The Relationships between Socioeconomic Status and General Health Status and Life Satisfaction: Evidence from New Zealand

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Abstract

Previous studies have identified positive associations between socioeconomic status (SES), including objective socioeconomic status (OSES) and subjective socioeconomic status (SSES), and health outcomes and life satisfaction (LS). Nonetheless, most studies concentrated on select populations and only a few studies investigated representative samples of the general population. Moreover, it is unclear whether OSES or SSES better predicts health outcomes and LS. Additionally, most research tended to use one element to represent SES and assess OSES by income, education, and occupation individually. The current study aims to address these gaps by using nationally representative data from New Zealand and creating a composite measure of OSES. It was hypothesised that both OSES and SSES positively predict general health status (GHS) and LS, with SSES being a better predictor. There were 1358 participants drawn from the 2017 International Social Survey Programme (51.7% females), aged 18 years and older. Data was analysed using Chi-squared tests to investigate the associations between OSES and LS, OSES and GHS, SSES and LS, and SSES and GHS, and multiple logistic regressions to investigate the predictors of GHS and LS, controlling for age, sex, and ethnicity. Both the unadjusted and adjusted logistic regressions showed that OSSES and SSES were significant predictors of GHS and LS, with SSES being a stronger predictor. The findings supported the hypotheses and have provided insights into the positive impacts that OSES and SSES have on GHS and LS specifically in New Zealand. Implications of the study and directions for future research are discussed.

Keywords: socioeconomic status, health, life satisfaction, subjective well-being, New Zealand

The Relationships between Socioeconomic Status and General Health Status and Life Satisfaction: Evidence from New Zealand

Improving lifespan health and subjective well-being (SWB), a key component of which is life satisfaction (LS) (Ryff, 1989), are policy priorities determined by the majority of nations, especially ones dealing with population ageing and continuing social movements (Kendig, Loh, O'Loughlin, Byles, & Nazroo, 2016). Consequently, it is worth exploring their determinants as it may help governments develop effective policies in order to promote individuals' development and quality of life.

Socioeconomic status (SES), consisting of objective SES (OSES) and subjective SES (SSES), has been linked with health and LS (Chen et al., 2016; Feinstein, 1993). OSES is the economic and social location compared to other people, which is commonly measured by education, job prestige, and/or income (Huang et al., 2017). Contrastingly, SSES can be defined as the self-assessment about an individual's position in a SES hierarchy (Präg, Mill, & Wittek, 2016) or one's point of view about his location in the social order in comparison with other people (Jackman & Jackman, 1973). There are occasionally a number of terms that are utilised to describe SSES such as perceived social position (Collins & Goodman, 2008; Garbarski, 2010) and subjective social status (Operario, Adler, & Williams, 2004; Singh-Manoux, Marmot, & Adler, 2005).

Generally, people having lower levels of OSES and SSES were argued to have a higher risk of worse health status. For instance, OSES and SSES were found to be differentially associated with oral health impacts in a random sample of 45-to-54-year-olds (Brennan, Spencer, & Roberts-Thomson, 2019) and cardiovascular risk control in adults with diabetes (Doshi, Smalls, Williams, Wolfman, & Egede, 2016). The majority of studies have focused on OSES, the

typical predictor of SES, so far (Nuru-Jeter, Sarsour, Jutte, & Thomas Boyce, 2010; Präg et al., 2016). Specifically, OSES was found to be negatively associated with obesity in diverse, young adolescents (Fradkin et al., 2015) and chronic low back pain in a random sample of 18-to-65-year-olds (Fliesser, Huberts, & Wippert, 2018). Nonetheless, there have been efforts to examine the association between SSES and health (Scott et al., 2014). For instance, SSES was found to be negatively associated with anxiety, pessimism, and stress (cardiovascular risk) in women (Ghaed & Gallo, 2007), susceptibility to the common cold in healthy men and women aged 21-55 years (Cohen et al., 2008), and DSM-IV mental disorders (Scott et al. 2014).

The considerable interest in SSES can be attributed to two causes. First, a number of public health researchers have found that it can be a composite measure and general marker of SES that taps various facets of SES, consisting of education, occupational prestige, and income (Segal, Segal, & Knoke, 1970; Webster & Driskell, 1978). Singh-Manoux et al. (2005) argued that SSES depicts a cognitive average of common dimensions of SES, comprising factors indicating an evaluation of contemporary and potential possibilities and resources. This "averaging hypothesis" could yield that SESS is not only a social but also an economic indicator that could be considered as a more accurate assessment of general SES (Singh-Manoux et al., 2005, p. 855). Second, interest in SSES is driven by studies of the relationship between income inequality and population health (Kawachi, & Kennedy, 1999; Wilkinson, 1992). Wilkinson (2002) concluded that this relationship can be mediated through the recognitions of position in the social hierarchy. These recognitions are argued to generate negative emotions that are associated with poor health outcomes via neuroendocrine pathways. Health impacts of SES gradients might not represent total socioeconomic circumstances, but they can generate via the

recognition of inequality together with psychological suffering influencing health (Wilkinson, 1999).

Since SSES incorporates a variety of socioeconomic indicators (Singh-Manoux et al., 2005), it comes as no surprise that past research has indicated it is a strong determinant of health outcomes (Adler, Epel, Castellazzo, & Ickovics, 2000; Operario et al., 2004; Ostrove, Adler, Kuppermann, & Washington, 2000; Singh-Manoux et al., 2003). Nevertheless, it is unclear whether OSES or SSES better predicts health outcomes. There have been a growing number of studies demonstrating that in comparison with OSES, SSES is more stably and strongly associated with health-related factors (Adler et al., 2000; Demakakos, Nazroo, Breeze, & Marmot, 2008; Gong, Xu, & Takeuchi, 2012; Lei & Tam, 2012; Quon & McGrath, 2014; Singh-Manoux et al., 2005). The majority of associations between SSES and health were still significant, even after adjusting for OSES (Adler et al., 2000; Ghaed & Gallo, 2007). It has been proposed that evaluating one's perceived social status could more accurately depict the long term effects of the social structure on health by considering individuals' earlier life circumstances, group interactions, family background and perceived potential trajectories (Wilkinson, 1997; 1999). SSES could be a more accurate indicator of SES than traditional OSES indicators which typically assess one time-point (Adler et al., 2000; Operario et al., 2004; Singh-Manoux et al., 2003).

In contrast to the results discussed above, fewer studies in the literature appear to support OSES as being a better predictor. For instance, Macleod, Davey Smith, Metcalfe, and Hart (2005) found objective social status, particularly in early life, can be a better predictor of health outcomes than subjective social status in a sample of 5232 Scottish men. This may be explained by the material hypothesis (Lynch, Smith, Kaplan, & House, 2000). This hypothesis postulates

that negative material circumstances are linked to numerous health-threatening exposures happening throughout the life span. Such exposures will threaten health regardless of any negative feelings which could be related to them. The combined impacts of these determinants bring about the social patterns of illness normally detected in adult years, via various particular mechanisms. While recognising negative feelings can promote not healthy behaviours, the material interpretation of health disparities perceives those behaviours as more a result of social hierarchies rather than an introspection of one's worthlessness. Although individual decisions obviously have a significant role, one's capacity to choose healthy selections is considerably restricted by their life's unforeseen events. A material interpretation of health disparities brings about the assumption that OSES should be more strongly associated with health than SSES (Macleod et al., 2005). In order to investigate the moderate significance of material resources versus social position in investigating the association between social ranking background and health, according to Kraus, Piff, Mendoza-Denton, Rheinschmidt, and Keltner (2012), it is advisable to include both OSES and SSES into research.

The associations between OSES and SSES and health are not static but could vary based on sociodemographic factors, noticeably age, ethnicity/race, and sex. First, regarding age, much research has confirmed that SES differentials in health were small in young adults, became largest in middle-aged (55-64) and old-aged (64-75) individuals, and might eradicate in older-aged (75+) individuals (House, Kessler, & Herzog, 1990). Second, regarding ethnicity/race, it was found that there were racial⁄ethnic differences in relations between SES factors and tooth loss for White, Black, and Mexican-American individuals (Jimenez, Dietrich, Shih, Li, & Joshipura, 2009). In addition, Franklin et al. (2015) indicated that SES differences in obesity risk were greater in Hispanic and White youth, but not in African American youth. Third, regarding

gender, SES differences in obesity risk were found to be greater in White girls and 5th-grade Hispanic boys in a sample of nearly 5000 African American, Hispanic, and White 5th graders (Fradkin et al., 2015)

With regard to LS, similar to health outcomes, studies have indicated that there are positive associations between LS and OSES and SSES. For instance, OSES and SSES were found to be positively associated with LS in Japanese and United States (U.S.) adults (Curhan et al., 2014), Chinese rural-to-urban migrants (Huang et al., 2017), and the American and Swedish samples (Fors Connolly, & Johansson Sevä, 2018). Specifically, lower OSES was found to be linked with dissatisfaction in Chinese adolescents (Chen et al., 2016), young Turkish people (Eroğlu, Bozgeyikli, & Çalişir, 2009), women domestic workers and employers (Daraei & Mohajery, 2013), and a large German panel (Ferrer-i-Carbonell, 2005). Lower SSES was also reported to be related to dissatisfaction in emerging adult college students (Zorotovich, Johnson, & Linn, 2016) and 202 undergraduate students aged 18-24 years (Haught, Rose, Geers, & Brown, 2015). Despite these positive associations, it is still questionable which SES is a better indicator of LS. For example, according to Curhan et al. (2014), SSES predicted LS more strongly in the U.S. than in Japan while OSSES predicted LS more strongly in Japan than in the U.S.

Like health outcomes, the associations between OSES and SSES and LS are not fixed but could vary based on sociodemographic factors, noticeably age, ethnicity/race, and sex. First, regarding age, Huang, Liu, Wang, and Zhang (2016) found that SES had a stronger impact on younger people's SWB, assessed by three elements: positive affect, negative affect, and LS (Diener, 2009), in comparison with older people in a sample of 240 Chinese adults. Second, regarding ethnicity/race, Assari, Preiser, and Kelly (2018) found that differences in education and

income predicted subsequent changes in positive affect (including feeling satisfied) in White Americans but not Black Americans over a ten-year period. Third, regarding sex, Fors Connolly and Johansson (2018) depicted that there were gender variations in the relation between SES and LS. Additionally, Joshanloo (2018) suggested that employment-relevant and education-relevant variables were more significant in predicting LS in men than women.

In summary, although the relationships between SES and health outcomes as well as LS have been well-established, most studies concentrated on select populations [e.g., pregnant women (Reitzel et al., 2007), adolescents (Quon & McGrath, 2014), older adults (Garbarski, 2010), civil service workers (Singh-Manoux et al., 2003, 2005), working men (Macleod et al., 2005)] and only a few studies investigated representative samples of the general population (Nobles, Weintraub, & Adler, 2013; Präg et al. 2016; Sakurai, Kawakami, Yamaoka, Ishikawa, & Hashimoto, 2010; Wolff, Subramanian, Acevedo-Garcia, Weber, & Kawachi, 2010). To fill this gap, this study will use nationally representative data from New Zealand. In addition, to the best of our knowledge, little is known about the relationship between SES and LS in New Zealand, so this research can shed light on this nation of the world.

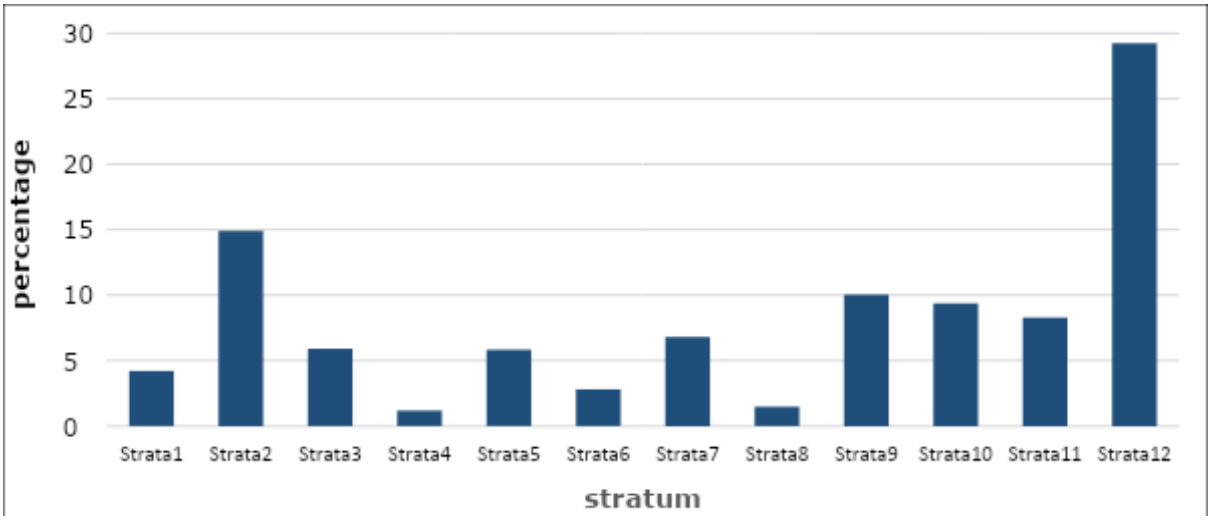
Further, the majority of research was likely to use one indicator to represent SES and assess OSES by income, education and occupation separately (Brennan et al., 2019; Nuru-Jeter et al., 2010; Ostrove et al., 2000), and relatively few used a composite measure of OSES (Fliesser et al., 2018). Hence, to address this gap, this study will incorporate both OSES and SSES and create a composite variable of OSES by combining three variables: education, household income, and personal income. Given the inconsistent findings regarding whether OSES or SSES better predicts health outcomes and LS, this also warrants further investigation.

The current study aims to identify predictors of general health status (GHS) and LS. Based on the above past literature, it is first hypothesised that GHS can be predicted by both OSES and SSES and the latter will be a stronger predictor. Higher OSES and SSES will be associated with better GHS. Second, it is hypothesised that LS can be predicted by both OSES and SSES and the latter will be a stronger predictor. Higher OSES and SSES will be associated with higher LS. According to the moderate significance in past studies, this study will adjust for age, sex, and ethnicity.

Methods

Participants and procedures

Participants were drawn from the 2017 International Social Survey Programme (ISSP). Details of the research design and recruitment process have been described elsewhere (Li, Wu, & Milne, 2018). Briefly, the process was as follows: names and addresses were obtained for all those on the electoral roll (aged 18 years and older). N = 15,000 were randomly selected from this list and n = 232 were removed from the analysis sample since they had overseas addresses, leaving a final analytic sample of n = 14,768. Each of the n = 14,768 was then classified into one of the twelve strata, as displayed in Figure 1 (Li et al., 2018), and a random sample from each stratum was chosen to be mailed a survey. The number selected to be mailed from each stratum was inversely proportional to the predicted response rates for each stratum. This means groups suspected to have low response rates were mailed in larger numbers and groups suspected to have high response rates were mailed in lower numbers. The n = 3876 selected participants received the ISSP questionnaire, a cover sheet asking participants to participate, and a pen. Participants were also provided informed consent and testing approved by the University of Auckland Human Participants Ethics Committee (reference number 018740) (Li et al., 2018).



Stratum 1	18–30 Māori
Stratum 2	18–30 Non-Māori
Stratum 3	31–45 Professionals
Stratum 4	31–45 Māori; Community, Managers, Clerical, Sales
Stratum 5	31–45 Non-Māori; Community, Managers, Clerical, Sales
Stratum 6	31–45 NZDep Q5; Labourer, Tech & Trade, Driver operator, Unemployed, Not stated
Stratum 7	31–45 NZDep Q2/3/4; Labourer, Tech & Trade, Driver operator, Unemployed, Not stated
Stratum 8	31–45 NZDep Q1; Labourer, Tech & Trade, Driver operator, Unemployed, Not stated
Stratum 9	46–60 NZDep Q4/5
Stratum 10	46–60 NZDep Q1/2/3; Taranaki-Wanganui-Manawatu, Auckland, Waikato
Stratum 11	46–60 NZDep Q1/2/3; Wellington, Canterbury, Bay of Plenty, Northland, Tasman, Nelson, Marlborough, West Coast, Otago-Southland, Hawkes Bay, Gisborne
Stratum 12	All >60

Figure 1. Response rates across 12 different strata. Reprinted from 'Methods and procedures for the 2017 International Social Survey Programme (ISSP) for New Zealand', by Li, E., Wu, I., & Milne, B., 2018, Retrieved January 8, 2020, from https://cdn.auckland.ac.nz/assets/auckland/arts/our-research/research-institutes-centres-groups/compass/surveys/issp-2017-methods.pdf. Reprinted with permission.

The mailout was on April 12, 2017. Participants could choose to take the survey either on the given questionnaire or on the online Qualtrics survey. For participants who did not take the survey, they received a reminder postcard on May 15, 2017, and a second questionnaire on June

8, 2017. From April 17, 2017, to August 22, 2017, 1358 participants (35% of the original sample) sent back surveys and were included in the study.

The comparison between the electoral roll sample (n = 14,768) and ISSP sample respondents (n = 1,358) on demographic and geographic data available through the electoral roll is displayed in Figure 2 (Li et al., 2018). It was revealed that in spite of the sampling strategy of oversampling groups less likely to participate, three out of seven sample characteristics differentiated moderately from the electoral roll. To be more specific, the sample underrepresented males and individuals living in Auckland, overrepresented those from professional occupations and under-represented those not in the workforce (Li et al., 2018).

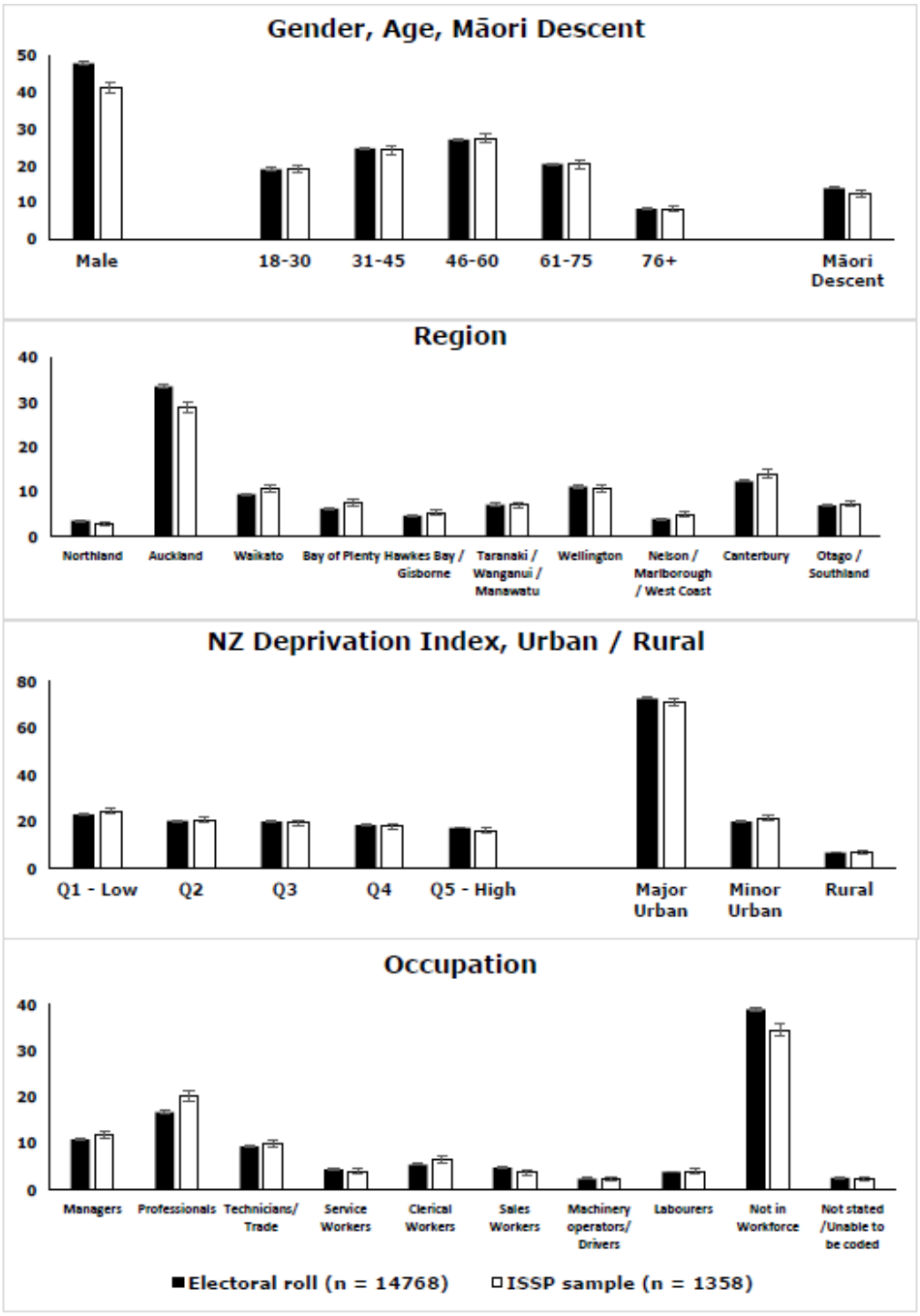


Figure 2. Comparison between the electoral roll sample and the sample respondents. Reprinted from 'Methods and procedures for the 2017 International Social Survey Programme (ISSP) for New Zealand', by Li, E., Wu, I., & Milne, B., 2018, Retrieved January 8, 2020, from https://cdn.auckland.ac.nz/assets/auckland/arts/our-research/research-institutes-centres-groups/compass/surveys/issp-2017-methods.pdf. Reprinted with permission.

Measures

SSES. Participants were asked to respond to the question: "In our society, there are groups which tend to be towards the top and groups which tend to be towards the bottom. Below is a scale that runs from the top to bottom. Where would you put yourself on this scale?" rated on a 10-point Likert scale, ranging from 1 *(Lowest, Bottom, 01)* to 10 *(Highest, Top, 10).* Then, before conducting the logistic regression analyses, SSES was recoded into three groups: participants who scored from 1 to 4 were assigned the value Low, participants who scored 5 and 6 were assigned the value Medium, and participants who scored from 7 to 10 were assigned the value High.

OSES. A composite variable of OSES was created by combining three individual variables: personal yearly income before tax, household income before tax, and education (α = .60). The chosen extraction method was principal components and the chosen rotation method was promax. The range for the composite variable was from -3.33 to 1.56. Then, before conducting the logistic regression analyses, OSES was recoded into tertiles: participants who scored lower than -.35 were assigned the value Low, participants who scored from -.35 to .57 were assigned the value Medium, and participants who scored higher than .57 were assigned the value High.

LS. Participants were asked to answer the question: "Life in general: How satisfied on the whole?" rated on a 7-point Likert scale, ranging from 1 *(Completely satisfied)* to 7 *(Completely dissatisfied).* To ensure that counts were large enough, LS was then recoded into two groups: participants who scored from 4 to 7 were assigned the value Not satisfied, and participants who scored from 1 to 3 were assigned the value Satisfied.

GHS. Participants were asked to respond to the statement: "In general, would you say your health is…" rated on a 5-point Likert scale, ranging from 1 *(Excellent)* to 5 *(Poor).* To ensure that counts were large enough, GHS was then recoded into two groups: participants who scored from 4 to 5 were assigned the value Not good and participants who scored from 1 to 3 were assigned the value Good.

Other sociodemographic variables. Age was recoded into four groups: 18-30, 31-45, 46-60, and 60+. Sex was coded into two groups: Male and Female. Ethnicity was recoded into three groups: European, Māori, and Other. Total response ethnicity was used. Participants who stated belonging to multiple ethnicities were counted once in every ethnicity stated. For instance, someone who is both European and Māori would be coded once in the European group and once in the Māori one. This means that the entire number of responses for all ethnicities can be larger than that of participants who identified their ethnicities.

Statistical analysis

All analyses were performed using R 3.5.3 and statistical significance was set at a *p*-value of .05. Chi-square tests of independence were run to investigate the associations between OSES and LS, OSES and GHS, SSES and LS, and SSES and GHS.

As mentioned, respondents' characteristics varied moderately from those of the electoral roll. To deal with these differences, the final sample was weighted to make it representative of the New Zealand voting population. Unadjusted and adjusted logistic regression analyses were conducted to examine the relationship between LS and SES and that between GHS and SES. Regarding unadjusted logistic regression, LS and GHS were respectively regressed on SSES and OSES. Next, regarding adjusted logistic regression, LS and GHS were respectively regressed on SSES, OSES, sex, ethnicity, and age.

Results

Weighted frequency tables for respondents' characteristics

The distributions of sex, age, ethnicity, SSES, OSES, GHS, and LS are presented in Table 1.

Table 1
Respondents' characteristics

	Frequency	Valid Percentage
Sex (*n* = 1358)		
Female	702	51.7%
Male	656	48.3%
Age (*n* = 1358)		
18-30	264	19.4%
31-45	320	23.6%
46-60	363	26.7%
60+	411	30.3%
Ethnicity (*n* = 1358)		
European	1101	81.8%
Māori	173	12.9%
Other	193	14.3%
SSES (*n* = 1261)		
Low	187	14.8%
Medium	555	44%
High	519	41.2%
OSES (*n* = 1163)		
Low	390	33.5%
Medium	386	33.2%
High	387	33.3%
LS (*n* = 1344)		
Not satisfied	179	13.3%
Satisfied	1165	86.7%
GHS (*n* = 1348)		
Not good	166	12.3%
Good	1182	87.7%

Note. OSES = Objective socioeconomic status. SSES = Subjective socioeconomic status. LS = Life satisfaction. GHS = General health status. The data for ethnicity may not match the overall total, or 100%, due to possible multiple selections of ethnicity.

Weighted crosstabs with chi-square analyses

OSES, LS, and GHS. The distributions of OSES, LS, and GHS are presented in Table 2.

Table 2
Distributions of OSES, LS, and GHS

	LS		GHS	
	Not satisfied	Satisfied	Not good	Good
Low OSES n (%)	75 (19.5%)	309 (80.5%)	80 (20.7%)	307 (79.3%)
Medium OSES n (%)	39 (10.1%)	346 (89.9%)	30 (7.8%)	357 (92.2%)
High OSES n (%)	29 (7.5%)	358 (92.5%)	21 (5.4%)	366 (94.6%)

A chi-square test of independence was performed to examine the relation between OSES and LS and that between OSES and GHS. A significant association was found for these variables. The chi-square results were X^2 (2, N = 1358) = 2.84, p = <.001 for OSES and LS and X^2 (2, N = 1358) = 5.18, p = <.001 for OSES and GHS. The majority of people of all OSES levels perceived themselves as being satisfied and being of good health. However, the lower the OSES, the greater the proportion who were not satisfied with life and with not good health. This was particularly notable for the low OSES group.

SSES, LS, and GHS. The distributions of SSES, LS, and GHS are presented in Table 3.

Table 3
Distributions of SSES, LS, and GHS

	LS		GHS	
	Not satisfied	Satisfied	Not good	Good
Low OSES n (%)	58 (31.4%)	127 (68.6%)	57 (30.6%)	129 (69.4%)
Medium OSES n (%)	83 (15%)	470 (85%)	67 (12.1%)	487 (87.9%)
High OSES n (%)	31 (6%)	485 (94%)	30 (5.8%)	487 (94.2%)

A chi-square test of independence was performed to examine the relation between SSES and LS and that between SSES and GHS. A significant association was found for these variables. The chi-square results were X^2 (2, N = 1358) = 7.52, p = <.001 for SSES and LS and X^2 (2, N = 1358) = 7.83, p = <.001 for SSES and GHS. The majority of people of all SSES levels perceived themselves as being satisfied and being of good health. However, the lower the SSES, the greater the proportion who were not satisfied with life and with not good health. This was particularly notable for the low OSES group.

Association between SSES and OSES

The distributions of SSES and OSES for the whole sample, by sex, age, and ethnicity with chi-square analyses are presented in Appendix A. The correlation between SSES and OSES for the whole sample is presented in Appendix B.

Weighted logistic regression

Predicting GHS

Unadjusted logistic regression. The unadjusted logistic regression showed that SSES was a significant predictor (Table 8). People who had medium SSES had a 3.06 higher odds of good GHS compared to those who had low SSES (p < .001). People who had high SSES had a 5.59 higher odds of good GHS compared to those who had low SSES (p < .001). The unadjusted logistic regression also showed that OSES was a significant predictor. People who had medium OSES had a 2.05 higher odds of good GHS compared to those who had low OSES (p < .05). People who had high OSES had a 2.30 greater odds of good GHS compared to those who had low OSES (p < .05). SSES ORs are greater than OSES ORs, which indicates that SSES has a greater effect on GHS than OSES.

Table 8
Unadjusted logistic regression predicting GHS

			95% CI		
	B (*SE*)	OR	Lower	Upper	*z*
Constant	.61 (.19)	1.84	1.27	2.71	3.16*
SSES					
Low	Ref				
Medium	1.12 (.24)	3.06	1.91	4.92	4.64**
High	1.72 (.29)	5.59	3.21	9.93	5.99**
OSES					
Low	Ref				
Medium	.72 (.24)	2.05	1.28	3.33	2.96*
High	.83 (.27)	2.30	1.36	4.00	3.03*

*Note: *p < .05, ** p < .001.*

Adjusted logistic regression. The adjusted logistic regression showed that SSES was a significant predictor (Table 9). People who had medium SSES had a 3.19 higher odds of good GHS compared to those who had low SSES ($p < .001$). People who had high SSES had a 5.69 higher odds of good GHS compared to those who had low SSES ($p < .05$). The adjusted logistic regression also showed that OSES was a significant predictor. People who had medium OSES had a 1.93 higher odds of good GHS compared to those who had low OSES ($p < .05$). People who had high OSES had a 2.25 greater odds of good GHS compared to those who had low OSES ($p < .05$). SSES ORs are greater than OSES ORs, which indicates that SSES has a greater effect on GHS than OSES. The adjusted logistic regression also showed that age was a significant predictor, especially over 60 years of age. People who aged over 60 years had a .44 reduced odds of good GHS compared to those aged 18-30 years ($p < .05$).

Table 9

Adjusted logistic regression predicting GHS

			95% CI		
	B (*SE*)	OR	Lower	Upper	*z*
Constant	1.41 (.57)	4.09	1.32	12.63	2.46*
SSES					
Low	Ref				
Medium	1.16 (.25)	3.19	1.96	5.20	4.66**
High	1.74 (.30)	5.69	3.19	10.34	5.82*
OSES					
Low	Ref				
Medium	.66 (.26)	1.93	1.18	3.23	2.57*
High	.81 (.30)	2.25	1.27	4.08	2.74*
Age					
18-30	Ref				
31-45	-.58 (.34)	.56	.28	1.09	-1.68
46-60	-.66 (.34)	.52	.26	1.00	-1.92
60+	-.83 (.34)	.44	.22	.83	-2.45*
Gender					
Female	Ref				
Male	-.37 (.21)	.69	.46	1.04	-1.77
European ethnicity					
No	Ref				
Yes	.05 (.43)	1.05	.46	2.52	.12
Māori ethnicity					
No	Ref				
Yes	.02 (.37)	1.02	.51	2.21	.04
Other ethnicities					
No	Ref				
Yes	.59 (.46)	.56	.23	1.41	-1.28

Note: *$p < .05$, ** $p < .001$.

Predicting LS

Unadjusted logistic regression. The unadjusted logistic regression showed that SSES was a significant predictor (Table 10). People who had medium SSES had a 2.63 higher odds of LS compared to those who had low SSES ($p < .001$). People who had high SSES had a 6.46 higher odds of LS compared to those who had low SSES ($p < .001$). The unadjusted logistic regression also showed that OSES was a significant predictor. People

who had medium OSES had a 1.68 higher odds of LS compared to those who had low OSES ($p < .05$). People who had high OSES had a 2.03 greater odds of LS compared to those who had low OSES ($p < .05$). SSES odds ratios (ORs) are greater than OSES ORs, which indicates that SSES has a greater effect on LS than OSES.

Table 10

Unadjusted logistic regression predicting LS

			95% CI		
	B (*SE*)	OR	Lower	Upper	*z*
Constant	.53 (.19)	1.70	1.18	2.48	2.48
SSES					
Low	Ref				
Medium	.97 (.23)	2.63	1.68	4.10	4.26**
High	1.87 (.28)	6.46	3.76	11.29	6.67**
OSES					
Low	Ref				
Medium	.52 (.22)	1.68	1.09	2.60	2.30*
High	.71 (.25)	2.03	1.24	3.38	2.78*

Note: *$p < .05$, ** $p < .001$.

Adjusted logistic regression. The adjusted logistic regression showed that SSES was a significant predictor (Table 11). People who had medium SSES had a 2.58 higher odds of LS compared to those who had low SSES ($p < .001$). People who had high SSES had a 6.12 higher odds of LS compared to those who had low SSES ($p < .001$). The adjusted logistic regression also showed that OSES was a significant predictor. People who had medium OSES had a 1.99 higher odds of LS compared to those who had low OSES ($p < .05$). People who had high OSES had a 2.45 greater odds of LS compared to those who had low OSES ($p < .001$). SSES ORs are greater than OSES ORs, which indicates that SSES has a greater effect on LS than OSES. The adjusted logistic regression also showed that age was a significant predictor, especially over 60 years of age. People aged over 60 years had a 2.63 higher odds of LS compared to those aged 18-30 years ($p < .05$).

Table 11
Adjusted logistic regression predicting LS

			95% CI		
	B (*SE*)	OR	Lower	Upper	*z*
Constant	-.01 (.50)	.98	.36	2.60	.04
SSES					
Low	Ref				
Medium	.95 (.23)	2.58	1.64	4.03	4.12**
High	1.81 (.28)	6.12	3.54	10.78	6.40**
OSES					
Low	Ref				
Medium	.69 (.23)	1.99	1.27	3.15	2.96*
High	.90 (.27)	2.45	1.46	4.20	3.33**
Age					
18-30	Ref				
31-45	.19 (.26)	1.21	.73	2.02	.74
46-60	.51 (.27)	1.66	.97	2.85	1.86
60+	.97 (.30)	2.63	1.48	4.74	3.27*
Gender					
Female	Ref				
Male	-.21 (.20)	0.81	.55	1.20	-1.06
European ethnicity					
No	Ref				
Yes	.15 (.40)	1.16	.54	2.58	.38
Māori ethnicity					
No	Ref				
Yes	.02 (.32)	1.02	.56	1.96	.07
Other ethnicities					
No	Ref				
Yes	.19 (.43)	1.21	.53	2.91	.44

Note: *$p < .05$, ** $p < .001$.

Discussion

The current research aimed to explore whether GHS and LS could be predicted by OSES and SSES. The first hypothesis, depicting that GHS would be predicted by both OSES and SSES and SSES would be a better predictor, was supported. It was found that GHS was positively associated with both OSES and SSES and the SSES ORs were greater than OSES ORs. The second hypothesis, depicting that LS would be predicted by both OSES and SSES and SSES would be a better predictor, was also supported. It was found

that LS was positively associated with both OSES and SSES and the SSES ORs were greater than OSES ORs. Noticeably, age, especially age over 60 years, was found to be a predictor of GHS and LS when compared to those aged 18-30 years.

The results from this study depicted that both OSES and SSES were associated with GHS and LS. Higher OSES and SSES were associated with better GHS and higher levels of LS. These findings are consistent with past studies (Brennan et al., 2019; Curhan et al., 2014; Doshi et al., 2016; Fors Connolly & Johansson Sevä, 2018; Huang et al., 2017). The association between GHS and SES can be explained by two perspectives: social causation and health selection (Elstad & Krokstad, 2003). Social causation suggests that health individually is linked with social order ranking (Dahl, 1996). People having greater SES will have better health benefits than those having lower SES. An elite working and living condition is associated with a lower prevalence of illness (Rahkonen, Lahelma, & Huuhka, 1997). Moreover, a great salary enhances the benefits of access to medical care and facilities, allowing people to maintain a reasonably healthy lifestyle (Atal, & Cheng, 2016; Schöllgen, Huxhold, & Tesch-Römer, 2010). In contrast, health selection proposes that health influences social mobility and it is a "screening mechanism of social mobility" (Wang, Zhen, Li, & Wen, 2018, p. 1). Health selection may lead to health differences in various SES groups. The healthier people are likely to go up the social hierarchy, and the less healthy go down (Dahl, 1996). This could extend the social gradient in health, thus leading to health inequality (Jiao, 2016; West, 1991).

With regard to LS, past research has shown that people who are born into a greater SES household access better means of advancement (e.g. funds for higher education) and appear to show higher overall subjective well-being (SWB) and LS than those from more

humble backgrounds (Douthitt, MacDonald, & Mullis, 1992). OSES indicators (e.g., income, education) can exert significant influences on the quality of life (Pinquart & Sörensen, 2000). For example, it was reported that economic stress could do harm to SWB (Pearlin, Menaghan, Lieberman, & Mullan, 1981) and a great salary could allow better access to items for business or commercial use and leisure chances and a greater majority of activities, thus generating and improving SWB (George, 1992). SSES also has positive impacts on individuals' life quality. People who perceive themselves as superior compared to other people might feel more competent in their attainments, more able to set and achieve targets, and have a broader sense of accomplishment, thus boosting LS and contentment (Zorotovich, Johnson, & Linn, 2016).

The present findings also showed that SSES predicted GHS and LS better than SSES. These results are consistent with the past literature (Adler et al., 2000; Demakakos et al., 2008; Gong et al., 2012; Kraus, Adler, & Chen, 2013; Lei & Tam, 2012; Quon & McGrath, 2014; Singh-Manoux et al., 2005). There are two possible reasons for these findings. First, SSES can be a more accurate indicator of social position. If SSES reflects the cognitive average of different SES indicators (Webster & Driskell, 1978; Singh-Manoux et al., 2003), it could more accurately represent the social position of a person, possibly by considering the previous and potential prospects (Singh-Manoux et al., 2005). It has been indicated that SSES has a tendency to fully capture the sociocultural situation of a person more completely than OSES (Singh-Manoux et al., 2003). SSES is liable to have a multidimensional value like that of self-rated health (Borg & Kristensen, 2000) since it combines various better SES indicators of an individual. Consequently, SSES could be a better representation of the socioeconomic trajectory than OSES at an individual level.

It is also possible that SSES permits a more nuanced evaluation of OSES and associated life opportunities (Singh-Manoux et al., 2005). For instance, different people can receive the similar objective ranking according to university completion, but those who graduated from more reputable universities might perceive their SSES as higher, probably because of better life opportunities. It is probable that a person's evaluation of their own SES permits them to consider their distinctive life situations, taking into account not only contemporary SES situations but also previous (socioeconomic, educational, and financial status) as well as potential possibilities (Singh-Manoux et al., 2005).

Second, another explanation can be SSES disparity represents the hierarchy-health hypothesis theorising that relative social ranking has an important effect on health outcomes (Singh-Manoux et al., 2005). SSES is vital as it reflects mechanisms relevant to an individual's position in the social hierarchy. SSES is indicated to implicate an individual's "relative" social ranking in contrast to "absolute" social ranking (Singh-Manoux et al., 2005, p. 860). Theoretically, the disparity between OSES and SSES could be relevant to the idea of relative social ranking.

Such relative social ranking is argued to have an impact on health in a number of ways. First, hierarchical ranking can affect health indirectly via unhealthy behaviours (Wilkinson, 1992). Plenty of studies have stated that social hierarchies generate conditions for and drive the social behaviour of people and interaction partners (Fiske, 2010; Johnson, Leedom, & Muhtadie, 2012). Consequently, one explanation to the relationship between social ranking and health, in comparison with economic resources, can be it is more strongly associated to forms of social behaviour (e.g., social subordination) and interpersonal

influencing factors which can enhance illness or defend the body against it (Cundiff & Matthews, 2017).

Next, it can directly affect physiological processes and neuroanatomic pathways, bringing about a rise in biological susceptibility to illness. It was theorised that a neural circuit connecting limbic, prefrontal cortex, and striatal structures represents the emotional, cognitive, and behavioral elements of hierarchy-linked social interactions (Levitan, Hasey, & Sloman, 2000). Recent research investigating the structure and function of brain processes linked to social hierarchy provides preliminary evidence for the neural mechanism of a human social hierarchy system (Beasley, Sabatinelli, & Obasi, 2012). With regard to limbic and prefrontal cortex, Gianaros et al. (2007) examined the impact of SSES on mental health utilising MRI data to identify structural changes included in psychosocial stress. Results showed that self-reported low SES uniquely covaried with reduced grey matter volume in the perigenual area of the anterior cingulate cortex, a brain region included in feeling emotions and adjusting behavioral and physiological response to psychosocial stressors, even after controlling for confounding demographic and psychological variables (e.g., sex, age). The decrease in grey matter volume, especially in the brain regions vital to psychosocial stressors' reactivity, may be linked to mood and stress dysregulation (Sapolsky, 2004, 2005; Gesquiere et al., 2011). Regarding striatum, Ly, Haynes, Barter, Weinberger, and Zink (2011) examined striatal response utilising fMRI in people with different levels of hierarchical rank. Results showed that there was a positive relationship between an individual's hierarchical rank and striatal activation during the processing of status-related information.

Our results further stated that GHS and LS could be predicted by age, especially age over 60 years. Compared to younger people (aged 18-30 years), older people (aged over 60 years) were more likely to rate their GHS as not good. This finding is consistent with past studies (Andersen, Christensen, & Frederiksen, 2007; Eriksson, Undén, & Elofsson, 2001; Idler & Cartwright, 2018; Shibuya, Hashimoto, & Yano, 2002). One explanation to this can be older individuals are more likely to be more pessimistic about their health than younger individuals (Roberts, 1999), thus rating their GHS lower. Besides, older people are more likely to have poorer health – due to natural age-related decline in physical health.

In addition, compared to younger people (aged 18-30 years), older people (aged over 60 years) were found to be more likely to rate their LS as satisfied. This positive relationship between age and SWB as well as LS is usually known as the paradox of SWB in old age (Whitbourne & Sneed, 2002). This association is consistent with previous literature (Gaymu & Springer, 2010; Stone, Schwartz, Broderick, & Deaton, 2010). Researchers have provided a number of explanations to this relationship, namely the model of selective optimisation with compensation (Baltes, & Baltes, 1990; Marsiske, Lang, Baltes, & Baltes, 1995), the hedonic treadmill model (Diener, Lucas, & Scollon, 2009), and the socioemotional selectivity model (Carstensen, 1992, 1995; Hendricks & Cutler, 2004). First, the selective optimisation with compensation model (Baltes, Lindenberger, & Staudinger, 2006; Jopp & Smith, 2006) postulates that older people optimise the beneficial effects (e.g. gains) and mitigate the adverse effects (e.g. losses) by selection, optimisation, and compensation with reference to daily needs and functional deterioration in old age (Carpentieri, Elliott, Brett, & Deary, 2017). In late adulthood, when losses are common, it may be of extreme significance to hold growth-related targets in order to enhance LS instead

of concentrating solely on losses (Gana, Bailly, Saada, Joulain, & Alaphilippe, 2013). Second, the hedonic treadmill theory (Bottan & Truglia, 2011; Keely, 2005) states that people have a tendency to ultimately return to a comparatively consistent level of SWB and LS over time after experiencing negative events or life changes that might decrease SWB and LS for a while. Based on this theory, durable firmness in SWB and LS can be explained by personality and genetic influences instead of by life situations (Bartels et al., 2010; Weiss, Bates, & Luciano, 2008). This may explain high SWB and LS in old age when compared to younger ages. Third, the socioemotional selectivity theory argues that stronger emotional saliency enables people to control their emotions so as to achieve high SWB and LS levels (Carstensen, 1992, 1995). Therefore, being conscious that time is restricted, older adults make an attempt to maintain their SWB and LS and participate in effective strategies for regulating emotions much more actively than younger adults (Gana et al., 2013).

The findings presented in this study have some limitations. First, the cross-sectional design precludes interpretation of causality, with the findings which show associations only. Future studies are needed to clarify temporal facets of associations. Questions of causal relationships between variables should be verified by replications and be investigated by the use of longitudinal and experimental (intervention) data in the future. Second, the current study relied on a self-rated measure of health outcomes, which can lead to some research bias and subjectivity. Even though the single-item self-rated health question has been well-acknowledged as a valid and reliable tool to measure health outcomes (DeSalvo et al., 2006; Rohrer, Arif, Denison, Young, & Adamson, 2007), it may be more plausible to utilise clinical diagnosis or a multi-item health status index since it can be a better measure of health status (K Van Ginneken & Groenewold, 2012). Third, the current research only

concentrated on the positive impacts of SES on GHS and LS, not paying attention to other negative determinants which might threaten individuals' GHS and LS, such as substance abuse, smoking, and medication abuse (Farhud, 2015). Hence, in further research, more justifiable designs with both positive and negative indicators should be established.

Despite these limitations, this current study has important theoretical and practical implications. This study has contributed to research on health, SWB, and LS and enhanced our understanding of the relationships between SES and health as well as LS specifically in New Zealand. The majority of past studies were conducted using select populations. In contrast, present research used nationally representative data from New Zealand, thus improving the external validity of previous public health and SWB research and shedding light on the relationship between SES and LS in this nation. Furthermore, it was found that health and LS can be predicted by age, especially age over 60 years. Future investigation is warranted to explore this idea.

The results also yield some practical implications. The findings that SES positively predicted higher levels of LS and GHS imply that policies and interventions aiming to reduce SES gradients in health and LS are needed. This can be done in a number of ways. First, a society can make an attempt to raise SES of the lowest groups to minimise those gradients (Dow, Schoeni, Adler, & Stewart, 2010). Reducing poverty and developing better access to excellent education of the low SES community were reported to be key to conquering health disparities based on socioeconomic inequities (Stringhini et al., 2017). For example, increasing their economic status may lead to a greater income distribution in society, so there will be few chances for SES inequalities in health as well as LS (Dow et al., 2010). This can be done by undertaking programmes focusing on offering extra payments to

the family in order to help the family moving up the social ladder (e.g., tax and transfer systems, minimum pay rules). Besides, together with raising SES of the lowest SES groups, government policies can make an attempt to implement interventions aiming to lessen SES of the highest SES groups (Dow et al., 2010). Those two strategies can be combined, as financing poverty eradication can be equivalent to raising taxes for high SES groups. In general, redistribution away from the highest SES would decrease the SES-health gradient and improve overall population health (Dow et al., 2010). Those redistributions can be achieved by increasing top marginal tax rates or regulating executive compensation. Additionally, since SSES was found to be a better predictor of GHS and LS, policymakers should aim to focus more on instructing individuals to perceptively reconstruct or reassess the way they rate and view themselves and their core values rather than raise their OSES and its indicators (e.g., income, education, occupation).

In conclusion, the current study has provided an empirical approach to examine the relationships between SES and GHS as well as LS specifically in New Zealand. It was found that higher levels of OSES and SSES were associated with higher levels of GHS and LS among the New Zealand sample. These findings have yielded important theoretical and practical implications for public policy and intervention - for example, policies aiming to reduce poverty and improve access to high-quality education for low SES groups can be implemented in order to address SES disparities in health and LS. Next, further research should investigate the effect of age on health and LS, examine the temporal aspects of the associations, and implement more valid designs with both positive and negative elements that may affect health and LS.

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Appendix A

Weighted crosstabs for SSES and OSES with chi-square analyses

Whole sample

The distributions of SSES and OSES for the whole sample are presented in Table 4.

Table 4

Distributions of OSES and SSES for the Whole Sample

	Low SSES	Medium SSES	High SSES
Low OSES n (%)	93 (24.7%)	180 (47.9%)	103 (27.4%)
Medium OSES n (%)	43 (11.7%)	169 (45.8%)	157 (42.5%)
High OSES n (%)	16 (4.4%)	133 (36.6%)	214 (59%)

A chi-square test of independence was performed to examine the relation between SSES and OSES for the whole sample. The relation between these variables was significant, X^2 (4, N = 1358) = 1.08, p = <.001.

The majority of those with low OSES perceived themselves as being of medium SSES. The majority of those with medium OSES perceived themselves as being of medium and high SSES. The majority of those with high OSES perceived themselves as being of high SSES.

Sex

The distributions of SSES and OSES by sex are presented in Table 5.

Table 5

Distributions of OSES and SSES by Sex

	Males			Females		
	Low SSES	Medium SSES	High SSES	Low SSES	Medium SSES	High SSES
Low OSES n (%)	39 (24.5%)	70 (44%)	50 (31.5%)	54 (26.2%)	99 (48.1%)	53 (25.7%)
Medium OSES n (%)	21 (11%)	89 (46.8%)	80 (42.2%)	22 (11.5%)	91 (47.7%)	78 (40.8%)
High OSES n (%)	7 (3.4%)	73 (35.6%)	125 (61%)	9 (5.7%)	60 (38%)	89 (56.3%)

A chi-square test of independence was performed to examine the relation between SSES and OSES, separately for males and females. A significant association was found for both groups. The chi-square results were X^2 (4, N = 1358) = 4.62, p = < .001 for males and X^2 (4, N = 1358) = 5.84, p = < .001 for females.

For both males and females, the majority of those with low OSES perceived themselves as being of medium SSES. The majority of those with medium OSES perceived themselves as being of medium and high SSES. The majority of those with high OSES perceived themselves as being of high SSES.

Age

The distributions of SSES and OSES by age group are presented in Table 6.

Table 6

Distributions of OSES and SSES by Age Group

	18-30			31-45			46-60			60+		
	Low SSES	Medium SSES	High SSES	Low SSES	Medium SSES	High SSES	Low SSES	Medium SSES	High SSES	Low SSES	Medium SSES	High SSES
Low OSES n (%)	19 (21.8%)	38 (43.7%)	30 (34.5%)	18 (33.9%)	25 (47.2%)	10 (18.9%)	19 (30.1%)	26 (41.3%)	18 (28.6%)	26 (26%)	52 (52%)	22 (22%)
Medium OSES n (%)	14 (16.9%)	38 (45.8%)	31 (37.3%)	13 (12.6%)	54 (52.4%)	36 (35%)	14 (12.6%)	56 (50.5%)	41 (36.9%)	2 (2.7%)	30 (40.5%)	42 (56.8%)
High OSES n (%)	15 (19.2%)	31 (39.8%)	32 (41%)	6 (5%)	55 (46.2%)	58 (48.8%)	4 (3.3%)	42 (34.4%)	76 (62.3%)	1 (2%)	10 (20%)	39 (78%)

A chi-square test of independence was performed to examine the relation between SSES and OSES, separately for people aged 18-30, 31-45, 46-60, and over 60 years. A significant association was found for all age groups. The chi-square results were X^2 (4, N = 1358) = 6.84, p = <.001 for people aged 18-30 years, X^2 (4, N = 1358) = 3.36, p = <.001 for people aged 31-45 years, X^2 (4, N = 1358) = 4.21, p = <.001 for people aged 46-60 years, and X^2 (4, N = 1358) = 5.57, p = <.001 for people aged over 60 years.

For people of all ages, the majority of those with low OSES perceived themselves as being of medium SSES. For people aged 18-60 years, the majority of those with medium OSES perceived themselves as being of medium SSES. For people aged over 60 years, the majority of those with medium OSES perceived themselves as being of high SSES. For people aged 18-45 years, the majority of those with high OSES perceived themselves as being of medium and high SSES. For people aged over 45 years, the majority of those with high OSES perceived themselves as being of high SSES.

Ethnicity

The distributions of SSES and OSES by ethnicity are presented in Table 7.

Table 7

Distributions of OSES and SSES by Ethnicity

	European			Māori			Other		
	Low SSES	Medium SSES	High SSES	Low SSES	Medium SSES	High SSES	Low SSES	Medium SSES	High SSES
Low OSES n (%)	62 (21.6%)	135 (47%)	90 (31.4%)	21 (36.2%)	25 (43.1%)	12 (20.7%)	22 (40%)	25 (45.5%)	8 (14.5%)
Medium OSES n (%)	34 (10.8%)	144 (45.7%)	137 (43.5%)	9 (18.4%)	27 (55.1%)	13 (26.5%)	8 (16.7%)	25 (52.1%)	15 (31.2%)
High OSES n (%)	14 (4.5%)	104 (33.8%)	190 (61.7%)	1 (3.6%)	11 (39.3%)	16 (57.1%)	3 (5.8%)	28 (53.8%)	21 (40.4%)

A chi-square test of independence was performed to examine the relation between SSES and OSES, separately for people belonging to the European, Māori and other ethnic groups. A significant association was found for all ethnic groups. The chi-square results were X^2 (4, N = 1358) = 7.53, p = <.001 for the European ethnic group, X^2 (4, N = 1358) = 17.91, p = .001 for the Māori ethnic group, and X^2 (4, N = 1358) = 20.09, p = <.001 for other ethnic groups.

For all ethnic groups, the majority of those with low and medium OSES perceived themselves as being of medium SSES. For people belonging to the European ethnic group, while the majority in the medium OSES group perceived themselves as being of medium SSES, a similar proportion also perceived themselves as being of high SSES. For people belonging to the European and Māori ethnic groups, the majority of those with high OSES perceived themselves as being of high SSES. For people belonging to other ethnic groups, the majority of those with high OSES perceived themselves as being of medium SSES.

Appendix B

Spearman's Rank Correlation between OSES and SSES for the Whole Sample

A Spearman's rank-order correlation was run to determine the relationship between OSES and SSES. There was a weak, positive correlation between OSES and SSES, which was statistically significant ($r_s = .36$, $p < .001$).