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Financial self-efficacy scale for people living in Aotearoa New
Zealand (NZ-FSES)

Founded at Unitec Institute of Technology in 2015

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Abstract

As indicated by the increased amount of literature that examines the role of financial self-efficacy in current or future financial behaviours, it is important to have a valid and reliable tool to measure financial self-efficacy. This study contributes to this growing area of literature by validating a financial self-efficacy scale with New Zealanders. The sample consists of 303 individuals with diverse ages, cultural backgrounds, genders and educational levels. Results show that the scale has a strong reliability with a coefficient alpha of 0.94, capable of measuring both high and low levels of financial self-efficacy, and is equally accurate for participants of different genders, age groups and cultures.

Background and introduction

As governments all over the world are trying to increase their citizens' financial capability in preparing them for retirement, the financial self-efficacy (FSE) construct has gained increased attention in the past decade as a mediator for financial behaviour change (Farrell et al., 2016; Sturr et al., 2021; Tang & Baker, 2016). Financial self-efficacy is a task-specific concept of general self-efficacy. There are two approaches to understanding self-efficacy; one is from a motivational approach, which explains self-efficacy in relation to "motivation of control," and the other is from a cognitive approach, which identifies

self-efficacy in relation to "experience of control" (Gecas, 1989, p. 292). This paper uses Bandura's social cognitive theory to explain the concept of self-efficacy, which refers to "belief about what can one do under different sets of conditions with whatever skills one possesses" (Bandura, 1997, p. 37).

Bandura (1997) associates self-efficacy with individuals' experience of controlling their own lives, and that their personal experience with successful performance in the past can influence their perceptions about self-efficacy. As Bandura (1997) identifies, self-efficacy is a task-specific concept; its measurement should pertain to a specific area of tasks. Therefore, in this paper, the term financial self-efficacy refers to "one's perceived belief about their ability to manage the tasks associated with personal finance." It is not about individuals' current ability to manage their finance but about the extent to which they feel confident that they can successfully achieve financial tasks. Bandura's social cognitive theory also posits that self-efficacy enhances an individual's ability to solve their problems by motivating them to shape their thought patterns, and efficiently controlling their social environments and behaviours (Bandura & Wood, 1989).

FINANCIAL SELF-EFFICACY AND FINANCIAL BEHAVIOUR

Financial self-efficacy is a critical determinant of an individual's personal financial behaviour. Farrell et al. (2016) surveyed 1542 Australian women to examine the influence of FSE on personal financial behaviour and found that Australian women with high FSE were more likely to save and invest finances and less likely to owe debts compared to women with lower FSE. Tang and Baker's study (2016) conducted with adults in the United States confirmed that FSE can affect an adult's financial behaviour either directly or indirectly. While FSE directly impacted adults' decisions to have more savings, the indirect effect of FSE enabled adults to evaluate their subjective knowledge of finance in order to achieve positive financial-management outcomes and behaviours. Consistent with Tang and Baker's findings, Despard et al.'s (2020) analysis of the National Financial Capability Study's survey data indicated that FSE and subjective knowledge, as well as ownership of savings-bank accounts, were found to be the strongest predictors that enhanced US households to maintain an emergency fund in order to manage an unexpected financial crisis. These results agree with Reyers' (2019) finding, which showed South African households, living both below and above the poverty line, displayed emergency-saving behaviour if they had high self-efficacy and access to bank accounts.

Regarding young adults, several factors affect their financial behaviours. Terri et al. (2011) investigated the factors that predict young adults' advancement in the process of savings from adolescence to young adulthood. They used data from the Childhood Development Supplement (CDS) and the Transition into Adulthood supplement (TA) of the Panel Study of Income Dynamics (PSID) survey conducted in the United States. While the CDS data administered in 2002 assessed whether parents saved finances separately for their adolescents, the TA supplement data administered in 2005 and 2007 examined whether participants who became young adults and were no longer studying at high schools had progressed with their savings. Parental savings were found to be an important factor for young adults to hold higher

amounts as savings. Friedline (2012) recruited 744 children aged 12 to 15 from the CDS data administered in 2007 of the PSID survey to further explore the role of parents' savings on children's financial behaviour. The study explains that children from high-income families whose parents had regular savings for them were more than twice as likely to be involved in college savings compared with children from low- or moderate-income families. Friedline (2012) stated parents' income can also predict whether children are provided with the opportunity to be included in parental savings or not. In contrast, Terri et al. (2011) and Mason et al. (2010) found that household income was not a significant factor in predicting either parents' or children's financial behaviour.

Tali (2016) interviewed 103 first-grade children to explore the factors that prompt children to engage in saving money. The study found parents' attitudes and awareness toward saving money and the child's financial access are major determinants of children's financial behaviour. However, recently, Herawati et al. (2020) surveyed 561 undergraduate students who were studying accounting in seven different universities in Bali. Their findings reveal that parents' socioeconomic status had an indirect effect on undergraduate students' FSE. Financial literacy was found to be the highest for students whose parents had high socioeconomic status, and that increased their FSE more than students whose parents had lower socioeconomic status.

There is evidence that parental financial socialisation (parents' financial practice and how they communicate with their children) plays a crucial role in addressing financial behaviours (Rudi et al., 2020; Zhao & Zhang, 2020; Antoni et al., 2019). For example, Rudi et al.'s (2020) study examined the significance of parenting in predicting FSE among US students during their transition to adulthood. The sample consisted of 850 students having educational loans and 800 students who did not have any educational loans. The study used the term 'borrowers' to indicate students who were under the pressure of meeting the increased expense of higher education and student-loan debts, and the term 'nonborrower' represented students who were financially supported by their families. For nonborrowers, the explicit financial communication before college contributed to a higher FSE. For borrowers, the implicit modelling from parents predicted a higher level of FSE. These results are congruent with studies conducted in South Africa (Antoni et al., 2019; Chowa & Despard, 2014), which confirm parental financial socialisation can positively influence students' financial behaviour. Zhao & Zhang's (2020) study conducted with 6311 US respondents aged 25 to 54 indicates parents' education is a significant factor that can predict the quality of financial socialisation delivered to their children.

Mindra and Moya (2017) identified that an adult's FSE has a full mediating effect in enabling the relationship between their financial-management attitude, financial knowledge and the ability to access formal financial services. Although financial knowledge enhanced an individual's ability to plan and implement strategies for accessing formal financial services, their attitudes and decisions related to making investment decisions were positively influenced by FSE. Henager and Cude (2016) studied the relationship between FSE and long-term and short-term financial behaviour among individuals of different age groups. They found that, compared with older adults, young adults' FSE was positively related to both long-term and short-term financial

behaviours. While young adults were more likely to use FSE to explain their long-term financial behaviours, older adults' objective financial knowledge played a central role in explaining their long-term financial behaviours such as retirement savings. Shim et al.'s (2019) longitudinal survey conducted with first-year college students at Southwestern State University in Georgia, USA, investigated how FSE was linked to students' ability to repay their student loans. The study found that students with higher FSE perceived themselves capable of paying off their student loans compared to students whose FSE was lower.

A study conducted by Hunter and Sawatzki (2019) in New Zealand also found that social, cultural and mathematical knowledge are significant predictors of financial knowledge among Pasifika students aged 10 to 12 years. In the United States, Sherraden et al.'s (2011) study evaluated the effectiveness of providing elementary-school children the opportunity to participate in financial education and savings programmes. The study found that the elementary students who received financial education and were involved in the saving programme ICS (I Can Save) achieved higher financial-literacy test scores and financial capabilities compared to those who had not been exposed to financial education and saving programmes.

The National Strategy for Financial Capability in New Zealand, a government-subsidised operation group formed during the Covid-19 pandemic, set out financial wellbeing of the general population as an important goal to achieve and co-ordinated various programmes through the Commission for Financial Capability (CFFC) (Commission for Financial Capability, 2020a). 'Sorted in Schools,' 'Sorted at Work,' and 'Sorted in Community' are CFFC's financial-capability-building initiatives. CFFC offers Professional Learning Development (PLD) workshops and webinars for teachers to assist students in developing positive financial behaviours through 'Sorted in Schools' programmes nationwide (Commission for Financial Capability, 2020c). The 'Sorted at Work' programme provides the opportunity for employers to select and incorporate appropriate financial-capability-building courses for their employees, to help them progress with their financial wellbeing and organisational performance goals (Commission for Financial Capability, 2019). The 'Sorted in Community' programme works through ten-week courses delivered through community-based organisations including NGOs, churches and public libraries, to help build people's knowledge and skills on personal financial planning, financial savings schemes such as KiwiSaver, and making investments through owning houses and insurance policies (Commission for Financial Capability, 2020b).

Moreover, Building Financial Capability services, offered by the Ministry of Social Development in New Zealand, have been strengthened to help people recover from the financial shocks of Covid-19. Various strategies include providing people with the service of financial mentors to help them develop strength-based financial plans, and facilitating people to be involved in collective learning on financial management. MoneyMates group meetings, offered by a number of budget services across New Zealand such as Christian Budgeting New Zealand (CBNZ), and MoneyTalks, a free financial helpline service provided by the Ministry of Social Development, are extended to increase the financial self-efficacy of the population (Ministry of Social

Development, 2020).

In New Zealand, Massey University's Financial Education and Research (Fin-Ed) Centre is conducting a 20-year longitudinal study to address New Zealanders' attitudes and behaviours related to financial management and changes over different stages at five-year intervals. The first stage of the study was conducted with young adults aged 18 to 22 (Stangl & Matthews, 2012). Even though young New Zealanders acquired financial knowledge from their parents, the application of knowledge was not found to be significant at the age of 18 to 22. Participants' attitudes towards saving finances were shaped by emotions such as "sense of belonging," "excitement," "self-fulfilment," "fun and enjoyment," "security," "sense of accomplishment" and "being well-respected" (p. 23). In 2019, the second stage of the study was conducted when participants were aged 23 to 27. The participants noticed that their financial self-efficacy and financial literacy significantly increased over five years (Matthews et al., 2019).

EXISTING MEASUREMENTS OF FINANCIAL SELF-EFFICACY

In a previously published article, the author has discussed several existing FSE measurements and their pros and cons (Nguyen, 2019). There appears to be only one new scale that has been developed and tested since. Hoge et al. (2020) developed an economic self-efficacy scale and tested it with a sample of women who had experienced domestic violence. They developed ten items for the scale, based on Schwarzer and Jerusalem's (1995) General Self-Efficacy Scale. The items were revised to reflect financial-management tasks, such as: "I can solve most financial problems if I invest the necessary effort," "If I am in financial trouble, I can usually think of something to do," "If I have a financial problem, I can find ways to get what I need," "Thanks to my resourcefulness, I know how to handle unforeseen financial situations," "I can remain calm when facing financial difficulties because I can rely on my financial abilities," "I am confident that I could deal efficiently with unexpected financial events" (Hoge et al., 2020, p. 3021). The scale showed strong reliability, with a Cronbach's alpha coefficient value of 0.88. In terms of validity, Hoge et al. (2020) indicated that the concurrent validity of the scale is sufficient, through strong correlation results with other relevant economic concepts. However, the sample of the study is limited to volunteers from one domestic violence agency and was only tested with women who have experienced domestic violence.

Research Methods

RESEARCH METHODOLOGY

This study adapted the Women's Financial Self-Efficacy Scale (WFSES) that the author developed and tested with women in the United States (Nguyen, 2019), and tested it with people living in Aotearoa New Zealand. Given that no standardised tool to measure financial self-efficacy has been validated with New Zealanders, this is a crucial step to enable researchers to conduct a rigorous evaluation in the future.

The study sought to examine the reliability and validity of the scale, using a quantitative approach. Specifically, it examined whether the adapted scale shows robust psychometric properties and whether the scale positively correlates with the standardised General Self-Efficacy Scale (Chen et al., 2001).

The WFSES was validated with a sample of female participants in the United States, and showed an excellent reliability of 0.93 and a very good validity (correlation with another standardised measurement at 0.43) (Nguyen, 2019). Existing items from the WFSES were revised and the irrelevant items were removed to fit with the financial system in New Zealand. Input from experienced budgeting educators in New Zealand were included in the item revision process.

In terms of reliability testing, the split-half method and internal consistency method (coefficient alpha) were used. Content-related validity, criterion-related validity and construct-related validity were examined to test the validity. To examine the content-related validity, the scale was reviewed by two financial educators who were experts in financial management and a senior researcher to see whether it covered all the important domains and contents of the financial self-efficacy construct. Response-related validity was examined through think-aloud interviews. Five intermediate-school students were asked to speak their thoughts out loud while taking the scale, to see if there was any item that was confusing, hard to understand, or could be understood in different ways. Criterion-related validity and construct-related validity were tested by comparing the results obtained through the self-efficacy scale with the results of the New General Self-Efficacy (NGSE) scale, which is a widely used standardised scale with a coefficient alpha of 0.85 (Chen et al., 2001).

DATA COLLECTION

Data were collected via both online and paper-based surveys. Students from two schools (an intermediate and a secondary school) who participated in their schools' financial capability programmes were invited to take the scale. An information sheet and consent form were distributed to students to seek permission from their parents before they undertook the survey. Other channels used to recruit participants included the student email list and the staff forum of a tertiary institute; the newsletter of a non-profit organisation; and the website of the Aotearoa New Zealand Association for Social Workers (ANZASW). Intermediate-school students were given paper surveys by teachers to fill in during class, and the rest were distributed online using Google forms. The online survey also had the informed-consent form on the first page, and included both the NZ-FSES and the NGSE scale.

SAMPLE

There were 303 participants in total, which exceeds the minimum sample size of 100 required for item analysis. Three quarters of the participants were female and the rest identified as male. Nearly half of the participants were European (43%), followed by Pasifika (18%), multi-cultures (15%), Māori (12%), Asian (8%), African (3%) and Middle Eastern (2%). The sample had a representation of almost all cultures in New Zealand. Children under 18 years

TABLE 1. DEMOGRAPHIC INFORMATION OF PARTICIPANTS (N=303).

Characteristics	Category	Total	%
Gender	Female	210	69%
	Male	93	31%
Age	11-17	107	35%
	18-30	38	12%
	31-40	25	8%
	41-50	48	16%
	51-60	48	16%
	61+	37	13%
Culture	European	131	43%
	Māori	35	12%
	Pasifika	54	18%
	Asian	24	8%
	African	8	3%
	Muslim/Middle Eastern	7	2%
	Multi-culture(s)	44	15%
Financial-literacy training	Yes	116	38%
	No	187	62%
Education	Intermediate school	83	28%
	Secondary school	48	16%
	Undergraduate degree	79	26%
	Postgraduate degree	89	30%
Income	Less than $25,000	52	18%
	$25,000 – $50,000	44	15%
	$50,000 – $75,000	65	22%
	$75,000 – $100,000	34	12%
	More than $100,000	16	5%
	Not applicable	83	28%

old accounted for 35% of the participants. One fifth were young people under 40 years old. Among the middle-aged and elderly, 16% were between 41 and 50, 16% were between 51 and 60, 12% were between 61 and 70 and 1% were over 70 years old. The majority of the participants had lived in New Zealand for more than three years (97%). More than half of the participants either had an undergraduate or graduate degree. Twenty-eight percent had studied to intermediate-school level, and 16% had studied to secondary-school level. Nearly 40% of the participants had received some form of financial-literacy training.

DATA ANALYSIS

The authors used R (R Core Team, 2019) to analyse the data, with consultation from an R expert. Traditional item analysis was used to calculate item difficulty, item discrimination and coefficient alpha. Furthermore, the Item Response Theory (IRT) framework was used to review item characteristic curves for individual items and test information function for the instrument. All these results provided information about the difficulty of the items, how well they correlated with each other, how well the scale worked and how good the internal consistency was. Correlation analysis was used to test the criterion-related validity and construct-related validity. In addition, Differential Item Functioning (DIF) analysis was conducted to explore the difference in response in terms of gender and cultures. DIF analysis is a common method to examine the measurement invariance of instruments based on demographic subgroups (e.g., gender, ethnicity and socioeconomic status). DIF analysis involved techniques such as the Mantel-Haenszel method, logistic regression, or structural equation modelling to assess the difference in responses between two or more groups (item bias) (McGovern & Lowe, 2018).

Results

RELIABILITY

The item analysis results showed that the distribution was fairly normal. The skewness was -0.51. The scores ranged from a minimum of 16 to a maximum of 80. The mean and median were similar (57.26 and 58). All items indicated a high item total-correlation, suggesting that they can distinguish low and high levels of financial self-efficacy. The lowest item total-correlation was 0.58. The reliability analysis yielded a high coefficient alpha of 0.94. This reliability result is similar to the previous validation with women in the United States that yielded a coefficient alpha of 0.93 (Nguyen, 2019).
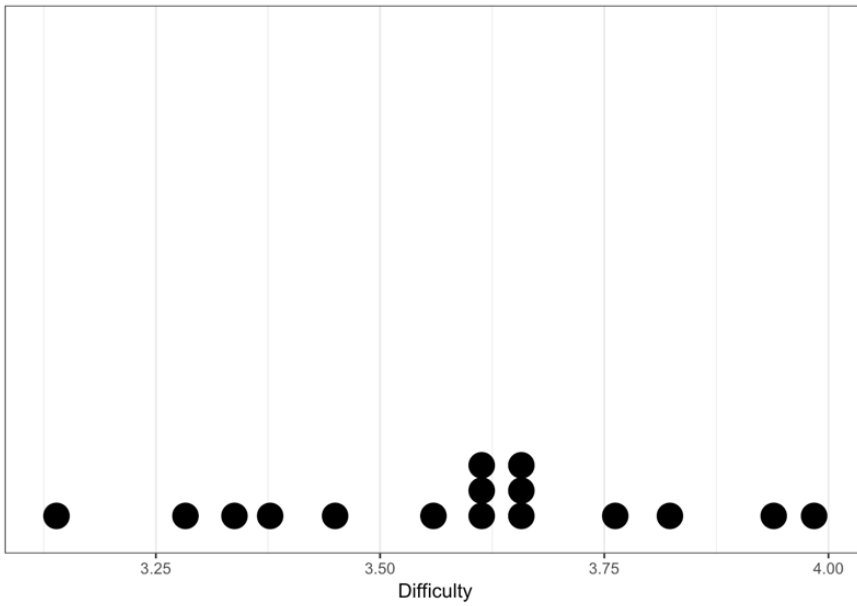
Item Difficulties

Figure 1. Item difficulties.

Figure 1 shows the level of difficulty of the items. Each dot represents the average item score from each item (i.e., the average of responses on a five-point scale used in the NZ-FSES). Figure 1 shows that most of the participants selected 3 or higher on the ranking scale, representing high levels of confidence.
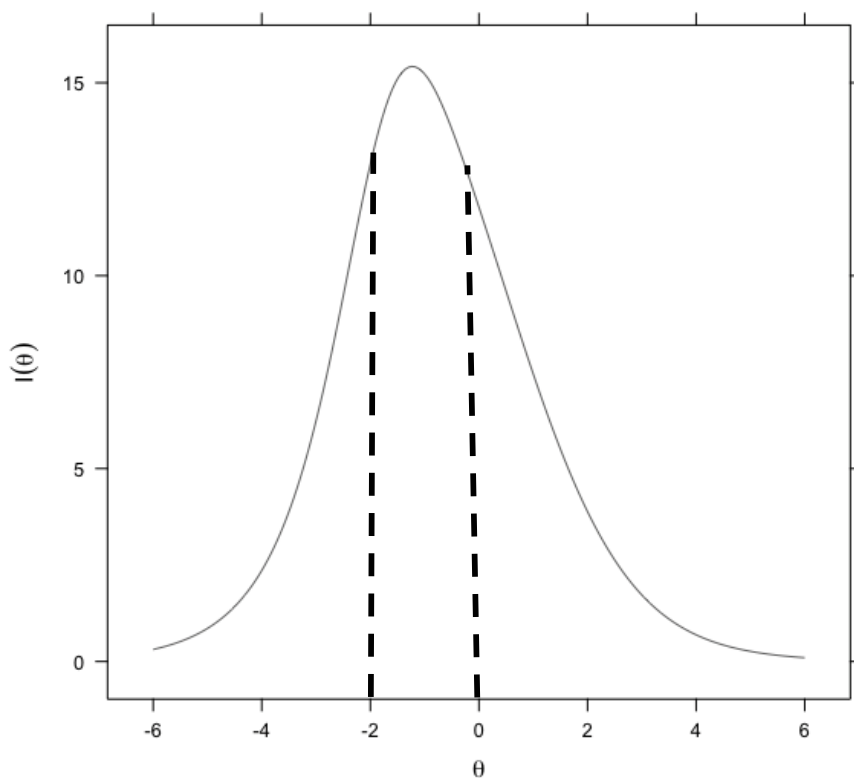

Figure 2. Test information plot.

Figure 2 shows the test information plot for the NZ-FSES. The test information plot indicates how informative (i.e., accurate) the scale is given the latent trait of financial self-efficacy. The x-axis represents financial literacy on a logistic scale (ranging from -6 to 6 where high values indicate higher financial self-efficacy). The y-axis represents the amount of information (accuracy) of the scale. As shown in Figure 2, the NZ-FSES is capable of measuring both high and low levels of financial self-efficacy. It should also be noted that the peak point is ranging between -2 and 0, which means the scale seems to measure low to moderate levels of financial self-efficacy more accurately.

VALIDITY

The content-related validity and the response-related validity were examined for the items of NZ-FSES. Even though the researcher had previously checked the content- and response-related validity with WFSES, the items that were adapted into the NZ-FSES went through an additional validity check. Two financial educators reviewed the items and concluded that the items covered the main domains of financial management and were appropriate to measure the concept of financial self-efficacy.

The think-aloud interviews with five intermediate-school students showed that students had no difficulty in understanding most of the items. However, one item phrased "make ends meet" was found to be harder for some students to understand and hence the item was rephrased to make it easier for young people to understand. The initial rephrasing of the item "I can make ends meet on a limited income" was further reworded into "I can manage on a limited income."

Additional validity evidence was obtained through examining how well the NZ-FSES correlated with the NGSE scale, a well-cited standardised measurement on general self-efficacy (Chen et al., 2001). The correlation between the two measurements showed a result of 0.54, which seems to be adequate for criterion-related validity, as Murphy and Davidshofer (2005) indicate most validity coefficients were not more than 0.5.

MEASUREMENT INVARIANCE

According to McGovern and Lowe (2018), measurement invariance "is when a test or scale is found to measure the same construct in the same way across different groups of people" (p. 1035). It is important to have evidence for measurement invariance as it is related to measurement bias (the extent to which a participant's score is being affected by their demographic characteristics rather than their true ability) (McGovern & Lowe, 2018).

In this study, DIF analysis was used to examine measurement invariance between different ethnic and gender groups. In terms of ethnicity, the author grouped participants into European (Pākehā/white) and non-European (non-Pākehā/non-white) groups. The European group comprises of people who identified themselves as European/Pākehā/white and non-European comprises of the rest, who identified themselves as Māori, Pasifika, Asian, African, Middle Eastern and multi-cultures. Figure 3, below, shows that the peak points of European and non-European groups are similar, and the test information curves are almost overlapped, which suggests that the NZ-FSES is equally accurate for European and non-European participants.
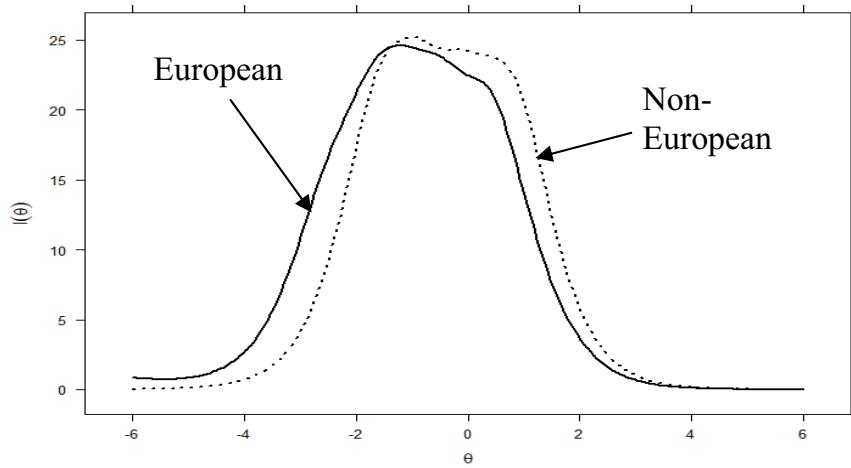
Figure 3. Measurement Invariance Analysis between European and non-European groups.
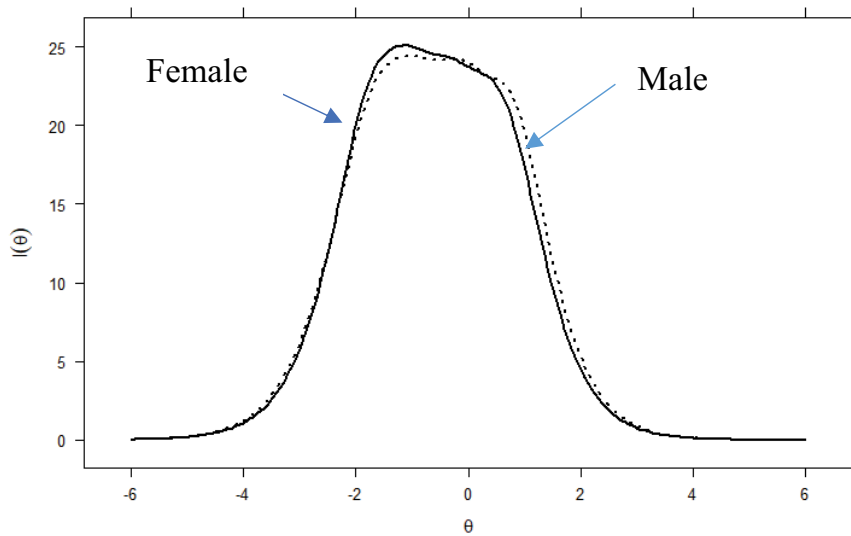

Figure 4. Measurement Invariance Analysis between male and female groups.

Figure 4 shows that, in terms of gender, the scale also functions very similarly for males and females, as the test information curves are overlapping very closely.

SHORTER SCALE

Although the NZ-FSES was adapted from the shorter version of WFSES (16 items), the scale could still be shortened further. Based on the item information function (Figure 5), the following items could be removed: X1 (I can keep track of my spending to see where I need to make changes), the test information of this item did not provide much information regarding people's ability; X2 (I can pay my bills on time), covers a narrow range of financial self-efficacy; X6 (I can set financial goals for my future well-being), this item is similar to item X7 (I can develop a plan to achieve my financial goals); X12 (I can save money regularly for future goals), the content of this item is covered in X11 and X13. Please see Table 2 for both versions of the NZ-FSES.
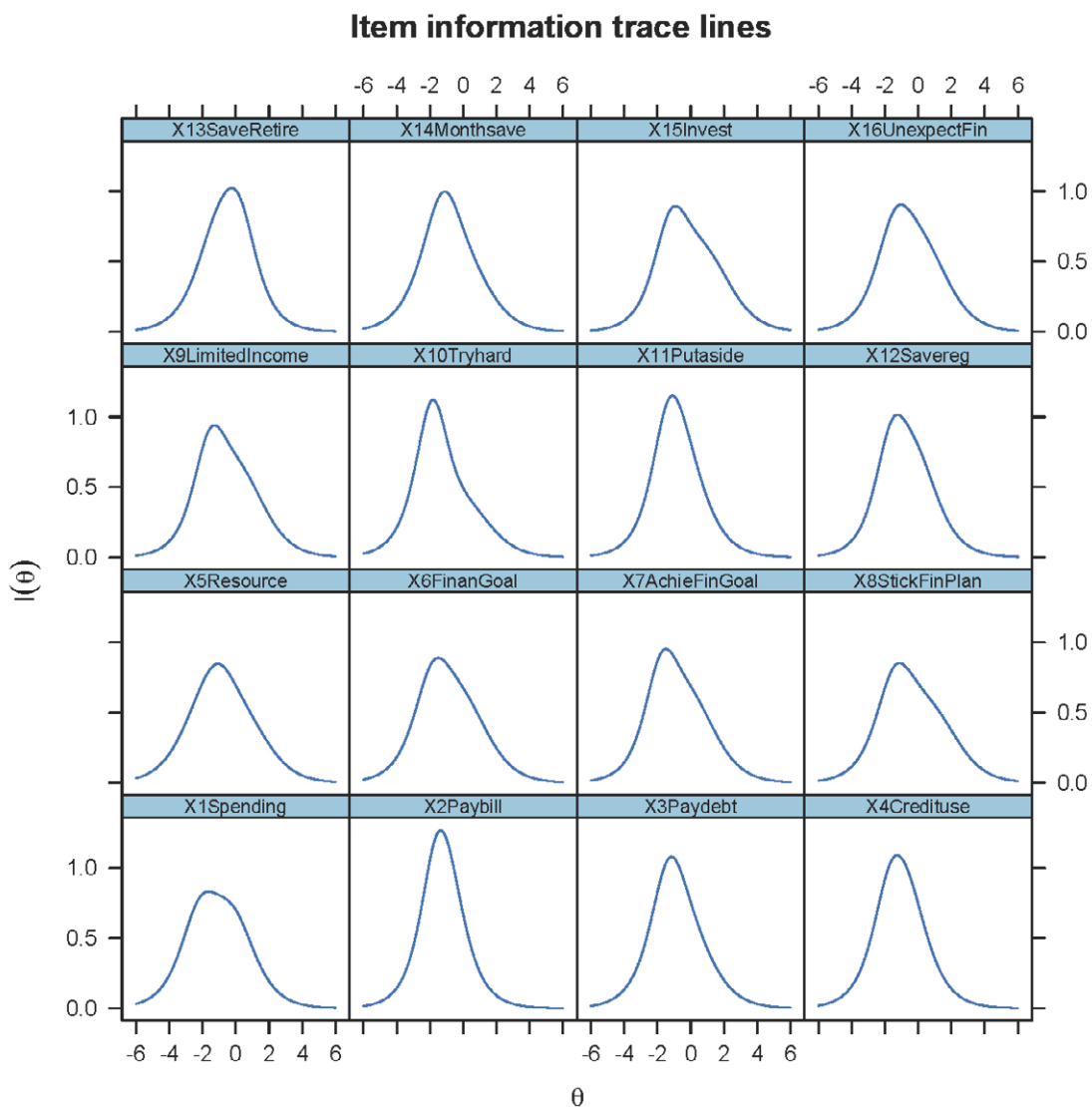

Figure 5. Test information function for each item.

TABLE 2. FULL AND SHORTENED VERSIONS OF NEW ZEALANDERS' FINANCIAL SELF-EFFICACY SCALE.

Instructions for taking the scale:

– *Please* circle the appropriate number *in each statement* to rate how confident you are in taking *the financial actions listed below.*

– Note*: You do NOT need to be actually doing the actions now to rate yourself high. Instead, this is about the extent of your confidence in* thinking that you can *do the actions.*

– *Use the scale below to rate each item.*

1	2	3	4	5
Not confident at all		Moderately confident		Highly confident

Full scale	Shortened scale
1. I can keep track of my spending to see where I need to make changes. 2. I can pay my bills on time. 3. I can figure out ways to pay off my debt as early as possible. 4. I can reduce my use of credit by making good spending decisions. 5. I can find resources to help me solve a difficult financial problem. 6. I can set financial goals for my future well-being. 7. I can develop a plan to achieve my financial goals. 8. I can stick to my financial plan. 9. I can manage on a limited income. 10. I can achieve my financial goals if I try hard enough. 11. I can put aside some money for future unexpected expenses. 12. I can save money regularly for future goals. 13. I can save for retirement. 14. I can figure out how much money I can save per month. 15. I can invest my savings appropriately. 16. I can be prepared to handle unexpected financial problems.	1. I can set financial goals for my future wellbeing. 2. I can achieve my financial goals if I try hard enough. 3. I can develop a plan to achieve my financial goals. 4. I can figure out how much money I can save per month. 5. I can put aside some money for future unexpected expenses. 6. I can figure out ways to pay off my debt as early as possible. 7. I can reduce my use of credit by making good spending decisions. 8. I can find resources to help me solve a difficult financial problem. 9. I can manage on a limited income. 10. I can save for retirement. 11. I can invest my savings appropriately.

Discussion

Although this scale used the items from the Women's Financial Self-Efficacy Scale (WFSES), it was tested with both men and women, and also children, in New Zealand. The results show very good reliability and validity scores for all groups. In addition, given the diversity of the sample this time, the researcher was able to run Differential Items Functioning (DIF). Thus, an additional validity

measure was undertaken for the scale, assuring users that the measurement is accurate regardless of gender, age or ethnicity of the participant.

In this study, the researcher used the 'item information' function to find the items that conveyed similar information about financial self-efficacy and the items that did not differentiate participants effectively. This resulted in the formation of a shorter scale, with 11 items instead of 16 items, which would greatly enhance the efficiency of data collection in future research by saving time and cost. Given that the scale has now been tested in both the United States and New Zealand, and has shown very good reliability and validity results both times, it can be used to measure an individual's financial self-efficacy in other developed countries with similar financial systems and contexts.

Compared to the previous testing, in which the sample was skewed toward people who have higher education and high socioeconomic status, the current sample is much more diverse in terms of education level (44% have a high-school completion or below, 26% have an undergraduate degree and 30% have a postgraduate degree) and annual personal income (18% earn less than 25K, 15% earn 25–50K; 22% earn 50–75K; 17% earn more than 75K). This would give researchers the confidence to use the scale with people from lower socioeconomic groups. The test information function plot (Figure 2) also shows that the scale differentiates better among people at the lower end of financial self-efficacy. Although the sample in this study is diverse and has representation from a wide range of age, gender and ethnic groups, it is a non-random sample. Therefore, the generalisation of the results is limited.

Given that the scale has now been validated with different genders, ages and cultural groups, researchers and practitioners could use the scale to compare the level of financial self-efficacy among different groups. It could be used in experimental or longitudinal studies to track the changes in financial self-efficacy. Given that the scale has only been tested in developed countries, it would be beneficial to test it in a developing country where the financial system and financial literacy are different.

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