

DOES INCOME CAUSALLY AFFECT MULTI-DIMENSIONAL WELL-BEING? A
NATIONAL LONGITUDINAL PANEL STUDY

BY

AMY HE DU

A thesis submitted to the Victoria University of Wellington
in fulfilment of the requirements for the degree of
Master of Science
in Cross-Cultural Psychology

Te Herenga Waka — Victoria University of Wellington

2022

Acknowledgements

I would like to thank my supervisor, Joe Bulbulia. His wisdom and work ethics inspired me. The past year and half were filled with challenges, and I would not have made it without his professionalism, generosity, understanding and encouragement.

Tables of Contents

Acknowledgements	ii
Table of Contents	iii
Abstract	iv
List of Figures and Tables.....	v
Introduction	1
The Question	1
The Conceptual Challenge: Dimensions of Well-being	1
More Money, Better Well-being? Theories of Income and Well-being.....	4
The Inferential Challenge	7
The Points of Difference in this Thesis.....	11
Methods	12
Panel Data Collection	13
Participants	13
Exposure variable.....	13
Multi-dimensional Well-being Outcomes.....	14
Data Analysis	19
Results	21
Discussion Study 1	24
Study 2	27
Methods	28
Results	29
Discussion Study 2	33
Study 3	37
Methods	38
Results	39
Discussion Study 3.....	42
General Discussion	46
References.....	51
Appendix A.....	68
Appendix B	78

Abstract

We investigate the popular hypothesis that income improves well-being by combining national-scale longitudinal data with the outcome-wide framework of causal epidemiology. We first consider theories of income and well-being, the conceptual challenge of defining well-being, and the inferential challenge in testing hypotheses using observational data. We then conducted three studies that attempt to address these challenges. Contrary to the hypothesis that income improves well-being globally, Study 1 finds that the scope of self-reported improvement in well-being is limited to life satisfaction, permeability of individual, power dependence, satisfaction with living standard, satisfaction with future security and occupational status. This observation raises the measurement challenge of self-reported household income. In Study 2, we repeat the approach in Study 1 using an objective measure of occupational status as the exposure. We find that increases in occupational status increases well-being across a broader bandwidth of wellbeing outcomes than does an increase in self-reported income. In Study 3, we investigate whether a subjective measure of wealth, namely satisfaction with standard of living, improves multi-dimensional well-being outcomes. And if so, which? Results are broadly consistent with Study 1 and 2. However, it is subjective satisfaction with one's standard of living that has the strongest effects.

List of Figures

Figure 1. Directed Acyclic Graph for Causal Inference in Longitudinal Data based on VanderWeele et al. (2020) developed for the New Zealand Attitudes and Values Study (NZAVS), adapted from Bulbulia (2022).....	9
Figure 2. Causal Effects of Log Income on Kessler-6 Distress and Meaning in Life	23
Figure 3. Causal Effects of Occupational Status on Meaning in Life and Perfectionism.....	30

List of Tables

Table 1. Characteristics of Sample in Year 2018.....	13
Table 2. Longitudinal Association between Household Income with Well-being Outcomes	21
Table 3. Longitudinal Association between Household Income and Occupational Status with Well-being Outcomes	32
Table 4. Longitudinal Association between Household Income and Standard of Living Satisfaction with Well-being Outcomes	40

Does Income Causally Affect Multi-Dimensional Well-being? A National Longitudinal Panel Study

The Question

Income is often used as a proxy for human well-being . However, do changes in income cause changes in well-being? If so, which dimension of well-being does income affect? What are the magnitudes of such effects? These questions are of longstanding interest to psychological scientists, philosophers, and more recently, to governments seeking to promote well-being. Here, we consider, theories of income and well-being, the conceptual challenge of defining well-being and the inferential challenge in testing hypotheses using observational data.

The Conceptual Challenge: Dimensions of Well-being

Well-being is one of the most researched concepts in psychology. Yet, its conceptual complexity means that different groups of researchers have taken different focuses to understand it. Psychological scientists distinguish between hedonic well-being and eudaimonic well-being. Hedonic well-being, also referred to as “subjective well-being” (Diener, 2009), “emotional well-being”, or simply “happiness” (Ryan & Deci, 2001), pertains to the presence of positive emotions and the absence of negative emotions (Diener et al., 1985). From a more elaborate view, Diener et al. (2010) created the 6-item Scale of Positive and Negative Experience that includes the feelings of good, positive, pleasant, joy, happy, and contented, and the feelings of negative, bad, unpleasant, sad, angry, and afraid. Baumeister et al. (2013) suggest that this simple form of happiness is rooted in our biological nature, which arises when basic needs are satisfied. This could also mean that negative feelings arise when basic needs are not satisfied.

Philosophers have claimed that positive emotions alone are insufficient for a good life (Aristotle, 1985; Mill, 1957). A good life, “eudaimonic well-being”, or “psychological well-

being”, means realising and living in accordance with one’s true self (Norton, 1977), or actualising human potentials (Aristotle, 1985; Ryan & Deci, 2001). Eudaimonic well-being is characterised by higher cognitive states, as people reflect on their internal psychological states and evaluate on the meaning of these states. These higher states of well-being are rooted in our culture, as they require us to interpret and evaluate circumstances in relation to ourselves across time according to culturally mediated values (Baumeister et al., 2013).

However, there is yet to be a unified definition of eudaimonic well-being in social sciences research (Kashdan et al., 2008; see Waterman, 2008 for a discussion). For example, Deci and Ryan (2001) proposed three factors of eudaimonic well-being including autonomy (also called locus of control), competence, and belonging. Later, Diener et al. (2010) proposed an eight-item flourishing scale that includes purpose and meaning, supportive relationships, engagement, contribution to others, competence, optimism, being respected by others, and being a good person. Ryff (1989, 1995) proposed six factors including self-acceptance (also called self-esteem), positive relations with others, autonomy, environmental mastery, purpose in life, and personal growth. Compared to hedonic well-being, eudaimonic well-being is arguably harder to achieve as it pertains to a much more diverse range of higher states, also rendering more disagreements to its conceptualisation.

Several prominent psychologists of well-being have promoted their theories of holistic well-being, or flourishing. For example, Martin Seligman (2011), who popularised the study of positive psychology, proposed that human flourishing is consisted of positive emotions, engagement, relationships, meaning and achievement. More recently, Tyler VanderWeele (2017) theorises that a holistic measurement of human flourishing should include at least happiness and life satisfaction, mental and physical health, meaning and purpose, character and virtue, and

close social relationships. VanderWeele also considers financial and material stability as important to allowing a person to flourish over time, rather than just momentarily. VanderWeele (2017) agrees that his conceptualisation is a minimum set of well-being indicators that are subject to additional variations for different populations.

Rather than seeking conceptual agreement about the categories of well-being, we might simultaneously investigate all the categories as outcomes, shifting our attention to multi-dimensional flourishing. This approach is also recommended by Tyler VanderWeele (2017, 2020), referred to as the outcome-wide approach. The outcome-wide approach presents many benefits for science. First, by including an extensive range of well-being measures in the same study, researchers efficiently provide the research community more information. Different interest groups can then take different parts of the results to inform their more specific research questions. Second, by presenting all results, this will reduce the “researcher degrees of freedom” of only reporting the results that align with our expectations (VanderWeele et al., 2020). Researchers are often tempted to retrospectively adjust the model after seeing the results, to produce significant and hence publishable results. This phenomenon is called “p-hacking”, which is partly responsible for the replication crisis in psychological science (Open Science Collaboration, 2015). Addressing this issue, the outcome-wide approach allows us to report relationships between the interested exposure with a wide list of outcomes, which can include the results that show an reliable effect as well as null results (VanderWeele et al., 2020).

Third, by assessing a large set of well-being measures simultaneously applying the same set of covariate controls and using the same sample, we can directly compare effect sizes. This is otherwise not possible by post-hoc analysis of separate studies that applied different controls and used different samples. This is because, when different covariates are applied to the same set of

exposure-outcome relationship, the effect sizes can be different, as a specific confounder could contribute to the effect size. And when different samples are used, certain sample characteristics such as age or ethnicity could be responsible for the observed effects. With the outcome-wide approach, we use the same set of covariate controls to all investigated relationships in the same sample. Overall, we do not intend to provide a new definition of well-being. Rather, we aim to provide an integrative framework for understanding well-being with few prior theoretical constraints.

More Money, Better Well-being? Theories of Income and Well-being

The question “Does money buy happiness?” has been a topic of longstanding scholarly debates (Easterlin, 1973, 1995; Kahneman & Deaton, 2010; Stevenson & Wolfers, 2008). Past associational studies suggest a positive relationship between income and subjective well-being. One of the earliest works on this topic proposed that a society’s economic development is not linked to its average level of happiness, referred to as the famous “Easterlin paradox” (Easterlin, 1973, 1995). Following this work, Stevenson and colleagues (Stevenson & Wolfers, 2008, 2013; Sacks et al., 2012) reanalysed a number of international cross-sectional datasets and find that overall, the average estimate of the association between subjective well-being and household income is 0.38, with the majority of the estimates between .25 and .45. As their analyses focused on establishing the magnitude of the bivariate associations, they were unable to rule out the impact of reverse causation on these effects. Other studies find that more income is associated with lower levels of psychiatric disorders (Muntaner et al., 1998), greater life satisfaction (Diener et al., 2010; Kobau et al., 2010; Lucas & Schimmack, 2009), greater happiness and less daily stress (Sengupta et al., 2012). Isaacs et al. (2018) find that 1 in 4 people among the poorest one-fifth of Australians have high levels of psychological distress, which is in sharp contrast to about

1 in 20 people in the richest one-fifth of Australians. In one of the few longitudinal studies, Orpana and colleagues (2009) analysed 12 years (1994-2007) of survey data and find that lower household income was associated with greater risk for psychological distress in Canada. Although longitudinal, their study does not use causal inferential methods. The longitudinal association is therefore a statistical association and not a causal estimand.

Researchers have also been interested in the contrast between emotional wellbeing, which is the presence of positive affect and the absence of negative affect, and evaluative well-being, which is life satisfaction. Kahneman and Deaton (2010) observed that while higher log income predicts greater life satisfaction, emotional well-being does not increase beyond an annual income of \$75,000. Emotional well-being is operationalised as the presence of happiness, enjoyment and frequent smiling and laughter, and the absence of worry and sadness. This study used categorical income measures and used a US sample. Concerned with the satiation is due to using categorical income, Jebb and colleagues (2020) used a continuous measure of income and analysed data from 164 countries. They find a global plateau between \$60,000 to \$75,000 annual income for emotional well-being, and that life satisfaction also plateaus at \$95,000. However, the satiation tends to occur later at higher income levels in wealthier world regions. In a response to the two studies that find a point of satiation, Killingsworth (2021) implemented several methodological changes including using a continuous measure of emotional well-being and using experience sampling to ask people how they feel at a dozen of occasions to minimise memory errors. He finds that log income is robustly associated with both greater emotional well-being and life satisfaction, and there is no plateau for emotional well-being above \$75,000 annual income, or at any income level between \$10,000 to \$500,000. Specifically, emotional well-being was operationalised as higher levels of positive feelings, which is the average of

confident, good, inspired, interested and proud, and lower levels of negative feelings, which is the average of afraid, angry, bad, bored, sad, stressed, and upset.

Fewer research investigated the association between income and eudaimonic well-being. Several studies find a positive association between income and meaning in life (Kobau et al., 2010; Piquart, 2002; Ward & King, 2016, 2019). Steward et al. (2009) find that respondents above Canada's low-income cut-offs had an odds of reporting a sense of belonging that was 2.31 times higher than those below the cut-off line. Ryff and Singer (2008) suggest that a person's self-realisation (or self-actualisation) is nurtured by their surrounding context such as levels of education, income, or occupational status. In other words, those at the low end of the socioeconomic status hierarchy would have diminished opportunities and resources to make the most of their lives, and hence lower eudaimonic well-being. Contrary to the positive association of these results, Waterman et al. (2010) find that in two large samples of US college students, the highest eudaimonic well-being scores were reported among students whose family income was from below US\$30,000 to \$50,000, and the lowest scores corresponded with family income from \$50,000 to above \$100,000. This study used a different six factor measurement of eudaimonic well-being, which included self-discovery, potential development, purpose and meaning, involvement in activities, effort investment, enjoyment of activities as personally expressive. The direction of this relationship suggests the need of a more careful assessment.

What is the relationship between income and physical health? In a 1999 study (Ecob & Davey Smith, 1999), log household income is positively associated with physical health as measured by height, waist-hip ratio, respiratory function, malaise, limiting long term illness. Ettner (1996) finds that increases in income significantly improved mental and physical health, though alcohol consumption also rises with income. In a UK panel survey from 1991-1997,

Benzeval and Judge (2001) used an income measure that precede the health outcomes, and controlled for initial health status in their statistical model to determine causal direction of the relationship. They find that higher income causes better self-reported physical health.

The Inferential Challenge

Although extensive research attention has been dedicated to the statistical association between income and well-being, causation remains unclear. Most social science studies, even longitudinal studies, do not attempt to evaluate the causal effect of income on dimensions of well-being. However, epidemiological methods for causal inference provide tools for addressing the fundamental question of interest. In cross-sectional studies, causal inference is arguably intractable. There are some instances that causation can be inferred from observational results, such when it is logically impossible for reverse causation. For example, demographic variables such as age and biological sex cannot be caused by other socio-psychological variables, except for perhaps one's parents' age and various genetic elements. However, notice that these examples require strong, uncontroversial assumptions. Without strong assumptions about the direction of causation, we cannot estimate causal effects from cross-sectional studies. For example, when a study finds that more income is associated with higher levels happiness, it is possible that more income makes people happier. However, it is also possible that happier people go on to earn more money (Diener et al., 2002; Graham et al., 2004; Marks & Fleming, 1997). Similarly, simply investigating association in longitudinal data will not yield causal estimands.

Outcome-wide Causal Inference

To address the causal inferential challenge, we will use a longitudinal dataset (Sibley, 2021), and adopt an outcomewide approach designed for causal inference in longitudinal data (VanderWeele et al., 2020). This method is commonly used in epidemiology studies

(VanderWeele, 2017a). Longitudinal datasets are rare for a reason. The administration of the survey and the data collection processes are both capital-intensive and time-consuming. Most researchers do not have the luxury to conduct their own longitudinal study. The collected data is also labour-intensive to clean. And the analyses of such large datasets require computers that have high computational power. For the current study, we used the existing longitudinal national panel dataset from the New Zealand Attitude and Values Study (NZAVS; Sibley, 2021). Started in 2009, the NZAVS is a 20-year national panel study of social attitudes, personality, and health outcomes of more than 60,000 New Zealanders (Sibley, 2021). For each year, the same set of variables are collected from the same population, which allows us to implement the analytical strategies described below.

To answer the causal question, does income causes greater well-being, we need to first define a contrast in the exposure of interest. In Study 1, we will contrast between two levels of income and estimate the resulting change in each of the continuous well-being outcomes. In Study 2, we will contrast between two levels of occupational status and estimate the resulting change in each of the continuous well-being outcomes. In Study 3, we will contrast between two levels of satisfaction with standard of living and estimate the resulting change in each of the continuous well-being outcomes.

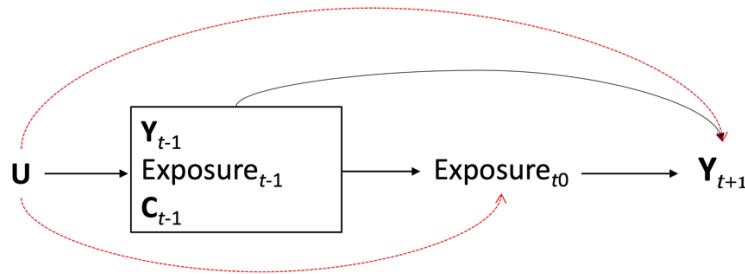
Because more than one-level exposure cannot be observed in any individual at the same time, we cannot infer individual-level causal effects. However, if certain assumptions are satisfied, we infer average effects in the populations of interest (for more details, see Bulbulia, 2022; VanderWeele et al., 2020). We call the contrast in the expected mean outcomes the marginal causal effect. We identify the marginal causal effects at the level of groups of individuals who are experiencing different levels of exposure (Bulbulia, 2022b).

Here, we focus on the assumption of conditional exchangeability, which requires confounding control. We use three waves of data from the NZAVS for our statistical model for causal inference. Controlling for a rich set of confounders in the baseline year 2018, we will assess the causal relationships between the exposure variable, household income, in 2019, and the well-being outcomes in 2020. The steps are as follows:

First, we need to set the exposure variable temporally prior to the outcome variable (see Figure 1). This is to mirror the cause-and-effect relationship embedded in common sense and in our language, that the cause always occurs temporally before the effect. With more than two waves of data available from the NZAVS, we can satisfy this requirement.

Figure 1.

Directed Acyclic Graph for Causal Inference in Longitudinal Data based on VanderWeele et al. (2020) developed for the New Zealand Attitudes and Values Study (NZAVS). Adapted from Bulbulia (2022).



Note. U = Unmeasured confounders; C_{t-1} =Confounders at $t-1$, where $t-1$ is the baseline time temporally prior time t ; $Exposure_{t-1}$ =Exposure variable at baseline; Y_{t-1} =Outcome variable at baseline; $Exposure_{t0}$ =exposure variable at time 0, Y_{t+1} = outcome variable at time $t+1$ which is temporally after time t .

Second, we control for the outcome prior the time of baseline exposure, at $t-1$, shown as Y_{t-1} in Figure 1. This step is to mitigate reverse causation. For example, we want to assess whether happiness causes income. By controlling the level of income prior to the time that we measure happiness, we mitigate the influence of prior income on happiness. Then, we can be more confident that the association we observe between income and happiness is not due to happier people are more likely to make more money. This is an important step as the baseline outcome is often one of the strongest confounders that affects the exposure and the subsequent outcome (VanderWeele et al., 2020).

Third, we control for a rich set of covariates at $t-1$, represented by C_{t-1} in Figure 1. This step is to reduce confounder bias. The set of controlled covariates are selected based on the disjunctive cause criterion (VanderWeele et al., 2020; VanderWeele & Shpitser, 2011). This criterion is described in VanderWeele (2020). Specifically, we control for each covariate that may cause the exposure, or the outcome, or both. Additionally, we will not control for any variable known to be an instrumental variable, which is when a variable that is a cause of the exposure but is otherwise unrelated to the outcome. This is because when there is residual unmeasured confounding, controlling for an instrumental variable will increase the bias that is already present due to unmeasured confounding (Pearl, 2012; VanderWeele et al., 2020). However, we will include any variable that serves as a proxy for an unmeasured variable that is a common cause of both the exposure and the outcome. This strategy is called the modified disjunctive confounding control strategy (VanderWeele et al., 2020). This strategy is powerful because if there is a subset of the measured covariates that suffices to control for confounding, then the subset selected by the disjunctive cause criterion will suffice as well (VanderWeele & Shpitser, 2011). Notice, the burden of proof is on the side of excluding a previously measured

baseline covariate. The criterion specifies that we only exclude a covariate from the list when there is substantive evidence that a certain covariate is neither a cause of the exposure nor the outcome. In our study, the covariates used for confounding control are described in the methods section.

Fourth, we control for the exposure variable at the prior wave, $t-1$, represented by $Exposure_{t-1}$ in Figure 1. After controlling for baseline outcome, reverse causation may still exist. This occurs if the outcome two waves prior to the exposure affects both the baseline exposure independently of the outcome one wave prior, and further affects the final outcome independently of the exposure and the outcome one wave prior (VanderWeele et al., 2020). Therefore, controlling for the exposure at $t-1$ can further rule out reverse causation.

With the above steps, we make the best attempt at controlling for confounder bias. However, we cannot rule out all sources of unmeasured confounding. Therefore, we can assess the robustness of longitudinal associations to potential unmeasured confounding using sensitivity analysis. For this study, we will use E-value. E-value reflects “the minimal strength of association on the risk ratio scale that an unmeasured confounder (or confounders) would require in its association with both the exposure and the outcome to explain away a causal effect” (VanderWeele et al., 2020). A larger E-value means it is harder for an unmeasured confounder to explain away our observed causal effect.

The Points of Difference in this Thesis

Past studies on income and wellbeing have operationalised income and well-being in different ways. Psychological flourishing is a complex and multidimensional concept and should be measured using a variety of factors. For the current study, we will include all the well-being-related factors available from the NZAVS dataset. We loosely categorise them into the following

dimensions: physical health, embodied well-being, reflective well-being, social well-being, and economic well-being. From physical health to embodied well-being, then to reflective well-being, each dimension is moving to higher level of cognitive states. From those dimensions then moving to social and economic well-being reflects moving from the more introspectively evaluated factors to involving an individual looking outward to their social and economic spaces and evaluating their relation to those external elements.

Past studies on the relationship between income and well-being are extensive yet face two challenges. First, most studies rely on cross-sectional data, which are limited for clarifying causation. Second, many studies draw from small and/or demographically homogenous populations, limiting generalisability. We address these two challenges by first using longitudinal data from the national panel study New Zealand Attitude and Values Study (NZAVS), which has demographic diversity. Second, we will adopt the outcome-wide analytical approach to infer causality (VanderWeele et al., 2020).

In Study 1, we assess the causal effect of household on a range of specific well-being indicators. As income is subject to measurement bias, we will repeat the approach in Study 2 and use an objective measure of occupational status as the exposure. In Study 3, we use a subjective measure of satisfaction with standard of living as the exposure and assess its causal effect on the same well-being indicators. We hypothesise that income will have positive causal effects across all well-being outcomes. While literature on occupational status and subjective standard of living satisfaction are scarce, we make the general hypothesis that these two exposures also have positive causal effects across well-being outcomes.

Methods

Panel Data Collection

We use three waves of data from the New Zealand Attitude and Values Study. The study is university-based, not-for-profit and independent of political or corporate funding. The NZAVS is reviewed every 3 years by the University of Auckland Human Participants Ethics Committee.

Details on the sampling procedure of each time wave is reported here

<https://www.psych.auckland.ac.nz/en/about/new-zealand-attitudes-and-values-study/nzavs-tech-docs.html>.

The NZAVS research team obtained informed consent for data collection from the included participants and kept the data confidential. After each timewave, each participant was offered the chance to enter a prize draw to win one out of five NZ\$1000 grocery vouchers (NZ\$5000 total prize pool, Sibley, 2021).

Participants

The participants are New Zealand residents aged 18-65. In year 2018, there were responses from 47,951 participants. The demographics of these participants are presented in Table 1. In the 42,684 responses collected in 2019, 72.5% were retained from the previous year. In the 38,551 responses collected in 2020, 78.1% were retained from the previous year.

Table 1.

Characteristics of Sample in Year 2018.

Sample Characteristics	Year 2018 (N=47,951)	
	%	Mean (SD)
Sex		
Male	37.1%	
Female	62.6%	
Gender diverse	0.2%	
Age, years		48.59(13.86)
Ethnicities		
European	88.6%	
Māori	9.8%	

Pacific Nations peoples	2.2%	
Asian	5.3%	
Education		5.33 (2.73)
Deprivation		4.62 (2.71)
Socioeconomic status		54.05(16.46)
Household income (NZ\$)		115,295 (95,686)
Religious	35.3%	
Parents	68.3%	
Romantic partner	71.3%	
Employed	76.1%	
Live in urban/suburban area	80.6%	
Born in NZ	75.9%	

Exposure variables

Household income. Participants were asked to “Please estimate your total household income (before tax) for the year 20XX”, followed by a blank space.

Occupational status. Participants were asked to respond to an open-ended question asking “What is your current occupation?”. These unique strings were then classified according to the Australian and New Zealand Standard Classification of Occupations (ANZSCO) Level 3 (Boven et al., 2021). The scores range from 10 to 90.

Satisfaction with standard of living (Cummins et al., 2003). Participants were asked “Please rate your level of satisfaction with - your future security”. The rating options range from 0=completely dissatisfied to 10=completely satisfied.

Multi-dimensional Well-being Outcomes

Physical Health

Alcohol frequency and Intensity. Participants were asked “how often do you have a drink containing alcohol?” on a scale from never, to 4 or more times a week. And if they do drink

alcohol, they are then asked to respond to “how many drinks containing alcohol do you have on a typical day when drinking?” followed by an empty box.

Smoking. Participants were asked “Do you currently smoke?” followed by yes/no options.

Body mass index. BMI was calculated by dividing height by weight, which were answered by the participants with questions “what is your height?” and “what is your weight”.

Hours of exercise. Participants were asked to “Please estimate how many hours you spent doing each of the following things last week. – Exercising” followed by an empty space.

Hours of sleep. Participants were asked “During the past month, on average, how many hours of *actual sleep* did you get per night?” followed by an empty space.

Short-form subjective health (Ware & Sherbourne, 1992). Participants rate on 3 items: “In general, would you say your health is...”, “I seem to get sick a little easier than other people”, “I expect my health to get worse.”, from 1=Poor to 7=Excellent, or 1=Strongly Disagree to 7=Strongly Agree.

Embodied Well-being

Body satisfaction (Stronge et al., 2015). Participants were asked to rate “I am satisfied with the appearance, size and shape of my body” on a scale from 1=very inaccurate to 7=very accurate.

Sexual Satisfaction (developed for NZAVS). Participants were asked to rate “How satisfied are you with your sex life?” from 1=not satisfied to 7=very satisfied.

Kessler 6 Distress (Kessler et al., 2010). Participants rate on 6 items with the instruction: “During the last 30 days, how often did you feel hopeless/ feel so depressed that nothing could

cheer you up/ feel restless or fidgety/ feel everything was an effort/ feel worthless/ feel nervous.”

The rating options range from 0 = none of the time to 4 = all of the time.

Rumination (adapted from Nolen-Hoeksema & Morrow, 1993). Participants rate from 0 = none of the time to 4 = all of the time with the instruction “During the last 30 days, how often did you have negative thoughts that repeat over and over”.

Fatigue (Sibley et al., 2020). Participants were asked to rate “During the last 30 days, how often did.... you feel exhausted?” from 0=none of the time to 4=All of the time.

Reflective Well-being

Life Satisfaction (Diener et al., 1985). Participants rate on 2 items with the instruction “Please indicate how strongly you disagree or agree with each statement: I am satisfied with my life; In most ways my life is close to ideal”. The rating options range from 1= strongly disagree to 7 = strongly agree.

Personal Well-being Index (Cummins et al., 2003). Participants rate on 4 items with the instruction “Please rate your level of satisfaction with the following aspects of your life: your standard of living, your health, your future security, and your personal relationships”. The rating options range from 0= completely dissatisfied to 10=completely satisfied. In the subsequent analyses, the four items will also be categorised into different dimensions: Personal relationship satisfaction as a part of social well-being, health satisfaction as a part of embodied well-being. Standard of living satisfaction and future security satisfaction as a part of economic wellbeing.

Gratitude (McCullough et al., 2002). Participants rate on 3 items with the instruction “Please indicate how strongly you disagree or agree with each statement: I have much in my life to be thankful for; When I look at the world, I don’t see much to be grateful for; I am grateful to

a wide variety of people”. The rating options range from 1= strongly disagree to 7 = strongly agree.

Life Meaning (Steger et al., 2006). Participants rate on 2 items with the instruction “Please indicate how strongly you disagree or agree with each statement: My life has a clear sense of purpose; I have a good sense of what makes my life meaningful”. The rating options range from 1= strongly disagree to 7 = strongly agree.

Self-esteem (Rosenberg, 1965). Participants rate on 3 items with the instruction “Please circle the number that best represents how accurately each statement describes you: On the whole am satisfied with myself; Take a positive attitude toward myself; Am inclined to feel that I am a failure”. The rating options range from 1 = very inaccurate to 7 = very accurate.

Perfectionism (Rice et al., 2014). Participants rate on 3 items with the instruction “Please indicate how strongly you disagree or agree with each statement: Doing my best never seems to be enough; My performance rarely measures up to my standards; I am hardly ever satisfied with my performance”. The rating options range from 1= strongly disagree to 7 = strongly agree.

Power Dependence (developed for NZAVS). Participants rate on 2 items with the instruction “Please indicate how strongly you disagree or agree with each statement: I do not have enough power or control over important parts of my life; Other people have too much power or control over important parts of my life”. The rating options range from 1= strongly disagree to 7 = strongly agree.

Impermeability Group (Mummendey & Wenzel, 1999). Participants rate on 2 items with the instruction “Please indicate how strongly you disagree or agree with each statement: The current income gap between New Zealand Europeans and other ethnic groups would be very hard to change.” The rating options range from 1= strongly disagree to 7 = strongly agree.

Permeability of Individual (Tausch et al., 2015). Participants were asked to “Please indicate how strongly you disagree or agree with each statement: I believe I am capable, as an individual, of improving my status in society”. The rating options range from 1= strongly disagree to 7 = strongly agree.

Vengefulness (anti-Forgiveness) (Adapted from Berry et al., 2005; Caprara, 1986; Developed for NZAVS). Participants rate on 3 items with the instruction “Please indicate how strongly you disagree or agree with each statement: Sometimes I can't sleep because of thinking about past wrongs I have suffered; I can usually forgive and forget when someone does me wrong; I find myself regularly thinking about past times that I have been wronged”. The rating options range from 1= strongly disagree to 7 = strongly agree.

Work Life Balance (Developed for NZAVS). Participants were asked to rate “I have a good balance between work and other important things in my life” on a scale from 1= strongly disagree to 7 = strongly agree.

Social Well-being

Social belonging (adapted from Hagerty & Patusky, 1995). Participants rate on 3 items with the instruction “Please circle the number that best represents how accurately each statement describes you: Feel like an outsider; Know that people in my life accept and value me; Know that people around me share my attitudes and beliefs”. The rating options range from 1 = very inaccurate to 7 = very accurate.

National well-being (Tiliouine et al., 2006). Participants rate on 3 items with the instruction “Please rate how satisfied you are with each aspect of your life and/or New Zealand society using the scale below: The economic situation in New Zealand; The social conditions in

New Zealand; Business in New Zealand”. The rating options range from 1= completely dissatisfied to 10 = completely satisfied.

Community (Quality of Life 2008 Survey National Report, 2009). Participants rate on 1 item with the instruction “Please indicate how strongly you disagree or agree with each statement: I feel a sense of community with others in my local neighbourhood”. The rating options range from 1= strongly disagree to 7 = strongly agree

Social support (Cutrona & Russell, 1987; Williams et al., 2000). Participants rate on 3 items with the instruction “Please indicate how strongly you disagree or agree with each statement: There are people I can depend on to help me if I really need it; There is no one I can turn to for guidance in times of stress; I know there are people I can turn to when I need help”. The rating options range from 1= strongly disagree to 7 = strongly agree.

Economic Well-being

Future security. This is a part of the Personal Well-being Index (Cummins et al., 2003). Participants are asked to “Please rate your level of satisfaction with the following aspects of your life - your future security”. The rating options range from 0= completely dissatisfied to 10=completely satisfied.

Occupational status and *Satisfaction with future security* will be a part of the economic well-being outcome variables when they are not being examined as the exposure variable.

Data Analysis

All data were analysed using R version 4.2.1 (R Core Team, 2022).

We implemented two eligibility criteria to our sample. We include participants who are employed in 2018 and 2019, as well as earning a minimum annual household income of 30,975 NZD. This is calculated based on the New Zealand legal minimum hourly wage in 2019, which

is 17.7 NZD times by 7-hour workday for 250 working days a year (Employment New Zealand, 2022). We excluded participants who do not satisfy these criteria.

To reduce biases due to missing data, we multiply imputed missing data that are either not responded by the participants, or that we have lost them for the follow-up time waves (VanderWeele et al., 2020). We used 10 imputations for MICE in R (Buuren & Groothuis-Oudshoorn, 2011).

In addition to controlling the exposure, household income, and all the well-being outcome variables listed above, we also controlled for an extensive set of covariates: demographic variables (age, gender, ethnicity, birthplace, religious identification, spiritual identification, education, employment status, sexual orientation, disability, being a parent, have a romantic partner, number of children, home ownership, church attendance frequency, political orientation, employment status (retirement status, semiretirement status, lost job), geographic linkage to urban area, hours of work, disability status, and deprivation), personality (agreeableness, conscientiousness, extraversion, honesty/humility, neuroticism, openness), perfectionism, personal respect, charitable donations, hours on volunteering, charitable donations, job security. The descriptive statistics of all these variables are reported in Appendix A.

We used g-computation to estimate the causal association (for more details, see Bulbulia, 2022a). We estimated the causal effects of an increase in log household income from one standard deviation below the mean, \$58,406.1, to one standard deviation above the mean, \$209,142.9, on well-being outcomes. One standard deviation below the mean income is at the lowest 16th percentile and one standard deviation above the mean income is at the 84th percentile.

While this leap of income over a year may not be common for most people, it is chosen to imitate a remarkable improvement in income and detect its causal effect on well-being.

We computed the standardised regression coefficients, standard error, the 95% confidence interval. We also computed the E-values (VanderWeele & Ding, 2017) to assess the robustness of the associations of income (lower level vs. higher level) with various well-being outcomes to unmeasured confounding (Bulbulia, 2022; VanderWeele et al., 2020). E-value is “the minimal strength of association on the risk ratio scale that an unmeasured confounder (or confounders) would require in its association with both the exposure and the outcome to explain away a causal effect” (VanderWeele & Ding, 2017).

Results

Increasing the annual household income from \$58,406.1 to \$209,142.9 caused reduction in body satisfaction ($\beta = -0.05$, $E\text{-value}=1.44$), and improvements in life satisfaction ($\beta = 0.06$, $E\text{-value}=1.46$), power dependence ($\beta = -0.06$, $E\text{-value}=1.45$), permeability of individual ($\beta = 0.10$, $E\text{-value}=1.68$), satisfaction with personal relationships ($\beta = 0.05$, $E\text{-value}=1.43$), satisfaction with standard of living ($\beta = 0.17$, $E\text{-value}=2.08$), satisfaction with future security ($\beta = 0.05$, $E\text{-value}=1.41$), and occupational status ($\beta = 0.08$, $E\text{-value}=1.56$; see Table 2). Of the 32 well-being outcomes we tested, the 95% confidence intervals of those 8 associations excluded zero (see Table 2). The Personal Wellbeing Index comprises 4 indicators which are reported separately under different sections as well as together at the end of the results table. There are 32 well-being outcomes in total.

Table 2.

Longitudinal Association between Household Income with Well-being Outcomes

β	SE	95% CI		$E\text{-value}$	Threshold
		<i>LL</i>	<i>UL</i>		

Health measures

Alcohol Frequency	0.024	0.018	-0.012	0.060	1.261	1.000
Alcohol Intensity	0.006	0.020	-0.033	0.046	1.116	1.000
Smoker (RR)	1.000	0.000	1.000	1.000	1.000	1.000
BMI	0.017	0.012	-0.007	0.042	1.211	1.000
Log Hours Exercise	-0.041	0.025	-0.089	0.007	1.366	1.000
Hours of Sleep	0.021	0.021	-0.021	0.063	1.240	1.000
Short-Form Health	-0.024	0.021	-0.064	0.017	1.261	1.000

Embodied well-being

Body Satisfaction	-0.054	0.020	-0.094	-0.015	1.441	1.195
Health Satisfaction	0.011	0.020	-0.028	0.050	1.164	1.000
Sexual Satisfaction	0.003	0.023	-0.041	0.047	1.080	1.000
Kessler 6 Distress	-0.036	0.020	-0.075	0.003	1.337	1.000
Rumination	-0.012	0.023	-0.057	0.033	1.172	1.000
Fatigue	0.002	0.024	-0.044	0.048	1.064	1.000

Reflective well-being

Life Satisfaction	0.058	0.019	0.021	0.095	1.463	1.239
Person Well-being	0.093	0.017	0.061	0.126	1.652	1.473
Index						
Gratitude	0.025	0.021	-0.017	0.066	1.267	1.000
Life Meaning	0.024	0.020	-0.016	0.063	1.261	1.000
Self Esteem	0.009	0.019	-0.028	0.046	1.146	1.000
Perfectionism	-0.032	0.022	-0.074	0.010	1.312	1.000
Power Dependence 1	-0.055	0.023	-0.100	-0.010	1.446	1.155
Power Dependence 2	-0.025	0.023	-0.070	0.020	1.267	1.000
Impermeability Group	0.025	0.026	-0.027	0.076	1.267	1.000
Permeability of	0.099	0.026	0.049	0.149	1.684	1.408
Individual						
Vengefulness	0.001	0.019	-0.037	0.039	1.045	1.000
Work-Life Balance	-0.016	0.026	-0.067	0.035	1.204	1.000

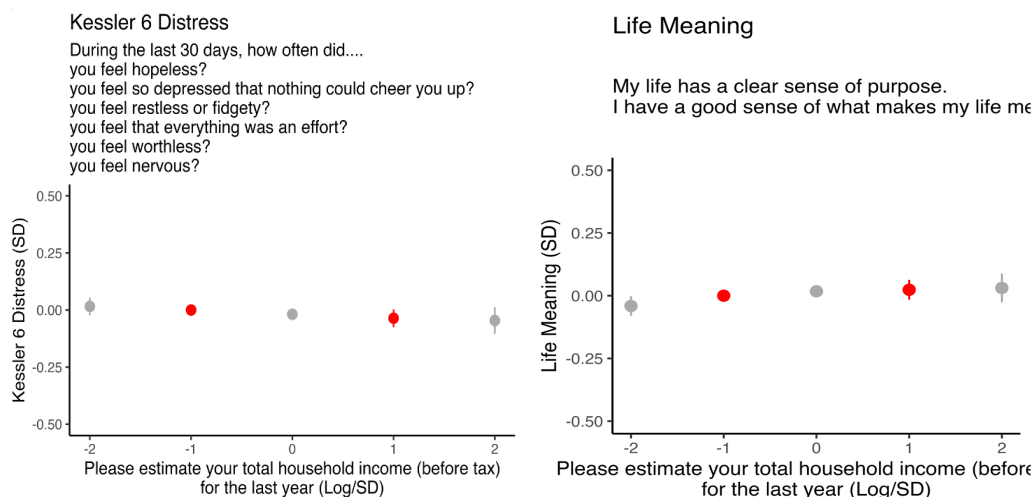
<i>Social well-being</i>						
Personal Relationships	0.052	0.021	0.010	0.093	1.430	1.163
Social Belonging	-0.001	0.020	-0.040	0.039	1.045	1.000
Community	-0.027	0.023	-0.072	0.018	1.280	1.000
National Well-being	0.004	0.026	-0.048	0.055	1.093	1.000
Social Support	0.008	0.020	-0.031	0.047	1.137	1.000
<i>Economic well-being</i>						
Occupational Status/10	0.076	0.018	0.042	0.110	1.561	1.365
Standard Living	0.172	0.020	0.132	0.211	2.077	1.864
Future Security	0.048	0.022	0.005	0.090	1.407	1.105
<i>PWI subscales</i>						
Personal Relationships	0.052	0.021	0.010	0.093	1.430	1.163
Your Health	0.011	0.020	-0.028	0.050	1.164	1.000
Standard Living	0.172	0.020	0.132	0.211	2.077	1.864
Future Security	0.048	0.022	0.005	0.090	1.407	1.105

Note. Boldface indicates the confidence interval excludes zero.

Although other results have their 95% confidence intervals crossing zero and therefore are not reliable, the general direction of these results are broadly consistent with past literature. For example, the direction of the effect of more income on Kessler 6 distress is downward ($\beta = -0.04$, 95%CI: -0.08, 0.003), and the direction of the effect of more income on meaning in life is upward ($\beta = 0.02$, 95%CI: -0.02, 0.06; see Figure 2). It is possible that multiple imputation had attenuated some results.

Figure 2.

Causal Effects of Log Income on Kessler-6 Distress and Meaning in Life



The E-values show that we have moderate evidence that the association of income with several well-being outcomes were robust to unmeasured confounding. For example, to explain away the association between income and satisfaction with personal relationships, an unmeasured confounder associated with both high income and high personal relationship satisfaction by 1.43-fold each on the risk ratio scale, above and beyond the measured covariates, would suffice, but weaker confounding would not.

Discussion Study 1

In this nationally representative panel study, we found that an increase of annual household income from \$58,406.1 to \$209,142.9 causes reliable changes in 8 out of 32 aspects of well-being.

Physical health. Our results do not demonstrate an increase in household income would cause marginal average changes in self-evaluated health, body mass index, health-promoting behaviours of exercise and sleep, and health-compromising behaviours of alcohol and tobacco use. Our results are unable to support Benzeval and Judge's (2001) finding that higher income causes better self-reported health. There are two notable differences between our studies. First, while they have also used a longitudinal dataset and controlled for age, sex, and initial health,

they have not controlled for prior level of income and other potential sources of confounding like we had. Second, they have operationalised income as long-term income, which is the average increase in income over 6 years from 1991 to 1997. They have also shown that long-term income is more important for health than current income. Future studies can go beyond simple two-level changes to examine the effect of stability and fluctuations in financial resources on well-being (VanderWeele, 2017b). For example, Benzeval and Judge (2001) created a measure of poverty stability based on the number of years people spend in the bottom 20 per cent of the income distribution. They found that poverty stability is more strongly associated with health than experiencing an income reduction.

Embodied well-being. Body satisfaction lowers as income increases. More income may cause greater dissatisfaction with body image as once people have the means to satisfy their basic needs, they subject themselves to higher standards that are harder to be achieved through money. Past study suggests that pressure to be thin is greatest among women in high SES brackets (Caldwell et al., 1997). We found no evidence suggesting that higher household income causes marginal average changes in psychological distress, although the direction of the effect aligns with past literature ($\beta = -0.04$). While several studies found that lower income levels associate with elevated psychological distress (Isaacs et al., 2018; Orpana et al., 2009), no previous study examined if increased income alleviate distress. Our results suggest that psychological distress is perhaps a more tenacious condition that is resistant to improved economic circumstances, compared to negative feelings that could be soothed by more money (Jebb et al., 2020; Kahneman & Deaton, 2010; Killingsworth, 2021).

Reflective well-being. The positive relationship between income and life satisfaction is well-established in psychology and economic literature (Deaton, 2008; Kahneman & Deaton,

2010). Our study which controlled for a full list of confounding variables further clarifies the causal direction and the strength of this causal relationship ($\beta = 0.02$, 95%CI: 0.01, 0.02, E-value=1.46).

Increased income causes less power dependence ($\beta = -0.06$, 95%CI: -0.01, -0.10, E-value=1.45). This means that more income causes people to feel more powerful and hence capable of controlling important parts of their life. Also, increased income causes better permeability of individual ($\beta = 0.10$, 95%CI: 0.10, 0.02, E-value=1.46). This means that money empowers individuals to believe they can improve their status in the society. This implies that they become to perceive the social structure as non-discriminatory and permeable for them to achieve upward social mobility (Tausch et al., 2015). Better permeability of individual also reflects an individualistic strategy of coping with life difficulties.

Together with other satisfaction measures, higher income causes greater life satisfaction, and satisfaction with personal relationships, standard of living, and future security. Our results show no marginal average changes in other aspects of satisfaction such as health satisfaction and sexual satisfaction. These results suggest that income increase has varied effects on the satisfaction with specific aspects of life. Specifically, income has stronger influence on the interpersonal and economic satisfactions, as compared to satisfaction with physical conditions and fulfilments.

The measurement problem of income. Our results are possibly limited by inaccurate reporting of household income. While household income has the advantage of being objective and quantifiable, it is susceptible to a few sources of bias. First, the social desirability response bias means that participants may report higher income than they actually make. Such bias could potentially attenuate any causal effects that exist between income and well-being outcomes.

Second, income is a sensitive and private subject matter in many cultures, and New Zealand is no different. This could lead to a reluctance in sharing this information in surveys, although knowing that this information is anonymous and kept confidential. Participants could also not recall the exact amount of their household income at the time of survey completion. Moore et al. (2000) referred to this type of forgetfulness as “motivated mis-remembering”.

To address this challenge of inaccurate reporting and non-response, it is arguable that written survey is a better format compared to telephone interviews. However, phone interviews, which was used by Kahneman and Deaton (2010), also have several advantages (Groves, 1989). For example, reassurance of confidentiality of response could also be made on the phone, which has been found to reduce nonresponse and/or increase the response accuracy to income question (Singer et al., 1995). Phone interviews could also reduce non-response. It is easier for participants to leave a question blank in a written survey than not answering a question in an ongoing conversation.

The household income question in the current study is an open question, in contrast to other studies that have asked the participants to select an income band that they belong to (Kahneman & Deaton, 2010; Killingsworth, 2021). In subsequent analyses of those other studies, the midpoint of each income range was selected as the income value. Both methods have their pros and cons. Open question is more susceptible to report bias yet can capture the variability between participants within each income range. The ‘band selection’ method reduces report bias yet is unable to capture individual variability.

In the next study, we will test whether improvement in an objective measure of occupational status causes better well-being outcomes.

Study 2

Occupational status is an objective measure of one's economic circumstances, which is calculated based on the average education and income level associated with a given occupation (Boven et al., 2021). The measure considers the attributes of an occupation that converts a person's main resource, which is their education, into a reward, which is income (Ganzeboom et al., 1992).

Occupational status has several advantages over self-reported income. First, occupational status is less susceptible self-report bias because it is not a taboo. Participants are much less likely to intentionally lie about their profession. Second, unlike income, which asks for a quantitative response, occupation asks for participants' current occupation, which is a qualitative answer. Hence, it is less likely that participants accidentally mis-remember their profession. Finally, income is directly disposable and readily exchanged into other resources. In contrast, occupational status is relatively stable, as people do not frequently change their occupation, although they may change the institution they work for. Hence, occupational status may be a better measure of one's economic gains as it can be more resilient to the wax and wane of our income due to temporal circumstances, such as going through company lay-offs or pay cut during economic downturns.

No study that we are aware of has studied the relationship between occupational status with well-being outcomes. Occupation is a prominent part of our lives as we spend most of the waking hours doing our jobs. We hypothesise that raising the occupational status will cause improvement in one's well-being. We will use the same set of well-being outcomes in this study as in study 1.

Methods

Occupational status is measured by the New Zealand Socioeconomic Index (NZSEI). Participants were asked to respond to an open-ended question asking “what is your current occupation?”. The occupational status score is calculated based on the average education and income level associated with that occupation, with education given a higher importance than income in the scoring, and adjusted for the influence of age (Boven et al., 2021). The scores range from 10 to 90, and a higher score represents a higher socioeconomic position as represented by occupation. For example, a tertiary education teacher has a score of 88, an electrician has a score of 47, and packers and product assemblers have a score of 10 (Boven et al., 2021). The scores are then divided by 10 for the analysis. These unique strings were then classified according to the Australian and New Zealand Standard Classification of Occupations (ANZSCO) Level 3 (Boven et al., 2021). In line with prior research, missing values for occupational status were imputed using a combination of education and age. The same dataset from 2018 to 2020 will be used and the same set of outcome variables from Study 1 will also be used.

We estimated the causal effects of an increase in occupational status from score 3 to score 6. This is from around two standard deviations below the mean to just over the mean occupational status. This contrast is selected for the purpose of showing the effect of a substantial improvement in occupational status.

Consistent with Studies 1 and 2, we computed the standardised regression coefficients, its standard error, and the 95% confidence interval. We also computed the E-values to assess the robustness of the associations of occupational status (lower level vs. higher level) with various well-being outcomes to unmeasured confounding (Bulbulia, 2022b; VanderWeele et al., 2020). E-value is “the minimal strength of association on the risk ratio scale that an unmeasured

confounder (or confounders) would require in its association with both the exposure and the outcome to explain away a causal effect” (VanderWeele & Ding, 2017).

Results

The causal effects of an increase in occupational status from a score of 3 to 6 on well-being outcomes are reported in Table 3. An increase in occupational status from score 3 to 6 improves a myriad of well-being measures. With embodied well-being, increased occupational status causes marginal average reduction in psychological distress ($\beta = -0.04$, E-value=1.49), rumination ($\beta = -0.05$, E-value=1.57), and fatigue frequency ($\beta = -0.05$, E-value=1.53). With reflective well-being, increased occupational status causes marginal average improvement in life satisfaction ($\beta = 0.04$, E-value=1.44), gratitude ($\beta = 0.04$, E-value=1.48), self-esteem ($\beta = 0.05$, E-value=1.52), and decrease in power dependence ($\beta = -0.05$, E-value=1.54), impermeability of group ($\beta = -0.05$, E-value=1.54), and vengefulness ($\beta = -0.07$, E-value=1.68). With social well-being, increased occupational status causes marginal average improvement in social belonging ($\beta = 0.06$, E-value=1.64). Lastly, higher occupational status causes better living standard satisfaction ($\beta = 0.04$, E-value=1.47). The E-values of these estimates are moderately robust to unmeasured confounding.

Although other results have their 95% confidence intervals crossing zero and therefore not reliable, the general direction of these results broadly align with our expectation. For example, the direction of the effect of higher occupational status on meaning in life is upward ($\beta = 0.01$, 95%CI: -0.02, 0.05; see Figure 3). Moving from score 3 to 6 with occupational status, the direction of its effect on perfectionism is downward ($\beta = -0.03$, 95%CI: -0.06, 0.01; see Figure 3). Yet perfectionism increases with occupational status score 7 and above.

Figure 3.

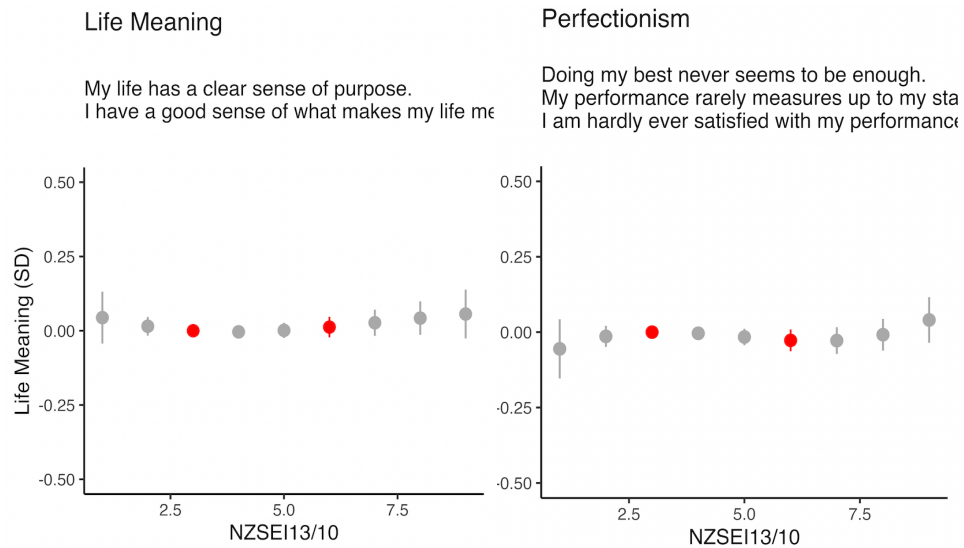
Causal Effects of Occupational Status on Meaning in Life and Perfectionism

Table 3.*Longitudinal Association between Household Income and Occupational Status with Well-being Outcomes*

	Household income						Occupational status					
	β	SE	95% CI		E-value	Thres hold	β	SE	95% CI		E-value	Thres hold
			LL	UL					LL	UL		
Health measures												
Alcohol Frequency	0.024	0.018	-0.012	0.060	1.261	1	-0.006	0.017	-0.038	0.026	1.146	1
Alcohol Intensity	0.006	0.020	-0.033	0.046	1.116	1	0.010	0.020	-0.029	0.048	1.196	1
Smoker (RR)	1.000	0.000	1.000	1.000	1.000	1	0.953	0.104	0.749	1.157	1.277	1
BMI	0.017	0.012	-0.007	0.042	1.211	1	0.003	0.013	-0.022	0.028	1.099	1
Log Hours Exercise	-0.041	0.025	-0.089	0.007	1.366	1	-0.029	0.026	-0.081	0.023	1.381	1
Hours of Sleep	0.021	0.021	-0.021	0.063	1.240	1	0.038	0.020	-0.002	0.078	1.458	1
Short-Form Health	-0.024	0.021	-0.064	0.017	1.261	1	0.023	0.018	-0.013	0.059	1.327	1
Embodied well-being												
Body Satisfaction	-0.054	0.020	-0.094	-0.015	1.441	1.195	-0.003	0.019	-0.041	0.035	1.099	1.000
Health Satisfaction	0.011	0.020	-0.028	0.050	1.164	1.000	0.012	0.018	-0.024	0.047	1.219	1.000
Sexual Satisfaction	0.003	0.023	-0.041	0.047	1.080	1.000	-0.013	0.019	-0.050	0.025	1.230	1.000
Kessler 6 Distress	-0.036	0.020	-0.075	0.003	1.337	1.000	-0.042	0.019	-0.078	-0.005	1.491	1.129
Rumination	-0.012	0.023	-0.057	0.033	1.172	1.000	-0.052	0.020	-0.091	-0.013	1.572	1.228
Fatigue	0.002	0.024	-0.044	0.048	1.064	1.000	-0.047	0.019	-0.085	-0.009	1.531	1.194
Reflective well-being												
Life Satisfaction	0.058	0.019	0.021	0.095	1.463	1.239	0.036	0.017	0.003	0.070	1.441	1.095
Person Well-being Index	0.093	0.017	0.061	0.126	1.652	1.473	0.026	0.015	-0.004	0.056	1.355	1.000
Gratitude	0.025	0.021	-0.017	0.066	1.267	1.000	0.041	0.021	0.001	0.081	1.482	1.000
Life Meaning	0.024	0.020	-0.016	0.063	1.261	1.000	0.012	0.018	-0.022	0.047	1.219	1.000

Self Esteem	0.009	0.019	-0.028	0.046	1.146	1.000	0.045	0.019	0.008	0.081	1.515	1.170
Perfectionism	-0.032	0.022	-0.074	0.010	1.312	1.000	-0.027	0.018	-0.064	0.009	1.363	1.000
Power Dependence	-0.055	0.023	-0.100	-0.010	1.446	1.155	-0.048	0.023	-0.092	-0.003	1.540	1.099
Power Dependence 2	-0.025	0.023	-0.070	0.020	1.267	1.000						
Impermeability Group	0.025	0.026	-0.027	0.076	1.267	1.000	-0.048	0.023	-0.093	-0.002	1.540	1.099
Permeability of Individual	0.099	0.026	0.049	0.149	1.684	1.408	0.006	0.023	-0.039	0.051	1.146	1.000
Vengefulness	0.001	0.019	-0.037	0.039	1.045	1.000	-0.065	0.019	-0.103	-0.027	1.676	1.371
<i>Social well-being</i>												
Personal Relationships	0.052	0.021	0.010	0.093	1.430	1.163	0.011	0.020	-0.028	0.049	1.208	1.000
Social Belonging	-0.001	0.020	-0.040	0.039	1.045	1	0.061	0.018	0.025	0.097	1.644	1.353
National Well-being	0.004	0.026	-0.048	0.055	1.093	1	0.020	0.022	-0.023	0.063	1.300	1.000
Community	-0.027	0.023	-0.072	0.018	1.280	1	0.001	0.020	-0.039	0.041	1.055	1.000
Social Support	0.008	0.020	-0.031	0.047	1.137	1	0.032	0.019	-0.006	0.069	1.407	1.000
<i>Economic well-being</i>												
Standard Living	0.172	0.020	0.132	0.211	2.077	1.864	0.040	0.020	0.001	0.080	1.474	1.051
Future security	0.048	0.022	0.005	0.090	1.407	1.105	0.015	0.023	-0.030	0.061	1.250	1.000
<i>PWI subscales</i>												
Personal Relationships	0.052	0.021	0.010	0.093	1.430	1.163	0.011	0.020	-0.028	0.049	1.208	1.000
Your Health	0.011	0.020	-0.028	0.050	1.164	1.000	0.012	0.018	-0.024	0.047	1.219	1.000
Standard Living	0.172	0.020	0.132	0.211	2.077	1.864	0.040	0.020	0.001	0.080	1.474	1.051
Future Security	0.048	0.022	0.005	0.090	1.407	1.105	0.015	0.023	-0.030	0.061	1.250	1.000

Note. Boldface indicates the confidence interval excludes zero.

Discussion Study 2

Overall, the results show that occupational status score is another useful measure that is connected to a range of well-being outcomes. The confidence intervals of 11 out of 32 associations have excluded zero.

Embodied well-being. While income had limited influence on embodied well-being, increased occupational status causes people to become more satisfied with their health and feel emotionally better, evident in reductions in psychological distress, rumination, and fatigue.

It is possible that individuals with higher occupational status encounter less emotional stressors in life, or that their occupation and corresponded higher income and educational background act as coping resources that protect them against emotional stressors both at work and in their personal lives. A survey conducted by the New Zealand ministry of education (2009) found that higher levels of education and literacy skill are related to better emotional well-being. Job-related stress that are threatening to well-being include job title (Boran et al., 2012) and job characteristics (Haq et al., 2008).

Jobs with lower occupational status are also likely to be based on physical labour and are repetitive in nature. These jobs can be emotionally vexing and result in burnout (Brotheridge & Grandey, 2002). For example, hospitality or caregiving staff are often required to smile and treat all customers nicely, even when they do not feel this way internally. This phenomenon is called ‘emotional labour’ (Hochschild, 1983). It is also more likely that people who do jobs with lower occupational status are stigmatised in the society, leading to worse emotional well-being (Ostaszkiwicz et al., 2016)

Reflective well-being. Increased occupational status causes marginal average improvement in self-esteem ($\beta=0.05$, E-value=1.52). While several studies found that self-

esteem led to higher occupational status (Kammeyer-Mueller et al., 2008; Krauss & Orth, 2022), our results are the first to demonstrate that higher occupational status has a causal role in raising self-esteem. Self-esteem refers to an individual's overall self-evaluation of their competencies (Rosenberg, 1965). Jobs with lower occupational status are more likely to have a system-imposed behaviour control system, achieved through division of labour, rigid hierarchy, centralisation, standardisation, and formalisation (Korman, 1971). These controls suggest to the employee that they are incapable of regulating themselves, leading to lower levels of self-esteem (Pierce & Gardner, 2004). In contrast, jobs with higher occupational status are likely to be more complex and less structured. People are given more freedom of self-expression and personal control. This promotes people to perceive themselves as trusted and capable, resulting in higher self-esteem (Pierce & Gardner, 2004).

Social well-being. An increase in occupational status improves social belonging. Our result is consistent with past findings that income and educational attainment are positively related to sense of belonging (Hagerty et al., 1996; Stewart et al., 2009). As their studies were only associational, our study clarified the causal direction and the strength of this relationship ($\beta = 0.06$, 95%CI: 0.03, 0.10, E-value=1.64).

Higher social belonging means “people in my life accept and value me”, that I do not “feel like an outsider”, and that “people around me share my attitudes and beliefs” (Hagerty & Patusky, 1995). Occupational status reflects the socioeconomic position one's occupation holds in the society supported by not only income but also education. Hence, higher occupational status implies having more not only economic resources but also cultural resources.

Interview responses (Stewart et al., 2009) find that lower income groups are more likely to define their social space in terms of physical proximity, such as their neighbourhood block. In

contrast, higher income people are more likely to define their social space in terms of “interests” such as religious belief, sexual orientation, occupation, or ethnic origin (Smith, 2001; Stewart et al., 2009). Greater social belonging may be fostered by shared attitudes and beliefs of people with higher occupational status scores, due to their similar educational training in rational thinking (Nunn et al., 1978; de Werfhorst & Graaf, 2004; see a discussion by van de Werfhorst, 2010). People with lower occupational status may have jobs that are more varied in nature and associated skills, leading to lower levels of social belonging.

In contrast, good personal relationships may be initiated by shared values, but necessarily developed and sustained through difficulties through economic means such as gift giving and financial support. It was found that household income can predict divorce (Amato & Previti, 2003; Watt, 2001). Those with high financial stress also reported lower relationship satisfaction (Berry & Williams, 1987; Britt et al., 2008), and that lower income couples may experience greater fluctuations in marital satisfaction across time (Jackson et al., 2017).

Conclusions. Our results suggest that compared to more income, improved occupational status has greater positive influence across embodied well-being and reflective well-being. Earning more money is effective at improving life satisfaction, personal relationships, and future security. More money can also make people feel more in control of important parts of life and believe that they can improve their social status. This is an important first step in building a better life. However, individuals should more importantly consider improving their occupational status if they wish to promote overall well-being, and particularly emotional wellbeing, self-esteem, and social belonging.

In reality, raising occupational status from 30 to 60 is uncommon. Jobs with a NZSEI score around 30 include checkout operators (29), delivery drivers (30), hospitality workers (32).

And jobs that have a NZSEI score around 60 include financial and insurance clerks (57), ICT and telecommunication technicians (60), and real estate sales agent (61). It is more likely that with experience, people move upward in their income from being promoted to a managerial position. Moving upward in occupational status requires a determination to change profession and undertaking advanced academic and/or professional trainings.

Hence, our study has important relevance for individual decision making and government policy making. When choosing the level of schooling and the age to enter the workforce, teenagers should consider to fully explore their academic potential, and take on the highest possible levels of educational opportunities. When making career-related decisions, individuals can think beyond finding a “better job” in terms of better salary. Rather, take on jobs that make the most out of one’s educational background. Also, educational attainment does not have to stop at early adulthood. Through taking further higher education, one can find a job that enjoys higher occupational status and hence promote their overall well-being. Governments should fund more educational opportunities for lower-level working adults who wish to advance their skills and change to a more challenging profession.

However, after Studies 1 and 2, we have not yet found strong effects with one of the most important indicators of reflective wellbeing, namely meaning in life. We also do not see strong effects between income and occupational status with health indicators. Hence, we next explore a subjective measure of living standard.

Study 3

Standard of living satisfaction is a subjective measurement of one’s economic circumstances, which asks the participants how satisfied they are with their standard of living in New Zealand. This is a subjective measurement as people’s evaluation of their standard of living

is not necessarily determined by the absolute value of their income, but rather by their personal expectation (Joseph Sirgy et al., 2013), or by their perceived relative position from a reference group (Frank & Enkawa, 2008; Sági, 2011; however, see Yu et al., 2020).

Income, or standard of living, can reflect the amount of material goods and services that can be purchased, which can include the needs that one cannot live without, such as groceries, and the wants that can improve one's standard of living, such as designer bags. However, the satisfaction with standard of living asks whether the amount of goods and services that one can objectively afford, is subjectively considered enough. One can have little but feel satisfied, and one can have plenty and still wants more or wants better.

There has been little study of the relationship between standard of living satisfaction and well-being outcomes. Yu et al. (2020) find that satisfaction with standard of living has a positive impact on life satisfaction and perceived happiness. Ng and Diener (2014) find that financial satisfaction predicts life evaluation. No literature to date has explored the relationship between standard of living satisfaction with eudaimonic well-being. This study will explore the causal strength of standard of living satisfaction on a range of well-being outcomes.

Methods

The standard of living question asks the participants to “please rate your level of satisfaction with the following aspects of your life and New Zealand. – your standard of living” on a scale from 0 -completely Dissatisfied to 10 -completely Satisfied. This question is a part of the Personal Well-being Index (Cummins et al., 2003). The same NZAVS data between 2018 to 2020 from study 1 will be used. The same set of outcome variables from study 1 will also be used.

We estimated the causal effects of an increase in standard of living satisfaction from one standard deviation below the mean to one standard deviation above the mean on well-being outcomes. This contrast is also selected for the purpose of showing the effect of a substantial improvement in subjective satisfaction with living standard. We computed the standardised regression coefficients, standard error, the 95% confidence interval. We also computed the E-values (VanderWeele & Ding, 2017) to assess the robustness of the associations of standard of living satisfaction (lower level vs. higher level) with various well-being outcomes to unmeasured confounding (Bulbulia, 2022b; VanderWeele et al., 2020).

Results

Increasing satisfaction with living standard from one standard deviation below the mean to one standard deviation above improves a myriad of well-being measures (see Table 4). With physical well-being, greater satisfaction with living standard causes marginal average increases in log hours of exercise, hours of sleep, subjective health. With embodied well-being, greater satisfaction with living standard causes marginal average increases in body satisfaction, health satisfaction, sexual satisfaction, and decreased psychological distress, rumination, and fatigue frequency. With reflective well-being, greater living standard satisfaction causes marginal average improvement in life satisfaction, gratitude, meaning in life, self-esteem, permeability of individual, work-life balance, and decreased in perfectionism, power dependence, vengefulness.

Table 4.*Longitudinal Association between Household Income and Standard of Living Satisfaction with Well-being Outcomes*

	Household income						Standard of living					
	β	SE	95% CI		E-value	Thres hold	β	SE	95% CI		E-value	Thres hold
			LL	UL					LL	UL		
Health measures												
Alcohol Frequency	0.024	0.018	-0.012	0.060	1.261	1	-0.015	0.014	-0.042	0.011	1.196	1.000
Alcohol Intensity	0.006	0.020	-0.033	0.046	1.116	1	-0.027	0.015	-0.057	0.003	1.280	1.000
Smoking (RR)	1.000	0.000	1.000	1.000	1.000	1	1.000	0.000	1.000	1.000	1.000	1.000
BMI	0.017	0.012	-0.007	0.042	1.211	1	-0.007	0.011	-0.028	0.014	1.127	1.000
Log Hours Exercise	-0.041	0.025	-0.089	0.007	1.366	1	0.041	0.020	0.002	0.081	1.366	1.062
Hours Sleep	0.021	0.021	-0.021	0.063	1.240	1	0.073	0.018	0.037	0.110	1.545	1.347
SF Health	-0.024	0.021	-0.064	0.017	1.261	1	0.099	0.018	0.064	0.134	1.684	1.495
Embodied well-being												
Body Satisfaction	-0.054	0.020	-0.094	-0.015	1.441	1.195	0.114	0.019	0.077	0.150	1.763	1.566
Health Satisfaction	0.011	0.020	-0.028	0.050	1.164	1.000	0.215	0.018	0.179	0.251	2.320	2.120
Sexual Satisfaction	0.003	0.023	-0.041	0.047	1.080	1.000	0.084	0.016	0.052	0.115	1.604	1.434
Kessler 6 Distress	-0.036	0.020	-0.075	0.003	1.337	1.000	-0.097	0.017	-0.129	-0.064	1.673	1.495
Rumination	-0.012	0.023	-0.057	0.033	1.172	1.000	-0.067	0.021	-0.109	-0.026	1.512	1.273
Fatigue	0.002	0.024	-0.044	0.048	1.064	1.000	0.041	0.020	0.002	0.081	1.366	1.062
Reflective well-being												
Life Satisfaction	0.058	0.019	0.021	0.095	1.463	1.239	0.357	0.018	0.323	0.392	3.239	2.992
Person Well-being Index	0.093	0.017	0.061	0.126	1.652	1.473	0.505	0.014	0.478	0.532	4.451	4.203
Gratitude	0.025	0.021	-0.017	0.066	1.267	1.000	0.230	0.018	0.195	0.266	2.409	2.204
Life Meaning	0.024	0.020	-0.016	0.063	1.261	1.000	0.209	0.017	0.176	0.242	2.286	2.097

Self Esteem	0.009	0.019	-0.028	0.046	1.146	1.000	0.152	0.016	0.121	0.184	1.967	1.799
Perfectionism	-0.032	0.022	-0.074	0.010	1.312	1.000	-0.161	0.017	-0.194	-0.129	2.016	1.836
Power Dependence 1	-0.055	0.023	-0.100	-0.010	1.446	1.155	-0.186	0.020	-0.225	-0.148	2.155	1.939
Power Dependence 2	-0.025	0.023	-0.070	0.020	1.267	1.000	-0.171	0.021	-0.212	-0.131	2.071	1.848
Impermeability Group	0.025	0.026	-0.027	0.076	1.267	1.000	0.000	0.022	-0.043	0.044	1.000	1.000
Permeability of Individual	0.099	0.026	0.049	0.149	1.684	1.408	0.094	0.021	0.053	0.134	1.657	1.435
Vengefulness	0.001	0.019	-0.037	0.039	1.045	1.000	-0.094	0.017	-0.127	-0.061	1.657	1.478
Work Life Balance	-0.016	0.026	-0.067	0.035	1.204	1.000	0.213	0.021	0.173	0.254	2.309	2.076
<i>Social well-being</i>												
Personal Relationships	0.052	0.021	0.010	0.093	1.430	1.163	0.166	0.019	0.129	0.203	2.043	1.842
Social Belonging	-0.001	0.020	-0.040	0.039	1.045	1	0.157	0.018	0.120	0.193	1.994	1.805
National Well-being	0.004	0.026	-0.048	0.055	1.093	1	0.128	0.020	0.090	0.167	1.838	1.630
Community	-0.027	0.023	-0.072	0.018	1.280	1	0.096	0.018	0.060	0.132	1.668	1.478
Social Support	0.008	0.020	-0.031	0.047	1.137	1	0.146	0.018	0.111	0.180	1.934	1.746
<i>Economic well-being</i>												
Occupational Status/10	0.076	0.018	0.042	0.110	1.561	1.365	0.045	0.014	0.019	0.072	1.390	1.216
Future Security	0.048	0.022	0.005	0.090	1.407	1.105	0.342	0.020	0.303	0.381	3.132	2.865
<i>PWI subscales</i>												
Personal Relationships	0.052	0.021	0.010	0.093	1.430	1.163	0.166	0.019	0.129	0.203	2.043	1.842
Your Health	0.011	0.020	-0.028	0.050	1.164	1.000	0.215	0.018	0.179	0.251	2.320	2.120
Future Security	0.048	0.022	0.005	0.090	1.407	1.105	0.342	0.020	0.303	0.381	3.132	2.865

Note. Boldface indicates the confidence interval excludes zero

With social well-being, greater living standard satisfaction causes marginal average improvements in personal relationships, social belonging, sense of community, satisfaction with national well-being, and social support. Lastly, greater living standard satisfaction causes greater satisfaction with future security. The E-values of all the above estimates are moderately robust to unmeasured confounding. Out of the 32 associations, the confidence intervals of 26 associations have excluded zero. The plots for the causal effects of standard of living satisfaction on all the well-being outcomes are presented in Appendix B.

Discussion Study 3

Compared to income and occupational status, our results show that an increase in the satisfaction with one's standard of living causes improvement in the widest range of well-being measures, from physical health, embodied well-being, reflective well-being to social well-being. The confidence intervals of 26 out of 32 associations have excluded zero.

Physical health. Our study is the first to demonstrate that better living standard satisfaction causes better subjective health ($\beta = 0.10$, CI95%:0.06,0.13, E-value=1.68). Together with results from Studies 1 and 2, our results suggest that our subjective perception and evaluation of our living standard has a greater influence on our health than self-reported objective measures of income and occupational status.

While no past studies directly examined the relationship between living standard satisfaction and subjective health, the direction of our results are consistent with studies on subjective socioeconomic status and health. It was found that subjective socioeconomic status has a stronger cumulative association with physical health than objective socioeconomic status (Cundiff & Matthews, 2017). An inferior evaluation of one's own resources and social status in comparison to a superior group will likely lead to higher rates of common cold, hypertension,

cholesterol diseases, stress, and adoption of maladaptive health behaviours (Adler & Rehkopf, 2008; C. Anderson et al., 2015; Cohen et al., 2008; Zell et al., 2018). However, we note that living standard satisfaction is not the same as subjective SES, as the evaluation of living standard does not necessarily involve an element of social comparison.

Embodied well-being. While both income and occupational status do not show a reliable relationship with health satisfaction, living standard satisfaction has a strong causal effect on health satisfaction ($\beta=0.22$, 95%CI: 0.18, 0.25, E-value=2.32). An E-value of 2.32 means that, to explain away the association between living standard satisfaction and health satisfaction, an unmeasured confounder associated with both high living standard satisfaction and high health satisfaction by 2.32-fold each on the risk ratio scale, above and beyond the measured covariates, would suffice, but weaker confounding would not. Being satisfied with one's own living standard means such evaluation is not based on comparison to a superior group. However, it is possible that one's evaluation is based on comparison to an inferior group or their past worse living standard, or that they do not make comparisons but feel a general sense of satisfaction with their living standard. Whichever strategy people may endorse, our results suggest that they apply the same strategy for evaluating their satisfaction with standard of living and health.

Reflective well-being. Being more satisfied with standard of living reliably raises one's level of gratitude ($\beta=0.23$, 95%CI: 0.20, 0.27, E-value=2.41). No past study we are aware of has investigated the relationship. Greater gratitude means that individuals have a greater tendency to recognise and respond to the role of other people's benevolence in one's positive outcomes (McCullough et al., 2002). In other words, gratitude is an other-focused emotion. Satisfaction with living standard means being satisfied with one's own material possessions. Together, our results suggest that, as people become more satisfied with their own living standard, they begin

to see a greater role of others in contributing to their own positive circumstances. To understand the mechanism of this relationship, it might be helpful to consider the concept of materialism. Highly materialistic people tend to believe that they need more income to satisfy daily needs (Richins & Dawson, 1992). This may be because that materialistic people “define their self-concept and success in life by quantity of quality of their extrinsic possessions” (Kashdan & Breen, 2007, p522). It was found that lower satisfaction with standard of living is associated with higher materialism (Richins & Dawson, 1992), which is inversely related to gratitude (Kashdan & Breen, 2007; Lambert et al., 2009). Future studies can investigate whether materialism plays a mediating role between standard of living satisfaction and gratitude. While our study focused on the causal effect of standard of living satisfaction on gratitude, future study can explore the strength of the reverse relationship (Unanue et al., 2019).

Meaning in life is one of the signature indicators of eudaimonic well-being. While the sign of the relationships between income and meaning ($\beta = 0.02$, 95%CI: -0.02, 0.06, E-value=1.26), and between occupational status and meaning ($\beta = 0.01$, 95%CI: -0.02, 0.05, E-value=1.29), are pointing to the positive direction, which is consistent with past studies (Kobau et al., 2010; Pinquart, 2002; Ward & King, 2016, 2019), they do not show reliable causal effects. In contrast, increased satisfaction with standard of living has a strong causal effect on a greater sense of meaning in life ($\beta = 0.21$, 95%CI: 0.18, 0.24, E-value=2.29). A high level of standard of living satisfaction suggests that people are not overly concerned about improving the material circumstances of their lives. In other words, becoming wealthier is not the top priority, suggesting that they may have higher and non-materialistic pursuits. And meaning in life can be one of such higher eudaimonic pursuits. Our results are consistent with Maslow’s hierarchy of

needs, that people can move upward on the hierarchy once they satisfy the more basic needs (Maslow, 1970).

Greater satisfaction with standard of living also leads to a higher level of self-esteem ($\beta = 0.15$, 95%CI: 0.12, 0.18, E-value=1.97). Self-esteem means the “extent to which one prizes, values, approves or likes oneself” (Blascovich & Tomaka, 1991, p.115). One of the main contributors of low self-esteem is low socioeconomic status, and socioeconomic status is the primary way that society views an individual (Twenge & Campbell, 2002). While objective socioeconomic status can bring down people’s self-esteem, our results suggest that we can enhance our self-esteem by raising our own satisfaction with our living standard.

Social well-being. Greater satisfaction with living standard results in greater social belonging ($\beta = 0.16$, 95%CI: 0.12, 0.19, E-value=1.99). For some people, a low level of living standard makes them feel ashamed. People report not seeing their family often because of feeling ashamed of being poor and not able to do costly social activities with other family members (Stewart et al., 2009). However, whether the family members in fact look down to them for this reason is not clear. Being satisfied with our living standard means not worried about how others perceive our living standard. We recommend that one’s objective living standard should not act a barrier for people to being open to new encounters and making social connections.

Economic well-being. Standard of living satisfaction has a strong causal effect on future security ($\beta = 0.34$, 95%CI: 0.30, 0.38, E-value=3.13). While more income also positively contributes to future security, it is to a lesser extent ($\beta = 0.05$, 95%CI: 0.01, 0.09, E-value=1.41). The E-value of standard of living satisfaction on future security is twice as large as the E-value of income on future security, suggesting that the former relationship is more robust to its unmeasured confounding. Personal security is one of the most fundamental human needs

(Maslow, 1970), and the lack of security means being exposed to life-threatening conditions. In this sense, personal security is necessarily supported by material living. Hence, owning a satisfactory level of material possessions, such as a shelter in a good neighbourhood, can make people feel more confident that they will also be safe in the future. To further understand this relationship, future studies could explore whether current security plays a mediating role linking living standard satisfaction to future security (Cummins et al., 2003).

Conclusions. Our results suggest that, if people want to achieve multi-dimensional well-being, it is the most effective to raise one's own level of satisfaction with their current living standard, compared to pursuing more income or entering a better profession.

However, why doesn't income have such wide-ranging effects on multi-dimensional well-being? Income is an objective and absolute measure in the sense that it does not have an upper limit. In a capitalist economy, there are no limitations to the amount of money that an individual can possess. Hence, if the accumulation of money is the end goal for a person in life, this endeavour can never end. This situation echoes with what Graham and Pettinato (2002) referred to as "frustrated achievers", whose aspirations rise even more quickly than their income increases.

Rather, being satisfied with our current standard of living, no matter what they may objectively be, is more important for our overall well-being. We cannot change our objective external circumstances, such as when the next financial crisis or global pandemic arrives, or whether we can get a promotion at work. However, we can adopt a flexible mindset of accepting and feeling content with our current circumstances, whatever they may be. This recommendation aligns with major religious teachings. In The Bible, Hebrews 13:5 reads "Keep your lives free from the love of money and be content with what you have" (*New International Version Bible*,

n.d.). In Buddhism, the second noble truth states that desire is one of the three roots of suffering (Anderson, 2013). In Dao Te Ching, Lao Tzu says “He who knows contentment is rich” (Laozi & Lau, 1963).

Future studies should explore possible causes of standard of living satisfaction such as personality traits (Costa & McCrae, 1980; Ng, 2015; Rammstedt, 2007), social norms (Clark & Oswald, 1996) and social comparison (Boyce et al., 2010; Frank & Enkawa, 2008).

Nevertheless, one of the most important causes of standard of living satisfaction is income ($\beta = 0.17$, 95%CI: 0.13, 0.21, E-value=1.86; Frank & Enkawa, 2008; Yu et al., 2020).

General Discussion

With three studies, we investigated the popular hypothesis that income improves well-being by combining national-scale longitudinal data with the outcome-wide framework for causal inference. We found that the subjective satisfaction of standard of living has the greatest impact on multidimensional well-being. The confidence intervals of 26 out of 32 associations have excluded zero. In contrast, household income had the most limited connection with well-being. The confidence intervals of 7 out of 32 associations have excluded zero. Occupational status situates between income and subjective standard of living, relating to 11 out of 32 outcomes.

Specifically, an increase in income caused improvements over life satisfaction, permeability of individual, power dependence, satisfaction with living standard, satisfaction with future security and occupational status. The scope of income’s influence is mainly focused on reflective well-being and economic well-being. In comparison, the main areas of improvements caused by higher occupational status are embodied and reflective well-being. Greater satisfaction

with standard of living caused improvements over all categories across physical health, embodied well-being, reflective well-being, social well-being and economic well-being.

Causal Inference Framework. Most past studies on income and well-being are associational, and previous reviews urged for a causal assessment (eg. Stevenson & Wolfers, 2008; Diener & Seligman, 2004). Our study is a first systematic work on income's causal effects on multi-dimensional well-being. Methodologically, we adopted VanderWeele and colleagues' outcome-wide approach for causal inference in longitudinal data (VanderWeele et al., 2020; Bulbulia, 2022b). The five key elements in this approach are 1) using a longitudinal dataset, 2) include a wide range of outcomes, 3) control for all relevant covariates at baseline, 4) use two-levels of counterfactual exposure to estimate marginal average effects, and 5) compute E-values to assess robustness of these effects to unmeasured confounding. Our results from the three studies demonstrate that this is an effective framework for studying multi-dimensional well-being and its causes.

In addition to causal inference, the outcome-wide framework also holds several benefits for practicing and promoting well-being science. First, including an extensive range of well-being measures in the same study improves research efficiency. Second, by reporting all relevant outcome results, whether they are significant or not, reduces the “researcher degrees of freedom” and hence helps to address the replication crisis. Third, by applying the same set of covariate controls and using the same sample for all well-being measures simultaneously, we can directly compare effect sizes.

Objective vs. Subjective Measures of Income. While there is extensive research on the association between income and well-being, research on occupational status and standard of living satisfaction are scarce. Our studies demonstrate the usefulness of a subjective measure of

standard of living satisfaction and an objective measure of occupational status for studying multi-dimensional well-being. Future studies can look beyond a singular measure of income and explore different objective and subjective measures of income.

Limitations and Future Studies

There are several limitations in our studies. First, the list of well-being outcomes examined in our studies are limited by the scope of the NZAVS dataset. Hence, the items do not form a comprehensive representation of each well-being category. For example, we did not examine positive affect in embodied well-being, which is a key item in typical subjective well-being measurements (Diener, 2009). However, this is a common constraint of working with existing longitudinal datasets.

Second, the NZAVS sample is demographically diverse, yet its representation of the Asian population and of Pacific Nations peoples are low. In 2018, New Zealand has 15.3% Asians and 9% Pacific Nations peoples (Statistics New Zealand, 2018). The NZAVS sample has 4% Asians and 1.9% Pacific Nations peoples in 2018. The Asian population and especially the Asian migrant population is known to be hard to reach for research purposes. For data collection in future waves of the NZAVS, monetary rewards or building personal connections to the local cultural activity groups are some ways to address this challenge.

Lastly, while the income-well-being relationships and the well-being variables we used should be applicable to any modern society, it is possible that some of our observed results are unique to developed countries and countries with higher income equality. For example, Graham and Pettinato (2002) found that in Russia and Peru, which are two new market economy countries with high macroeconomic volatility, people are not satisfied even when their income raises. This is first because the upwardly mobile individuals tend to have an unattainable

reference group, suggesting that their aspiration rises more quickly than their absolute income increase. Second, volatile markets means that income gains may not be stable and hence cannot predict satisfaction with future security. Future research can conduct similar within-nation longitudinal studies to test the income-well-being causal relationship in different countries.

Concluding Remarks

In current government policies and individual decision-making, income is a universal proxy for well-being (Diener & Seligman, 2004). The primary goal of government policies is economic development measured in GDP per capital. Individuals also spend most of their waking hours striving to increase personal earnings through various endeavours. However, money is only made meaningful and desired when it is equated to its purchasing power in a society for the goods and services that can improve our well-being. While governments begin to acknowledge the importance of well-being as a goal of national development and policy-making, well-being measures are yet to be used routinely to evaluate public policies (Frijters et al., 2020).

To accelerate progress on making well-being the primary goal of government and individual decision-making, we need compelling evidence that is representative and can reveal causal directions. Using national panel data and the outcome-wide framework with extensive covariate controls at baseline and sensitivity analysis, we found that more income does improve well-being. However, income has limited causal effects on multi-dimensional well-being. In comparison, raising our subjective satisfaction with standard of living has the strongest and most wide-ranging effects on multi-dimensional well-being.

References

- Adler, N. E., & Rehkopf, D. H. (2008). U.S. Disparities in Health: Descriptions, Causes, and Mechanisms. *Annual Review of Public Health, 29*(1), 235–252.
<https://doi.org/10.1146/annurev.publhealth.29.020907.090852>
- Amato, P. R., & Previti, D. (2003). People’s Reasons for Divorcing: Gender, Social Class, the Life Course, and Adjustment. *Journal of Family Issues, 24*(5), 602–626.
<https://doi.org/10.1177/0192513X03024005002>
- Anderson, C., Hildreth, J. A. D., & Howland, L. (2015). Is the desire for status a fundamental human motive? A review of the empirical literature. *Psychological Bulletin, 141*(3), 574–601. <https://doi.org/10.1037/a0038781>
- Anderson, C. S. (2013). *Pain and its ending: The Four Noble Truths in the Theravāda Buddhist canon*. Routledge.
- Aristotle. (1985). *Nicomachean Ethics*. Hackett Publishing Company.
- Baumeister, R. F., Vohs, K. D., Aaker, J. L., & Garbinsky, E. N. (2013). Some key differences between a happy life and a meaningful life. *The Journal of Positive Psychology, 8*(6), 505–516. <https://doi.org/10.1080/17439760.2013.830764>
- Benzeval, M., & Judge, K. (2001). Income and health: The time dimension. *Social Science & Medicine, 52*(9), 1371–1390. [https://doi.org/10.1016/S0277-9536\(00\)00244-6](https://doi.org/10.1016/S0277-9536(00)00244-6)
- Berry, J. W., Worthington, E. L., O’Connor, L. E., Parrott, L., & Wade, N. G. (2005). Forgivingness, Vengeful Rumination, and Affective Traits. *Journal of Personality, 73*(1), 183–226. <https://doi.org/10.1111/j.1467-6494.2004.00308.x>

- Berry, R. E., & Williams, F. L. (1987). Assessing the Relationship between Quality of Life and Marital and Income Satisfaction: A Path Analytic Approach. *Journal of Marriage and the Family*, 49(1), 107. <https://doi.org/10.2307/352675>
- Blascovich, J., & Tomaka, J. (1991). Measures of Self-Esteem. In *Measures of Personality and Social Psychological Attitudes* (pp. 115–160). Elsevier. <https://doi.org/10.1016/B978-0-12-590241-0.50008-3>
- Boran, A., Shawaheen, M., Khader, Y., Amarin, Z., & Hill Rice, V. (2012). Work-related stress among health professionals in northern Jordan. *Occupational Medicine*, 62(2), 145–147. <https://doi.org/10.1093/occmed/kqr180>
- Boven, N., Shackleton, N., Bolton, L., & Milne, B. (2021). *The 2018 New Zealand Socioeconomic Index (NZSEI-18): Brief technical summary*. Compass Research Centre, University of Auckland.
- Boyce, C. J., Brown, G. D. A., & Moore, S. C. (2010). Money and Happiness: Rank of Income, Not Income, Affects Life Satisfaction. *Psychological Science*, 21(4), 471–475. <https://doi.org/10.1177/0956797610362671>
- Britt, S. L., Grable, J. E., Nelson Goff, B. S., & White, M. (2008). The influence of perceived spending behaviors on relationship satisfaction. *Financial Counseling and Planning*, 19, 31–43.
- Brotheridge, C. M., & Grandey, A. A. (2002). Emotional Labor and Burnout: Comparing Two Perspectives of “People Work.” *Journal of Vocational Behavior*, 60(1), 17–39. <https://doi.org/10.1006/jvbe.2001.1815>
- Bulbulia, J. (2022a). *G-computation in NZAVS Studies*. <https://go-bayes.github.io/b-causal/posts/g-computation/g-computation.html>

- Bulbulia, J. (2022b). *Outcome-Wide Causal Inference in the NZAVS*. <https://go-bayes.github.io/b-causal-lab/>
- Buuren, S. van, & Groothuis-Oudshoorn, K. (2011). **mice**: Multivariate Imputation by Chained Equations in R. *Journal of Statistical Software*, 45(3).
<https://doi.org/10.18637/jss.v045.i03>
- Caldwell, M. B., Brownell, K. D., & Wilfley, D. E. (1997). Relationship of weight, body dissatisfaction, and self-esteem in African American and white female dieters. *International Journal of Eating Disorders*, 22(2), 127–130.
[https://doi.org/10.1002/\(SICI\)1098-108X\(199709\)22:2<127::AID-EAT2>3.0.CO;2-H](https://doi.org/10.1002/(SICI)1098-108X(199709)22:2<127::AID-EAT2>3.0.CO;2-H)
- Caprara, G. V. (1986). Indicators of aggression: The dissipation-rumination scale. *Personality and Individual Differences*, 7(6), 763–769. [https://doi.org/10.1016/0191-8869\(86\)90074-7](https://doi.org/10.1016/0191-8869(86)90074-7)
- Clark, A. E., & Oswald, A. J. (1996). Satisfaction and comparison income. *Journal of Public Economics*, 61(3), 359–381. [https://doi.org/10.1016/0047-2727\(95\)01564-7](https://doi.org/10.1016/0047-2727(95)01564-7)
- Cohen, S., Alper, C. M., Doyle, W. J., Adler, N., Treanor, J. J., & Turner, R. B. (2008). Objective and subjective socioeconomic status and susceptibility to the common cold. *Health Psychology*, 27(2), 268–274. <https://doi.org/10.1037/0278-6133.27.2.268>
- Costa, P. T., & McCrae, R. R. (1980). Influence of extraversion and neuroticism on subjective well-being: Happy and unhappy people. *Journal of Personality and Social Psychology*, 38(4), 668–678. <https://doi.org/10.1037/0022-3514.38.4.668>
- Cummins, R. A., Eckersley, R., Pallant, J., Vugt, J. V., & Misajon, R. (2003). *Developing a National Index of Subjective Wellbeing: The Australian Unity Wellbeing Index*. 32.

- Cundiff, J. M., & Matthews, K. A. (2017). Is subjective social status a unique correlate of physical health? A meta-analysis. *Health Psychology, 36*(12), 1109–1125.
<https://doi.org/10.1037/hea0000534>
- Cutrona, C., & Russell, D. (1987). The Provisions of Social Relationships and Adaptation to Stress. In *Advances in Personal Relationships* (Vol. 1, pp. 37–67).
- Deaton, A. (2008). Income, Health, and Well-Being around the World: Evidence from the Gallup World Poll. *Journal of Economic Perspectives, 22*(2), 53–72.
<https://doi.org/10.1257/jep.22.2.53>
- Diener, E. (2009). Subjective Well-Being. In E. Diener (Ed.), *The Science of Well-Being* (Vol. 37, pp. 11–58). Springer Netherlands. https://doi.org/10.1007/978-90-481-2350-6_2
- Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The Satisfaction With Life Scale. *Journal of Personality Assessment, 49*(1), 71–75.
https://doi.org/10.1207/s15327752jpa4901_13
- Diener, E., Nickerson, C., Lucas, R. E., & Sandvik, E. (2002). Dispositional Affect and Job Outcomes. *Social Indicators Research, 59*(3), 229–259.
<https://doi.org/10.1023/A:1019672513984>
- Diener, E., & Seligman, M. E. P. (2004). Beyond Money: Toward an Economy of Well-Being. *Psychological Science in the Public Interest, 5*(1), 1–31. <https://doi.org/10.1111/j.0963-7214.2004.00501001.x>
- Diener, E., Wirtz, D., Tov, W., Kim-Prieto, C., Choi, D., Oishi, S., & Biswas-Diener, R. (2010). New Well-being Measures: Short Scales to Assess Flourishing and Positive and Negative Feelings. *Social Indicators Research, 97*(2), 143–156. <https://doi.org/10.1007/s11205-009-9493-y>

- Easterlin, R. A. (1973). Does Money Buy Happiness? *The Public Interest*, 30, 3-.
- Easterlin, R. A. (1995). Will raising the incomes of all increase the happiness of all? *Journal of Economic Behavior & Organization*, 27(1), 35–47. [https://doi.org/10.1016/0167-2681\(95\)00003-B](https://doi.org/10.1016/0167-2681(95)00003-B)
- Ecob, R., & Davey Smith, G. (1999). Income and health: What is the nature of the relationship? *Social Science & Medicine*, 48(5), 693–705. [https://doi.org/10.1016/S0277-9536\(98\)00385-2](https://doi.org/10.1016/S0277-9536(98)00385-2)
- Employment New Zealand. (2022). *Minimum wage rates from May 2013 to April 2021*. New Zealand Government. <https://www.employment.govt.nz/hours-and-wages/pay/minimum-wage/previous-rates/>
- Ettner, S. L. (1996). New evidence on the relationship between income and health. *Journal of Health Economics*, 15(1), 67–85. [https://doi.org/10.1016/0167-6296\(95\)00032-1](https://doi.org/10.1016/0167-6296(95)00032-1)
- Frank, B., & Enkawa, T. (2008). Does aggregate income influence satisfaction with the standard of living? *International Journal of Society Systems Science*, 1(2), 113. <https://doi.org/10.1504/IJSSS.2008.021915>
- Frijters, P., Clark, A. E., Krekel, C., & Layard, R. (2020). A happy choice: Wellbeing as the goal of government. *Behavioural Public Policy*, 4(2), 126–165. <https://doi.org/10.1017/bpp.2019.39>
- Ganzeboom, H. B. G., De Graaf, P. M., & Treiman, D. J. (1992). A standard international socio-economic index of occupational status. *Social Science Research*, 21(1), 1–56. [https://doi.org/10.1016/0049-089X\(92\)90017-B](https://doi.org/10.1016/0049-089X(92)90017-B)
- Graham, C., Eggers, A., & Sukhtankar, S. (2004). Does Happiness Pay? In W. Glatzer, S. Von Below, & M. Stoffregen (Eds.), *Challenges for Quality of Life in the Contemporary*

- World* (Vol. 24, pp. 179–204). Springer Netherlands. https://doi.org/10.1007/978-1-4020-2903-5_13
- Graham, C., & Pettinato, S. (2002). Frustrated Achievers: Winners, Losers and Subjective Well-Being in New Market Economies. *Journal of Development Studies*, 38(4), 100–140. <https://doi.org/10.1080/00220380412331322431>
- Groves, R. M. (1989). *Survey Errors and Survey Costs: Groves/Survey Errors*. John Wiley & Sons, Inc. <https://doi.org/10.1002/0471725277>
- Hagerty, B. M., Williams, R. A., Coyne, J. C., & Early, M. R. (1996). Sense of belonging and indicators of social and psychological functioning. *Archives of Psychiatric Nursing*, 10(4), 235–244. [https://doi.org/10.1016/S0883-9417\(96\)80029-X](https://doi.org/10.1016/S0883-9417(96)80029-X)
- Hagerty, B., & Patusky, K. (1995). Developing a Measure Of Sense of Belonging. *Nursing Research*, 44, 9–13. <https://doi.org/10.1097/00006199-199501000-00003>
- Haq, Z., Iqbal, Z., & Rahman, A. (2008). Job stress among community health workers: A multi-method study from Pakistan. *International Journal of Mental Health Systems*, 2(1), 15. <https://doi.org/10.1186/1752-4458-2-15>
- Hochschild, A. R. (1983). *The Managed Heart: Commercialization of human feeling*. University of California.
- Isaacs, A. N., Enticott, J., Meadows, G., & Inder, B. (2018). Lower Income Levels in Australia Are Strongly Associated With Elevated Psychological Distress: Implications for Healthcare and Other Policy Areas. *Frontiers in Psychiatry*, 9, 536. <https://doi.org/10.3389/fpsy.2018.00536>
- Jackson, G. L., Krull, J. L., Bradbury, T. N., & Karney, B. R. (2017). Household Income and Trajectories of Marital Satisfaction in Early Marriage: Income and Satisfaction

- Trajectories. *Journal of Marriage and Family*, 79(3), 690–704.
<https://doi.org/10.1111/jomf.12394>
- Jebb, A. T., Morrison, M., Tay, L., & Diener, E. (2020). Subjective Well-Being Around the World: Trends and Predictors Across the Life Span. *Psychological Science*, 31(3), 293–305. <https://doi.org/10.1177/0956797619898826>
- Joseph Sirgy, M., Gurel-Atay, E., Webb, D., Cicic, M., Husic-Mehmedovic, M., Ekici, A., Herrmann, A., Hegazy, I., Lee, D.-J., & Johar, J. S. (2013). Is Materialism All That Bad? Effects on Satisfaction with Material Life, Life Satisfaction, and Economic Motivation. *Social Indicators Research*, 110(1), 349–366. <https://doi.org/10.1007/s11205-011-9934-2>
- Kahneman, D., & Deaton, A. (2010). High income improves evaluation of life but not emotional well-being. *Proceedings of the National Academy of Sciences*, 107(38), 16489–16493. <https://doi.org/10.1073/pnas.1011492107>
- Kammeyer-Mueller, J. D., Judge, T. A., & Piccolo, R. F. (2008). Self-Esteem and Extrinsic Career Success: Test of a Dynamic Model. *Applied Psychology*, 57(2), 204–224. <https://doi.org/10.1111/j.1464-0597.2007.00300.x>
- Kashdan, T. B., Biswas-Diener, R., & King, L. A. (2008). Reconsidering happiness: The costs of distinguishing between hedonics and eudaimonia. *The Journal of Positive Psychology*, 3(4), 219–233. <https://doi.org/10.1080/17439760802303044>
- Kashdan, T. B., & Breen, W. E. (2007). Materialism and Diminished Well-Being: Experiential Avoidance as a Mediating Mechanism. *Journal of Social and Clinical Psychology*, 26(5), 521–539. <https://doi.org/10.1521/jscp.2007.26.5.521>
- Kessler, R., Green, J., Gruber, M., Sampson, N., Bromet, E., Cuitan, M., Furukawa, T., Gureje, O., Hinkov, H., Hu, C., Lara, C., Lee, S., Mneimneh, Z., Myer, L., Oakley-Browne, M.,

- Posada-Villa, J., Sagar, R., Viana, M., & Zaslavsky, A. (2010). Screening for serious mental illness in the general population with the K6 screening scale: Results from the WHO World Mental Health (WMH) survey initiative. *International Journal of Methods in Psychiatric Research*. <https://doi.org/10.1002/mpr.310>
- Killingsworth, M. A. (2021). Experienced well-being rises with income, even above \$75,000 per year. *Proceedings of the National Academy of Sciences*, 118(4), e2016976118. <https://doi.org/10.1073/pnas.2016976118>
- Kobau, R., Sniezek, J., Zack, M. M., Lucas, R. E., & Burns, A. (2010). Well-Being Assessment: An Evaluation of Well-Being Scales for Public Health and Population Estimates of Well-Being among US Adult. *Applied Psychology: Health and Well-Being*, 2(3), 272–297. <https://doi.org/10.1111/j.1758-0854.2010.01035.x>
- Korman, A. K. (1971). Organizational achievement, aggression and creativity: Some suggestions toward an integrated theory. *Organizational Behavior and Human Performance*, 6(5), 593–613. [https://doi.org/10.1016/S0030-5073\(71\)80009-0](https://doi.org/10.1016/S0030-5073(71)80009-0)
- Krauss, S., & Orth, U. (2022). Work Experiences and Self-Esteem Development: A Meta-Analysis of Longitudinal Studies. *European Journal of Personality*, 36(6), 849–869. <https://doi.org/10.1177/08902070211027142>
- Lambert, N. M., Fincham, F. D., Stillman, T. F., & Dean, L. R. (2009). More gratitude, less materialism: The mediating role of life satisfaction. *The Journal of Positive Psychology*, 4(1), 32–42. <https://doi.org/10.1080/17439760802216311>
- Laozi, & Lau, D. C. (1963). *Tao te ching*. Penguin Books.

Lucas, R. E., & Schimmack, U. (2009). Income and well-being: How big is the gap between the rich and the poor? *Journal of Research in Personality*, 43(1), 75–78.

<https://doi.org/10.1016/j.jrp.2008.09.004>

Marks, G. N., & Fleming, N. (1997). Influences and Consequences of Well-being Among Australian Young People: 1980–1995. *Social Indicators Research*, 46(3), 301–323.

<https://doi.org/10.1023/A:1006928507272>

Maslow, A. H. (1970). *Motivation and personality*. Harper & Row.

Mccullough, M. E., Emmons, R. A., & Tsang, J.-A. (2002). The grateful disposition: A conceptual and empirical topography. *Journal of Personality and Social Psychology*, 82(1), 112–127. <https://doi.org/10.1037//0022-3514.82.1.112>

Mill, J. S. (1957). *Utilitarianism*. Liberal Arts Press.

Moore, J., Stinson, L., & Welniak, E. (2000). *Income Measurement Error in Surveys: A Review*.

Mummendey, A., & Wenzel, M. (1999). Social Discrimination and Tolerance in Intergroup Relations: Reactions to Intergroup Difference. *Personality and Social Psychology Review*, 3(2), 158–174. https://doi.org/10.1207/s15327957pspr0302_4

Muntaner, C., Eaton, W. W., Dila, C., Kessler, R. C., & Sorlie, P. D. (1998). Social class, assets, organizational control and the prevalence of common groups of psychiatric disorders. *Social Science & Medicine*, 47(12), 2043–2053. [https://doi.org/10.1016/S0277-9536\(98\)00309-8](https://doi.org/10.1016/S0277-9536(98)00309-8)

New International Version Bible. (n.d.). BibleGateway.

<https://www.biblegateway.com/passage/?search=Hebrews%2013&version=NIV>

- Ng, W. (2015). Processes Underlying Links to Subjective Well-being: Material Concerns, Autonomy, and Personality. *Journal of Happiness Studies*, 16(6), 1575–1591.
<https://doi.org/10.1007/s10902-014-9580-x>
- Ng, W., & Diener, E. (2014). What matters to the rich and the poor? Subjective well-being, financial satisfaction, and postmaterialist needs across the world. *Journal of Personality and Social Psychology*, 107(2), 326–338. <https://doi.org/10.1037/a0036856>
- Nolen-Hoeksema, S., & Morrow, J. (1993). Effects of rumination and distraction on naturally occurring depressed mood. *Cognition and Emotion*, 7(6), 561–570.
<https://doi.org/10.1080/02699939308409206>
- Norton, D. L. (1977). *Personal Destinies: A Philosophy of Ethical Individualism*. Princeton University Press.
- Nunn, C., Harry Crockett, & Allen Williams. (1978). *Tolerance for nonconformity*. Jossey-Bass Publishers.
- Open Science Collaboration. (2015). Estimating the reproducibility of psychological science. *Science*, 349(6251), aac4716. <https://doi.org/10.1126/science.aac4716>
- Orpana, H. M., Lemyre, L., & Gravel, R. (2009). Income and psychological distress: The role of the social environment. *Health Reports*, 20(1), 21–28.
- Ostaszkievicz, J., O’Connell, B., & Dunning, T. (2016). ‘We just do the dirty work’: Dealing with incontinence, courtesy stigma and the low occupational status of carework in long-term aged care facilities. *Journal of Clinical Nursing*, 25(17–18), 2528–2541.
<https://doi.org/10.1111/jocn.13292>
- Pearl, J. (2012). *On a Class of Bias-Amplifying Variables that Endanger Effect Estimates*.
<https://doi.org/10.48550/ARXIV.1203.3503>

- Pierce, J. L., & Gardner, D. G. (2004). Self-Esteem Within the Work and Organizational Context: A Review of the Organization-Based Self-Esteem Literature. *Journal of Management*, 30(5), 591–622. <https://doi.org/10.1016/j.jm.2003.10.001>
- Pinquart, M. (2002). Creating and maintaining purpose in life in old age: A meta-analysis. *Ageing International*, 27(2), 90–114. <https://doi.org/10.1007/s12126-002-1004-2>
- Quality of Life 2008 Survey National Report*. (2009). Nielsen.
- R Core Team. (2022). *R: A language and environment for statistical computing*. R Foundation for Statistical Computing. <https://www.R-project.org/>
- Rammstedt, B. (2007). Who worries and who is happy? Explaining individual differences in worries and satisfaction by personality. *Personality and Individual Differences*, 43(6), 1626–1634. <https://doi.org/10.1016/j.paid.2007.04.031>
- Rice, K. G., Richardson, C. M. E., & Tueller, S. (2014). The Short Form of the Revised Almost Perfect Scale. *Journal of Personality Assessment*, 96(3), 368–379. <https://doi.org/10.1080/00223891.2013.838172>
- Richins, M. L., & Dawson, S. (1992). A Consumer Values Orientation for Materialism and Its Measurement: Scale Development and Validation. *Journal of Consumer Research*, 19(3), 303. <https://doi.org/10.1086/209304>
- Rosenberg, M. (1965). *Society and the Adolescent Self-Image*. Princeton University Press; JSTOR. <http://www.jstor.org/stable/j.ctt183pjhh>
- Ryan, R. M., & Deci, E. L. (2001). On Happiness and Human Potentials: A Review of Research on Hedonic and Eudaimonic Well-Being. *Annual Review of Psychology*, 52(1), 141–166. <https://doi.org/10.1146/annurev.psych.52.1.141>

- Ryff, C. D. (1989). Happiness is everything, or is it? Explorations on the meaning of psychological well-being. *Journal of Personality and Social Psychology*, 57(6), 1069–1081. <https://doi.org/10.1037/0022-3514.57.6.1069>
- Ryff, C. D. (1995). Psychological Well-Being in Adult Life. *Current Directions in Psychological Science*, 4(4), 99–104. <https://doi.org/10.1111/1467-8721.ep10772395>
- Ryff, C. D., & Singer, B. H. (2008). Know Thyself and Become What You Are: A Eudaimonic Approach to Psychological Well-Being. *Journal of Happiness Studies*, 9(1), 13–39. <https://doi.org/10.1007/s10902-006-9019-0>
- Sacks, D. W., Stevenson, B., & Wolfers, J. (2012). The new stylized facts about income and subjective well-being. *Emotion*, 12(6), 1181–1187. <https://doi.org/10.1037/a0029873>
- Sági, M. (2011). Determinants of Satisfaction with Living Standards in Transition Societies. *International Journal of Sociology*, 41(4), 55–78. <https://doi.org/10.2753/IJS0020-7659410403>
- Seligman, M. E. P. (2011). *Flourish: A visionary new understanding of happiness and well-being* (1. Free Press hardcover ed). Free Press.
- Sengupta, N. K., Osborne, D., Houkamau, C. A., Hovverd, W. J., Wilson, M. S., Halliday, L. M., West-Newman, T., Barlow, F. K., Armstrong, G., Robertson, A., & Sibley, C. G. (2012). How much happiness does money buy? Income and subjective well-being in New Zealand. *New Zealand Journal of Psychology*, 41(2), 21–34.
- Sibley, C. G. (2021). *Sampling procedure and sample details for the New Zealand Attitudes and Values Study* [Preprint]. PsyArXiv. <https://doi.org/10.31234/osf.io/wgqvz>
- Sibley, C. G., Greaves, L. M., Satherley, N., Wilson, M. S., Overall, N. C., Lee, C. H. J., Milojev, P., Bulbulia, J., Osborne, D., Milfont, T. L., Houkamau, C. A., Duck, I. M.,

- Vickers-Jones, R., & Barlow, F. K. (2020). Effects of the COVID-19 pandemic and nationwide lockdown on trust, attitudes toward government, and well-being. *American Psychologist*, 75(5), 618–630. <https://doi.org/10.1037/amp0000662>
- Singer, E., Thurn, D. R. V., & Miller, E. R. (1995). Confidentiality Assurances and Response: A Quantitative Review of the Experimental Literature. *Public Opinion Quarterly*, 59(1), 66. <https://doi.org/10.1086/269458>
- Smith, M. K. (2001). Community. In *The encyclopedia of pedagogy and informal education*. <https://infed.org/mobi/community/>
- Statistics New Zealand. (2018). *2018 Census totals by topic*. Statistics New Zealand.
- Steger, M. F., Frazier, P., Oishi, S., & Kaler, M. (2006). The meaning in life questionnaire: Assessing the presence of and search for meaning in life. *Journal of Counseling Psychology*, 53(1), 80–93. <https://doi.org/10.1037/0022-0167.53.1.80>
- Stevenson, B., & Wolfers, J. (2008). *Economic Growth and Subjective Well-Being: Reassessing the Easterlin Paradox* (No. w14282; p. w14282). National Bureau of Economic Research. <https://doi.org/10.3386/w14282>
- Stevenson, B., & Wolfers, J. (2013). Subjective Well-Being and Income: Is There Any Evidence of Satiation? *American Economic Review*, 103(3), 598–604. <https://doi.org/10.1257/aer.103.3.598>
- Stewart, M. J., Makwarimba, E., Reutter, L. I., Veenstra, G., Raphael, D., & Love, R. (2009). Poverty, Sense of Belonging and Experiences of Social Isolation. *Journal of Poverty*, 13(2), 173–195. <https://doi.org/10.1080/10875540902841762>

- Stronge, S., Greaves, L. M., Milojev, P., West-Newman, T., Barlow, F. K., & Sibley, C. G. (2015). Facebook is Linked to Body Dissatisfaction: Comparing Users and Non-Users. *Sex Roles*, 73(5–6), 200–213. <https://doi.org/10.1007/s11199-015-0517-6>
- Tausch, N., Saguy, T., & Bryson, J. (2015). How Does Intergroup Contact Affect Social Change? Its Impact on Collective Action and Individual Mobility Intentions among Members of a Disadvantaged Group: How Does Intergroup Contact Affect Social Change. *Journal of Social Issues*, 71(3), 536–553. <https://doi.org/10.1111/josi.12127>
- Tiliouine, H., Cummins, R. A., & Davern, M. (2006). Measuring Wellbeing in Developing Countries: The Case of Algeria. *Social Indicators Research*, 75(1), 1–30. <https://doi.org/10.1007/s11205-004-2012-2>
- Twenge, J. M., & Campbell, W. K. (2002). Self-Esteem and Socioeconomic Status: A Meta-Analytic Review. *Personality and Social Psychology Review*, 6(1), 59–71. https://doi.org/10.1207/S15327957PSPR0601_3
- Unanue, W., Gomez Mella, M. E., Cortez, D. A., Bravo, D., Araya-Véliz, C., Unanue, J., & Van Den Broeck, A. (2019). The Reciprocal Relationship Between Gratitude and Life Satisfaction: Evidence From Two Longitudinal Field Studies. *Frontiers in Psychology*, 10, 2480. <https://doi.org/10.3389/fpsyg.2019.02480>
- van de Werfhorst, H. G. (2010). Cultural capital: Strengths, weaknesses and two advancements. *British Journal of Sociology of Education*, 31(2), 157–169. <https://doi.org/10.1080/01425690903539065>
- VanderWeele, T. J. (2017a). Outcome-wide Epidemiology. *Epidemiology*, 28(3), 399–402. <https://doi.org/10.1097/EDE.0000000000000641>

- VanderWeele, T. J. (2017b). On the promotion of human flourishing. *Proceedings of the National Academy of Sciences*, 114(31), 8148–8156.
<https://doi.org/10.1073/pnas.1702996114>
- VanderWeele, T. J. (2017c). On the promotion of human flourishing. *Proceedings of the National Academy of Sciences*, 114(31), 8148–8156.
<https://doi.org/10.1073/pnas.1702996114>
- VanderWeele, T. J., & Ding, P. (2017). Sensitivity Analysis in Observational Research: Introducing the E-Value. *Annals of Internal Medicine*, 167(4), 268.
<https://doi.org/10.7326/M16-2607>
- VanderWeele, T. J., Mathur, M. B., & Chen, Y. (2020). Outcome-Wide Longitudinal Designs for Causal Inference: A New Template for Empirical Studies. *Statistical Science*, 35(3).
<https://doi.org/10.1214/19-STS728>
- VanderWeele, T. J., & Shpitser, I. (2011). A New Criterion for Confounder Selection. *Biometrics*, 67(4), 1406–1413. <https://doi.org/10.1111/j.1541-0420.2011.01619.x>
- Ward, S. J., & King, L. A. (2016). Poor but Happy? Income, Happiness, and Experienced and Expected Meaning in Life. *Social Psychological and Personality Science*, 7(5), 463–470.
<https://doi.org/10.1177/1948550615627865>
- Ward, S. J., & King, L. A. (2019). Exploring the place of financial status in the good life: Income and meaning in life. *The Journal of Positive Psychology*, 14(3), 312–323.
<https://doi.org/10.1080/17439760.2017.1402075>
- Ware, J. E., & Sherbourne, C. D. (1992). The MOS 36-Item Short-Form Health Survey (SF-36): I. Conceptual Framework and Item Selection. *Medical Care*, 30(6), 473–483.
<https://doi.org/10.1097/00005650-199206000-00002>

- Waterman, A. S. (2008). Reconsidering happiness: A eudaimonist's perspective. *The Journal of Positive Psychology*, 3(4), 234–252. <https://doi.org/10.1080/17439760802303002>
- Waterman, A. S., Schwartz, S. J., Zamboanga, B. L., Ravert, R. D., Williams, M. K., Bede Agocha, V., Yeong Kim, S., & Brent Donnellan, M. (2010). The Questionnaire for Eudaimonic Well-Being: Psychometric properties, demographic comparisons, and evidence of validity. *The Journal of Positive Psychology*, 5(1), 41–61. <https://doi.org/10.1080/17439760903435208>
- Watt, T. T. (2001). Explaining Divorce: An Examination of the Relationship Between Marital Characteristics and Divorce. *Journal of Divorce & Remarriage*, 35(3–4), 125–145. https://doi.org/10.1300/J087v35n03_08
- Well-being and education*. (2009). Ministry of Education. <https://www.educationcounts.govt.nz/publications/series/ALL/36013>
- Werfhorst, H. G. V. de, & Graaf, N. D. de. (2004). The sources of political orientations in post-industrial society: Social class and education revisited. *The British Journal of Sociology*, 55(2), 211–235. <https://doi.org/10.1111/j.1468-4446.2004.00016.x>
- Williams, K. D., Cheung, C. K. T., & Choi, W. (2000). Cyberostracism: Effects of being ignored over the Internet. *Journal of Personality and Social Psychology*, 79(5), 748–762. <https://doi.org/10.1037/0022-3514.79.5.748>
- Yu, G. B., Lee, D.-J., Sirgy, M. J., & Bosnjak, M. (2020). Household Income, Satisfaction with Standard of Living, and Subjective Well-Being. The Moderating Role of Happiness Materialism. *Journal of Happiness Studies*, 21(8), 2851–2872. <https://doi.org/10.1007/s10902-019-00202-x>

Zell, E., Strickhouser, J. E., & Krizan, Z. (2018). Subjective social status and health: A meta-analysis of community and society ladders. *Health Psychology, 37*(10), 979–987.

<https://doi.org/10.1037/hea0000667>

Appendix A

Characteristics of Sample at Baseline in 2018

Sample Characteristics	Overall (N=27025)
Agreeableness	
Mean (SD)	5.37 (0.974)
Median [Min, Max]	5.50 [1.00, 7.00]
Missing	228 (0.8%)
Conscientiousness	
Mean (SD)	5.17 (1.03)
Median [Min, Max]	5.25 [1.00, 7.00]
Missing	223 (0.8%)
Extraversion	
Mean (SD)	3.91 (1.19)
Median [Min, Max]	4.00 [1.00, 7.00]
Missing	223 (0.8%)
Honesty_humility	
Mean (SD)	5.49 (1.14)
Median [Min, Max]	5.75 [1.00, 7.00]
Missing	227 (0.8%)
Neuroticism	
Mean (SD)	3.42 (1.14)
Median [Min, Max]	3.50 [1.00, 7.00]
Missing	229 (0.8%)
Openness	
Mean (SD)	5.00 (1.11)
Median [Min, Max]	5.00 [1.00, 7.00]
Missing	224 (0.8%)
Age	
Mean (SD)	49.5 (12.8)
Median [Min, Max]	52.0 [18.0, 94.0]

Sample Characteristics	Overall (N=27025)
Alcohol.Frequency	
Mean (SD)	2.28 (1.32)
Median [Min, Max]	2.00 [0, 5.00]
Missing	745 (2.8%)
Alcohol.Intensity	
Mean (SD)	2.08 (1.90)
Median [Min, Max]	2.00 [0, 30.0]
Missing	1297 (4.8%)
Body Satisfaction	
Mean (SD)	4.28 (1.67)
Median [Min, Max]	4.00 [1.00, 7.00]
Missing	285 (1.1%)
Born in New Zealand	
Yes	21341 (79.0%)
No	5674 (21.0%)
Missing	10 (0.0%)
Believe in God	
Yes	11521 (42.6%)
No	14452 (53.5%)
Missing	1052 (3.9%)
Believe in Spirit	
Yes	17305 (64.0%)
No	8668 (32.1%)
Missing	1052 (3.9%)
Belonging	
Mean (SD)	5.21 (1.03)
Median [Min, Max]	5.33 [1.00, 7.00]
Missing	226 (0.8%)
Charitable Donation	

Sample Characteristics	Overall (N=27025)
Mean (SD)	1100 (6370)
Median [Min, Max]	200 [0, 500000]
Missing	1009 (3.7%)
Children Number	
Mean (SD)	1.78 (1.41)
Median [Min, Max]	2.00 [0, 14.0]
Missing	711 (2.6%)
Church attendance frequency	
Mean (SD)	0.579 (1.57)
Median [Min, Max]	0 [0, 8.00]
Missing	497 (1.8%)
Community	
Mean (SD)	4.23 (1.63)
Median [Min, Max]	4.00 [1.00, 7.00]
Missing	101 (0.4%)
Education^a	
Mean (SD)	6.63 (2.67)
Median [Min, Max]	8.00 [1.00, 11.0]
Missing	146 (0.5%)
Employed	
Yes	23188 (85.8%)
No	3808 (14.1%)
Missing	29 (0.1%)
Job Security	
Mean (SD)	5.52 (1.53)
Median [Min, Max]	6.00 [1.00, 7.00]
Missing	4754 (17.6%)
Emotion Regulation1	
Mean (SD)	2.66 (1.56)

Sample Characteristics	Overall (N=27025)
Median [Min, Max]	2.00 [1.00, 7.00]
Missing	208 (0.8%)
Emotion Regulation2	
Mean (SD)	4.18 (1.65)
Median [Min, Max]	4.00 [1.00, 7.00]
Missing	81 (0.3%)
Emotion Regulation3	
Mean (SD)	4.80 (1.40)
Median [Min, Max]	5.00 [1.00, 7.00]
Missing	1336 (4.9%)
Ethnicity Category	
European	22735 (84.1%)
Māori	2501 (9.3%)
Pacific Nations peoples	507 (1.9%)
Asian	1087 (4.0%)
Missing	195 (0.7%)
Gratitude	
Mean (SD)	5.96 (0.834)
Median [Min, Max]	6.00 [1.00, 7.00]
Home Ownership	
Yes	0 (0%)
No	21040 (77.9%)
Missing	5985 (22.1%)
Hours on Exercise_log	
Mean (SD)	1.56 (0.819)
Median [Min, Max]	1.61 [0, 4.39]
Missing	644 (2.4%)
Hours on Work	
Mean (SD)	30.5 (19.0)

Sample Characteristics	Overall (N=27025)
Median [Min, Max]	40.0 [0, 100]
Missing	644 (2.4%)
Body Mass Index	
Mean (SD)	27.1 (5.60)
Median [Min, Max]	26.1 [11.9, 69.3]
Missing	334 (1.2%)
HLTH.Disability	
Yes	0 (0%)
No	5238 (19.4%)
Missing	21787 (80.6%)
Fatigue Frequency	
Mean (SD)	1.57 (1.05)
Median [Min, Max]	2.00 [0, 4.00]
Missing	264 (1.0%)
Sleep Hours	
Mean (SD)	6.95 (1.06)
Median [Min, Max]	7.00 [2.50, 14.0]
Missing	1106 (4.1%)
Impermeability of Group	
Mean (SD)	3.65 (1.58)
Median [Min, Max]	4.00 [1.00, 7.00]
Missing	630 (2.3%)
Log Income	
Mean (SD)	11.6 (0.575)
Median [Min, Max]	11.6 [10.3, 15.2]
Kessler 6 sum	
Mean (SD)	4.92 (3.74)
Median [Min, Max]	4.00 [0, 24.0]
Missing	240 (0.9%)

Sample Characteristics	Overall (N=27025)
Meaning in Life	
Mean (SD)	5.53 (1.12)
Median [Min, Max]	5.50 [1.00, 7.00]
Missing	3 (0.0%)
Life Satisfaction	
Mean (SD)	5.42 (1.12)
Median [Min, Max]	5.50 [1.00, 7.00]
Missing	135 (0.5%)
Lost job	
Yes	0 (0%)
No	1123 (4.2%)
Missing	25902 (95.8%)
Deprivation^b	
Mean (SD)	4.50 (2.63)
Median [Min, Max]	4.00 [1.00, 10.0]
Missing	249 (0.9%)
National Wellbeing Index	
Mean (SD)	5.41 (1.62)
Median [Min, Max]	5.33 [0, 10.0]
Missing	5 (0.0%)
Occupational status (NZSEI)	
Mean (SD)	56.4 (16.1)
Median [Min, Max]	61.0 [10.0, 90.0]
Being a Parent	
Yes	0 (0%)
No	19240 (71.2%)
Missing	7785 (28.8%)
Have a Partner	
Yes	0 (0%)

Sample Characteristics	Overall (N=27025)
No	0 (0%)
Missing	27025 (100%)
Perfectionism	
Mean (SD)	3.07 (1.31)
Median [Min, Max]	3.00 [1.00, 7.00]
Missing	2 (0.0%)
Permeability Individual	
Mean (SD)	5.31 (1.17)
Median [Min, Max]	5.00 [1.00, 7.00]
Missing	631 (2.3%)
Political Orientation	
Mean (SD)	3.55 (1.39)
Median [Min, Max]	4.00 [1.00, 7.00]
Missing	1338 (5.0%)
Power Dependence1	
Mean (SD)	2.87 (1.58)
Median [Min, Max]	2.00 [1.00, 7.00]
Missing	192 (0.7%)
Power Dependence2	
Mean (SD)	2.81 (1.56)
Median [Min, Max]	2.00 [1.00, 7.00]
Missing	1266 (4.7%)
Religious Identification	
Mean (SD)	1.66 (2.55)
Median [Min, Max]	0 [0, 7.00]
Missing	542 (2.0%)
Personal Respect	
Mean (SD)	4.96 (1.25)
Median [Min, Max]	5.00 [1.00, 7.00]

Sample Characteristics	Overall (N=27025)
Missing	645 (2.4%)
Retired	
Yes	715 (2.6%)
No	25883 (95.8%)
Missing	427 (1.6%)
Rumination	
Mean (SD)	0.766 (0.944)
Median [Min, Max]	0 [0, 4.00]
Missing	290 (1.1%)
Self Control	
Mean (SD)	4.45 (1.39)
Median [Min, Max]	4.50 [1.00, 7.00]
Missing	6 (0.0%)
Self-esteem	
Mean (SD)	5.22 (1.23)
Median [Min, Max]	5.33 [1.00, 7.00]
Missing	228 (0.8%)
Semi-retired	
Yes	0 (0%)
No	0 (0%)
Missing	27025 (100%)
Sexual Satisfaction	
Mean (SD)	4.60 (1.73)
Median [Min, Max]	5.00 [1.00, 7.00]
Missing	1786 (6.6%)
Short-Form Health	
Mean (SD)	5.11 (1.11)
Median [Min, Max]	5.33 [1.00, 7.00]
Smoker	

Sample Characteristics	Overall (N=27025)
Smoker	1393 (5.2%)
Non-smoker	25052 (92.7%)
Missing	580 (2.1%)
Spiritual Identification	
Mean (SD)	3.87 (2.08)
Median [Min, Max]	4.00 [1.00, 7.00]
Missing	1266 (4.7%)
Standard of Living	
Mean (SD)	7.83 (1.82)
Median [Min, Max]	8.00 [0, 10.0]
Social Support	
Mean (SD)	6.03 (1.06)
Median [Min, Max]	6.33 [1.00, 7.00]
Missing	10 (0.0%)
Linkage to Urban Area	
Yes	21825 (80.8%)
No	4953 (18.3%)
Missing	247 (0.9%)
Vengeful Rumination	
Mean (SD)	2.87 (1.22)
Median [Min, Max]	2.67 [1.00, 7.00]
Missing	6 (0.0%)
Volunteering	
Yes	7611 (28.2%)
No	18770 (69.5%)
Missing	644 (2.4%)
Satisfaction with Health	
Mean (SD)	6.92 (2.18)
Median [Min, Max]	7.00 [0, 10.0]

Sample Characteristics	Overall (N=27025)
Missing	63 (0.2%)
Satisfaction with Future.Security	
Mean (SD)	6.48 (2.23)
Median [Min, Max]	7.00 [0, 10.0]
Missing	47 (0.2%)
Satisfaction with Personal Relationships	
Mean (SD)	7.90 (2.09)
Median [Min, Max]	8.00 [0, 10.0]
Missing	61 (0.2%)

Note. ^aEducation was coded using the New Zealand Qualifications Authority scheme, which ranged from 0 (none) to 10 (doctoral degree or equivalent).

^bMeshblock level (approx. 100 person-sized geographic units) coded with a decile rank from 1 (low) to 10 (high) with the NZ Deprivation index (Atkinson et al., 2014)

Appendix B

Figures on the Causal Effects of Satisfaction with Standard of Living on Multi-Dimensional Well-being

Figure B1.

Causal Effects of Satisfaction with Standard of Living on Health Outcomes

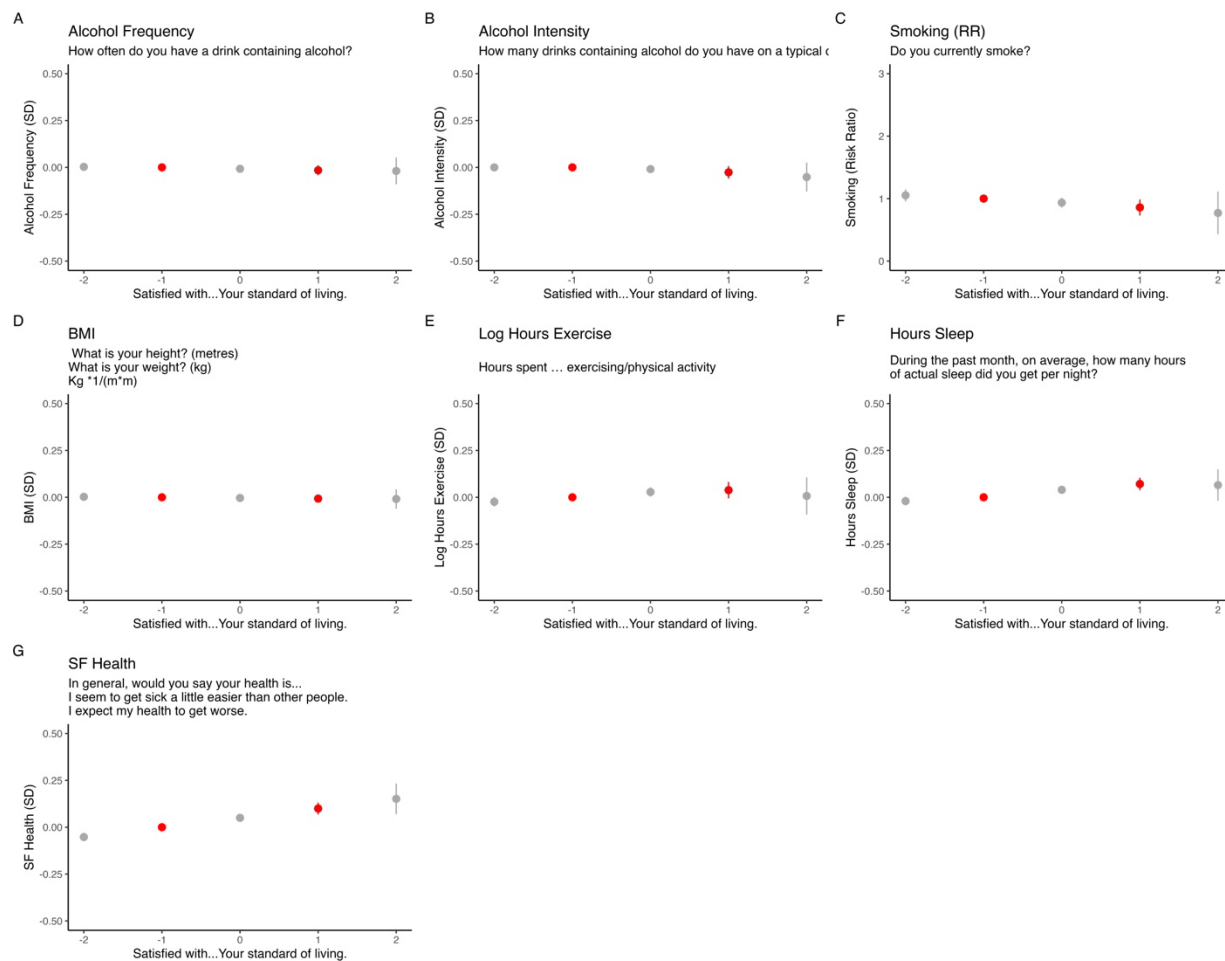


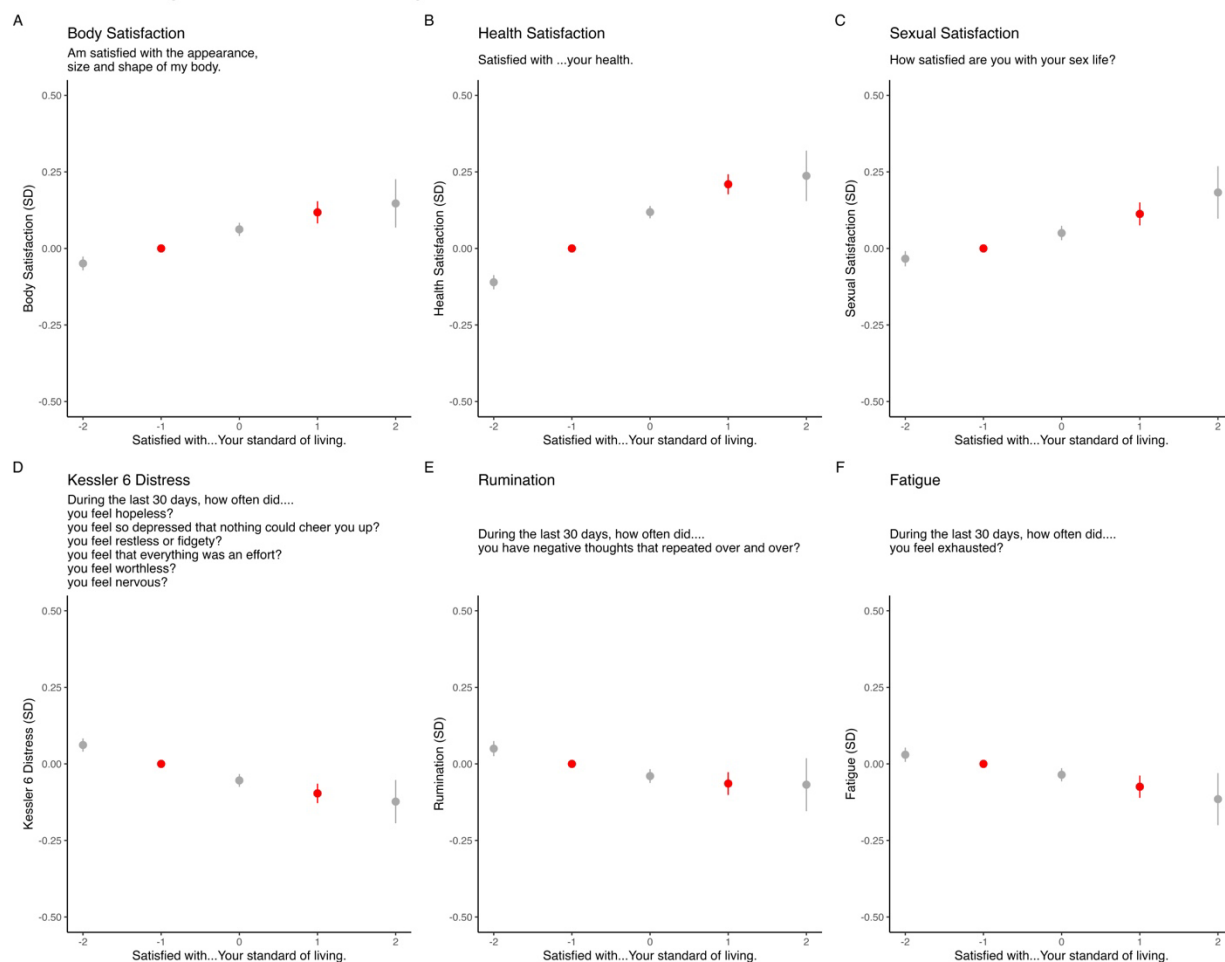
Figure B2.*Causal Effects of Satisfaction with Standard of Living on Embodied Well-being*

Figure B3.

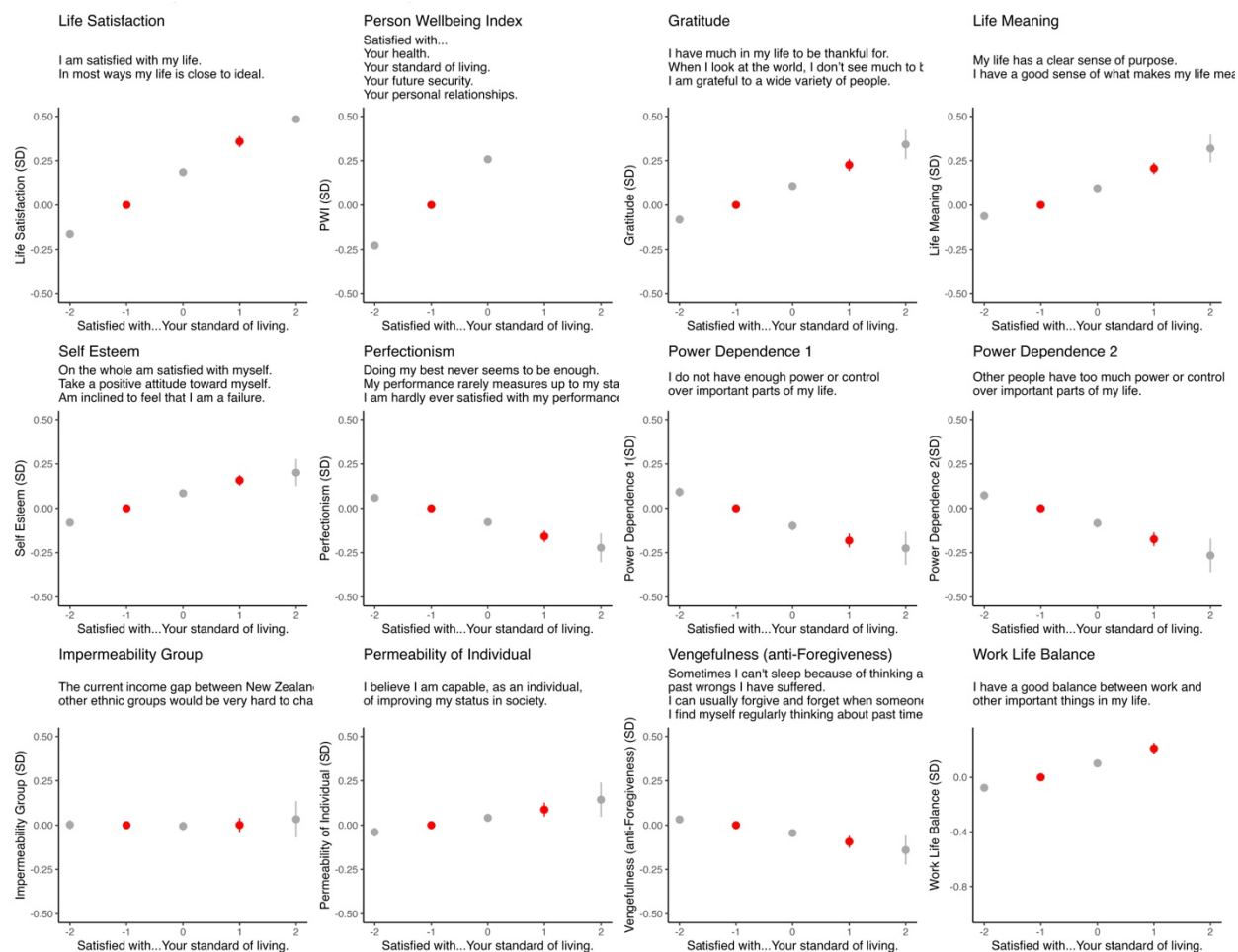
Causal Effects of Satisfaction with Standard of Living on Reflective Well-being

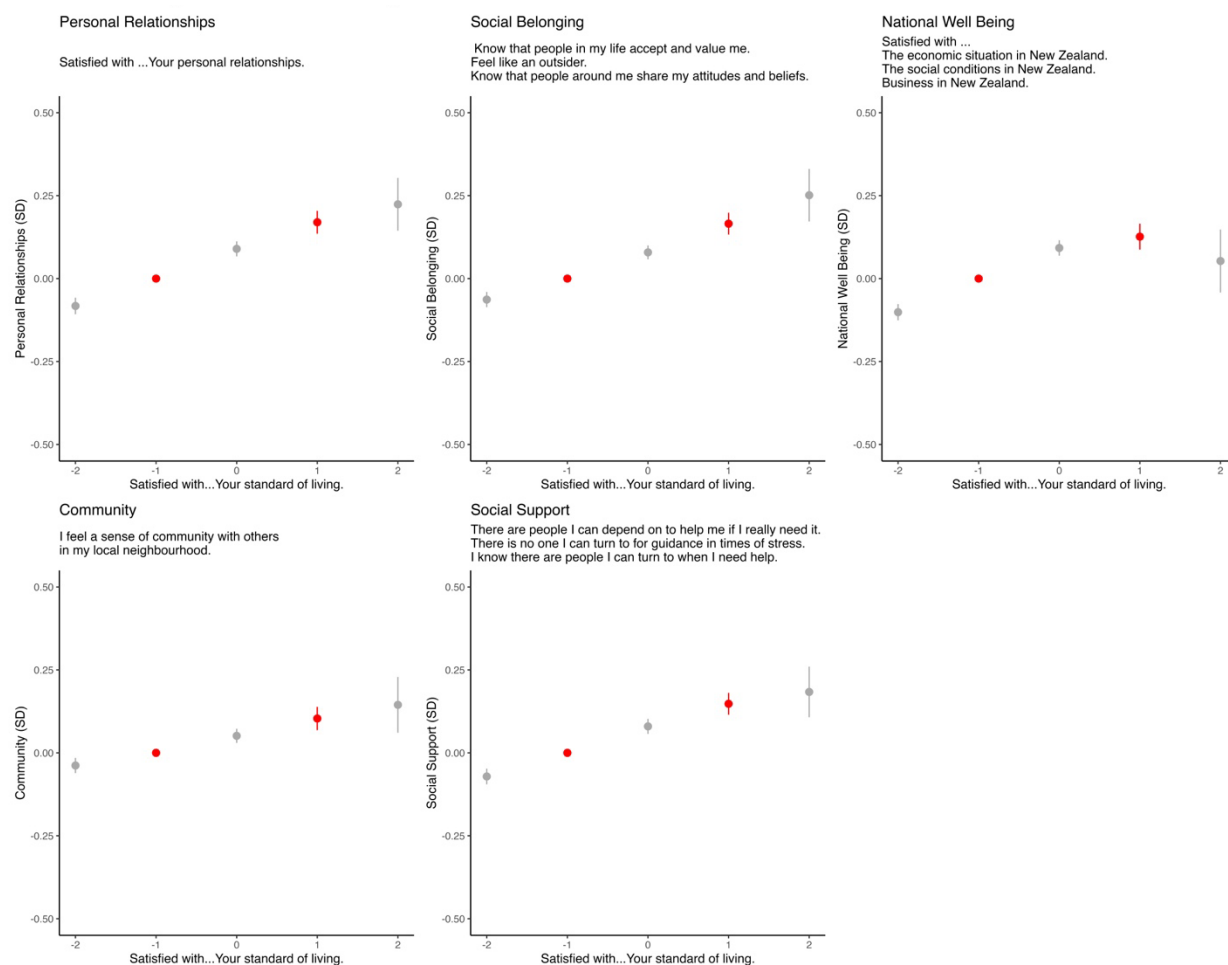
Figure B4.*Causal Effects of Satisfaction with Standard of Living on Social Well-being Outcomes*

Figure B5.

Causal Effects of Satisfaction with Standard of Living on Economic Well-being Outcomes

