New Zealand Journal of Psychology

New Zealand
Psychological Society
Rōpū Mātai Hinengaro o Aotearoa

Editor's Introduction

CALL FOR PAPERS: Environment, climate and sustainability

From the Society Website:

"We have a challenge ahead. Scientists are clear about the evidence in support of human induced climate destabilization. Fundamental changes in our behaviour, our attitudes and values are required if we are to avoid catastrophic future scenarios. We are beginning to experience extreme environmental changes and yet responding to this reality is still resisted.

At the New Zealand Psychological Society's AGM In 2014, the membership passed two remits that have guided the development of the Society's 'Climate change response'. This has also provided the mandate and basis for our sharing psychological knowledge and advice in professional networks in Aotearoa/New Zealand and internationally and contributing to the political measures to address climate change.

Significant actions taken by the Society began with the establishment of the Climate Psychology Taskforce (CPTF) and the development and publication of the Society's Position Statement on Environmental Wellbeing and Responsibility to Society. The statement provides a fitting summary of the reasons for our climate response:

As psychologists, we function to promote the wellbeing of society. So it is vital that as a discipline, we acknowledge the profound impact humans collectively are having on the environment and urgently work to counter the ill-effects to the health and wellbeing of people and planet. We acknowledge that the implications of environmental damage and climate change bring in new responsibilities and require an extended understanding of the nature of wellbeing."

We invite submissions for an upcoming special issue of the *New Zealand Journal of Psychology* focused on environment, climate, and sustainability.

Due Date for Manuscript Submission: March 1st, 2021

We welcome contributions in the form of scholarly reviews, empirical research whether qualitative or quantitative in nature, commentaries relating to practice relevant to psychologists working Aotearoa New Zealand, and other relevant contributions. Contributions should be broadly relevant to the themes of environment, climate and sustainability, but more specific examples might include:

- Psychological and behavioural aspects of people and nature
- Ecological consequences of human actions
- Perception of, and behavioural responses to, environmental risks and hazards
- Māori and indigenous perspectives on the environment and it's impacts
- Effects of environment (and perception of the environment) on human cognition and health
- Theories of environment-relevant behaviour, values, norms, attitudes, and personality
- Psychology of sustainability and climate change
- Psychological practice in the context of environment, climate and sustainability

Special issue Editors are drawn from the New Zealand Psychological Society's Climate Psychology Task Force and include Brian Dixon, Jackie Feather, Natasha Tassell-Matamua, and Marc Wilson. For further information about the Society's Climate Change initiatives please visit the Society website.

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.

Marc Wilson

CONTENTS

Perception of financial satisfaction and its implications for free first-year education in New Zealand university students

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Financial stress predicts negative academic, social, and psychological outcomes in a tertiary student's life. To investigate whether free first-year education could mitigate financial stress in New Zealand tertiary education students, 270 psychology students from the University of Canterbury completed scales measuring financial stress, perceived socio-economic status, and debt attitude as well as demographic status and financial status variables over a series of two experiments. The efficacy of the New Zealand government's free first-year tertiary education policy on reducing students' financial stress was investigated in contrast with taking a temporal discounting approach, i.e. putting less value on future gains: Half of the participants were primed with a paragraph regarding free first-year education. Students' financial stress increased with increasing debt, inability to save money, and thinking that one's weekly income was not sufficient for living needs, but objective financial status variables such as their income, receiving Student Allowance, and part-time employment were not associated with students' financial stress. Priming with the government's free first-year education policy did not decrease first-year students' financial stress, indicating that the students were taking a temporal discounting approach. Overall, the findings suggest that 1) the government's focus could usefully shift to students' present financial concerns and 2) students' financial counselling and financial management skills could be enhanced.

Keywords: *Student Allowance, Financial Stress, Tertiary Education, Priming, Temporal Discounting.*

Introduction

University students in the Western world are expected to be conscious of both academic duties and financial obligations. A perception that one's financial obligations exceed their available resources to cope with these obligations is defined as financial stress (Gurung, 2013; Sulsky & Smith, 2005). Financial stress leads to negative academic and mental health outcomes (Drentea, 2000; Joo, Durband, & Grable, 2008; Krause, 1997; Letkiewicz et al., 2014; Skinner, Zautra, & Reich, 2004). The aim of the current study was to examine the effect of recently introduced free first-year tertiary education on perceived financial stress in tertiary students in New Zealand (NZ). In the rest of this introduction, the negative outcomes of financial stress are briefly pointed out, followed by a discussion of student debt as a factor that exacerbates financial stress (Letkiewicz et al., 2014; Morra, Regehr, & Ginsburg, 2008). A mitigating factor of financial stress, perception of one's financial status (Dwyer, McCloud, & Hodson, 2012; Lim, Montalto, & Heckman, 2014), is also discussed. Finally, the rationale for the current research is presented.

Financial stress predicts negative academic outcomes. According to a news article in The Australian, Australian students reported that financial instability was one of the reasons they would drop out of university (Hare, 2017). Joo et al. (2008) conducted an online survey in the USA to examine the attributes of students who dropped out of college or at least reduced their course work to get employment. They found that financial stress in students, financial stress in the family, older age, and work

engagement led students to drop out or reduce their course work. In addition, Letkiewicz et al. (2014) investigated the expected time to finish a university degree in relation to economic and social factors using data from 2010 Ohio Student Financial Wellness Survey. They found that financial stress predicted the odds of graduation taking more than four years, except in those individuals who met with financial counsellors or were employed – being more likely to graduate on time. It can be noted from the mentioned two studies, Joo et al. (2008) and Letkiewicz et al. (2014), that financial stress leads to negative academic outcomes. However, there is inconsistency in relation to work engagement: Joo et al. (2008) showed that it led students to drop out, while Letkiewicz et al. (2014) determined that it helped students graduate on time.

Financial stress is associated with mental health problems. Generally, financial stress has been a predictor of low self-esteem (Dohrenwend & Dohrenwend, 1982), negative emotions (Skinner et al., 2004), depression (Krause, 1997), and anxiety (Drentea, 2000) in all population groups. Hyun, Quinn, Madon, and Lustig (2006) reported that students' confidence in financial status (self-report that they had enough financial support to complete their studies) was negatively related to mental health issues such as hopelessness, exhaustion, sadness, depression, and being overwhelmed. As well as investigating factors mitigating financial burden, Hyun et al. (2006) revealed the subjective nature of financial stress such that it was self-report of financial support availability that decreased mental health issues. Notably, financial

stress affects both dimensions of subjective happiness, well-being and psychological distress, as explained by Headey and Wearing (1992). More specifically, financial stress influences well-being negatively by affecting one's emotional state (Skinner et al., 2004); and it enhances psychological distress as a consequence of leading to depression and anxiety (Drentea, 2000; Krause, 1997).

Letkiewicz et al. (2014) showed that students who had high amounts of debt, those who spent more than they earned (using credit cards) and those who had car loans reported more financial stress. These findings were further supported by Lim et al. (2014), wherein they analysed responses from 2010 Ohio Student Financial Wellness Survey to identify factors leading to financial stress in college students. According to them, the two most important stressors in a student's life appeared to be expecting a large student loan at graduation and inability to participate in the same activities as peers due to insufficient funds. As evident from this study, not just the present debt, but even anticipation of future debt can lead to financial stress. This finding is further supported by Morra et al. (2008) who studied a sample of Canadian medical students and reported that both present and future anticipated debt predicted perceived financial stress. Moreover, anticipated debt accounted for extra variance in financial stress beyond that produced by current debt.

A US study by Dwyer et al. (2012) found that the level of student debt had three types of effects on degree completion. A student loan up to 10,000 USD increased the probability of students completing their degrees; the effect plateaued at 10,000 USD; and debt beyond 10,000 USD decreased the probability of degree completion. There are noticeable differences between the US and NZ Student Loan schemes. For instance, most NZ tertiary students take Student Loan in NZ from the government (The Student Loan Scheme Annual Report, 2020) and there are no private loans. While in the US, around 8% students acquire private loans (Backman, 2020) and some Student Loans in the US could be forgiven (Friedman, 2019). However, the amount of average student debt is almost similar in both countries: around 29000 USD in the US and around 27000 NZD in NZ (Friedman, 2019; Student Loan Scheme Annual Report 2017, 2018). The average student loan, thus, could potentially decrease the odds of degree completion in both countries based on the study by Dwyer et al. (2012). Consistent with this, Scott (2009) reported that a majority of NZ tertiary students did not finish their degrees. However, the leading factor behind this, according to Scott (2009) seemed to be being a part-time student. Unfortunately, there are no other published studies directly examining the effects of financial stress on degree completion in NZ tertiary students.

Research studies have found that lower socio-economic status was one of the factors leading to increased financial stress across all generations (Caplan & Schooler, 2007; Drentea, 2000). Dwyer et al. (2012) reported that students from higher socio-economic strata were less influenced by the effects of increasing student debt on completing their degrees. The effects of socio-economic status may be mirrored by students' perceptions of their financial situation. Lim et al. (2014) also reported that those with better financial efficacy (high rating of "I

manage my money well") and financial optimism (high rating of "being optimistic about the future despite financial problems") reported less financial stress despite the effects of expecting a high amount of student loan at graduation and inability to participate in the same activities as peers. In the light of these findings, it can be argued that the students who perceive themselves as financially better off will potentially report lower financial stress.

An NZ tertiary education student faces similar financial challenges to students in other developed countries. Except in a limited number of European and South American countries (Goetz, 2017), university students or their families finance students' studies and pay for their day to day living needs (Saker & Hawkins, 2017). Some governments, such as NZ, provide Student Loan services (Barr & Crawford, 2005) such that students' tuition fees are paid by the state services and automatically deducted from their incomes later on. However, day to day living allowances reportedly do not keep pace with expenses and students struggle to make ends meet, leading to financial stress (Enoka, 2015). For instance, longitudinal studies by the NZ Union of Students' Associations (NZUSA) revealed that a typical student (full time, borrowing money for weekly costs, no Student Allowance, and working part-time) was close to severe financial distress; a third of students reported a severe financial burden; and the weekly income of a typical student was not sufficient for day to day needs. Moreover, final-year students had an extra concern. They tended to report increased distress as they estimated that their Student Loans would be more than 30,000 NZD on average by graduation. These students self-reported that increasing Student Loans were affecting their future decisions such as their ability to buy a home, go overseas, study further, and have children (Income & expenditure report 2017 - The cost of being a student in New Zealand, 2018).

This outcome is not unexpected since only a third of NZ tertiary education students are eligible to receive Student Allowances and Accommodation Benefits (non-repayable amounts paid weekly to full-time or semi-full time students to help with living costs and rental accommodation) (Accomodation Benefit, 2018; Student Allowance, 2018). The rest of them may borrow weekly Living Costs – a payable loan that adds up towards the Student Loan balance (Student Loan living costs, 2018) - work on a part-time or full-time basis in-term and during summer holidays, or be assisted by their families (Income & expenditure report 2017 - The cost of being a student in New Zealand, 2018) to pay for their day to day or present financial needs. The most common present financial obligations include living costs, such as accommodation, food, bills, commuting, and phone and internet; as well as one-off costs, such as rental property bonds, computer, and text books (Income & expenditure report 2017 - The cost of being a student in New Zealand, 2018; Typical living costs, 2018). Besides present needs, NZ tertiary education students face a future financial obligation in the form of paying back their Student Loan, as they do not have to pay it back while studying, because they have no or low income (Income & expenditure report 2017 - The cost of being a student in New Zealand, 2018; Paying back

your student loan, 2018).

The Labour-led government of NZ elected in 2017 decided to address the Student Loan issue, in the form of instituting free first-year tertiary education, as one of their key policy changes. The policy was announced in November 2017 and students starting tertiary education in 2018 did not pay any tuition fees (Fees-free tertiary study on fast track, 2018). The policy was meant to "invest in education" and get the student "closer to a more affordable future" (Fees-free tertiary study on fast track, 2018). This policy shift might have noticeable effects because Student Loan is the most common source of paying university tuition fees in NZ. Based on figures from the Ministry of Education, 176,938 individuals (which comprises 70% of eligible students) borrowed from Student Loan in 2016 and the average amount borrowed was 9053 NZD. Based on NZUSA figures, 79% of students reported that they paid their tuition fee via Student Loan (Income & expenditure report 2017 - The cost of being a student in New Zealand, 2018).

It is well-established in the literature that those with lower incomes and younger ages (such as students) attribute less value to future gains and losses – a phenomenon known as temporal discounting (Ainslie & Haslam, 1992; Thaler, 1981). Moreover, the discount rates for gains are usually more pronounced than for losses, i.e., these individuals tend to discount more if it is a delayed future gain compared to a delayed future loss (Thaler, 1981). If the fees-free first year policy is examined in the light of temporal discounting, we argue that the government has been addressing future economic concerns of tertiary education students, but these they would temporally discount anyway. In the meantime, the present financial concerns are increased because the cost of living as a student has increased since 2012 (Income & expenditure report 2017 - The cost of being a student in New Zealand, 2018). We developed the current studies to test the argument that students will disregard this future financial gain in the form of fees-free first year policy. If it is true that students discount the future gain for the present needs, their financial stress should not reduce even if they are reminded of the fees-free policy. We used priming with the fees-free policy to explore this possibility. More specifically, if temporal discounting happens, priming was not expected to decreases students' financial stress. On the other hand, if such priming decreases the financial stress of students, it would mean that the government was on the right track with the fees-free policy, easing the future financial burden of tertiary students.

The current studies investigated university students' financial stress using the Students' Financial Stress Scale – Aotearoa (SFSS-A). SFSS-A was preferred over readily available scales such as Revised COPE Inventory (Brougham, Zail, Mendoza, & Miller, 2009) and Financial Stress Scale – College Version (Northern, O'Brien, & Goetz, 2010). The latter two scales have been developed in the USA, but since the loan profiles and the economic obligations of NZ students are different to those of American students (Backman, 2020; Friedman, 2019; Student Loan Scheme Annual Report 2017, 2018), we decided to use a scale that would be more relevant to NZ tertiary students. The SFSS-A was originally developed

by a Research Methods (PSYC344) course students of University of Canterbury in 2017 (PSYC344 Students, 2017). Of course, these students were subject to financial stress in a NZ context. We further measured the well-known relationships between debt vs financial stress and perceived financial status vs financial stress to confirm the validity of SFSS-A, so that students with higher debt levels and those with lower perception of their financial and subjective social status should report higher financial stress.

Participants also completed the MacArthur Subjective Social Status (SSS) Scale (Adler & Stewart, 2007), answered demography, study status, and financial status questions. Those with higher ratings on the SSS Scale were expected to have less stress.

Study 1

The free first-year education policy applies to first-year university students exclusively. Therefore, it was expected to affect students at different study levels differently. In Study 1, Stage-1 (100 level) students who did not pay tuition fees in 2018 were compared with Stage-2 (200 level) and Stage-3 (300 level) students who did pay tuition fees in 2018. Participants' financial stress was measured using the SFSS-A (PSYC344 Students, 2017) and the SSS (Adler & Stewart, 2007) was used to measure subjective social status. Students were also asked demographic questions and whether or not they had any type of debt (*debt* group and *no-debt* group hereafter), whether or not they received Student Allowance, their employment status, and whether or not they had any Student Loans. To investigate if reminding them of the free first year education policy affects students' stress, half of them were primed with the statement of Education Minister regarding the fees-free first year education policy and the other half were un-primed. If students were employing temporal discounting, we anticipated that such priming would affect all participants similarly, such that the SFSS-A scores of *primed* Stage-1 students would be comparable with the SFSS-A scores of *un-primed* ones (Hypothesis-1a). Alternatively, a simple priming effect would predict that the *primed* Stage-1 students would score lower on SFSS-A than the *un-primed* ones (Hypothesis-1b). Since the fees-free policy does not apply to Stage-2/Stage-3 students, we did not expect any differences in the effects of priming and/or employing temporal discounting. Therefore, we hypothesised that scores in *primed* Stage-2/Stage-3 students would be comparable on SFSS-A with the scores in *un-primed* ones (Hypothesis-2). In addition, it was anticipated that all students in the *debt* group, regardless of the study year, would score higher than the *no-debt* group on SFSS-A (Hypothesis-3). Finally, it was hypothesised that the participants who ranked themselves with higher SSS, regardless of study year, would score lower on the SFSS-A than those who ranked themselves lower SSS (Hypothesis-4).

METHOD

Participants

One hundred and twenty participants consisting of 60 Stage-1 and 60 Stage-2 or Stage-3 psychology students of the University of Canterbury were subjects of this experiment. Stage-1 students were credited 1% towards

their final introductory psychology course grades. Stage-2 and Stage-3 students received 10 NZD gift vouchers each; and went into a draw to win an additional 50 NZD gift voucher. The study was a 2 (*primed*, *un-primed*) X 2 (*debt*, *no-debt*) between-subject ANCOVA design. The independent variables were condition (*primed* vs. *un-primed*) and whether they were in the debt group or no-debt group. SSS functioned as a covariate. The SFSS-A score was the dependent variable of the study.

Materials

SFSS-A. This is a 22-item unidimensional self-report scale (see Table 1) designed to measure university students' perceived stress due to financial burden

The scale has reportedly demonstrated good test-retest reliability for overall socioeconomic position ($k = 0.62$) (Giatti, Camelo, Rodrigues, & Barreto, 2012). It is a 10-point scale with ladder rungs from 1 (the worst-off) to 10 (the best off) and we used it as a measure of overall socioeconomic position.

The survey also asked questions regarding age group, gender, ethnicity, level of education, employment status, whether or not participants received Student Allowance from the government or any other form of financial support, and if they had any form of debt (*debt* group and *no-debt* group). The survey concluded by thanking respondents for their participation.

Table 1. Means and standard deviations of SFSS-A items.

Items	M	SD
1. I think about how to reduce my spending every day	5.38*	1.10
2. I constantly worry about my financial situation	4.93	1.75
3. I try not to think about how much debt I am in	4.52	1.70
4. My income is sufficient to meet my needs (*R*)	3.79	1.83
5. I think my financial position has a negative effect on my social life	4.27	1.70
6. I think my financial position has a negative effect on my study	3.88	1.75
7. Not meeting my weekly financial demands is constantly on my mind	3.78	1.91
8. Worrying about money affects my daily mood	4.15	1.81
9. I feel like I don't have enough money to do the things I enjoy	4.96	1.68
10. I feel ashamed if I have to borrow money	5.38*	1.67
11. I worry about unplanned expenses	5.22*	1.64
12. I find myself stressing about upcoming payments	4.73	1.73
13. I feel stressed when I receive my bills	4.68	1.66
14. I am often concerned I will not have enough funds to make necessary purchases	4.48	1.73
15. I feel I need to get a job to cover my immediate needs	5.04*	1.81
16. I spend all my money on living costs	4.06	1.81
17. I regularly miss out on social occasions due to finances	3.76	1.82
18. I compromise my well-being due to my financial situation	3.68	1.84
19. I have avoided checking my bank balance out of fear	3.50	2.12*
20. I am able to easily balance my finances with my social life (*R*)	3.88	1.51
21. Financial stress restricts my social life	3.83	1.73
22. I avoid interactions that involve money	4.07	1.54

Note. M = mean. SD = standard deviation.* indicates the removed item. The rating scale was from 1 (strongly disagree) to 7 (strongly agree). *R* = reverse scored.

(PSYC344 Students, 2017). The scale was generated by PSYC344 (Research Methods) course students of the School of Psychology, Speech and Hearing, University of Canterbury in 2017. It has acceptable levels of convergent and discriminant validities and its internal consistency reliability is α = 0.93 (PSYC344 Students, 2017). The participants responded to each item on a 7-point Likert scale (Barnette, 2012) from 1 (strongly disagree) to 7 (strongly agree). The rating scale appeared opposite each question. A sample statement of SFSS-A is, "worrying about money affects my daily mood". Two items, 4 and 20 are reverse scored, indicated with (*Rs*) in Table 1.

Subjective Social Status (SSS) Scale. SSS (Adler & Stewart, 2007) is a self-report measure of social status that asks participants to compare themselves with the people of their community, using a numbered stepladder image.

Procedure

The questionnaire was distributed online. Participants read the information sheet, consented to participate and were randomly assigned to *primed* and *un-primed* conditions. The *primed* condition read a statement by the Education Minister Chris Hipkins declaring free first year tertiary education for first-year students in 2018. The *un-primed* participants read a paragraph of the same length about the nature of New Zealand. Participants then completed the scales and answered demography questions on their own. Answers were anonymously pooled after data collection, so the participants were not debriefed immediately. Instead, they were asked whether or not they wanted to receive a copy of the results. The questionnaire took 10-15 minutes to complete. IBM Statistical Package

for Social Sciences (SPSS) version 25 was used to analyse the data.

RESULTS
Demography data

The majority of participants identified as female, between 18-24 years old, and NZ Europeans. Most of them reported some unspecified form of debt, were full-time students, and reported not receiving Student

Table 2. Demography data breakdown for all participants of Study 1

		%	Frequency
Gender			
	Female	80.00	96
	Male	19.20	23
	Other	0.80	1
Age group			
	Under 18	9.20	11
	18 - 24	76.70	92
	25 - 34	10.00	12
	35 - 44	1.70	2
	45 - 54	2.50	3
Ethnicity			
	Pākehā (NZ European)	75.00	90
	NZ Māori	2.50	3
	Pacific Islander	2.50	3
	South Asian	4.20	5
	African	0.80	1
	East Asian	3.30	4
	Middle Eastern	0.80	1
	Other	10.80	13
Debt			
	Yes	70.80	85
	No	29.20	35
Student Allowance			
	Yes	40.00	48
	No	60.00	72
Employment status			
	Employed part-time	55.80	67
	Not currently employed	44.20	53
Course work			
	Full-time student	95.80	115
	Part-time student	4.50	5

Allowance. Less than half of the participants were not currently employed. Please refer to Table 2 for a further breakdown of demographic data.

Initial observations of the data

Participants' scores of Subjective Social Status (SSS) scale were normally distributed with skewness of -0.08 ($SE = 0.22$) and kurtosis of -0.62 ($SE = 0.44$). Categories ranged from 2-8, with a mode of 4, $M = 4.90$, and $SD = 1.52$. The means and standard deviations were monitored for extreme floor and ceiling effects, thus items 1, 10, 11, and 15 (Table 1) were removed due to high average scores ($M > 5$) and item 19 was removed due to a high standard deviation ($SD > 2$). Only a few participants did not think about ways to reduce their spending (1), did not feel ashamed of borrowing money (10), did not worry about unplanned expenses (11), and did not feel they needed jobs to cover their immediate needs (15). The composite variable of SFSS-A was calculated by averaging responses of each participant over the remaining 17 items. The reliability analysis determined that the item-total

correlations of all items were above 0.3. The internal consistency reliability of the scale was acceptable ($\alpha = .94$). The 17 items had an average score of $M = 4.20$ and $SD = 1.25$.

Priming and temporal discounting

The sample was divided into two groups (Stage-1 and Stage-2/Stage-3) and their mean stress scores were analysed separately using analysis of covariance (ANCOVA) controlling for SSS. The perceived financial stress of *primed* Stage-1 students was not significantly different from that of the *un-primed* Stage-1 students, $F(1,55) = 3.86$, $p = .054$, supporting Hypothesis-1a. The alternative hypothesis (Hypothesis-1b) was thus not supported. In addition, average perceived financial stress did not differ between the *primed* and *un-primed* conditions for Stage-2/Stage-3 students, $F(1,55) = 0.23$, $p = .64$, supporting Hypothesis-2. These findings suggest that Stage-1 students were potentially employing temporal discounting regarding fees-free tertiary education.

For the next section, all participants were treated as one group.

Effects of debt, SSS and demographic variables

Bivariate correlations showed that financial stress decreased with higher SSS ($r = -.42$, $p < .001$) and with receipt of a Student Allowance ($r = -.23$, $p = .013$); and increased if there was any form of debt ($r = .35$, $p < .001$) (See Figure 1 for a scatterplot of the relationship between the SFSS-A and SSS).
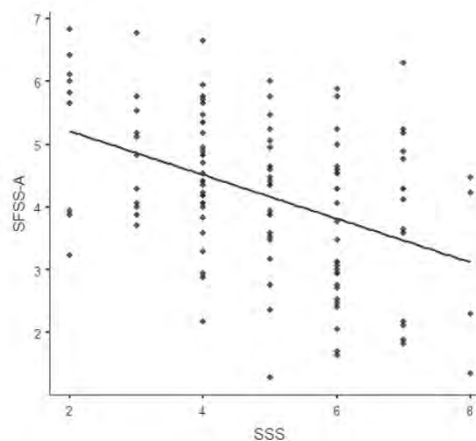
Figure 1. Scatterplot of relationship between SFSS-A and SSS in Study 1.

There were no significant correlations of SFSS-A with gender, age, level of study, employment or study status being full- or part-time. However, when we excluded the shared variance of independent variables using multiple regression, it was found that only debt and SSS were significant predictors of perceived financial stress, $R^2 = .29$, $F(3,116) = 15.57$, $p < .001$, and not Student Allowance (Table 3, Model 1).

Therefore, we excluded Student Allowance using hierarchical regression and obtained Model 2 (see Table 3 again). Model 2 showed that participants' reported debt and SSS predicted financial stress with a large effect size

($f^2 = 0.36$). Thus, debt was a strong predictor of perceived financial stress with $\beta = .32$ as predicted by Hypothesis-3 (see Table 3 for other model parameters).

The participants' higher SSS scores predicted lower perceived financial stress with $\beta = -.40$, as anticipated in

Table 3. Model Coefficients for multiple regression analysis in Study 1

Predictor	Estimate	SE	t	p	St Est
Model 1					
Intercept	7.18	0.47	15.22	< .001	
SSS	-0.30	0.07	-4.48	< .001	-0.37
Having debt	0.85	0.22	3.95	< .001	0.31
Student Allowance	-0.25	0.21	-1.20	0.233	-0.10
Model 2					
Intercept	6.91	0.41	16.66	< .001	
SSS	-0.32	0.06	-5.00	< .001	-0.40
Having debt	0.86	0.22	4.01	< .001	0.32

Note. SE = Standard error, t = t value, p = p value, St Est = Standardised estimate

Hypothesis-4. Furthermore, the scores of SSS, *primed* and *un-primed* conditions, and *debt* group and *no-debt* group were centred to assess the moderation effects of SSS on the mentioned measures. It turned out that SSS did not moderate perceived financial stress of *primed* vs. *un-primed* participants, $\beta = .07$, $t(116) = .88$, $p = .38$. Likewise, SSS did not moderate the perceived financial stress of the *debt* group vs. *no-debt* group, $\beta = .05$, $t(116) = .68$, $p = .50$. Thus, although subjective social status mitigated financial stress in general, it did not particularly mitigate the financial stress of those with debt.

Study 2

In Study 1 we found that debt led to perceived financial stress, perceived higher socioeconomic status decreased perceived financial stress, and that university students potentially use temporal discounting in regard to perception of fees-free education. The results supported Hypothesis-1a, Hypothesis-2, Hypothesis-3, and Hypothesis-4. Study 1 also showed that SSS affected financial stress, but receiving Student Allowance and the employment status did not. Study 2 added new scales to measure attitudes to debt, and some new questions to investigate the varying effects of subjective and objective financial status variables on financial stress. These questions included asking the subjects to report amount of their weekly income (objective) and what they usually spent it on, report whether or not they thought this amount was enough for their living needs (subjective), and whether or not they could save at the end of each week (subjective). We notice that asking about weekly income being enough is similar to items 4 and 7 of SFSS-A. However, the additional question in Study 2 was a simple yes/no question. Study 2 also sought to replicate the findings of Study 1; therefore, all the Study 1 questions were asked again.

Only Stage-1 psychology students participated in Study 2, but we ensured that no Study 1 participants were re-recruited. Study 2 respondents completed SFSS-A (PSYC344 Students, 2017), the SSS (Adler & Stewart, 2007), and also the Attitudes to Debt Scale (ADS) (Haultain, Kemp, & Chernyshenko, 2010). The ADS

consists of two uncorrelated factors, Fear of Debt (emotional aversion to debt) and Debt Utility (the usefulness of acquiring debt) (Haultain et al., 2010), and these have been shown to correlate differently with financial status factors. For instance, Haultain et al. (2010) found the amount of debt was not correlated with Fear of Debt, but it was correlated with Debt Utility ($r = .14$, $p < .01$). On the other hand, the amount of saving decreased Fear of Debt ($r = -.12$, $p < .01$), but not Debt Utility. The respondents were also asked if they would have enrolled if it was not for free education in 2018. The specific hypotheses of Study 2 follow below.

The priming manipulation matched that of Study 1. It was anticipated that the SFSS-A scores of *primed* students would be comparable with the SFSS-A scores of *un-primed* ones (Hypothesis-5). It was anticipated that the participants in the *debt* group would show higher financial stress than the *no-debt* group (Hypothesis-6) and that participants who ranked themselves with higher SSS would demonstrate lower financial stress than the ones who ranked themselves with lower SSS (Hypothesis-7).

It was hypothesised that the students who thought their weekly income was enough would show lower financial stress than those who thought their weekly income was not enough (Hypothesis-8). Similarly, the students who reported that they could save at the end of the week would demonstrate lower financial stress (Hypothesis-9). However, we suspected that the objective variable of actual income level would not affect the financial stress (Hypothesis-10).

It was anticipated that the students who reported higher SSS scores, could save at the end of the week, or thought that their weekly income was sufficient, would report lower Fear of Debt (Hypothesis-11). Moreover, the students who showed higher Fear of Debt were anticipated to show greater financial stress (Hypothesis-12). Consistent with Haultain et al. (2010), it was anticipated that Debt Utility would not correlate with the subjective financial status measures (Hypothesis-13).

METHOD
Participants

One hundred and fifty Stage-1 psychology students of the University of Canterbury participated in the study. They were credited 1% towards their final course grades. The study was a 2 (*primed*, *un-primed*) X 2 (*debt*, *no-debt*) between-subject ANCOVA design. The independent variables were condition (*primed* vs. *un-primed*) and whether they were in the *debt* group or *no-debt* group. SSS functioned as a covariate and the rating of the SFSS-A was the dependent variable of the study.

Materials

The questionnaire contained the SFSS-A (PSYC344 Students, 2017), SSS (Adler & Stewart, 2007) and, additionally, the two-factor Attitude to Debt Scale (ADS) (Haultain et al., 2010).

ADS. ADS (Haultain et al., 2010) is a 9-item two-factor (Fear of Debt and Debt Utility) self-report measure

of attitudes towards debt. Fear of Debt has four items and its internal consistency reliability was α = 0.65 (Haultain et al., 2010) when tested with first year university students. Debt Utility has five items and its internal consistency reliability was α = 0.64 (Haultain et al., 2010) when tested with first year university students. The participants responded to each item on a 7-point Likert scale (Barnette, 2012) from 1 (strongly disagree) to 7 (strongly agree). The rating scale appeared opposite each question. A sample statement of Fear of Debt is, "One of the worst aspects of tertiary education is being in debt". A sample statement of Debt Utility is, "I would rather be in debt than change my lifestyle".

The survey also asked questions about age, gender, ethnicity, employment status, the amount of weekly income, and being a part-time or a full-time student. In addition, the participants were asked whether or not they received Student Allowance or any other form of financial support, what they spent their weekly income on (living costs, general spending, credit card repayments etc.), and if they had any form of debt (*debt* group and *no-debt* group). Finally, they were asked whether or not they could save at the end of a week, whether or not they thought their incomes were sufficient, and whether or not they would enrol this year had it not been for free education. These three were all answered yes/no. Priming and other instructions were similar to Study 1. Data analysis concentrated on replicating Study 1 results and examining the effects of the newly added variables. We used IBM SPSS version 25 to analyse the data.

RESULTS
Demography data
The majority of participants identified as female and NZ Europeans (See Table 4 for detailed demographic data). The age of participants ranged from 16 to 49 years (*M* = 20.94, *SD* = 5.76) and their weekly income ranged from none to 1000 NZD (*M* = 251.85, *SD* = 199.60), with three participants reporting more than 1000 NZD weekly income. It appeared that most of their weekly income was spent on living costs and general spending such as clothes and recreation.

Most were full-time students and about half were employed part-time. Less than half reported receiving Student Allowance and financial support from other sources such as family and Living Costs loans from the Ministry of Social Development. Only a small number reported some form of debt and had Student Loans. In terms of subjective financial measures, around half of them thought that their weekly income was not sufficient for their living needs, and fewer than half reported that they could not save at the end of the week. In addition, 20% of the students reported they would not have enrolled this year if it was not for *free* education.

Initial observations of the data
The distribution of scores on SSS and data relating to the SFSS-A were very similar to those obtained for Study 1 and hence are not reported here. The composite variable of SFSS-A was calculated in a similar method as Study 1. Likewise, the composite variables of the two factors of ADS, Fear of Debt and Debt Utility, were separately calculated by averaging responses of each participants over items of these scales.

It was found that Fear of Debt and Debt Utility were not significantly correlated (*r* = -.11, *p* = .19). The reliability analysis yielded acceptable internal consistency reliabilities for both Fear of Debt (α = .77) and Debt Utility (α = .79).

Table 4. Demography data breakdown for all participants of Study 2

	%	Frequency
Gender		
Female	74.67	112
Male	23.33	35
Other	2.00	3
Ethnicity		
Pākehā (NZ European)	76.67	115
NZ Māori	7.33	11
Pacific Islander	2.00	3
South Asian	4.00	6
East Asian	2.67	4
Other	7.33	11
Debt		
Yes	30.00	45
No	70.00	105
Type of debt		
Student Loan	15.33	23
Finance payment	10.67	16
Credit card	10.00	15
Mortgage	4.67	7
Can save at the end of the week?		
Yes	61.33	92
No	38.67	58
Weekly income is enough?		
Yes	49.33	74
No	50.67	76
Student Allowance		
Yes	43.33	65
No	56.67	85
Employment status		
Employed part-time	55.33	83
Not currently employed	42.00	63
Employed full-time	2.67	4
Financial support from other sources		
Yes	42.00	63
No	58.00	87
Weekly income spent on...		
Living costs	82.67	124
General spending	74.67	112
Commuting	9.33	14
Course work		
Full-time student	89.33	134
Part-time student	10.67	16

Effects of Priming, SSS, demography and financial variables
ANCOVA analysis showed that there were no significant differences in financial stress of *primed* vs. *un-primed* conditions. Thus, the outcome of priming in Study 1 was replicated here and Hypothesis-5 was supported. As demonstrated in Table 5, bivariate correlations showed that financial stress decreased with higher SSS (see also Figure 2), while it increased with age, if the participant was female, if they did not receive financial support from the family, and if they had any form of debt.

Table 5. Pearson correlation scores of SFSS-A with demography and financial status variables

	r	p - value
SSS	-0.36	<.001
Age	0.21	0.01
Gender	0.30	<.001
No family financial support	0.23	0.004
Have debt	0.27	0.001
Not saving at end of week	0.53	<.001
Weekly income not enough	0.55	<.001
Having credit card loan	0.19	0.02
Pay for finances	0.21	0.01
Student Allowance	-0.14	0.09
Employment condition	-0.08	0.36
Support from MSD	-0.15	0.08
Amount of weekly income	0.06	0.47

Note. All *p*-values are reported as exact unless they are <.001.
SFSS-A = Composite scores of SFSS-A. SSS = Subjective Social Status scale. MSD = Ministry of Social Development

The participants also demonstrated increasing financial stress if they thought they could not save at the end of each week, if they thought their weekly income was not sufficient for their living needs, and if they had credit card loans or finances. Financial stress was not significantly correlated with Student Allowance receipt, employment condition, if they received financial support from the government such as weekly benefits, or with weekly income. It is noticeable here that none of objective financial status measure were associated with financial stress, supporting Hypothesis-10.

Analysis with multiple regression showed that inability to save at the end of the week, thinking that the weekly income was not sufficient, being a female, and receiving financial support from the family were significant predictors of perceived financial stress, $R^2 = .54$, $F(7,142) = 23.55$, $p < .001$ (see Model 1 in Table 6), while age, SSS and debt were not.
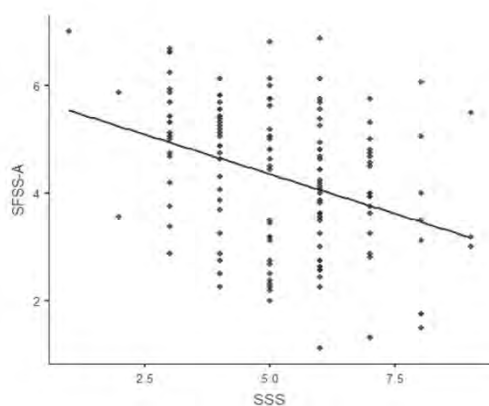
Figure 1. Scatterplot of relationship between SFSS-A and SSS in Study 2.

We excluded non-significant predictors of financial stress one after another, using hierarchical regression repeatedly, resulting in Models 2 and 3 (see Table 6). The final model ($R^2 = .53$, $F(5,144) = 31.94$, $p < .001$) determined debt as a significant predictor of financial stress along with other independent variables resulted

earlier in Model 1 (see Table 6) with a large effect size ($f^2 = 1.13$). However, Models 1, 2, and 3 were not significantly different from each other ($\Delta R^2 = $ ns).

Table 6. Model coefficients for multiple regression analysis in Study 2

Predictor	Estimate	SE	t	p	St Est
Model 1					
Intercept	-42.40	5.22	-8.12	<.001	
SSS	-0.10	0.05	-1.86	0.07	-0.11
Having debt	0.32	0.17	1.86	0.06	0.11
No saving	0.86	0.18	4.67	<.001	0.32
Not enough income	0.86	0.17	4.94	<.001	0.33
Gender	0.73	0.17	4.44	<.001	0.26
Age	0.01	0.01	0.46	0.65	0.03
Receiving family support	-0.40	0.17	-2.36	0.02	-0.14
Model 2					
Intercept	-43.04	5.02	-8.58	<.001	
SSS	-0.09	0.05	-1.82	0.07	-0.11
Having debt	0.34	0.17	1.99	0.05	0.12
No saving	0.87	0.17	5.11	<.001	0.33
Not enough income	0.86	0.17	4.95	<.001	0.33
Gender	0.74	0.17	4.47	<.001	0.26
Receiving family support	-0.40	0.17	-2.35	0.02	-0.14
Model 3					
Intercept	-46.23	4.74	-9.75	<.001	
Having debt	0.34	0.17	2.02	0.046	0.12
No saving	0.93	0.17	2.38	<.001	0.35
Not enough income	0.91	0.17	5.29	<.001	0.35
Gender	0.78	0.17	4.73	<.001	0.27
Receiving family support	-0.46	0.17	-2.64	0.009	-0.15

Note. SE = Standard error, *t* = t value, *p* = p value, St Est = Standardised estimate. No Saving = Thinking they cannot save at the end of the week, Not enough income = Thinking their weekly income is not enough.

As Table 6 shows, the findings that debt, thinking that the weekly income was sufficient, and ability to save at the end of the week were significant predictors of financial stress is consistent with hypotheses 6, 8, and 9 respectively. However, contrary to Study 1, SSS was no more a significant predictor of financial stress, rejecting Hypothesis-7. Notably, receiving financial support from the family mitigated financial stress and being female increased it.

Attitudes towards debt

Fear of Debt decreased with increasing SSS ($r = -.22$, $p < .01$), if they could save at the end of the week ($r = -.18$, $p < .05$), and if they thought their weekly income was sufficient for their living needs ($r = -.25$, $p < .01$) – consistent with Hypothesis-11. Moreover, consistent with Hypothesis-12, Fear of debt increased financial stress ($r = .43$, $p < .001$). Debt Utility did not correlate with subjective financial status measures; nor did it correlate with SSS supporting Hypothesis-13. Age was significantly correlated with Debt Utility, $r = -.21$, $p = .008$.

DISCUSSION

This project investigated implications of perceived financial stress for first-year fees-free education in tertiary students after NZ government announced the policy for new students of 2018. As mentioned earlier, the government policy mostly relates to students' future, but a number of results indicate that students are more

concerned about the present. Note particularly the effects of debt and not being able to save at the end of the week on increasing financial stress; and of higher SSS (only based on Study 1) and thinking that one's weekly income is sufficient on decreasing financial stress. These results indicate that the participants were heavily concerned about their present financial needs.

Consistent with this interpretation, Lim et al. (2014) and the NZUSA report (Income & expenditure report 2017 - The cost of being a student in New Zealand, 2018) showed that the sources of financial stress in students were their day to day or present financial obligations, not the future concerns of repaying Student Loan. It may be that the primed students were not impressed that their future financial concerns were taken care of, because their financial stress was related to their present financial obligations. Thus both studies suggest that the university students potentially employed temporal discounting in regards to fees-free education. They disregard the remote future gain and worry about their present financial needs. This is consistent with former research on temporal discounting (Ainslie & Haslam, 1992; Thaler, 1981).

Another explanation for the lack of priming may be the dubious efficacy of monetary priming in general. Caruso, Vohs, Baxter, and Waytz (2013) conducted five experiments indicating that priming with money prompted the participants to endorse free-market systems and tolerate social inequality. However, when Rohrer, Pashler, and Harris (2015) replicated the mentioned study, they found no evidence of such a priming effect. This could be regarded as a limitations of the current study, which could be further probed in the future by examining temporal discounting in a different way than priming.

We found in both studies that debt increased financial stress. In Study 1, we also found that subjective perception of higher social status decreased financial stress. Study 2 further determined that other subjective financial status measures, such as ability to save and thinking that weekly income was sufficient decreased financial stress. The importance of subjective factors in student financial stress was underscored by the significant correlation of subjective financial and social status measures with the emotional dimension of the ADS, Fear of Debt (Haultain et al., 2010), as well as by the finding of no correlation between subjective financial status measures and Debt Utility. In contrast, both studies found objective financial status measures such as Student Allowance receipt, employment, other financial support from the government, and income were not associated with financial stress. The only objective measure that decreased financial stress—based on Study 2—was receiving financial support from the family. Future studies could further compare and contrast subjective and objective financial stress measures.

Consistent with the findings of the current project, former foreign studies, e.g. Dwyer et al. (2012), Letkiewicz et al. (2014), as well as the NZUSA report (Income & expenditure report 2017 - The cost of being a student in New Zealand, 2018), demonstrated that student debt was a source of financial stress in university students. The findings of Study 1 are consistent with Dwyer et al. (2012) and Hyun et al. (2006) in indicating that perceived higher social status is a protective factor against students'

financial stress. From Study 2, it is evident that the driving force behind students' financial stress is how they perceive themselves financially, and not the amount they make on weekly basis. Those who think their income is sufficient and can save at the end of the week (regardless of the amount) experience less financial stress. On the other hand, objective measures do not necessarily define financial stress. The amount of income and receiving Student Allowance or any other type of support did not decrease financial stress, unless the student was subjectively satisfied and thought their income was enough. However, critics could argue that the financial stress results based on the SFSS-A (PSYC344 Students, 2017) relate to the present financial concerns not because students do not have future financial concerns, but because the observed variables of the scale represent the present financial issues only. This matter could be resolved by research on students' financial worries for the future, although such research will also need to investigate the relative strengths of present and future financial concerns. It would also be borne in mind that the relative strengths might well differ from person to person.

An obvious limitation of the present research is that, partly for reasons of convenience, the research has focussed on students studying a single discipline at a single NZ university. However, previous NZ research (e.g. Haultain et al., 2010) indicates that psychology students are not particularly unusual in how they think about their finances. Nor is there any reason to believe that students at the University of Canterbury are very different in their concerns, although students at vocational institutes and polytechnics may have a somewhat different perspective. Previous research does indicate considerable international differences in students' financial concerns, but, as mentioned earlier, different countries do have very different sets of policies.

As it stands, our findings imply, firstly, the policy focus might usefully be shifted to the present financial concerns of tertiary students. On the contrary, the government's free first-year tertiary education policy is addressing a future economic concern. Secondly, the driving forces behind financial stress appear to be mostly subjective factors. This suggests that applied psychological measures might be useful in overcoming students' financial stress. There are at least two practical applications based on the mentioned theoretical implications:

In the first place, our research indicates that the free first-year education policy may not be serving its purpose. Two key parts of the policy were to improve the affordability of tertiary education and to encourage more students to study after school (Fees-free tertiary study on fast track, 2018). But our research and findings by Lim et al. (2014) show that it is the present financial concerns that lead to financial stress and eventually, negative educational, social and psychological outcomes (Drentea, 2000; Joo et al., 2008; Krause, 1997; Lim et al., 2014). Furthermore, the policy does not seem to be encouraging many students into tertiary education. Four out of 5 participants in Study 2 reported that they would have enrolled in university regardless of the policy. Nor is there any guarantee that the extra 20% students of 2018 continued to study in 2019 – when they had to pay their

tuition fees. The government might do better to make Student Allowance and similar services more readily available to ease the present financial burden of students instead of investing in fees-free education at the cost of negative educational, social and psychological outcomes due to financial stress.

Secondly, financial stress might be mitigated by changing the way students see themselves. Our analysis showed that there were a few students who did not think about reducing their spending, were not ashamed of borrowing money, did not worry about unplanned expenses, did not feel they needed jobs to cover their immediate needs, and did not constantly worry about their financial situation. These worries differ from person to person. One may consider twenty dollars enough saving while another will not be satisfied with a hundred. One might think two hundred dollars weekly income is enough and another would be looking for a thousand. Former empirical evidence suggests that these perceptions can be changed. For instance, Letkiewicz et al. (2014) showed that the US students who received financial counselling had higher odds of graduating in four years than those who had financial stress.

A majority of people consider themselves above average in most important life roles despite having ongoing daily hassles, including financial burdens (Headey & Wearing, 1992). That said, financial counselling services and financial management plans could be shaped for NZ tertiary education students in a way that could mitigate their financial stress. This, however, does not mean that we accept the financial stress being considered a normal phenomenon in students. We do believe it is an important issue and it has to be addressed. In the meantime, empirical evidence is needed to evaluate efficacy of financial counselling services and financial management plans in an NZ context. A future study might investigate if such interventions work.

To conclude, subjective financial status variables such as ability to save and thinking that the weekly income is sufficient influence financial stress in NZ university students. On the other hand, weekly income, Student Allowance, and employment status do not. Reminding first-year students of their free first-year education does not decrease their present financial stress due to the possibility of temporal discounting. Perhaps the focus should shift to the present financial burden of students – which might be reduced by financial counselling and enhancing financial management skills.

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Correlates of cancer illness uncertainty, experiential avoidance of uncertainty and well-being during oncology treatment with curative intent

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Patients with cancer often experience heightened distress and uncertainty while receiving oncology treatment. However, limited research has focused on patients' daily experiences of uncertainty and experiential avoidance (EA) of uncertainty during oncology treatment with curative intent. Thirty-one patients with various primary sites of cancer completed a seven-day daily diary about daily psychosocial well-being, treatment-related distress, illness uncertainty, and EA. Regression analyses indicated a significant negative association between daily uncertainty across the week and well-being over and above average daily distress (β = -.42). EA mediated the relationship between illness uncertainty and well-being (Sobel = -2.80; p = .005). EA of illness uncertainty is associated with heightened levels of distress and reduced well-being during the course of oncology treatment with curative intent.

Keywords: *Experiential avoidance, distress, well-being, uncertainty, oncology treatment, cancer*

Introduction

The day-to-day well-being of patients with cancer can significantly diminish during oncology treatment due to the specific symptoms of the primary cancer tumour as well as treatment-related side effects (Bennion & Molassiotis, 2013). Well-being is a multifaceted and subjective evaluation of how individuals perceive their own sense of wellness and balance between challenges (e.g., treatment-related distress) and resources (e.g., coping resources, social support) (Dodge, Daly, Huyton, & Sanders, 2012), which is also often operationalised as the experience of high positive affect, low negative affect, and satisfaction with one's life (Deci & Ryan, 2008).

Cancer-related distress has been extensively researched and it is estimated that 35% of patients experience distress across diverse tumour sites and stages of cancer progression (Zabora, BrintzenhofeSzoc, Curbow, Hooker, & Piantadosi, 2001). Distress may vary according to several psychosocial and personal factors (McHugh, Cousins, Macdonald-Smith, & Hulbert-Williams, 2015; Nipp et al., 2016). Increased distress has been linked to the frequency and intensity of cancer symptoms and oncology treatment-related side effects at diverse phases of oncology treatment (Dunne et al., 2017; Sharp, O'Leary, Kinnear, Gavin, & Drummond, 2016). Despite increased research focus on the psychosocial needs of patients with cancer, few studies have focused on predictors of daily well-being and treatment-related distress during the active phase of oncology treatment across heterogeneous types of cancer.

Two previous qualitative studies that we conducted explored patients' experiences during oncology treatment and the perspectives of oncology healthcare professionals (HPs) about patients' needs specific to the active phase of oncology treatment with curative intent (Aldaz, Treharne, Knight, Conner, & Perez, 2017; Aldaz, Treharne, Knight, Conner, & Perez, 2018). A central theme identified in our previous qualitative study (Aldaz et al., 2018) which was consistent with previous studies (Bennion & Molassiotis, 2013) was that patients experienced a heightened sense of treatment-related distress and greater uncertainty during oncology treatment, both of which affected their sense of daily well-being. Whether or not cancer patients perceive uncertainty as a stressor may influence how distressed they feel and their sense of well-being (Dodge et al., 2012), depending on the availability and quality of social support and the coping strategies they use (Lazarus & Folkman, 1987).

Past research has found illness uncertainty is associated with increased distress and reduced well-being among head and neck cancer patients (Haisfield-Wolfe et al., 2012). One coping strategy people with cancer may use to deal with illness uncertainty is experiential avoidance of thoughts and emotions related to their illness (Aldaz et al., 2018). Experiential avoidance (EA) has been defined as a regulatory strategy characterised by the individual's efforts to control or avoid unpleasant thoughts and/or emotions (Kashdan, Barrios, Forsyth, & Steger, 2006; Machell, Goodman, & Kashdan, 2015). As applied to oncology treatment in the present study, EA would manifest as the patients' efforts to avoid unpleasant internal experiences such as thoughts and/or emotions associated with uncertainty about their illness and/or oncology treatment. In cancer patients, higher acceptance of illness uncertainty and lower levels of experiential avoidance are associated with lower psychological

distress immediately following psychological intervention or in the long-term (Aguirre-Camacho et al., 2017; Eisenberg et al., 2015). While avoidant coping has mostly been identified as a significant negative predictor of well-being for cancer patients (e.g., Dunne et al., 2017; Eisenberg et al., 2015; Kurita, Garon, Stanton, & Meyerowitz, 2013; Shahar & Herr, 2011; Stanton, Danoff-burg, & Huggins, 2002; Tan, Marks, & Hoy, 2016), there is less research among cancer patients on how avoidant coping relates to positive aspects such as emotional well-being (e.g., Dunne et al., 2017; Kurita et al., 2013). Furthermore, the majority of previous research in this area has made use of retrospective measures that ask people with cancer to report their experiences over the past weeks or months. Such measures are indispensable as they capture cancer patients' overall beliefs about how they feel, and it is people's beliefs that tend to influence health decisions (Conner & Barrett, 2012). However, retrospective measures are prone to recall biases and are therefore less accurate than daily assessment (Schwarz, 2012).

The aim of the present study was to investigate the relationships between illness uncertainty and experiential avoidance with well-being and distress among cancer patients over the course of a week when they were receiving oncology treatment with curative intent. Data were collected using a daily diary design where participants completed measures of illness uncertainty, well-being, and distress once per day for seven consecutive days to minimise recall bias. We aggregated participants' responses over the week to enhance the accuracy and ecological validity of our findings (Conner & Barrett, 2012; Iida, Shrout, Laurenceau, & Bolger, 2012; Shiffman et al., 2008). We hypothesised that higher levels of illness uncertainty would be associated with lower levels of well-being and treatment-related distress, and that experiential avoidance would predict lower levels of well-being when controlling for illness uncertainty and treatment-related distress.

METHODS

Research Design

This study employed a micro-longitudinal cross-sectional research design (Aldaz, Hegarty, Conner, Perez, & Treharne, 2019; Conner & Lehman, 2012). First, participants completed three one-off retrospective questionnaires assessing illness acceptance, social support, and symptoms of anxiety and depression. Following this, participants completed a paper-based questionnaire (i.e., a 'daily diary') once per day for seven days. The daily diary measured participants' distress, well-being, illness uncertainty, and experiential avoidance that day. The use of repeated daily measures allowed us to more accurately measure cancer patients' experience of illness uncertainty, well-being, distress, and experiential avoidance throughout a week of oncology treatment. End-of-day ratings improve ecological validity because participants complete measures as part of their daily lives (Hamaker, 2012; Reis, 2012), and the shortened recall period enhances accuracy because participants can more accurately report how they felt that particular day (Conner & Barrett, 2012; Iida et al., 2012; Schwarz, 2012). End-of-day ratings more closely reflect

participants experiences, whereas ratings over the past week or month tend to reflect how people typically feel (Aldaz et al., 2019; Conner & Barrett, 2012). Thus, aggregating cancer patients' daily ratings of illness uncertainty, well-being, distress, and experiential avoidance is likely to provide a more accurate reflection of their experiences over a week of treatment.

Participants and recruitment

Participants were recruited through the Oncology and Haematology Unit at Dunedin Hospital. While the sample was heterogeneous regarding cancer site (e.g., lung, prostate, neck), all participants were currently receiving oncology treatment with curative intent. Prospective participants were identified, informed of the study, and initially invited to take part in the research by their oncologist or a senior clinical nurse. A study advertisement was also placed in the oncology unit's waiting room. Participants were eligible for inclusion if they were 20 years of age or older, currently receiving oncology treatment with curative intent (i.e., chemotherapy, radiation therapy, hormonal therapy) for stages I-III of cancer progression.

Table 1. Socio-demographic characteristics of the study participants (N = 31)

Characteristic	Frequency (%)
Ethnicity	
NZ European / Pākehā	80.6
Māori	6.5
Other European	12.9
Relationship	
Single	12.9
Married or similar	67.7
Divorced or separated	6.5
Widowed	12.9
Sexual orientation	
Asexual	3.2
Bisexual	3.2
Heterosexual	93.5
Household occupancy	
Live alone	22.6
Spouse / partner	48.4
Spouse / partner with children	19.4
Parents	3.2
Others	6.5
Education level	
No formal qualifications	19.4
Vocational or trade	16.1
NCEA Levels 1-2	3.2
NCEA Level 3	12.9
Bachelor's degree	25.8
Postgraduate degree or diploma	19.4
Other	3.2
Employment	
Full-time	38.7
Part-time	6.5
Retired	35.5
Unable to work due to illness	19.4

The scope of this study excluded patients in palliative care and patients with psychiatric comorbidities. Participants were required to be fluent in English language and able to provide informed consent. Prospective participants were then contacted by the lead researcher (BEA) who scheduled a face-to-face appointment with participants who met inclusion criteria. Subsequently, participants were instructed on how to complete the paper-based questionnaire and daily diary, which included an emphasis on the importance of not backfilling any missed days. Support persons (e.g., partners) were able to attend this meeting if desired or needed.

Table 2. Clinical details of the participants' types of cancer and treatments

Characteristic	Freq (%)
Primary tumour site	
Breast	35.5
Rectum	19.4
Colon	9.7
Ovarian	9.7
Lung	6.5
Oesophageal	6.5
Prostate	6.5
Head and neck	3.2
Pancreas	3.2
Secondary tumour site	
None	96.8
Liver	3.2
Stage of cancer progression	
Stage I	22.6
Stage II	22.6
Stage III	32.3
Stage IV	6.5
Treatment	
Chemotherapy	77.4
Radiotherapy	16.1
Radiotherapy (as additional tx)	9.7
Herceptin	3.2
Hormonal therapy	3.2
Previous treatment	
Surgeries	67.7
Chemotherapy	6.5
None	25.8

Note: The two patients with cancer categorised as 'Stage IV' met inclusion criteria as their treatment had a curative intent.

The recruitment process resulted in 35 oncology patients initially interested in the study. Of these patients, three did not meet inclusion criteria (e.g., palliative care). Of the 32 participants, one person's health deteriorated rapidly leading to his death prior to completing the questionnaires and daily diary. Thirty-one participants completed and returned the demographic questionnaires, the initial questionnaires, and the completed daily diary packet. Most participants completed all seven of the daily diaries (n = 27/31; 87.1%); the other participants missed only one day of the diary during the one-week survey period (n = 4/31; 12.9%). Altogether, the sample produced 213 days' worth of data, which is 98.2% out of 217 possible days.

The final sample consisted of 12 men (38.7%) and 19 women (61.3%). Participants' mean age was 60 (SD = 14; range 26 to 79). Table 1 provides further demographic characteristics. The majority of the participants were New Zealand European/Pākehā and in an intimate heterosexual relationship living with their partners (68%), and 19% also had children living in the family home. Clinical details of the sample are outlined in Table 2. The sample included patients with a range of cancer sites, oncology treatment modalities, and different cycles of chemotherapy ranging from cycles two to seven (M = 4.1, SD = 1.5). The number of treatment cycles required in each patient's oncology treatment varied according to individual needs. The majority of participants had previously undergone surgical tumour removal and were currently receiving chemotherapy at the time of recruitment.

Materials
Initial Questionnaires

Participants completed three initial questionnaires: Illness acceptance was measured using the Peace, Equanimity, and Acceptance in the Cancer Experience (PEACE) (Mack et al., 2008); social support was measured using the Multidimensional Scale of Perceived Social Support (MSPSS) (Zimet, Dahlem, Zimet, & Farley, 1988), and levels of anxiety and depression were measured using the Hospital Anxiety and Depression Scale (HADS; Zigmond & Snaith, 1983). All measures have shown good reliability and validity in previous research (Cicero, Lo Coco, Gullo, & Lo Verso, 2009; Hodges & Winstanley, 2012; Mack et al., 2008; Michopoulos et al., 2008; Zigmond & Snaith, 1983).

Daily Measures

The National Comprehensive Cancer Network's (NCCN) Distress Thermometer (DT) and symptom checklist is as a brief self-reported measure of patients' distress (National Comprehensive Cancer Network, 2015). The DT consists of a visual analogue thermometer (range 0-10, anchored at 0 'no distress' to 10 'extreme distress') followed by a yes/no checklist of 41 frequently experienced cancer-related problems grouped in six clusters (i.e., practical, family, emotional, spiritual, physical and 'other' problems). Participants rated their overall distress for seven consecutive days using the DT and then endorsed any of the 41 problems experienced that day. The DT has been reported to have 77.1% sensitivity and 66.1% specificity to detect cancer-related distress (Mitchell, 2007). In the present study, internal consistency for the 41 DT items was found to be acceptable (α = .81).

The Flourishing Scale (Diener et al., 2010) is an 8-item measure of socio-emotional well-being that measures wellness in relationships, self-esteem, purpose, and meaning in life (e.g., 'I am optimistic about my

future'; 'I am interested in my daily activities'). Participants rate each item for how they felt today using a 7-point Likert scale from 'strongly disagree' (1) to 'strongly agree' (7). The Flourishing Scale provides a single score of psychological well-being with good internal consistency (α = .86) (Nezlek, 2012), and convergent validity with other psychological well-being scales (r = .78) (Diener et al., 2010). In the present study, the Flourishing Scale was found to have excellent internal consistency (α = .94).

The daily adaptation of Mishel's Uncertainty in Illness Scale Community Form (MUIS-C; Bailey et al., 2011) is a 23-item self-report measure of uncertainty about chronic illness in outpatients. It has good internal consistency (α = .74 - .92) (Bailey et al., 2011). We extracted five items from MUIS-C for use in the daily diary based on their relevance to daily experiences during oncology treatment with curative intent. The word 'today' was added to remind participants to report their experience that day. The five items were: (i) 'Today I am unsure if my health is getting better or worse'; (ii) 'Today I have a lot of questions without answers'; (iii) 'It is difficult to know today if the treatments or medications I am getting are helping'; (iv) 'Because of the unpredictability of cancer today, I cannot plan for the future' and; (v) 'I'm certain today they will not find anything else wrong with me in the future'. Answer options range from 1 'strongly disagree' to 5 'strongly agree'. In the present study, the daily adaptation of the MUIS-C was found to have acceptable internal consistency (α = .78).

Experiential avoidance (EA) of illness uncertainty-related thoughts and/or emotions was measured using four self-report questions about participants' efforts to control or avoid unpleasant thoughts and/or emotions, which were adapted from an existing EA scale (Kashdan et al., 2013) (e.g., 'How upset and bothered were you about any uncertainty-related feelings or thoughts today?'). Participants answer each question using a 5-point scale ranging from 1 'very slightly or not at all' to 5 'extremely'. These questions were originally conceived to assess the EA of anxiety-related thoughts or feelings in the general population (Machell et al., 2015). Items in the daily diary were adjusted in order to address illness uncertainty-related thoughts and emotions instead. The original daily EA scale has a strong correlation (r = .82) with a measure of daily suppression of negative emotions, demonstrating acceptable convergent validity (Kashdan et al., 2013; Machell et al., 2015). In the present study, the daily measure of EA of illness uncertainty-related thoughts and/or emotions was found to have good internal consistency (α = .87).

Procedure

During the initial one-off face-to-face meeting, participants were provided with three sets of papers: (i) a demographic form; (ii) the initial questionnaires; and (iii) a seven-day daily diary along with prepaid return envelopes. Participants were asked to complete the demographic form and initial questionnaires prior to starting their next oncology treatment cycle, and to begin the daily diary on the first day of their next treatment cycle. Chemotherapy patients began their daily diary on the day they attended their chemotherapy hospital appointment (day 1 of the diary). Radiotherapy-only patients began filling their diary on the day of the initial one-off meeting with the principal investigator (BEA). Radiotherapy at Dunedin Hospital is typically delivered on five consecutive days per week (Monday to Friday), resting on the weekends. Patients combining both treatments (radiation and chemotherapy) commenced their daily diary on the day they went into hospital for chemotherapy infusion (also day 1 of the diary). The frequency and duration of chemotherapy and radiation therapy treatment cycles varied across patients according to their oncology treatment plan. The daily diary was completed during seven consecutive days. Participants were asked to fill the diary in the evenings or at the end of the day, when they could find a quiet time to think and reflect on their daily treatment-related experiences. Participants were offered a $20 grocery voucher as reimbursement for any expenses incurred, such as travel costs. This study was approved by the University of Otago Health Ethics' Committee (reference H14/140).

Statistical Analyses

Between-person regression analyses of aggregated daily variables using forced entry were conducted using IBM's Statistical Package for the Social Sciences (SPSS) version 23. Initial regression analyses examined the relationships between distress and well-being, illness uncertainty and well-being, and uncertainty and distress in separate regression models (regression models 1 through 3). Following this, we used hierarchical regression to examine whether adding illness uncertainty accounted for significantly more variance in well-being when controlling for distress (regression model 4). Next, we examined whether experiential avoidance accounted for significantly more variance in well-being when controlling for distress and illness uncertainty (regression model 5). Finally, we used a hierarchical regression to examine whether experiential avoidance moderated the relationship between illness uncertainty and well-being when controlling for distress (regression model 6).

RESULTS

Descriptive statistics

On average, participants reported high levels of acceptance of having cancer and low levels of struggle with illness. Participants also reported strong perceptions of social support available from family and/or friends. On average, participants in this study had low levels of anxiety or depression symptoms, with the average scores of both anxiety and depression falling within the 'normal' range (Snaith, 2003). Table 3 shows the mean, standard deviation (SD), minimum and maximum values for both the baseline and aggregated daily psychological measures, which were computed by taking a weekly average of the continuous daily variables for each participant across seven consecutive days.

Consistent with past research, the most frequently reported distress-related symptoms were: fatigue, sleep, eating difficulties, loss of appetite, tingling, reduced memory and concentration, and skin problems (Bennion & Molassiotis, 2013). Average daily illness uncertainty and EA of uncertainty were moderately correlated (r = .45;

Table 3. Descriptive statistics of retrospective one-off measures and daily variables aggregated across the course of a week (N = 31)

Retrospective measures	Mean	SD	Min	Max
Acceptance (PEACE)	17.16	2.20	11.00	20.00
Struggle (PEACE)	13.00	4.72	7.00	24.00
Social support (MSPSS)	75.58	11.93	23.00	84.00
Anxiety (HADS)	5.94	3.97	0.00	15.00
Depression (HADS)	4.19	2.55	1.00	11.00
Aggregated Daily Measures				
Well-being	44.28	9.46	16.86	56
Distress	7.37	5.15	0.43	22.71
Uncertainty	2.43	0.70	1	3.71
Experiential avoidance	1.64	0.71	1	3.54

$p < .05$) in keeping with previous findings (Kurita et al., 2013). As expected, distress and well-being were negatively correlated ($r = -.48$), but the correlation was not so high as to suggest complete multicollinearity ($r \geq .80$).

Regression Analyses

The results of the regression analyses are presented in Table 4. In regression models 1 through 3 we examined the relationships between distress (DIS) and well-being (WB), illness uncertainty (UNC) and well-being, and illness uncertainty and distress separately. All were significant and in the hypothesised directions ($p < .05$).

Table 4 also presents the results of the hierarchical regression analyses. In the first step of regression model 4, we entered distress as a predictor of well-being. Distress was significantly associated with well-being and

accounted for an additional 16% of R^2, predicting well-being over and above distress ($\beta = -.42$).

In regression model 5, we first centred illness uncertainty and distress. In the next step, we entered EA. Higher levels of EA were associated with lowers levels of well-being ($\beta = -.53$) when controlling for both illness uncertainty and distress. Distress and illness uncertainty combined accounted for 39% of the variation in well-being. Experiential avoidance accounted for an additional 14% of the variance in well-being. Furthermore, when EA was entered in the regression, the beta weights (β) of distress and uncertainty became non-significant. This finding suggested that EA mediated the relationship between illness uncertainty and well-being (see Figure 1).

The Sobel test indicated a significant indirect effect of distress on well-being through EA across the course of a

Table 4. Between-person regression analyses

Regression		Outcome [a]	Predictor [a]	B	SE B	β	R^2	Adj R^2	R^2 change	F change
1		WB	DIS	-.89	.30	-.48**	.23	.21	.23	8.80**
2		WB	UNC	-7.35	2.11	-.54**	.30	.27	.29	12.11**
3		DIS	UNC	2.65	1.28	.36*	.13	.1	.13	4.33*
4	Model 1	WB	DIS	-.89	.30	-.48**	.23	.21	.23	8.80**
	Model 2		DIS	-.61	.29	-.33*	.39	.35	.16	7.17*
			UNC	-5.74	2.14	-.42*				
5	Model 1	WB	DIS	-.61	.29	-.33*	.39	.35	.39	8.92**
			UNC	-5.74	2.14	-.42*				
	Model 2		DIS	-.04	.33	-.02	.53	.47	.14	7.82**
			UNC	-4.00	2.02	-.30				
			EA	-6.97	2.49	-.53**				
6	Model 1	WB	DIS	-.04	.33	-.02	.53	.47	.53	10.00
			UNC [c]	-4.00	2.02	-.30				
			EA [c]	-6.97	2.49	-.53*				
	Model 2		DIS [c]	-.04	.33	-.02	.56	.49	.03	1.66
			UNC [c]	-4.67	2.06	-.35*				
			EA [c]	-6.33	2.51	-.48*				
			UNC × EA [i]	-3.51	2.73	-.19				

[a] = averaged daily values across the course of a week; [c] = group-centred; [i] = Interaction; ** $p < .01$; * $p < .05$

predicted 23% of the variance in well-being. In the next step, we added illness uncertainty. Illness uncertainty

week ($b = -.79$; Bootstrap CI -1.56, -.10). This coefficient represented a medium effect size ($k^2 = .37$, 95% Bootstrap CI .06, .71). The Sobel z-value was -2.80 ($p < .01$).

Indirect effect, b = -.79, 95% CI [-1.56, -.10]
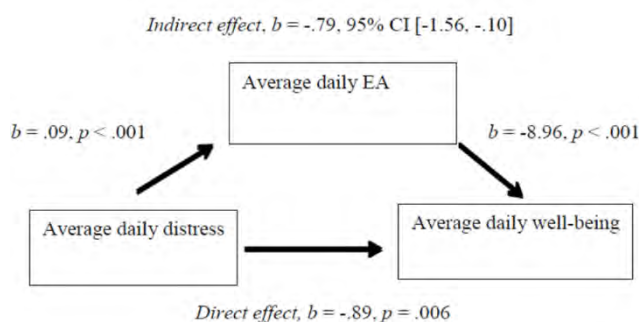
Figure 1. Mediating effect of average daily experiential avoidance (EA) on well-being

In regression model 6, we examined whether EA moderated the relationship between uncertainty and well-being. Experiential avoidance did not moderate the relationship between illness uncertainty and well-being controlling for distress.

DISCUSSION

The aim of the present study was to investigate the relationships between illness uncertainty and experiential avoidance with well-being and distress among cancer patients over the course of a week when they were receiving oncology treatment with curative intent. We found that higher levels of illness uncertainty were associated with lower levels of well-being, and experiential avoidance mediated this relationship. Our findings support previous research that shows illness uncertainty and experiential avoidance are related to the well-being of cancer patients receiving treatment with curative intent (Aguirre-Camacho et al., 2017; Eisenberg et al., 2015; Haisfield-Wolfe et al., 2012). While past research has focused primarily on treatment-related distress, we have extended these findings to show that experiential avoidance explains the relationship between illness uncertainty and reduced well-being. A major strength in the present study was its daily diary design, which allowed for the aggregation of participants' responses across a week, producing a total of 213 days' worth of data. This design enhanced the robustness of the measures of psychosocial constructs in this study, which were then used in the regression analyses in keeping with recommendations (Iida et al., 2012).

Participants' experience of illness uncertainty was negatively associated with well-being across a week of oncology treatment, irrespective to their level of treatment-related distress. This finding is particularly relevant for oncology health professionals and psychosocial services as it indicates two ways in which the well-being of patients could be protected: 1) by providing cancer patients with more information about their illness and the likely outcome and 2) by providing interventions for cancer patients about how to cope with the uncertainty of their illness. Higher levels of illness uncertainty were associated with higher levels of EA.

Experiential avoidance fully mediated the relationships between distress and well-being. This mediation effect is consistent with similar findings from past studies, which also identified avoidance as a significant predictor of well-being (Eisenberg et al., 2015; Kurita et al., 2013; Shahar & Herr, 2011; Stanton, Danoff-

burg, & Huggins, 2002; Tan et al., 2016). However, it has also been suggested that EA may be a borderline construct with other psychological factors such as, rumination and worry, which share a common tendency to negative emotions, aversive appraisals of stressors and subsequent avoidant coping styles (Spinhoven, Drost, de Rooij, van Hemert, & Penninx, 2016). Therefore, while this study supports the hypothesis of EA mediating the relationship between distress and well-being, it is important to recognise that other similar psychological constructs could also explain the variability in patients' reports of average daily well-being.

Our findings provided a further test of Mishel's theory of uncertainty in illness (Mishel, 1988) and were consistent with the theory in that we identified a positive association between average daily uncertainty with higher levels of average daily distress and lower well-being. The association between uncertainty and distress identified in this study is in keeping with past research that reported a moderate correlation between illness uncertainty and distress among patients with head and neck cancer (Haisfield-Wolfe et al., 2012).

Limitations

There were several limitations to this daily-diary study. A relatively small sample size may have limited the statistical power of our analysis, and lack of diversity in ethnicity and sexuality limit the generalisability of the results to other patient populations. Our sample included only two Māori participants and future research could explore the issues around cancer-related uncertainty using a kaupapa Māori approach to build on past research on experiences of cancer among Māori (Reid, Ahuriri-Driscoll, Mackay, Barnett, & Richardson, 2020). In addition, our daily adaptations of MUIS-C and EA of illness uncertainty-related thoughts and/or emotions used in the daily diary have not been previously validated, although both had good completion rates suggesting acceptable face validity to participants.

Clinical implications

Our findings have implications for patients, oncology health professionals and psychosocial support services. The findings of this study suggest that patients may benefit from recognising their avoidance of illness uncertainty-related thoughts and/or emotions because of the association with higher levels of daily treatment-related distress. However, the directionality of the relationship is not specified by our findings due to their correlational nature, and it is also possible that interventions that help to reduce levels of distress may lead patients to experience less uncertainty and become less avoidant of unpleasant uncertainty-related thoughts and/or emotions. Regardless of the directionality of our findings, cancer patients may benefit from interventions that assist them to cope with illness uncertainty and reduce their use of experiential avoidance (e.g., Aguirre-Camacho et al., 2017; Kurita et al., 2013). For many cancer patients, it may not be possible to decrease their levels of uncertainty, therefore, interventions that use a more acceptance-based approach to coping with uncertainty may be useful (e.g., Germino et al., 2013;

Mishel et al., 2005). The findings of the present study are specific to experiences of oncology treatment but re-affirm the potential impact of experiential avoidance on well-being established in previous theoretical and empirical literature (e.g., Kashdan et al., 2006; Machell et al., 2015). It is uncertain whether this association with well-being expands to experiential avoidance of uncertainty of other health conditions or other aspects of life. This research was conducted before the Covid-19 pandemic and uncertainty relating to health is likely to be even more pertinent during this period of wider global uncertainty. Qualitative research could help understand the lived experience of cancer patients in relation to current aspects of uncertainty to help plan interventions that account for Covid-19 to build on existing qualitative research with cancer patients (e.g., Aldaz et al., 2018; Bennion & Molassiotis, 2013) and plan relevant interventions.

In conclusion, cancer patients' attempts to avoid illness uncertainty are negatively associated with their well-being when controlling for distress levels, and this relationship is mediated by experiential avoidance. These findings help to broaden existing knowledge about the role of experiential avoidance for people's well-being outside of clinical settings (e.g., Kashdan et al., 2006; Machell et al., 2015). In addition, the findings add to the small body of literature on the role of experiential avoidance for cancer patients' well-being (e.g., Aguirre-Camacho et al., 2017; Eisenberg et al., 2015; Kurita et al., 2013). Further research into patients' ways of coping with uncertainty (e.g., reducing avoidance and/or increasing acceptance of uncertainty) could help enhance well-being and reduce distress during oncology treatment.

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It's All Just Fun and Games… Right? Habitual Gaming Links with Body Dissatisfaction, Psychological Distress, and Lower Self-Esteem

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Research assessing the links between gaming and psychological well-being is based primarily on adolescent samples. This study used data from the New Zealand Attitudes and Values Study to assess the extent to which self-reported casual (0.1-5.0 hours per week; 15.4%) and habitual gaming (≥5.0 hours per week; 7.6%) was associated with body satisfaction, psychological distress, and self-esteem for men and women (N=21,060). Both men and women who gamed habitually reported lower body satisfaction, higher psychological distress, and lower self-esteem than casual gamers and non-gamers. Casual gaming was weakly associated with lower body satisfaction for both genders, and self-esteem for men. This study is the first to document a negative dose-response relationship between time spent gaming and psychological well-being using a nationally representative adult sample. The magnitude of these associations appear to be broadly similar for men and women.

Keywords: *Video games, gaming, body satisfaction, psychological distress, self-esteem, gender differences*

Introduction

In 2018, New Zealand's video game industry generated approximately $548 million in sales (Interactive Games and Entertainment Association, 2018). Recent samples suggest that approximately 67% of New Zealanders play video games, and that 73% of players are adults aged 18 and over (Brand & Todhunter, 2017). Psychology research generally focuses on the negative correlates of gaming, showing links with depressive symptoms, lowered self-esteem, loneliness, sleep disturbance, and poorer academic performance (Andreassen et al., 2016; Brunborg et al., 2014; Lemmens, Valkenburg, & Peter, 2011; Rehbein, Kleimann, & Mößle, 2010; Skoric, Teo, & Neo, 2009). Moreover, relative to young/adolescent women, some negative effects of gaming are more pronounced for young/adolescent men (Li & Wang, 2013; Rehbein et al., 2010). However, past research has predominantly studied the effects of gaming using adolescent samples (e.g. Brunborg et al., 2014; Lemola et al., 2011). The present study analyses data from Wave 8 (2016) of the New Zealand Attitudes and Values Study (NZAVS; N=21,060) to assess whether time spent gaming is associated with body dissatisfaction, psychological distress, and self-esteem among adult men and women. This is the first known study to assess gender differences in the psychological correlates of gaming using a large-scale national probability sample.

Video gaming

Research exploring the links between gaming and psychological well-being produces mixed results. Studies have found that playing games that reward cooperation with other players can increase prosocial behaviours in and outside of the game context (Ewoldsen et al., 2012; Ferguson & Garza, 2011). Additionally, studies have shown causal links between playing preferred video games and improved mood, relaxation, and decreased anxiety (Russoniello, O'Brien, & Parks, 2009; Ryan, Rigby, & Przybylski, 2006). In contrast, studies show that problematic gaming (i.e. gaming to the extent where it interferes with other responsibilities; Ferguson, Coulon, & Barnett, 2011), is associated with negative outcomes. For example, Lemmens et al.'s (2011) longitudinal study with Dutch adolescents showed that pathological gaming increased gamers' feelings of loneliness over time. Similarly, Brunborg et al. (2014) found with Norwegian adolescents that video game addiction was associated with conduct problems, poorer academic achievement, and depression. The mix of positive and negative findings indicates that gaming in itself is not necessarily detrimental to psychological well-being. A large limitation of existing research is the predominance of small, adolescent, or community (e.g. gaming communities) samples, limiting the generalisability of findings.

As video games are often surrounded by moral panic, some people believe that playing frequently necessarily leads to negative outcomes such as addiction and violence (Markey, Markey, & French, 2015). However, empirical research shows that greater time spent gaming is not enough to predict detrimental outcomes (Charlton & Danforth, 2007; Ferguson & Wang, 2019; Király, Tóth, Urbán, Demetrovics, & Maraz, 2017; Kuss & Griffiths, 2012; Lemmens et al., 2011). Charlton and Danforth (2007) proposed that two groups of behaviours comprise the criteria for behavioural addiction: core and peripheral

criteria. Core criteria (i.e. conflict, behavioural salience, withdrawal and relapse, and reinstatement) are typically associated with addiction and detrimental outcomes; whereas peripheral criteria (i.e. euphoria, tolerance, and cognitive salience) are more closely related to high engagement but minimal detrimental outcomes (Billieux, Flayelle, Rumpf, & Stein, 2019; Brunborg et al., 2013; Charlton, 2002; Charlton & Danforth, 2007; Peters & Malesky, 2008). Individuals who endorse all four core criteria are considered 'addicted', while those who endorse all three peripheral criteria but fulfilled none or one of the core criteria are considered 'highly engaged' (Brunborg et al., 2013). This conceptualisation of addiction suggests that individuals can be highly engaged with gaming without being classified as problematic or addicted (Ferguson et al., 2011; Király et al., 2017; Przybylski, Weinstein, & Murayama, 2017; Wood, 2008).

Research shows gender differences in the behaviours and outcomes associated with gaming. Most studies find that men spend more time gaming than women (Brand & Todhunter, 2017; Lucas & Sherry, 2004; Jackson et al., 2010). Adolescent and adult studies also show that men are more likely to be addicted to video games than women (Andreassen et al., 2016; Li & Wang, 2013). Lemmens et al. (2011), for example, found that adolescent boys exhibited a higher level of game addiction than girls. Another study with Chinese adolescents showed that boys scored higher than girls in rumination and overall cognitive distortion as a result of online gaming (Li & Wang, 2013). With regards to psychological outcomes, Rehbein et al. (2010) showed higher levels of sleep disturbance and suicidal thoughts in video game-dependent boys than girls. Collectively, existing literature appears to converge with regards to men exhibiting greater levels of gaming addiction, dependence, and cognitive disturbance than women.

Links with Psychological Well-Being

The theory of compensatory internet use suggests that individuals are likely to engage in online activities (e.g. social media) to cope with psychosocial issues; the stronger the desire to cope, the more time is spent online (Kardefelt-Winther, 2014a). For example, an individual high on social anxiety may be motivated to socialise with others on social networking sites or in online games due to the sense of anonymity (McKenna, Green, & Gleeson, 2002). Such a coping strategy can have positive outcomes like fulfilling the desire to socialise, but poses the risk of relying on the escapism to alleviate negative feelings (Kardefelt-Winther, 2014a). Given that video games are intentionally designed to feel rewarding (Charlton & Danforth, 2007; Hsu, Wen, & Wu, 2009; King & Delfabbro, 2009) and online in-game interactions are becoming increasingly prevalent (Entertainment Software Association, 2018), the tenets of compensatory internet use can apply to gaming as well. Accordingly, a study with Australian adolescents found that after adjusting for demographic factors, frequent gamers (≥45 minutes per day) were more likely than less frequent gamers to report high/very high levels of psychological distress (Mathers et al., 2009). Additionally, a survey study of online gamers found that the relationship between escapism and negative outcomes was strongest for players with low self-esteem and high stress (Kardefelt-Winther, 2014b). Thus,

research indicates that high video game engagement may be both a cause and consequence of negative psychological well-being (Charlton & Danforth, 2007; Kardefelt-Winther, 2014a, 2014b; Mathers et al., 2009).

Gaming has been empirically linked with various aspects of psychological well-being. The present research focuses on body satisfaction, psychological distress, and self-esteem in particular. Findings indicate that body satisfaction can be diminished by playing games that depict idealised male and female bodies (Barlett & Harris, 2008), but is not associated with internet gaming disorder symptoms (Kircaburun, Griffiths, & Billieux, 2019). Given the previous finding that body dissatisfaction significantly predicted problematic internet use (Koronczai et al., 2013), body satisfaction may also have a similar relationship with gaming. However, there are currently no population-level studies assessing the link between gaming and body image. Research generally finds that psychological distress is linked with frequent (Mathers et al., 2009) and problematic (Brunborg et al., 2013) gaming. Lastly, there is converging evidence that low self-esteem, either as a cause or consequence, is associated with gaming (Hoare, Milton, Foster, & Allender, 2016; Jackson et al., 2010; Ko, Yen, Chen, Chen, & Yen, 2005; Lemmens et al., 2011; Witt, Massman, & Jackson, 2011). Research has yet to establish whether psychological distress and self-esteem are negatively associated with gaming among adults.

Overview and Hypotheses

The present study analyses data from Wave 8 (2016) of the New Zealand Attitudes and Values Study (NZAVS; N=21,060), a large-scale adult national probability sample. We assess whether time spent gaming reliably associates with body satisfaction, psychological distress, and self-esteem, and whether gender moderates these relationships. This is the first study to assess the negative psychological correlates of gaming with a nationally representative adult sample.

We formulated three hypotheses following the notion that psychosocial problems may motivate higher media engagement (Kardefelt-Winther, 2014a). First, we predicted that habitual gaming would link with lower body satisfaction than casual gaming for men and women (Hypothesis 1). Secondly, informed by Mathers et al.'s (2009) findings, we expected that habitual gaming would link with higher psychological distress than casual gaming for men and women (Hypothesis 2). Thirdly, we predicted that habitual gaming would associate with lower self-esteem than casual gaming for men and women (Hypothesis 3; Hoare et al., 2016). We tested for gender differences in all models, but did not make specific predictions about these.

METHODS

Sampling Procedure

The NZAVS is an ongoing 20-year longitudinal study that began in 2009. Wave 8 was chosen for the present study as it contained the largest available sample at time of analysis. Using national probability samples of New Zealanders sampled from the electoral roll, the NZAVS collects nationally representative data regarding social and political attitudes, personality, and health outcomes. Participants were sent a paper copy of the questionnaire,

or if an email address was provided, they were invited to complete an online version of the questionnaire. Detailed information about the sampling procedures and retention rates are provided by Sibley (2019).

The NZAVS performs relatively well in terms of representativeness, but contains biases such as over-representation of women (62.6% sample; 52.1% census) and under-representation of Māori (11.3% sample; 14.9% census) and Asian (4.6% sample; 5.1% census) individuals. The standard NZAVS post-stratification weighting procedure for gender, ethnicity and region was used to adjust the sample to be representative of the general population.

Participants

The present study analyses data from wave 8 (2016) of the NZAVS survey which contained responses from 21,936 participants. Demographic characteristics of the sample (N=21,060) are presented in Appendix 1.

Measures

Gaming, our focal predictor, was measured using the open-ended item "Please estimate how many hours you spent doing each of the following in the past week… Playing computer games". Preliminary analyses revealed that 77% of participants spent no time gaming. Of those who indicated at least some time spent gaming, the median time reported was 5 hours (see Figure 1). Gaming behaviour was thus modelled using two dummy coded variables: the first represented casual gaming, where 0=no, and 1=casual gaming (i.e. gaming between 0.1-5.0 hours per week). The second represented habitual gaming, where again 0=no, and 1=habitual gaming (i.e. greater than 5 hours per week). The casual gaming variable thus tested whether casual gamers differed significantly on each outcome relative to non-gamers. Similarly, the habitual gaming variable tested whether habitual gamers differed significantly from non-gamers. We thus binned participants in these three groups and modelled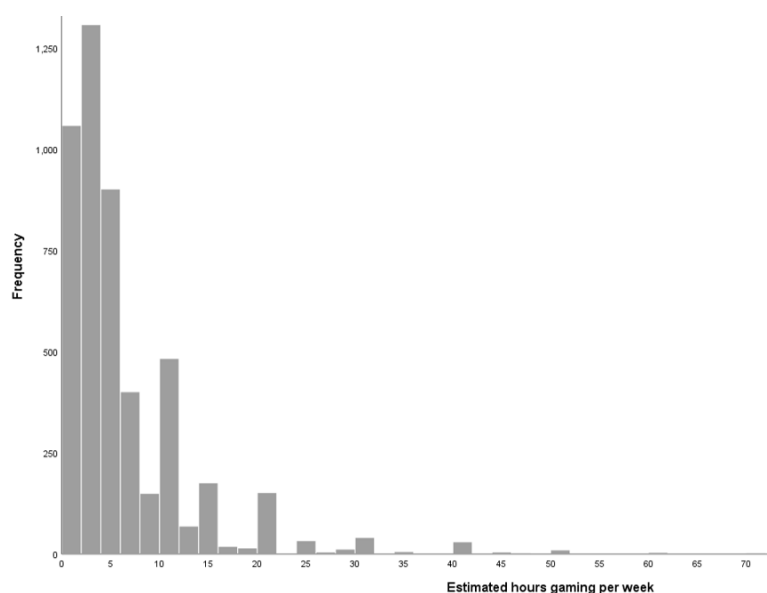 them as non-gamers (5,905 men; 10,315 women), casual (1,254 men; 726 women), and habitual gamers (1,990 men; 870 women) given the heavily skewed distribution of these count data for hours of reported gaming (where, as noted above, the median for those who gamed was 5 hours per week, which seemed a reasonable split point for binning participants as casual versus habitual gamers). See Appendix 2 for frequencies of estimated hours spent gaming.

Body satisfaction was measured using responses to the single item "I am satisfied with the appearance, size and shape of my body" devised for the NZAVS (Stronge, 2018), rated on a scale of 1 (very inaccurate) to 7 (very accurate).

Self-esteem was measured using three items from the Rosenberg (1965) Self-Esteem Inventory (α=.70): "I… On the whole am satisfied with myself", "… Take a positive attitude toward myself", "… Am inclined to feel that I am a failure". Each item was rated on a scale of 1 (very inaccurate) to 7 (very accurate).

Psychological distress was measured using the Kessler-6 scale (Kessler et al., 2002; α=.85). Participants were asked to rate items such as "During the last 30 days, how often did… you feel hopeless?", "… you feel so depressed that nothing could cheer you up?", "… you feel exhausted?". Each item was rated on a 5-point scale (0=none of the time, 4=all of the time).

RESULTS

The model was tested using multi-group regressions for men and women, predicting the three outcomes simultaneously (body satisfaction, psychological distress, and self-esteem) and allowing for the residual covariance between them. The use of a multi-group model allowed us to test for significant differences between men and women, and for the psychological correlates of casual and habitual gaming, relative to non-gaming men and women.

Missing data for exogenous variables were estimated using Rubin's (1987) procedure for multiple imputation procedure with parameter estimates averaged over 1000 datasets (thinned using every 200th iteration). The model was estimated using Full Information Maximum Likelihood, which allowed for missing data in the outcome measures, and robust estimation of the standard errors to adjust for possible non-normality in residuals.

Regression coefficients assessing the associations between gaming and the three outcomes are presented in Tables 1, 2, and 3. For women, the model accounted for 20.2% of the variance predicting body satisfaction, $F(18,13172) = 183.4$, $p < .001$; 16.4% for psychological distress, $F(18,13172) = 139.8$, $p < .001$; and 9.4% for self-esteem $F(18,13172) = 74.59$, $p < .001$. For men, the model accounted for 17.0% of the variance predicting body satisfaction $F(18,7881) = 89.83$, $p < .001$; 14.1% for psychological distress $F(18,7881) = 69.9$, $p < .001$; and 10.4% for self-esteem $F(18,7881) = 49.52$, $p < .001$).

Figure 1. Frequency distribution of estimated hours gaming per week. Note that 0s are not shown.

Table 1. Linear regression predicting body satisfaction.

	Men					Women				
	b	SE	95% CI	β	t	b	SE	95% CI	β	t
Age	.010	.002	.007, .013	.091	6.796***	.018	.001	.015, .020	.142	15.090***
Regional deprivation	.017	.006	.005, .028	.030	2.719**	.013	.005	-.002, -.023	.020	2.383
Qualification	.010	.007	-.005, .024	.017	1.318	.014	.006	.001, .026	.022	2.140
Maori	.189	.060	.071, .307	.036	3.139**	.166	.045	.078, .254	.032	3.684***
Pacific	.337	.122	.097, .577	.033	2.775**	.631	.100	.434, .827	.061	6.294***
Asian	.017	.091	-.162, .195	.002	.181	.082	.068	-.052, .215	.010	1.163
Religious	.068	.035	-.001, .136	.021	1.944*	.076	.028	.021, .131	.022	2.699**
Parent	.144	.047	.051, .236	.041	3.050**	-.003	.035	.073, .066	-.001	-.090
Partner	.107	.048	.012, .201	.028	2.213*	.061	.033	-.003, .125	.016	1.878
Employed	-.049	.047	-.141, .043	-.012	-1.047	-.028	.034	-.095, .039	-.007	-.825
Urban	-.068	.036	-.139, .003	-.021	-1.888	-.038	.029	-.095, .019	-.011	-1.295
Born in New Zealand	-.044	.041	-.124, .036	-.012	-1.082	-.098	.036	-.169, -.027	-.023	-2.707**
Sexual orientation	-.438	.076	-.587, -.289	-.071	-5.763***	.112	.060	-.005, .229	.017	1.874
Smoker	.063	.064	-.062, .188	.011	.986	-.009	.053	-.113,.096	-.001	-.161
Disability	-.230	.041	-.311, -.150	-.062	-5.612***	-.300	.034	-.367, -.232	-.074	-8.698***
BMI	-.112	.004	-.120, -.104	-.374	-26.764***	-.110	.003	-.115, -.104	-.424	-41.470***
Casual	**-.244**	**.044**	**-.331, -.157**	**-.057**	**-5.502*****	**-.111**	**.037**	**-.184, -.038**	**-.023**	**-2.962****
Habitual	**-.382**	**.061**	**-.501, -.283**	**-.071**	**-6.315*****	**-.223**	**.057**	**-.334, -.111**	**-.032**	**-3.926*****

Note. * *p* < .05, ** *p* < .01, *** *p* < .001. Gaming behaviours with significant effects are bolded. Model fit statistics: men R^2 = 17.0%, women R^2 = 20.2%

Table 2. Linear regression predicting psychological distress.

	Men					Women				
	b	SE	95% CI	β	t	b	SE	95% CI	β	t
Age	-.012	.001	-.014, -.011	-.263	-19.611***	-.015	.000	-0.016, -0.014	-.308	-32.016***
Regional deprivation	.008	.003	.003, .014	.035	3.004**	.009	.002	.005, .013	.036	4.141***
Qualification	-.002	.003	-.008, .005	-.007	-.543	-.008	.003	-.013, -.004	-.032	-3.079**
Maori	-.043	.025	-.092, -.001	-.019	-1.697	-.041	.018	-.077, -.005	-.020	-2.209*
Pacific	.014	.057	-.098, .107	.003	.242	-.018	.040	-.097, .061	-.004	-.0458
Asian	.069	.040	-.011, .148	.020	1.698	.085	.030	.026, .143	.026	2.842**
Religious	.003	.015	-.027, .032	.002	.183	-.012	.011	-.034, .010	-.009	-1.058
Parent	-.020	.021	-.061, .021	-.013	-.954	-.058	.015	-.087, -.034	-.038	-3.951***
Partner	-.157	.022	-.200, -.113	-.096	-6.990***	-.114	.014	-.141, -.087	-.074	-8.157***
Employed	-.111	.021	-.152, -.070	-.066	-5.275***	-.096	.014	-.125, -.068	-.060	-6.702***
Urban	.035	.015	.005, .065	.025	2.285*	-.024	.012	.001, .047	.017	2.053*
Born in NZ	-.024	.017	-.058, .010	-.015	-1.399	-.038	.015	-.067, -.009	-.022	-2.598*
Sexual orientation	.098	.034	.030, .165	.037	2.839**	.126	.025	.077, .176	.047	4.974***
Smoker	.123	.030	.063, .182	.051	4.037***	.170	.024	.123, .217	.069	7.102***
Disability	.259	.018	.223, .295	.165	14.144***	.273	.015	.244, .302	.168	18.427***
BMI	.008	.002	.005, .012	.066	5.048***	.004	.001	.002, .005	.034	3.619***
Casual	.031	.019	-.006, .068	.017	1.640	.024	.015	-.006, .054	.013	1.590
Habitual	**.095**	**.027**	**.043, .147**	**.042**	**3.563*****	**.115**	**.025**	**.067, .163**	**.042**	**4.694*****

Note. * *p* < .05, ** *p* < .01, *** *p* < .001. Gaming behaviours with significant effects are bolded. Model fit statistics: men R^2 = 14.1%, women R^2 = 16.4%.

Wald's Chi-Squared test was used to assess whether the links between casual and habitual gaming and each outcome differed significantly between men and women. Casual and habitual gaming were significantly associated with lower body satisfaction for both men and women. Men's body satisfaction was more adversely linked with casual gaming than women's, Wald's $\chi2(1)$ = 5.26, *p* = .022; but no gender difference was found for habitual gaming, Wald's $\chi2(1)$ = 3.706, *p* = .054. Men and

women's levels of psychological distress were not associated with casual gaming. Habitual gaming was reliably associated with higher psychological distress for men and women, with no significant gender difference, Wald's $\chi2(1)$ = 0.317, *p* = .573. Casual gaming was weakly associated with lower self-esteem for men but not for women, Wald's $\chi2(1)$ = 1.622, *p* = .203. Habitual gaming was associated with significantly lower self-esteem for both men and women, with no significant

Table 2. Linear regression predicting psychological distress.

	Men					Women				
	b	SE	95% CI	β	t	b	SE	95% CI	β	t
Age	-.012	.001	-.014, -.011	-.263	-19.611***	-.015	.000	-0.016, -0.014	-.308	-32.016***
Regional deprivation	.008	.003	.003, .014	.035	3.004**	.009	.002	.005, .013	.036	4.141***
Qualification	-.002	.003	-.008, .005	-.007	-.543	-.008	.003	-.013, -.004	-.032	-3.079**
Maori	-.043	.025	-.092, -.001	-.019	-1.697	-.041	.018	-.077, -.005	-.020	-2.209*
Pacific	.014	.057	-.098, .107	.003	.242	-.018	.040	-.097, .061	-.004	-.0458
Asian	.069	.040	-.011, .148	.020	1.698	.085	.030	.026, .143	.026	2.842**
Religious	.003	.015	-.027, .032	.002	.183	-.012	.011	-.034, .010	-.009	-1.058
Parent	-.020	.021	-.061, .021	-.013	-.954	-.058	.015	-.087, -.034	-.038	-3.951***
Partner	-.157	.022	-.200, -.113	-.096	-6.990***	-.114	.014	-.141, -.087	-.074	-8.157***
Employed	-.111	.021	-.152, -.070	-.066	-5.275***	-.096	.014	-.125, -.068	-.060	-6.702***
Urban	.035	.015	.005, .065	.025	2.285*	-.024	.012	.001, .047	.017	2.053*
Born in NZ	-.024	.017	-.058, .010	-.015	-1.399	-.038	.015	-.067, -.009	-.022	-2.598*
Sexual orientation	.098	.034	.030, .165	.037	2.839**	.126	.025	.077, .176	.047	4.974***
Smoker	.123	.030	.063, .182	.051	4.037***	.170	.024	.123, .217	.069	7.102***
Disability	.259	.018	.223, .295	.165	14.144***	.273	.015	.244, .302	.168	18.427***
BMI	.008	.002	.005, .012	.066	5.048***	.004	.001	.002, .005	.034	3.619***
Casual	.031	.019	-.006, .068	.017	1.640	.024	.015	-.006, .054	.013	1.590
Habitual	**.095**	**.027**	**.043, .147**	**.042**	**3.563*****	**.115**	**.025**	**.067, .163**	**.042**	**4.694*****

Note. * *p* < .05, ** *p* < .01, *** *p* < .001. Gaming behaviours with significant effects are bolded. Model fit statistics: men R^2 = 14.1%, women R^2 = 16.4%.

gender difference, Wald's χ2(1) = 1.50, *p* = .221. These results indicate that habitual gaming is reliably associated with lower body satisfaction, higher psychological distress, and lower self-esteem at similar rates for men and women. Finally, the focal results held while controlling for a range of covariates (see Appendix 1).

DISCUSSION

Using a large, national probability sample of New Zealanders (N=21,060), we tested whether casual and habitual gaming reliably associated with body satisfaction, psychological distress, and self-esteem, and whether gender moderated these links. First, gamers were categorised according to a median split at 5 hours. Figure 1 (and Appendix 2) shows that a large cluster of participants indicated having spent up to 5 hours gaming in the past week; this constitutes a significant proportion of gamers, who we binned as casual gamers. Past this cluster, there is a large drop in frequency of participants who indicated gaming more than 5 hours in the past week. Cutting off this tail past the cluster thus looked to be a reasonable split point from which to categorise participants who gamed more frequently, who we labelled as habitual gamers. Then, our primary analyses compared whether these two groups differed from each other, and from non-gamers, on the three psychological outcomes.

Casual gaming was significantly associated with lower body satisfaction for both men and women, and this relationship was more adverse for men. Habitual gaming showed a stronger, more adverse association with body satisfaction than casual gaming, supporting Hypothesis 1; there was no gender difference for this association (as much as one can predict the null). Supporting Hypothesis 2, higher psychological distress was observed in men and women who gamed habitually, with no significant gender difference. Casual gaming was not linked with psychological distress, and was significantly associated with lower self-esteem for men only. Supporting

Hypothesis 3, and relative to casual gaming, habitual gaming was associated with lower self-esteem for men and women, with no significant gender difference. In sum, the present research demonstrated that among adults, (a) poorer psychological well-being was consistently observed among those who gamed habitually, and (b) gender played only a small role in moderating these associations.

With a nationally representative adult sample, we documented that men and women who gamed habitually reported markedly poorer psychological well-being than casual gamers and non-gamers. We build on a large body of existing literature regarding the antecedents of psychological well-being. It is well-established that idealistic media portrayals of men's and women's bodies can undermine body satisfaction (e.g. Blond, 2008; Griffiths et al., 2018), belonging to minority ethnic groups is associated with higher psychological distress (Krynen, Osborne, Duck, Houkamau, & Sibley, 2013; Lee, Duck, & Sibley, 2017), and being unemployed is associated with lower self-esteem (de Witte, Rothmann, & Jackson, 2012; Goldsmith, Veum, & Darity, 1997). By demonstrating that habitual gaming is also linked with these aspects of psychological well-being, we highlight the importance of acknowledging the potential ramifications of habitual behaviours. Additionally, our findings contribute to public health research given that body dissatisfaction is linked with eating disorders (see Stice, 2002), psychological distress predicts the development of mental illness (see Kessler et al., 2002), and low self-esteem is a risk factor for depression (e.g. Orth, Robins, Meier, & Conger, 2016). Overall, the population-level estimates presented provide reliable foundations for forthcoming research to conduct more detailed analyses on adults' gaming behaviours and outcomes.

Our focal findings must be interpreted with caution as each significant association produced a standardised effect size of less than .1. They do not necessarily imply

that all habitual gamers experience poorer psychological well-being than casual gamers and non-gamers; in fact, considering the effect sizes, our results indicate that these differences may be too small to be practically meaningful. However, in our view, these small effect sizes are appropriate given the broad nature of the sample—they appear small because we sampled the general adult population in New Zealand rather than gamers specifically. Because there is little research regarding the links between gaming and psychological well-being among adults, we believe it is important to first document broad, descriptive findings showing these patterns among adult gamers.

That we were able to identify a) a sizeable population of gamers in this general sample and b) conceptually consistent links between gaming and psychological well-being within this group is noteworthy. Achieving these shows that the small effect sizes \ do not necessarily imply a practically negligible difference between habitual gamers and casual and non-gamers. They instead warrant a closer look at the individuals who contributed to the adverse association between habitual gaming and psychological well-being—what drives this link? Would these effects remain similar or appear stronger if a study were to sample adult gamers specifically? How do adult gamers compare to gamers of other age groups? This is an important line of research to undertake that our findings will hopefully spur.

The significant covariate effects in our model may also be of specific interest to other researchers. Identifying with a non-heterosexual sexual orientation was linked with higher psychological distress and self-esteem for men and women, and lower body satisfaction for men only. This is in line with a large body of research showing that gay men tend to experience particularly low levels of body satisfaction (e.g. Basabas, Greaves, Barlow, & Sibley, 2019; Peplau et al., 2009). Consistent with another area of research (e.g. Boman et al., 2013; Chalk, 2016; Rai et al., 2012), having a disability was associated with lower body satisfaction, higher psychological distress, and lower self-esteem for both men and women. Lastly, identifying with a Māori ethnicity was linked with higher body satisfaction and higher self-esteem for men and women, supporting previous research indicating that affiliating with a Māori ethnic identity is associated with positive outcomes (e.g. Matika, Manuela, Muriwai, Houkamau, &Sibley, 2017; Talwar, Carter, & Gleaves, 2012). The effects of these (and other) covariates were very small, with all but disability, age, and BMI having standardised associations of less than .1 (see Appendix 2, Tables 1 and 2). These demographic covariates may be of interest of researchers who may want to examine these patterns further with more fine-grained approaches.

The NZAVS sample we analysed here performs relatively well in terms of representing the New Zealand adult population, but contains some biases including the over-representation of women, under- and over-representation of people for whom English is their primary or first language (see Satherley et al., 2015). Crucially, the fact that women are over-represented in the NZAVS (being about 60% of the sample) is adjusted for in our analyses because we explicitly estimated parameters for men and women in our multi-group models

and tested for differences between them (and generally found consistent patterns for men and women). Our analyses only pertain to the gaming population who are over 18 years of age (as our sample only contained those over 18). Other samples are needed to examine rates of gaming in younger cohorts. The fact that the NZAVS is a general survey, rather than one specifically about gaming or framed in terms of being about a special interest or topic, is key because it removes the risk of people being more likely to participate because they have a particular interest or option about the specific topic (i.e., people interested in gaming responding to a survey about gaming). Our findings thus provide broad, population-level estimates regarding the links between casual and habitual gaming and the rates of psychological well-being among New Zealand adults in general.

Caveats and Future Directions

Although being a strength in one regard, the general and broad nature of the NZAVS is a weakness in another. Our analyses of gaming-related behaviours were limited to the single self-reported hours-of-gaming measure included in the questionnaire. By only measuring time spent gaming per week, other aspects of gaming behaviours such as genre (e.g. first-person shooter, role-playing, puzzle), content (e.g. general, mature), platforms (e.g. Xbox, mobile), motives (e.g. achievement, escape), and interference with everyday life were not captured. Here, more specific surveys focused on gaming are needed, which balances the risk of response bias due to special interest with providing more in-depth and detailed information about gaming. Men and women's body satisfaction, for example, may be more negatively correlated with playing mature games where characters are more likely to be sexualised for older audiences (Blond, 2008; Downs & Smith, 2010; Griffiths et al., 2018). Alternatively, perhaps gamers with low body satisfaction are more motivated to play games when they are able to customise the appearance of their characters/avatars (Koronczai et al., 2013). Our analyses cannot speak to these more specific and subtle potential effects. By establishing population-level findings about adult gamers' psychological well-being, we complement forthcoming research that conduct more detailed analyses on gaming behaviours and outcomes with smaller samples.

Obviously, our results are also correlational in nature. Although our models statistically adjust for a diverse range of covariates and hence, third variable explanations, inferences about the causal direction of effects should be conducted with extreme caution.   The theory of compensatory internet use, for example, proposes that individuals may use gaming as a coping strategy to alleviate negative feelings stemming from psychosocial issues such as low self-esteem and stress (Kardefelt-Winther, 2014a, 2014b). Thus, for some people, poor psychological well-being might drive increased gaming.

Our findings are consistent with this possibility, as we simply show that individuals with poor body satisfaction, higher psychological distress, and low self-esteem were more likely to game habitually. According to this perspective, poor psychological well-being is not necessarily a direct cause of increased gaming time; rather, individuals with psychosocial issues who are

motivated to escape from life or gain a sense of achievement use games to fulfil these goals, thereby indirectly alleviating their negative feelings (Kardefelt-Winther, 2014c). In our view, we suspect that excessive gaming and negative psychological outcomes may exist, at least for some people, in a mutually reinforcing feedback loop. Our current analyses cannot test this possibility directly, but this is something we plan to investigate in future longitudinal work using the New Zealand Attitudes and Values Study. Before pursuing this line of future research we thought it important to conduct the current research to document the base rates for gaming in the population, and associations between casual and habitual gaming and a range of outcomes more generally.

Furthermore, we did not measure whether participants were addicted to gaming. It is difficult to imagine how one could do this directly, as asking a question like 'are you addicted to computer gaming?' might not necessarily yield reliable results. Far better, in our view, to use an indirect measure of the frequency of gaming over time, as we do. Previous research has shown that higher engagement can (but does not necessarily) predict problematic gaming (Charlton, 2002; Ferguson et al., 2011; Király et al., 2017; Yee, 2007). Therefore, there may have been participants in our sample who were genuinely addicted, which could have negatively skewed the results. To illustrate, previous studies have shown that problematic and addicted gamers tend to experience more negative outcomes such as lower life satisfaction, poorer school performance, and higher levels of depression and anxiety than highly engaged gamers (Mentzoni et al., 2011; Skoric et al., 2009). If our subsample of habitual gamers included a substantial proportion of addicted gamers, then the negative links we found may have been more adverse than they actually are. This is not a substantial concern, however, as researchers have previously established that only a minority of the general population experience behavioural addiction (see Kuss & Griffiths, 2012).

Some readers may also wonder about the time frame specified by some of our measures. We sampled reports of psychological distress using the Kessler-6 which, as is standard for this measure, asks participants about experiences of psychological distress over the last 30-day period. The Kessler-6 specifies this time frame because it is a reasonable period of time for detecting population variability in psychological distress (rather than, for example, the past day, or past hour, which would be too

fine a resolution and risk missing more general patterns). Our gaming measure, in contrast, asked about hours spent over the last 7 days and was nested within a more general hours measure (also including hours working, commuting, internet use, etc). Given that most people tend to operate on weekly cycles in terms of habitual activity, the questionnaire samples hours spent on each activity over the last meaningful cycle. Additionally, informal pilot testing conducted when initially designing the NZAVS in 2008 indicated that reported hours from the past week were more reliable than those based on the last month. We also note that the measures for self-esteem and body satisfaction did not specify a time period. However, because comparable conceptual links were found between gaming and the three outcomes, the differences in time frames across the measures used is not a substantial concern and would not have unduly impacted our findings.

Conclusion

As video games grow in popularity, there is a corresponding need for estimates of the effects of gaming and its dose-response relationship, so to speak, with psychological and health-related outcomes in the general population. We aimed to provide this information by contrasting the effects observed in casual gamers (operationalised as less than 5 hours per week), habitual gamers (more than 5 hours per week), and non-gamers. Our results indicate that on average, men and women who gamed habitually reported lower body satisfaction, higher psychological distress, and lower self-esteem relative to those who gamed casually and did not game at all. Habitual gamers reported similar outcomes regardless of gender, while there were weak gender differences for casual gamers: men who gamed casually reported lower body satisfaction and self-esteem than women who gamed casually. Our results indicate—unsurprisingly—that habitual gaming is correlated with negative psychological outcomes in the population. We hope these findings might pave the way for more detailed dose-response analyses of gaming behaviours and outcomes; whether there is an inflexion point at which hours of gaming starts to increase negative outcomes, and the possible trade-offs that men relative to women may be making when they choose to play video games. As game mediums, genres, and rates of game play evolve, so too should research adapt and expand to study gaming and its possible links with psychological well-being.

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Appendix 1. Descriptive statistics and measurement details for all outcome, predictor, and covariate variables, split by gender.

Variable	Men (n = 7,885) M (SD)	Women (n = 13,175) M (SD)	Item content
Body satisfaction (1 to 7)	4.52 (1.56)	4.09 (1.70)	I am satisfied with the appearance, size and shape of my body.
Psychological distress (0 to 4)	0.83 (.66)	0.90 (0.69)	e.g. During the last 30 days, how often did... you feel hopeless?
Self-esteem (1 to 7)	5.25 (1.20)	5.16 (1.25)	e.g. I... On the whole am satisfied with myself.
Age	51.33 (13.90)	48.42 (13.74)	What is your date of birth?
Regional deprivation index (1 low, 10 high)	4.55 (2.72)	4.71 (2.75)	Deprivation of respective neighbourhood region (meshblock) based on 2013 census data (Atkinson, Salmond, and Crampton, 2014)
Qualification (0 low, 10 high)	5.10 (2.76)	5.41 (2.72)	What is your highest level of qualification?
BMI	27.82 (5.20)	27.34 (6.80)	What is your height? (metres)—What is your weight? (kgs)
	N (%)	N (%)	
Heterosexual (0 no, 1 yes)	7,357 (93.3%)	12,266 (93.1%)	How would you describe your sexual orientation?
Māori (0 no, 1 yes)	773 (9.8%)	1,581 (12.0%)	Which ethnic groups do you belong to?
Pacific (0 no, 1 yes)	182 (2.3%)	356 (2.7%)	
Asian (0 no, 1 yes)	316 (4.0%)	620 (4.7%)	
Religious (0 no, 1 yes)	2,776 (35.2%)	5,230 (39.7%)	Do you identify with a religion and/or spiritual group?
Parent (0 no, 1 yes)	5,812 (73.7%)	9,658 (73.3%)	How many children have you given birth to, fathered, or adopted?
Partner (0 no, 1 yes)	6,253 (79.4%)	9,658 (73.3%)	What is your relationship status?
Employed (0 no, 1 yes)	6,372 (80.8%)	10,172 (77.2%)	What is your current occupation?
Urban (0 no, 1 yes)	5,173 (65.6%)	8,525 (64.7%)	Urban vs rural residential location coded from meshblock data (Statistics NZ, 2016)
Born in NZ (0 no, 1 yes)	6,159 (78.1%)	10,580 (80.3%)	Where were you born? (please be specific, e.g., which town/city?)
Smoker (0 no, 1 yes)	647 (8.2%)	1,094 (8.3%)	Do you currently smoke?
Disability or illness (0 no, 1 yes)	1,822 (23.1%)	2,952 (22.4%)	Do you have a health condition or disability that limits you, and that has lasted for 6+ months?
Casual gamer (0.1-5.0 hours)	1,254 (15.9%)	1,990 (15.1%)	Please estimate how many hours you spent... Playing computer games.
Habitual gamer (≥5.0 hours)	726 (9.2%)	870 (6.6%)	

Appendix 2. Distribution of estimated hours spent gaming in the past week.

Hours gamed	Frequency
0	16315
0 ≤ 1	1058
1 ≤ 2	852
2 ≤ 3	455
3 ≤ 4	405
4 ≤ 5	496
5 ≤ 6	171
6 ≤ 7	229
7 ≤ 8	131
8 ≤ 9	18
9 ≤ 10	476
10 ≤ 11	6
11 ≤ 12	62
12 ≤ 13	6
13 ≤ 14	80
14 ≤ 15	95
15 ≤ 16	13
16 ≤ 17	5
17 ≤ 18	14
18 ≤ 19	0
19 ≤ 20	142
20+	159
Total	21,188

Note. Frequency count exceeds sample size of primary analyses because the analyses excluded participants who did not respond to all items (gender, gaming, outcomes, and covariates) measured in the model.

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Surveying women leaders' career trajectories: Implications for leadership development in New Zealand organisations

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This study relied on senior women leaders' retrospective accounts to identify the factors that shaped their career progression, and tested the relationships between executive coaching, mentorship, and sponsorship, and career satisfaction and leadership efficacy perceptions. Quantitative and qualitative data were gathered from an online survey of 159 women in senior leadership positions in New Zealand. The findings show that organisational culture and perceived work-family tensions were the factors that most hindered leadership advancement among women. In addition, women leaders ascribed personal attributes such as drive and hard work, along with social resources such as sponsors and managerial support, to their leadership advancement. Based on the results, we offer practical suggestions to improve career management, leadership development, and organisational outcomes for women leaders.

Introduction

Me aro koe ki te hā o Hine-ahu-one.
Pay heed to the dignity of women

At the turn of the 21st century, and despite recent calls for greater gender parity in the workplace, leadership teams are still largely male-dominated (Hillman, 2015). A recently published Westpac Diversity Dividend Report suggests that gender balance in the c-suite makes a substantive positive contribution to the New Zealand economy (Deloitte, 2017). Along with financial returns, organisations that ensure gender parity at the senior leadership level show significantly better social responsibility, innovation, and customer service outcomes (Deloitte, 2017, Glass & Cook, 2018; Glass et al., 2016).

Despite the evident merits of gender parity at work, and although women hold about 60% of all university degrees in New Zealand (Statistics, New Zealand, 2015) and account for nearly 50% of the general workforce (Ministry for Women, 2016), current figures show that among New Zealand's Top 100 NZX companies less than one in four board members are women, and only four chief executive positions were held by women (McLennan et al., 2018). Moreover, though New Zealand has traditionally ranked within the top ten countries for women in leadership, in 2018 New Zealand's place in the ranking fell to 33 out of 35 countries, just ahead of Australia and Japan (Grant Thornton, 2018). The same report underscores another concerning statistic: the proportion of women in senior leadership positions within New Zealand has declined from 31% in 2004 to 19% in 2018.

While these statistics are difficult to explain in light of growing awareness of the need to effectively manage diversity in organisations, the leadership literature offers ample evidence of some of the main challenges faced by women leaders. For instance, accounts of glass ceiling effect suggest that women are at a significant disadvantage with regards to upward mobility in an organisation, and their ascent often stalls at the middle management level (Chisholm-Burns et al., 2017; Weyer, 2007). The leadership labyrinth is another common metaphor that illustrates the myriad obstacles aspiring women leaders face, including gender stereotyping, family responsibilities, lack of role models, and exclusion from informal networking (Eagly & Carli, 2007, 2012; Koenig et al., 2011). To be clear, many of the factors that purportedly hinder women leaders' progression, such as the leadership labyrinth phenomenon described, have been either anecdotally or only theoretically discussed, but seldom validated with evidence. Scholars have long called for empirical research that identifies not only the factors that deter women leaders' careers, but also the factors that positively contribute to their success (Allen et al., 2004; Helms et al., 2016; Hopkins et al., 2008). Such evidence would go a long way to provide robust guidelines around how to best support aspiring women leaders.

The objectives of this study are twofold. Based on an online survey of current senior women leaders in New Zealand organisations, we first examine some of the theoretically advanced factors believed to enhance leaders' competence beliefs (i.e., leadership efficacy) and career satisfaction, namely satisfaction with mentorship, sponsorship, and executive coaching, to determine whether and how these formal leadership development initiatives impact women's leadership experiences. Second, the study relies on qualitative data extracted from the online survey to offer preliminary insights into additional factors that women leaders attribute to their career advancement and satisfaction, and the factors that women leaders view as having posed obstacles throughout their career. This information is aimed at identifying general themes to guide further empirical enquiry.

Literature Review
Women leaders in organisations

Studies examining the impact of gender parity on organisational outcomes highlight the positive financial results associated with having women in executive teams (Cook & Glass, 2014; Nguyen & Faff, 2007), along with supplier and customer loyalty, increased accountability, socially responsible practices, and positive organisational climate (Glass & Cook, 2018; Glass et al., 2016; Setó-Pamies, 2015). Yet, these effects are largely contingent on whether and how organisations manage the contextual factors that influence women's ability to develop a leadership career, and to thrive as leaders (Miller & del Carmen Triana, 2009). Failure to provide a supportive leadership development environment for women has resulted in their underrepresentation in senior management roles, and, notably, it has also perpetuated misconceptions around leadership capability in this gender group. For instance, while New Zealand businesses have recently ascribed the shortage of women leaders to a lack of available female talent (Deloitte, 2017), scholars suggest that ineffectual diversity management driven by unconscious biases and archaic beliefs about women's competence in a leadership role are largely responsible for sustained gender imbalance in the c-suite (Eagly & Carli, 2007; Singh & Vinnicombe, 2003).

Unconscious biases and held beliefs about women's fitness for leadership can be partly explained by role congruity theory. The theory underlines perceived discrepancies between traditional gender roles and the requirements of a leadership role (Eagly & Karau, 2002). This perceived incongruity leads to two forms of prejudice: (a) women are viewed less favourably than men as potential leaders because the behaviours women exhibit in leadership roles are inconsistent with the expectations of appropriate female behaviours, and (b) social convention around what constitutes stereotypically female behaviour leads to the perception that women are less likely to meet leadership role requirements than men (Eagly & Karau, 2002; Hoyt, 2005). Leadership behaviours fitting with the stereotypically male gender role include assertiveness and dominance. Conversely, women are generally expected to exhibit communal characteristics, and enact nurturing, kind, and sympathetic behaviours (Koenig et al., 2011). In the workplace, the perceived lack of congruence between conventional leadership requirements and women's attributes has been linked to underestimation of competence and even penalisation for enacting leadership behaviours (Heilman, 2012).

The effect of role incongruence perceptions in gendered leadership outcomes has been scarcely examined, but it is reasonable to assume their association with skewed performance appraisals, lack of support for aspiring women leaders' development, and denial of credit for women's contributions and success in the workplace. Beyond their detrimental impact on career advancement, these dynamics likely undermine women's perceptions of competence in a leadership role, and stifle their sense of career fulfilment when they occupy executive level positions. More research is needed to explore and empirically verify the factors that shape women leaders' views of their role and career.

The women in leadership literature focuses mainly on the negative biases described above, along with their connection to widely known phenomena such as the glass ceiling (i.e., invisible institutional barriers that render women disproportionally less likely than men to achieve senior leadership positions) and glass cliff effects (i.e., women are more likely than men to be appointed to leadership positions during times of crisis when the risk and probability of failure in role are higher). Less is known about the factors that hinder and those that support women leaders' careers. This study relies on quantitative and qualitative data to explore senior women leaders' views of their leadership careers. Though limited, the research into formal leadership development practices indicates that networking support, executive coaching, and mentorship might result in positive career outcomes for this gender group (e.g., Fitzsimmons et al., 2014; Harris & Leberman, 2012; Searby et al., 2015; Tolar, 2012). Hence, the quantitative portion of this study will focus on the impact of formal leadership development (i.e., mentoring, executive coaching, and sponsorship) on women leaders' efficacy beliefs and career satisfaction. The qualitative portion of the study is exploratory, and delves into the personal, societal, and organisational factors that positively or negatively shape women leaders' career experiences. In it, we collect written accounts from New Zealand women leaders to answer research questions around the factors perceived as hindering or contributing to their career advancement.

Leadership efficacy and career satisfaction: The role of formal leadership development

Self-efficacy is a motivational construct that influences individuals' activity choices, goal setting, effort expenditure, task persistence, adversity coping, and overall performance (Bandura, 1997; Hoyt, 2005). Leadership efficacy is a "specific form of efficacy associated with the level of confidence in the knowledge, skills and abilities associated to leading others" (Hannah et al., 2008, p.669). Leadership efficacy has been described as directly promoting effective leadership engagement, adaptability, and flexibility across complex and challenging organisational contexts.

When exploring leadership efficacy among women leaders, research suggests two dynamics. On the one hand, women are more often exposed to negative female gender stereotypes around leadership, which may over time undermine their leadership efficacy. Yet, even when faced with these stereotypes, women who exhibit greater leadership efficacy show higher levels of performance and wellbeing levels than those with lower leadership efficacy (Hoyt & Blascovich, 2007). These findings suggest that women are susceptible to efficacy threats in their leadership role, but also highlight how organisations benefit from ensuring women develop leadership efficacy as a personal resource throughout their careers. But how can organisations promote leadership efficacy among women?

Bandura (1977, 1997) outlined several factors that influence self-efficacy appraisals, which can be linked to supportive leadership development practices: role modelling, feedback, verbal persuasion, and vicarious

learning. For instance, vicarious learning in a leadership context occurs when employees have opportunities to either observe or hear about others' leadership trajectories. These learning moments clarify the path to achieving similar career goals, including the experiences and capabilities necessary to succeed in that role. Leadership efficacy can also be developed through verbal persuasion, whereby experienced professionals hold one-on-one discussions meant to enhance an individuals' belief that they can also succeed as leaders.

Formal leadership development agents such as mentors and executive coaches are in a privileged position to engage in these conversations, and to further enhance efficacy perceptions through vicarious learning, role modelling, and performance feedback. However, these causal linkages have seldom been tested among women leaders. Similarly, whether and how mentorship, sponsorship, and executive coaching influence women leaders' views of career satisfaction, defined as the composite positive perception of an individual's working life (Judge et al., 2005; Ngo & Hui, 2018), remains unclear. In what follows, we discuss these formal leadership development practices and ways in which they may uniquely foster leadership efficacy and career satisfaction for women leaders.

Mentorship and leadership outcomes

A mentor is an experienced individual within an organisational support network who can provide career guidance and serve as a role model to less experienced workers (Ensher & Murphy, 2005; Joo et al., 2012). Organisations increasingly rely on formal mentoring programs within leadership development systems, and research into mentorship is steadily developing (Baugh & Fagenson-Eland, 2007; Moore & Wang, 2017; Ragins & Kram, 2007). Mentoring offers substantial benefits for organisations, mentees, and mentors. For mentees with effective mentors, some of the benefits include greater career mobility, higher perceptions of vocational fit, and greater job satisfaction compared to those with an ineffective mentor or no mentor at all (Allen et al., 2004; Burke & McKeen, 1997).

Though scarce, and seldom examined on the backdrop of gender differences, the research suggests that emerging leaders in trusting mentoring relationships have enhanced levels of leadership efficacy and overall performance (Lester et al., 2011). Moore and Wang (2017) propose that good mentors increase mentees' leadership efficacy beliefs by fostering a sense of psychological safety (i.e., less fear of making mistakes, willingness to openly discuss career concerns), and providing vocational support and positive role modelling. This in turn results in greater mentee willingness to attempt stretch goals, leading to improved performance and innovativeness. The notion that mentorship quality, rather than mere availability, is a stronger predictor of positive workplace attitudes has been empirically tested, with findings showing that satisfaction with mentoring has significantly greater effects on mentee outcomes than mentoring availability or frequency of exchanges with the mentor (Xu & Payne, 2014). We expect that satisfaction with the mentor-mentee alliance may also be a key driver of career satisfaction and leadership efficacy.

H1: Satisfaction with a mentor will be positively associated with a) career satisfaction and b) leadership efficacy among women leaders

Career Sponsor

A sponsor is typically an influential senior executive who is willing to create opportunities and advocate for an individual whose leadership potential has been identified (Hewlett, 2013). The guidelines of a sponsoring relationship are ill-defined in the literature, and have in the past been undifferentiated from those that characterise the role of a mentor. Yet, a sponsor's primary role is not to offer career guidance, but rather to support network development for the emerging leader, and in this way facilitate career advancement. Their role is to actively endorse a protégé and boost their profile by introducing them to other executives, broadening their professional network (Helms et al., 2016; Hewlett, 2013), and nominating or referring the protégé for promotion when opportunities arise (Friday et al., 2004).

Preliminary research indicates the significance of career sponsorship for aspiring women leaders (Helms et al., 2016), especially given that women are more likely to be excluded from informal workplace networks than their male counterparts (Hewlett et al., 2010). Though limited, the evidence suggests that career sponsorship is positively associated with lower likelihood of career plateau, more favourable appraisals for promotion, and overall increased career satisfaction among women (Greenhaus et al., 1990; Ng et al., 2005).

The evidence is fuzzy on whether these positive outcomes can be attributed to having sponsors, or to the actual quality of the sponsorship. Moreover, while there is preliminary data to support the association between sponsorship and career outcomes among women leaders (Ng et al., 2005), no research to date has empirically tested the relationship between women leaders' satisfaction with sponsorship and their perceptions of leadership efficacy.

H2: Satisfaction with a career sponsor will be positively associated with a) career satisfaction and b) leadership efficacy among women leaders

Executive Coaching

Executive coaching is a leadership development intervention designed to help emerging leaders enact positive changes in mindset and behaviour, and it typically relies on the one-on-one formal relationship between an externally hired executive coach and an individual (coachee) (Athanasopoulou & Dopson, 2018; Grant, 2014). This developmental intervention has strong adaptive, reflective, and goal-focused components that target both leader development and overall organisational performance (Bozer & Jones, 2018). In practice, coaching offers emerging leaders the opportunity and tools to reflect on and independently identify any skill deficits or positive assets they wish to develop, which in turn expands their leadership capability and improves their overall performance (Joo et al., 2012; Moen & Federici, 2012; Moen & Kvalsund, 2008).

The coaching process takes into account the multiple life roles and changing career and personal circumstances of the developing executive. Women, in particular, have unique roles and demands that require special

consideration in a coaching alliance (Mainiero & Sullivan, 2005; Ruderman & Ohlott, 2005). These demands range from achieving work-life balance and ensuring a smooth return to work process following parental leave, to navigating the gender stereotyping that often permeates corporate environments. Given the exceptional challenges faced by aspiring women leaders, an executive coach must rely on a holistic approach to leadership development by attending to personal, occupational, and societal pressures (Hopkins et al., 2008).

The extant literature still has a fair way to go in establishing the factors that contribute to effective executive coaching (Athanasopoulou & Dopson, 2018; de Haan et al., 2016), and little is known about coaching outcomes among women leaders. Yet, the evidence indicates that leadership self-efficacy, an intended outcome of executive coaching, is fostered under conditions of perceived autonomy, support, and resource availability. These three conditions feed into the foundations of self-efficacy appraisals, namely guided reflection on past performance, role model observation, and encouraging prompts from credible and legitimate sources, all of which fall within the purview of executive coaching (Paglis, 2010). Hence, satisfaction with executive coaching is expected to positively influence women leaders' self-efficacy through their effect on efficacy appraisals.

Leaders' perceptions of a high quality coaching relationship are also expected to increase career satisfaction. Recent research suggests that this association can be explained by the notion of 'high-quality connections', whereby the positive emotions and sense of connection that arise from a good coaching alliance enhance learning and self-awareness in a leadership context, which subsequently increase the career satisfaction of emerging leaders (Van Oosten, McBride-Walker, & Taylor, 2019).

H3: Satisfaction with an executive coach will be positively associated with a) career satisfaction and b) leadership efficacy among women leaders.

In addition to the associations suggested above, and given the dearth of information about that factors that contribute to or hinder women leaders' careers, we rely on qualitative accounts from women leaders to explore the following questions:

RQ1: What factors negatively affect leadership advancement for women in New Zealand?

RQ2: What factors positively contribute to leadership advancement for women in New Zealand?

METHODS
Participants and Procedure
The participants for this study consisted of women leaders working in New Zealand organisations. The main inclusion criterion for this study, which was communicated with prospective participants in the information sheet, was that they had to occupy senior leadership roles (e.g., CEO, CFO, COO, board member, head of division). The participants were recruited using a number of methods. A total of 145 senior women leaders were directly contacted after an extensive online search for women leaders in New Zealand, using an email address obtained from websites or online social media

platforms such as LinkedIn and Twitter. Participants were also asked to forward the details of the study onto other female leaders they had within their networks. Additionally, leadership professional groups were approached and some agreed to pass on the details of the study to their mailing lists or advertise on their websites and social media platforms. As a result, the exact number of invitations sent cannot be established.

The quantitative and qualitative data used in this study were collected from participants via an online survey administered at a single time point. To ensure adequate time to recruit, the survey was open for 12 weeks. After screening for eligibility and eliminating incomplete surveys, the total number of participants was 159. Out of the 159 participants 15% identified as Māori, 79% identified as Pakeha/New Zealand European 3% identified as Pasifika, 2% identified as Asian and 6% identified as another ethnic group. The length of tenure in a leadership position averaged 13.5 years.

Measures
Participants' views on leadership efficacy, career satisfaction, and satisfaction with mentoring, career sponsorship, and executive coaching were rated on 5-point Likert scales. Demographic and occupational information including current job title, sector, industry, financial investment in company, total length in leadership positions, and ethnicity were collected. Ahead of the questions pertaining to sponsoring, mentoring, and executive coaching, the respondents were presented with the following descriptions:

"A *career sponsor* is usually a senior level staff member invested in your career progression, who advocates for your success on the corporate ladder. By making you visible to top people both within and outside of your organization, your sponsor may support you to secure high profile assignments, promotions, and pay rises. A person sponsored may be referred to as a protégé."

"*Mentors* offer advice and guidance, and support you in achieving your desired career goals. Ideally, they are removed from your day-to-day functions and usually don't provide coaching on your job tasks. The person being mentored is usually referred to as a mentee."

"*Executive coaching* is designed to help facilitate professional and personal development to enable individual growth and improved performance. It is an organisation-funded developmental initiative that centres on the relationship between coach and client (you)."

Leadership Efficacy
Leadership self-efficacy was measured using 13 items covering two dimensions of the Leadership Efficacy Questionnaire (LEQ) developed by Hannah and Avolio (2013). The leader action self-efficacy (LASE) dimension consisted of 7 items that measured the leaders' perceived ability to effectively perform leadership functions such as motivating, coaching and inspiring, as well as getting followers to identify with the organisation's vision and goals (Hannah & Avolio, 2013). A sample item is *"As a leader, I am able to get staff to meet the requirements that have been set for their work".* Coefficient alphas range from .90 to .93 (Hannah & Avolio, 2013; Hannah et al., 2012).

The leader self-regulation efficacy (LSRE) dimension consisted of 6 items that measured the leaders' perceived capability to think through complex leadership situations, interpret their followers and context, generate unique and effective solutions to problems that arise, and the ability to motivate themselves to enact those solutions (Hannah & Avolio, 2013). A sample item is *"As a leader, I can think up innovative solutions to challenging leadership problems"*. Coefficient alphas range from .83 to .85 (Hannah et al., 2012). Participants rated each item on a scale from 1=not confident at all to 5=extremely confident.

Career Satisfaction

Career satisfaction was measured using the 5-item Greenhaus et al. (1990) Career Satisfaction Scale (CSS). Participants were asked to rate their experience of career satisfaction. A sample item is *"I am satisfied with the success I have achieved in my career so far"*. Participants rated each item on a 5-point scale from 1=strongly disagree to 5=strongly agree. Coefficient alphas for the CSS range from .83 to .88 (Greenhaus et al., 1990; Spurk et al., 2011).

Mentoring satisfaction

Mentoring satisfaction perceptions were assessed using the 7-item Mentoring Relationship Effectiveness Scale developed by Berk et al. (2005). A sample item included *"My mentor challenged me to extend my capabilities"*. Participants rated each item on a scale from 1=strongly disagree to 5=strongly agree. The scale's coefficient alpha is .94 (Berk et al., 2005).

Sponsor satisfaction

Given the lack of a sponsorship effectiveness scales available, seven items were developed for this study based on the role of the sponsor. A sample item is *"My sponsor gave me assignments that increased personal contact with important clients and key leaders"*. Participants rated each item on a scale from 1=strongly disagree to 5=strongly agree.

Executive Coaching satisfaction

An adaptation of de Haan et al. (2016) coaching effectiveness scale was used for this executive coaching component of the survey. The 7 items focused on the participant's relationship with an externally hired executive coach. An example of an item included was *"My coach and I collaborated on setting goals during my coaching sessions"*. Responses were provided on a scale from 1 = strongly agree to 5 = strongly disagree. De Hann et al.'s (2016) reported Cronbach alpha was .86.

Quantitative Data Analysis

Exploratory factor analyses (EFA) using principal axis factoring with oblique rotation (direct oblimin) were conducted to assess the dimensionality of the scales used in this study. The inclusion criteria were eigenvalues greater than one, and item factor loadings greater than .40 (DeVillis, 2016; Shultz et al., 2013). The EFA conducted for Leadership Efficacy showed that, after two double loading items being deleted, the remaining items loaded on their two corresponding factors 'leadership action self-efficacy' (LASE) and 'leadership self-regulation efficacy' (LSRE). The remainder of the items loaded onto single factors, consistent with the career satisfaction and formal leadership development unidimensional scales utilised.

Qualitative Data Analysis

In addition to the quantitative responses provided, women leaders were given the opportunity to elaborate on their experiences with mentoring, sponsorship and executive coaching, and in that way allow for a greater understanding of their impact on women leaders' trajectories. In addition, women leaders were asked to answer the following questions: *"Describe the top three factors that have hindered your leadership career"* and *"Describe the top three factors that have directly contributed to your leadership success"*. To analyse the open-ended responses, a thematic analysis was conducted. In the present study, we followed Braun and Clarke's (2006) six steps: 1) Data familiarisation – the responses provided were read and re-read to gain an insight of the content as a whole; 2) Initial codes were generated – the dataset was systematically processed by manually coding it, and a number of key patterns and themes were identified; 3) Search for themes along specific research questions and identification of overarching themes to nest the data; 4) Theme review – themes were refined and reviewed to ensure all themes were accurately captured; 5) Naming themes; and 6) Reporting – examples of participants' comments that illustrated the themes and addressed the research questions were selected for reporting.

RESULTS
Quantitative Results

Independent samples t-tests were conducted to test for significant differences in leadership efficacy and career satisfaction perceptions between Māori and non-Māori women leaders. While there were no statistically

Table 1. Descriptive Statistics

Measure	N	M	SD	1	2	3	4	5	6
1. Mentor satisfaction	73	4.05	.81	(.90)					
2. Sponsor satisfaction	66	3.93	.85	.41**	(.89)				
3. Coach satisfaction	42	3.78	.93	-.34†	.23	(.93)			
4. Leader action efficacy		3.90	.59	-.04	.27*	.18	(.85)		
5. Leader regulation efficacy		4.03	.57	.04	.22†	.15	.67**	(.86)	
6. Career satisfaction		4.07	.68	.12	.37**	.29†	.25**	.26**	(.88)
7. Leadership tenure		13.42	8.03	-.29*	.00	.23	.31**	.21**	.08

Note: N=159; **p < .01, *p < .05, †p <.10 (2-tailed)

significant differences in levels of leadership efficacy and career satisfaction between Māori and non-Māori women leaders in this study, this demographic variable was further examined by attending to the participants' qualitative statements, and the findings are explored in the Discussion section.

Table 1 shows the descriptive statistics, coefficient alphas for the scales, and intercorrelations among the variables of interest. The results indicate positive and significant associations between satisfaction with the sponsor and the outcomes leadership action efficacy and career satisfaction ($r=.27$, $p<.05$ and $r=.37$, $p<.01$, respectively), and, at a less stringent p-value, between satisfaction with the executive coach and career satisfaction ($r=.29$, $p=.06$), and satisfaction with the sponsor and leadership action efficacy ($r=.27$, $p<.05$) and regulation efficacy ($r=.22$, $p=.07$). These findings suggest that, in the sample of top women leaders surveyed, good sponsorship may be the most effective formal leadership development approach in ensuring leadership efficacy and career satisfaction. Through their networking capabilities, sponsors may be in the best position to enhance women leaders' organisational and strategic awareness, along with context-responsiveness (i.e., regulation efficacy), and their ability to rely on networks and support to align the team to a common purpose (i.e., action efficacy). Due to the very small subset of women leaders (N=15) with experience of all three forms of career support (mentorship, executive coaching, and sponsorship), it was not possible to conduct meaningful linear regression analyses to further explore the hypothesized effects. Overall, we found support for H2, which postulated positive and significant associations between satisfaction with career sponsor, for the subset of women leaders who experienced this form of developmental support, and leader efficacy and career satisfaction outcomes.

Qualitative Results

In the qualitative component of the survey, participants were asked to 'Describe the top three factors that have hindered your leadership career' and 'Describe the top three factors that have directly contributed to your leadership success' (See Table 2 and Table 3). Of the 159 participants, 150 provided comments to the open ended sections. Answers ranged from listed examples to several sentences. Participants identified *organisational culture, work-life conflict, and lack of confidence or self-doubt* as the main hindrances to their leadership career. Conversely, individual-level variables such as *drive, hard work, and personal values*, and social variables such as *networks, sponsorship, and managerial support* were identified as the factors that positively contributed to leadership success.

Factors that negatively affect leadership advancement among women leaders

Organisational culture was the most commonly cited hindrance factor, with 38% of respondents describing its negative effect on leadership advancement. Women leaders remarked on the set of organisational values, assumptions, and gender role beliefs that influenced how leadership advancement decisions were made. Comments in this section identified the detrimental impact of "unconscious biases", "old boys' networks", and "internal

politics", and remarked that women are "not being taken as seriously as male counterparts". Sexual harassment, in particular "refusal to accept sexual advances", were mentioned by two of the women leaders as reasons for being overlooked for career promotion. About 20% of the respondents connected gender stereotypes in the organisation or occupational culture as a source of hindrance, stating that "being a woman in a male dominated field" posed a significant obstacle to their advancement. Respondents discussed organisational stereotypes about women in leadership roles such as being seen as "too aggressive" or "outspoken for a woman" or "the [negative] perception of women in leadership roles". Women leaders also reported being overlooked for roles in favour of males: "I genuinely believe that if I had been a male, I would have been considered for promotion to partnership sooner".

Work-life conflict, defined as the set of incompatible demands between family and work roles, was mentioned by 26% of the respondents as having hindered their leadership advancement. Sources of work-life conflict included unwillingness to relocate due to family demands, and family commitments during business hours. Unwillingness or inability to relocate due to family demands were mentioned as factors that directly and negatively impacted on leadership promotion or advancement decisions.

About 25% of the women leaders surveyed remarked on self-doubt and lack of confidence as factors that negatively impacted their leadership advancement. Leaders' responses varied in length, from short labels (e.g., "self-doubt", "imposter syndrome") to lengthier statements (e.g., "lack of confidence to put myself forward for other roles"). Relatedly, a small proportion of women leaders (9%) justified "not putting themselves forward" or a "lack of self-promotion" with sense of modesty, with one respondent stating that she lacked "a here I am mana/impact". Women who described modesty as a hindering factor also commented on "focusing too much on the work and expecting hard efforts to be acknowledged".

Other themes that emerged in relation to leadership career hindrances were lack of management support (15%), described as lack of support from either the organisation or the managers at the women's early career stages (e.g., "previous organisations not providing the opportunity for me to advance" and "poor support and lack of guidance from leaders"), and lack of support for career planning (13%) (e.g., "no clarity of career goals", "a lack of goals around advancement").

Factors that contributed to leadership success

Nearly 35% of the participants attributed their leadership career success to personal drive. This was drawn from labels such as "personal determination", "drive", "commitment", "self-belief", "a willingness", and "own motivation and ambition". Hard work and results was another factor women leaders associated with their leadership career success (33%). This overarching theme was derived from labels and statements such as the ascription of success to "hard work and delivering results," "proven results", "track record of achieving

Table 2. Summary of key factors that negatively affected leadership advancement

Theme	Sub themes	% experienced
Organisational Culture	Old boys networks Unconscious bias Organisational Stereotypes Sexual harassment	37.5%
Work / Life Conflict	Family commitments Geographical locations Work hours required	26.3%
Self-Doubt / Lack of confidence	Lacking faith in abilities Not believing in oneself Imposter syndrome	25.6%
Gender		18.8%
Lack of management support	Not supported by leader to progress Held back for promotion	15%
Lack of development plan	No career progression plans No training opportunities	13.1%
Social and Occupational Stereotypes	Gender stereotypes Leader stereotypes	11.3%
Age and Ethnicity	Age too old or young Being an ethnic minority	8.8%
Modesty		8.8%
No qualifications	Lack of adequate leadership training Lack of university degree	7.5%
Avoidance	Fear of speaking up Not wanting to cause trouble Expecting to be acknowledged for work	5.6%
Organisational Size		4.4%
Lack of suitable Mentor		2.5%
Women hindering other women's progress		1.3%

results and hard work", "experience and achievements", "going above and beyond", "meeting organisational standards", and "strong performance".

Personal values and personality were identified as leadership success factors by just over 30% of the respondents. Women described their "work ethic", "integrity", "positive attitudes", and "values" as factors that positively contributed to their leadership success. One leader described her "[positive] personal attributes and wanting to get things done, to make a difference". In addition, 30% of women leaders also identified competencies as critical success factors, namely "experience and skill set", "technical aptitude", "ability to get new clients", and "the ability to collaborate with diverse personalities in complex environments" when listing competencies that contribute to leadership success. Descriptions for competencies were also described in ways such as "demonstrating good leadership practice" and "people skills to get things done". Finally, 28% of women leaders mentioned confidence as a key factor in contributing to their leadership success. "Belief in my

abilities and skills" and "having confidence in my ability to outperform my colleagues" were some of the ways leaders described this enabling factor.

Sponsorship, Mentoring and Executive Coaching

The participants had the opportunity to leave comments regarding their experiences with sponsors, mentors, and executive coaching in open-ended response fields. These comments were collated and thematically analysed to aid with the interpretation of the quantitative results. Over 40% of women leaders had experienced a sponsorship relationship during their career, and a third of these women stated that having a sponsor positively contributed to their leadership career. One of the participants stated "My sponsor definitely put me on my leadership path and supported and believed in me and what I could achieve. They were instrumental in my journey and helped build my confidence in what was possible". Others commented "I was very lucky early in my career with two senior (male) staff members who created opportunities for me and helped me to grow my

Table 3. Summary of key factors that contributed to leadership advancement

Theme	Subthemes	% experienced
Drive	Commitment Motivation Determination	33.8%
Hard work / Results / Experience	Delivering results Achievement Best person for job	33.1%
Personality / Personal Values	Strong work ethic Positive attitude Understanding people Making a difference	33.1%
Competencies	Strong skill set Technical ability	29.4%
Confidence		28.1%
Relationships / Networks	Support from colleagues and other in the industry Support from partner / friends	16.3%
Career Sponsorship	Advocate Belief in abilities	12.5%
Leadership / Manager Support		10.6%
Peer support		8.8%
Qualifications	MBA Further leadership training	8.8%
Luck / Timing		7.5%
Mentors		5.6%
Coaching	Equipping with right tools Developed a plan	2.4%

skills", and "Having a sponsor is something I encourage wāhine I work with to seek". Some women sought career sponsors independently from their organisation (e.g., "I sought out the sponsorship with the opportunity to work in a collaborative team - which opened the door"), while others were assigned one.

Mentoring satisfaction received a mix response. It was the most commonly experienced form of support by the women leaders surveyed (46%). Yet, only 6% directly attributed it to their leadership advancement. These qualitative findings are in line with the non-significant relationships between mentoring and leadership outcomes shown in the quantitative results section. Nevertheless, some mentors were viewed as vital psychosocial resources for women leaders. One participant stated: "A mentor is critical in executive roles as they become your peer support for challenges and times when these roles feel quite isolated." A crucial element described was having "a genuine connection" and the "right fit" if the relationship was going to be successful. The mentors were described as both formal and informal in nature, with one leader describing that "informal mentor relationships have been the most valuable (where we have identified each other through working experiences) as opposed to mentor

'set ups' where there is an obligation as opposed to a genuine connection."

Lastly, only 26% of all women leaders had experienced executive coaching during their career, with 3% directly attributing it to positive leadership outcomes. The main theme that emerged in the discussion field was around personal fit and relationship quality with the coach. Some women reported the benefits of having executive coaches (e.g., "throughout different phases of my career - they have been invaluable for assisting to make sense of certain situations, reflection, planning and testing out of ideas"). Several women remarked on the gains of seeking out an executive coach, instead of relying on a coach appointed by the organisation (e.g., "I used someone who was outside the corporate executive coach model - but this person was fantastic in challenging me to grow", and "The [internal] coach had a conflict of interest as was coaching other members of the same team"). The women leaders who were dissatisfied with executive coaching ascribed this negative experience to executive coaches not understanding their role, or not being relatable (e.g., "the coaches I had in the past I couldn't relate to").

DISCUSSION

Despite the methodological limitations associated with the small sample obtained, the quantitative results offer clear indication that satisfaction with sponsors had the strongest relationship with career satisfaction and leadership efficacy among women leaders, followed to a modest extent by executive coaching. These results are consistent with previous research signalling an association between sponsorship and career satisfaction across sectors (e.g., Cameron & Blackburn, 2016). Importantly, the findings signpost good sponsorship as an investment-worthy resource, as it may counteract some of the obstacles to women's leadership progression identified in the literature and in our study: organisational culture, and family demands limiting networking opportunities.

Our analysis of the qualitative data revealed that New Zealand women leaders identified organisational culture as the primary hindrance to their leadership career, particularly in organisations that reinforced traditional gender stereotypes through their practices and values. Organisations with value systems aligned with typically masculine features such as individualism, authority, and competitiveness were flagged by the respondents as generating contextual conditions that slowed their leadership career progress by creating systemic underestimation of women leader capabilities, and deflating their efficacy in a leadership role. These findings are consistent with the extant research suggesting that organisational cultures characterised by salient, undermining stereotypical attributions of women in the workplace negatively impact their careers (Eagly & Karau, 2002; Heilman, 2012; Walker & Artiz, 2015). Coupled with the respondents' identification of sponsorship and networking as important social factors that contributed to their leadership success, our results also lend credence to the postulation that sponsors act as advocates for aspiring women leaders, facilitate their access to influential organisational members, and equalise access to professional networks and milestones that are otherwise more easily attainable by men, especially those unencumbered by family demands.

The results from our study did not echo previous evidence of a positive relationship between mentoring and leadership outcomes (Lester et al., 2011). A possible explanation for this may be that mentoring offers psychosocial rather than career support. Several scholars have described mentors as fundamental sources of social support at work, helping women through work-life conflict and gender bias challenges they commonly face (Dawson et al., 2015; Underhill, 2006). In the present study, women leaders alluded to the social support provided by their mentors, discussing the importance of mentors in "assisting with personal challenges" and alleviating "feelings of isolation" during their career.

Finally, most of the women leaders surveyed listed drive, effort, and sustained performance as key factors that facilitated their leadership progression. These findings are consistent with extant leadership research, which suggests that the combination of personal characteristics such as motivation to lead and self-belief, along with sustained evidence of high performance, draw positive career outcomes for women leaders (Antonakis & Day, 2017; Zaccaro, et al. 2013).

Limitations and directions for future research

The main limitation of this study is sample size, particularly the small number of women leaders who reported having had experience with sponsors, mentors and executive coaches. As a result of the small sample sizes for these variables, we are unable to draw robust conclusions from the data, and rely primarily on qualitative findings to explore the phenomena of interest. Nevertheless, this study was intended as exploratory given the scarcity of empirical research available on the factors that facilitate or hinder women leaders' career experiences and success, and the qualitative data has enabled us to delve into, and identify, leadership dynamics specific to women, and report findings that can be further explored or replicated (Haig, 2013; Kline, 2004).

Secondly, this study relied on women leaders' recall of their experiences with sponsors, mentors and executive coaches, and a retrospective appraisal of the enabling and hindering factors that influenced their leadership trajectory. Retrieval biases may have influenced their responses, as recall questions are more difficult to answer due to the relative distance of the information in memory, especially considering the long tenure in leadership positions reported by some of the women. One way to help overcome recall biases, is to ensure all concepts are clearly defined (Podaskoff et al., 2012), a recommendation that was followed during the development of the survey. Future research could also consider objective measures of career success to verify participants' accounts.

Fundamental attribution error and individual differences such as locus of control, whereby personal success is tendentiously ascribed to competence, personal attributes, and effort, while failure is attributed to contextual factors and bad luck (e.g., Miller, 1984), may also partly explain why the success factors outlined by the respondents were primarily linked to motivation, personality, and competence.

Finally, this study relied on qualitative data to explore women leaders' views of their leadership career. While we strived to employ a rigorous analytical approach (see Braun & Clarke, 2006), future research could attempt to validate the themes that emerged from the analysis by relying on alternative data sources, having multiple subject matter experts code the data to ensure that there is consistency of interpretation, and ensure that the conclusions drawn from the study were minimally influenced by researcher bias that inevitably occurs in qualitative research (Cresswell, 2012).

Practical Implications

Despite the limitations outlined above, the present study offers several theoretical and practical directions. It is one of few studies that compiles women leaders' perspectives on the factors that contributed to or hindered their leadership career trajectory, and the first to empirically test the associations between these leaders' experiences with sponsors, mentors, and executive coaches, and their sense of leadership efficacy and career satisfaction.

The integrated uantitative and qualitative findings suggest that sponsors may be essential to women leaders'

career progression and experiences, as they are in a stronger position to offset the main obstacles to women's advancement than mentors or executive coaches. More research is needed to verify and further examine the role of sponsors in improving gender parity in the c-suite and supporting women's careers. As the results from our study elucidate some of the key challenges and opportunities unique to this demographic group, they can be used by aspiring women leaders as points of reflection about their own circumstances against career goals, inform their self-directed leadership development, and guide them toward the appropriate social resources (e.g., sponsors).

The results from our qualitative analysis provide further insights into the personal and contextual factors that influence women leaders' careers in New Zealand, and suggest ways in which organisations can implement practices and developmental programs that capitalise on enabling factors, while removing or mitigating barriers. Two related ideas are worth discussing in this regard. First, despite the growing number of New Zealand organisations allocating resources to improve diversity management, and the mounting evidence suggesting that diversity-friendly environments are associated with higher perceptions of leadership efficacy and career potential (Gündemir, Dovidio, Homan, & De Dreu, 2017), our findings reveal that stereotypical conceptions of female leaders are still pervasive, and negatively impact women's careers and leadership advancement. These results underscore the need for organisations to invest in devising, implementing, and evaluating initiatives that support aspiring women leaders, including policies and practices that undercut systemic hurdles.

Second, the initiatives and diversity management practices mentioned above should be part of a strategy that accomplishes a merit-based increase of women representation in senior executive roles by removing the extraneous barriers and developing their leadership capability. This contrasts with blindly subscribing to the notion that all organisations with more women on the board will perform better (Adams, 2016). Given the current social and business agendas for the promotion of women in leadership and gender parity on boards, and the New Zealand Government's recent assurance of gender parity across sectors by 2021 (Harris, 2018), organisations must, in the first instance, educate employees about unconscious biases linked to gender stereotypes, and how they adversely impact individuals and organisational functioning (Burke & Major, 2014; Friday & Friday, 2003), and follow that educational approach with formal leadership development support (e.g., sponsorship, coaching) to develop women leaders' social resources and competencies.

Another insight from this study that is relevant to the New Zealand context pertains to the examination of leadership experiences and outcomes among Māori and non-Māori women leaders. While no statistically significant differences were found with respect to leadership outcomes between these groups, the qualitative data suggest that Māori women reported distinctive experiences of their leadership trajectories. The Māori women leaders surveyed noted added pressure throughout their leadership career progression, as they felt they had to "prove their worth even more, not only as a woman, but

as a Māori woman". This finding this is consistent with previous research highlighting differences between individuals within majority and minority groups in the way they develop leadership careers, namely the added demand experienced by minority groups to put in more effort and time into work in order to receive equal credit (Wyatt & Silvester, 2015). Our findings are in line with Fitzgerald's (2003) call for the need to refine indigenous theories of leadership that account for and explain what it means to be a Māori women in leadership, and the unique support systems and obstacles they experience. This also presents an opportunity to ensure that career satisfaction assessment among indigenous peoples shows appropriate domain coverage, including workplace cultural wellbeing (Greenhauss, 1990; Haar & Brougham, 2013).

As a final remark, the fact that women leaders ascribed their leadership success primarily to personal attributes, and identified external variables outside of their control as career hindering factors is noteworthy. Whilst the attribution of success to internal factors and of failure to external variables represent well-researched attribution biases mentioned earlier (McLeod, 2010), in this context they highlight the need for leadership development programs to emphasise self-awareness and balancing perceptions of resources and barriers.

Overall, the results of the current study indicate women leaders in New Zealand are confident in their ability to lead once appointed and satisfied with their careers, but more can be done across industries and sectors to ensure gender parity, reduce hurdles unique to female leadership, and capitalise on existing talent among women to improve organisational outcomes.

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Correlates of New Zealanders' drinking status, frequency and intensity: Evidence from the New Zealand Attitudes and Values Study

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Comparisons to the New Zealand Health Survey indicate that the New Zealand Attitudes and Values Study (NZAVS) is a valid measure of drinking behavior among predominately middle-aged/older New Zealanders. Data from the 2014-16 NZAVS is used to identify key demographic and novel personality correlates of New Zealanders' drinking status, frequency and intensity. Men and Extraverted individuals were consistently found more likely to be a drinker, drink frequently and intensely. Those high on Honesty-Humility were less likely to be a drinker and drink intensely. Māori, Pacific and young people, and those living in highly deprived areas were infrequent but high intensity drinkers. Extraversion consistently showed strong associations with drinking behaviour suggesting that social factors are key drinking motives among middle-aged/older New Zealanders. Further research is warranted on the utility of personality-targeted interventions.

Introduction

According to the 2018/19 New Zealand Health Survey (NZHS), 80.3% of New Zealand adults were past-year drinkers; 26.9% of which were heavy episodic drinkers (at least monthly) and 24.9% were hazardous drinkers (Ministry of Health [MOH], 2019a). In this survey, heavy episodic drinking was defined as consuming 6 or more alcoholic drinks on one occasion, and hazardous drinkers were identified using the Alcohol Use Disorders Identification Test[1] (AUDIT; Babor et al., 2001). The high prevalence of such negative drinking behaviour is a major public health concern as this can lead to many adverse health and social consequences. Drinking increases one's risk of infectious, liver and cardiovascular diseases, and has been linked with a range of mental illnesses (Rehm, 2011). It can further lead to family disruptions, workplace problems, financial difficulties and violent or anti-social behaviour (Kraus et al., 2009; Rehm, 2011). Thus, it is vital to better understand the drinking patterns of different groups and implement target interventions for those at greater risk of suffering alcohol-related harm.

Several demographic factors have been linked with alcohol use among New Zealanders. Generally, men, younger individuals, and those of Māori or Pacific ethnicity or lower socio-economic status (SES) have shown higher prevalence of binge, risky or hazardous drinking[2] (Health Promotion Agency [HPA], 2017, 2018;

Jatrana, Carter, McKenzie, & Wilson, 2011; Kypri et al., 2009; MOH, 2015a, 2015b, 2016). Interestingly, high deprivation and Pacific ethnicity, along with Asian ethnicity, were also linked with lower likelihood of being a drinker (Huakau et al., 2005; MOH, 2015a, 2016, 2019a). Although those living in highly deprived areas and Pacific peoples are less likely to drink, those that do drink appear to drink in high intensities. There were also prominent differences between risk factors of high intensity drinking and frequent drinking. Men, those living in less deprived areas, European/Others and older people tended to be frequent drinkers (HPA, 2017, 2018; MOH, 2015a). Taken together, these findings highlight the importance of distinguishing between the differential predictors of drinking status, intensity and frequency to gain a more accurate insight into the drinking patterns of distinct groups in New Zealand.

Personality traits and drinking behaviour

Currently, little is known about the psychological contributors to drinking behaviours among New Zealanders. This includes the role of personality traits; "one's enduring pattern of thinking, feeling and behaving" (McCrae & Costa, 1997, p.509). Personality traits have been linked to distinct drinking patterns and motives (Kuntsche et al., 2006; Stewart & Devine, 2000) and thus help us better identify those at higher risk of adopting negative drinking behaviours and develop

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[1] The AUDIT is a reliable screening tool for identifying hazardous drinkers based on their level of alcohol consumption, dependence and risk of negative health consequences. A score of 8+ on this 10-item scale is considered to indicate hazardous drinking.

[2] Drinking intensity is measured in diverse ways across studies and definitions of 'heavy', 'binge', or 'risky' drinking are inconsistent. These terms have usually been defined as having 5 to 8+ drinks on one occasion. Some studies specify differential limits for men and

women (e.g. 6+/4+ drinks respectively). The current study is interested in assessing drinking intensity on a continuous scale and identifying group differences in the typical amount of alcohol consumed in one occasion. Thus, we do not specify definitions of 'heavy' or 'risky' drinking but broadly examine group differences in 'drinking intensity.'

tailored interventions for specific groups (See Appendix for definitions of Big-Six personality traits). In previous international studies, high Extraversion and low Conscientious have typically been associated with both frequent and high intensity drinking (Adan et al., 2017; Erevik et al., 2017; Hakulinen et al., 2015). On the other hand, Openness to experience has been linked with decreased likelihood of alcohol misuse (Erevik et al., 2017; Hakulinen et al., 2015). However, it is unclear whether these findings can be generalized to the New Zealand context as the role of personality traits has yet been assessed in New Zealand.

The present study aims to address this research gap by assessing the relation between the Big-Six personality traits and drinking behaviour using data from the 2014 to 2016 New Zealand Attitudes Values Study (NZAVS). Firstly, we assess the validity of the NZAVS (a non-government postal survey) in measuring population drinking patterns by comparing its findings to the New Zealand Health Survey (NZHS; a face-to-face and computer administered government survey). Subsequently, we use NZAVS data to assess the differential personality and demographic correlates of drinking status, frequency, and intensity. As the NZAVS includes a wider array of demographic variables than the NZHS, it allows us to identify the drinking patterns of a broader range of demographic groups. Most importantly, the present study provides a novel contribution to the literature by assessing the relationship between personality traits and drinking behaviour in the unique context of New Zealand.

METHODS
Sampling Procedure

The NZAVS is a longitudinal panel study of a national probability sample of New Zealand adults. This research is reviewed by the University Human Participants Ethics Committee every three years and has most recently been approved from 5-September-2017 until 3-June-2021 (Reference Number: 014889). In Time 1 (2009), the NZAVS recruited participants by randomly selecting samples from the New Zealand electoral roll (N= 6,518, response rate: 16.6%). A non-random booster sample was recruited at Time 3 (2011) through an unrelated survey posted on an online newspaper website. Further random booster samples were recruited from the 2012 and 2014 Electoral Roll in subsequent Time periods (Sibley, 2020). The validity of the NZAVS in monitoring changes in New Zealanders' political attitudes over time has been well-demonstrated (Sibley et al., 2017; See Appendix for details on sample sizes and response rates).

The NZHS is a continuous face-to-face and computer administered government survey that publishes annual updates on the health of New Zealanders. It uses a multi-stage, probability- proportional-to-size sampling design. The current study uses data on drinking frequency and intensity from the 2013/14, 2014/15 and 2016/17 NZHS provided by Statistics New Zealand. Each annual sample included around 14,000 adults. Note that there have been changes to the alcohol consumption question since 2015/16 (see notes in Table 3). Refer to NZHS Content

Guide on the Ministry of Health website for further details on survey methodology (MOH, 2019b).

Participants

This study uses NZAVS data collected in Time 6 (2014; N= 15,820), Time 7 (2015; N=13,942) and Time 8 (2016; N= 21,937). Participants for each time point had a mean age of 49, 51 and 50 years respectively, and median household income of $90,000. Sixty three percent of each sample were female, with 89-90% being European, 11-12% being Māori, 3% being of Pacific and 4% being of Asian ethnicity (ethnic categories were not mutually exclusive). Seventy-seven to seventy eight percent of participants from each time point were employed, and 74-75% were parents and had partners.

Measures

To measure drinking frequency, participants were asked "how often do you have a drink containing alcohol?" There were five response options: 'Never – I don't drink', 'Monthly or less', 'Up to 4 times a month', 'Up to 3 times a week', '4 or more times a week' and 'Don't know.' Drinking intensity was measured using the open-ended question: "how many drinks containing alcohol do you have on a typical day when drinking?" These 2 items were derived from the 10-item AUDIT which is included in the annual NZHS. We only focus on these 2 items in this study as the remaining 8 AUDIT items were not included in the NZAVS. Note that the NZHS did not include a 'Never – I don't drink' response option for the drinking frequency question but identified past year drinkers by asking whether participants "had a drink containing alcohol in the last year."

NZAVS participants were asked to report their gender, relationship and employment status, date of birth, and annual household income. Ethnicity was measured using the standard New Zealand Census item, in which participants could indicate each ethnic group they identified with. Education was coded as an eleven-level ordinal variable (0 = no qualification to 10 = doctorate). Deprivation was measured using the 2013 New Zealand Deprivation Index, which uses census information to assign a decile-rank index from 1 (least deprived) to 10 (most deprived) to each meshblock unit (Atkinson et al., 2014). SES was measured using the New Zealand socio-economic index (Milne et al., 2013). Personality traits were measured using the Mini-IPIP6 (Sibley et al., 2011), which assesses the Big-six personality traits using four-item subscales rated from 1 (very inaccurate) to 7 (very accurate). An example item for Extraversion included "I am the life of the party."

Statistical Analyses

The proportion of NZAVS and NZHS participants within each drinking frequency and intensity group were calculated using SPSS. Differences in proportion between the two studies are examined using Chi-square differences tests and Cramer's V effect sizes. NZAVS data was subsequently used to identify the differential correlates of drinking status, frequency and intensity. Separate analyses were conducted on Mplus using data collected in 2014 (Time 6), 2015 (Time 7) and 2016 (Time 8) respectively. For each time point, a range of demographic variables (e.g. age, gender, ethnicity, education,

deprivation level) and the Big-Six personality traits were simultaneously included as predictors for (1) drinking status, (2) frequency and (3) intensity. Details on the specific regressions and outcomes variables are noted below:

Binary logistic regressions were conducted using 'drinker' (0=abstainer, 1=drinker) as the outcome variable. Those who indicated "Never-I don't drink" in response to the item "How often do you have a drink containing alcohol?" were categorized as "abstainer", while those who chose either; 'monthly or less', 'up to 4 times a month', 'up to 3 times a week', or '4 or more times a week' were categorized as "drinker" ('Don't know' was excluded).

Ordinal logistic regressions were conducted using 'drinking frequency' as the outcome variable (1= 'Monthly or less', 2= 'Up to 4 times a month', 3= 'Up to 3 times a week', 4= '4 or more times a week').

Multiple regressions were conducted using 'drinking intensity' as the outcome variable.[3] Drinking intensity refers to the number of drinks containing alcohol one consumes on a typical day when drinking.

Only drinkers were included in the latter two analyses as abstainers were those that indicated they "never" drink when asked how often they drink. All analyses applied standard NZAVS (adjusting for gender, ethnicity, region) or NZHS (adjusting for deprivation, gender, ethnicity, region, age) weighting variables accordingly.

RESULTS
Comparison to the NZHS

As seen in Tables 1 to 3, the distribution of responses to questions were similar across time points for both the NZAVS and NZHS. The majority of participants in both studies were categorized as drinkers, although a slightly

past-year drinkers (see Table 1 notes for details on categorization). In the NZAVS, around a quarter of participants selected each of the four drinking frequency categories across all three survey years. Comparatively, a larger proportion of NZHS participants selected drinking 'monthly or less' (33.2-34%).

Most NZAVS participants indicated drinking '1 to 2 drinks', followed by '3 or 4 drinks' on a typical day when drinking for all time points. A slightly lower proportion of NZHS participants selected these same categories for all three time points. However, a much larger proportion of NZHS participants indicated consuming '7 to 9' (3.8-4.2% versus 1.9-2.4%) and '10 or more' drinks (7.1-7.7% versus 2.4-2.9%) than the NZAVS. Chi-square differences tests for the proportion of drinkers, drinking frequency and intensity between the NZAVS and NZHS were all significant. However, the Cramer's V effect sizes were relatively small for all three tests (.09, .15, .17 respectively) and below the cut point for a medium effect size (.21).

Demographic and personality correlates of drinking behaviour

Using NZAVS data, separate regression analyses were conducted to identify demographic and personality correlates of drinking status, frequency and intensity in Time 6, 7 and 8. Odds ratios or beta values of demographic and personality variables in Time 6, 7 and 8 are reported consecutively in brackets unless otherwise specified. Only key results are reported in-text. See tables in Appendix for further details on regression results.

Binary logistic regression: drinking status

Demographic correlates. Men (OR = 1.588, 1.391, 1.557), partnered individuals (OR = 1.368, 1.240, 1.278), employed individuals (OR = 1.519, 1.407, 1.524), and those with higher income (OR = 1.132, 1.271, 1.165) were

Table 1. Percentage of drinkers and non-drinkers in the NZAVS (item: "how often do you have a drink containing alcohol?") and NZHS (item: "have you had a drink containing alcohol in the last year?").

NZAVS	Time 6 (2014) (N= 15,036)	Time 7 (2015) (N= 13,423)	Time 8 (2016) (N= 20,893)
Drinkers	83.0%	83.5%	83.6%
Non-drinkers	17.0%	16.5%	16.4%
NZHS	2013/14 (N=13,299)	2014/15 (N= 13,494)	2015/16 (N= 13,769)
Drinkers	80.2%	79.5%	80.1%
Non-drinkers	19.8%	20.5%	19.9%

Note: NZAVS participants who selected "Never – I don't drink" categorized as 'non-drinkers', everyone else (excluding 'Don't know') categorized as 'drinkers.' NZHS participants who selected 'yes' categorized as drinkers, 'no' categorized as non-drinkers. N refers to number of participants who responded to question (excludes missing values and those who refused to answer or selected 'don't know'). Standard sample weighting applied for all samples (N for NZHS before weighting reported as results show population estimate of N after weighting).

smaller proportion of NZHS participants indicated being

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[3] We ran a multiple regression instead of a poisson model as the drinking intensity variable included non-integer values. This is because drinking intensity was measured using an open-ended question: "how many drinks containing alcohol do you have on a typical day when drinking."

Table 2. Percentage of participants who selected each response category for the item asking "How often do you have a drink containing alcohol?" in the NZAVS and NZHS.

NZAVS	Time 6 (2014) (N= 12,486)	Time 7 (2015) (N= 11,203)	Time 8 (2016) (N= 17,460)
Monthly or less	26.8%	25.7%	26.2%
Up to 4 times a month	23.9%	22.9%	23.9%
Up to 3 times a week	24.7%	25.0%	25.1%
4 or more times a week	24.7%	26.4%	24.8%
NZHS	2013/14 (N=10,478)	2014/15 (N= 10,560)	2015/16 (N= 10,808)
Monthly or less	33.2%	33.8%	34.0%
Up to 4 times a month	23.6%	22.0%	22.0%
Up to 3 times a week	21.2%	21.9%	22.4%
4 or more times a week	22.1%	22.3%	21.6%

Note: N refers to number of participants who responded to question (excludes missing, don't know and refused). Those who selected "don't know" or "Never- I don't drink' in NZAVS excluded. Standard sample weighting applied for all samples (N for NZHS before weighting reported as results show population estimate of N after weighting).

more likely to be drinkers across all time points. Higher SES in Time 8 (OR=1.005) was linked with higher odds of being a drinker.

Pacific (OR=.551, .500, .496) and Asian peoples (OR=.267, .339, .418), religious people (OR=.501, .520, .503), and those living in areas with higher deprivation (OR=.922, .915, .915) were less likely to be drinkers across all time points. Those living in urban areas were less likely to be drinkers in Time 8 (OR= .870).

Personality correlates. Higher Extraversion (OR=1.278, 1.241, 1.263) and lower Honesty-humility (OR=.921, .904, .942) were associated with higher odds of being a drinker across all time points. Higher Conscientiousness in Time 7 and 8 (OR=.906, .912) and

higher Neuroticism in Time 7 (OR=.928) were also linked with an increased likelihood of being a drinker.

Ordinal logistic regression: Frequency

Demographic correlates. Men (OR = 1.639, 1.662, 1.655), older (OR=1.035, 1.034, 1.037) and partnered individuals (OR=1.131, 1.176, 1.171), and those with higher income (OR=1.204, 1.275, 1.295) drank more frequently in all three time points. Those with higher SES in Time 6 (OR=1.003) and higher education in Time 7 (OR=1.036) also drank more frequently. On the other hand, Māori (OR=.644, .711, .718), Pacific (OR=.693, .662, .609) and Asian peoples (OR=.393, .446, .437), parents (OR=.879, .872, .769), religious people

Table 3. Percentage of participants who were categorized within each response category to the item asking "How many drinks containing alcohol do you have on a typical day when you are drinking?" in the NZAVS and NZHS.

NZAVS	Time 6 (2014) (N= 11,812)	Time 7 (2015) (N= 10,651)	Time 8 (2016) (N= 16,466)
1 or 2	66.0%	67.5%	65.8%
3 or 4	22.3%	21.7%	21.8%
5 or 6	6.8%	6.5%	7.1%
7 to 9	2.1%	1.9%	2.4%
10 or more	2.8%	2.4%	2.9%
NZHS	2013/14 (N=10,437)	2014/15 (N= 10,536)	2015/16 (N= 5,422)
1 or 2	60.3%	60.5%	57.7%
3 or 4	20.0%	19.3%	20.7%
5 or 6	8.8%	9.1%	9.8%
7 to 9	3.8%	3.8%	4.2%
10 or more	7.1%	7.3%	7.7%

Note: N refers to the number of participants who responded to question. NZAVS item was originally asked as open-ended question (item did not include 'Don't know' category). We report percentages for half the 2015/16 NZHS sample, as the other half were asked the same question but with a show card depicting the number of 'standard drinks' in common alcoholic drinks (NZAVS question did not include show card). N refers to number of participants who responded to question (excludes missing values, those who refused or selected 'don't know' in NZHS). Standard sample weighting applied for all samples (N for NZHS before weighting reported as results show population estimate of N after weighting).

(OR=.698, .700, .715), and those with higher deprivation (.942, .950, .950) drank less frequently.

Personality correlates. Those with higher Extraversion in all time points (OR=1.176, 1.175, 1.203), higher Neuroticism in Time 7 and 8 (OR=1.065, 1.051) and higher Conscientiousness in Time 6 (OR=1.048) drank more frequently.

Multiple regression: Intensity

Demographic correlates. Across all time points, being male (B=.692, .720, .782), younger (B = -.023, -.021, -.026), of Māori (B = .871, .835, .872) or of Pacific ethnicity (B= 1.808, 1.514, 1.120) and living in areas with higher deprivation (B = .072, .058, .050) were associated with higher drinking intensity.

Being Asian (B = -.644, -.591, -.717), religious (B = -.235, -.234, -.285), having higher education (B = -.065, -.054, -.074) and a partner (B = -.315, -.307, -.410) were associated with decreased drinking intensity in all three time points. Being a parent in Time 8 (B=-.146) and lower income in Time 6 (B= -.094) were linked with decreased drinking intensity. Higher SES (B = -.008, -.006) and being employed (B = -.205, -.157) were linked with decreased drinking intensity in Time 6 and 8.

Personality correlates. Higher Extraversion (B = .276, .203, .245) and lower Honesty-humility (B = -.094, -.124, -.141) were linked with higher drinking intensity across all three time points. Agreeableness was only associated with lower drinking intensity in Time 6 (B=-.088), and Neuroticism was linked with higher drinking intensity in Time 6 and 8 (B=0.53, .074).

Overall, gender (β=.153, .168, .174), age (β=-.138, -.128, -.161), Māori (β=.121, .121, .122) and Pacific ethnicity (β=.169, .153, .107), and Extraversion (β=.138, .106, .127) showed the strongest associations with drinking intensity.

DISCUSSION
Validity of the NZAVS

The present study assessed the validity of the NZAVS data in measuring population drinking patterns by comparing its estimates on drinking status, frequency and intensity to the NZHS. In all three consecutive survey years (2014-16), most NZAVS participants (83%) indicated being a drinker, and approximately one quarter of participants each indicated drinking 'monthly or less', 'up to 4 times a month', 'up to 3 times a week', and '4 or more times a week.' These proportions are comparable to the NZHS but a much larger proportion of NZHS participants indicated drinking 'monthly or less' (33.2-34.0%). Both studies indicated that New Zealanders commonly drink '1 to 2 drinks' or '3 or 4 drinks' on a typical drinking occasion. However, a considerably lower proportion of NZAVS reported consuming '7 to 9' (1.9-2.4% versus 3.8-4.2%) or '10 or more' (2.4-2.9% versus 7.1-7.7%) drinks on a typical day when drinking. Said again, the NZAVS tends to show a lower rate of infrequent but high intensity drinkers relative to the NZHS.

Disparities in estimates between the NZAVS and NZHS can largely be explained by their distinct study methodologies and sample characteristics. Whereas the

NZHS is an extensive face-to-face and computer assisted government survey, the NZAVS is a non-government postal survey. People are generally less likely to respond to non-government surveys (O'Neill & Sincavage, 2004), with younger individuals showing especially lower response rates to postal surveys (Hanna Tolonen et al., 2006; Hazell et al., 2008). Consequently, only around 5% of NZAVS participants were aged 18 to 24 years while around 26% of NZHS participants were aged 15 to 24 years for each survey year.[4] Young drinkers tend to drink less frequently but consume high volumes of alcohol in one occasion (HPA, 2017; MOH, 2015a) and are more likely to agree that "it's OK to get drunk as long as it's not every day" (18-24 years [43%] versus 25+ years [16%]; HPA, 2017). Hence, the larger proportion of young participants in the NZHS appear to be driving their higher rate of infrequent but high intensity drinkers.

The NZAVS has previously shown strong validity in measuring New Zealanders attitudes in voting projections (Sibley et al., 2017). Our results indicate that NZAVS is also a valid measure of population drinking patterns among middle-aged/older New Zealand adults. Considering the disparity in sample composition, NZAVS estimates of population drinking patterns were fairly consistent with the NZHS and differences in proportions between the two studies had small effect sizes. Disparities in findings between the two studies is likely driven by the lower proportion of younger respondents in the NZAVS. Subsequently, the current study used NZAVS data to identify the differential correlates of drinking status, frequency and intensity among predominantly middle-aged/older New Zealanders. It extends on the NZHS by assessing a wider range of demographic correlates and identifying novel personality correlates of New Zealanders' drinking behaviour.

Demographic correlates of drinking behaviour

Not all demographic variables showed consistent effects across the three survey years, but our results showed a similar general trend to earlier New Zealand studies (e.g. HPA, 2018; Jatrana et al., 2011; MOH, 2015a). Men, partnered and employed individuals and those with higher income were more likely to be drinkers. On the other hand, religious, Asian and Pacific peoples were less likely to be drinkers. Men reported drinking both frequently and intensely, but correlates of frequent drinking did not always correspond to that of high intensity drinking. Partnered and older individuals, and those with higher income drank more frequently. However, along with Asian peoples, religious people and those with higher education, partnered and older individuals tended to be low intensity drinkers. Pacific, Māori and Asian peoples, religious people, parents and those living in more deprived areas drank less frequently. Yet, Māori and Pacific peoples and those living in more deprived areas tended to be high intensity drinkers.

Our findings indicate that gender, age, ethnicity and deprivation level are key demographic correlates of drinking behaviour independent of a range of other demographic and personality characteristics. Men were consistently found more likely to be a drinker, to drink frequently and in higher intensities. As men are more

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[4] NZAVS did not include participants younger than 18.

likely to engage in risky behaviours such as driving or working machinery under the influence of alcohol, they are especially at risk of experiencing alcohol-related harm (MOH 2015a). Therefore, it is vital to implement public campaigns that educate men about responsible drinking behaviours and managing alcohol misuse. Our results also reinforce the importance of implementing target interventions for Māori, Pacific and young drinkers, and drinkers living in highly deprived areas. Although these groups drink less frequently, they are at greater risk of alcohol-related harm as they consume high volumes of alcohol on one occasion (HPA, 2018; MOH, 2015a). Promoting low risk drinking to these groups is an important step to reducing health inequalities as these groups are typically found to exhibit poorer physical and/or mental health outcomes (MOH 2018; 2019a).

Older individuals, those with partners and higher income reported drinking frequently but in lower intensities. These groups appear to have more established drinking patterns and may be less likely to encounter the same degree or type of alcohol-related harm as high intensity drinkers. However, it is important to better understand the long-term impact of frequent drinking on their health outcomes, especially among older individuals. As older individuals are more vulnerable to the physiological effects of alcohol (Barry & Blow, 2016), frequently consuming even low quantities of alcohol may have a greater toll on their health over time. Older adults who drank more than three times per week and had several health conditions were found more likely to experience drinking problems (e.g. interpersonal and functioning problems, falls and accidents; Moos, Brennan, Schutte & Moos, 2005), indicating that older drinkers with poor health may require focused interventions. It is essential to increase insight into the differential risk and type of alcohol-related harm experienced by older New Zealanders to develop more appropriate and effective interventions for this group.

The Big-Six personality traits

Previous international studies have generally identified high Extraversion and low Conscientiousness as personality risk factors of frequent or high-intensity drinking (Adan et al., 2017; Erevik et al., 2017; Hakulinen et al., 2015). Only Extraversion showed a strong and consistent pattern in our study. High Extraversion was associated with a higher likelihood of being a drinker as well as frequent and high intensity drinking in all three survey years. Conscientious was linked with a lower likelihood of being a drinker in Time 7 and 8, and increased drinking frequency in Time 6 but was not significantly associated with drinking intensity. Neuroticism showed associations with higher drinking frequency and intensity in two time points, but these associations were not as strong as Extraversion. Interestingly, Honesty-Humility was linked with a lower likelihood of being a drinker and high intensity drinking across all survey years. Our findings indicate that Extraversion and Honesty-Humility are the two most important personality traits associated with drinking behaviour among middle-aged/older New Zealanders.

Different personality traits have been found to be related to distinct drinking motives. Whereas high Neuroticism has been linked with coping motives, high Extraversion and low Conscientiousness has been linked with social and enhancement motives (Kuntsche et al., 2006; Stewart & Devine, 2000). Extraversion showed a particularly strong association with drinking behaviour in our study, suggesting that enhanced mood states and social factors may be key drinking motives among middle-aged/older New Zealanders. Several New Zealand adults agree that 'binge drinking is a part of kiwi culture' (HPA, 2018), and consider alcohol an important part of how New Zealanders socialize, relax and 'feel at ease' (Bev, 2010). It is essential to challenge the widespread cultural acceptance of drinking and provide public education the consequences of alcohol misuse. These messages could be delivered at community or social events, along with guidelines of responsible drinking and tips on maintaining a healthy social life without drinking. Community programmes could also promote alternative and culturally appropriate ways of socialising to groups at higher risk of negative drinking patterns or alcohol-related harm.

Personality traits showed strong associations with drinking behaviour even after controlling for a wide range of demographic variables. This finding indicates that personality traits may be an important driver of New Zealanders' drinking behaviour and highlights the need for further research on the utility of personality-targeted interventions. Previous international studies have found that personality-targeted interventions can be effective in reducing or preventing alcohol misuse among adolescents (e.g. Conrod et al., 2006, 2013). As personality traits showed consistent associations with drinking behaviour in our study, this suggests that personality-targeted treatment or interventions may also be beneficial for middle-aged/older adults in New Zealand. Personality inventories could be used to identify those at greater risk of alcohol-related harm and tailor treatment or support services to suit the specific personality traits or drinking motives of an individual. For instance, treatment for those high on Neuroticism could focus around adopting healthy coping strategies, whereas those high on Extraversion could be recommended alternative ways to maintain a healthy social life. As the current study broadly assessed the role of personality traits at a population level, further research on the relationship between personality traits and drinking behaviour at the individual level is needed to better understand the utility of personality-targeted interventions.

Limitations

The NZAVS asked about participants' drinking frequency and intensity but did not include the other eight items of the AUDIT. Although this enabled us to identify risk factors of frequent and high intensity drinking, we were unable to accurately examine the demographic and personality correlates of hazardous drinking in New Zealand. Our question on drinking intensity did not define what a standard 'drink' refers to, and hence there may have been differences in the way people interpreted this term. Moreover, as alcohol use has been associated with changes in one's personality traits (Hakulinen & Jokela, 2019), one may argue that greater opportunities to socialize through drinking may in fact lead to higher levels of Extraversion. Future studies should examine the

bi-directional relationship between personality traits and drinking behaviour over time.

High response rates are desired in probability sample surveys as this enables a more accurate estimation of sampling biases (Groves, 2006). However, obtaining high survey response rates have become difficult over the years. The Pew Research Centre report that their telephone survey response rates have decreased from 36% in 1997 to 15% in 2009, stabilizing at 9% in 2012 (Pew Research Center, 2012). Similarly, the NZAVS obtained a relatively low initial response rate of 16.6% in 2009 and average response rate of 9% for booster samples. Fortunately, applying post-survey adjustments can correct for sample biases even when response rates are low (Groves, 2006). Therefore, the NZAVS applies post-stratification sample weighting on gender, ethnicity and region of residence and has been shown to be a valid measure of New Zealanders' political attitudes over time (Sibley et al., 2017). However, it is important to note that this weighting variable does not take age into account, and thus our results had to be interpreted in terms of relevance to the middle-aged/older population.

In terms of panel attrition, ethnic minorities, men, those less educated and of younger age were found least likely to be constant NZAVS respondents (Satherley et al., 2015). As many of these characteristics are generally associated with high intensity drinking (MOH, 2015a, 2019), this suggests that our sample may become increasingly less representative of high intensity drinkers over time. Participants in the booster samples would need to constantly replace these lost drinkers to maintain a representative sample of drinkers. To examine this cycle of replenishment, we compared the difference in proportion of high intensity and frequent drinkers between the retained and booster sample in Time 8 (see Table A5

in Appendix). The retained sample showed a higher percentage of frequent drinkers (i.e. drinking 4 or more times a week) but slightly lower percentage of high intensity drinkers (i.e. drinking at least 5 drinks per occasion). These percentage differences were rather small but still significant. Although this suggests that high intensity drinkers may be more likely to be lost over time, the relatively greater proportion of high intensity drinkers in our booster sample is likely to minimize the impact of their attrition on the representativeness of our data.

Conclusion

Comparisons to the NZHS showed that the NZAVS has a lower rate of young respondents but is still a valid measure of population drinking patterns among middle-aged/older New Zealanders. The current study used 2014-16 NZAVS data to identify key demographic and personality correlates of drinking status, frequency and intensity among predominately middle-aged/older New Zealanders. Men and Extraverted individuals were consistently found more likely to be a drinker, drink frequently and in higher intensities. Honesty-Humility was linked with a lower likelihood of being a drinker and drinking intensely. Among drinkers, Māori and Pacific peoples, young people and those from highly deprived areas were more likely to be infrequent but high intensity drinkers. Our results strengthen evidence on the unique relationship that gender, age, ethnicity and deprivation level have with drinking behaviour, and reveal that Extraversion is a particularly important correlate of frequent and high intensity drinking in New Zealand. Further research on the role of personality traits will provide deeper insight into the drinking motives of New Zealanders and inform the development of personality-targeted interventions.

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Table A1. Interpretation of Big-Six personality traits, including example traits, and likely adaptive benefit and costs resulting from high levels of each personality dimension (adapted from Sibley et al. 2011).

Factor	Interpretation	Example Traits	Likely adaptive benefits of high levels (in evolutionary history)	Likely costs of high level (in evolutionary history)
Extraversion	Engagement in social endeavours	Sociability, leadership, exhibition	Social gains (friends, mates, allies)	Energy and time; risks from social environment
Agreeableness	Ingroup co-operation and tolerance; reciprocal altruism in HEXACO model	Tolerance, forgiveness, (low) quarrelsomeness	Gains from cooperation, primarily with ingroup (mutual help and nonaggression)	Losses due to increased risk of exploitation in short-term exchanges
Conscientiousness	Engagement in task-related endeavours	Diligence, organization, attention to detail	Material gains (improved use of resources), reduced risk	Energy and time; risks from social environment
Neuroticism (low Emotional Stability)	Monitoring of inclusionary status and attachment relations; kin altruism in HEXACO model.	Anxiety, insecurity, (low) calmness	Maintenance of attachment relations; survival of kin in HEXACO model	Loss of potential gains associated with risks to attachment relations.
Openness to Experience	Engagement in ideas-related endeavours	Curiosity, imaginativeness, (low) need for cognitive closure and (low) need for certainty	Material and social gains (resulting from discovery)	Energy and time; risks from social and natural environment
Honesty-Humility	Reciprocal altruism (fairness) Fairness, sincerity, (low)	Fairness, sincerity, (low) entitlement and (low) narcissism	Gains from co-operation, (mutual help and non-aggression)	Loss of potential gains that would result from the exploitation of others (and in particular outgroup members)

Table A2. Sample sizes, retention rates and response rates in each Time point of New Zealand Attitudes and Values Study.

	Time 1 (2009)	Time 2 (2010)	Time 3 (2011)	Time 3.5 (2012)	Time 4 (2012)	Time 5 (2013)	Time 6 (2014)	Time 7 (2015)	Time 8 (2016)
Sample size (N)	6,518	4,441	6,884	4,514	12,180	18,261	15,820	13,942	21,937
N retained from at least one previous Time point	----	4,423	3,918	4,090	6,807	10,502	15,740	13,941	13,779
N retained from previous Time point only	----	4,423	3,530	----	5,762	9,844	14,878	12,550	11,933
Number of Booster Samples	----	----	1	----	5	2	----	----	1
Additional N (including booster, occasional opt-in partners)	----	19	2,966	424	5,374	7,759	82	2	8,158
Response rate (average rate if more than 1 booster sample)	16.6%	----	92.4%	----	9.8%	8.55%	----	----	9.7%

Note: Time 3 included non-random booster recruited from unrelated online newspaper website. Time 4 included one weighted deprivation booster and four electoral boosters (one random and other three oversampling based on region of residence or ethnicity). Time 5 included a random electoral and Māori electoral booster. Time 8 included a random electoral booster. Around 400–450 Pacific participants were recruited informally via Pacific networks in Time 3.5.

Table A3. Results of binary logistic regression with drinker vs non-drinker (reference category) as outcome variable, Odds Ratio and SE for Time 6, 7 and 8 data.

	Time 6 (2014)		Time 7 (2015)		Time 8 (2016)	
	OR	SE	OR	SE	OR	SE
Gender (0 women, 1 men)	**1.588****	.124	**1.391****	.115	**1.557****	.098
Age	1.003	.003	1.003	.003	.999	.002
Māori (0 no, 1 yes)	.881	.093	.835	.090	.874	.074
Pacific (0 no, 1 yes)	**.551****	.088	**.500****	.081	**.496****	.068
Asian (0 no, 1 yes)	**.267****	.032	**.339****	.043	**.418****	.042
Education (0 low to 10 high)	1.017	.016	.988	.016	.992	.012
Parent (0 no, 1 yes)	**.683****	.065	**.756****	.076	**.814****	.062
Partnered (0 no, 1 yes)	**1.368****	.108	1.240*	.108	**1.278****	.084
Religious (0 no, 1 yes)	**.501****	.033	**.520****	.038	**.503****	.027
NZ Deprivation (0-10)	**.922****	.011	**.915****	.013	**.915****	.010
Log (income)	**1.132****	.030	**1.271****	.054	**1.165****	.034
Socio-economic status	1.003	.003	.999	.003	**1.005****	.002
Employed (0 no, 1 yes)	**1.519****	.119	**1.407****	.127	**1.524****	.098
Urban area (0 rural, 1 urban)	.941	.063	.884	.063	**.870****	.048
Extraversion	**1.278****	.041	**1.241****	.043	**1.263****	.032
Agreeableness	.981	.039	.962	.041	.955	.031
Conscientiousness	.949	.034	**.906****	.033	**.912****	.025
Neuroticism	1.033	.033	.928*	.032	.985	.025
Openness	1.012	.032	1.062	.036	.989	.025
Honesty-Humility	**.921****	.029	**.904****	.031	.942*	.025

Note: * p < .05, ** p < .01. "Never" and "Don't know excluded from analyses. N= 13100, R-square= 20%, N= 11808, R-square=19.5%, N= 18788, R-square=17.6% for time points respectively. Sample weighting applied.

Table A4. Results of ordinal logistic regression with alcohol frequency as outcome variable (i.e. "How often do you have a drink containing alcohol?"), Odds Ratio and SE for Time 6, 7 and 8 data.

	Time 6 (2014)		Time 7 (2015)		Time 8 (2016)	
	OR	SE	OR	SE	OR	SE
Gender (0 women, 1 men)	**1.639****	.070	**1.662****	.077	**1.655****	.060
Age	**1.035****	.002	**1.034****	.002	**1.037****	.002
Māori (0 no, 1 yes)	**.644****	.047	**.711****	.059	**.718****	.044
Pacific (0 no, 1 yes)	**.693****	.115	**.662****	.098	**.609****	.078
Asian (0 no, 1 yes)	**.393****	.049	**.446****	.057	**.437****	.039
Education (0 low to 10 high)	1.014	.009	**1.036****	.010	1.015	.008
Parent (0 no, 1 yes)	.879*	.047	**.872****	.049	**.769****	.035
Partnered (0 no, 1 yes)	1.131*	.063	1.176*	.071	**1.171****	.056
Religious (0 no, 1 yes)	**.698****	.030	**.700****	.032	**.715****	.026
NZ Deprivation (0-10)	**.942****	.007	**.950****	.008	**.950****	.006
Log (income)	**1.204****	.043	**1.275****	.062	**1.295****	.038
Socio-economic status	1.003*	.002	1.001	.002	1.001	.001
Employed (0 no, 1 yes)	.927	.055	1.020	.068	1.101	.052
Urban area (0 rural, 1 urban)	.964	.040	.975	.044	.955	.034
Extraversion	**1.176****	.021	**1.175****	.023	**1.203****	.018
Agreeableness	.964	.023	1.016	.025	.991	.020
Conscientiousness	1.048*	.022	.967	.021	.985	.017
Neuroticism	1.025	.020	**1.065****	.022	**1.051****	.017
Openness	1.003	.019	.977	.020	1.021	.016
Honesty-Humility	.966	.019	.980	.022	.970	.016

Note: * p < .05, ** p < .01. "Never" and "Don't know" excluded from analyses. Ordinal outcome variable: 1= 'Monthly or less', 2= 'Up to 4 times a month', 3= 'Up to 3 times a week', 4= '4 or more times a week', Time 6: N= 11361, R-square=16.3%, Time 7: N= 10235, R-square= 15.3%, Time 8: N= 18709, R-square= 16.0%, N= 16252 for time points respectively. Sample weighting applied.

Table A5. Results of multiple linear regression with alcohol intensity as outcome variable (i.e. how many drinks containing alcohol do you have on a typical day when drinking?), Unstandardized and standardized coefficients for Time 6, 7 and 8 data.

	Time 6 (2014)				Time 7 (2015)				Time 8 (2016)			
	B	SE	β	p-value	B	SE	β	p-value	B	SE	β	p-value
Gender (0 women, 1 men)	.692**	.054	**.153**	.000	.730**	.059	**.168**	.000	.782**	.046	**.174**	.000
Age	-.023**	.002	**-.138**	.000	-.021**	.002	**-.128**	.000	-.026**	.002	**-.161**	.000
Māori (0 no, 1 yes)	.871**	.114	**.121**	.000	.835**	.140	**.121**	.000	.872**	.102	**.122**	.000
Pacific (0 no, 1 yes)	1.808**	.325	**.169**	.000	1.514**	.317	**.153**	.000	1.120**	.205	**.107**	.000
Asian (0 no, 1 yes)	-.644**	.141	-.084	.000	-.591**	.148	-.084	.000	-.717**	.093	-.098	.000
Education (0 low to 10 high)	-.065**	.011	-.079	.000	-.054**	.012	-.067	.000	-.074**	.009	-.089	.000
Parent (0 no, 1 yes)	-.036	.067	-.007	.590	-.025	.072	-.005	.725	-.146**	.053	-.029	.006
Partnered (0 no, 1 yes)	-.315**	.073	-.058	.000	-.307**	.084	-.059	.000	-.410**	.062	-.076	.000
Religious (0 no, 1 yes)	-.235**	.055	-.050	.000	-.234**	.059	-.053	.000	-.285**	.042	-.061	.000
NZ Deprivation (0-10)	.072**	.011	.086	.000	.058**	.012	.074	.000	.050**	.009	.061	.000
Log (income)	-.094*	.046	-.044	.040	-.143	.137	-.059	.295	-.059	.034	-.025	.080
Socio-economic status	-.008**	.002	-.060	.000	-.005	.003	-.036	.076	-.006**	.002	-.046	.000
Employed (0 no, 1 yes)	-.205*	.084	-.035	.015	-.149	.096	-.027	.120	-.157**	.060	-.027	.009
Urban area (0 rural, 1 urban)	.022	.055	.004	.690	-.046	.053	-.010	.379	-.039	.045	-.008	.388
Extraversion	.276**	.026	**.138**	.000	.203**	.025	**.106**	.000	.245**	.018	**.127**	.000
Agreeableness	-.088*	.036	-.037	.013	-.049	.028	-.021	.077	-.050	.027	-.021	.064
Conscientiousness	-.009	.025	-.004	.714	-.035	.028	-.016	.220	.013	.023	.006	.570
Neuroticism	.053*	.025	.025	.034	.050	.025	.025	.043	.074**	.020	.037	.000
Openness	-.018	.024	-.009	.445	-.033	.024	-.017	.171	-.043	.020	-.021	.034
Honesty-Humility	-.094**	.030	-.050	.002	-.124**	.034	-.068	.000	-.141**	.021	-.075	.000

Note: * p < .05, ** p < .01. Time 6: N= 10893, R-squared= 18.9%, Time 7: N=9988, R-squared= 17.1%. Time 8: N= 15830, R-squared= 18.0% for time points respectively. Sample weighting applied. Predictors with standardized beta coefficients greater than .10 in bold. Unstandardized coefficient (B) represents amount of change on original scale of measurement, whereas standardized coefficients (β) represent change per standard deviation.

Table A6. Difference in proportions of drinking frequency and intensity between the retained and booster sample in Time 8 of NZAVS.

Drinker	Sample Frequency (Percentage)	
	Retained	Booster
Non-drinker	2130 (16.3)	1303 (16.7)
drinker	10941 (83.7)	6519 (83.3)
Drinking Frequency		
Monthly or less	2824 (25.6)	1749 (26.7)
Up to 4 times a month	2546 (23.1)*	1628 (24.9)*
Up to 3 times a week	2730 (24.8)	1658 (25.3)
4 or more times a week	2841 (25.8)*	1484 (22.7)*
Don't know	76 (0.7)	31 (0.5)
Drinking Intensity		
1 or 2	6920 (67.2)*	3916 (63.5)*
3 or 4	2239 (21.7)	1355 (22.0)
5 or 6	682 (6.6)*	485 (7.9)*
7 to 9	203 (2.0)*	195 (3.2)*
10 or more	256 (2.5)*	217 (3.5)*

Note: 'Retained' includes those retained from at least one previous Time point. 'Booster' includes those sampled from Time 8 random electoral booster and those who self-selected in during the Time 8 booster. '*' indicates significant difference between retained and booster sample based on z-score test. NZAVS sample weighting applied.

The Revised Multidimensional Model of Māori Identity and Cultural Engagement (MMM-ICE3)

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Māori are the diverse indigenous people of Aotearoa New Zealand. The Multidimensional Model of Māori Identity and Cultural Engagement (MMM-ICE) is a quantitative self-report survey measuring the extent that Māori view various domains of Māori culture as relevant to their self-concept. We describe the psychometric features of the seven refined subscales and add an eighth subscale reflecting Whānau Efficacy. We assess the MMM-ICE3 measurement properties using data from the Māori Identity and Financial Attitudes Study, the largest probability self-report study of Māori identity and psychology (N = 7019). Confirmatory Factor Analysis showed the MMM-ICE3 subscales were internally reliable and the eight theorised domains of identity fit better than alternative factor structures. Whānau Efficacy showed good construct validity and predicted unique variation in time spent with whānau and perceived social support. We provide the MMM-ICE3 scale in Māori and English.

Keywords: *Māori, Psychometrics, Identity, Self-report questionnaire, Scale development*

Introduction

Māori are the ethnically and culturally diverse indigenous people of Aotearoa New Zealand and comprise approximately 15.4% of the national population (MacPherson, 2017). The Multidimensional Model of Māori Identity and Cultural Engagement (MMM-ICE) is a quantitative self-report questionnaire. Here, Māori identity is defined as the parts of the person's self-concept that are related to their membership in the ethnic group Māori. The MMM-ICE assesses the extent to which Māori view different domains that are relevant to Māori identity and cultural engagement as central to their self-concept (Houkamau & Sibley, 2010). The survey is concerned with both the extent that an individual self-identifies as Māori as well as the individual's interpretations of what it means to be Māori. This survey was designed specifically to be inclusive of Māori realities (Houkamau & Sibley, 2010).

The most recent version of the MMM-ICE3, assesses concepts and characteristics commonly associated with Māori identity from eight domains. A table of operational definitions, means, standard deviations, Cronbach alpha scores, skewness and kurtosis for each MMM-ICE3 subscale is included in Table 1. Briefly, each of the MMM-ICE dimensions assess specific domains which are relevant to Māori identity and cultural engagement. These include; positive and central self-identification as Māori (Group Membership Evaluation, GME), confidence to engage in Māori cultural practices (Cultural Efficacy and Active Identity Engagement, CEAIE), belief that relationships with other Māori are fundamental to their Māori identity (Interdependent Self-Concept, ISC), Māori-specific spiritual beliefs (Spirituality, S), support for Māori rights (Socio-Political Consciousness, SPC),

stereotypical beliefs about Māori (Authenticity Beliefs, AB), certainty that they are "Māori looking" to others (Perceived Appearance, PA), and confidence in their whānau compatibility and capability (Whānau Efficacy, WE). Whānau is a Māori language term that can refer to a family group or familiar group of people and even include friends who are not kin with other members of the group (Moorfield, n.d). A key strength of this quantitative survey method is the ability to analyse trends, predict outcomes and explain processes that generate change for Māori. This scale can also be used to make comparisons between Māori about Māori-specific factors of identity.

The MMM-ICE: A brief history

The inception, development and validation of the MMM-ICE scale has previously been described in several papers (see Houkamau & Sibley, 2010; 2015; 2018). The first iteration of the MMM-ICE, created by Houkamau and Sibley (2010), utilised Exploratory Factor Analysis from an online (primarily undergraduate) sample (N = 270). Six defined but interrelated aspects of Māori identity (GME, CEAIE, ISC, S, SPC and AB) were detected and indicated a robust model. All six subscales were internally reliable and had acceptable item response parameters (Houkamau & Sibley 2010; Sibley & Houkamau, 2013). These aspects became the basis of an extensive multidimensional model of experiences and cultural engagement for Māori.

Houkamau and Sibley (2015) then updated the survey, MMM-ICE2, to include a seventh subscale named Perceived Appearance. This addition was in direct response to participant emails and comments on the initial MMM-ICE such as 'I strongly identify as Māori, but people don't often realise that I am Māori at all because I don't look it' (see Houkamau & Sibley, 2018, p. 479).

Table 1. Construct definitions and descriptive statistics for the eight factors indexed by the MMM-ICE3.

Group membership evaluation (GME)
M = 5.28 (SD = 1.35), α = .81, skewness = -.59 (SE = .03), kurtosis = -.33 (SE = .06).
The extent to which a person positively evaluates their membership in the social category Māori and views their membership as Māori as a personally important or central aspect of their self-concept *versus* the extent to which the person negatively evaluates their membership in the social category Māori and views their membership as Māori as peripheral or irrelevant to their self-concept.

Cultural efficacy and active identity engagement (CEAIE)
M = 4.84, (SD = 1.40), α = .78, skewness = -.41 (SE = .03), kurtosis = -.44 (SE = .06).
The extent to which a person perceives that they have the personal resources required (that is, the personal efficacy) to engage appropriately with other Māori in Māori social and cultural contexts *versus* the extent to which the person perceives that they lack the personal resources and ability to engage appropriately with other Māori in Māori social and cultural contexts.

Interdependent self-concept (ISC)
M = 4.01, (SD = 1.39), α = .76, skewness = -.02 (SE = .03), kurtosis = -.52 (SE = .06).
The extent to which the concept of the self-as-Māori is defined by virtue of relationships with other Māori *versus* the extent to which the concept of the self-as-Māori is viewed as being solely unique and independent to the individual rather than as part of the social group.

Spirituality (S)
M = 5.08, (SD = 1.62), α = .86, skewness = -.66 (SE = .03), kurtosis = -.49 (SE = .06).
The extent to which a person is engaged with their taha wairua and has a belief in Māori concepts of spirituality, including a feeling a connection with tūpuna or believing in tapu *versus* the extent to which the person is disengaged from or does not believe in Māori concepts of spirituality.

Socio-political consciousness (SPC)
M = 5.21, (SD = 1.62), α = .82, skewness = -.67 (SE = .03), kurtosis = -.21 (SE = .06).
The extent to which a person perceives historical factors as being of continued importance for understanding contemporary intergroup relations between Māori and other ethnic groups in Aotearoa New Zealand; and how actively engaged the individual is in promoting and defending Māori rights given the context of the Treaty of Waitangi *versus* the extent to which the person perceives historical factors and injustices experienced by Māori as being irrelevant in contemporary society.

Authenticity beliefs (AB)
M = 4.03, (SD = 1.37), α = .67, skewness = -.02 (SE = .03), kurtosis = -.32 (SE = .06).
The extent to which a person believes that to be a 'real' or 'authentic' member of the social category Māori, one must display specific (stereotypical) features, knowledge and behaviour *versus* the extent to which the person believes that Māori identity is fluid rather than fixed and produced through lived experience.

Perceived appearance (PA)
M = 4.12, (SD = 1.98), α = .93, skewness = -.10 (SE = .03), kurtosis = -1.21 (SE = .06).
The extent to which a person subjectively evaluates their appearance as having clear and visible features that signal their ethnicity and ancestry as Māori (or high Māori prototypicality) *versus* the extent to which a person evaluates their appearance as less indicative of having Māori ancestry (low Māori prototypicality).

Whānau efficacy (WE)
M = 4.72, (SD = 1.15), α = .71, skewness = -.32 (SE = .03), kurtosis = .09 (SE = .06).
The extent to which a person subjectively considers their whānau as solutions-focussed and able to work together (high whānau efficacy) *versus* the extent to which the person has little confidence that their whānau can deal with conflict or accomplish work together (low whānau efficacy).

Māori participants from Wave III of the New Zealand Attitudes and Values Study were invited to complete the MMM-ICE2 online (N = 276; Houkamau & Sibley, 2015). Results indicated that all seven subscales were internally reliable and Confirmatory Factor Analysis revealed a reasonable model fit. Houkamau and Sibley noted that future amendments of the MMM-ICE should aim to develop scale items to improve model fit.

The MMM-ICE survey has been further refined with the intention to more accurately capture the distinct, yet interconnected factors hypothesised as being part of Māori identity. We expect that as the first survey of its kind, the MMM-ICE should continuously improve, directed by feedback from Māori participants and research. Changes from the MMM-ICE2 to the MMM-ICE3 include the addition of an eighth factor - Whānau

Efficacy, omission of certain items across all factors for brevity and clarity as well as more appropriate wording for some survey questions.

The Whānau Efficacy Scale

Importance of whānau

As noted above, the MMM-ICE dimensions assess domains which are relevant to Māori identity and cultural engagement. The Whānau Efficacy subscale, therefore, should be viewed as an experiential domain that contributes to the subjective experience of identifying and engaging culturally as Māori. The Whānau Efficacy subscale was added because whānau are widely accepted as the primary social unit of Māori society, and commonly recognised as a crucial source of identity and well-being (Ministry of Health, 2014; Durie, 2006; Statistics New Zealand, 2013). In traditional Māori society, people would typically identify themselves through descent-based structures including their immediate biological whānau and their wider cultural institutions of hapū, iwi and waka (Moeke-Pickering, 1996). In their analysis of Te Kupenga (the first Māori Social Survey; Statistics New Zealand, 2013), Kukutai, Sporle, and Roskruge (2016) suggested that strengthening whānau connectedness will be most effective when also strengthening cultural connections. Connection to whānau can therefore be considered an important aspect of identifying, expressing and experiencing the self culturally as Māori.

In contemporary Aotearoa New Zealand society, definitions of whānau vary. For some, whānau can encompass family (especially across generations), extended family, friends or other kinship ties (Kukutai et al., 2016). McNatty and Roa (2002) explained that whānau can be purpose-oriented (for example, members of a kapa haka group) or descent-oriented (through whakapapa or genealogical connections). These whānau relationships are associated with responsibilities, expectations and duties including reciprocity (Kukutai, Sporle, & Roskruge, 2016). As the Ministry of Social Development stated, "for Māori, whānau provides care and nurturing as well as identity and a sense of purpose and belonging" (2004, p. 105; see also Durie, 1998).

Māori and non-Māori perspectives of whānau/family

Literature suggests that Māori perspectives of whānau may differ from Aotearoa New Zealand's ethnic majority Pākehā and that the western view of family structure is not reflective of a Māori worldview of whānau (Taiapa, 1995; Cunningham, Stevenson, & Tassell, 2005; Hirini, 1997; Kukutai, Sporle, & Roskruge, 2016). Māori are more likely to have children at younger ages and involve older generations (such as grandparents) and other whānau in raising their children than non-Māori (Cribb, 2009; Ministry of Social Development, 2004). Te Kupenga (Statistics New Zealand, 2013), a nationally representative survey of Māori well-being (N = 5549), reported that almost all Māori (98%) included people who did not live with them as part of their whānau. This is important since generic census surveys are traditionally based on Pākehā views of the household or neolocal "nuclear families" (for an in-depth history of Aotearoa New Zealand family morphologies see Pool, 2013). For statistical purposes, the Ministry of Social Development (2004) defined family as "two or more people living in the

same household who comprise either a couple, with or without children, or one parent and their children." They acknowledged that by using such a narrow scope of "family" and "household" they could not consider cultural distinctions in how family or whānau are conceptualised and managed. This definition of family may not be a fitting term since most Māori include people who do not live with them as part of their whānau. Research (such as the present study) that utilises a broader approach to the Māori concept of whānau will be more relevant for Māori.

Whānau and well-being

Given the importance of whānau to Māori identity, policy related to te ao Māori typically emphasises the key role of whānau connectedness for well-being (Kukutai, Sporle, & Roskruge, 2016). To empower (Māori and non-Māori) whānau there have been many models of whānau ora or whānau well-being proposed over the years. Whānau Ora is an initiative shaped by te ao Māori that recognises that a whānau-engaging, transformative and strength-based approach from health and social services will achieve long-term outcomes better than the traditional issue-focused and individual-centred approach to improving health (Te Puni Kōkiri, 2018).

There is a wealth of research documenting the positive contribution of social support to people's health and well-being (Tay, Tan, Diener, & Gonzalez, 2012; Waite, Iveniuk, & Laumann, 2014). Moeke-Pickering (1996) suggested that an environment that nurtured well-being among whānau members would create meaningful whānau and Māori identities and that a secure whānau identity would likely play a part in an overall stable Māori identity. In a similar vein (as part of a whānau-centred model) Durie and colleagues (2010) acknowledged that the state of each whānau member naturally affects others in the whānau and vice versa. Clearly, since the conditions and identities of whānau members influence each other, it would be ideal if whānau were "cohesive, resilient and nurturing" (Te Puni Kōkiri, 2018, p. 18). This is a specific outcome of the Whānau Ora initiative and is also comparable to collective efficacy.

In social psychology, collective efficacy can refer to an individual's belief in the overall ability of their group to work together and act effectively to achieve desired outcomes (Zaccaro, Blair, Peterson, & Zazanis, 1995). Research has shown that higher perceived collective efficacy is related to stronger resilience in the face of challenges and better accomplishments by the group (Bandura, 2000). Developing a sense of collective efficacy may be more relevant to Māori as opposed to self-efficacy.

Knowing that whānau are important sources of support, identity and well-being for Māori (Ministry of Health, 2014; Durie, 2006), we suggest that whānau cohesion may be a crucial aspect of identity for Māori. The Whānau Efficacy subscale was created to evaluate just that. The subscale explores an individual's faith in whānau to achieve collective goals and address challenges that affect whānau members. Being confident in the congruency and effectiveness of one's whānau would probably influence people's risk-taking behaviours and emotional well-being. Stated formally, the Whānau Efficacy domain is defined in the MMM-ICE3 as representing the extent to which a person considers their

Table 2. Factor loadings for MMM-ICE3 survey items in English.

	Standardised CFA loading
Group Membership Evaluation (GME)	
1. I reckon being Māori is awesome.	.876
2. I love that I am Māori.	.848
3. Being Māori is NOT important to my sense of what kind of person I am.	.458
4. Being Māori is cool.	.815
5. Being Māori is NOT important to who I am as a person.	.553
Cultural Efficacy and Active Identity Engagement (CEAIE)	
6. I don't know how to behave on a marae.	.583
7. I try to kōrero (speak) Māori whenever I can.	.704
8. I can't do Māori culture or speak Māori.	.548
9. I know how to behave the right way when I am on a marae.	.724
10. I have a clear sense of my Māori heritage and what it means for me.	.663
Interdependent Self-Concept (ISC)	
11. My relationships with other Māori (friends and family) are what make me Māori.	.731
12. How I see myself is totally tied up with my relationships with my Māori friends and family.	.696
13. For me, a big part of being Māori is based on my connections with other whānau.	.761
14. My Māori identity is fundamentally about my relationships with other Māori.	.567
15. My Māori identity has nothing to do with my relationships with other Māori.	.393
Spirituality (S)	
16. I believe that tūpuna (ancient ancestors) can communicate with you if they want to.	.814
17. I believe that my taha wairua (my spiritual side) is an important part of my Māori identity.	.834
18. I can sometimes feel my Māori ancestors watching over me.	.870
19. I have never felt a spiritual connection with my ancestors.	.663
20. I think tapu is just a made up thing. It can't actually affect you.	.499
Socio-Political Consciousness (SPC)	
21. I stand up for Māori rights.	.733
22. Māori would be heaps better off if we just forgot about the past and moved on.	.625
23. I'm sick of hearing about the Treaty of Waitangi and how Māori had their land stolen.	.644
24. What the European settlers did to Māori in the past has nothing to do with me personally. I wasn't there and I don't think it affects me at all.	.632
25. I think that Māori have been wronged in the past, and that we should stand up for what is ours.	.796
Authenticity Beliefs (AB)	
26. I reckon that true Māori hang out at their marae all the time.	.523
27. To be truly Māori you need to understand your whakapapa and the history of your people.	.594
28. True Māori always do karakia (prayer) before important events.	.658
29. Real Māori put their whānau first.	.563
Perceived Appearance (PA)	
30. I think it is easy to tell that I am Māori just by looking at me.	.857
31. I think it is clear to other people when they look at me that I am of Māori descent.	.830
32. People would never know that I am of Māori descent just by looking at me.	.833
33. I think it is hard to tell that I am Māori just by looking at me.	.882
34. When people meet me, they often do not realize that I am Māori.	.793
Whānau Efficacy (WE)	
35. If a problem arises that people cannot solve by themselves, the whānau as a whole will be able to solve it.	.658
36. People in my whānau usually have trouble dealing with conflict.	.320
37. People in my whānau have always been able to discuss problems that affect everyone.	.631
38. When a problem arises in my whānau, I often have very little confidence that we will be able to solve it.	.459
39. Whenever my whānau undertake a project together, we know that we will all work hard until it is accomplished.	.734

whānau as solutions-focussed and able to complete work together (higher Whānau Efficacy) versus the extent to which the person has little confidence that their whānau can deal with conflict or accomplish work together (lower Whānau Efficacy).

Whānau Efficacy is an important aspect of Māori cultural engagement not captured in the original MMM-ICE (nor any other survey). This subscale differs from Group Membership Evaluation by focussing specifically on the extent that participants evaluate their whānau as

effective and cohesive, rather than their ratings on how positive or important identifying with the wider social group, Māori, is for them. Whānau Efficacy is also different to the Interdependent Self Concept which measures an individual's belief that their relationships with other Māori is important to their identity as Māori rather than how capable or compatible they think their whānau are. A significant advantage of using the term "whānau" compared to family or household means that participants can respond with either their descent- or purpose-oriented whānau in mind. However, one could assume that because previous research found that "expressions of whānau that were solely based on a kaupapa concept were extremely rare" (Kukutai, Sporle, & Roskruge, p. 59, 2016), that participants may be likely to respond to the Whānau Efficacy items with their descent-oriented whānau in mind.

Additional refinements to the MMM-ICE3

In order to maintain a similar overall length, we also tweaked the MMM-ICE by removing items which had performed poorly in previous psychometric analyses or items noted by previous participants to be ambiguous. The refined MMM-ICE3 now contains 39 items and eight subscales in the MMM-ICE3 (see Table 2 for MMM-ICE3 items and factor loadings) in comparison to the 54 items and seven subscales in the MMM-ICE2. This more streamlined approach saves questionnaire space, is quicker for participants to complete and is expected to encourage better response rates due to having fewer items (Edwards et al., 2002).

We also refined the scale by subtly altering the wording of some items. These revisions were made based on feedback we had collected over the years from participants and stakeholders. As discussed by Houkamau and Sibley (2018), statements used in the MMM-ICE survey are intended to reflect how Māori identity might be referred to or discussed in day-to-day life, as opposed to how researchers believe that people should talk about being Māori. It is critical that survey questions strike the balance between everyday spoken phrases and item content. The original MMM-ICE items were based on analyses of qualitative data relating to Māori culture and identity (Houkamau & Sibley, 2010), however, feedback from participants suggested that some item wording could be interpreted as inappropriate and / or confusing. Reflecting this feedback, the MMM-ICE3 contains reworded versions of some of the less popular items. For example, some participants found phrases like "act" and "real Māori" inappropriate in items such as "I don't know how to act like a real Māori on a marae" (reverse coded; in MMM-ICE & MMM-ICE2). This was revised to "I don't know how to behave on a marae" (reverse coded; in MMM-ICE3), as part of the Cultural Efficacy and Active Identity Engagement factor.

Overview and guiding hypotheses

The current research aims to validate a revised version of the MMM-ICE (the MMM-ICE3) which includes a subscale assessing an eighth proposed factor of Māori identity – Whānau Efficacy. Here, we evaluate the measurement properties of the MMM-ICE3 using data from the largest national probability self-report questionnaire study of Māori identity and psychology ever conducted - the Māori Identity and Financial Attitudes

Study (MIFAS; see Houkamau, Sibley & Henare, 2019). The factor structure of the MMM-ICE3 will be assessed by Confirmatory Factor Analysis, this examines how well the eight-factor model representing each of the eight theorised dimensions of Māori identity fit the data. It was hypothesised that the proposed eight-factor solution would provide a reasonable approximate fit to the data, with a relatively low level of residual variation unexplained by the model.

The new Whānau Efficacy subscale will be tested to see whether it predicts unique variance in two criterion outcomes: (a) hours spent with whānau in the previous week and (b) perceived support from others. We reasoned that if a person is confident in their whānau ability to work together (or identifies as having higher Whānau Efficacy), that they would be more likely to spend time with their whānau, in comparison to someone who may feel their whānau would struggle in the face of tasks or challenges (have lower Whānau Efficacy) and therefore be less inclined to spend time with them. It was also assumed that people who were likely to believe that their whānau work well together (high Whānau Efficacy) may also sense that they are able to rely on others in times of need (high perceived support). Whereas Māori who feel that their whānau are less capable of working together (low Whānau Efficacy) may be more likely to feel that they do not have anyone to depend on (low perceived support).

These predictions that the Whānau Efficacy subscale of the MMM-ICE3 should predict unique variance in (a) hours spent with whānau and (b) perceived social support will be tested using path analysis. Note that the path model tests the hypotheses that Whānau Efficacy would significantly predict these two criterion outcomes when statistically adjusting for the other seven existing dimensions of the MMM-ICE2. That is, the Whānau Efficacy subscale is expected to predict variance in these two outcomes that would have remained unexplained (and thus have appeared as residual error) had the earlier seven-factor MMM-ICE2 scale been used.

METHODS

Participants

Participants were 7019 self-identified Māori who completed the MMM-ICE3 measures as part of the larger MIFAS survey (see Houkamau, Sibley & Henare, 2019). Note that adjusting for address inaccuracy yields an estimated response rate of 7% (7,019/98,500; see Houkamau, Sibley & Henare for further MIFAS response rate discussion). Only 15 participants filled out the te reo Māori version of the survey (see Table 3 for the te reo version of the MMM-ICE3 items). Participants were 4335 women, 2675 men and 4 gender diverse (5 unreported) with a mean age of 48.85 years (SD = 14.81). The MMM-ICE3 scale norms for Māori men and women across different age brackets are presented in Appendix A. 3019 solely identified as Māori, 3765 also identified as Pākehā, 314 identified as being also of Pacific nations descent, 119 identified as also having Asian ancestry and 87 reported other mixed ethnic affiliation. Scale norms for Māori who solely identify as Māori or identify as Māori and Pākehā are presented in Appendix B. Almost all were born in Aotearoa New Zealand (n = 6260) with only 122 born outside the country. Participants came from all over

Aotearoa New Zealand, with scale norms by iwi region detailed in Appendix C.

Participants reported an average education level of about NCEA Level 4 (M = 4.04, SD = 2.77). Participants had a mean New Zealand Deprivation score of 6.48 (SD = 2.88). The New Zealand Deprivation index is a socio-economic, decile-ranked score ranging from 1 to 10 which indexes the levels of material deprivation for each participant's immediate neighbourhood area based on census data (Salmond et al. 2007). As the index is decile ranked from 1 to 10 (i.e., each unit represents 10% of the population), a mean score of 6.48 indicates a moderate or mid-range level of deprivation relative to others in Aotearoa New Zealand.

Whether people lived rurally or in urban areas was almost evenly split, with 3453 living rurally and 3566 residing in urban centres. 2989 participants identified with a religious or spiritual group compared to 3668 who did not. Most participants (n = 5262) were parents whereas 1396 reported that they were not parents. Majority were in a serious romantic relationship (n = 4241) and 2252 were single. Most participants were employed, including self-employment or casual work (n = 4553) and 1888 were unemployed. 40% of participants indicated that they at least often talk about and build links through exploring whakapapa, whereas 40% reported they rarely do and 10% report they never do.

RESULTS

A key strength of Confirmatory Factor Analysis is that it provides indicators of both approximate model fit and the ability to test exact model fit. Tests of approximate model fit provide a general indicator of how closely the proposed model fits the data. The χ^2 of model fit, in contrast, provides a formal test assessing whether the hypothesised model departs significantly (at greater than chance) from the observed data. Two commonly used indicators of approximate fit are the Standardized Root Mean Square Residual (SRMR) and the Root Mean Square Error of Approximation (RMSEA). When evaluating model fit, Hu and Bentler (1999) suggested that reasonable models should have an SRMR below .09 and a RMSEA below .06. These are of course 'rules-of-thumb.'

Fit indices for the hypothesised eight-factor MMM-ICE3 indicated reasonable level of approximate fit (SRMR = .070, RMSEA = .068; 90% Confidence Interval for RMSEA = [.067, .069]; Comparative Fit Index (CFI) = .834, Tucker-Lewis Index (TLI) = .817; AIC = 986393). The CFI and TLI indicated that the model fit was less than ideal regarding these indicators, which ideally should be close to or above .95 (Hu & Bentler, 1999). The hypothesised model also deviated significantly from the observed data [$\chi^2(1,713) = 23617.73$, p < .01]. Thus, while our model did differ significantly from the data, the model provided reasonable approximation of the variation in item ratings, with the SRMR indicating that the model would allow the correlation matrix to be reproduced with an average accuracy to within roughly .070 units.

Comparison with alternative models

In addition to providing information on relative and absolute fit, Confirmatory Factor Analysis provides a method for formally evaluating whether a given proposed factor structure fits the data better than alternative structures. The hypothesized eight-factor MMM-ICE3 was compared with a variety of alternative models. The hypothesised eight-factor model fit better than a single-factor model in which every indicator freely loaded on every factor, and thus factors were not distinct [$\chi^2_{d.ff}(11) = 40409.02$, p < .001]. Relative fit indices for this alternative model were: (RMSEA = .113, SRMR = .100, CFI = .519, TLI = .492).

The hypothesised eight-factor model fit better than an alternative two-factor model in which aspects of Māori identity can be grouped into those that reflect the experiences of the self (GME, CEAIE, S, PA) and beliefs about the wider group, Māori (ISC, WE, SPC, AB; RMSEA = .111, SRMR = .098, $\chi^2_{d.ff}(12) = 38134.8$, p < .001).

The hypothesised eight-factor model also fit better than an alternative three-factor model in which aspects of Māori identity can be grouped into those that reflect the experiences of the self (GME, CEAIE, S, PA), how aspects of whānau relate to one's Māori identity (ISC, WE) and beliefs about the wider Māori group (SPC, AB; RMSEA = .109, SRMR = .099, $\chi^2_{d.ff}(14) = 35161.62$, p < .001).

The hypothesised eight-factor model was compared to and fit better than an alternative four-factor model loosely based on the Te Whare Tapa Whā health model (Durie, 1998). The four factors were taha tinana (PA, CEAIE), taha hinengaro (AB, GME), taha wairua (S, SPC) and taha whānau (ISC, WE; RMSEA = .096, SRMR = .114, $\chi^2_{d.ff}(17) = 22293.57$, p < .001).

The hypothesised eight-factor model fit better than an alternative five-factor model divided into concepts about whānau (WE, ISC), Māori-specific cultural experience (CEAIE, S), support for Māori political rights (SPC), positive identification with the wider Māori group (GME) and endorsement of stereotypical beliefs about what Māori do and look like (AB, PA; RMSEA = .084, SRMR = .088, $\chi^2_{d.ff}(21) = 11611.64$, p < .001).

A six-factor model that consisted of factors looking at Whānau Efficacy (WE), the importance of other Māori to the self (ISC), cultural and spiritual engagement (CEAIE, S), stereotypical views of Māori (PA, AB), how important positive a member values the group Māori (GME), and standing up for Māori political rights (SPC) did not fit better than the hypothesised eight-factor model (RMSEA = .080, SRMR = .086, $\chi^2_{d.ff}(26) = 7561.436$, p < .001).

The following alternative seven-factor models each assessed model fit when the items assessing Whānau Efficacy were modelled on to one of the factors from the MMM-ICE2. The hypothesised eight-factor model significantly fit better than every seven-factor alternative model when the Whānau Efficacy items were loaded on to; Group Membership Evaluation (RMSEA = .074, SRMR = .074, $\chi^2_{d.ff}(32) = 3455.927$, p < .001), Cultural Efficacy and Active Identity Engagement (RMSEA = .074, SRMR = .073, $\chi^2_{d.ff}(32) = 2894.882$, p < .001), Interdependent Self-Concept (RMSEA = .074, SRMR = .072, $\chi^2_{d.ff}(32) = 2986.306$, p < .001), Spirituality (RMSEA = .074, SRMR = .074, $\chi^2_{d.ff}(32) = 3814.17$, p < .001), Socio-Political Consciousness (RMSEA = .075, SRMR = .075, $\chi^2_{d.ff}(32) = 4025.116$, p < .001)

Table 3. Te reo Māori version of MMM-ICE3 survey items.

Group Membership Evaluation (GME)

1. He rawe te tū hei Māori.
2. Ka nui taku aroha ki taku Māoritanga.
3. EHARA tōku Māoritanga i tētahi wāhanga nui o tōku tuakiri.
4. He pai te tū hei Māori.
5. EHARA tōku Māoritanga i te wāhanga nui o tōku tuakiri.

Cultural Efficacy and Active Identity Engagement (CEAIE)

6. Kāore au e mōhio me aha au i runga i te marae.
7. Ngana ai au ki te kōrero Māori i ngā wā katoa.
8. Kāore au e whai i te ahurea Māori, e kōrero Māori rānei.
9. Kei te mōhio ahau me aha ahau i runga i te marae.
10. E mārama ana au ki tōku whakapapa Māori me te hāngaitanga mai ki a au.

Interdependent Self-Concept (ISC)

11. Mā aku hononga ki ētahi atu Māori (ngā hoa me te whānau) e Māori ai au.
12. Ko tōku katoa e whaipānga ana ki ōku hono ki ōku hoa me tōku whānau Māori.
13. Ki a au, he wāhanga nui o tōku Māoritanga aku hononga ki tōku whānau.
14. Ko te tūāpapa o tōku Māoritanga ko aku hononga ki ētahi atu Māori.
15. Kāore taku Māoritanga e pā ana ki aku hononga ki ētahi atu Māori.

Spirituality (S)

16. Ki a au ka taea e ngā tūpuna te kōrero mai ki te hiahia rātou.
17. E whakapono ana au he wāhanga nui o taku tuakiri Māori taku taha wairua.
18. He wā ōna ka rongo ahau i ōku tūpuna e titiro mai ana i a au.
19. Kāore anō au kia rongo i tētahi hononga ā-wairua ki ōku tūpuna.
20. He horihori noa iho te tapu. Nōhea e pā ki te tangata.

Socio-Political Consciousness (SPC)

21. Tū ai au mō ngā mōtika Māori.
22. Ka pai noa ake te Māori mēnā i wareware ngā rā o mua, ka kōkiri whakamua kē.
23. Kua hōhā au i te whakarongo ki ngā kōrero mō Te Tiriti o Waitangi me ngā whenua Māori i raupatungia.
24. Kāore i te pā ki a au ngā mahi a ngā Pākehā ki ngā Māori i mua. Kāore au i reira, nō reira kāore e pā mai ki a au.
25. Ki a au i tūkinotia te Māori i mua, nō reira me whawhai tātou mō ā tātou taonga.

Authenticity Beliefs (AB)

26. Ki a au nei, he rite tonu te haere a ngā Māori tūturu ki te marae.
27. E Māori tūturu ai koe me mōhio koe ki tō whakapapa me ngā kōrero hītori mō tō iwi.
28. Karakia ai te Māori tūturu i mua i ngā kaupapa nui.
29. Ko te whānau te mātāmua ki te Māori tūturu.

Perceived Appearance (PA)

30. Mā te titiro noa iho mai e mōhiotia ai au he Māori.
31. Ki a au, ka kitea au e ētahi atu ka mōhio noa mai rātou he whakapapa Māori ōku.
32. E kore te tangata e mahara he Māori ahau mā te titiro noa mai.
33. Kāore pea te tangata e mōhio he Māori ahau mā te titiro noa mai.
34. Ka tūtaki ana au ki ētahi atu, me uaua ka mōhio mai rātou he Māori ahau.

Whānau Efficacy (WE)

35. Ki te toko ake tētahi raruraru kāore e taea e te tangata kotahi te rongoā, ka riro mā te whānau katoa e rongoā.
36. He uaua ki ngā tāngata o taku whānau te tautohe.
37. Ka taea noatia e ngā tāngata o taku whānau te kōrero mō ngā raru ka pā ki tēnā me tēnā.
38. Ka puta he raru i waenga i tōku whānau, kāore au e kaha ki te whakapono ka taea e mātou te whakatika.
39. Ka tahuri ana taku whānau ki te whakatutuki ngātahi i tētahi kaupapa, e mōhio ana mātou ka pukumahi te katoa kia tutuki noa taua kaupapa.

Note: All items in the te reo version were numbered the same as the English version.

Table 4. Regression slopes and odds ratios for the models assessing the extent to which each MMM-ICE3 mean subscale score predicted hours spent with whānau and perceived support.

	Model predicting hours spent with whānau				Model predicting perceived support			
	b	se	β	z	b	se	β	z
Group Membership Evaluation (GME)	.894	.821	.029	1.089	.137	.023	.149	5.986*
Cultural Efficacy and Active Identity Engagement (CEAIE)	3.462	.957	.110	3.617*	.066	.027	.070	2.487*
Interdependent Self-Concept (ISC)	-2.022	.902	-.079	-2.240*	-.046	.025	-.059	-1.797
Spirituality (S)	1.273	.472	.059	2.699*	-.018	.013	-.028	-1.374
Socio-Political Consciousness (SPC)	.227	.796	.007	.286	-.071	.022	-.074	-3.192*
Authenticity Beliefs (AB)	-1.626	1.031	-.040	-1.578	-.239	.029	-.197	-8.305*
Perceived Appearance (PA)	.701	.288	.037	2.435*	-.027	.008	-.048	-3.377*
Whānau Efficacy (WE)	2.759	.609	.079	4.534*	.429	.018	.405	23.328*

R^2 for model predicting hours spent with whānau =.039, se=.005, p<.001.
R^2 for model predicting perceived support =.202, se=.011, p<.001

Authenticity Beliefs (RMSEA = .074, SRMR = .075, $\chi^2_{d.ff}$ (32) = 3127.889, p < .001) and Perceived Appearance (RMSEA = .077, SRMR = .087, $\chi^2_{d.ff}$ (32) = 5186.833, p < .001).

Predicting criterion outcomes

The construct validity of the newly added factor was assessed by testing whether Whānau Efficacy was linked with unique variance in two criterion outcomes: hours spent with whānau in the previous week and perceived support from others. These predictions were tested by estimating a model in which mean scale scores for each of the eight MMM-ICE3 subscales predicted the two criterion outcomes. Maximum Likelihood with robust estimation of the standard errors was used.

Table 4 presents the regression models assessing the extent to which each MMM-ICE3 mean subscale score uniquely predicted (a) hours spent with whānau in the previous week and (b) perceived support from others. Whānau Efficacy predicted significant unique variance in both criterion outcomes when adjusting for scores on the seven other MMM-ICE subscales. (a) People high in Whānau Efficacy (or more likely to believe that their whānau can work together to overcome obstacles), tended to report more hours spent with whānau in the previous week to filling out the survey (b = 2.759, se = .609, β = .079, z = 4.534, p < .001). (b) People who identified with high Whānau Efficacy were also more likely to report that they have people they can depend on if they needed (b = .429, se = .018, β = .405, z = 23.328, p < .001).

DISCUSSION

Māori are the diverse indigenous people of Aotearoa New Zealand, and the Multidimensional Model of Māori Identity and Cultural Engagement aims to appraise that diversity. The quantitative self-report questionnaire is intended for use in statistical models to predict and understand the outcomes and potentially protective function(s) of different aspects of Māori identity. Participant feedback from the MMM-ICE2 suggested that some items needed to be rephrased and these changes were included as part of the MMM-ICE3. The shortened and refined MMM-ICE3 builds upon the earlier MMM-ICE2 survey (Houkamau & Sibley, 2015) by adding an eighth domain that is relevant to Māori identity -Whānau Efficacy- to the existing seven subscales. We evaluated the measurement properties of the MMM-ICE3 utilising data from the MIFAS - a large-scale, national probability study of Māori identity and psychology (Houkamau, Sibley & Henare, 2019). Here we provide analyses that indicate that the MMM-ICE3 reliably indexes the eight hypothesised dimensions of Māori identity and cultural engagement, and that the eight factors provide a better fit than a variety of alternative theoretical factor structures. All eight subscales showed internal reliability and the newly developed measure of Whānau Efficacy showed good evidence of construct validity as it predicted unique variation in time spent with whānau and perceived social support. Critically, we provide extensive MMM-ICE3 scale norms and psychometric details based on national data, along with a copy of the scale in both te reo Māori and English in the hopes that the MMM-ICE3 is useful to others researching Māori identity.

Factor structure of the MMM-ICE3

The factor structures of both the six-factor MMM-ICE (Houkamau & Sibley, 2010; 2011; Sibley & Houkamau, 2013) and seven-factor MMM-ICE2 (Houkamau & Sibley, 2015) have been extensively validated. The current study extended these prior analyses by using Confirmatory Factor Analysis to formally test and statistically compare alternative factor structures of Māori identity with the eight-factor MMM-ICE3 model. For instance, a four-factor model loosely based on the Te Whare Tapa Whā health model by Durie (1998) might have represented the data better than the proposed eight-factor model, however, analyses did not support this four-factor model. Evidence from the alternative seven-factor models, where Whānau Efficacy was measured as part of an existing MMM-ICE2 subscale, suggested that Whānau Efficacy measures unique content not captured by the previous MMM-ICE2 subscales. All analyses of alternative theoretical models (ranging from one factor to seven factors) indicated that the eight-factor model, where each of the hypothesised subscales represented a distinct aspect of Māori identity, provided the most appropriate fit to the observed data.

Construct validity of the Whānau Efficacy subscale

The construct validity of the newly developed Whānau Efficacy subscale of the MMM-ICE3 was assessed using two criterion outcomes. The two outcomes considered were (a) hours spent with whānau and (b) level of perceived social support. As hypothesised, regression models indicated that Whānau Efficacy was significantly and positively associated with both increased hours spent with whānau and increased levels of perceived social support. Note that the association of Whānau Efficacy with the two criterion outcomes held when adjusting for scores on the other seven MMM-ICE2 subscales. This indicates that Whānau Efficacy predicted variance that could not be captured by the other MMM-ICE subscales.

The causal pathway between Whānau Efficacy and time spent with whānau cannot be determined from the current study but it may be a valuable contribution to research looking at time spent with whānau. Qualitative and quantitative research with young Māori suggests that some youths want to spend more time with their whānau (Edwards, McCreanor, & Moewaka-Barnes, 2007; Adolescent Health Research Group, 2004; Crengle et al., 2013). Since results from the current study indicate a positive link between Whānau Efficacy and time spent with whānau, strategies that foster whānau cohesion, like that of the Whānau Ora Outcomes Framework (Te Puni Kōkiri, 2018), might also encourage whānau to spend more time together. It is quite possible that the reverse works too where spending more time with whānau boosts whānau efficacy or that a third variable not measured here affects both variables for example wanting to spend time with whānau may increase both time spent with whānau and Whānau Efficacy. Note that the regression model indicated that the Cultural Efficacy and Active Identity Engagement factor was the strongest predictor of reported time spent with whānau, reflecting Kukutai and colleagues (2018) observation that cultural connection may strengthen whānau connection. Thus, both the Whānau Efficacy subscale tested and validated in the current study and the previously validated Cultural Efficacy and Active Identity Engagement factor (Houkamau & Sibley, 2010) could be useful measures for the Whānau Ora initiative and those looking to support Māori who want to spend more time with their whānau.

The link between Whānau Efficacy and perceived support is consistent with literature that explains that whānau are an important source for supportive relationships (Cram & Kennedy, 2014). The current research takes this a step further by providing evidence that specifically shows that an individual's subjective views about how well their whānau can work together is positively correlated with how much social support they feel they have access to. This link might be intuitive and obvious for some, nonetheless we contribute this statistical evidence to the whānau support literature. Note again that it is not possible from the current study to determine the direction of causality.

Whānau Efficacy as a Māori-specific measure may be a valuable contribution to the collective efficacy literature and especially relevant in terms of indigenous collective efficacy. A sense of collective efficacy has been shown to be beneficial for indigenous communities to contest the centuries of dispossession and disempowerment of colonisation (Tiessen, Taylor, & Kirmayer, 2009). Adams, Fryberg, Garcia, and Delgado-Torres (2006) found that for indigenous students in the United States (N=124), indigenous identity engagement was positively correlated with community efficacy. That is, the study confirmed a link where indigenous students that strongly identified with their ethnicity tended to report greater regard and belief in their community's ability to take action. Tiessen and colleagues (2009) reported an association between collective efficacy and positive self-esteem for indigenous youth (N=82), which taken together with the previous research could suggest that collective efficacy is pertinent to indigenous peoples and related to positive well-being. Knowing that one's whānau can find solutions (or having high Whānau Efficacy) could be a source of support and confidence for the Māori individual. Future research could see whether there are any links between Whānau Efficacy and potentially daunting situations such as completing secondary or tertiary education or travelling overseas.

Concluding comments

Ehara taku toa i te toa takitahi, engari he toa takitini
My success/strength is not mine alone, but the success/strength of many.

The above Māori whakataukī can be interpreted to mean that relationships and the support of many contribute to the outcomes and growth of an individual. As past literature and knowledge from the Māori community suggests, whānau realities and aspirations will shape and be shaped by an individual's identity as Māori. The current study contributes to this wealth of knowledge, in regard to the importance of whānau for Māori identity and wellbeing. Importantly, we acknowledge the thousands of Māori who were part of the MMM-ICE3, who shared their identities and provided us researchers the means to not only validate the scale but to also contribute to Māori identity and cultural engagement research.

Over time, understanding what is appropriate and relevant for Māori identity will be key when using and improving questionnaires for Māori. Research looking at the experiences and outcomes of the Māori population will need to accommodate the many different and complex identities, and lives, of Māori. The MMM-ICE3 aims to appreciate the diverse realities of identity expression and cultural engagement within the Māori population. We hope that the research community will find the MMM-ICE3 to be of use and ultimately valuable for Māori.

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Glossary

Māori	English
hapū	kinship group, clan
iwi	extended kinship group, tribe
kapa haka	Māori performance
kaupapa	purpose, issue, agenda
te ao Māori	the Māori world(view)
Te Kupenga	the Māori Social Survey
Te Puni Kōkiri	Ministry of Māori Development
tūpuna	ancestors
waka	canoe
whakapapa	genealogy
whānau	descent- or purpose-oriented group members

Appendix A. MMM-ICE3 scale norms for Māori men and women in different age brackets in New Zealand.

Gender	Age	N	Group Membership Evaluation		Cultural Efficacy and Active Identity Engagement		Interdependent Self-Concept		Spirituality		Socio-Political Consciousness		Perceived Appearance		Authenticity Beliefs		Whānau Efficacy	
			M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Women	18-25	384	5.60	1.20	4.85	1.30	3.81	1.20	4.88	1.53	5.30	1.26	3.20	1.76	3.43	1.03	4.95	1.55
	26-35	616	5.50	1.30	4.91	1.34	3.75	1.25	5.14	1.56	5.18	1.42	3.74	1.91	3.35	1.08	4385	1.18
	36-45	844	5.50	1.31	5.05	1.31	3.97	1.33	5.37	1.50	5.40	1.35	4.07	1.95	3.46	1.15	4.72	1.18
	46-55	1009	5.40	1.36	4.92	1.41	4.03	1.40	5.46	1.43	5.34	1.40	4.40	2.02	3.55	1.16	4.71	1.18
	55+	1385	5.30	1.40	5.00	1.41	4.32	1.42	5.43	1.50	5.31	1.42	4.34	1.96	3.95	1.20	4.78	1.13
	Subtotal	4238	5.40	1.33	4.97	1.37	4.50	1.37	5.34	1.50	5.31	1.40	4.11	1.98	3.63	1.17	4.78	1.16
Men	18-25	180	4.90	1.35	4.50	1.25	3.51	1.39	3.93	1.78	4.72	1.51	3.24	1.84	3.36	1.13	4.76	1.18
	26-35	289	5.21	1.34	4.67	1.35	3.64	1.38	4.40	1.70	4.71	1.48	3.94	1.90	3.40	1.12	4.73	1.21
	36-45	403	5.32	1.34	4.71	1.41	3.76	1.30	4.70	1.76	5.08	1.43	4.04	1.87	3.53	1.15	4.61	1.08
	46-55	645	5.30	1.34	4.77	1.42	4.08	1.40	4.90	1.70	5.21	1.50	4.50	1.99	3.71	1.15	4.61	1.14
	55+	1105	4.93	1.40	4.60	1.50	4.11	1.44	4.73	1.70	5.05	1.50	4.18	1.99	3.93	1.10	4.60	1.08
	Subtotal	2622	5.10	1.37	4.65	1.42	3.95	1.42	4.68	1.73	5.03	1.48	4.14	1.97	3.72	1.14	4.63	1.12
Overall		6869	5.28	1.35	4.84	1.40	4.01	1.40	5.09	1.62	5.21	1.43	4.12	1.98	3.70	1.16	4.72	1.15

Appendix B. MMM-ICE3 scale norms for Māori who solely identify as Māori or identify as Māori and Pākehā in New Zealand.

Ethnicity	N	Group Membership Evaluation		Cultural Efficacy and Active Identity Engagement		Interdependent Self-Concept		Spirituality		Socio-Political Consciousness		Perceived Appearance		Authenticity Beliefs		Whānau Efficacy	
		M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Sole-identified Māori	2943	5.67	1.19	5.36	1.24	4.52	1.32	5.62	1.38	5.55	1.27	5.10	1.67	3.87	1.23	4.84	1.14
Māori Pākehā	3696	4.97	1.39	4.42	1.38	3.60	1.30	4.65	1.67	4.94	1.49	3.31	1.85	3.49	1.07	4.63	1.14

Appendix C. MMM-ICE3 scale norms by iwi region in New Zealand.

Iwi Region	N	Group Membership Evaluation		Cultural Efficacy and Active Identity Engagement		Interdependent Self-Concept		Spirituality		Socio-Political Consciousness		Perceived Appearance		Authenticity Beliefs		Whānau Efficacy	
		M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Te Tai Tokerau/Tāmaki-makaurau (Northland/Auckland)	1701	5.49	1.28	5.06	1.32	4.19	1.35	5.35	1.55	5.41	1.33	4.34	1.87	3.68	1.15	4.79	1.15
Hauraki (Coromandel)	125	5.42	1.32	5.15	1.26	4.30	1.40	5.50	1.52	5.52	1.41	4.14	1.94	3.76	1.32	4.90	1.26
Waikato/Te Rohe Pōtae (Waikato/King Country)	591	5.68	1.22	5.38	1.27	4.32	1.37	5.61	1.37	5.58	1.30	4.82	1.82	3.76	1.17	4.90	1.13
Te Arawa/Taupō (Rotorua/Taupō)	295	5.60	1.21	5.11	1.31	4.20	1.28	5.32	1.55	5.57	1.23	4.27	1.89	3.50	1.13	4.78	1.10
Tauranga Moana/Mātaatua (Bay of Plenty)	790	5.64	1.23	5.30	1.30	4.40	1.40	5.54	1.46	5.56	1.30	4.70	1.90	3.76	1.22	4.81	1.18
Te Tai Rāwhiti (East Coast)	828	5.60	1.26	5.16	1.30	4.27	1.34	5.33	1.53	5.45	1.34	4.49	1.87	3.61	1.17	4.81	1.15
Te Matau-a-Māui/Wairarapa (Hawke's Bay/Wairarapa)	156	5.86	1.13	5.50	1.07	4.27	1.35	5.77	1.25	5.86	1.12	4.61	1.82	3.60	1.03	4.74	1.22
Taranaki	300	5.43	1.30	4.95	1.38	3.95	1.40	5.18	1.56	5.36	1.38	4.21	2.03	3.60	1.17	4.65	1.15
Whanganui/Rangitīkei (Wanganui/Rangitīkei)	163	5.70	1.23	5.30	1.20	4.36	1.35	5.52	1.37	5.53	1.41	4.57	1.90	3.62	1.13	4.82	1.16
Manawatū/Horowhenua/Te Whanganui-a-Tara (Manawatū/Horowhenua/Wellington)	85	5.86	1.14	5.24	1.25	4.44	1.27	5.51	1.45	5.81	1.25	4.50	2.02	3.61	1.12	4.73	1.17
Te Waipounamu/Wharekauri (South Island/Chatham Islands)	824	4.91	1.41	4.30	1.50	3.52	1.34	4.46	1.73	4.94	1.50	2.98	1.90	3.53	1.07	4.66	1.14