of the professional programmes, most (n = 13; 86.7%) in 2022 had at least one Māori staff member. This statistic included 12 (80.0%) programmes having Māori employed in the faculty and ten (66.7%) programmes employing Māori external to the faculty. At the time of the survey, there were 14 Māori staff teaching into psychology courses at undergraduate and graduate levels. In terms of staff who contribute to the professional programmes, there are only six Māori academics.

1d. Concern about shortage of Māori staff

All directors indicated that the shortage of Māori teaching staff members in psychology departments was of concern. Elaboration for these responses were summarised into two themes.

Category 1. The dominance of monocultural psychology

The dominance of monocultural psychology in Aotearoa is evidenced by its propagation of cultural convictions, practices, and norms intrinsic to western cultures, often at the cost of downplaying the diversity of other knowledge sources. Director 1 called for the offering of *"a more balanced psychology"* and the acknowledgement of the limitation of western psychology in responding to bicultural needs of the Aotearoa society. Māori psychology is grounded in a worldview that values "balance, continuity, unity, purpose, and interconnection" (Groot et al., 2018, p. 204); yet, he tirohanga Māori (Māori worldview) is rarely reflected in the existing psychology discipline. Director 1 shared a criticism about how psychology continues to upload institutional racism:

> *"Because staff continue to perpetuate WEIRD[5] ways of doing psychology. Psychology as it stands remains largely racist, or at least biased against mātauranga [knowledge] Māori and Māori worldviews. Of the staff that do support Māori in psychology or claim some allyship status, most still privilege their own wellbeing and that of western thought."*

Western norms continue to hold position as the 'most valid' foundation for psychology, which means Māori and Indigenous knowledge are routinely considered as an "add on" to the mainstream core of the discipline. As highlighted by Director 4, there is an urgent need to, *"honour the obligations of Te Tiriti, incorporate he tirohanga in psychology teaching, and consider the health and wellbeing of Māori more broadly".* In turn, improving the relevance of psychology for Māori can address the academic pipeline for Māori (Levy, 2007; Naepi et al., 2019), to ensure more Māori embark on study and careers in psychology. Director 2 touched on the importance of diversifying psychology and expanding the Māori psychology workforce:

> *"More Māori staff to serve as role models for the Māori students we want to attract into our programme would be wonderful, too. We can't reflect the communities we serve if we can't get a diverse cohort into the programme, and we won't get Māori students into the programme if the programme environment is not culturally safe and responsive".*

Category 2: Aronga takirua cultural double-shift

Aronga takirua refers to the double-shift role that Māori play in academia (Harr & Martin, 2022). Māori experience additional cultural labour that is not expected of Pākehā; for example, performing a karakia, ensuring research and psychological practices are carried out in a culturally safe manner, and offering cultural expertise in

[5] There is evidence of long decades of Aotearoa prioritising Western, Educated, Industrialised, Rich, and Democratic (WEIRD) psychology that displaces and marginalises Indigenous Māori knowledge sources such as mātauranga and tikanga (Groot et al., 2018).

leadership and supervisory roles in the institution. For Māori staff not employed to offer cultural advice, such labour comes on top of existing workloads and is usually not compensated appropriately (Harr & Martin, 2022; Johnson et al., 2021). Two directors raised concerns about the significance of aronga takirua for Māori in the department of psychology:

"We are focusing on increasing the diversification of psychology, yet Māori students don't have the ability to choose Māori supervisors for their MA or PhD sometimes because there just aren't enough. Māori staff who are there are already overloaded with their work, so taking on more is just not possible." (Director 2)

"We are very lucky to have a PTF [Permanent Teaching Fellow] who is specifically employed to support incorporation into courses. She has been amazing in supporting the programme. However, I worry that she is overworked." (Director 3)

1e. Steps to address shortage of Māori staff

To compensate for the low numbers of Māori psychology teaching staff, most directors had actively recruited Māori staff (86.7%) and implemented a more culturally responsive recruitment process for Māori (60.0%). Close to one-third (33.3%) provided career development opportunities for current Māori staff by supporting their doctoral research and/or psychologist registration. Other strategies employed to recruit or create a position for Māori included redirecting (limited) programme funds to employ a kaiārahi (advisor); increasing the FTE (full-time equivalent) of Māori staff (13.3%); growing the cultural responsiveness of the programme for Māori (13.3%); increasing the Māori graduation rate (13.3%); supporting the academic promotion of Māori staff (6.7%); and shoulder-tapping existing networks (6.7%).

1f. Difficulty in hiring Māori staff

Many programmes struggled to recruit Māori teaching staff, with nine (69.2%) directors reporting that no Māori applied for advertised roles. Thirteen directors recruited Māori staff through public advertisements. Two (15.4%) programmes received applications from Māori who were not trained or registered psychologists. The compulsory criteria set by universities (such as holding a PhD and being registered as a psychologist) poses obstacles in augmenting the presence of Māori teaching staff. This concern was shared by two directors:

"There is a very limited pool of Māori psychologists who have expertise in our programme's particular area. There are even less who also have a PhD which is the usual requirement for appointment of academic staff in our department. Without a PhD, the salary banding is low and does not appropriately value the other skills and expertise that a Māori candidate would bring to the role." (Director 4)

"According to the NZPB [New Zealand Psychologists Board] in their October 2021 newsletter, there were less than 15 Māori registered [specific discipline] psychologists in Aotearoa. The ones that we know of do not have PhDs. Due to this shortage, we recruit guest lecturers to speak to our intern psychologists, but we have not found a PhD-level registered psychologist who is Māori." (Director 5)

1g. Low number of Māori staff as a barrier to incorporate Māori content into training

In some programmes, directors relied on recent Māori graduates to return to academia to teach Māori content that was not otherwise available, due to the low number of existing Māori staff. Notably, the employment conditions for these new Māori graduates are often unfavourable due to the cultural labour they are expected to provide while also fulfilling university requirements (e.g., publishing, supervision and bringing in research grants).

"Funding restrictions limit our ability and we ask a lot of the same Māori graduates of our programme to mentor and teach our students. As our numbers of Māori graduates grow we hope this pressure on the same people will reduce." (Director 5)

MĀORI ADVISORY BODY

2a. Role of Māori advisory bodies

More than two-thirds (n = 11; 73.3%) of professional programmes now have established links with at least one Māori advisory body. This is a significant increase from 1985 when no programmes had links; $\chi2(1)= 11.67$, $p <$ .01. Examples of how Māori advisory bodies contribute include providing training or supervision for psychology training students (n = 8; 72.7%), research consultation (n = 7; 63.6%), offering input into the selection interview process (n = 7; 63.6%), supporting staff bicultural development (n = 1; 9.1%), reviewing programme progress (n = 1; 9.1%), and arranging kaupapa Māori internship placements (n = 1; 9.1%). Of the four programmes without an established link with a Māori advisory body, three (75.0%) were seeking contacts with either the Māori department, faculty, or division at the university, and one (25.0%) was seeking contacts with Māori organisations external to the university.

PROGRAMME STUDENTS

3a. Prerequisites for applying into training programmes

Application for entry into psychology training programmes involves various procedures. In 2022, the standard assessment included completing an application form, obtaining reference letters and attending a selection interview process. Two-thirds (n = 10; 66.7%) of programmes required students to obtain evidence of community experience. Slightly over half required students to provide evidence of knowledge about Māori culture (e.g., tikanga, te reo Māori, Māori health models) (n = 8; 53.3%) and cultural diversity (e.g., ethnicity, socioeconomic background, religion, LGBTQIA Takatāpui+) (n = 8; 53.3%). Prerequisites regarding knowledge about Māori culture and cultural diversity were not necessarily set as mandatory requirements; some directors only assessed applicants' abilities to demonstrate these competencies during the interview, or sought some indication of the applicants' openness to learning if knowledge in these areas was not demonstrated.

Directors were asked to rank five factors in their decisions to admit students into the training programme. Out of the 14 directors who responded, the degree of

influence for each factor (from 1: highest influence to 5: lowest influence) in descending order are as follows: 1) Commitment to Te Tiriti o Waitangi (*Mean* = 2.57; *SD* = 1.02); 2) Previous work experience and community engagement (*Mean* = 2.79; *SD* = 1.12); 3) Whakapapa Māori identification (Māori genealogical lineage) (*Mean* = 3.00; *SD* = 1.52) ; 4) Academic performance (*Mean* = 3.07; *SD* = 1.59); to 5) Interview performance (*Mean* = 3.50; *SD* = 1.74).

3b. Interview selection process

Out of the 13 directors who conducted an interview selection process in the last year, ten (76.9%) always had Māori representation on the interview panel. The majority (*n* = 12; 92.3%) encouraged Māori applicants to bring whānau support to the interview. Ten directors (76.9%) explicitly made this clear during the application process, while nine (69.2%) informed the interview candidate via phone and/or mail prior to the interview. In nine programmes (69.2%), all applicants were asked questions about Māori culture. Examples include the relevance of Te Tiriti o Waitangi to psychological practice (*n* = 9; 69.2%); knowledge of working with Māori (*n* = 9; 69.2%); differences between Māori and Pākehā approaches to mental health (*n* = 6; 46.2%); fluency in te reo (*n* = 3; 23.1%); Māori health models (*n* = 2; 15.3%); and impact of colonisation on Māori (*n* = 1; 7.6%).

3c. Shortage of Māori students

The expression of concern among directors regarding the low number of Māori applying (76.9% vs 77.8%; $\chi2(1)= 0.00$, $p = .96$) and graduating (53.8% vs 77.8%; $\chi2(1)= 1.26$, $p = .26$) from the training programmes remains, even after almost four decades. Directors considered the main issue being the inadequate number of Māori students progressing through the undergraduate and postgraduate programmes, which is a prerequisite to entering a training programme.

> "*We don't have enough Māori students coming through our Masters degree programme, which is a necessary prerequisite for our psychology training programme."* (Director 5)

> *"We cannot accept Māori students if none apply! To apply, there have to be enough Māori students coming through the psychology programme as a whole."* (Director 6)

Funding for Māori student enrolments and completions (e.g., scholarships), therefore, ought to begin from the undergraduate level. As Director 7 noted: *"The level of investment precludes Māori students – 6 years before getting to internship. Investment requires so much cost carried by students"*. Among the ten directors who thought the annual intake of Māori students was inadequate, some steps were taken to rectify the imbalance. This included the incorporation of Māori-focused content into the psychology curriculum (90.0%); active recruitment of Māori staff (80.0%); active promotion of training programmes for Māori students (80.0%); having a more culturally responsive selection process for Māori applicants (70.0%) and scholarships for Māori students (70.0%). However, the proportion of directors taking steps to address the low intake of Māori students in 2022 did not differ significantly with 1985 (69.2% vs 33.3%; $\chi2(1)= 2.64$, $p = .10$).

PROGRAMME CONTENT

4a. Kaupapa Māori and Indigenous Psychologies

The number of programmes offering Kaupapa Māori content have significantly increased since four decades ago (100% vs 44.4%; $\chi2(1)= 10.10$, $p < .01$). Directors were asked to rate the extent to which Kaupapa Māori and Indigenous Psychologies (a cultural knowledge base that centres the philosophies and worldviews of tangata whenua Māori) were incorporated into the psychology training curriculum. On a scale of zero to 100 percent, the mean across 15 programmes was 29.73% (range = 10.0% to 82.0%). Content relating to Kaupapa Māori and Indigenous Psychologies was mostly covered through guest lectures (*n* = 15; 100%), Māori input into the delivery of training programmes (*n* = 14; 93.3%), and workshops (*n* = 13; 86.7%).

Half of the programmes included a visit to marae (Māori communal centre) (*n* = 8; 53.3%) or consulted with a Māori advisory body (*n* = 7; 46.7%). Less than two-fifths included a visit to a Māori health service (*n* = 6; 40.0%), or consultation with Māori staff or departments within the university (*n* = 5; 33.3%), or kaumātua (*n* = 5; 33.3%). Two programmes (33.3%) provided Kaupapa Māori cultural supervision and/or placement. Overall, compared to 1985, there was a statistically significant increase in the proportion of directors making initiatives within programmes to incorporate aspects of Māori culture (e.g., tikanga, te reo Māori, Māori health models) (100.0% vs 33.3; $\chi2(1)= 12.79$, $p < .01$).

On a scale of one (much more) to five (much less), directors were asked to rate how much more or less time should be dedicated to Kaupapa Māori and Indigenous Psychologies content within the training curriculum. Amongst the 14 respondents, the mean was 1.50, with eight (57.1%) reporting that 'much more' specific content on Kaupapa Māori and Indigenous Psychologies should be delivered. Eight directors (53.3%) responded that their programmes did not have adequate Kaupapa Māori content. The two most prominent issues highlighted were the limited Māori staff available for consultation (*n* = 6; 75.0%), and the lack of funding support (*n* = 4; 50.0%). Other directors reported the absence of established relationships with Māori organisations (*n* = 2; 25.0%); students being overloaded with other training requirements thus leaving little room for Kaupapa Māori training (*n* = 2; 25.0%); or difficulties in doing the right thing without being seen as tokenistic (*n* = 1; 12.5%).

4b. Institutional enablers and barriers to incorporate Māori content into training

In an open-text box, directors were asked to list factors that helped (or did not help) with incorporating aspects of Māori culture into the training programme.

Enablers. A commitment to indigenise the psychology discipline at various institutional levels provided the lever for directors to implement changes and hold the relevant individuals and departments accountable. Director 2 named all the entities that play key roles in increasing Māori content within psychology training:

> "*What helped was having professional bodies (our School, our department, our university, our*

professional body (NZPsS [New Zealand Psychological Society], our Board (NZPB [New Zealand Psychologists Board] and its committees, such as the accreditation committee) that have expectations that taha Māori can, should, and must be incorporated into all aspects of our programme. They gave me a leg to stand on when I pushed for change."

Barriers. Divergent approaches exist across universities in addressing their Te Tiriti o Waitangi responsibilities. Director 7 shared that *"university policy and their lack of value or recognition for cultural knowledge, Indigenous processes and values"* led to less provision of resources to prioritise the growth of Māori-focused content. Funding restriction was reported by Directors 5 and 9 and this was the reasons for Director 5 to *"ask a lot of the same Māori graduates of our programme to mentor and teach our students".*

Director 2 also shared the isolating journey as an ally and the challenges faced in gathering solidarity amongst (predominantly tauiwi) staff members who did not understand the need to address Māori inequity in psychology.

"What didn't help was having to re-fight to re-gain ground all the time, especially within the programme staff. Because not all members of the programme staff agreed with the importance of incorporating taha Māori or changing our course content or examining barriers for Māori, I sometimes feel very alone and therefore have to call on others for support."

4c. Outsourcing Māori content

Directors were asked about their perceptions of contracting out parts of the training programme to Māori educational organisations or institutes of learning. Compared to 1985, there was a significant increase in directors endorsing contracting out parts of the programme (100% vs 66.7%; $\chi 2(1)= 5.47$, $p = .02$), especially given the current shortage of Māori staff. For example, two directors shared:

"In truth, I would prefer to have permanent FTE added to our programme so we can integrate the expertise throughout the programme, but, when that's not possible, contracting in would be an option to consider." (Director 2)

"*Although I think it is incumbent on all programmes to have in-house representation of Māori staff and weave elements of Te Ao Māori across the curriculum, I am also aware of how this can put pressure on the few Māori psychologists who currently have the skills and availability to provide this. I would like to see programmes working together more to pool resources and I think working with other organisations such as Te Whare Wananga o Aotearoa makes good sense."* (Director 4)

Universities that were unable to attract and retain sufficient Māori staff took a pragmatic option of collaborating with external Māori organisations. However, financial barriers, bureaucratic structures, and the lack of previous experience of collaborating with Māori and external organisations were usually significant barriers.

"We would be doing it already if the university was willing to pay for it. Last year, we had zero budget to contract out training and had to rely on personal connections and relationships for guest lectures." (Director 5)

As is apparent in the comment directly above, a lack of resourcing means that programmes resort to work-arounds and favours, which is not a sustainable or ethical way of providing Māori content.

DISCUSSION

In this study, we made comparisons to Abbott and Durie's 1987 study to assess the progress in cultural responsiveness of programmes towards Māori across four aspects of psychology training: programme staff, relationship with Māori advisory bodies, programme students, and programme content. Overall, we observed a higher degree of action to increase the number of Māori staff and integrate Māori-focused content within psychology training compared to four decades ago. In 2022, the majority of the programmes (86.7%) have at least one Māori staff member and more than two-thirds (73.3%) have established links with a Māori advisory body. However, concerns persist regarding the participation and graduation rates of tauira Māori in the programmes, despite heightened awareness and a greater willingness to rectify the historical disparity in Māori representation within psychology. Echoing Dr Michelle Levy's tribunal claim that calls for the New Zealand Psychologists Board to "actively support the recruitment and retainment of tauira Māori into psychology training programmes" (2018, p.21), our finding identified the sustainable growth of Māori student representation and psychologist workforce to be a crucial avenue for future advancement.

A key concern highlighted in the findings is the contradiction in the hiring process, which means that tauiwi staff members are not being required to possess knowledge of Te Tiriti o Waitangi or being held accountable for immersing themselves in Māori-centric environments after being recruited. Consequently, Māori staff find themselves tangled within the "politics of distraction" (Smith, 2003, p.2) where they become the on-demand cultural advisor, or perform cultural labour to ensure that tauiwi staff provide a culturally safe learning environment for Māori students (Smith, 2021).

There were two programmes without any Māori staff representation, and all directors expressed concerns about the shortage of Māori teaching staff members within their schools. The current situation for the small Māori workforce in psychology is a reflection of previous research that examined the inaction of the New Zealand Psychologist's Board and schools of psychology to actively provide an environment conducive to Māori participation in psychology (Love, 2002; Levy, 2018; NSCBI et al., 2018). Although funding issues and the low number of Māori individuals with PhDs available to teach within academic programs have been identified as core reasons for the lack of Māori staff, this is a rhetorical device that conveniently shifts responsibility to Māori to be more available, and frames equity and Te Tiriti obligations as simple financial issues (Nikora, 2001). Māori and tangata Tiriti psychologists have long

contributed solutions to defining how to not only increase the number of Māori, but also the relevance of psychology for Māori (Lawson-Te Aho, 1994; Levy & Waitoki, 2016; NSCBI et al., 2018). The evidence continues to show that these recommendations have not been implemented or monitored. A significant impact of inaction results in ongoing inequity of access for Māori consumers. In 2002, Dr Levy wrote: "Despite ongoing attempts to recruit and retain more Māori within the discipline of psychology, the numbers of Māori psychologists continues to remain low, raising serious concerns about the ability of the profession to effectively meet the needs of its clientele" (p. 27). The same concerns persist even after 20 years.

There is an urgent need for directors and key personnel within schools of psychology to: 1) develop career paths for Māori staff and students; 2) create inclusive, culturally-responsive teaching environments; 3) remove gatekeeping hiring criteria placed on Māori (e.g., Eurocentric publications); 4) provide senior, full-time, continuing positions for Māori staff; 5) set performance criteria for all current and incoming staff to implement Te Tiriti o Waitangi in their coursework; 6) and uphold the tino rangatiratanga (sovereignty) of Māori staff to influence outcomes, directions, and priorities to improve Māori participation in psychology (Herbert, 2021; Johnson et al., 2021; Love, 2002; Naepi et al., 2019). To ensure that academia becomes a culturally safe and attractive employment option for Māori, it is crucial for universities to address the systemic racism that exists within these institutions (Smith et al., 2022). This implies recognising and actively working to dismantle the racist practices and structures that hinder Māori representation and engagement in higher education.

Four of the programs lacked affiliations with a Māori advisory body, thereby presenting challenges for the meaningful incorporation of Māori content within psychology training. The Māori value of whakawhanaungatanga can be used to guide directors to establishing meaningful and trusting relationships with Māori organisations. Relationships with Māori that facilitate the development of a shared set of goals based on mutual respect, and grounded in Te Tiriti o Waitangi reduces the problem of engagement that serves as mere symbolic gestures (Rata & Al-Asaad, 2019). There was an increase in desirability of outsourcing parts of psychologist training to Māori organisations or institutes of learning, with most directors citing the lack of Māori staff members to be the fundamental reason. This was also a recommendation put forward by Abbott & Durie (1987) if a programme was not in the position to deliver Māori-focused content. Such as approach is unsustainable and should not be seen as a way for psychology training to exempt itself from the responsibility to grow Māori capacity within schools, and across Māori organisations. A partnership model between the professional programmes and Māori organisations, if executed in accordance with the relational sphere outlined in Matike Mai (Jackson & Mutu, 2016), can provide a platform for students to be trained through practical Indigenous-focused solutions (Fish et al., 2023). A relational sphere offers opportunities for Kaupapa Māori practitioners and programme directors to share power and make joint decisions that respect the mana (authority) of all involved (Herbert, 2021; Jackson & Mutu, 2016). During this partnership, there should be minimal control of what constitutes "psychology", as Māori are guaranteed tino rangatiratanga to determine the type of content and training that are essential to care for tangata whaiora (Māori health service users).

Addressing the barriers for Māori to meaningfully participate in psychology cannot be done in isolation. Director 1 noted, "It would be good for programmes to come together to share experiences of how to improve." Given the current situation wherein leadership roles within Schools of psychology are largely held by Pākehā and tauiwi staff, there is a pressing need for directors to identify, test, and execute solutions in response to the issues highlighted in this paper as a collective responsibility. Ihimaera and Tassell (2004) contended that "collective responsibility means the onus rests with the relevant organisations, not with Māori who do not have the critical mass and should not be expected to progress a much needed and overdue bicultural development" (p.16).

The prospect of deferring progress by an additional four decades, only to observe a gradual implementation of changes, is untenable. At this current juncture, directors are presented with a distinctive and consequential opportunity to form allyship in honouring Te Tiriti o Waitangi (Jackson & Mutu, 2016) by identifying opportunities for inter-program knowledge exchange and to reciprocally assume accountability through the ongoing assessment of progress made by other programmes. Part of this process requires directors to clearly articulate their positionality and purposefully overcome facets of fragility (discomfort stemming from fear of making mistakes) to actively participate in dialogues and initiatives aimed at addressing the issues raised in the Waitangi Tribunal claim (Levy, 2018) and transforming the existing unjust structures for Māori (Crawford & Langridge, 2022; Ngata & Dutta, 2023). Any efforts to hold Psychology liable to respond to Te Tiriti o Waitangi cannot be accomplished in a silo.

Agitating for an end to monoculturalism in psychology requires a deep dive into the wider (ongoing) impacts of settler colonialism and racism on Māori. Much like the 1980s, the current decade in Aotearoa has seen the Crown's attempt to address its role in perpetuating widespread societal injustices via punitive policies and institutions. Ongoing Waitangi Tribunal hearings continue to expose the impact of colonisation on Māori economic, social and health outcomes (Hauora report; Waitangi Tribunal, 2023). These wider issues must be centred in psychology training – arguably, psychology training should be trauma-informed and cognisant of how it perpetuates systemic inequity. Significantly, yet unacknowledged in research writing, is the intergenerational privilege and wealth that has been afforded to Pākehā via colonisation at the expense of Māori (Ngata & Dutta, 2023). The impact of psychology's privilege in academia is entrenched having drawn on its self-imposed epistemic superiority from foundations of racism and oppression. As Professor Pihama stated (2023), universities in Aotearoa are built on land stolen from Māori. These structural issues are the drivers of the limited Māori-focused content in psychology, and the corollary pipeline issue of not enough Māori staff, too few

Māori students, and a lack of Māori psychologists. The discipline's assumption of its own superiority and universality generates a deficit thought-trap and perpetuates the status quo.

Limitations

Towards the end of the survey, directors were given the opportunity to comment on the utility of the questions in open-text boxes. Some of the issues and recommendations are summarised below. One director raised a question about the use of percentage to measure the degree psychology training incorporates Kaupapa Māori content: "I'm also not sure about the use of a percentage, how do we measure these things if the core of who we are or what we do is from a Māori and a community world view?" This feedback prompted us to consider asking another question about the integration of Kaupapa Māori psychology into all aspects of teaching rather than as a separate provision in future surveys (Herbert, 2021).

Furthermore, the information on Māori staff can be further nuanced by examining their role and FTE (the number of paid hours) to identify the extent of Māori resource within programmes. A few directors commented that their responses to the survey were based on a broad reflection of the programme and they wished there were more specific questions on formal classroom teaching, internship, and supervised practices. Other topics they felt warranted future research should include: pay equity in psychology, the monopoly of clinical psychology, and the different training needs for different branches of psychology. There is also a forthcoming study from (anonymised) that report on students' perspectives of the training programme that will allow us to discern disparities (if any) alongside directors' responses.

Conclusion

It is time to break the cycle of 'not enough tauira Māori—not enough Māori staff and psychologists—no capacity to decolonise psychology' that has slowed the progress for psychology to meet its goal to be culturally responsive for Māori. The discipline of psychology in Aotearoa has been referred to as a tool of colonisation (Levy & Waitoki, 2016) for its history of engendering a racial hierarchy of defining whose knowledge is valid while compelling others to assimilate (Groot et al., 2018; Smith, 2021). For psychology to gain acceptance amongst Māori, it is necessary for all agencies that can influence the operation of psychology to facilitate the empowerment of Māori leadership and create specialised channels and initiatives that invigorate Kaupapa Māori psychology. Aotearoa New Zealand has the potential to be the champion of Indigenous psychology at the international scale. Further, we have Te Tiriti o Waitangi to serve as a relational framework in psychology, alongside esteemed Māori scholars who are pioneering anti-racism work in psychology, promoting Indigenous worldviews, and contributing to the sustainable future of relational psychology (Herbert, 2021; Love, 2002). To end, we pose the wero (challenge) for key stakeholders of psychology (the Board, schools of psychology, universities, organisations employing psychologists) to renew our efforts to work collaboratively to accomplish Te Tiriti aspirations.

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Corresponding Author
Associate Professor Waikaremoana Waitoki
Email: moana.waitoki@waikato.ac.nz

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University didn't cater to me as a Pacific person: Building the Pacific workforce in clinical psychology programmes across Aotearoa New Zealand

Julia Ioane[1], Isi Cash[1], Linda Fatialofa[2], Veronica Graham[3], Rochelle Nafatali[1], Rayna Phillips[1], Shauney Thompson[3], and Peyton Wolfgramm[3]

[1]Massey University
[2]Te Herenga Waka Victoria University of Wellington
[3]University of Auckland

Pacific people comprise around 8% of Aotearoa NZ's population. They have higher rates of mental health distress but lower rates of mental health service use than do non-Pacific people. Having more Pacific clinical psychologists is a necessary part of addressing these disparities, yet only 1.7% of currently registered clinical psychologists are Pacific. This paper, co-authored by members of an informal pastoral and clinical support group (Pacific Clinical Talanoa), draws on experiences of clinical psychology training as Pacific people. The support group engaged in regular talanoa as part of their support for one another, which subsequently led to a multi-vocal account of training experiences and concerns. Recommendations are offered to promote and improve equity and Pacific engagement, including wider understanding amongst both non-Pacific psychologists and Pacific communities, as to how the profession can collectively enhance Pacific mental wellbeing.

Keywords: *Pacific mental health; clinical psychology; cultural competence; equity; health workforce diversity; talanoa*

INTRODUCTION

Who we are

A Pacific Clinical Talanoa (PCT) group was set up at the beginning of 2021 as an attempt by the first author to bring together current Pacific students in clinical psychology across universities. It is an informal group providing pastoral and clinical support to one another where experiences (tears and laughter) are shared, research topics are discussed and Pacific members of the community are invited to talanoa generally about their own experiences and the role of clinical psychology among Pacific people. It is led by the only Pacific staff member in a clinical psychology programme in Aotearoa NZ and it is intended to be a safe space where we are seen for who we are – Pacific people.

It was during one of these talanoa nights that the idea for this article arose. Whilst we all dream of becoming clinical psychologists, ultimately to serve our Pacific communities, the experience remains challenging to our cultural and spiritual selves. This needs to be addressed in order to meet the over-representation and growing needs of our Pacific people in mental health.

First, we briefly outline the state of Pacific health and mental health in Aotearoa NZ, before focusing on clinical psychology in particular. We give a multi-vocal account of our experiences within clinical psychology training, under a methodological framework of Pacific talanoa. Our experiences bring to life our questions and concerns. Then, recommendations are offered for vital discussion and debate, so we can see them enacted.

Just as 'western' medicine used to be seen as separate from Pacific ways, but has increasingly been woven into our collective wisdom, so our vision is that clinical psychology can be a relevant and culturally appropriate response to Pacific mental health concerns, alongside other tools.

Pacific people

Pacific people in Aotearoa New Zealand (NZ) are a heterogenous group who have either migrated or are descended from the Pacific Islands, Oceania.1 Currently, they make up 8.1% of the population and consist of more than 23 communities, the most populous of which include Sāmoa, Tonga and Cook Islands (Ministry for Pacific Peoples, 2016). It is estimated that, in 20 years, one in eight workers and one in five children will be Pacific (Pasefika Proud, 2016). At the same time, it is well known that Pacific people continue to face the worst inequities across health, employment and home ownership (Health Quality & Safety Commission, 2021; Ministry of

[1] Whilst this article focuses on Pacific people in Aotearoa NZ, we wish to acknowledge our tuakana-teina relationship with tangata whenua, our Polynesian family members with whom we share ancestry, the indigenous Māori people. This article prioritises the Pacific perspective(s), though we are explicitly aware of our place in te Tiriti o Waitangi and the significant inequities faced by tangata whenua that must always be prioritised in Aotearoa NZ.

Business, Innovation & Employment, 2021; Ministry for Pacific Peoples, 2021).

Health, in particular, is a priority need. A recent study found that 7% of Pacific children, between the ages of 12 and 24 months, experienced barriers to seeing a local doctor, compared to just 2.8% of NZ European children. Furthermore, 9.1% of Pacific children aged 3½ to 4½ years experienced barriers, compared to 3.2% of NZ European children. This can be expected to have major health, social and economic implications, as limited access to primary health care leads to poor health outcomes now and in the future for these communities (Irurzun-Lopez et al., 2021). Research by Southwick et al. (2012) found that barriers for Pasifika people accessing primary healthcare included inadequate cultural competence in the workforce and poor training of health professionals in family-based approaches. Building capacity and capability of a Pacific workforce in health remains an immediate and future priority (Ministry of Health, 2014; 2020).

Pacific mental health

Mental health is no exception, with Pacific people experiencing higher rates of psychological distress and suicidal behaviour compared to non-Pacific People (Ataera-Minster & Trowland, 2018). This is compounded by the low proportion of mental health service-users that are Pacific, relative to Māori and NZ Europeans (Ataera-Minster & Trowland, 2018; Ministry of Health, 2021). Barriers that exist to service use for Pacific People include the stigma about mental health within their community, a lack of trust in services or access to information about them, and lack of familial involvement (Fa'alogo-Lilo & Cartwright, 2021). In interviews with Pacific people who had used mental health services, and service providers, Fa'alogo-Lilo & Cartwright (2021) found that Pacific people preferred to locate solutions within the family, had a mistrust of services, had limited knowledge of where to seek help, and found that services lacked understanding of their cultural values and practices. For those who had accessed mental health services, they reported preferring contact with Pacific health and mental health providers (where available), working with Pacific clinicians and treatment grounded in Pacific cultural understandings of health and wellbeing. This included cultural interpretations of mental health and illness, and recognising the important role and involvement of family within a person's recovery.

This presents an opportunity for Pacific service-providers to intervene to ensure the removal of these and other present barriers for service-users and their families. Addressing the mental health needs of Pacific people, both current and future, is critical to their overall health. This was recognised in the NZ Government's 2018 inquiry into mental health, He Ara Oranga, which emphasised that the mental health system requires a transformation where, "at every corner of the system, [there is] … a strong Pacific presence" (New Zealand Government, 2018, p. 41). The inquiry reported that the mental health sector has a need for more culturally competent mental health practitioners, including Pacific clinicians (New Zealand Government, 2018). The recommendation for more culturally diverse clinicians was made after mental health research has consistently reported increases in the rates of Pacific people experiencing psychological distress over decades (e.g., Ministry of Health, 2008). Despite higher incidence, research also indicates that, relative to all NZ populations, Pacific people are less likely to access mental health services (Ministry of Health, 2008).

Tiatia-Seath (2014) also researched Pacific people's engagement with mental health services, finding that offering treatment that recognised and valued a Pacific worldview was desired by Pacific people and their families. According to Tiatia-Seath (2014), however, there are not enough Pacific clinicians available to work with the number of Pacific people needing to access mental health support. She called for a focus on matching Pacific clients with culturally competent clinicians. While moves have been made toward improving non-Pacific clinicians' cultural knowledge and skills (New Zealand Government, 2018), it is vital that we continue building a larger workforce of Pacific mental health clinicians (Fa'alogo-Lilo & Cartwright, 2021). This includes Pacific providers from the organisational level through to the professional workforce and informal caregivers. The latter includes family and Church members and friends, who are vital alongside the formal roles of social workers, cultural support workers, peer support workers, nurses, clinical psychologists, doctors and psychiatrists. For the purposes of this article, we focus on clinical psychologists, but we also invite those from other disciplines to consider issues of training, recruitment and retention, as there will be similarities.

Pacific programmes in health

In other areas of health, such as medicine, there have been successful programmes targeted at recruiting and supporting Pacific students. For example, the University of Otago Pacific Opportunities Programme (POPO) programme for Health Science first-year students showed better retention of Pacific students than previously (Sopoaga & van der Meer, 2012). In addition, there have been calls for targeted pipeline approaches across secondary, tertiary, community and workforce development so that students from minority communities are well supported as they train into and across health professional programmes (Curtis et al., 2014). Such examples include the Waipapa Taumata Rau University of Auckland's Māori and Pacific Admission Scheme (MAPAS) programme for medical students, which showed increased retention and completion, alongside a sense of belonging, for the Māori and Pacific students who participated (Curtis et al., 2015).

The Aniva Programme funded by Manatu Hauora (Ministry of Health) and Te Whatu Ora (Health NZ) provides support to build the Pacific health workforce through leadership and networking opportunities. Evidence has shown that Pacific Aniva students had higher retention rates, and faster and higher completion rates in the Whitireia Aniva Master of Professional Practice degree than did other Pacific Master's learners, from 2012-2019 (Pacific Perspectives, 2020). The Auckland University of Technology's Pacific Learning Village, in the Faculty of Health and Environment Sciences, was credited with raising success rates of

Pacific students from 65% to 72% over five years (Nanai et al., 2011).

Common to many of these programmes is that they are led by Pasifika and teaching and tutoring is carried out in a collectively shared environment, where relationships are prioritised and individual support is provided in a community space. Given this evidence across other areas of health, we believe that a local and national targeted approach is needed to increase Pacific representation in clinical psychology curriculum and practice.

(Clinical) Psychology in Aotearoa NZ

There are 3791 psychologists holding a current practising certificate (email communication, New Zealand Psychology Board NZPB, 23/08/23).

There are currently 84 registered psychologists who identify themselves as Pacific (Samoan, Fijian, Niuean, Tongan, Other Pacific Peoples, Pacific Peoples NFD and Cook Islands Māori). Of these, 37 Pacific psychologists (44%) are practising in the scope of clinical psychology (email communication, NZPB, 23/08/23). Overall, as of June 2022, just 2% of currently registered psychologists in Aotearoa NZ are Pacific, yet Pacific people are known to have disproportionately higher rates of mental health distress than do non-Pacific. This highlights a significant gap in the Pacific psychology workforce.

The higher rates of Pacific mental health distress may be due to barriers relating to accessing mental health services, economic inequality and issues with mental health literacy, which has been described as being lower for Pacific people than for non-Pacific people in Aotearoa NZ (Kapeli et al., 2020). The over-representation of Pacific people in mental health statistics means that, although we need to build the Pacific workforce in psychology, we also need to build Pacific competence amongst all psychologists, because of the time needed for recruiting and training a Pacific workforce to meet the demand for services by Pacific communities.

At present, there are six, university-based, professional clinical psychology programmes across NZ (University of Auckland, University of Waikato, Massey University, Victoria University of Wellington, University of Canterbury, and University of Otago). What do we need to consider in terms of ensuring these programmes build responsiveness to Pacific mental health service-users amongst all graduates, attract and retain Pacific clinical psychologists, and also build Pacific clinical psychology leadership in academia and services?

A review of the research looking at student experiences in clinical psychology training in the UK and US acknowledged that the programmes needed a cultural shift, from what British psychologist James Randall (2019) described as breeding a culture that encouraged elitism, individualism, and isolation:

This is a profession whose history is rooted in disconnecting individuals from their social context. A profession that has secured status and a powerful standing within the professional market, through predominantly placing the impetus for change on the individual. (Randall, 2019, p. 7)

Notably, Pacific students in doctoral clinical psychology programmes in the US had lower rates of representation and higher rates of attrition than did other ethnicities (Callahan et al., 2018).

Pacific students' experiences of psychology/health professional programmes in NZ have been little explored. Waiari et al. (2021) noted that the success of Pacific and Māori students in psychology was dependent on whether the learning environment upheld a student's cultural identity and beliefs. The authentic involvement of students was dependent on how their learning connected to lived experiences, where Pacific knowledge and engagement needed to be seen in the curriculum and in practice settings. Interestingly, Tapu Tu'itahi (2018) noted her experiences in a psychotherapy programme was having to leave her cultural and spiritual self at the door in order to survive the training programme. She went further to describe the isolation, lack of cultural safety and the cultural incompetence of academic staff during her training. This is consistent with earlier studies with Pacific students in clinical training who described feelings of loneliness (Berking et al., 2007), having to leave spirituality outside (Makasiale, 2007) and psychology training that was not welcoming nor supportive of Pacific values and beliefs (Coombes & Alefaio-Tugia, 2013). McRobie and Agee (2017) described their training as a struggle to maintain their Pacific sense of self while engaged in a NZ European/Pākehā mainstream counselling programme.

As part of increasing psychology services for Pacific communities, 'Pasifikology' was formed in 2005, to provide a network of support for the few Pacific psychologists practising in Aotearoa NZ, and for graduates and students of psychology in general (https://www.pasifikology.co.nz/). Our talanoa focuses on clinical psychology, specifically, now, not the broader grouping of Pasifikology over time (though there will be some commonality).

This research

The purpose of this paper is to provide you with our own real-life experiences, frustrations and recommendations. Eight authors are listed; there were other clinical psychology students moving in and out of the Pacific Clinical Talanoa support group over time whose experiences are echoed here; plus we know other Pacific students in psychology, including Pacific practitioners and lecturers, have felt troubled. We want this to be the beginning of a vital conversation leading to action, not a fixed summary purporting to have all the answers.

METHOD

To authentically honour the 'method' we used, we drew on our deep and lived understandings of talanoa, where conversations move across initial meetings, discovering each other's identity and origins, to relationship-building and trust, to also supporting formal debates and self-reflexive learning (Rumsey et al., 2022; Tecun et al., 2018; Vaioleti, 2013). We did not purposely attempt to select and choose a formal research method for our talanoa to begin. Rather, it was through the natural flow of building a relationship of trust and respect where talanoa was generated. As the talanoa was held each month, experiences were shared and common themes emerged as we acknowledged the similarities and (sometimes painful)

journeys that some of us were on, or had been on. Preparation of the results included a talanoa where draft themes were discussed to seek collective agreement from all as to what were the key points we wished to raise in our article.

Vaioleti (2006) highlights the way that the talanoa method provides a particular engagement, where the knowledge, experiences, spirits and emotions of those involved intermingle in conversation that may lead to critical discussions or knowledge creation, such as our talanoa have. Rumsey et al.'s (2022) paper focused on cross-cultural issues, such as 'confidentiality' that is expected in research, as opposed to reality, which is that:

> "The concept of confidentiality in the Pacific, in small island states, is extremely hard to maintain. If you start talking about someone on the island you can bet your bottom dollar they know who it is." (Rumsey et al., 2022, p. 1307)

In our desire to enhance clinical psychology, we must engage with both Pacific and non-Pacific viewpoints to move forward; reporting on our talanoa as 'findings' for this journal is a beginning of that, echoing Vaka et al.'s (2016) call for cross-cultural, mental-health care advancement:

> "We suggest that talanoa is able to open up the dialogue to construct quality research evidence to ultimately support the development of practice, which will be culturally relevant and appropriate and can lead to improved health-related experiences for all people in society." (Vaka et al., 2016, p. 543)

As part of a talanoa support group, the more we shared our experiences, the more we began to realise common themes and experiences and ways in which we responded to them successfully and ways that were not successful. This formed a frame of analysis that has simply developed in ongoing talanoa (over videoconferencing), acknowledging key themes that were emerging and recognising that we were not alone in our experiences. It led to discussions on how we could prevent this from continuing for future Pasifika students in clinical psychology. We decided to communicate more widely to the psychology profession via The New Zealand Journal of Psychology. Those who had time and interest then wrote sections of this paper, including some history, literature review, and understanding what others had experienced in trying to build the Pacific health workforce, especially in psychology. One of us sent out email communication to the group to seek out key points of experiences to be synthesised for further discussion. Drafts were refined and revised, and populated with illustrative quotes, then with recommendations as to what we want to see the wider profession engage with and act on.

Given the small number of Pasifika clinical psychology students (one has now joined the even smaller ranks of practising Pasifika clinical psychologists), we decided to provide shared quotes that are representative of our general views, rather than named quotations. Formal ethics approval was not sought nor required for this talanoa, commentary and expression of our perspectives on diverse university clinical psychology programmes.

FINDINGS

Findings are presented as key points derived from our talanoa, with illustrative quotes.

Clinical psychology training is a lonely place, expecting us to park our culture at the door

As we reflected on our journey through our clinical programmes, this comment was typical:

> *Indeed, at times I've felt like I've had to park my culture at the door. I've also felt incredibly lonely in the Clinical Psychology programme, feeling like I wish I just had someone else like me to go through the programme with. As I went through the programme, I felt more and more removed from my culture and my spirituality; which was ironic given a mantra of the programme is encourage your cultural background. At times, I felt the mantra had great intentions but no substance.*

The myths that put you off even applying for training: Is it impossible to get in or will you be 'the brown vote'?

It is well known that places in a clinical psychology programme are strictly limited. However, circulation of discouraging myths have established themselves as common beliefs amongst psychology undergraduates and essentially dampen hopes of potential applicants.

Drawing upon anecdotal evidence from psychology students at different academic stages, the majority of myths construe programme admission as 'impossible'. One of the authors recalled not being aware of the competitiveness of the programme and, had she known, she would not have applied. Fears of the application process were based on perceived entry preferences for students with previous counselling experience and high GPAs.

We also acknowledge the limitations of being able to compete fairly, due to family (nuclear and extended), cultural and church responsibilities that require prioritisation and are an innate part of our lives. Those of us who have been successful were initially hesitant to apply, due to concerns about financial pressures and anecdotal stories of having to leave your culture behind. Our own experiences are also highlighted in the following:

> *The selection process was difficult. I remember getting a call the evening before the interview to attend. And when I arrived, another Pasifika person had the same experience so I couldn't help but feel we were both "brown votes". We later sat and had a long talanoa and found we were asked concerning questions that we were unsure others were asked too, such as ..... We also felt that they couldn't let both of us in, which ended up being the case.*

Following further discussion among students, it became aware that the concerning questions related primarily to financial and motivational concerns including their knowledge of the Pasifika culture, despite there being no Pasifika representation on the panel.

Shouldn't Pacific mental health service-user experience be of value to clinical psychology training?

One Pacific candidate, who also had mental health service-user experience, felt there are covert selection criteria differences between universities that disadvantage certain groups. They shared their journey of the application process:

> *Of the three clinical programmes allowing entry after Bachelor's, two programmes required explicit disclosure of mental health history – I wasn't short-listed for either. The remaining university, I applied under their advanced entry pathway as they require an honours degree or higher. It was with the third programme I was accepted and felt culturally safe and seen throughout the interview process. The difference in results makes me feel varying prejudices exist in some programmes.*

Pacific worldviews are poorly incorporated

The struggle to have Pacific worldviews recognised within psychology academia and training was clear. Many Pacific clinical psychologists felt their cultural worldview was incorporated "*poorly*". Low Pacific staff representation and overall handling by institutions led to students feeling, "*University didn't cater to me as a Pacific person."* Academically, the worldview was merely "*theorised*", no tangible proactivity was seen to "*tackle the systemic prejudice*" that we feel hinders Pacific students and potential programme applicants.

Where does private clinical psychology practice fit within Pasifika communities?

We note a growing concern about clinical psychologists moving into private practice (that is, relatively soon after qualifying), whereas there used to be much more of an expectation that clinical practice would start in the 'public mental health system', with multi-disciplinary teams working with different ages and issues, to become an experienced and ethical practitioner, before 'going it alone' in private practice.

As Pasifika people, we see the growing inequity that private practice brings. Pasifika people continue to earn below the living wage and yet remain over-represented in seeking health services (Ataera-Minster & Trowland, 2018; Ministry for Pacific Peoples, 2021). Pasifika people, in general, can in no way, shape or form, afford private practice psychology services; therefore, the disparity between Pasifika people and others who can afford private psychology will continue to increase.

This is not to discredit counselling services available through Work and Income NZ (where a person accessing WINZ benefits may apply for some subsidised sessions with a private counsellor/therapist); public health organisations (PHOs, where a GP might refer someone to in-house counselling for a few 'free' sessions); employee assistance programmes (EAP, where an employer may provide access to a few free sessions of counselling to an employee to manage issues that are affecting their productivity at work, such as grief, behavioural issues, substance abuse, financial concerns etc); or churches (providing that the person is involved with a church community and is comfortable seeking counselling support from church leaders). All these services may be of benefit, but note that all have barriers – you must be receiving a benefit (WINZ), or be able to pay to see a GP (PHOs), or working in a job where EAP is available (EAP), or engaged with a church. The lack of publicly funded availability and access to clinical psychologists will continue to increase the disparity and inequity of psychological services to our underserved communities, that include Pacific.

The fear we have, as Pasifika people, is that psychology becomes a service that only 'those who have' can access. We are aware of how alluring the 'money train' is that private practice provides, where hourly rates surpass what is currently being paid in health, education and forensic settings. We also understand that the clinical psychology training programme does take a significant financial sacrifice and the need to pay back debt following graduation. However, we question the values that we as a profession have. As far as we know, there is no monitoring or accountability requirements for a clinician to engage in private practice, other than to be a registered clinical psychologist. How do clinical psychologists keep themselves safe in private practice - particularly when they could easily be only 1-2 years after graduation? How do their clients know that they are sufficiently skilled to work independently, without audited requirements for clinical or cultural oversight?

As a point of comparison, it may be helpful to review the process by which lawyers commence their practice as barristers (New Zealand Law Society, 2020). Requirements include that a lawyer must have 3 years' full-time experience within the last 5 years and they are required to undertake a further course, and be assessed as being adequately skilled, in order to practice on their own.

Also, who are we serving as a profession when we engage in private practice? The health system in Aotearoa NZ continues to burst at its seams with waiting lists across our mental health services. If we as a profession are promoting private practice as an opportunity to avoid the high caseloads and limited resources within the public mental health system, what happens to those on these waiting lists?

Where does clinical psychology see itself in terms of improving equity amongst Pasifika communities? We leave this question for you to reflect upon and we challenge those in the learning institutions and on the New Zealand Psychology Board to see this as a priority for further exploration.

RECOMMENDATIONS

The following recommendations are offered for discussion, debate – and ultimately – implementation. We would also welcome other ethnic minorities to consider their applicability to building a truly representative profession in clinical psychology.

1. Early intervention – Given the small number of Pasifika applicants to clinical psychology programmes in the first place, a review of undergraduate psychology courses is recommended to explore the pipeline of Pasifika students from undergraduate to doctoral clinical psychology programmes.

A clear progression pathway from first-year undergraduate to doctoral-level clinical psychology programmes needs to be developed for Pasifika students. A review of the relationship between undergraduate psychology courses and clinical psychology programmes

is needed to ensure Pacific students are given optimal opportunity from the outset to 'have what it takes' to apply for the doctoral programme. Therefore, clinical psychology programmes will need to be visible and accessible from first-year undergraduate courses and participate in the student mentoring programmes that are generally available for undergraduate psychology students. Early visibility of clinical psychology at undergraduate level will provide a practical opportunity for students to seek information about clinical psychology programmes. There are likely to be support groups for Pasifika psychology students and that may be a viable option for clinical psychology programmes to connect and engage with.

2. Have a collective vision and strategy across all clinical psychology programmes to promote and improve equity for Pasifika students

We believe that for any initiative to work effectively, and be sustainable over time, a nationwide approach across all clinical psychology programmes to a) promote Pasifika worldviews in psychology training, and b) target representation of Pasifika students in a training programme, will begin to authentically meet the needs of Pasifika people in Aotearoa NZ. As a starting point, a national Pacific advisory group made up of key Pasifika leaders across the sectors and in the local community would be worthy of consideration to promote the role of clinical psychology among Pacific communities.

3. Targeted approach with Pasifika students and their families, from high school, to promote the relevance of psychology within a collective worldview

Engagement with Pasifika students and their families is imperative to ensure a holistic worldview is undertaken at the outset of any interest in psychology. This would essentially require a relationship with secondary schools and, equally importantly, with the Pasifika community, that begins at high school and continues throughout undergraduate psychology courses.

Each learning environment will require a different response. For example, Pasifika high school students and their families will need to know what psychology is, what it offers to the Pasifika community, what the requirements are for studying psychology and, of equal importance, how much it pays. The transparency of the psychology profession is pivotal to ensure that there is active and sustainable engagement from Pasifika families to support their family member, should they wish to embark on this journey.

At undergraduate level, a specific support programme is needed from Year One. One example is the Tuākana programme at The University of Auckland for Māori and Pacific students. The Tuākana programme for psychology has been a positive experience for some of the authors as it provided collective support for Pacific people.

[The Tuākana programme for psychology] was also a safe space to talk about worldviews, perspectives, experiences, to be heard, learn and grow together.

4. Specific scholarships for Pacific students in clinical psychology

Pacific people overall continue to face social and economic hardship and most of the authors in this article are no different. From an individual perspective, Western academic and career aspirations take priority. However, from a Pasifika perspective, family (and church) obligations and aspirations are just as important. It is not uncommon for Pasifika students to engage in short courses only, as the need to financially provide for families remains paramount. Therefore, we believe that if there were specific scholarships available for Pasifika students, this is likely to remove the economic barriers for Pasifika to engage in such training programmes.

5. Nothing about us, without us

We believe that if therapeutic services are authentically meant to be accessible for all, start with the communities that continue to be under-served by the practice of clinical psychology. Promote and actively target Pasifika representation across all levels of clinical psychology - from leadership to practice, from theory to frameworks.

We challenge the institutions to provide direct opportunity for Pasifika worldviews to be authentically incorporated in the curriculum. We do not mean having guest lecturers where one or two lectures incorporate the Pasifika worldview, we suggest that Pasifika is embedded throughout the training. For example, provide an opportunity for a Pasifika clinical formulation model to be developed or to include Pasifika case examples in assessments or create opportunities for placements and internships with Pasifika agencies/organisations. Opportunities to engage with Pasifika in clinical psychology are endless.

6. Pasifika people do not understand clinical psychology as a career choice

Pacific cultures are collective, and according to the 2018 census, the majority of Pacific peoples in Aotearoa NZ are religious and identify as Christian (7 out of 10). Furthermore, most Pacific people continue to seek support when worried from family and friends (Ataera-Minster & Trowland, 2018). This experience is typical, from among our group:

Dad could not understand why there was a need for a psychologist. His view was that if people needed help, they should either talk to their family or talk to God. Why would they want to talk to a stranger?

More education is needed amongst our Pacific communities about the role of clinical psychology. It is another approach that can work alongside support that Pacific peoples have, such as family, church and social support. It can also help provide more effective coping strategies to support one's own health and wellbeing.

As a comparison, there was a time when western medicine was frowned upon, and Pacific people in the islands continued to prioritise traditional medicine. Now, both traditional and western medicine work side by side, in both Aotearoa NZ and in the Pacific Islands. We believe that clinical psychology, overall, could have a place in holistic approaches to the health and wellbeing of Pacific people.

7. Build Pacific resources in clinical psychology programmes

Research tells us that when students can see themselves in their teachers, their student journey is likely to improve

(Nanai et al., 2017). We encourage targeted approaches to mentoring Pasifika clinical psychologists or early-career doctoral graduates to consider a part-time role with universities. Newly registered clinical psychologists are more than likely going to enter the field to practice, but could also be encouraged to remain engaged with training in manageable ways. We believe that, in order to increase Pasifika visibility in clinical psychology, influencing the curriculum as a teacher will allow students of all backgrounds to experience the reality of the cultures in Aotearoa NZ that will be needing their service.

Whilst we recommend the inclusion of Pasifika in teaching staff, we do so with caution. For example, research has shown the challenges faced by Pacific women in New Zealand universities, including experiences of being devalued and their Pasifika knowledge ignored, alongside many examples of exclusion (Naepi et al., 2020). We challenge universities that, in order to build Pasifika staff in clinical psychology programmes, the system needs to deconstruct its institutional and systemic biases and make space for indigenous and ethnic minority experience, knowledge and practice.

Future research

More work is needed to authentically include Pacific worldviews in our clinical psychology curriculum and practice. One place to start is to review our clinical psychology programmes to establish: a) To what extent are Pacific worldviews, theories, models and practices included in clinical psychology programmes to inform assessments and examinations? b) What placements or internships are supported to actively include Pasifika agencies and organisations? c) What targets are in place to achieve Pasifika representation in the recruitment of clinical psychology students and staff? d) Is there a collective vision of clinical psychology programmes throughout Aotearoa NZ to improve equity and increase accessibility of the practice to underserved communities in Aotearoa NZ? If the answers to these questions are hard to find, then simply put, we are not doing enough.

Strengths and limitations

We hope this paper is enlightening and inspiring to both Pacific and non-Pacific people associated with clinical psychology. We are keen to explore the experiences of others who may feel the 'mainstream' of clinical psychology cannot truly and safely meet their identities, even though there are good intentions. There are limitations to our expression, observed in pulling a formal 'paper' together, including about using our names in a profession where reputation matters, and where we were unsure as to how we might be seen following this publication, though recognising that the need for our voice to be heard was stronger than a fear of repercussions as students or staff in clinical psychology.

Conclusion

Whilst we have highlighted the challenges faced by our own Pacific lived experiences in clinical psychology, we are acutely aware of the need for us to work alongside our non-Polynesian family in psychology to serve our Pacific communities. We believe that growing a Pasifika workforce does not necessarily mean that the answer lies solely in increasing the number of Pasifika students and practitioners in clinical psychology. Whilst that may be a formidable solution, the reality is that this solution is decades from being realised, nor do we believe that only Pacific psychologists should work with Pacific communities. We must all be responsible in serving all of our communities in Aotearoa NZ (Ioane, 2023). There are things that we can do now to cater for Pacific students in clinical psychology training, and in the practice. There is room for all of us to share in the decision-making for clinical psychology – if we are truly authentic in creating a practice that is accessible and equitable for all our communities in Aotearoa NZ.

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Corresponding author:
Professor Julia Ioane
Clinical Psychology, Massey University
Private Bag 102904
Auckland 0632
09-212-7160
Email: j.ioane@massey.ac.nz

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Sleep hygiene mediates the relationship between perceived academic stress and insomnia symptom severity among Pasifika students in Aotearoa New Zealand

Ilaisaane F Fakapulia, Latika Samalia, and Erik Wibowo

Department of Anatomy, University of Otago

Many Pasifika students in Aotearoa New Zealand face challenges in their tertiary education. Their academic stress may potentially affect their wellbeing. Using a cross-sectional approach, we aimed to explore the proportion of Pasifika students with insomnia symptoms in the Department of Anatomy at the University of Otago, and whether their academic stress and sleep hygiene were associated with their insomnia symptoms. A brief (10-15 min) online survey was sent to 101 Pasifika science students at second- and third-year undergraduate levels in our department. Data from 57 Pasifika students (21.1 ± 1.6 years old; 28.1% Samoan, 26.3% Tongan, 24.6% Fijian) were assessed. The proportions of Pasifika students with no, mild, moderate, and severe insomnia symptoms were 15.8%, 35.1%, 31.6%, and 7% respectively. Insomnia symptoms correlated with higher levels of stresses related to students' academic self-perceptions. Insomnia symptom severity also correlated with sleep hygiene, especially: going to and getting out of bed at irregular times, staying in bed longer than necessary, consuming alcohol/tobacco/caffeine close to bedtime, going to bed feeling distressed, sleeping in an uncomfortable bed, and worrying while in bed. Sleep hygiene mediated the relationship between perceived academic stress and insomnia symptom severity. Pasifika science students in Aotearoa New Zealand may be at elevated risk of having insomnia symptoms due to academic stress. Sleep hygiene education may potentially help improve their wellbeing.

Keywords: *Academic stress; Pasifika students; insomnia symptoms; sleep hygiene; ethnic minority*

INTRODUCTION

The number of people in Aotearoa New Zealand who identify as Pasifika as their ethnicity is increasing, with ~8% in 2021 (Stats NZ, 2018b). According to Airini et al (2010), the term Pasifika refers to "peoples who have migrated from Pacific nations and territories…[and] New Zealand-based (and born) population, who identify as Pasifika, via ancestry or descent" (page 49). Similarly, the enrolment of Pasifika students at Te Whare Wānanga o Otāgo (the University of Otago) is also increasing, approximately 6% in 2021 (University of Otago, 2023). In our department (Te Tari Kikokiko, the Department of Anatomy), there are approximately 90-100 Pasifika students at second- and third-year undergraduate levels each year.

Pasifika students in Aotearoa New Zealand, however, are overrepresented in poor academic outcomes. For example, data from the First Year Health Sciences programme (Sopoaga et al., 2013) and anatomy courses (Time et al., 2023) at the University of Otago show that Pasifika students have lower academic performance than New Zealand European students. Similarly, data from Te Wānanga Aronui o Tāmaki Makau Rau (the Auckland University of Technology) also show that Pasifika students in a Human Anatomy and Physiology course have lower academic grades than Māori and Pākehā students (Brown et al., 2018). Furthermore, Pasifika students are more likely to leave tertiary studies without a qualification compared to Pākēha students (Benseman et al., 2006).

Various factors may influence academic outcomes among Pasifika students. How education is approached differs between the Western and Pacific frameworks. As in other institutions in Aotearoa New Zealand, the University of Otago was built within a Western framework and often does not take into account indigenous values in the learning environment. Pasifika student success requires a holistic learning environment that incorporate building relationships with academics, a welcoming environment, and teaching practices which are culturally appropriate to Pacific cultures (Alkema, 2014). These differences in academic approaches may potentially lead to Pasifika students struggling to adapt to the Western-style education system. Additional factors that may lead to lower academic performances and ultimately withdrawal from study among Pasifika students include motivation, family pressure, financial hardship, and lack of support (Benseman et al., 2006). Furthermore, Pasifika students at our institution may have additional stressors because the majority come from a place with strong Pacific cultures, but Dunedin only has ~3% Pacific communities (Stats NZ, 2018a), and thus they may need to adjust culturally too.

Currently, how academic stress among Pasifika students influences their wellbeing is not yet documented. Data from other university students overseas show the

association between poor sleep and academic performances (BaHammam et al., 2012; Okano et al., 2019). Thus, there is a possibility that the academic struggles among Pasifika students may affect their wellbeing, including their sleep.

In this study, we aim to investigate the proportion of Pasifika students with insomnia symptoms in our department, and whether their academic stress and sleep hygiene are associated with their insomnia symptoms. According to the International Classification of Diseases 11, insomnia disorders are "characterised by the complaint of persistent difficulty with sleep initiation, duration, consolidation, or quality that occurs despite adequate opportunity and circumstances for sleep, and results in some form of daytime impairment" (World Health Organization, 2021). In this study, we measured symptoms of insomnia using the Insomnia Severity Index (ISI) (Bastien et al., 2001), which can assess subjective report of nocturnal and diurnal symptoms of insomnia. Academic stress was measured using the Perceived Academic Stress Scale (Bedewy & Gabriel, 2015), which collects information on stresses related to pressures to perform well, excessive workloads or assessments, self-confidence of success, and time restraints for academic works. Potentially, these stresses may affect students' psychological wellbeing. Sleep hygiene includes behaviours and lifestyles that may potentially affect sleep quality, and we measured sleep hygiene using the Sleep Hygiene Index (SHI) (Mastin et al., 2006). Frequent engagement in these behaviours may worsen sleep quality, and consequently students' wellbeing.

We are also interested to determine if sleep hygiene is a mediator for the relationship between academic stress and insomnia symptoms because academic stress may potentially influence behaviours that are related to sleep. Data from our study may potentially highlight that Pasifika students may need additional support during their study, not just academically, but also for their wellbeing. Improvement in their academic performance may potentially better their overall wellbeing. Our findings should also be relevant to other under-represented ethnic minority students or international students in other countries.

METHOD

Participants

Participants information can be found in the Results section below.

Materials

Participants completed an online survey that took approximately 10-15 minutes to complete. Once the link was clicked, they viewed a screening question: "The following statements relate to the 200- and 300- levels papers you are studying this year (2021). Please select an option which is applicable to you, with the options "I am currently taking one or more anatomy papers at 200- and 300-levels", "I took one or more anatomy papers at 200- and 300-levels last semester", and "I have not taken any anatomy paper at 200- and 300-levels". Only those selecting the first two options viewed the Participant Information Sheet and the consent form. Only those who consented to the study had access to the questionnaires.

Demographic

Demographic information including age, ethnicity, gender, courses they had taken, place of birth, primary place of growing up, sexual orientation, and relationship status were collected by self-report. We used the categories for ethnicities from Statistics New Zealand where each participant may select multiple ethnicities. A total of 18 participants had Pacific ancestry and also selected another ethnicity such as Māori, New Zealand European, or Asian.

Perceived Academic Stress

Academic stress was assessed using the Perception of Academic Stress Scale (Bedewy & Gabriel, 2015), which has three subscales for stresses related to academic expectations (e.g., unrealistic expectation from parents or teachers), faculty work and examination (e.g., insufficient time for academic work, excessive workload), and students' academic self-perception (e.g., confidence in being success as a student or in future career). This scale has 18 items related to academic stress. Each can be rated on a 5-point scale ranging from "strongly disagree" to "strongly agree". Five items were reverse-scored. The internal consistency in our sample was $\alpha = 0.795$.

Insomnia Severity Index

Insomnia symptoms (e.g., difficulty falling asleep, staying asleep, problems with waking too early, and satisfaction with current sleep pattern) in the past two weeks were measured using the Insomnia Severity Index (ISI) (Bastien et al., 2001). Each item was rated on a scale from 0-4, with a higher score indicating more severe insomnia symptoms. The cut-off scores for no, mild, moderate and severe insomnia symptoms were 0-7, 8-14, 15-21, and 22-28, respectively. The internal consistency in our sample was $\alpha = 0.820$.

Sleep hygiene

The SHI (Mastin et al., 2006) asked how frequently the participant engaged in 13 behaviours that could potentially affect their quality of sleep. Each item was rated on a 5-point scale; ranging from 'never' to 'always'. Examples of the items include statements about going to bed at inconsistent times, going to bed while distressed, sleeping in an uncomfortable bedroom or on an uncomfortable bed, and doing important work close to bedtime. A higher score indicated worse sleep hygiene. The internal consistency in our sample was $\alpha = 0.753$.

Procedure

We distributed an online survey to Pasifika students in our department. The survey was approved by the University of Otago Human Ethics Committee (D21/245) and built using the Research Electronic Data Capture (REDCap) database. The survey link generated from REDCap was then distributed via email to 101 second- and third-year Pasifika undergraduate students. The Biomedical Otago Pasifika Students Association also helped distributed the survey in their mailing lists. Each participant received a $25 gift card as koha.

The survey was active from August 2021 to September 2021. This period was approximately mid-to-late semester at our institution. During this time, Aotearoa New Zealand was under Level 2 restriction of the COVID-19 pandemic. Within this period, 75 people accessed the survey link,

and 59 consented to the study. Two participants were removed because they did not answer any questions.

Data analyses

Data were analysed using SPSS (IBM version 25). Data from 57 participants were analyzed in this study (56.4% response rate). Demographic data and the proportion of students with insomnia symptoms were summarized using descriptive statistics. No sex difference was found in the scores for insomnia severity, sleep hygiene and perceived academic stress. Pearson's correlation analyses were used to determine how insomnia symptoms correlate with perceived academic stress and sleep hygiene.

Mediation analysis was conducted, using the method outlined in Baron and Kenny (1986) followed by the Sobel test, to indicate whether sleep hygiene mediated the association between perceived academic stress and insomnia symptoms. No covariate was included because of the small sample size. $P < 0.05$ was considered significant.

RESULTS

Participants were 57 Pasifika students at the University of Otago (see Table 1). Participants ranged in age from 19 to 26 years of age with an average of 21.1 (*SD* = 1.6) years old (41 participants provided age information). The three most represented ethnicities were Samoan (28.1%), Tongan (26.3%), and Fijian (24.6%). Among our participants, 35.1%, 57.9%, and 1.8% identified as male, female, and akava'ine (third gender of Cook Islands Māori descent) respectively. Most of participants (61.4%) were born in Aotearoa New Zealand (all born outside of Dunedin), 28.1% in the Pacific Islands and 5.3% stated other locations. In addition, 5.3% of participants indicated that their primary place of growing up was in Dunedin, 28.1% in the Pacific Island, and the majority in Aotearoa New Zealand other than Dunedin (57.9%). Furthermore, 57.9% of participants were in a relationship. In term of sexual orientation, 73.7% were heterosexual, 3.5% were gay/lesbian, and 5.3% were bisexual. Among our participants, 91.2% had taken second-year anatomy papers, and 47.4% had taken third-year anatomy papers.

Table 1. *Demographic data of participants*

Variables	*N*	%
Ethnicities		
Pacific peoples, not further defined	3	5.3
Samoan	16	28.1
Cook Islands Māori	7	12.3
Tongan	15	26.3
Niuean	2	3.5
Tokelauan	2	3.5
Fijian	14	24.6
Solomon Islander	1	1.8
Māori	4	7.0
New Zealander European	7	12.3
Asian	6	10.5
Other ethnicity	1	1.8
Gender		
Male	20	35.1
Female	33	57.9
Aka'vaine	1	1.8
Missing	3	5.3
Anatomy papers taken		
200-level papers	52	91.2
300-level papers	27	47.4
Place of birth		
Dunedin	0	0
New Zealand, other than Dunedin	35	61.4
Pacific Island	16	28.1
Other	3	5.3
Place grow up		
Dunedin	3	5.3
New Zealand, other than Dunedin	33	57.9
Pacific Island	16	28.1
Other	2	3.5
In a relationship		
Yes	21	57.9
No	33	36.8
Sexual orientation		
Prefer not to answer	3	5.3
Heterosexual	42	73.7
Gay/Lesbian	2	3.5
Bisexual	4	5.3
Other	1	2.0
Missing	6	10.5

As shown on Figure 1, there were high proportions of insomnia symptoms in our participants with 35.1% reporting mild, 31.6% moderate, and 7.0% severe insomnia symptoms. The severity of insomnia symptoms correlated with perceived academic stress ($r = .390$, $p < .01$) and sleep hygiene scores ($r = .627$, $p < .001$). Table 2 indicates that insomnia symptoms correlated positively with stresses related to students' academic self-perception ($r = .426$, $p < .01$). In addition, insomnia symptom severity correlated with poor sleep hygiene behaviours: going to bed ($r = .380$, $p < .01$) and getting out of bed ($r = .534$, $p < .001$) at irregular times, staying in bed longer than necessary ($r = .533$, $p < .001$), consuming alcohol/tobacco/caffeine close to bedtime ($r = .340$, $p < .05$), going to bed feeling distressed ($r = .628$, $p < .001$), sleeping in an uncomfortable bed ($r = .332$, $p < .05$), and worrying while in bed ($r = .295$, $p < .05$).

Figure 2 shows the association between perceived academic stress and insomnia symptoms was mediated by sleep hygiene. The total effect of perceived academic stress on insomnia symptoms was 3.972 (95% *CI*: 1.282, 6.661), meaning insomnia symptom severity was expected to increase by 3.972 per unit increase of perceived academic stress. The direct effect of perceived academic stress on insomnia symptom severity after adjusting for sleep hygiene was 2.295 (95% *CI*: -.018, 4.608). The indirect effect of perceived academic stress through sleep hygiene was 1.676 (95% *CI*: -.130, 3.481).

Table 2. *Correlation coefficients between insomnia symptom severity and both sleep hygiene and academic stress.*

Subscale/Item	Correlation coefficient
Perceived academic stress subscales	
Stresses related to academic expectation	.213
Stresses related to faculty work and examination	.223
Stresses related to students' academic self-perceptions	.426**
Sleep hygiene items	
I take daytime naps lasting 2 or more hours	.115
I go to bed at different times from day to day	.380**
I get out of bed at different times	.534***
I exercise to the point of sweating within 1hr of going to bed	.012
I stay in bed longer than I should more than twice a week	.533***
I use alcohol, tobacco or caffeine within 4 hours of going to bed	.340*
I do something that may wake me up before bedtime	.228
I go to bed feeling stressed, angry, upset or nervous	.628***
I use my bed for things other than sleep or sex	.197
I sleep on an uncomfortable bed	.332*
I sleep in an uncomfortable bedroom	.241
I do important work before bedtime	.182
I think, plan or worry when I am in bed	.295*

*Significant associations between insomnia symptoms and the independent variable, $p < .05$; ** $p < .01$; *** $p < .001$

Figure 1. Proportion of different insomnia symptom severity among Pasifika students in our sample.

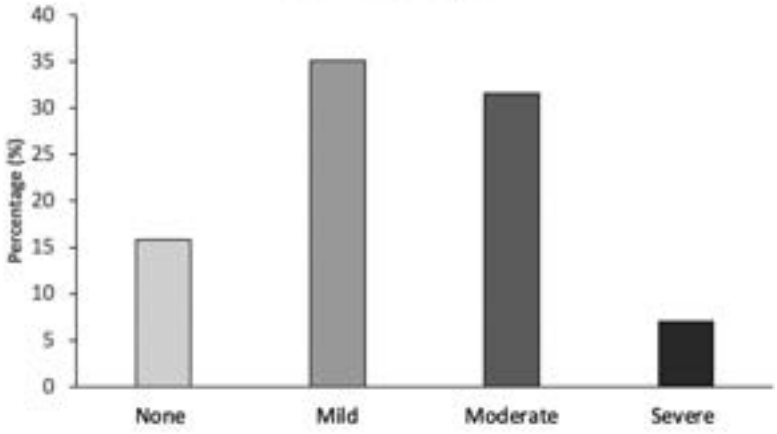
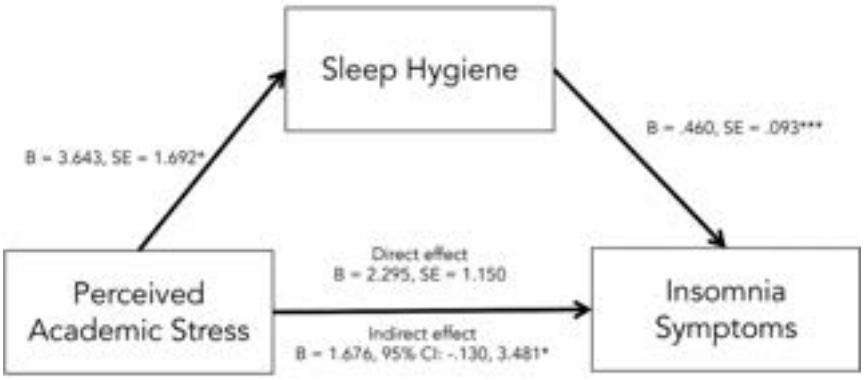


Figure 2. Sleep hygiene mediated the relationship between perceived academic stress and insomnia symptoms.



DISCUSSION

There are a few main findings from this study. First, self-reported insomnia symptoms are common among the Pasifika student cohort from our department, with 38.6% of our participants reported of having moderate-to-severe insomnia symptoms. Second, insomnia symptoms correlated with stresses associated with students' academic self-perceptions, and various sleep hygiene behaviours. Third, sleep hygiene mediated the relationship between perceived academic stress and insomnia symptoms among Pasifika students. These findings highlight the importance of supporting under-represented Pasifika students in Aotearoa New Zealand as their wellbeing may be significantly impacted if they face academic struggles. In addition, our findings may be relevant to other under-represented ethnic minority students such as Māori or international students in our institutions or elsewhere.

Insomnia symptoms and perceived academic stress

Of major concern in this study is the high proportion of insomnia symptoms in our sample. While we cannot compare this proportion with students of other ethnicities in the same cohort, such a proportion is higher than the proportion in the general population in Aotearoa (27.2%) (Paine et al., 2005) or medical students in our institution (49.5%) (Duthie et al., 2022). This finding emphasizes the critical needs for our institution to provide support for Pasifika students so they can have better wellbeing during their study. The Otago Medical School, for example, offers a module on self-care for medical trainees. A similar seminar or workshop could potentially be offered to Pasifika students at the beginning of a semester so they can have tools for managing their sleep on their own, for example through sleep hygiene education or relaxation techniques.

The finding that high academic stress is linked to more severe insomnia symptoms is not totally surprising. Poor sleep have been known to be linked to lower academic marks in university student populations in the US (BaHammam et al., 2012; Okano et al., 2019). For example, medical students who perform well academically sleep earlier, and sleep for a longer duration than those achieving lower marks (BaHammam et al., 2012). In addition, Li et al. (2016) also showed that academic stress is associated with poor sleep quality among university students in China. These findings suggest that academic stress may influence sleep in students across cultures.

In this study, we showed that stresses related to students' academic self-perceptions correlate with insomnia symptom severity among Pasifika students. The items in this subscale are related to their confidence to succeed academically and future career (Bedewy & Gabriel, 2015). Another study had previously shown that poor academic self-perception is related to psychological distress (Yamada et al., 2014), which could potentially be linked to poor sleep too. We did not find a similar relationship for stresses related to academic expectation (i.e., those associated to pressures from family, peers, teachers) or faculty work and examinations (i.e., those related to workload). This is probably because these later subscales measure external factors rather than students' internal assessment of their performance.

As noted in the Introduction, Pasifika students continue to be over-represented in poor academic outcomes in Aotearoa New Zealand (Benseman et al., 2006; Brown et al., 2018; Sopoaga et al., 2013; Time et al., 2023). At our institution, many departments (including ours) have Pasifika student liaisons who help answer queries related to the academic matters of Pasifika students, and the university's Pacific Islands Centre also organizes tutorials for Pasifika students. Additional initiatives to improve student's academic outcomes could potentially be explored. For example, bridging programmes could be developed to help students transition from lower to higher undergraduate levels. Undoubtedly the type of learning and assessment styles change as students proceed to more senior levels. Thus, students may benefit from additional preparation for later undergraduate levels. Similar programmes have been successfully offered in other institution overseas (Ashley et al., 2017; Bradford et al., 2021; Strayhorn, 2011), so this could be one way that our institution could explore. Hypothetically, if their academic outcomes are improved, their psychological wellbeing may potentially be better as well.

Our team is currently conducting a study to explore the study habits of Pasifika students as well as their perception on various anatomical topics. Identifying these may help us develop a plan to improve their academic support. We also recognize that some topics covered in our anatomy courses may be considered as taboo (*tapu*) for Pasifika students. These include the use of cadavers (*tūpāpaku*) in laboratory teaching and the discussion of head and reproductive anatomy. It remains to be determined if students who are uncomfortable studying these topics may have elevated academic stress.

Sleep hygiene as a mediator

The mediating effect of sleep hygiene on the relationship between perceived academic stress and insomnia symptom severity warrants an in-depth discussion. There is a possibility that students with high academic stress may engage in behaviours that are related to poor sleep. For example, if they procrastinate completing an assignment or studying for an exam, they may go to sleep late, consume caffeinated drinks close to bed time in order to stay awake for studying, or being distressed in the evening. Indeed, our correlation analyses confirm that more severe insomnia symptoms are related to frequently going to bed and getting out of bed at inconsistent times, staying in bed longer than necessary, consuming alcohol/tobacco/caffeine close to bedtime, going to bed feeling distressed, sleeping in an uncomfortable bed, and worrying while in bed. Considering that this survey was launched in mid-to-late semester, students might have had more assessments due during our recruitment period, and thus they might have elevated stress levels.

We also recognize that religion is an important aspect among Pasifika students. In the most recent census by Stats NZ, almost 80% of Pacific peoples in Aotearoa New Zealand have religious affiliation (Stats NZ, 2018b). Considering that Pasifika population in Dunedin is small, one of the ways Pasifika students can meet Pacific peoples

is through church affiliation. Anecdotally, church activities and responsibilities often take precedence when these things arise and, for Pasifika students, they must drop what they are doing and attend to them (Evans, 2018). Consequently, these commitments may lead to students getting home late, and thus they have to stay up later to study, affecting their sleep hygiene.

Limitations

Our study has several limitations. First, our sample size is small, which limits our statistical analyses. However, this is expected as the Pasifika students in our department are ethnic minorities, so their numbers are expected to be smaller than New Zealand European students. Suffice to say, we sent out the survey to 101 students, and recruited over 50% of them. Secondly, we did not recruit students of other ethnicities for comparison. Thus, from the data collected here, we cannot conclude that the findings are unique to Pasifika students. However, given the similarities in cultures, some results may be similar to Māori students. Thirdly, our data are based on self-report, and scales like the ISI have limitations. For example, the ISI cannot separate primary and comorbid insomnias (Morin et al., 2011), and participants were not asked if they had been clinically diagnosed with insomnia, thus those who had elevated ISI scores might not necessarily have insomnia. A future study using objective measures such as polysomnography or actigraphy would help determine how specific sleep parameters are most affected during their study.

Conclusion

In conclusion, our findings provide evidence that a high proportion of Pasifika students in our department have some level of insomnia symptoms. Additionally, sleep hygiene mediates the association between perceived academic stress and insomnia symptom severity. Based on these findings, academic support to Pasifika students may potentially reduce their academic stress and subsequently improve their wellbeing including sleep. Institutions in Aotearoa New Zealand or elsewhere should ensure that their under-represented students (such as ethnic minority or international students) are well-supported during their study. While academic support is important, students may also benefit from initiatives (e.g., workshop or seminar) that are designed to improve their wellbeing.

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Corresponding Author
Dr. Erik Wibowo.
Department of Anatomy, University of Otago, Dunedin
Phone: +64 03 470 4692.
Email: erik.wibowo@otago.ac.nz
ORCID: 0000-0002-5309-1490

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Implicit Bias Training for New Zealand Medical Students using Cognitive Bias Modification: An Outline of Material Development

Che-Wei Hsu[1] and Zaine Akuhata-Huntington[2]

[1]Psychological Medicine, Dunedin School of Medicine, University of Otago
[2]Kōhatu Centre for Hauora Māori, Dunedin School of Medicine, University of Otago

Health inequity for marginalized groups increases the risk of developing health problems. Healthcare providers' unconscious bias contributes to this inequity. A novel bias modification method—called Cognitive Bias Modification for stereotype (CBM-S)—is a digital tool designed to be used in conjunction to existing bias training to address medical students' biases toward Māori (an indigenous population in Aotearoa New Zealand). CBM-S encourages non-stereotypical interpretations through relevant and specific text-based scenarios and has been tested against control. To improve the scenario's relevance and specificity, here, we adopted a user-centered approach to materials development for CBM-S that involved iterative inputs from medical students and Māori participants to achieve our objectives. We outlined the material development process for CBM-S to provide a guide for researchers and educators in developing CBM-S training.

Keywords: *Cognitive bias modification, implicit bias training, medical student bias, health education, health inequity, indigenous healthcare*

INTRODUCTION

Health inequity refers to the unequal access to health resources and systematic disparity in patients' healthcare experience and overall health status (McCartney et al., 2019). It is a significant global issue, especially for marginalized groups (e.g., indigenous populations, rainbow communities, older persons, people with disabilities; Baah et al., 2019). Health inequity is a risk factor for developing both mental and physical health problems (Paradies, 2006). This is due in part to barriers in accessing healthcare services (Ellision-Loschmann & Pearce, 2006; Harris et al., 2012) and patient's negative experiences during the health-seeking process (Cooper et al., 2012; Harris et al., 2012). It has been well documented that healthcare providers' implicit (unconscious) bias contributes to such barriers (Blair IV et al., 2001; Gonzalez et al., 2014; Smedley et al., 2003; van Ryn & Fu, 2003; White III, 2011). Implicit bias is often difficult to address; conventional bias training is often cognitively and temporally demanding and requires effortful introspection and frequent and long-term education (Forscher et al., 2019). The present paper outlined the material development process for a novel bias training tool called Cognitive Bias Modification for Stereotype (CBM-S). CBM-S is a digital, self-administered training tool that addresses New Zealand medical students' *interpretation bias* of common healthcare scenarios involving Māori patients (Hsu & Akuhata-Huntington, 2024). CBM-S targets bias at the implicit level and is designed to complement existing bias training.

Content Specificity in Interpretation Bias

In information processing theory, scholars have shown that an ambiguous social situation can elicit multiple interpretations, and that subsequent responses to that situation reflect the selected interpretation (Atkinson & Shiffrin, 1968; Lachter et al., 2004). An interpretation bias occurs when an individual consistently follows a similar thought pattern (Nisbett & Ross, 1980), for example, interpreting that Māori patients who ask a series of questions about treatment reflects their lack of education. In many studies, researchers have demonstrated *content specificity* in interpretation bias; that is, interpretation bias is strongest when the situation matches the individual's beliefs (Mathews & MacLeod, 1994; Savulich et al., 2015; Savulich et al., 2017; von Hippel et al., 1997; Yiend & Mackintosh, 2004). For instance, von Hippel et al. (1997) captured participants' gender and ethnic bias by measuring their interpretation of common situations involving females and African Americans, respectively. In that study, male undergraduates completed an implicit bias measure—the Linguistic Intergroup Bias (LIB; Maass et al., 1989), which included text-based scenarios that could elicit stereotypical interpretations about the target group (i.e., women or African Americans). To assess for gender bias, students were randomly assigned to read one of two scenarios involving an ambiguous situation (e.g., *unable to change a blown fuse*). These scenarios were designed to reflect gender stereotype-congruent situations. Each story included either a male name (e.g., *James*) or a female name (e.g., *Molly*). Students provided similarity ratings of four short interpretations of each scenario. The statements varied in their degree of abstraction [e.g., *James/Molly is unable to change the fuse* (concrete) to *James/Molly is dependent* (abstract)]. A higher average rating on abstract interpretations of scenarios with a female name indicated stronger gender bias against women.

To assess ethnic bias, ambiguous scenarios were presented to students (e.g., scenarios involving a slam dunk champion or a spelling-bee winner). These scenarios were designed to reflect ethnic stereotype-congruent situations. Each story was either accompanied by a

photograph of an African American or a Caucasian. Again, students provided similarity ratings of four short interpretations of each scenario that varied in the level of abstraction (e.g., *Johnson performs 360-degree slam-dunk* (concrete) to *Johnson is athletic* (abstract)]. In general, 43% of students showed gender bias towards women; 45% of students showed ethnic bias towards African Americans. Taken together, these results highlighted the use of content-specific experimental materials in capturing biased interpretations of relevant scenarios.

User-Centered Development of Bias Training

Building on from this notion of *content specificity*, employing a user-centered development approach may maximize that specificity and relevance of materials to be used in bias reduction training, such as CBM-S. CBM-S adopts methods of an emerging class of bias modification training called CBM (Hsu, 2023), which was conventionally designed as a therapeutic for various mental health concerns (Hirsch et al., 2018; Koster & Horrelbeke, 2015; Woud et al., 2017). In a clinical application of CBM, researchers have also demonstrated the importance of using content-specific materials in capturing and modifying interpretation bias in people with depression (Lamberton & Oei, 2008). That is, training for depression should include materials that invite *negative* interpretation bias but encourage a *positive* resolution. To improve the content-specificity of materials used in CBM training, Hsu et al. (2023) adopted a user-centered approach to materials development by working collaboratively with experienced clinical psychologists and experts by experience (people with first-hand experience of mental health concerns). Together, these contributors co-created CBM materials that were relevant to their everyday experiences to better capture and modify unhelpful interpretation bias.

In the present paper, we illustrated a similar user-centered development approach to create content for a single-session CBM-S. CBM-S has recently been tested against control in medical education to address students' ethnic bias towards indigenous patient groups in NZ, and results have been promising (see Hsu & Akuhata-Huntington, 2024). Bias modification is achieved by using implicit inferential learning via a word task. To illustrate, CBM-S involves presenting medical students with a set of *user-generated*, *content specific* materials (i.e., healthcare scenarios involving Māori). The final word of each scenario is first omitted to create ambiguity with the purpose of eliciting multiple interpretations. To create the word task, a fragment of the final word of each scenario is revealed ("*…overgen-ralis-d"*). Students enter the first letter of that word to complete the word task, which resolves the ambiguity of the scenario in a *non-ethnic stereotype* manner. This prompted word task is not only effective in guiding the training activity, but more importantly, it is a crucial method to *implicitly* induce a less biased response. According to learning theories, guiding users to respond in a forced direction through cued prompts leads to improved learning outcomes than to provide information in an open-ended manner (Adesope et al., 2017; Rowland, 2014).

CBM-S has several advantages over existing bias training in that it offers an alternative, cost-effective approach that can be self-administrated and delivered through digital platforms. This feature enhances its accessibility and scalability, making it a more feasible option for a wider range of individuals. Beyond this, CBM-S takes a different approach to bias modification. More specifically, existing implicit bias training methods such as metacognition, fact provision, group discussions, and counterstereotype exemplars, involve passive information delivery about social groups, challenging preconceived notions (Joy-Gaba et al., 2010) and promoting awareness of biases concerning those groups (Sabin et al., 2022). CBM-S targets interpretation bias at an *implicit* level, aiming to address biases in a more nuanced and indirect manner through the word task and ambiguous scenarios previously described.

The present paper provides the detailed development and evaluation process of CBM-S content and assessment materials, which had the following objectives and methodology:

- **Objective 1:** Adopt a user-centered approach, with input from medical students and Māori participants to create and evaluate content-specific material to be used in CBM-S and tested against control. The methodology for Objective 1 includes two stages: content creation and evaluation.
- **Objective 2:** Obtain reliability ratings of interpretation bias assessments and user feedback of CBM-S. The methodology for Objective 2 involves one stage of collecting user feedback and reliability data for two interpretation bias assessments. In the present paper, we adopted two interpretation bias measures that are commonly used to assess interpretation bias in CBM studies: the Scrambled Sentence Task (SST; Rude et al., 2003; Rude et al., 2022) and Similarity Rating Task (SRT; Eysenck et al., 1991) The SST and SRT are reliable measures of interpretation bias in psychopathology (e.g., SST: Cronbach's α of .79, Würtz et al., 2022; SRT: α = .82, Berna et al., 2011). Please see below in the method section for more details on the development of these two measures.

METHOD and RESULTS

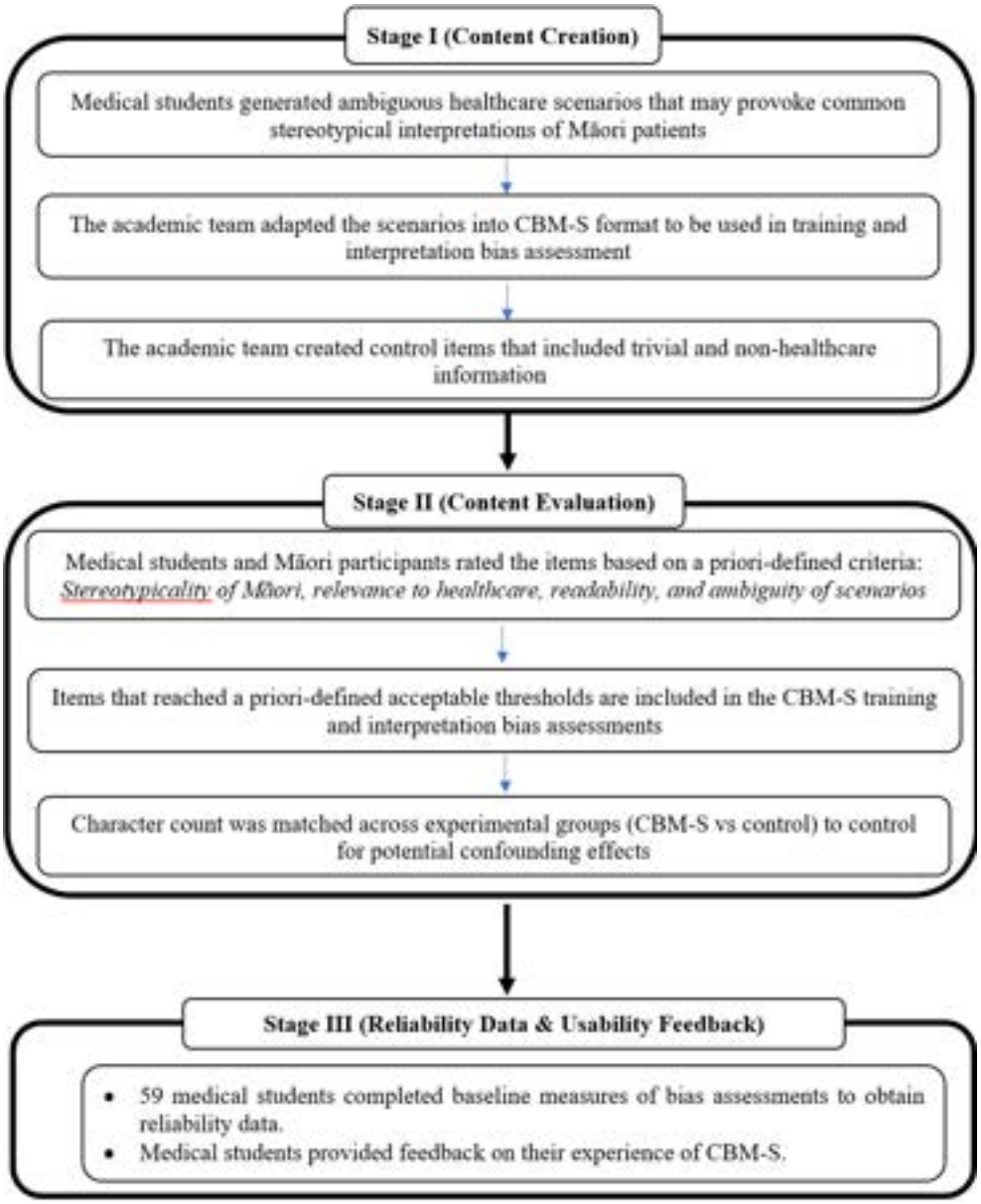
The development and evaluative process of materials for Cognitive Bias Modification for Stereotype (CBM-S) involved varying inputs from medical students and Māori participants (see Figure 1, for a schematic of a three-stage iterative development process). The CBM-S program of work received ethical approval from the University of Otago Ethics Committee (reference: 22/063). We obtained informed consent from all participants in the study.

Stage I: Content Creation

Healthcare Scenario

We invited a group of medical students (N = 5) to each generate 20 common healthcare scenarios involving Māori to be used for developing CBM-S items. From the 100 scenarios, we aimed to develop 80 CBM-S items and 20 interpretation bias assessment items. To do this, we provided a brief introduction about CBM-S, followed by

Figure 1. *Schematic of the material development process*

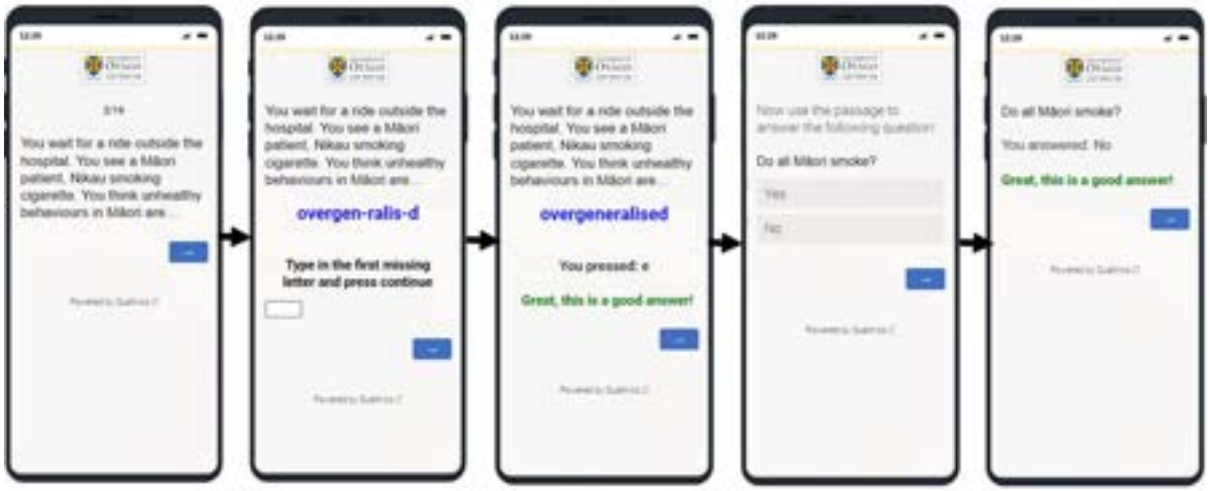


three exemplars of healthcare scenarios involving Māori (e.g., Māori refuses western medicine). Each participant was asked to '*write down 20 scenarios common to healthcare settings that you think may trigger ethnically biased thoughts about Māori patients and to provide both a stereotype/prejudice/discrimination and non-stereotypical/neutral interpretation of that scenario.*' Pre- and post- this task, we asked students to rate their mood using a Visual Analog Scale to monitor for any abrupt mood changes in sadness, anger, distress, anxiety (Gould et al., 2001); we did not find any significant mood changes.

Training Items

Following scenario creation, the academic team—consisting of one Māori researcher and one non-Māori researcher—randomly selected 80 of the 100 scenarios and adapted them into standardized CBM format to be used as training items for CBM-S. CBM format included a three-sentence passage followed by a yes/no question. We removed one or more letters of the final word of each item to create the word task (we removed generally vowels, depending on the length of the word). Participants completed the final word to resolve the ambiguity in a non-ethnic stereotypical manner. We adopted the student-generated *non-stereotypical/neutral* interpretation of each scenario to create the final word for each item. See Figure 2a for an example training item. Gender-neutral pronouns (i.e. they, them) and second-person pronouns (i.e. you, yours) were adopted to generate a first-person perspective of the scenarios. First-person perspective encourages active mental participation in text-based narratives that promotes readers to develop richer perspective-taking (Brunyé et al., 2011), which has been shown to improve the modification effects of the CBM method (Holmes & Mathews, 2005; Holmes et al., 2006).

Figure 2a. *An example CBM-S training item.*



Three additional features were included in the training items. First, to encompass a broader experience of ethnic bias, we arranged the training items into five domains of modern racism toward Māori (Satherley & Sibley, 2018):

1. Negative affect (*negative feelings toward Māori*)
2. Anxiety (*feeling anxious during encounters with Māori*)
3. Denial of historical reparation (*past injustice is non-transferrable to the present day*)
4. Denial of contemporary injustice (*discrimination is not a present-day issue*)
5. Symbolic exclusion (*Māori culture is not representative of Aotearoa New Zealand*)

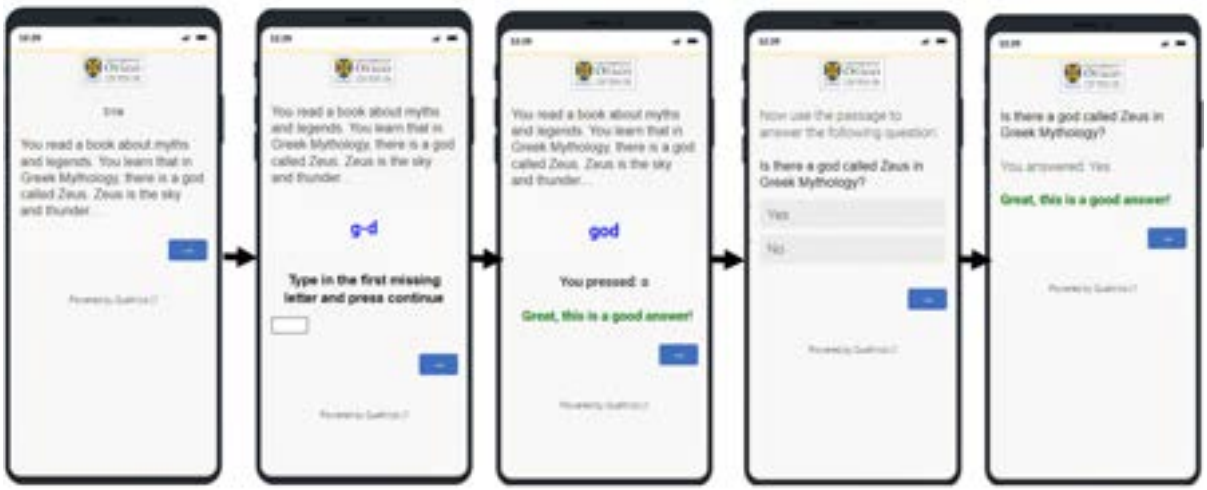
Second, we included dedicated verbs in the final sentence of each item to reflect the pipeline of cognitive information processing, starting from higher-level thoughts to more stable schemata/beliefs (Rumelhart, 1984). Verbs used to reflect processing at each level included: 1) 'think, sense, imagine' (*top level*), 2) 'assume, presume, suppose' (*intermediate level*), and 3) 'believe, are sure, know' (*bottom level*).

Third, researchers have shown that, to achieve effective group bias modification, it is important to both individuate traits and characteristics to the person (Lebrecht et al., 2009; Lee et al., 2017; e.g., *DeAndre is kind*) as well as generalize them to a social category (Gawronski et al., 2018; e.g., *Blacks are kind*). In order to reflect this in CBM-S, initial training blocks used specific Māori names (e.g., Mrs Wiremu) before progressively including group labels (i.e., Māori patients).

Control Items

The academic team created 80 control items to test the modification effects of CBM-S. The aim was to create control items with contents that were unambiguous, non-medical, and non-cultural. We adopted trivial passages from https://mommypoppins.com/kids/fun-facts-for-kids-random-fun-facts), and created non-medical and non-cultural everyday scenarios [e.g., '*It is raining so you carry an umbrella with you. You walk to the bus stop and wait for the bus. You see there are already many people…*(waiting)']. The format of control items was identical to the training items (i.e., a three-sentence

Figure 2b. *An example control item.*



scenario using gender-neutral second-person pronouns with a fragmented final word and a follow-up yes/no question). The fragmented word is used to complete the passage—as opposed to resolving ambiguity. See Figure 2b for an example control item.

Interpretation Bias Measures

The academic team adopted the remaining 20 of the 100 student-generated healthcare scenarios to create two interpretation bias measures that are commonly in CBM studies—Scrambled Sentence Task (SST) and Similarity Rating Task (SRT). Two sets of SSTs and SRTs were developed for pre- and post-assessment of interpretation bias in CBM-S. Interpretation bias measures only included specific Māori names to promote the implicit processing of assessment items (Harris et al., 2016; Paradies et al., 2014).

Bias Measure: Scrambled Sentences Task

The SST consisted of scrambled sentences of six words each, including two critical words that were adopted from student-generated interpretations of healthcare scenarios. One word depicted a common stereotype of Māori patients; the other word opposed that depiction in a non-stereotypical/neutral manner. An example of a scrambled sentence is: '*habits / engages / Miss Ropata / in / **unhealthy** / **good**,*' (critical words in bold). Using one of two critical words, participants form either a five-word non-stereotypical interpretation ['*(Miss Ropata) engages in **good** habits*'] or stereotypical interpretation ['*(Miss Ropata) engages in **unhealthy** habits*']. See Figure 3a for an example SST item.

Bias Measure: Similarity Rating Task

The SRT (also known as the Ambiguous Scenario Test) consisted of two parts—encoding and recognition. Encoding items included a three-sentence scenario using gender-neutral second-person pronouns followed by a fragmented final word to induce the ambiguity of the passage; a follow-up yes/no question reinforces that ambiguity. We created titles for each scenario to be used as a cued reminder of the related scenario during the recognition phase. Recognition items included two short statements associated with each encoding item. We adopted student-generated interpretations of healthcare scenarios to develop the two short statements—one statement provided an explanation of the scenario that is consistent with common stereotypes of Māori patients; the other statement explained the scenario in a non-stereotypical/neutral manner. See Figure 3b for an example SRT item.

Figure 3a. *An example SST assessment item.*

Stage II: Content Evaluation

Procedure

Another group of 10 raters (medical students and Māori) evaluated the items created in Stage I. One medical student was unable to complete all of the ratings and did not respond to subsequent communications, resulting in nine final raters (n = 4 medical students; n = 5 Māori participants). Input from each contributor varied according to the task required and is discussed below. Training and control items were interleaved in random order to blind raters from the type of item (i.e., training or control items); for assessment items, stereotype, and non-stereotype statements were presented in random order.

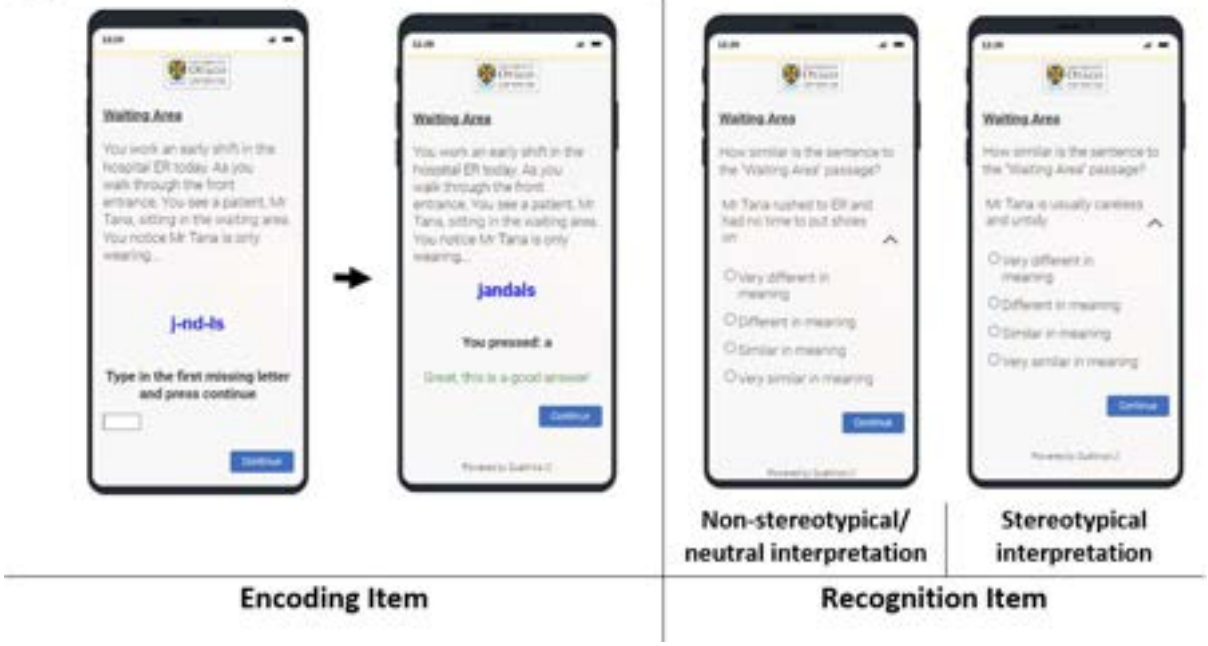
Content Specificity: Training Items

For the purpose of rating, we adopted student-generated interpretations of healthcare scenarios to create two final fragmented words for each scenario—one word resolved the ambiguity of the training item in a non-stereotypical/neutral manner; the other word resolved the ambiguity in a manner that is consistent with common stereotypes of Māori patients. Medical students rated the training items based on a set of a priori-defined criteria (*stereotypicality towards Māori; relevance to a healthcare setting; readability and ambiguity of the scenario*) using a 7-point scale [1 = not at all… to 7 = completely…(*criterion*)]. Māori participants rated the training items on the stereotypical criterion only to reflect a user-centered development approach and promote content specificity. More specifically, to promote an effective and culturally sensitive training approach, it is important to include items that Māori consider to be stereotyping their culture and ethnicity. Items that were excluded based on medical students' ratings of stereotypicality were included if Māori raters had rated those items as stereotypical (21% of items met this criterion). Here is one example of an item that met this criterion: '*While you examine a Māori patient, you tilt their head to the side. As you do this, they appear to move their head away from you. You presume that they are…(uncomfortable/distrustful)*.' Thresholds were set, a priori, to determine acceptable training items: *stereotypical resolution* (≥ 5*), non-stereotypical resolution* (≤ 3*); readability* (≥ 5*); relevance* (≥ 5*); ambiguity* (≥ 2 counts of *'Yes'* responses).

Content Specificity: Control Items

Ratings for the control items followed an identical procedure to that of the training items. For the purpose of rating, two final fragmented words were created. Thresholds were set, a priori, to determine acceptable control items: *stereotypicality of the two fragmented words* (≤ 3*); readability* (≥ 5*); relevance* (≤ 3*);*

Figure 3b. *An example SRT assessment item.*



ambiguity (≤ 1 count of *'Yes'* responses).

Interpretation Bias Measures

Medical students rated 20 SRT encoding items and recognition items based on a set of a priori-defined criteria using a 7-point scale [1 = not at all… to 7 = completely…(*criterion*)]. For encoding items, medical students provided ratings of '*relevance to a healthcare setting'* and '*readability of the scenario*;' for recognition items, both medical students and Māori participants provided ratings of '*stereotypicality.'* Thresholds were set, a priori, to determine acceptable items to be used in interpretation bias assessments: *stereotypical interpretation* (≥ 5*); non-stereotypical interpretation* (≤ 3*); readability* (≥ 5*); relevance* (≥ 5*).* We did not collect ratings of SST items due to the similarity of item contents between SST and SRT as a result of using the same set of student-generated scenarios from Stage I.

Name Ratings

The Māori names to be used in the final set of CBM-S training and assessment items were selected based on user ratings using a 7-point scale (*1 = extremely common non-Māori name to 7 = extremely common Māori name*). The same group of medical students and Māori participants evaluated 16 Māori names and 14 English names that were randomly selected from a list of popular names in New Zealand between 2019-2021 (https://smartstart.services.govt.nz/news/baby-names-maori). Names that reached a priori-defined acceptable value of (≥ 5) were included in the final set of CBM-S items (Note that only the finalized version of CBM-S included the names that were selected here. Materials used for rating during Stage II included group labels (i.e., Māori) and Māori names).

Results

Following the collection of user ratings, we reviewed and refined the items based on a priori-defined acceptable rating values for each criterion and identified any systematic differences between items. This detailed review process is outlined below.

Content specificity: Training and Control Items

First, we examined the ratings for each training and control item independently. Items that fell below a priori-defined acceptable value for each rating criterion were excluded from the final set of CBM-S training and control items. Fifty-nine CBM-S training items and all control items reached acceptable ratings for each criterion

Table 1. *Mean (SD) item ratings (training; control; assessment)*

	Students Ratings (N=4) Mean (*SD*)			Māori Ratings (N=5) Mean (*SD*)		
	Training Items	Control Items	Assessment Items	Training Items	Control Items	Assessment Items
NonStereotypical Interpretation	1.25 (0.64)	1.00 (0.00)	1.27 (0.71)	1.60 (1.38)	1.60 (1.20)	2.04 (1.75)
Stereotypical Interpretation	5.71 (1.26)	1.00 (0.00)	4.97 (2.06)	6.55 (1.06)	1.60 (1.20)	6.21 (1.61)
Relevance to Healthcare	5.98 (1.19)	0.80 (0.47)	6.48 (1.24)	N/A	N/A	N/A
Readability	6.86 (0.58)	6.76 (0.64)	6.58 (1.05)	N/A	N/A	N/A

Table 2. *Participant Descriptive Data*

	Medical Students (N = 59)
Age (Years) Mean (*SD*)	21.59 (1.97)
Ethnicity	
NZ European	31
Māori	8
Pasifika	1
Chinese	9
Other (e.g., Dutch, Japanese)	10
Gender (female:male:non-binary)	39:19:1
Year in Medicine (ELM:ALM)	34:25

(contact author for the complete set of items). Inter-rater reliability on each rating criterion for training items were: $ICC_{non\text{-}stereotype}$ = .42; $ICC_{stereotype}$ = .57; $ICC_{relevance}$ = .72. We do not report ICC scores for ratings of control items and the readability and ambiguity criteria of training items, as might be expected, there was limited variability in these data to make meaningful interpretations of ICC values (Bobak et al., 2018).

Next, we examined any group differences as a function of the mean rating of each criterion (*stereotypical and non-stereotypical resolution, relevance, readability, ambiguity*).

Table 1 shows the mean ratings of the final set of CBM-S training and control items.

For these analyses, we combined ratings of Māori participants and medical students (see Figure 4). Consistent with our aim, Paired Samples t-tests between the training and control groups revealed systematic differences in:

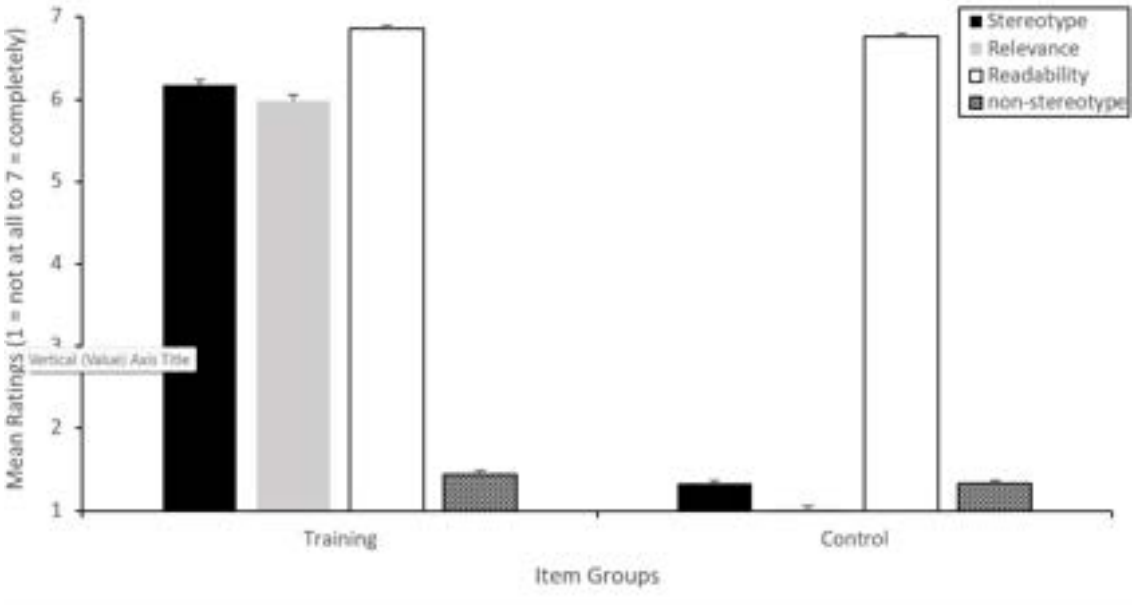
- mean ratings of *stereotypical resolution* between training (M = 6.18, SD = 1.23) and control items (M = 1.33, SD = .94), $t(530)$ = 80.48, $p < .001$.
- mean ratings of *relevance to healthcare* between training (M = 5.98, SD = 1.19) and control items (M = 1.02, SD = .13), $t(234)$ = 63.37, $p < .001$.
- the proportion of students who thought training items (86%) and control items (33%) were *ambiguous*, χ^2 (1) =34.33, $p < .001$.

That is, relative to the control items, training items provided a more consistent depiction of common stereotypes of Māori patients, were more relevant to a healthcare context, and were more ambiguous. On the other hand, we did not find any statistically significant differences in ratings of *readability* between training (M = 6.86, SD = .58) and control items (M = 6.76, SD = .64), $t(234)$ = 1.79, p = .07, and in ratings of *non-stereotypical resolution* between training (M = 1.44, SD = 1.13) and control items (M = 1.33, SD = .94), $t(530)$ = 1.65, p = .10.

In order to match the number of training and control items, we excluded 21 control items based on the item's length, operationally defined as the item's character count. This controls for potential and inadvertent effects of time spent in CBM training (Standage et al., 2009). The Two One-sided Test (TOST) for testing equivalence (Lakens et al., 2018) revealed that the length of training items (M = 134.46, SD = 16.76) was equivalent to that of control items (M = 132.52, SD = 12.55), $t(107)$ = -1.74, p = .04, given an equivalence bound of 6.67 to -6.67 (95% CI).

Interpretation Bias Measures

Figure 4. *Mean ratings of each criterion (excluding ambiguity) across training and control items.*



Next, we examined the ratings for each assessment item independently. Items that fell below a priori-defined acceptable value for each rating criterion were excluded from the final sets of assessment items. Fifteen items reached an acceptable rating for each criterion and were adapted to be used in the final set of SRT and SST items (contact author for complete sets of assessment items). Some items were reworded to create additional content to accommodate for the number of items needed for the bias measures (i.e., the SST consisted of 15 items for each version; the SRT consisted of eight items for each version). Interrater reliability for each of the rating criteria were: $ICC_{non\text{-}stereotype}$ = .68; $ICC_{stereotype}$ = .86; $ICC_{relevance}$ = .52. Again, we do not report ICC scores for ratings of the readability criterion due to floor effect (Bobak et al., 2018).

We then examined any differences in the mean rating of the *stereotypical* and *non-stereotypical resolutions* of the items. Table 1 above shows the mean ratings of the final set of SRT items (recall that we did not collect ratings of SST items due to the similarity of item contents between SST and SRT). For these analyses, we combined ratings of Māori participants and medical students. Consistent with our aim, a Paired Samples t-test revealed a systematic difference in mean ratings of *stereotypical interpretation* (M = 5.66, SD = 1.92) and *non-stereotypical interpretation* (M = 1.70, SD = 1.44), $t(134) = 20.02$, $p < .001$. Specifically, relative to non-stereotypical interpretations, stereotypical interpretations provided a more consistent depiction of common stereotypes of Māori patients. High mean ratings were obtained for items' *relevance to a healthcare setting* and *readability* (see Table 1).

Name Ratings

To obtain a list of names common to Māori to be used in the final set of CBM-S training and assessment materials, we examined the ratings for each name independently. Names that fell below a priori-defined acceptable value for each rating criterion were excluded from the final list of names. Ten names reached the acceptable value, in ascending order of commonality to a Māori name were: *Miss Kahaki, Kiwa, Mr Te Wiata, Mrs Waerea, Mr Tipene, Ms Awatere, Miss Wiremu, Miss Ropata, Nikau, Mr Rewi*. A high degree of reliability was found between raters on name ratings (ICC_{name} = .93). A Paired Samples t-test revealed a difference in mean ratings of these final 10 names (M = 5.30, SD = 1.74) and the names that did not reach acceptable value (M = 2.72, SD = 1.47), $t(298) = 13.49$, $p < .001$.

Stage III: Testing & User Feedback

Participants

As a part of the CBM-S efficacy study (Hsu & Akuhata-Huntington, 2024), we recruited from the University of Otago Medical School 60 medical students in Early Learning in Medicine (ELM: 1st and 2nd year in medicine) and Advanced Learning in Medicine (ALM: 3rd-5th year in medicine). Due to technical issues, one student's data were lost. The final sample included 59 students. Table 2 shows participants' descriptive data.

Procedure

CBM-S testing was hosted on Qualtrics—an online survey platform. After the students received information about the study and provided eConsent, they completed the training and assessments online using either their personal computers or mobile phones/tablets. We obtained user feedback on CBM-S training and examined the reliability of two interpretation bias measures.

User Feedback

A set of questions were included post-training to incorporate user feedback to help refine and improve CBM-S. Medical students rated the training items on the following features using a 7-point scale: **enjoyment**: *1-annoying* to *7-enjoyable*; **clarity:** *1-clear* to *7-confusing*; **interest:** *1-not interesting* to *7-interesting;* **ease of use:** *1-complicated* to *7-easy*. These rating criteria were selected from a 10-scale User Experience Questionnaire based on coverage of the scales and their relevance to CBM-S. The questionnaire was designed to measure users' experience of interactive products (Laugwitz et al., 2008).

Interpretation Bias Measure: SST

Recall that we developed two versions of the SST (SSTv1 and SSTv2) from student-generated healthcare scenarios, with each version consisting of 15 scrambled sentences of six words. Students received one of two versions of SST in a fixed order. Using 5 out of 6 words, students reordered the words to create a grammatically correct sentence. The scrambled sentences were designed to form either a stereotypical or non-stereotypical interpretation using one of two critical words (e.g., '*Ms Waerea likely seeks* ***western/alternative*** *treatment'*); an error occurs when a sentence includes both or none of the critical words or is grammatically incorrect. To reduce deliberate response biases in information processing (Bowler et al., 2012; Rude et al., 2003), the SST included two features. First, students were instructed to '*choose whatever sentence comes to mind and to complete the task as fast as you can as the task is time-limited*.' Students had 5 minutes to complete as many items as possible. Second, students completed the SST user a cognitive load; that is, students were presented with a six-digit number (e.g., 815374) pre-SST and were told '*You will be asked to recall the number later, so please keep the number in your mind while you complete the word task.' S*tudents were asked to recall the same number immediately post-SST.

Using a yes (1) or no (0) dummy coding, two researchers coded all the responses as either *stereotypical*, *non-stereotypical*, or *error*. For example, a sentence that included the 'stereotype' critical word was coded as: (stereotypical = 1; non-stereotypical = 0; error = 0). Kappa scores ranged from moderate to perfect agreement (Landis & Koch, 1977), k = .58–.97, *all $p < .001$*, with only one falling below 0.6. Once all the responses were coded, we summed the scores for each coding category (SUM_stereotypical, SUM_non-stereotypical, SUM_error). An interpretation bias score, ranging from 0% to 100%, was calculated using the following equations:

Bias Score	**= (SUM_stereotypical ÷ Total Items Attempted) x 100**
Non-Bias Score	**= (SUM_non-stereotypical ÷ Total Items Attempted) x 100**

A higher bias score indicated a tendency to interpret scenarios involving Māori in a manner that is congruent to common stereotypes of Māori.

Interpretation Bias Measures: SRT

Recall that SRT consists of two parts—encoding and recognition. During encoding, students received one of the two SRT versions (SRTv1 and SRTv2) in a fixed order. Each version of the SRT consisted of eight items. At the beginning of the encoding phase, students were given the following instructions 'As you *read through each passage, it is important to imagine yourself as the healthcare provider in the situation described*.' For each passage, students were asked to complete the final fragmented word followed by a yes/no question. During the recognition phase, students were presented with two short statements that were related to a passage from the encoding phase. One statement provided an explanation of the passage that is consistent with common stereotypes of Māori patients; the other statement explains the passage in a more helpful/benign manner. Using a 4-point scale (*1 - very different in meaning* to *4 - very similar in meaning)*, students were instructed to rate '*how similar the sentence is to the corresponding passage.*'

We calculated the average score for each type of statement separately to obtain two mean scores: Mean [Stereotype] and Mean [Non-Stereotype]. An interpretation bias score, ranging from +3 to -3, was calculated as follows:

Interpretation Bias = Mean [Stereotype] – Mean [Non-Stereotype]

A more positive score indicated a tendency to interpret scenarios involving Māori in a manner that is congruent to common stereotypes of Māori.

Associations Measure: Implicit Association Test (IAT)

The IAT measures the strength of association between evaluations of targeted categories. It is a widely used measure in social psychology (Greenwald et al., 1998). While we acknowledge the limitations of using skin-tone to measure implicit evaluations of Māori, in the present study, we utilized a readily available online IAT test to assess medical students' automatic evaluations of light and dark skin tones (see Figure 5; Project Implicit, n.d.). During the IAT, students were invited to sort *words* and *pictures of faces* as quickly as possible into one of two categories using two keyboard keys: the 'e' key was pressed to indicate that the *word or picture* belonged to the group on the left; the 'i' key was pressed to indicate that the *word or picture* belonged to the group on the right.

The skin-tone IAT consisted of five parts:

1) **Faces and categories.** Students grouped *faces* of different skin-tone into either 'Dark-Skinned People' (left of screen) or 'Light-Skinned People' (right of screen).
2) **Words and evaluation.** Students grouped different *words* into either 'Bad' (left of screen) or 'Good' (right of screen): ('Good' words: *Delightful, Attractive, Fabulous, Joyful, Adore, Pleasure, Cheer, Appealing*) and ('Bad' words: *Horrific, Sadness, Bothersome, Annoy, Tragic, Selfish, Angry, Despise*).
3) **Category and evaluation combined.** Students grouped both *words and faces* into either the 'Dark-Skinned People/Bad' (left of screen) or 'Light-Skinned People/Good' (right of screen). This step was administered twice.
4) **Faces and categories (with the placement of categories switched).** Students grouped *faces* of different skin-tone into either 'Light-Skinned People' (left of screen) or 'Dark-Skinned People' (right of screen).
5) **Combined categories and evaluations**. Students grouped both *words and faces* into either the 'Light-Skinned People/Bad' (left of screen) or 'Dark-Skinned People/Good' (right of screen). This step was administered twice.

Steps 3 and 5 were counterbalanced in fixed order across the students. For example, if in Step 3, student S1 was shown '***Dark****-Skinned People/****Bad****, **Light****-Skinned People/****Good***,' then in Step 5, S1 was shown '***Light****-Skinned People/****Bad****, **Dark****-Skinned People/****Good***.' The same combination would apply to student S2 in reverse.

Figure 5. *Example skin-tone IAT test*

Note. Adapted from Project Implicit (n.d.).

Table 3. *Medical Students' ratings of the CBM-S training*

Features Mean (SD) ratings Median ratings Rating range (min-max)	Ratings for each Feature: 7-point Rating Scale (% of Participants)						
Enjoyment	***1-Annoying***	***2-***	***3-***	***4-***	***5-***	***6-***	***7-Enjoyable***
4.20 (1.52) 4.00 1-7	6.7%	3.3%	20%	30%	20%	13.3%	6.7%
Clarity	***1-Clear***	***2-***	***3-***	***4-***	***5-***	***6-***	***7-Confusing***
3.53 (4.00) 4.00 1-6	13.3%	20%	13.3%	16.7%	26.7%	10%	0%
Interest	***1-Not interesting***	***2-***	***3-***	***4-***	***5-***	***6-***	***7-Interesting***
4.23 (5.00) 5.00 1-7	3.3%	10%	20%	13.3%	36.7%	13.3%	3.3%
Ease of Use	***1-Complicated***	***2-***	***3-***	***4-***	***5-***	***6-***	***7-Easy***
5.13 (5.00) 5.00 2-7	0%	3.3%	6.7%	16.7%	36.7%	20%	16.7%

The average time students spend sorting words and faces accurately into their corresponding categories (i.e., good/bad; dark/light skin tone) were recorded and inferred students' automatic evaluations of light and dark skin tone. Results from Project Implicit (n.d.) were presented in categories, ranging from (*1 - strong preference for light skin tone* to *7 - strong preference for dark skin tone*, with labels *moderate, slightly, and no preference* between the two endpoints of the scale).

Results

Reliability of SST

Using reliability analysis, Cronbach's α for the bias score for SSTv1 was .45 and for SSTv2 was .73, with an average Cronbach's α of .63, indicating a moderate level of internal consistency (Hair et al., 2010). The corrected item-total correlation for SSTv1 and SSTv2 had a mean of .22 and .35, respectively. Pearson's Product Moment Correlation showed that the correlation between bias and non-bias scores was statistically significant for SSTv1, $r = -.76$, $p < .001$, and for SSTv2, $r = -.81$, $p < .001$. Next, to assess the split-half reliability of the SST, we correlated bias scores based on odd and even numbered items. Results revealed Spearman-Brown-corrected reliability between the two halves of .38 for SSTv1 and .72 for SSTv2.

Reliability of SRT

Using reliability analysis, Cronbach's α for the bias score for SRTv1 was .35 and for SRTv2 was .66, with an average Cronbach's α of .49, indicating a poor level of internal consistency (Hair et al., 2010). The corrected item-total correlation for SSTv1 and SSTv2 had a mean of .23 and .35, respectively. Pearson's Product Moment Correlation showed that the correlation between interpretation bias and non-bias scores was statistically non-significant for SRTv1, $r = .24$, $p = .25$, and for SRTv2, $r = .20$, $p = .27$, suggesting that SRT items likely had low sensitivity to assessing interpretation bias in the present study.

Next, to assess the split-half reliability of the SRT, we correlated bias scores based on odd and even numbered items. Results revealed Spearman-Brown-corrected reliability between the two halves of .03 for SRTv1 and .69 for SRTv2.

Correlation: Bias and Association Tests

Next, we examined whether there was an association between the SRT and SST, and the IAT. As point-biserial correlations determined the relation between the SST and SRT scores and skin-tone IAT. Results showed a statistically non-significant correlation between IAT scores and SST scores (SSTv1: $r = -.10$, $p = .64$; SSTv2: $r = -.21$, $p = .24$) and SRT scores (SRTv1: $r = .34$, $p = .09$; SRTv2: $r = -.24$, $p = .18$). Additionally, a Pearson's Product Moment Correlation showed that the correlation between the SRT and SST interpretation bias scores was statistically non-significant, $r = .02$, $p = .87$, suggesting that the two interpretation bias measures were likely non-convergent.

Usability Feedback

The results of students' ratings of CBM-S are shown in Table 3. As shown in Table 3, the mean ratings on all features revealed positive experiences with using CBM-S. That is, on average, students found CBM-S enjoyable, clear, interesting, and easy to use.

DISCUSSION

In the present paper, we reported the detailed development process of creating training and assessment materials for a novel digital self-administered ethnic bias training called Cognitive Bias Modification for Stereotype (CBM-S). CBM-S was developed in New Zealand and aims to address medical students' bias toward Māori

patients by presenting students with a series of ambiguous healthcare situations that invite multiple interpretations but leading students to respond with a non-stereotypical/neutral interpretation. An integral part of a high-quality and efficacious educational tool is the *relevance and specificity* of its materials, which can be achieved through adopting a user-centered approach to materials development. The present paper involved iterative inputs from medical students and Māori, and we aimed to achieve our two objectives: 1) to create and evaluate contents to be used in CBM-S that address common Māori stereotypes in healthcare settings and 2) to obtain user experience data of CBM-S and reliability data of interpretation bias measures.

Medical students created 100 common healthcare scenarios involving Māori, which researchers adapted into standard CBM format. CBM-S items adopted specific verbs to reflect a progression from higher-level thought processes (*what we think*) to more stable schemata/beliefs (*what we believe*). All items were rated by medical students and Māori participants using a set of pre-defined criteria (*stereotypicality, relevance to healthcare, readability, and ambiguity of the scenario*). Additionally, a progression from using specific Māori names to using more generic labels of ethnicity (i.e., Māori) was adopted to promote individual- and group-level attribution of traits/behaviours from the scenarios. The names that were rated by medical students and Māori to create a pool of names commonly given to Māori.

Out of the 100 scenarios created, 59 CBM-S training items and all control items reached a priori-defined acceptable value for each criterion. Further analyses of CBM-S content revealed that relative to control, training items were more ambiguous, more relevant to healthcare settings, and provided a more consistent depiction of common Māori patient stereotypes, with both training and control items rated as highly comprehensible. In the final set of CBM-S items, we included the 59 training items and selected 59 control items based on the average character count of scenarios so that the length of the scenarios was equivalent across training and control items. By matching the character count of the scenarios across experiment groups, we aimed to reduce the potential confounding effects of the duration spent in CBM-S training. Overall, medical students found CBM-S easy to use and to comprehend, interesting, and enjoyable.

The remaining 20 student-generated healthcare scenarios were adapted into interpretation bias assessment items. Fifteen items reached a priori-defined acceptable value for each criterion: *stereotypicality, relevance to healthcare, and readability.* These 15 items were used to create two versions of the Scrambled Sentence Task (SST) and the Similarity Rating Task (SRT)—two interpretation bias measures that are commonly used in clinical studies of the CBM method. Each version of the SST consisted of 15 scrambled sentences of six words each; each version of the SRT consisted of eight items. Reliability testing of interpretation bias assessments showed an overall moderate internal consistency for the SST but poor internal consistency for the SRT. There was a negative correlation between bias and non-bias scores on the SST. Our analyses did not reveal a correlation between bias and non-bias scores on the SRT or between the SRT and SST scores. These results suggest that despite adopting from the same pool of student-generated scenarios to create both the SRT and SST, the reliability of the SRT in measuring medical students' interpretation bias of scenarios involving Māori patients may be limited. One possible explanation for the difference in reliability between the two interpretation measures is that, unlike the SST, students' responses to the SRT may have been subjected to demand characteristics—a reported issue of the SRT assessment (Schoth & Liossi, 2018). The SST is a time-limited task under cognitive load. This feature of the SST was designed to limit conscious response bias (Bowler et al., 2012; Rude et al., 2003).

In addition to the overall reliability data, our analyses revealed that relative to version one of both interpretation bias measures, version two showed better internal consistency and split-half reliability. There may be several explanations for this difference. First, 15 user-generated exemplars that reached a priori-defined acceptable values were adopted to create two versions of 15 SST items and eight SRT items (46 items in total). This is to accommodate for the conventional number of items used for each measure. As a result, some assessment items were similar but not the same as student-generated scenarios. Furthermore, the finalized assessment items were not re-rated by service users, meaning that these items did not go through the same iterative process of review and refinement as during the first phase of item creation. Items that were included in version two of the bias measures may have been more similar to the student-generated scenarios than did version one, which may have accounted for the differences in reliability across versions. Through retrospection of our data, we observed that the mean stereotypicality rating of the items for version one was $M = 5.40$, and the rating for version two was $M = 5.81$, although not statistically significant.

Another possible explanation is that despite adopting student-generated exemplars to create assessment items, the personal relevance to any one individual is limited and may not necessarily reflect the interpretation of the scenarios of all our participants. A re-examination of our data revealed a dispersion of ratings of assessment items. More specifically, stereotypicality ratings of the items ranged from 3.33 – 7, with a variation of 1.26. These data suggest individual variations in the interpretation of assessment scenarios, which may have impacted the reliability across versions.

Consistent with findings from previous studies, we did not find a correlation between interpretation bias measures and the Implicit Association Test (IAT). IAT measures the strength of associations between categories and automatic evaluations of those categories—as opposed to biased interpretations of healthcare situations. In other words, at the basic level of social information processing, IAT may be assessing a different cognitive component (i.e., pattern matching) to that of students' interpretation of healthcare scenarios (Sekaquaptew et al., 2003). Specifically, the skin-tone IAT assesses whether participants recognize and associate 'good' (e.g., attractive, joyful) or 'bad' (e.g., horrific, despise) words with light- or dark-skinned faces. Interpretation bias measures, such as SRT and SST, assess participants' interpretation of scenarios involving the target group,

which may have manifest in different ways depending on the given situation.

The content development process discussed in this paper should consider the following limitations. First, as previously discussed, five medical students from the same university created 100 healthcare exemplars involving Māori, which may limit the generalization of these scenarios. Future work should include a larger sample within a broader context to create content that directly reflects personal experiences of ethnic stereotyping in different healthcare contexts. By the same token, interpretation bias assessment items should adopt one-to-one mapping of student-generated scenarios to individual test items to improve the reliability and relevance of the measures.

A second limitation is that further development of assessments for measuring interpretation bias toward marginalized ethnic groups, particular for the SRT, should address issues of demand characteristics. In some studies, researchers have included indirect ratings of interpretation bias by measuring participants' ratings of pleasantness (Berna et al., 2011), or their level of concern (Davey et al., 1992), pertaining to the SRT scenarios. These ratings invite participants to report their feelings rather than their explicit interpretations, which may mask the intent of the assessment.

Finally, although Māori are often (inaccurately) associated with dark skin, using skin tone to measure associations of concepts of Māori is unidimensional and may have limited the validity of our findings. Māori is rich in cultural values and practices derived from *mātauranga Māori* (Māori knowledge) that encompasses multidimensional concepts and traditions (Mead, 2016). As such, using skin tone is a limited and superficial representation of Māori that may not have captured students' perceptions of Māori when engaged in assessment and training.

We anticipate that CBM training will complement existing training methods, such as metacognitive strategies, fact provision, and open discussions, as a part of a weekly independent learning approach in medical education and professional development. There is empirical evidence in the clinical literature suggesting a reduction in interpretation bias following six-session weekly trainings (40-items per session), with evidence of effects after the third session that remained at a 1-month and 3-month follow-up (Yiend et al., 2022). We envisage a similar weekly training session approach for CBM-S in medical education, with future studies needed on the 'dose-response' of the training in modifying ethnic bias.

Conclusion

In conclusion, CBM is a class of training methods that has now been extended into a digital training tool to address implicit ethnic bias, which we called CBM-S. In the NZ context, CBM-S aims to address medical students' bias toward Māori in healthcare settings. When developing any educational tool, it is important to follow a user-centered development approach to maximize *content specificity and relevance* of training content. This approach will most likely also optimize user acceptability and engagement, and the effectiveness and reliability of the training and assessment, to create an ethnic bias training tool to achieve true health equity.

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Corresponding author:
Dr Che-Wei Hsu, Department of Psychological Medicine, University of Otago, PO Box 54, Dunedin, New Zealand 9054.
Tel +64 3 470 0999 ext 57362
E-mail: jerry.hsu@otago.ac.nz
ORCID: 0000-0002-3297-3961

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Community-level diversity decreases right-wing authoritarianism and social dominance orientation by alleviating dangerous and competitive worldviews: Multilevel and longitudinal tests of the Dual Process Model

Danny Osborne[1], Kieren J. Lilly[1], Yanshu Huang[2], and Chris G. Sibley[1]

[1]University of Auckland
[2]University of Queensland

Although living in diverse communities can affect socio-political views, studies rarely—if ever—assess mediators of the relationship between macro-level diversity and individual-level intergroup attitudes. According to the Dual Process Model of Ideology and Prejudice, community-level diversity should correlate negatively with right-wing authoritarianism (RWA) and social dominance orientation (SDO) by reducing dangerous and competitive worldviews, respectively. Study 1 examined these hypotheses using a nationwide random sample of New Zealand Europeans (N = 11,007) nested in 254 communities. As hypothesised, community-level diversity had specific negative indirect effects on between-level variability in RWA and SDO via reductions in dangerous and competitive worldviews, respectively. Study 2 pursued a longitudinal follow-up (N = 9,355) and showed that dangerous and competitive worldviews predicted increases in RWA and SDO (respectively) a year later. Collectively, these results demonstrate that living in diverse communities can improve intergroup attitudes by reducing perceptions that the world is a dangerous and competitive place.

Keywords*:* Dual Process Model, Social Dominance, Authoritarianism, Diversity, Worldviews, Multilevel Modelling

INTRODUCTION

"When Mexico… sends its people… they're sending people that [sic] have lots of problems, and they're bringing those problems to us. They're bringing drugs. They're bringing crime. They're rapists. And some, I assume, are good people…"

—Donald Trump

When Donald Trump announced his presidential candidacy, he expressed a familiar set of racist tropes. In addition to inciting fear over exaggerated crime statistics (Holpuch, 2015, July 7), Trump claimed that immigrants were competing with United States' (US) citizens for jobs. To the surprise (and chagrin) of many, Trump's now-infamous speech—a speech that drew upon the dual themes of fear and competition—resonated with many voters and eventually propelled him to the highest elected office in the US. Thus, Trump's electoral success demonstrates the effectiveness of political campaigns that appeal to those who view the world as a dangerous and competitive place.

But what happens when majority group members actually encounter immigrants? In the current paper, we argue—and demonstrate using a random sample of native-born New Zealand Europeans—that the size of the immigrant population in the local community alleviates majority group members' perceptions that the world is a dangerous and competitive place. In turn, declines in dangerous and competitive worldviews should reduce right-wing authoritarianism (RWA; Altemeyer, 1996) and social dominance orientation (SDO; Pratto et al., 1994). Before testing these hypotheses with multilevel (Study 1) and longitudinal (Study 2) data, respectively, we review research examining the effects of macro-level[1] diversity on individual-level attitudes toward minorities. We then provide a brief overview of Duckitt's (2001) Dual Process Model (DPM) of Ideology and Prejudice to theorise about the effects of macro-level diversity on individual-level intergroup attitudes.

Community Diversity

Scholars have long been interested in the impact that living in an ethnically diverse community has on majority group members' attitudes toward minorities. In one notable early example of this interest, renowned political scientist V. O. Key (1949) argued that the proportion of blacks living in Southern electoral counties posed a threat to whites' political power and should thus elicit racially conservative voting. Consistent with this "racial threat" hypothesis, Southern whites' support for the Democratic

[1] Past research examining the impact of the broader social context on intergroup attitudes has focused on various levels of analysis including the local community (e.g., Reny & Newman, 2018), municipality (e.g., Sarrasin et al., 2017), metropolitan area (e.g., Taylor, 1998), and country (e.g., Quillian, 1995). Here, we use macro-level diversity as an umbrella term to capture these myriad levels of analysis and note (when appropriate) the specific focus when discussing individual studies.

Party—a party that fervently resisted racial integration at the time (see Black & Black, 2002; Osborne et al., 2011)—correlated positively with the proportion of blacks living in the electoral county. That is, the greater the proportion of blacks, the more support Southern Democrats received from white voters.

More recently, Reny and Newman (2018) showed that the entry of African Americans into predominately white communities during the 1940s to 1960s correlated positively with whites' support for a racially charged housing policy in California. Likewise, Taylor (1998) revealed that the percentage of blacks in the local area correlated positively with whites' anti-black biases, anti-egalitarianism, stereotyping, and avoidance of intergroup contact. These results were, however, specific to anti-black biases—the proportion of blacks living in an area was unassociated with prejudice towards Asians or Latinos. Outside of the US, Quillian (1995) found a positive correlation between the proportion of immigrants living in Western European countries and anti-immigrant views amongst majority group members, especially in countries undergoing financial hardship (see also Hjerm, 2009; Rink et al., 2008).

Although these studies corroborate the racial threat hypothesis, the diversity of one's local community could also decrease intergroup hostility. Indeed, research on contact theory shows that interactions with outgroup members—interactions that are more prevalent in areas with high levels of ethnic diversity (e.g., see Brune et al., 2016; Hewstone & Schmid, 2014; Van Assche, Asbrock, Dhont, et al., 2018; Wagner et al., 2006)—can reduce majority group members' biases by dispelling some of the misperceptions they may have of minorities (e.g., see Allport, 1954). Accordingly, Pettigrew and Tropp's (2006) meta-analysis demonstrated that intergroup contact reduces biases towards racial and non-racial outgroups. These results call into question the conclusion that macro-level diversity always elicits intergroup bias (see also Hewstone, 2015).

There are other reasons to question the generalisability of the racial threat hypothesis. For example, Voss (1996) noted that studies that find support for the racial threat hypothesis assess macro-level diversity at an inappropriate level of analysis (i.e., state- and county-wide measures of diversity likely overestimate whites' actual proximity to minorities), omit key macro-level variables (e.g., cultural differences across parishes), and suffer from measurement error. Voss addressed these shortcomings by examining the parish-level support David Duke, a former Imperial Wizard of the Ku Klux Klan, received in Louisiana's Senate and gubernatorial elections in 1990 and 1991, respectively. Contrary to the racial threat hypothesis, the proportion of blacks living in local parishes was unassociated with support for David Duke. Thus, the amount of diversity present in majority group members' local environment need not always elicit intergroup hostility.

Subsequent work demonstrates the potential for the diversity of one's local context to improve intergroup relations. Although the actual proportion of immigrants living in a given locality correlates positively with the perceived size of the immigrant population, objective indicators of the immigrant population are indirectly associated with tolerance via intergroup contact (Schlueter & Scheepers, 2010; Schlueter & Wagner, 2008). Accordingly, Wagner and colleagues (2006) revealed that the proportion of minorities living in a community correlated negatively with intergroup bias via increased contact with members of the minority group (also see Sarrasin et al., 2012). The perceived diversity of one's local community—a likely consequence of living in a diverse neighbourhood—also correlates positively with support for economic redistribution (Steele & Perkins, 2018). Finally, community-level contact fosters group norms for diversity, which then reduce intergroup bias (see Christ et al., 2014). Living in diverse communities has the potential to alleviate intergroup biases among majority group members.

Dual Process Model of Ideology and Prejudice

When discussing intergroup attitudes, it is important to note that distinct motivational goals underlie prejudice. Indeed, Duckitt's (2001) Dual Process Model (DPM) of Ideology and Prejudice posits that social biases originate from two social ideological attitudes: RWA (see Altemeyer, 1996) and SDO (see Ho et al., 2015; Pratto et al., 1994). Whereas RWA reflects the goals to establish security and order, SDO captures the need for dominance and power. Accordingly, RWA and SDO are manifestations of two distinct worldviews: RWA arises from the view that the world is a dangerous and threatening place, whereas SDO emerges from a competitive worldview (also see Duckitt & Sibley, 2017; Osborne et al., 2023).

A burgeoning literature corroborates the tenets of the DPM. For example, Duckitt and colleagues (2002) demonstrated that dangerous (but not competitive) worldviews correlated positively with RWA, whereas competitive (but not dangerous) worldviews correlated positively with SDO. These findings have been replicated in various countries including Belgium (Van Hiel et al., 2007), Italy (Chirumbolo et al., 2016), New Zealand (Duckitt, 2001; Sibley & Duckitt, 2009), and the US (Crowson, 2009; Weber & Federico, 2007). And notably, Sibley et al. (2007) showed in a five-month longitudinal study that dangerous (but not competitive) worldviews had a positive cross-lagged effect on RWA, whereas competitive (but not dangerous) worldviews had a positive cross-lagged effect on SDO. Consistent with the DPM, these results suggest that distinct worldviews temporally precede RWA and SDO.

In arguably the most definitive study on the topic to date, Perry and colleagues (2013) conducted a meta-analysis of 46 cross-sectional studies (N = 12,939) investigating the associations between worldviews and (a) RWA and (b) SDO. Consistent with the DPM, the average association between dangerous worldviews and RWA was over three times the size of the corresponding association between competitive worldviews and RWA. Likewise, the average association between competitive worldviews and SDO was nearly seven times the size of the corresponding relationship between dangerous worldviews and SDO. Thus, RWA and SDO are separate instantiations of distinct motivational goals to avoid threat and achieve dominance, respectively.

Although studies demonstrate that RWA and SDO are rooted in distinct worldviews, research has neglected the possibility that people's macro-level environment may affect their perceptions of the world as a dangerous and

competitive place. This is a notable oversight, as Duckitt (1989) argued that one of the key shortcomings of the authoritarianism literature is its near-exclusive focus on the individual—a form of psychological reductionism present in much of social psychology (for similar critiques, see Pettigrew, 1991; Pettigrew et al., 2010; see also Osborne et al., 2019). Accordingly, Duckitt's (2001) DPM drew inspiration from cross-cultural work by D'Andrade (1992), Strauss (1992) and others (e.g., Ross, 1993) when noting that the local environment can affect people's needs for conformity and dominance. Whereas punitive socialization practices should elicit needs for social conformity that, in turn, foster dangerous worldviews and RWA, a childhood scarred by unaffectionate parenting should instil a toughminded approach to the world that fosters competitive views of the world and SDO. However, research has yet to examine the extent to which other key aspects of the macro-level environment (e.g., community-level diversity) correlate with RWA and SDO via dangerous and competitive worldviews.

Study 1

Study 1 addresses this oversight by examining the indirect effects of community-level diversity on RWA and SDO. Because living in diverse communities increases majority group members' opportunity for intergroup contact (see Brune et al., 2016; Wagner et al., 2006), we hypothesized that community-level diversity would correlate negatively with seeing the world as a dangerous and competitive place. In turn, given that RWA and SDO are distinct effects of the motivational goals for social conformity and toughmindedness (respectively; Duckitt, 2001; Osborne et al., 2023), dangerous and competitive worldviews should correlate positively with RWA and SDO, respectively. That is, community-level diversity should have negative indirect effects on RWA and SDO through reductions in dangerous and competitive worldviews, respectively.

In testing our hypotheses, we aimed to rule out plausible alternative explanations for our predicted results. Specifically, because macro-level economic conditions can increase competition between groups (see Scheepers et al., 2002), we adjusted for the community-level (a) unemployment rate and (b) median household income. To demonstrate that our predicted associations are unique to exposure to immigrants, we also adjusted for the impact that the proportion of minorities living in the community had on dangerous and competitive worldviews. Finally, we specified an alternative multilevel model in which community-level diversity moderated the relationships between worldviews and both RWA and SDO. Thus, we can be confident that our results demonstrate the multilevel processes underlying, rather than the boundary conditions of, the DPM.

Study 1 makes multiple contributions to the literature. Although research has assessed the impact that macro-level diversity has on intergroup attitudes (e.g., Sarrasin et al., 2012; Schlueter & Wagner, 2008; Van Assche, Asbrock, Dhont, et al., 2018; Van Assche, Asbrock, Roets, et al., 2018; Van Assche et al., 2014; Van Assche et al., 2019), studies have yet to investigate how the context shapes people's worldviews and, in turn, their levels of RWA and SDO. Relatedly, we use advanced statistical analyses (namely, multilevel structural equation modelling) to partition the variance of RWA and SDO, as well as dangerous and competitive worldviews, into individual and contextual levels of analysis. This approach helps to increase understanding of the DPM by integrating the context into individual-level predictors of RWA and SDO. Finally, we investigate our hypotheses using a large random sample of New Zealand-born New Zealand Europeans, thus providing a generalisable assessment of the DPM.

METHOD

Sampling procedure

Data come from Time 5 of the New Zealand Attitudes and Values Study (NZAVS)—an annual nationwide panel study that began in 2009.[2] Although data collection for Time 5 began in September 2013 and concluded in October 2014, sampling for Time 5 took place on four occasions. The first occasion was in 2009 (Time 1) and was based on a random sample of adults from the Electoral Roll (a national registry of voters).[3] This first sampling occasion yielded 6,518 participants, which, after adjusting for errors in the Electoral Roll, represents a response rate of 16.6%. By 2011 (Time 3), 3,918 participants were in the sample (a retention rate of 60.1%). To compensate for sample attrition, a non-random booster sample was recruited from the website of a major New Zealand-based newspaper, adding 2,966 new participants to the study and bringing the Time 3 sample size to 6,884.

To increase the size and diversity of the sample, we conducted two additional booster samples in 2012 and 2013. The first of these booster samples consisted of a sample frame of 1,500 people who were between 18-60 years old[4] and listed as Māori on the Electoral Roll. Of those contacted, 92 volunteered for the study (response rate = 6.1%). The second booster sample was based on a random sample of 70,000 people between 18-60 years old listed on the 2014 Electoral Roll. Of those contacted, 7,499 volunteered for the study (response rate = 10.7%). Thus, Time 5 contained 18,261 participants (i.e., 10,593 retained from one or more previous wave; 7,499 additions from booster sampling and 169 unmatched or unsolicited opt-ins).

Participants

We examine the 11,007 native-born New Zealand Europeans (M_{age} = 48.81, *SD* = 14.16) from Time 5 who provided either partial or complete responses to our focal variables (i.e., 99.2% of our sample who identified as New Zealand European and were born in New Zealand). The sample had more women (*n* = 6,192) than men (*n* = 4,095) and were nested in 254 communities (average cluster size = 43.33).

Sample Size and Statistical Power

Because the analyses for the current study are based on

[2] We use Time 5 data because it is our largest sample size to date that includes dangerous and competitive worldview measures.

[3] Registration on the electoral roll is compulsory, making our sample as close to randomly selected as possible.

[4] We restricted this sample frame to those 60 years and under because we aim to retain them for 15 years.

an ongoing longitudinal study that began in 2009, the sample size was determined by our ability to retain participants for the duration of our projected 20-year study. To these ends, we phoned, emailed, and sent postal reminders to non-respondents to maximize our retention rate (for an examination of attrition rates, see Satherley et al., 2015). We also conducted frequent booster samples to differentiate between cohort effects and normal developmental trends (e.g., see Zubielevitch et al., 2023). Because these external factors determined our sample size, we did not conduct (post-hoc) power analyses for the current study.

Measures

We assessed the following within-level measures relevant to this study: RWA, SDO, and worldviews. Items were rated on a 1 (Strongly Disagree) to 7 (Strongly Agree) scale. Because home addresses were known, within-level data were matched with the following between-level variables: Community-level (a) diversity, (b) unemployment rate, (c) median household income, and (d) size of the minority population. To put these between-level variables on a common metric, community-level median household income was rescaled to range from 0 to 1. Thus, all between-level variables have either a theoretical or actual range of 0 to 1.

Within-level variables

Right-Wing Authoritarianism (RWA) was assessed using six items (items 8, 12, 15, 22, 26, and 29; $\alpha = .691$) from Altemeyer's (1996) 30-item scale. Example items were: (a) "Our country will be destroyed some day if we do not smash the perversions eating away at our moral fibre and traditional beliefs" and (b) "Atheists and others who have rebelled against established religions are no doubt every bit as good and virtuous as those who attend church regularly" (reverse-scored).

Social Dominance Orientation (SDO) was assessed using six items (i.e., items 3, 4, 7, 9, 12, and 13; $\alpha = .739$) from Sidanius and Pratto's (1999) 16-item SDO_6 scale. Example items were: (a) "Inferior groups should stay in their place" and (b) "We should have increased social equality" (reverse-scored).

*Dangerous worldview*s were assessed using these two items from Duckitt and colleagues' (2002) 10-item scale: "There are many dangerous people in our society who will attack someone out of pure meanness, for no reason at all" and "Despite what one hears about 'crime in the street,' there probably isn't any more now than there ever has been" (reverse-scored; $r = .276$, $p < .001$).

*Competitive worldview*s were assessed using these two items from Duckitt and colleagues' (2002) 20-item scale: "It's a dog-eat-dog world where you have to be ruthless at times" and "Life is not governed by the 'survival of the fittest.' We should let compassion and moral laws be our guide" (reverse-coded; $r = .302$, $p < .001$).

Between-level variables

All between-level variables were assessed using ward-level data derived from the 2013 New Zealand census and, as such, roughly coincided with the beginning of the year-long data collection period for Time 5 (which also began in 2013). Statistics New Zealand (2009) describes wards as geographic units that reflect the local communities within a given district and are designed "to increase community involvement in the local government system". Although wards are census-based designations and, as such, do not assess residents' actual level of identification with the local community, they were designed to reflect psychologically meaningful communities similar to cantons or townships in other countries. As such, they are not defined by geographic size, but rather, the sense of community found within a broader district. In 2013, ward size (defined as the number of people who slept in the given ward on the night of 5 March 2013) was relatively small on average ($M_{\text{Residents}} = 16{,}566.16$, $SD = 27{,}071.51$), but ranged from 381 residents to 156,081 residents in New Zealand's smallest and largest wards, respectively.

Community-level diversity was assessed by dividing the number of non-New Zealand-born people living in a ward by the total number of people living in the same ward. Thus, community-level diversity reflected the overall proportion of immigrants living in each ward ($M_{\text{Diversity}} = .208$, $SD = .075$) and ranged from .090 to .527 in the least-to-most diverse wards, respectively.

Proportion of minorities living in the community was assessed by dividing the number of non-New Zealand Europeans living in a ward by the total number of people living in each ward ($M_{\text{Minorities}} = .224$, $SD = .140$) and ranged from .075 to .815 in the wards with the least-to-most minorities, respectively.

Community-level unemployment was assessed by dividing the number of unemployed people living in a ward who were 15 years old or older by the total number of people living in the same ward who were 15 years old or older ($M_{\text{Unemployed}} = .038$, $SD = .019$) and ranged from .009 to .123 in the wards with the lowest-to-highest rates of unemployment, respectively. Although New Zealand has no minimum working age, Statistics New Zealand begins counting those 15 years of age and older as unemployed if they (a) have no paid employment at the time of the interview, (b) are available to work and (c) have sought employment in the last four weeks (Statistics New Zealand, 2023).

Community-level median household income was assessed by taking the median household income of the given ward from the 2013 census ($M_{\text{Median income}} = \$59{,}222.656$, $SD = \$14{,}300.181$) and ranged from \$31,000 to \$114,000 (NZD) in the poorest and wealthiest wards, respectively. To place this variable on the same metric as the other between-level variables, community-level median household income was rescaled to range from 0 (\$31,000 NZD) to 1 (\$114,000 NZD).

RESULTS AND DISCUSSION

The aim of this study was to assess the association between community-level diversity and intergroup attitudes. Because exposure to diverse cultures should dispel majority group members' fears about immigration, community-level diversity should lessen New Zealand Europeans' dangerous and competitive worldviews.

Because participants were nested within communities, traditional mediation analyses were inappropriate for testing our predictions (Preacher et al., 2011; Preacher et al., 2010). Specifically, by ignoring the clustering in our data, we would underestimate our standard errors and increase our Type I error rates (Krull & MacKinnon, 2001). Therefore, statisticians recommend estimating indirect effects that occur across levels of analysis via multilevel structural equation models (Preacher et al.,

Table 1. Descriptive statistics and bivariate correlations between L1 and L2 variables.

	1	2	3	4	5	6	7	8
L1 Variables								
1. RWA	----							
2. SDO	.191***	----						
3. Dangerous worldviews	.288***	.125***	----					
4. Competitive worldviews	.045***	.414***	.200***	----				
L2 Variables								
5. Proportion of minorities	−.063***	−.020*	−.039***	−.028**	----			
6. Unemployment rate	−.039***	−.038***	−.010	−.032***	.748***	----		
7. Median household income[1]	−.123***	−.019*	−.153***	−.028**	.134***	−.192***	----	
8. Community diversity	−.127***	−.037***	−.134***	−.043***	.691***	.316***	.563***	----
Summary Statistics								
Mean	.380	.225	.530	.350	.256	.042	.320	.284
SD	.181	.147	.232	.203	.134	.014	.140	.104
Dispersion	0-1	0-1	0-1	0-1	.08-.82	.01-.12	.00-1.00	.09-.53
α	.691	.739	.432	.457	----	----	----	----
n	10,999	10,999	10,694	10,682	11,007	11,007	11,007	11,007
Intraclass Correlation Coefficient	.062	.046	.043	.007	----	----	----	----

Note: Variables were rescaled to range from 0 to 1.

[1] Median household income was rescaled to range from 0 ($31,000) to 1 ($114,000). The mean unscaled community-level median household income was $59,222.66 (*SD* = 14,300.18). * $p < .05$; ** $p < .01$; *** $p < .001$

2011). Thus, we estimated a multilevel structural equation model using maximum likelihood estimates and first-order derivatives (MLF) to approximate the standard errors in *Mplus Version 8.8* (Muthén & Muthén, 1998-2017). We also estimated 95% confidence intervals (CI) to assess the precision of our point estimates.

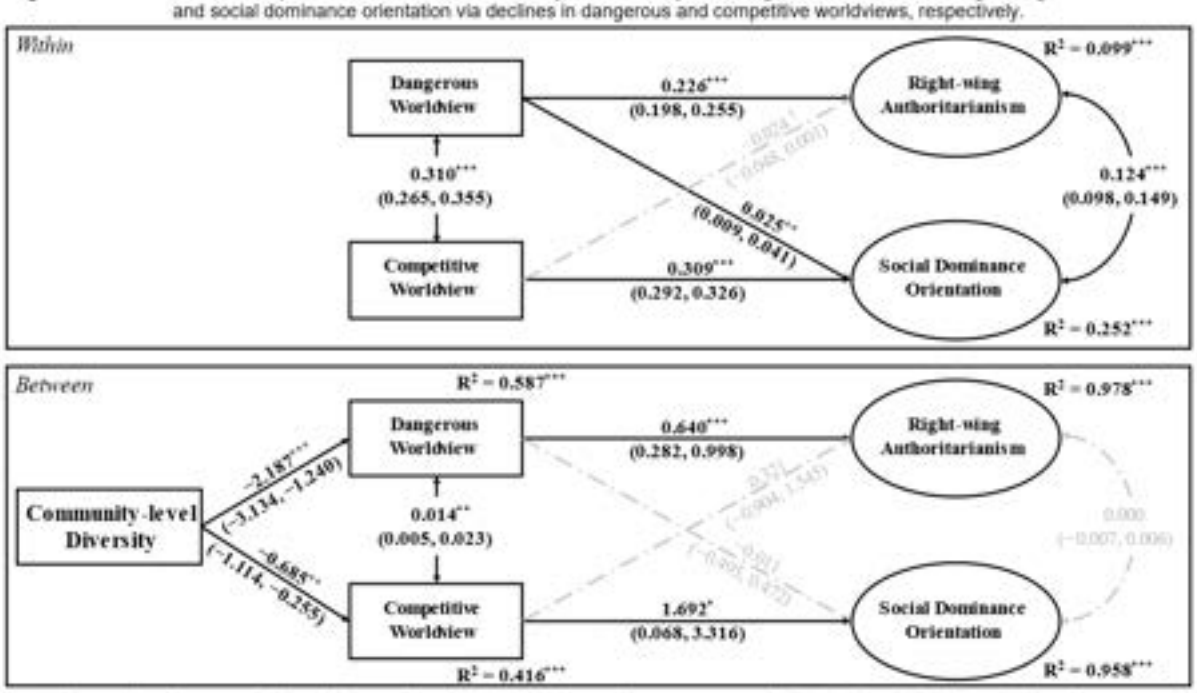
Prior to testing our hypotheses, we examined the multilevel measurement invariance of our 6-item measures of RWA and SDO by creating three, 2-item parcels for each construct and then following the steps outlined by Kim and colleagues (2017). Parcels were created by averaging the two items with the highest and lowest factor loadings obtained from an initial exploratory factor analysis. The subsequent two items with the next highest and lowest factor loadings were then averaged together. Finally, the last remaining pair of items were averaged together. This balanced parcelling approach was taken for both RWA and SDO (see Little et al., 2002), and provides numerous benefits to model estimation including (a) decreasing the likelihood of correlated residuals, (b) reducing the chance of cross-factor loadings, and (c) improving scale reliability (Rioux et al., 2020).

After parcelling our items, we estimated a multilevel confirmatory factor analysis (CFA) in which the same three, 2-item parcels that loaded onto the RWA (SDO) latent variable at the within-level of analysis were the same three, 2-item parcels that comprised RWA (SDO) at the between-level of analysis. Because this initial configural model yielded a negative residual variance for the first between-level factor loading for SDO, we constrained it to 0, re-estimated the model, and obtained a model with acceptable fit, $\chi^2_{(17)} = 1251.453$, $p < .001$; comparative fit index (CFI) = .916; root mean square error of approximation (RMSEA) = .081; standardized root mean square residual$_{within}$ ($SRMR_{within}$) = .071; $SRMR_{between}$ = .117. We then constrained the congeneric factor loadings to equality across the two levels of analysis to estimate a model with metric invariance but once again encountered a negative residual variance at the between-level of analysis. After constraining this second residual variance to 0, the change in model fit was acceptable (i.e., ΔCFI < .010; see Cheung & Rensvold, 2002), $\chi^2_{(22)} = 1361.738$, $p < .001$; CFI = .909; RMSEA = .074; $SRMR_{within}$ = .070; $SRMR_{between}$ = .331. The increase in the $SRMR_{between}$ does, however, suggest a likely source of misfit at the between-level of analysis. We therefore freed the equality constraints on the second and third between-level factor loadings for SDO and achieved a better-fitting model (as indicated by the $SRMR_{between}$), $\chi^2_{(20)} = 1293.903$, $p < .001$; CFI = .913; RMSEA = .076; $SRMR_{within}$ = .070; $SRMR_{between}$ = .154. Because only (partial) metric invariance is needed to compare the strength of associations across levels of analysis (see Heck & Thomas, 2020; Putnick & Bornstein, 2016; Widaman & Reise, 1997), we used this model with partial metric invariance as the measurement model for the multilevel structural equation model used to test our hypotheses.

Hypothesised model

Table 1 shows the bivariate correlations and descriptive statistics for the within- and between-level variables included in this study. To test our hypotheses that community-level diversity would have negative indirect effects on RWA and SDO by reducing dangerous and competitive worldviews (respectively), we estimated a multilevel structural equation model that partitioned the variance of these variables into within-level and between-level effects. The within-level component of our model regressed both the RWA and SDO latent variables onto both dangerous and competitive worldviews. We also estimated the covariance between both worldviews, as well as a residual correlation between RWA and SDO. Our between-level model reproduced and extended our within-level model by adding community-level diversity as a predictor of dangerous and competitive worldviews. To rule out plausible alternative explanations, our between-level model also used community-level (a) size of the minority population, (b) median household income,

Figure 1. Multilevel structural equation model in which community-level diversity has a negative indirect effect on right-wing authoritarianism and social dominance orientation via declines in dangerous and competitive worldviews, respectively.



Note. Analyses adjust for community-level (a) proportion of minorities, (b) unemployment rate, and (c) median household income. Paths reflect unstandardized regression coefficients (with 95% confidence intervals in parentheses). The hypothesized model fit these data well, $\chi^2_{(60)} = 1839.759$, $p < .001$; comparative fit index (CFI) = .908; root mean square error of approximation (RMSEA) = .052; standardized root mean square residual$_{within}$ ($SRMR_{within}$) = .065; $SRMR_{between}$ = .139. $^{\dagger}p < .10$; $^{*}p < .05$; $^{**}p < .01$ $^{***}p < .001$.

and (c) unemployment rate to predict both worldviews.[5] All community-level variables were allowed to covary at the between-level of analysis (for *Mplus* syntax, see Appendix B).

Figure 1 demonstrates that our model provided an acceptable fit to these data, $\chi^2_{(60)} = 1839.759$, $p < .001$; CFI = .908; RMSEA = .052; $SRMR_{within}$ = .065; $SRMR_{between}$ = .139. The upper half of Figure 1 reveals that, as hypothesised, dangerous worldviews predicted RWA better than did competitive worldviews (b = 0.226, 95% CI = [0.198, 0.255]; $p < .001$ vs. b = −0.024, 95% CI = [−0.048, 0.001]; p = .058, respectively; $b_{difference}$ = 0.250, 95% CI = [0.210, 0.290]; $p < .001$). Conversely, competitive worldviews predicted SDO better than dangerous worldviews (b = 0.309, 95% CI = [0.292, 0.326]; $p < .001$ vs. b = 0.025, 95% CI = [0.009, 0.041]; p = .002, respectively; $b_{difference}$ = 0.284, 95% CI = [0.260, 0.308]; $p < .001$). After accounting for the effects of dangerous and competitive worldviews, the residual covariance between RWA and SDO was both positive and significant (b = 0.124, 95% CI = [0.098, 0.149]; $p < .001$).

As for our between-level model, the lower half of Figure 1 shows that community-level diversity correlated negatively with dangerous worldviews (b = −2.187, 95% CI = [−3.134, −1.240]; $p < .001$). In turn, although competitive worldviews did not correlate with community-level RWA (b = 0.321, 95% CI = [−0.904, 1.545]; p = .608), between-level variability in dangerous worldviews correlated positively with RWA (as hypothesized; b = 0.640, 95% CI = [0.282, 0.998]; $p < .001$). Consequently, the hypothesised negative specific indirect effect of community-level diversity on RWA via dangerous worldviews was reliable ($b_{indirect}$ = −1.400, 95% CI = [−2.353, −0.447]; p = .004).[6] Notably, these effects adjust for the effects of the community-level (a) unemployment rate (b = −4.508, 95% CI = [−9.973, 0.957]; p = .106), (b) median household income (b = −0.586, 95% CI = [−0.991, −0.182]; p = .005), and (c) size of the minority population (b = 1.024, 95% CI = [0.227, 1.820]; p = .012) on dangerous worldviews.

The lower half of Figure 1 also reveals that community-level diversity correlated negatively with competitive worldviews (b = −0.685, 95% CI = [−1.114, −0.255]; p = .002). In turn, although dangerous worldviews and SDO did not correlate at the community-level (b = −0.011, 95% CI = [−0.495, 0.472]; p = .964), between-level variability in competitive worldviews correlated positively with SDO (as hypothesized; b = 1.692, 95% CI = [0.068, 3.316]; p = .041). Consequently, the predicted negative indirect effect of community-level diversity on SDO through competitive worldviews was reliable ($b_{indirect}$ = −1.158, 95% CI = [−2.285, −0.032]; p = .044).[7] These associations emerged after adjusting for the effects of the community-level (a) size of the minority population (b = 0.413, 95% CI = [0.064, 0.762]; p = .020), (b) median household income (b = −0.097, 95% CI = [−0.296, 0.101]; p = .336), and (c) unemployment rate (b = −3.331, 95% CI = [−6.324, −0.339]; p = .029) on competitive

[5] We obtained similar results when also controlling for age and education at the individual-level, although the indirect effect of community-level diversity on SDO via between-level variability in competitive worldviews became marginally significant (see Appendix A).

[6] The specific indirect effect of community-level diversity on RWA via competitive worldviews was non-significant, $b_{indirect}$ = −0.219, 95% CI = [−1.080, 0.641]; p = .617.

[7] The specific indirect effect of community-level diversity on SDO via dangerous worldviews was non-significant, $b_{indirect}$ = 0.024, 95% CI = [−1.033, 1.082]; p = .964.

worldviews.

Alternative model

In a final set of analyses, we sought to rule out the possibility that community-level diversity moderates the relationships worldviews have with RWA and SDO. Specifically, community-level diversity may serve as a situational cue that strengthens the correlations both worldviews have with RWA and SDO (e.g., see Duckitt & Sibley, 2017; Osborne et al., 2023). Indeed, research reveals that authoritarianism may only correlate with intergroup attitudes when threats to the normative environment are salient (see McCann, 2008; Stenner, 2005). Thus, community-level diversity may serve as a social cue that activates authoritarian predispositions, thereby strengthening the association between dangerous worldviews and RWA. Similar processes may occur for SDO whereby situational cues regarding competition (e.g., community-level diversity) strengthen the association between competitive worldviews and SDO.

To rule out these potential alternative explanations, we estimated a multilevel random coefficients model in which the associations dangerous and competitive worldviews have with RWA and SDO (respectively) were treated as random slopes moderated by community-level diversity. Accordingly, we group-mean centred our individual-level predictors, and grand-mean centred our between-level variables. We then regressed the RWA and SDO latent variables onto both worldviews at the individual-level of analysis. To assess potential cross-level interactions, we estimated the slopes for the associations between (a) RWA and dangerous worldviews and (b) SDO and competitive worldviews as separate random effects. Community-level diversity was then used to predict these two random slopes (after adjusting for our between-level covariates). Consistent with our multi-level mediation analysis, we used a measurement model with partial metric invariance to estimate this model. However, to ensure model convergence, we added a Montecarlo integration and increased the M iterations to 4000.

Results revealed that community-level diversity correlated negatively with between-level variability in RWA (b = −1.692, 95% CI = [−2.458, −0.926]; p < .001). Notably, this relationship emerged after adjusting for community-level (a) median household income (b −0.397, 95% CI = [−0.741, −0.054]; p = .023), (b) unemployment rate (b = −3.539, 95% CI = [−7.731, 0.652]; p = .098), and (c) size of the minority population (b = 0.643, 95% CI = [0.048, 1.238]; p = .034). Most importantly, the cross-level interaction in which community-level diversity moderated the relationship between dangerous worldviews and RWA was non-significant (b = 0.141, 95% CI = [−0.272, 0.553]; p = .505). Likewise, none of the three community-level covariates moderated the relationship between dangerous worldviews and RWA (ps $\geq$ 0.693).

Similar results emerged when examining the potential cross-level interaction in which community-level diversity moderates the relationship between competitive worldviews and SDO. Specifically, community-level diversity correlated negatively with between-level variability in SDO (b = −1.101, 95% CI = [−1.692, −0.510]; p < .001). Once again, this association emerged after adjusting for community-level (a) size of the minority population (b = 0.725, 95% CI = [0.222, 1.228]; p = .005), (b) unemployment rate (b = −5.445, 95% CI = [−9.151, −1.739]; p = .004), and (c) median household income (b = −0.164, 95% CI = [−0.456, 0.128]; p = .271). Critically, the cross-level interaction in which community-level diversity moderates the relationship between competitive worldviews and SDO was non-significant (b = 0.240, 95% CI = [−0.099, 0.578]; p = .165). Likewise, none of the three community-level covariates reliably correlated with the strength of the relationship between competitive worldviews and SDO (ps $\geq$ 0.383). Together, these results support our contention that, rather than moderating the associations worldviews have with RWA and SDO, community-level diversity indirectly impacts RWA and SDO via reductions in dangerous and competitive worldviews, respectively.

Study 2

Table 2. Descriptive statistics and bivariate correlations for the variables used in Study 2. Although the summary statistics are reported here, latent variables were used in the focal analyses.

	1	2	3	4	5	6	7	8
Time 5								
1. RWA	----							
2. SDO	.198	----						
3. Dangerous worldviews	.299	.136	----					
4. Competitive worldviews	.052	.423	.202	----				
Time 6								
5. RWA	.799	.226	.299	.070	----			
6. SDO	.232	.709	.166	.418	.268	----		
7. Dangerous worldviews	.292	.167	.646	.216	.305	.178	----	
8. Competitive worldviews	.059	.404	.190	.637	.081	.463	.215	----
Summary Statistics								
Mean	3.259	2.329	4.126	3.043	3.186	2.357	4.004	2.998
SD	1.091	0.879	1.396	1.206	1.109	0.900	1.371	1.202
Dispersion	1-7	1-7	1-7	1-7	1-7	1-6.5	1-7	1-7
α	.700	.746	.435	.458	.707	.779	.415	.465
n	9,348	9,348	9,097	9,086	9,352	9,353	9,327	9,136

Note: All bivariate correlations are significant at p < .001.

Table 3. *Fit statistics for a longitudinal measurement model of RWA and SDO across two annual waves (N = 9,354).*

	χ^2	*df*	RMSEA	RMSEA 90% CI	SRMR	CFI	ΔCFI	Pass?
Measurement Model								
Configural invariance	4045.937***	132	.056	[.055, .058]	.065	.946	----	----
Metric invariance	4076.598***	138	.055	[.054, .057]	.065	.946	.000	Yes
Scalar invariance	4433.792***	144	.056	[.055, .058]	.065	.941	.005	Yes

Note. Configural invariance: Similar factor loading patterns; Metric invariance: Equal factor loadings; Scalar invariance: Equal intercepts
***$p < .001$.

Although Study 1 offers initial support for hypotheses, the cross-sectional nature of these data cannot speak to the temporal order of these associations. To address this critical limitation, we conducted a follow-up study with the same participants a year later to examine the longitudinal associations worldviews had with RWA and SDO.[8] Specifically, participants completed measures of dangerous worldviews, competitive worldviews, RWA and SDO, as well as several scales outside the scope of this study. Given both the theoretical basis of the DPM (Duckitt, 2001) and past longitudinal work (Sibley et al., 2007), we hypothesized that dangerous and competitive worldviews would predict subsequent increases in RWA and SDO, respectively. Such results would bolster our argument that decreases in dangerous and competitive worldviews elicited by community-level diversity influence RWA and SDO, respectively.

Participants

We retained 9,355 of the 11,007 native-born New Zealand Europeans who participated in Study 1 (i.e., 84.99% retention rate) in a follow-up survey one year later (i.e., Time 6 of the NZAVS). Once again, the sample contained more women (n = 5,917) than men (n = 3,423; $n_{\text{non-binary}}$ = 15) and were an average of 49.62 (SD = 14.00) years old at the first measurement occasion in 2013 (i.e., Time 5).

Measures

Study 2 used the same six-item measures of RWA and SDO, as well as the same two-item measures of dangerous and competitive worldviews, used in Study 1. All four sets of variables were assessed in 2013 (i.e., Time 5) and 2014 (i.e., Time 6).

RESULTS AND DISCUSSION

Table 2 displays the descriptive statistics and bivariate correlations for the variables used in Study 2. Before testing our hypotheses that dangerous and competitive worldviews predict subsequent increases in RWA and SDO, respectively, we estimated three increasingly restrictive longitudinal CFAs to ensure that participants responded to our items similarly over time. We began by using the same three, 2-item parcels for RWA and SDO used in Study 1 as freely estimated indicators of their respective latent constructs at Times 5 and 6. The two-item measures for dangerous and competitive worldviews were also used as freely estimated factor loadings of their respective latent constructs at both time points. Thus, identical factor loading patterns were estimated at Times 5 and 6. To recognize item-specific measurement error, we allowed congeneric items / parcels to correlate with each other across time. Finally, we used effects coding to identify the measurement model such that factor loadings and item intercepts for each construct averaged to 1 and 0 (respectively), and the latent variable means and variances were constrained to 0 and 1 (respectively) at each timepoint.

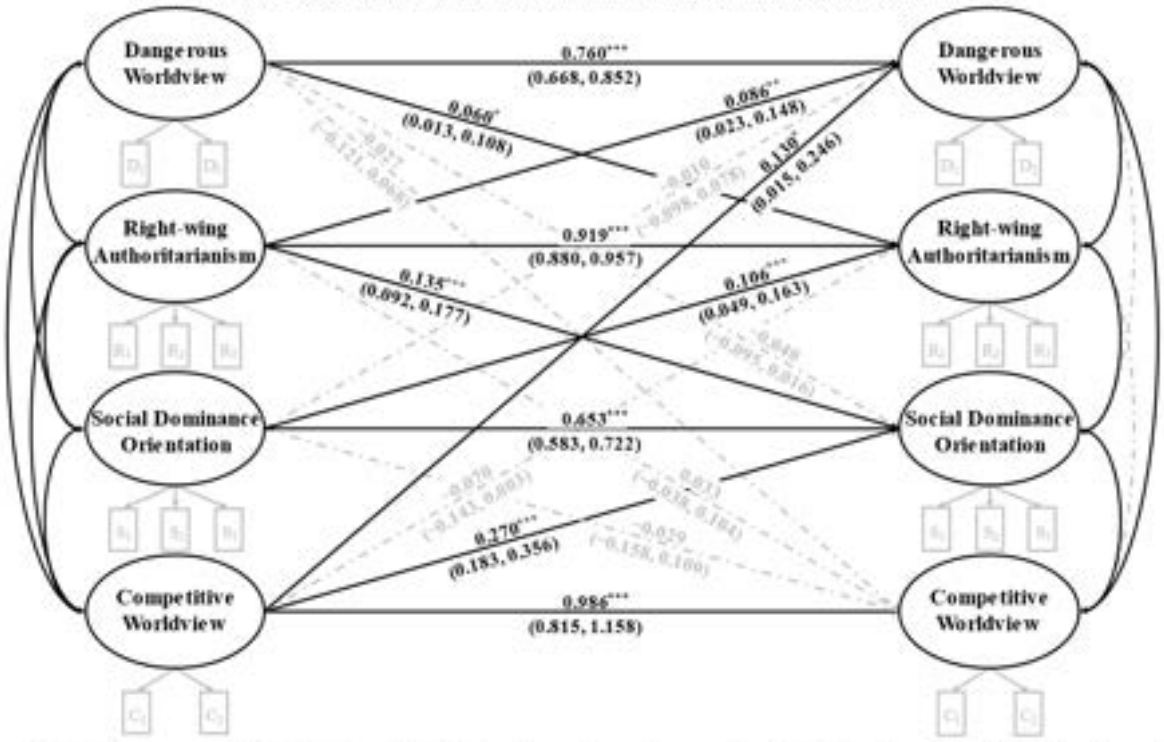
Table 3 demonstrates that our initial measurement model with configural invariance fit these data well, $\chi^2_{(132)} = 4045.937$, $p < .001$; CFI = .946; RMSEA = .056, 90% CI [.055, .058]; SRMR = .065. As such, we added further parameter constraints to this initial baseline measurement model to estimate a longitudinal CFA with metric invariance. Specifically, we constrained the factor loadings at Time 6 to equality with their congeneric factor loadings at Time 5 and then freely estimated the latent variances of each construct at Time 6. Next, we estimated a longitudinal CFA with scalar invariance by further constraining to equality the congeneric item intercepts at Times 5 and 6 and by freely estimating the latent means of each construct at Time 6. Based on Cheung and Rensvold's (2002) criteria (i.e., ΔCFI < .010), the addition of these increasingly restrictive model constraints did not significantly reduce model fit for either the metric (ΔCFI = .000) or scalar (ΔCFI = .005) invariant measurement models. Thus, participants interpreted our four latent variables similarly across time.

To investigate our hypotheses that dangerous and competitive worldviews precede increases in RWA and SDO, respectively, we used the scalar invariant measurement model noted above to estimate a cross-lagged panel model (with latent variables) in which our Time 6 latent variables were regressed onto the Time 5 measures. We also estimated the residual correlations between our Time 6 measures, as well as the correlations between dangerous worldviews, competitive worldviews, RWA, and SDO at Time 5. Based on standard criteria for assessing model fit (i.e., CFI > .95; RMSEA < .06; SRMR < .08; Hu & Bentler, 1999), our model fit these data well, $\chi^2_{(144)} = 4433.792$, $p < .001$; CFI = .941; RMSEA = .056, 95% CI [.055, .058], $p < .001$; SRMR = .065.

Figure 2 reveals that dangerous (b = 0.760, 95% CI = [0.668, 0.852]; $p < .001$) and competitive (b = 0.986, 95% CI = [0.815, 1.158]; $p < .001$) worldviews were stable across time. Likewise, RWA (b = 0.919, 95% CI = [0.880, 0.957]; $p < .001$) and SDO (b = 0.653, 95% CI = [0.583, 0.722]; $p < .001$) were stable across our annual assessment. After adjusting for these autoregressive effects, dangerous worldviews had a positive cross-lagged effect on RWA (b = 0.060, 95% CI = [0.013, 0.108]; p = .013), whereas competitive worldviews were unassociated with RWA (b = −0.070, 95% CI = [−0.143, 0.003]; p = .059). Conversely, competitive worldviews had a positive cross-lagged effect on SDO (b = 0.270, 95% CI = [0.183,

[8] Because community-level diversity was an L2 variable derived from the New Zealand census (which is conducted every 5 years), we were unable to examine the temporal ordering of community-level diversity on these processes.

Figure 2. Cross-lagged panel model of the relationships between worldviews, RWA, and SDO.



Note. Paths reflect unstandardized coefficients (with 95% confidence intervals in parentheses). The hypothesized model fit these data well, $\chi^2(144) = 4433.792$, $p < .001$; CFI = .941; RMSEA = .056, 95% CI [.055, .058], $p < .001$; SRMR = .065. *p < .05; **p < .01 ***p < .001.

0.356]; $p < .001$), but dangerous worldviews were unassociated with SDO ($b = -0.040$, 95% CI = [−0.095, 0.016]; $p = .164$). These results support our hypotheses and demonstrate that dangerous (but not competitive) worldviews predict increases in RWA over time, whereas competitive (but not dangerous) worldviews predict increases in SDO over time.

Figure 2 also examines the potential reciprocal associations that RWA and SDO have with worldviews. Accordingly, RWA predicted increases in dangerous worldviews ($b = 0.086$, 95% CI = [0.023, 0.148]; $p = .007$), but SDO was unassociated with changes in dangerous worldviews over time ($b = -0.010$, 95% CI = [−0.098, 0.078]; $p = .829$). In contrast, neither SDO ($b = -0.029$, 95% CI = [−0.158, 0.100]; $p = .661$), nor RWA ($b = 0.033$, 95% CI = [−0.038, 0.104]; $p = .363$), were associated with changes in competitive worldviews. Finally, competitive worldviews predicted increases in dangerous worldviews ($b = 0.130$, 95% CI = [0.015, 0.246]; $p = .027$), whereas dangerous worldviews were unassociated with changes in competitive worldviews ($b = -0.027$, 95% CI = [−0.121, 0.068]; $p = .582$). These results indicate that dangerous worldviews and RWA reinforce each other over time, whereas the relationship between worldviews and the preference for group-based hierarchy is unidirectional in that competitive worldviews predict increases in SDO over time (but not vice-versa).

GENERAL DISCUSSION

In two studies, we examined the impact that community-level diversity has on RWA and SDO via worldviews (Study 1) and the longitudinal associations between these worldviews and RWA and SDO (Study 2). Because living in diverse communities should expose majority group members to information that dispels their concerns about immigration, we predicted in Study 1 that community-level diversity would have negative indirect effects on RWA and SDO via reductions in dangerous and competitive worldviews, respectively. To demonstrate that our results are unique to community-level diversity, we adjusted for community-level unemployment and median household income, as well as the size of the minority population. Study 2 then assessed the cross-lagged effects that dangerous and competitive worldviews have on RWA and SDO using the same sample of participants surveyed again a full year later.

As hypothesised, Study 1 revealed that dangerous and competitive worldviews correlated positively with RWA and SDO (respectively) at the within-level of analysis. Although dangerous worldviews also correlated positively with SDO at the within-level of analysis, this unexpected association was less than a tenth the size of the corresponding hypothesized association between competitive worldviews and SDO. More importantly, community-level diversity correlated negatively with RWA and SDO via dangerous and competitive worldviews (respectively). Study 2 then assessed the cross-lagged effects of worldviews on RWA and SDO, revealing that dangerous worldviews predicted increases in RWA better than did competitive worldviews (which predicted non-significant decreases in RWA), whereas competitive worldviews predicted SDO better than did dangerous worldviews (which predicted non-significant decreases in SDO). Together, these results support recent theorizing that community-level diversity can reduce intergroup conflict (Hewstone, 2015; Pettigrew, 2016; Van Assche, Asbrock, Dhont, et al., 2018).

Our results showing that community-level diversity correlates negatively with both RWA and SDO via dangerous and competitive worldviews (respectively)

corroborate Visintin and colleagues' (2016) findings that ethnic diversity can promote support for multiculturalism. Specifically, Visintin et al. showed that the proportion of Roma living in districts across Bulgaria correlated positively with Bulgarians' support for multiculturalism, but only when a high proportion of Bulgarian Turks also resided in the district. That is, multi-cultural diversity fosters harmonious intergroup attitudes. Our results replicate and extend these findings by showing that the beneficial effects of community-level diversity on intergroup attitudes generalise to declines in RWA and SDO, and by identifying two critical mediators of this process (namely, dangerous and competitive worldviews).

Studies 1 and 2 also increase understanding of the DPM by demonstrating the impact that the macro-level environment has on how people view the world (Study 1), as well as the longitudinal associations these worldviews have with RWA and SDO (Study 2). Although many argue that the context shapes worldviews (e.g., Duckitt, 2001; Duckitt & Fisher, 2003; Osborne et al., 2023; Sibley et al., 2007), multilevel tests of this thesis are rare, with one exception. Sibley and colleagues (2013) analysed independently collected council data and showed that the proportion of immigrants living in a given meshblock—an area unit smaller than the community-level measure used here in Study 1—increased the strength of the negative relationship between dangerous worldviews and pro-immigrant attitudes. We extend this literature by illustrating one of the reasons why community-level diversity correlates with RWA and SDO (namely, diversity in the community correlates negatively with dangerous and competitive worldviews). Study 2 also builds upon the nascent literature examining the longitudinal effects of worldviews to show that dangerous and competitive worldviews precede RWA and SDO, respectively.

Our results showing that community-level diversity may facilitate intergroup harmony also contribute to research on contact theory. Specifically, research has long noted the potential for intergroup contact to reduce prejudice (e.g., see Allport, 1954; Hewstone, 2015; Pettigrew & Tropp, 2006, 2011). Indeed, longitudinal studies show that intergroup contact has negative cross-lagged effects on prejudice (Christ et al., 2014; Dhont et al., 2012; Swart et al., 2011). However, multilevel tests of this hypothesis are rare (for exceptions, see Christ et al., 2014; Pettigrew et al., 2010; Sarrasin et al., 2012; Wagner et al., 2006). Our results suggest that the contact opportunities afforded by living in diverse communities can reduce perceptions of the world as a dangerous and competitive place amongst native-born ethnic majority group members.

Strengths, Limitations, and Future Directions

Although the results from Study 1 are consistent with contact theory, a measure of contact with immigrants was not included in our dataset. The proportion of immigrants living in one's community should, however, increase contact opportunities. Indeed, the diversity of one's local area correlates positively with intergroup contact (Pettigrew et al., 2010; Wagner et al., 2006). For example, Stein and colleagues (2000) found that the proportion of Latinos living in counties in Texas correlated positively with European Americans' reported contact with minorities. Likewise, Brune and colleagues (2016) showed that the number of Asians living within the immediate community correlated positively with self-reported time spent with Asian friends amongst New Zealand Europeans. Although these results corroborate our argument that community-level diversity facilitates intergroup contact, future research should include measures of contact with immigrants to validate and extend the results from Study 1.

On a related note, although Study 1 identified one set of processes through which community-level diversity reduces bias, other mechanisms could also transmit these effects. Christ and colleagues (2014) showed that positive contact at the community-level decreases intergroup biases by fostering norms of tolerance, irrespective of personal contact. Relatedly, the increased opportunities for contact afforded by community-level diversity may foster intergroup friendships, a key factor that alleviates intergroup conflict (see Pettigrew & Tropp, 2011; Swart et al., 2010). Finally, Schmid and colleagues (2014) found that neighbourhood diversity correlated positively with intergroup contact but correlated negatively with intergroup threat. In turn, intergroup contact and intergroup threat correlated positively and negatively (respectively) with outgroup trust. We contribute to this literature by highlighting another route through which community-level diversity can foster harmony between groups.

Due to limitations of the New Zealand census, Study 1 could only adjust for three between-level variables. Accordingly, other (non-measured) between-level variables could explain our results. For example, conservatism and intergroup bias correlate positively at the individual-level (see Duckitt et al., 2002; Jost et al., 2009). Thus, conservative communities may similarly foster dangerous and competitive worldviews that, in turn, influence RWA and SDO. Community-level norms could also decrease (or increase) intergroup biases in people (see Christ et al., 2014). Future research should consider these (and other) between-level variables when examining the contextual factors that shape individual-level worldviews, RWA, and SDO.

Although Study 2 demonstrated that dangerous and competitive worldviews precede increases in RWA and SDO (respectively), Study 1 is unable to determine if people who are low on dangerous and competitive worldviews seek out diverse communities, or if diverse communities attenuate dangerous and competitive worldviews. Indeed, people who are high (low) in SDO are attracted to—and subsequently pursue—hierarchy-enhancing (hierarchy-attenuating) academic majors (Sidanius et al., 2003) and occupations (Zubielevitch et al., 2022). However, living in diverse communities may nevertheless promote tolerance. Indeed, both experimental (Gaertner et al., 1999; Pettigrew & Tropp, 2006) and longitudinal (Dhont et al., 2012; Pettigrew & Tropp, 2006; Swart et al., 2011; Vezzali et al., 2010) studies demonstrate that contact with outgroups precedes reductions in intergroup bias. Moreover, our between-level data were obtained from the 2013 New Zealand census which concluded before the data collection period

or our individual-level data.[9] Although this methodological point increases confidence that community-level diversity preceded individual-level dangerous and competitive worldviews, some participants may have completed the survey in neighbourhoods that experienced either an increase or decrease in immigration since the 2013 New Zealand census. As such, longitudinal research that follows people as they move into, and out of, neighbourhoods in real time is needed to see if tolerant people are attracted to diverse communities, or if diverse communities foster tolerant residents.

We should also note that increases in ethnic diversity could increase intergroup bias under some conditions. Scheepers and colleagues (2002) found that the proportion of non-European Union (EU) citizens living in 15 EU countries correlated positively with ethnic exclusionism, presumably due to increases in perceived threat. Quillian (1995) also showed that the percentage of immigrants living in European countries correlated positively with prejudice. Finally, Van Assche and colleagues (Van Assche, Asbrock, Dhont, et al., 2018; Van Assche et al., 2014; Van Assche et al., 2019) have shown that the diversity within one's community can facilitate both positive and negative contact, which, in turn, promotes and undermines intergroup tolerance, respectively, particularly among those who are high on authoritarianism (see also Boin et al., 2021). Thus, increases in the diversity of one's community can sometimes elicit intergroup hostility especially amongst those who are pre-disposed to view outgroups with suspicion.

The discrepancy between our findings that the proportion of immigrants living in a community can ultimately lessen RWA and SDO and other studies showing that diversity can elicit intergroup conflict may be due to a few factors. For one, contextual diversity should reduce bias when actual intergroup contact is high (see Laurence et al., 2019; Stein et al., 2000). Accordingly, state- and country-wide measures of diversity may overestimate the extent to which majority group members actually interact with minorities (see also Voss, 1996). Community-level diversity could also have a curvilinear relationship with intergroup attitudes whereby small amounts of diversity reduce intergroup biases, but large influxes of immigration elicit fears about competition and unleash various prejudices: Once the diversity of a neighbourhood exceeds a certain threshold (e.g., 50%), further increases in immigration could inflame fears over danger and competition. Relatedly, the impact of community-level diversity on ethnic majority group members' worldviews may depend on whether the current neighbourhood composition reflects a recent increase or decrease in foreign-born community members. Dramatic and/or rapid changes to the composition of a neighbourhood could also have a different impact than gradual changes in immigration on dangerous and competitive worldviews (cf. Smith et al., 2019). Because the complexity of our multilevel analyses in Study 1 required us to use a static measure of community-level diversity, we were unable to examine these important nuances. Nevertheless, these reflect crucial questions for future research to address.

Given the complexity of multilevel analyses, we focused on the impact community-level diversity has on the motivational antecedents of RWA and SDO. Thus, Study 1 cannot speak directly to the outcomes of the DPM. However, considerable research highlights the consequences of RWA and SDO. For example, RWA and/or SDO correlate positively with prejudice towards various groups including immigrants (Chirumbolo et al., 2016), minorities (Bilewicz et al., 2017) and members of the LGBTQI+ community (Poteat & Mereish, 2012; Whitley, 1999), as well as sexism (Akrami et al., 2011; Austin & Jackson, 2019; Christopher et al., 2013) and racism (Van Hiel & Mervielde, 2005; Van Hiel et al., 2004). RWA and SDO also predict prejudice towards dangerous and threatening groups, respectively (Cohrs & Asbrock, 2009). Finally, longitudinal research reveals that RWA and/or SDO precede increases in generalized prejudice (Asbrock et al., 2010; Bratt et al., 2016; Osborne et al., 2021). Collectively, these studies demonstrate the harmful effects of RWA and SDO on intergroup relations, and further highlight the need to examine the individual and contextual antecedents to these two distinct intergroup attitudes.

Unexpectedly, Study 2 found a reciprocal relationship between dangerous worldviews and RWA. Specifically, dangerous worldviews predicted increases in RWA (as hypothesized) and RWA predicted increases in dangerous worldviews. Although these results do not contradict our thesis that dangerous worldviews foster RWA, the reciprocal associations were similar in magnitude and leave the question about temporal order (which we hypothesized) unanswered. Despite being inconclusive, the autoregressive effects of RWA and SDO were larger than the autoregressive effect of dangerous and competitive worldviews. Thus, there was noticeably more residual variance left to explain in worldviews than in either RWA or SDO. That dangerous worldviews still predicted increases in highly stable levels of RWA a year later illustrates the potential for worldviews to shape RWA. Still, future research should examine more closely the potential for dangerous worldviews and RWA to mutual reinforce each other.

Finally, our results reflect intergroup processes occurring in one nation. Nevertheless, we view this potential limitation as a strength. Indeed, as noted by Sarrasin and colleagues (2012), examining the effects of between-level variables on individual-level outcomes within a country has multiple benefits. Specifically, between-country comparisons conflate cross-national differences in ideological, historical, and institutional variables with differences in levels of diversity—confounds that are not present in analyses that investigate diversity within a nation. Cross-country analyses also overlook variability in the amount of diversity found within a nation. By focusing on communities within a single country, we increase confidence that between-level diversity drives these relationships (rather than the many other differences that invariably exist across nations).

[9] The 2013 New Zealand census was based on population counts on 5 March 2013, whereas data collection for Time 5 of the NZAVS began 17 September 2013 and concluded 20 October 2014.

Conclusion

Although many have debated the impact that living in diverse communities has on intergroup attitudes, the mechanisms responsible for transmitting these effects to individual-level outcomes have been largely unexamined. We addressed this oversight by assessing the indirect effects of community-level diversity on RWA and SDO via the mechanisms posited by the DPM (Duckitt, 2001). As predicted, Study 1 revealed that community-level diversity had negative indirect effects on RWA and SDO via dangerous and competitive worldviews, respectively, whereas Study 2 showed that the corresponding worldviews predicted increases in RWA and SDO a year later. These results highlight the impact that socio-structural factors have on psychological variables and elucidate how local environments influence intergroup attitudes. Ultimately, these data conflict with former US President Trump's xenophobic worldview by showing that, rather than bringing danger and competition, the diversity produced by immigration can foster intergroup harmony.

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Corresponding Author:
Danny Osborne
School of Psychology
University of Auckland
Private Bag 92019, Auckland 1142
Email: d.osborne@auckland.ac.nz

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APPENDIX A

Although Study 1 controlled for multiple community-level variables, individual-level variables could also explain the relationships dangerous and competitive worldviews have with RWA and SDO. Indeed, education correlates negatively (Coenders & Scheepers, 2003; Wagner & Zick, 1995), whereas age correlates positively (Duriez & Van Hiel, 2002; Sarrasin et al., 2012; Zubielevitch et al., 2023), with hostile intergroup attitudes. As such, we re-ran the multilevel structural equation model reported in Study 1 after adjusting for the effects of age and education on RWA and SDO (see Table S1 for the descriptive statistics and bivariate correlations). Specifically, using the measurement model with (partial) metric invariance described in the main manuscript, we regressed the latent variables of RWA and SDO onto both worldviews, education, and age for the within-level component of our model. We also estimated the covariance between worldviews, age, and education, as well as the residual correlation between RWA and SDO. Our between-level model reproduced and extended our within-level model by adding community-level diversity as a predictor of both worldviews, as well as the following between-level covariates: (a) proportion of minorities living in the community, (b) community-level unemployment, and (c) median household income. All four community-level variables were allowed to covary at the between-level of analysis.

Figure S1 provides an overview of our results, $\chi^2_{(93)}$ = 2715.223, $p < .001$; comparative fit index (CFI) = .881; root mean square error of approximation (RMSEA) = .051; standardized root mean square residual$_{within}$ ($SRMR_{within}$) = .060; $SRMR_{between}$ = .280. The upper half of Figure S1 reveals that, as hypothesised, dangerous worldviews predicted RWA better than did competitive worldviews (b = 0.201, 95% CI = [0.168, 0.234]; $p < .001$ vs. b = −0.015, 95% CI = [−0.043, 0.013]; p = .281, respectively; $b_{difference}$ = 0.216, 95% CI = [0.171, 0.261]; $p < .001$). Conversely, competitive worldviews predicted SDO better than dangerous worldviews (b = 0.325, 95% CI = [0.305, 0.344]; $p < .001$ vs. b = 0.007, 95% CI = [−0.011, 0.026]; p = .428, respectively; $b_{difference}$ = 0.317, 95% CI = [0.290, 0.344]; p <.001). Notably, these associations emerged after adjusting for the impact of age (b = 0.010, 95% CI = [0.008, 0.012]; $p < .001$) and education (b = −0.045, 95% CI = [−0.057, −0.033]; $p <$ .001) on RWA, as well as the impact of age (b = 0.008, 95% CI = [0.006, 0.010]; $p < .001$) and education (b = −0.030, 95% CI = [−0.039, −0.022]; $p < .001$) on SDO. After accounting for the effects of both worldviews and our socio-demographic covariates on RWA and SDO, the residual covariance between both outcomes was both positive and significant (b = 0.105, 95% CI = [0.075, 0.134]; $p < .001$).

As for our between-level model, the lower half of Figure S1 shows that community-level diversity correlated negatively with dangerous worldviews (b = −2.088, 95% CI = [−3.150, −1.025]; $p < .001$). In turn, between-level variability in dangerous worldviews correlated positively with RWA (b = 0.611, 95% CI = [0.193, 1.029]; p = .004), whereas competitive worldviews were unassociated with community-level RWA (b = 0.435, 95% CI = [−0.975, 1.846]; p = .545). Consequently, the hypothesised negative specific indirect effect of community-level diversity on RWA via dangerous worldviews was significant ($b_{indirect}$ = −1.275, 95% CI = [−2.325, −0.225]; p = .017)[10]. Notably, these relationships adjust for the community-level (a) size of the minority population (b = 0.924, 95% CI = [0.011, 1.836]; p = .047), (b) median household income (b = −0.504, 95% CI = [−0.920, −0.087]; p = .018), and (c) unemployment (b = −3.682, 95% CI = [−10.260, 2.896]; p = .273).

The lower half of Figure S1 also reveals that community-level diversity correlated negatively with competitive worldviews (b = −0.660, 95% CI = [−1.118, −0.203]; p = .005). In turn, there was a marginally significant positive association between competitive worldviews and SDO at the between-level (b = 1.794, 95% CI = [−0.096, 3.684]; p = .063), whereas dangerous worldviews did not correlate with community-level SDO (b = −0.054, 95% CI = [−0.622, 0.514]; p = .852). Most importantly, the predicted negative indirect effect of community-level diversity on SDO via competitive worldviews was marginally significant ($b_{indirect}$ = −1.184, 95% CI = [−2.456, 0.088]; p = .068)[11]. These associations emerged after adjusting for community-level (a) size of the minority population (b = 0.376, 95% CI = [0.012, 0.741]; p = .043), (b) median household income (b = −0.081, 95% CI = [−0.286, 0.124]; p = .441), and (c) unemployment (b = −2.978, 95% CI = [−6.127, 0.170]; p = .064).\

Summary

Despite adding age and education as individual-level covariates, a similar pattern of results emerged across the models presented here and in our manuscript. Indeed, both sets of analyses demonstrated that community-level diversity had negative indirect effects on RWA and SDO via declines in dangerous and competitive worldviews (although the latter indirect effect was only marginally significant). Accordingly, these supplementary analyses increase confidence in our conclusion that community-level diversity has negative indirect effects on RWA and SDO via reductions in dangerous and competitive worldviews.

[10] The negative specific indirect effect of community-level diversity on RWA via competitive worldviews was not significant, $b_{indirect}$ = −0.287, 95% CI = [−1.254, 0.679]; p = .560.

[11] The negative specific indirect effect of community-level diversity on SDO via dangerous worldviews was not significant, $b_{indirect}$ = 0.113, 95% CI = [−1.074, 1.300]; p = .852.

Table S1. Descriptive statistics and bivariate correlations between L1 and L2 variables.

	1	2	3	4	5	6	7	8	9	10
L1 Variables										
1. Age	----									
2. Education	-.129***	----								
3. RWA	.179***	-.219***	----							
4. SDO	.086***	-.170***	.191***	----						
5. Dangerous worldviews	.047***	-.293***	.288***	.125***	----					
6. Competitive worldviews	-.165***	-.167***	.045***	.414***	.200***	----				
L2 Variables										
7. Proportion of minorities	-.036***	.079***	-.063***	-.020*	-.039***	-.028**	----			
8. Unemployment rate	-.028**	.041***	-.039***	-.038***	-.010	-.032***	.748***	----		
9. Median household income[1]	-.069***	.182***	-.123***	-.019*	-.153***	-.028**	.134***	-.192***	----	
10. Community diversity	-.058***	.174***	-.137***	-.037***	-.134***	-.043***	.691***	.316***	.563***	----
Summary Statistics										
Mean	48.81	4.81	3.28	2.35	4.18	3.10	.26	.04	.44	.28
SD	14.16	2.78	1.09	0.88	1.39	1.22	.13	.01	.19	.10
Dispersion	18-94	0-10	1-7	1-7	1-7	1-7	.08-.82	.01-.12	.00-1.00	.09-.53
α	----	----	.691	.739	.432	.457	----	----	----	----
n	11,007	10,868	10,999	10,999	10,694	10,682	11,007	11,007	11,007	11,007
ICC	.024	.052	.062	.046	.043	.007	----	----	----	----

[1]Median household income was rescaled to range from 0 ($31,000) to 1 ($114,000). The mean unscaled community-level median household income was $59,222.66 (*SD* = 14,300.18). * $p < .05$; ** $p < .01$; *** $p < .001$

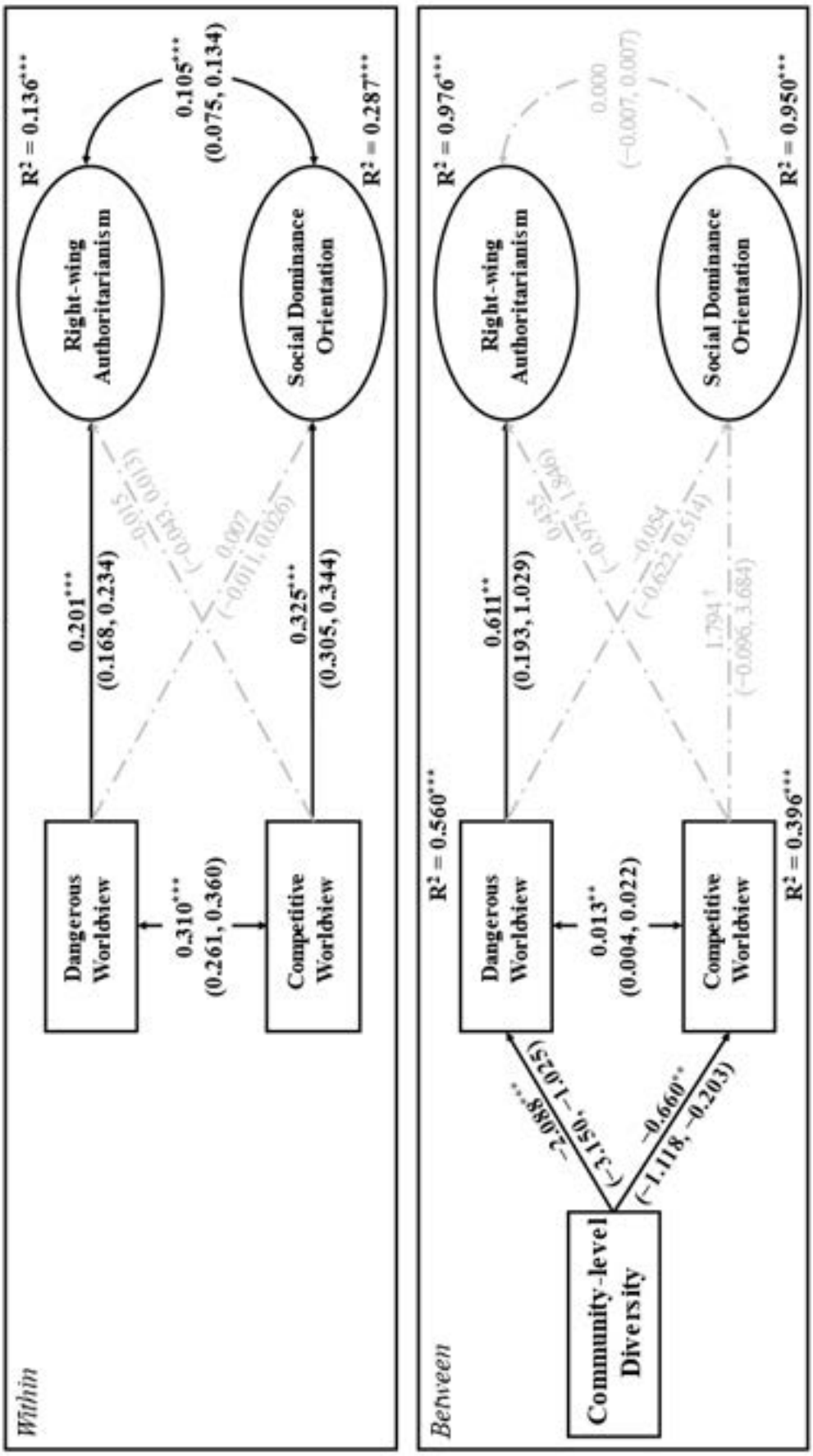

Figure S1. Multilevel structural equation model in which community-level diversity has a negative indirect effect on right-wing authoritarianism and social dominance orientation via declines in dangerous and competitive worldviews, respectively.

Note. Analyses adjust for community-level (a) proportion of minorities, (b) unemployment, and (c) median household income, as well as participants' age and education (at the within-level of analysis). Paths represent unstandardized regression coefficients (with 95% confidence intervals shown in parentheses). Fit indices for the model were: $\chi^2_{(93)} = 2715.223$, $p < .001$; comparative fit index (CFI) = .881; root mean square error of approximation (RMSEA) = .051; standardized root mean square residual$_{within}$ (SRMR$_{within}$) = .060; SRMR$_{between}$ = .280. $^{\dagger}p < .10$; $^{*}p < .05$; $^{**}p < .01$ $^{***}p < .001$.

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APPENDIX B

```
TITLE:

================================================================================
This is the script the following paper:

Community-level diversity decreases right-wing authoritarianism and social dominance orientation by alleviating dangerous
and competitive worldviews: Multilevel and longitudinal tests of the Dual Process Model
================================================================================

DATA: FILE IS MLM Data Extract.txt;

VARIABLE:

IDVARIABLE IS subnum;
MISSING ARE ALL (9999);

NAMES ARE

EthCatT5
BORNNZT5
O_SBORNW
MINORW
UNEMPW
MEDINC
SDO1T5 ! It is OK if some groups have more of a chance in life than others.
SDO2T5 ! Inferior groups should stay in their place.
SDO3T5 ! To get ahead in life, it is sometimes okay to step on other groups.
SDO4RT5     ! We should have increased social equality.
SDO5RT5     ! It would be good if groups could be equal.
SDO6RT5     ! We should do what we can to equalise conditions for different groups.
RWA1T5      ! It is always better to trust the judgment of the proper authorities in government
            ! and religion than to listen to the noisy rabble-rousers in our society who are trying ! to create doubt in
            people's minds.
RWA2T5      ! It would be best for everyone if the proper authorities censored magazines so that
            ! people could not get their hands on trashy and disgusting material.
RWA3T5      ! Our country will be destroyed some day if we do not smash the perversions eating
            ! away at our moral fibre and traditional beliefs.
RWA4rT5     ! People should pay less attention to The Bible and other old traditional forms of
            ! religious guidance, and instead develop their own personal standards of what is
            ! moral and immoral.
RWA5rT5     ! Atheists and others who have rebelled against established religions are no doubt
            ! every bit as good and virtuous as those who attend church regularly.
RWA6rT5     ! Some of the best people in our country are those who are challenging our
            ! government, criticizing religion, and ignoring the "normal way" things are supposed ! to be done.
CmWd1T5     ! It's a dog-eat-dog world where you have to be ruthless at times.
CmWd2rT5    ! Life is not governed by the 'survival of the fittest.' We should let compassion and
            ! moral laws be our guide.
DnWd1T5     ! There are many dangerous people in our society who will attack someone out
            ! of pure meanness, for no reason at all.
DnWd2rT5    ! Despite what one hears about "crime in the street," there probably isn't any more
            ! now than there ever has been.
SUBNUM
WARD13T5;

USEVARIABLE ARE

SDOP1       !2-item parcel of SDO
SDOP2       !2-item parcel of SDO
SDOP3       !2-item parcel of SDO

RWAP1       !2-item parcel of RWA
RWAP2       !2-item parcel of RWA
RWAP3       !2-item parcel of RWA
```

```
CWT5            !2-item competitive world beliefs scale.
DWT5            !2-item dangerous world beliefs scale.

O_SBornW        !1-(Number NZ born divided by total people in ward)

MinorW          !1-(Number of NZ Europeans divided by total people in ward)

UnEmpW          !(Number of people 15 years and over who are unemployed divided by total
                !people in ward)

MedInc;         !Median household income in ward scaled to range from 0 to 1

USEOBSERVATIONS ARE (EthCatT5 EQ 1 AND BORNNZT5 EQ 1);

CLUSTER = Ward13T5;         !Specifies Urban Area as a Level 2 ID variable in MLM
BETWEEN = O_SbornW MinorW UnEmpW MedInc;

DEFINE:

SDOP1 = MEAN(SDO4RT5 SDO2T5);       !Highest and lowest factor loading
SDOP2 = MEAN(SDO6RT5 SDO3T5);       !Second highest and second lowest factor loading
SDOP3 = MEAN(SDO5RT5 SDO1T5);       !Third highest and third lowest factor loading

RWAP1 = MEAN(RWA2T5 RWA4rT5);       !Highest and lowest factor loading
RWAP2 = MEAN(RWA3T5 RWA5rT5);       !Second highest and second lowest factor loading
RWAP3 = MEAN(RWA1T5 RWA6rT5);       !Third highest and third lowest factor loading

CWT5 = MEAN (CmWd1T5 CmWd2rT5);     !Competitive Worldview
DWT5 = MEAN (DnWd1T5 DnWd2rT5);  !Dangerous Worldview

ANALYSIS:

TYPE = Twolevel;
PROCESSORS = 4;
ESTIMATOR = MLF;
H1Iterations = 4000;

MODEL:

!=============================================================================
!============================== START OF L1 MODEL ============================
!=============================================================================

%WITHIN%

!=============================================================================
!============================START OF MEASUREMENT MODEL=======================
!============================OF HYPOTHESIZED MODEL @ L1=======================
!=============================================================================

SDO BY SDOP1
     SDOP2      (F1L2)
     SDOP3      (F1L3);

RWA BY RWAP1
     RWAP2      (F2L2)
     RWAP3      (F2L3);

!=============================================================================
!============================END OF MEASUREMENT MODEL=========================
!============================OF HYPOTHESIZED MODEL @ L1=======================
!=============================================================================

!=============================================================================
!================ANALYSES PREDICTING PARTICIPANTS' RWA AND SDO @ L1==========
!=============================================================================
```

```
RWA ON DWT5 (W_DWRWA)
    CWT5 (W_CWRWA);

SDO ON CWT5 (W_CWSDO)
    DWT5 (W_DWSDO);

!=============================================================================
!=======================ADDITIONAL MODEL SPECIFICATIONS=======================
!=============================================================================

RWA WITH SDO;        !Estimates the correlation between RWA and SDO @ L1
DWT5 WITH CWT5;      !Estimates the correlation between world views @L1

!=============================================================================
!================================ START OF L2 MODEL ==========================
!=============================================================================

%BETWEEN%

!=============================================================================
!============================START OF MEASUREMENT ============================
!============================OF HYPOTHESIZED MODEL @ L2=======================
!=============================================================================

BSDO BY SDOP1
    SDOP2     !(F1L2)     Full metric invariance constraint relaxed due to model misfit
    SDOP3;    !(F1L3)     Full metric invariance constraint relaxed due to model misfit

SDOP1@0;


BRWA BY RWAP1
    RWAP2     (F2L2)
    RWAP3     (F2L3);

RWAP1@0;

!=============================================================================
!============================END OF MEASUREMENT MODEL=========================
!============================OF HYPOTHESIZED MODEL @ L2=======================
!=============================================================================

!=============================================================================
!================ANALYSES PREDICTING PARTICIPANTS' RWA AND SDO @ L2============
!=============================================================================

BRWA ON DWT5 (B_DWRWA)
    CWT5 (B_CWRWA);

BSDO ON CWT5 (B_DWSDO)
    DWT5 (B_CWSDO);

!=============================================================================
!=============ANALYSES PREDICTING PARTICIPANTS' WORLDVIEWS @ L2================
!=============================================================================

DWT5 ON O_SBornW (L2b1)
    MinorW
    UnEmpW
    MedInc;

CWT5 ON O_SBornW (L2b2)
    MinorW
    UnEmpW
    MedInc;

!=============================================================================
!=======================ADDITIONAL MODEL SPECIFICATIONS=======================
```

```
!=============================================================================

BRWA WITH BSDO;          !Estimates the correlation between RWA and SDO @ L2
DWT5 WITH CWT5;         !Estimates the correlation between world views @L2
O_SBornW WITH UnEmpW MinorW MedInc;
UnEmpW WITH MinorW MedInc;
MinorW WITH MedInc;

!=============================================================================
!================================                 ================================
!================================ END OF L2 MODEL  ================================
!================================                 ================================
!=============================================================================

MODEL INDIRECT:
BSDO ind O_SBornW;

BRWA ind O_SBornW;

!=============================================================================
!=============================================================================
!============================START OF MODEL CONSTRAINTS=======================
!=============================================================================
!=============================================================================

MODEL CONSTRAINT:

NEW(W_RWA W_SDO B_RWA B_SDO);

W_RWA = (W_DWRWA - W_CWRWA);
B_RWA = (B_DWRWA - B_CWRWA);

W_SDO = (W_CWSDO - W_DWSDO);
B_SDO = (B_CWSDO - B_DWSDO);

!=============================================================================
!=============================================================================
!============================END OF MODEL CONSTRAINTS==========================
!=============================================================================
!=============================================================================

OUTPUT:

SAMPSTAT CINTERVAL TECH1 STDYX;
```

A psychometric analysis of the Frost Multidimensional Perfectionism Scale in a sample of New Zealand adolescents

Maddy Brocklesby[1,2], Jessica Anne Garisch[1,2], Kealagh Robinson[3], Robyn Langlands[1], Lynne Russell[4], Angelique O'Connell[1,5], and Marc Stewart Wilson[1]

[1]School of Psychology, Te Herenga Waka Victoria University of Wellington (VUW)
[2]Pathways, Wellington
[3]School of Psychology, Massey University, Wellington
[5]Health Services Research Centre, VUW, Wellington
[6]Oranga Tamariki – Ministry for Children, Wellington

Increasingly, anecdote and research have suggested a high rate of perfectionism among adolescents. The authors of the most common measure used in perfectionism research, the Frost Multidimensional Perfectionism Scale, have proposed that perfectionism comprises six subcomponents, however this has been the subject of debate in regard to adolescent populations. Our study examined the psychometric properties of the Frost Multidimensional Perfectionism Scale in a sample of 930 New Zealand adolescents. Broadly consistent with our hypotheses, and previous research, the results showed that Frost and colleagues' original six-factor structure did not provide a good fit to the adolescent sample. Instead, exploratory factor analyses reveals a four-factor solution reflecting 'Concerns and Doubts', 'Parental Perceptions', 'Personal Standards' and 'Organisation'. Further analyses provides support for two second-order factors representing Positive and Negative perfectionism. Overall, despite differing from Frost and colleagues' original six-factor conceptualisation, the four first-order components conform to the two hypothesized second-order components.

Keywords: *Perfectionism, Adolescence, Mental Health, Factor Analysis*

INTRODUCTION

For at least two decades, there has been growing concern over the apparent increase in perfection amongst today's adolescents (e.g., Curran & Hill, 2019), with some researchers suggesting that we are amidst a perfectionism 'epidemic' (Flett & Hewitt, 2014, 2020; see also Hawkins et al., 2006; Mofield & Parker-Peters, 2015; Portesova & Urbanek, 2013; Rice et al., 2011). Previous research has highlighted the potentially detrimental effects of perfectionism, providing evidence of a number of negative mental health outcomes for highly perfectionistic adolescents (e.g., Affrunti & Woodruff-Borden, 2014; Boone et al., 2014; Claes et al., 2012; Hewitt et al., 1997). There is currently one self-report measure dominating perfectionism research; however its validity for use in adolescent samples has been questioned (e.g., Hawkins et al., 2006). The aim of this study was to evaluate the psychometric properties of this measure, the Frost Multidimensional Perfectionism Scale (FMPS: Frost et al., 1990), in order to support the validity of future research using this scale in adolescent samples.

Perfectionism

Perfectionism, typically defined as "the setting of excessively high personal standards of performance" (Frost et al., 1990, p. 450) has been considered a positive quality across a variety of situations, contributing to high levels of motivation and achievement (Hamachek, 1978; Stoeber & Rambow, 2007; Thorpe & Nettelbeck, 2014). More often, however, research has shown that perfectionism can manifest as an underlying cognitive vulnerability that can, when coupled with adverse environmental circumstances, result in psychological distress and associated sub-optimal coping strategies (e.g., Klibert et al., 2005; O'Connor et al., 2010)

Contemporary understanding of the multidimensional nature of perfectionism owes much to the influential contribution of Frost and colleagues (1990). In consolidating previously conflicting and unclear conceptualisations of what perfectionism might entail, these researchers identified key components of perfectionism within existing measures (e.g., The Burns Perfectionism Scale, Burns, 1980; subscales within the Eating Disorders Inventory, Garner et al., 1983; The Dysfunctional Attitudes Scale, Weissman & Beck, 1978; The Irrational Beliefs Test, Jones, 1969) and consolidated them to create the Frost Multidimensional Perfectionism Scale (Frost et al., 1990). The development of the FMPS moved perfectionism research from a state of conflicting definitions and findings to a position of widespread agreement on how research on the associated factors and outcomes of perfectionism can proceed. As such, the FMPS is now one of the most widely used scales to measure perfectionism (Flett & Hewitt, 2015).

The Frost Multidimensional Perfectionism Scale

Frost and colleagues' (1990) FMPS conceptualises perfectionism as having six factors; 'Concern over Mistakes' (CM; where even slight mistakes are perceived as failures), 'Doubts about Actions' (DA; feeling that a task is never successfully completed), 'Parental Criticism' (PC; anything less than perfection will result in

disapproval), 'Parental Expectations' (PE; feeling that parental expectations are increasingly high), 'Personal Standards' (PS; setting of challenging goals for oneself); and 'Organisation' (O; preoccupation with order and neatness). These six components are measured using a 35-item self-report measure, validated on several samples of female, American undergraduates (Frost et al., 1990). Initial analysis produced good internal reliabilities, exceeding that reported for other, previous, perfectionism scales (e.g., Burns, 1980) or subscales within other measures (e.g., the Eating Disorders Inventory, Garner et al., 1983; Irrational Beliefs Test, Jones, 1969), and displaying good convergent validity. Finally, consistent with early ideas that perfectionism may be related to negative outcomes, Frost and colleagues identified a positive relationship between the overall perfectionism scores (excluding O items due to low inter-correlations with the other subscales), and subscale scores for CM and DA, with a measure of depression.

Later research using this original six-factor structure has supported the relationship between specific components of perfectionism and negative outcomes. In particular, the components tapping into negative self-evaluation, namely CM and DA, have been associated with psychopathological symptoms and disorders such as depression, anxiety disorders, eating disorders, substance abuse, stress, and suicide ideation and attempts (Antony et al., 1998; Bieling et al., 2004; Dickie et al., 2012; Frost et al., 1990; Hamilton & Schweitzer, 2000; Handley et al., 2014). In addition, research has also highlighted a relationship between O and PS and positive outcomes. For example, O was shown to be related to positive achievement striving and good work habits (Frost et al., 1990). Overall, there is strong support for the division of the FMPS subscales into those typically related to negative outcomes (Concern over Mistakes, Doubts about Actions, Parental Criticism, and Parental Expectations) and those typically related to positive outcomes (Personal Standards and Organisation), sometimes referred to as positive and negative perfectionism (Frost et al., 1993).

The resulting two-factor model has since become the most well-supported conceptualisation of perfectionism (Bieling et al., 2004; Blankstein & Winkworth, 2004). However, there has been ongoing controversy regarding the scale's applicability for diverse populations. In particular, researchers have questioned whether the underlying six factors and overarching two second-order factors are equally as appropriate for diverse populations as they were for the undergraduates employed in both the original validation study (Frost et al., 1990), and Frost and colleagues' (1993) study identifying the overarching positive and negative components. Of particular interest is the scale's utility in an adolescent sample.

Using the FMPS psychometric with adolescents

With regard to the development of perfectionism and its associated outcomes, childhood and adolescence are particularly important life stages (Flett et al., 2002). With a view towards targeted prevention strategies, it follows that children and adolescents are logical targets for researching the onset of perfectionism, the factors associated with it, and related outcomes. Indeed, there is a growing body of research that supports the view that this population is particularly important, suggesting that perfectionism can adversely affect up to a third of children and adolescents in community settings, and likely more in clinical populations (Chan, 2009; Flett & Hewitt, 2014; Hawkins et al., 2006; Parker, 1997; Portesova & Urbanek, 2013). It is vital, therefore, that there is a reliable and valid measure of perfectionism with which research can be conducted and then utilised in reducing negative perfectionism and promoting positive perfectionism, thereby enhancing adolescent mental wellbeing.

Debating the conceptualisation of perfectionism

Although most researchers agree that perfectionism is multidimensional, there are conflicting perspectives on which particular conceptualisation of the FMPS should be used in order to generate the most empirically valid and theoretically useful information about its correlates and potential effects. At one extreme researchers have proposed using the original six factors (e.g., Parker & Adkins, 1995; Parker & Stumpf, 1995). At the other extreme this has been rendered down to only two factors representing positive and negative perfectionism (e.g., Chang et al., 2004; Coxet al., 2002; Khawaja & Armstrong, 2005). Given the importance of an appropriate measurement of perfectionism that can identify those at risk, this lack of consensus across a wide variety of samples, and specifically in adolescent samples, will be described and evaluated below.

Six-factor structure. Early psychometric analyses of the FMPS looked promising in regard to Frost and colleagues' (1990) proposed six-factor structure. For example, Parker and Stumpf (1995) broadly replicated the six factors in a sample of academically-talented children, except for two items which loaded on different factors. Internal reliabilities for the subscales and the overall perfectionism score ranged from .67 (DA) to .90 (O), slightly lower than those found in Frost's undergraduate sample. Parker and Stumpf also provided evidence for the existence of both a positive and a negative element of perfectionism through their relation to key personality traits. Specifically, PS and O were positively associated with conscientiousness while DA, CM and PC correlated positively with neuroticism.

Similarly, Parker and Adkins (1995) reported six factors in a sample of male and female undergraduates, and internal reliability scores similar to those identified by Frost and colleagues (except for the PE subscale: .57). However, Parker and Adkins decided to retain all items, concluding that the FMPS is psychometrically sound with an underlying six-factor structure.

Five-factor structure. Since Parker and colleagues' (1995, 1995) research, few other researchers have provided convincing support for the six-factor structure. For example, both Cox and colleagues (2002) and Stallman and Hurst (2011) have suggested that a lack of distinction between PE and PC calls for one combined subscale representing Parental Perceptions. Thus, an argument for a five-factor model arose. In a sample of clinical outpatients, Cox and colleagues also observed that many items load highly on more than one subscale. Consequently, after removal of the cross-loading items, they proposed a 22-item scale (Brief FMPS), that correlated highly with the original subscales and displayed adequate internal reliabilities (.63-.90) across

both clinical and non-clinical adults. Further analyses indicated a higher-order, positive and negative, factor structure (as proposed by Frost et al., 1993). The Brief FMPS and components of the Brief Multidimensional Perfectionism Scale (Brief-MPS-HF; Hewitt & Flett, 1991) demonstrated good fit on three of five fit indices, and better than the equivalent model using the full FMPS. Overall, Cox and colleagues supported a five-factor structure for the Brief FMPS, in which the five factors could be further grouped into secondary-order factors corresponding to positive and negative perfectionism.

In an Australian undergraduate sample, Stallman and Hurst (2011) also combined PE and PC into a single 'Parenting' factor, and a smaller item-set following exclusion of six items with low factor loadings (below 0.45). Confirmatory Factor Analysis (CFA) indicated a good fit, and internal reliabilities of the five subscales ranged from .76 (DA) to .90 (O & 'Parenting').

Finally, and directly pertinent to this investigation, Sotardi and Dubien (2019) report a five-factor structure after allowing two cross-loadings, but in a Uniervsity sample aged from 16 to 64.

Four-factor structure. Further, some researchers have taken the five-factor model and further reduced it to four (Hawkins et al., 2006; Stumpf & Parker, 2000), typically involving the amalgamation of CM and DA items. For example, Stumpf and Parker (2000) first identified four factors in a sample of academically talented children and then replicated the model with undergraduate students. They reported that Concerns and Doubts (CM and DA combined) was positively associated with neuroticism and negatively associated with self-esteem, whereas PS and O were positively associated with conscientiousness. These findings led them to explore second-order factors from which they found support for higher healthy (positive; O and PS) and unhealthy factors (negative; PE/PC and CM/DA) of perfectionism.

Hawkins, Watt and Sinclair (2006) conducted some of the first psychometric research on the FMPS using community adolescents. In their all-female sample, they also broadly replicated the above four factors with internal reliabilities ranging from .76 to .87 and only minor exclusions due to cross loadings (items originally from CM and PS respectively). In addition, Hawkins and colleagues explored the possibility of two higher-order factors. They reported that PS correlated with all three other factors and, importantly, correlated most strongly with CAD, rather than O as would be expected if they were to make up a healthy perfectionism factor. This finding, along with low internal reliability scores (.45 for 'healthy' perfectionism and .66 for 'unhealthy' perfectionism), led Hawkins and colleagues to conclude that higher-order factors were not valid in this sample.

Three-factor structure. Another less commonly proposed, although plausible, factor structure has been identified by Purdon, Antony and Swinson (1999) in a sample of clinically-anxious patients. Purdon and colleagues argue that, despite finding support for the original six-factor structure, low percentages of variance for the last three factors suggested it was over-extracted and, therefore, three factors were more statistically appropriate. They describe a further-reduced three-factor structure comprised of Fear of Mistakes (CM and DA), Goal Achievement Orientation (PS and O), and Perceived Parental Pressure (PC and PE). Internal reliabilities were .91, .85, and .91 respectively. However, it is important to note that, to our knowledge, this factor structure has not been replicated in any other sample (but see Kantack, 2014, for an example of research using these subscales). Moreover, Gelabert et al., (2011) tested Purdon and colleagues' three-factor structure along with the original six-factor structure (Frost et al., 1990) and a four-factor structure (Stoeber, 1998) in a Spanish sample. They found that the six-factor model showed the best fit, superior to a four-factor model and, finally, Purdon and colleague's three-factor model.

Two factor structure. Finally, and arguably most importantly given the current use, many researchers have supported Frost and colleagues (1993) and advocated an overarching two-factor structure representing positive and negative perfectionism. As evidenced above, this is often hierarchical, with two superordinate factors based on the six individual subscales at the first-order (e.g., Cox et al., 2002; Stumpf & Parker, 2000). Only Khawaja and Armstrong (2005) have conducted a first-order two-factor analysis of the individual scale items rather than subscale scores. In their sample of Australian undergraduates they found 17 items contributed to positive or negative perfectionism with internal consistency scores of .89 and .91 respectively (see also Burgess et al., 2016).

Overall, the existence of positive and negative facets of perfectionism have been broadly supported in adult clinical (e.g., Cox et al., 2002), undergraduate (e.g., Frost et al., 1993; Stallman & Hurst, 2011), adolescent non-clinical (e.g., Luyckx et al., 2008; Stumpf & Parker, 2000), and child (e.g., Parker & Stumpf, 1995) samples. Given that the focus of this paper is on adolescents, the following section will attend to evidence for, or against, the two-factor model of perfectionism specifically in adolescents.

In a sample of Belgian adolescents and undergraduates, Luyckx and colleagues (2008) investigated perfectionism and identity exploration in relation to well-being. They used the CM and DA subscales of the FMPS to represent negative perfectionism, and PS to represent positive perfectionism. CFA showed adequate fit to the data, and they reported good internal consistency for both positive perfectionism and negative perfectionism (α's > .75).

In another study with adolescents, Thorpe and Nettlebeck (2014) first identified a four-factor solution using exploratory factor analysis (EFA), and then conducted a second-order factor analysis resulting in two factors. Whilst Thorpe and Nettlebeck are confident with the reliability of positive perfectionism, they expressed concern around the clarity of negative perfectionism in their sample. However, overall the evidence supported a two-factor solution.

Current state of FMPS research

To summarise, it is not clear whether Frost's original six factors, or even which of the various proposed alternative factor structures, can be successfully applied to diverse populations. This uncertainty is compounded by inconsistent reporting of internal reliability. To illustrate, Ha and colleagues (2010) found only 40% of 145 studies identified as using the FMPS reported either full scale or

Table 1. *Goodness of fit statistics for Frost Multidimensional Perfectionism Scale factor structures*

	Proposed factors	Items retained	χ^2(d.f.)	χ^2/d.f.	CFI	RMSEA
Frost et al., 1990	6	35	2971.58 (545)	5.45	0.86	0.069
Cox et al., 2002	5	22	1206.84 (199)	6.07	0.90	0.074
Hawkins et al., 2006	4	33	3240.66 (489)	6.63	0.83	0.078
Purdon et al., 1999	3	35	5126.74 (557)	9.20	0.73	0.094
Khawaja & Armstrong, 2005	2	17	835.34 (118)	7.08	0.91	0.081
Frost et al., 1993	2	35	6029.19 (559)	10.79	0.68	0.103
One factor	1	35	9076.02 (560)	16.21	0.50	0.128

Note: All χ^2 significant at p<.001

subscale coefficient alphas. In a meta-analysis of those that have reported internal consistency, DA is reported as the least reliable subscale, while O is consistently the most reliable. Ha and colleagues also report that higher score reliabilities were associated with samples that are older, with higher proportions of 'White' and female participants, and greater variability on the FMPS. Unfortunately, routine underreporting of reliability adds a caveat to published research on perfectionism.

This study

Against this background, we aim to investigate the psychometric characteristics of the FMPS in a New Zealand community adolescent sample, and specifically its underlying factor structure. In light of the above debate, the support for a number of different factor structures makes it hard to predict which structure is likely to best fit New Zealand adolescents. However, there is a wider consensus for two overarching factors, therefore it is anticipated that a two-factor structure will be supported in this sample. To our knowledge this is the first study to examine the FMPS in a New Zealand sample. Clarifying the underlying nature of perfectionism will help enable researchers to conduct valid studies on the relationship between perfectionism and other positive and negative correlates, which in turn will help identify at risk individuals and prevent, associated negative mental health outcomes.

METHOD

Participants

Participants were 930 New Zealand adolescents (58% female, 42% male, <1% gender diverse), recruited to take part in a wider longitudinal Youth Wellbeing Study investigating a variety of factors associated with youth wellbeing. Secondary schools from the broad Wellington region were invited to participate, of which 15 ultimately participated.

Participants range in age from 13 years to 17 years (M = 14.50 years, SD = 1.29). The majority of the sample endorsed Pākehā (New Zealand/ European; 72.2%) and 7.3% indicated Māori as their primary ethnicity.

Materials

Within the wide array of measures used in the wider study, the focus of this study is Frost Multidimensional Perfectionism Scale (FMPS; Frost et al., 1990). It is comprised of 35 items measured on a 5-point Likert scale from 1 (*totally disagree*) to 5 (*totally agree*). For example, 'If I fail at school, I am a failure as a person', 'Other people seem to accept lower standards for myself than I do', 'My parents never try to understand my mistakes' and 'I try to be an organised person'.

Procedure

Ethical approval for this research was granted by the National Health and Disability Ethics Committee. Both school and parent/caregiver consent were sought prior to visiting the school to administer the survey. Students with parent/caregiver consent were then given the opportunity to participate in the survey during a period within their regular class hours. These students were briefed, by a member of the research team, on the purpose of the survey, with emphasis on the confidentiality and voluntary nature of the survey.

Students were typically allowed a full school period to complete the survey. Each classroom had a researcher available to answer any questions the students had, and at least one clinical psychologist from the research team was available in the event of participant distress. On completion, students were debriefed, provided with a sheet of paper detailing services that they could contact for support, and given a chocolate bar for participation.

Data was entered into and analysed using SPSS version 27 statistical software package (IBM, 2020) and AMOS (IBM, 2013).

RESULTS

Confirmatory Factor Analysis

First, Confirmatory Factor Analyses were conducted to ascertain which, of the various proposed factor structures for the FMPS, best fit this sample of New Zealand adolescents. CFA enables the researcher to test the goodness-of-fit for existing models and was therefore, given the plethora of proposed factor structures, considered a more appropriate first step than Exploratory Factor Analysis, which determines the factor structure that best represents the data without consideration of previous models (Hair et al., 2009).

14 different models were explored using AMOS 22 (IBM, 2013) including Frost's (1990) original factor structure, variations of the six-factor structure (Parker & Stumpf, 1995), five-factor (Cox et al., 2002; Stallman & Hurst, 2011), four-factor (Hawkins et al., 2006; Khawaja & Armstrong, 2005; Stumpf & Parker, 2000), a three-factor (Purdon et al., 1999), two-factor (Frost et al., 1993; Khawaja & Armstrong, 2005; Luyckx et al., 2008) and

hierarchical factor structures (Cox et al., 2002; Stumpf & Parker, 2000). For the sake of simplicity, the original model and only the variation with the best fit from each number of factors will be reported. As shown in Table 1, each model was assessed using multiple fit indices. These included the Chi-Square (χ^2), Comparative Fit Index (CFI), and the Root Mean Square Error of Approximation (RMSEA)[1].

As a guide, Tabachnik and Fidell (2013) suggest that a good fit is often represented by a non-significant χ^2, indicating that the model generated by the data is not significantly different to the model proposed. However, this statistic is particularly sensitive to large sample sizes, meaning our significant χ^2 statistics provide little guidance in regard to meaningful interpretation. Alternatively, it is suggested that χ^2 divided by the degrees of freedom is a more appropriate measure with an χ^2/d.f. between 2 (Tabachnick & Fidell, 2013) and 5 (Wheaton et al., 1977) indicating satisfactory fit. According to these guidelines, Frost and colleagues' (1990) original factor structure comes the closest to a good fit.

Other goodness-of-fit statistics broadly support the χ^2/d.f. statistic in highlighting large discrepancies between the proposed models and the model guided by this data. To illustrate, Tabachnick and Fidell (2013) state that for the data to be considered a good fit to the model the CFI should be greater than .95 (see also Hu & Bentler, 1999). As seen in Table 2, according to this fit index, the data does not show a good-fit with any of the previous models. However, Khawaja and Armstrong's (2005) two-factor model, and Cox and colleagues' (2002) five factor model appeared the closest to an acceptable fit with CFI statistics of 0.91 and 0.90 respectively.

The Root Mean Square Error of Approximation (RMSEA) was the final goodness-of-fit statistic considered. It too, raised questions about the validity of applying this data to previously proposed models. Hu and Bentler (1999) propose that RMSEA values less than 0.06 indicate a good-fit and values over 0.10 indicate a poor fit. According to this statistic, Frost and colleagues' (1990) original factor structure provides the best (although not good) fit, closely followed by Cox and colleagues (2002) five-factor structure. When combining all of the available fit indices, the statistics suggest that the data best fits Frost and colleague's original six factor structure ($\chi^2(545) = 2971.58$, $p < 0.001$; $\chi^2/d.f. = 5.45$; $CFI = .859$; $RMSEA = .069$) and Cox and colleague's five factor structure ($\chi^2(199) = 1206.84$, $p < 0.001$; $\chi^2/d.f. = 6.07$; $CFI = .90$; $RMSEA = .074$). However, none of the goodness-of-fit indices for either model exceed the criteria recommended to represent a good-fit.

Exploratory Factor Analysis

Given that the CFAs conducted showed that the data from this New Zealand adolescent sample does not show a good-fit with any of the previously proposed factor structures, exploratory Principle Components Analysis (PCA) with Varimax orthogonal rotation was employed to help determine the relationships between underlying variables and multiple items[2]. Traditional measures of suitability for factor analysis indicated that the data was suitable for PCA (Bartlett's Test of Sphericity $\chi^2(595) = 15771.70$, $p < .001$; Keyser-Meyer-Olkin: .94).

The PCA conducted on all 35 items from the FMPS produced some mixed results. Five components with eigenvalues greater than one accounted for 60.82% of the variance (Kaiser, 1974). However, Cattell's (1966) scree plot suggested either a two or four component solution. Given that Kaiser's criterion has often been critiqued for resulting in the retention of too many factors (e.g., Pallant, 2013) and the ambiguity of the current scree plot, Horn's (1965) parallel analysis was conducted to help determine the appropriate number of factors to retain.

Parallel analysis compares the eigenvalues produced with those from a randomly generated data set. This enables the researcher to retain only components that have larger eigenvalues than those generated randomly. Many argue that this method is more accurate than either Kaiser's criterion or the use of a Cattell's scree plot (e.g., Pallant, 2013). Parallel analysis resulted in the eigenvalues of four components exceeding those produced from a random data set. Specifically, the fifth PCA factor provided an eigenvalue of 1.05, below the 1.27 recommended by parallel analysis. As a result, another PCA was conducted, this time limiting the number of components to four.

In the resulting PCA, four components explained 57.83% of the variance. As can be seen in Table 2, the first component comprised of 13 items originally from CM and DA, plus two additional items (items 4 and 5) originally from the PS and PC factors respectively (Frost et al., 1990). The third and fourth components mirrored the original PS (6 items) and O (6 items) factors respectively. Finally, the fourth component comprised of seven items from PE and PC. Item 3 was excluded due to low loadings on two factors with neither loading significantly higher than the other (.42 on Factor 1; .40 on Factor 4). The four components explained 29.94%, 15.70%, 6.47% and 5.72% of the variance respectively. They will be referred to as Concerns and Doubts (CAD), Personal Standards (PS), Organisation (O) and Parental Pressure (PP) as in Stumpf and Parker (2000). All four components have high internal consistency. (CAD, $\alpha = .93$; PS, $\alpha = .84$; O, $\alpha = .91$; PP, $\alpha = .83$).

As previously outlined, higher-order factors are often created by combining correlated lower-level factors (e.g., Cox et al., 2002; Hawkins et al., 2006). As such, an exploratory PCA with Varimax orthogonal rotation was undertaken to test whether the factors combined to create two second-order factors representing positive and negative perfectionism. The PCA produced two components with eigenvalues greater than one and accounted for 78.66% of the variance (Kaiser, 1974).

[1] Multivariate outliers were computed with the 10 most extreme outliers removed. Further analysis showed that this had very little effect on the subsequent results, therefore all data was included in the final analyses.

[2] EFA was also conducted using an oblique rotation and results did not significantly differ, therefore, the results of the Varimax rotation are reported.

Table 2. *Result of FMPS PCA; factor structure and item loadings*

Item (original factor from Frost et al., 1990)	CAD (α=.93)	O (α=.91)	PS (α=.84)	PP (α=.91)
14. If I fail partly, it is as bad as being a complete failure (CM)	.79			
23. If I do not do as well as other people, it means I am an inferior human being. (CM)	.78			
9. If I fail at school, I am a failure as a person. (CM)	.76			
13. If someone does a task at work/school better than I, then I feel like I failed the whole task. (CM)	.74			
25. If I do not do well all the time, people will not respect me. (CM)	.74			
21. People will probably think less of me if I make a mistake. (CM)	.73			
28. I usually have doubts about the simple everyday things I do. (DA)	.72			
34. The fewer mistakes I make, the more people will like me. (CM)	.69			
10. I should be upset if I make a mistake. (CM)	.69			
17. Even when I do something very carefully, I often feel that it is not quite right. (DA)	.65			
33. It takes me a long time to do something "right." (DA)	.64			
18. I hate being less than the best at things. (CM)	.62			
32. I tend to get behind in my work because I repeat things over and over. (DA)	.59			
4. If I do not set the highest standards for myself, I am likely to end up a second-rate person. (PS)	.46			
5. My parents never tried to understand my mistakes. (PC)	.46			
31. I am an organized person. (O)		.84		
29. Neatness is very important to me. (O)		.84		
7. I am a neat person. (O)		.83		
8. I try to be an organized person. (O)		.80		
27. I try to be a neat person. (O)		.80		
2. Organization is very important to me. (O)		.77		
12. I set higher goals than most people. (PS)			.79	
19. I have extremely high goals. (PS)			.76	
6. It is important to me that I be thoroughly competent in everything I do. (PS)			.59	
24. Other people seem to accept lower standards from themselves than I do. (PS)			.57	
30. I expect higher performance in my daily tasks than most people. (PS)			.55	
16. I am very good at focusing my efforts on attaining a goal. (PS)			.54	
26. My parents have always had higher expectations for my future than I have. (PE)				.72
20. My parents have expected excellence from me. (PE)				.67
35. I never felt like I could meet my parents' standards. (PC)				.62
1. My parents set very high standards for me. (PE)				.61
11. My parents wanted me to be the best at everything. (PE)				.60
22. I never felt like I could meet my parents' expectations. (PC)				.58
15. Only outstanding performance is good enough in my family. (PE)				.51

Note: Loadings less than 0.30 not shown

Cattell's (1966) scree plot also supported a two component solution. As outlined in Table 3, CAD and PP combined to form a component representing negative perfectionism and O and PS combined to form a component representing positive perfectionism. Both negative and positive perfectionism had high internal consistency. In addition, an overall scale based on the individual 35 items was also found to have high internal consistency (α = .93).

DISCUSSION

This study investigated the psychometric properties of the FMPS in a New Zealand adolescent sample. Given

Table 3. *Result of FMPS second-order PCA; factor structure and item loadings*

Subscale identified in first order factor analysis	Negative Perfectionism (α = .93)	Positive Perfectionism (α = .89)
Concerns and Doubts	.86	
Parental Perceptions	.87	
Organisation		.93
Personal Standards		.75

that there is wide debate regarding the FMPS factors, there was no specific prediction about which conceptualisation of the underlying factor structure would best fit this sample. However, given the relatively consistent finding of two overarching factors, it was expected that positive and negative perfectionism would also be identified in this sample.

First level factor structure

Overall, CFA showed that none of the previously proposed models fit this sample as assessed using the range of conventional measures of fit. However, Frost and colleagues' (1990) original six factor structure indicated closer-to-satisfactory fit than the other 13 models tested. Therefore, EFA was used to form a data-driven model specific to this sample. A parallel analysis supported four factors, that subsequent EFA showed were mostly consistent with the factor structures previously reported by a number of previous researchers (e.g., Hawkins et al., 2006; Stumpf & Parker, 2000; Thorpe & Nettelbeck, 2014), whereby Concerns over Mistakes and Doubts about Actions are combined to form Concerns and Doubts and Parental Criticism and Parental Expectations were combined to form Parental Perceptions. Personal Standards and Organisation remained their own factors. Only one item was removed due to low and relatively equal loadings across two of the factors.

This initial analysis lends some support to the underlying factors proposed by Frost and colleagues (1990). However, in this younger sample it does raise questions about the validity of differentiating between CM and DA, and between PE and PC. It is possible that adolescents may have more difficulty in differentiating between these relatively similar constructs. This is similar to other studies using the FMPS in other child and adolescent samples who also struggled to differentiate between some of the original proposed factors (Hawkins et al., 2006; Kornblum & Ainley, 2005; Stumpf & Parker, 2000; Thorpe & Nettelbeck, 2014) and similar to other psychological constructs which show differing structures across ages (e.g., alexithymia; Parker et al., 2010). Indeed, Wadsworth and colleagues (2022) concluded that the FMPS (administered to both 8–12-year-olds and their parents) was valid for the parents, but not the pre-teens, potentially reflecting developmental factors.

Overarching positive and negative factors

A second-order factor analysis supported combining CAD and PP, and combining PS and O, to represent two overarching, positive and negative, factors. Therefore, this study more definitively lends support to the occurrence of positive and negative perfectionism in adolescents (Chang et al., 2004); Hawkins et al., 2006); Parker & Stumpf, 1995; Stumpf & Parker, 2000; Thorpe & Nettelbeck, 2014). Both the resulting fundamental four factors and the overarching two factors had satisfactory internal consistency alpha coefficients.

Theoretical and practical implications

This research supports the notion that perfectionism is comprised of components representing both positive and negative perfectionism. Relatedly, it further indicates that researchers should continue to use scales such as the FMPS that allow the distinction between positive and negative factors of perfectionism. Failure to do so poses the risk that significant relationships with important outcomes could potentially be masked through the cancelling out of each component's unique and typically opposite effects.

Clarifying the underlying nature of perfectionism in adolescents and providing a reliable measure of the components of perfectionism will allow researchers to begin developing a solid research base with a common language for the different facets of a perfectionistic presentation. This will then enable clinicians to have a better understanding of the correlates and risks of having perfectionism. For example, Thorpe and Nettlebeck (2014) reported that positive perfectionism was positively related to higher academic grades over and above intelligence and conscientiousness, and that negative perfectionism, specifically components representing parental criticism, were associated with lower academic achievement. Similarly, negative perfectionism has been associated with more depressive symptoms and positive perfectionism with greater academic adjustment (Luyckx et al., 2008). In addition, this greater understanding of perfectionism in adolescents, coupled with research that monitors perfectionism over time, will assist in identifying risk and protective factors for the development of perfectionism. For example, Flett and colleagues (2002) outline some family environmental factors, such as parental perfectionism, that could give rise to perfectionistic adolescents. Such understanding of the development of perfectionism will subsequently help identify interventions that can limit perfectionism and its associated maladaptive outcomes.

When the Youth Wellbeing Study Team present at local schools on the subject of adolescent wellbeing, parents report concern about perfectionism. This may reflect several things—an external pressure from the National Certificate of Education Achievement regime exacerbating levels of perfectionism, or that as young people move through secondary school the increase in important assessment is reflected in an apparently age-related increase in perfectionism. In either case, longitudinal research may help to establish whether there

is an increase in levels of perfectionism across all ages, or rather that it is particularly evident among older students.

Qualifications and limitations

There are two critical qualifying factors to consider in interpreting these results. First, there is research to suggest that perfectionism can present differently in males and females (Blankstein et al., 2008; Blankstein & Winkworth, 2004; Klibert et al., 2005). Given that this sample comprised of both males and females and analysis was not conducted individually with each gender, this study sheds little light on whether the underlying factor structure differs by gender. This factor structure has been supported in a female-only sample (Hawkins et al., 2006), but has not yet been tested in male or gender-diverse only samples.

A second limitation may be that the sample consisted of only students who were still attending school, present on the day of data collection, and whose parents had provided consent. Research suggests that adolescents that have already dropped out of school or engage in truancy have significantly higher levels of psychopathology than those who remain in education (Egger et al., 2003). Therefore, it could be possible that students who have higher levels of psychopathology, who based on previous research we would expect to have the highest level of negative perfectionism, may not be well represented in this sample. It is important to be aware of this potential limitation; however there is little to suggest that the underlying factor structure of perfectionism in the missing adolescents would be significantly different than those captured in the sample. Based on previous research (e.g., Gaudreau & Thompson, 2010) it would be expected that their perfectionism profile would be *more* extreme (higher on perfectionism and lower on positive perfectionism) rather than qualitatively different. It is unclear how parental consent might differentiate adolescents in terms of absolute levels of perfectionism of either kind, though it might be anticipated that parental expectations might be higher among parents of non-participants.

Strengths

This study has a number of key strengths. First, the aim was to comprehensively understand perfectionism in adolescents, therefore, analysis was conducted with previous models in mind, but also using a data-driven approach. Unlike studies that use only EFA, or construct scales based on the original factors, this multi-method approach limited the influence of bias regarding the best model for *this* adolescent sample.

Another key strength is that EFA was conducted using the full original 35 items rather than Frost and colleagues (1990) predetermined subscales. This allowed testing of Frost's original underlying six-factor structure through giving freedom for the items to load on any factor, whether it be the factor proposed by Frost or a factor more suited to this sample. This approach also allowed for individual item analysis and the removal of items that cross-loaded or only loaded weakly on the scales (only item 3 was removed).

Finally, the large sample used for this study broadly represents the heterogeneous nature of New Zealand adolescents. The sample included community adolescents from a variety of ethnicities and cultures, religious orientations, family structures, socio-economic status and from a wide range of schools (co-education/single sex, private/public, and religious/non-religious). This helps enable the generalisation of findings to New Zealand's wider adolescent population.

Future research

Future research could include a longitudinal investigation of perfectionism in adolescents to monitor how perfectionism develops and whether the underlying nature of the construct changes over time or remains relatively consistent. This could either provide support for one underlying model of perfectionism that is relevant throughout adolescence and young adult life or could shed some light on why there have been multiple conflicting models of perfectionism presented across different samples in past research. For example, it seems reasonable that parental expectations may contribute differently to perfectionism among young people living at home, compared to young adults living away from the sphere of close parental influence.

In addition, future research could investigate the underlying nature of perfectionism in males and females (and among gender-diverse youth). As mentioned above, most research has been conducted with males *and* females, or females *only*. Outcome research suggests perfectionism may have different effects for males and females (e.g., Blankstein et al., 2008; Blankstein & Winkworth, 2004; Klibert et al., 2005) therefore it makes logical sense to investigate whether the underlying nature of perfectionism is different. Indeed, 'perfectionism' may be a developmental construct, changing over time and developmental stage. For example, Branje and colleagues (2007) reported that conscientiousness increases among young women only. While they don't report sex differences in personality change, Heaven and Ciarrochi (2008) reported developmental declines in conscientiousness that appear to be ameliorated for youth with authoritaran parents.

Finally, the field of perfectionism could benefit from further psychometric analyses of the FMPS in different adolescent and adult samples, particularly non-western cultures, and male and female samples, to further increase confidence in the scale and perfectionism's underlying structure and to help extend and enable reliable and valid perfectionism research in wider populations.

Conclusions

In conclusion, this study has demonstrated that, in New Zealand adolescents, the FMPS is best conceptualised as having four underlying factors and two overarching positive and negative factors. Sub-scales based on first-, and second-order demonstrated more than adequate internal reliability alpha coefficients. Clarity regarding this widely used scale of perfectionism will enable further perfectionism research in adolescents which may then be used to develop prevention strategies, identify at risk populations, and reduce the negative outcomes associated with negative perfectionism.

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Corresponding author:
Marc Wilson
Email: Marc.Wilson@vuw.ac.nz

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