MINISTRY OF EDUCATION
Te Tāhuhu o te Mātauranga

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Well-being and education level

How does education relate to New Zealanders' assessment of their well-being? Is this different for physical well-being and for mental or emotional well-being? How does this change when literacy skills, income and other factors are taken into account?

People with higher levels of education, literacy skill and/or income are likely to have better physical and mental/emotional well-being

However, once gender, age, ethnicity and other characteristics are taken into account, higher levels of education are only related to better physical well-being and not related to the level of mental/emotional well-being.

If the level of literacy skill and income are also taken into account, education level is not related to either physical or mental/emotional well-being.

The Adult Literacy and Life Skills (ALL) Survey

The ALL survey provides information about the relationships between literacy and a number of factors, including respondents' assessment of their own well-being. A representative sample of New Zealand adults aged between 16 and 65 years participated in the survey during 2006 (Satherley and Lawes, 2007).

The ALL survey directly measured the literacy, numeracy and problem-solving skills of individuals. It also recorded information about other areas, including self-assessed health status or well-being, income and education level. This means that the survey can give insights into the questions raised above.

Well-being and its measurement

The physical, mental and emotional well-being of people is an important outcome for a society. Well-being can be measured in various ways. For example, the proportion of the population who are obese is one approach (Ministry of Social Development, 2007). Another is by asking individuals to self-assess their health status (Ministry of Health, 2008).

A set of 13 questions in the ALL background questionnaire allowed respondents to self-assess their own well-being. These are summarised in the table opposite. The first 12 items are from an internationally accepted tool known as the Medical Outcomes Study Short Form 12, commonly referred to as the SF-12.[1] The last item sought to measure the general affect of health on quality of life.

From the responses to these items, two scales have been constructed – one measuring physical well-being and the other measuring mental/emotional well-being.

These scales were derived using a procedure called principal factor analysis. In this case, two factors were identified. The table below also shows the factor loadings.[2] Loadings greater than 0.3 in absolute value are in bold.

Items contributing to factors measuring well-being

Item summary	Factor 1	Factor 2
How respondent feels about life (1 = good, 5 = bad)	-0.19	**-0.58**
General health (1 = excellent, 5 = poor)	**-0.43**	**-0.42**
Limited moderate activities	**0.61**	0.14
Limited climbing stairs	**0.55**	0.17
Accomplished less (physical)	**0.78**	0.18
Limited kind of work (physical)	**0.83**	0.14
Accomplished less (emotional)	0.19	**0.63**
Limited kind of work (emotional)	0.18	**0.58**
Pain interfered with work	**-0.62**	-0.24
Calm and peaceful?	-0.10	**-0.60**
Lots of energy?	-0.33	**-0.51**
Downhearted and sad?	0.05	**0.70**
Interfered with social activities	**0.36**	**0.57**
% of variance explained	22.4%	21.9%

Although some items are strong on both factors, there is a good split overall. It is possible to identify factor 1 as 'physical well-being' and factor 2 as 'mental or emotional well-being'. These factors have been standardised to have an average value of 100.

1 The SF-12 and other similar, assessments were developed by the Quality Metric Corporation and are widely used internationally to measure self-assessed health.

2 These loadings are from a 2-factor solution with Varimax rotation.

Potential relationships with well-being

Analysis of the ALL data shows that there are strong links between education level and literacy skills and between income and literacy skill (Satherley et al, 2008).

Distribution of income by educational level

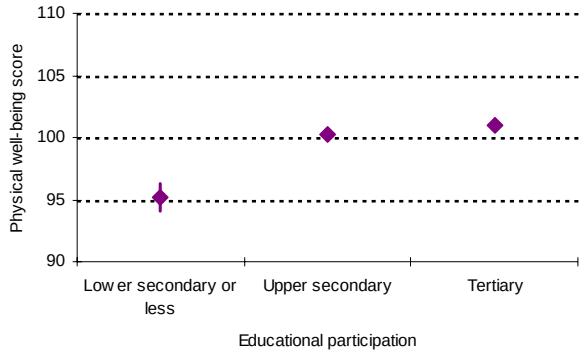
1= lowest income, 5 = highest income	Income quintile					
	1	**2**	**3**	**4**	**5**	**Total**
Education level						
Lower secondary or less	26.1	30.5	19.5	15.8	8.1	100
Upper secondary	25.7	23.1	21.9	17.6	11.7	100
Tertiary	12.8	14.9	18.0	23.5	30.8	100

The link between education and income is shown in the table opposite. People across the population have been ranked on their incomes and divided into five equal groups called quintiles. For those at each education level, the table shows the percentage of that group in each overall income quintile. The table shows that people with higher levels of education are more likely to be in the higher income quintiles.

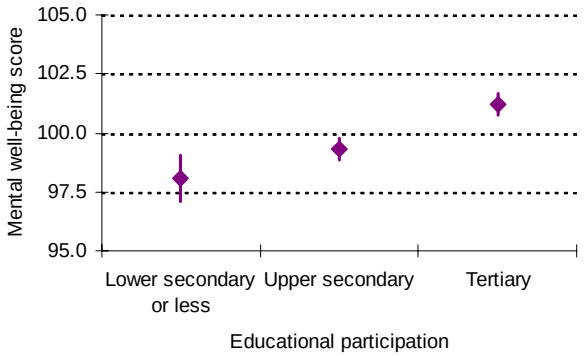
The top two figures below show the physical and mental/emotional well-being factors against education level. Mean values are indicated by the diamonds and the 95% confidence intervals for the mean indicated by vertical bars. These figures show that people with low education have low levels of physical well-being and that mental/emotional well-being improves with education levels.

Document literacy is the ability to read discontinuous text such as charts, tables and figures and as such represents a key skill in many workplaces. The bottom two figures below show the data from the physical and mental/emotional well-being factors graphed against average document literacy skill, together with a line of best fit.

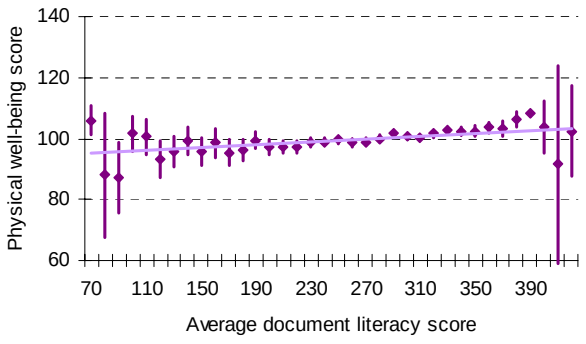
Physical well-being by education level



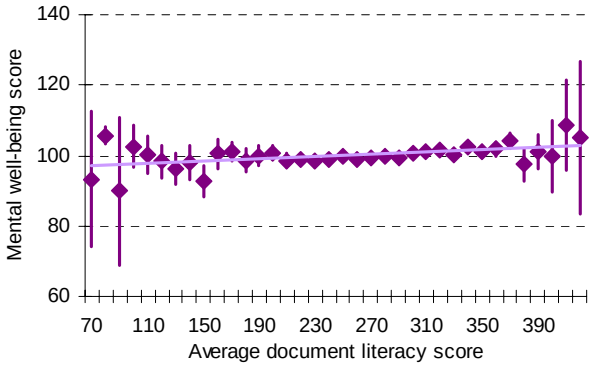
Mental/emotional well-being by education level



Physical well-being by average document literacy



Mental/emotional well-being by average document literacy

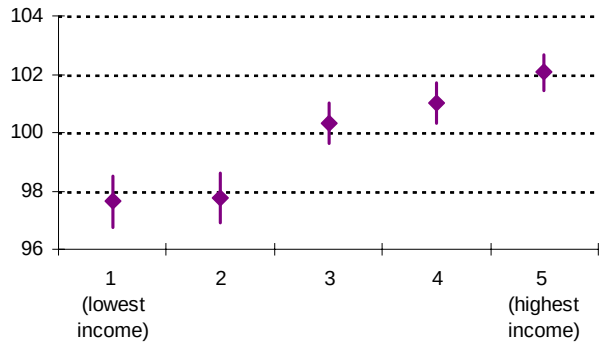


The preceding figures show that physical and mental/emotional well-being are higher at higher levels of literacy skill. Note that there is greater variation in well-being at the extremes of document literacy score due to smaller populations there.

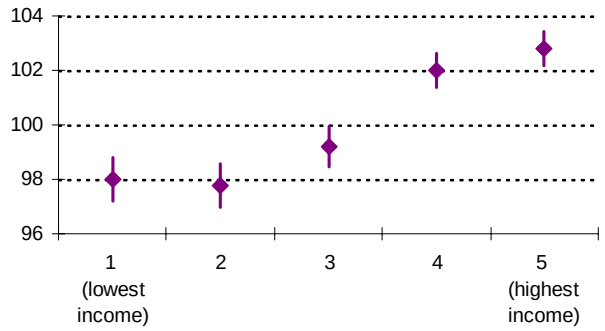
The next two figures below show the physical and mental/emotional well-being factors graphed against income quintile. These figures show that higher income is associated with higher well-being. In particular, the 40 percent of the population with the lowest incomes have lower physical and mental/emotional well-being, while

those in the top 40 percent of incomes have higher physical and mental/emotional well-being.

Physical well-being by income



Mental/emotional well-being by income



Relationship of other factors to well-being

The analysis above shows the strong links between education level, income and literacy skill and well-being. However, further exploration of relationships is possible to address questions such as:

1. If characteristics such as gender and ethnicity are taken into account, does education still have the same relationship to well-being?

2. If skill level is also taken into account, does the relationship between education and well-being remain?

3. If both skill level and income are taken into account, what is the relationship between education and well-being?

The characteristics that could be related to well-being are set out below. They cover common demographic variables and characteristics related to education. These characteristics are used in a linear regression model to explore their relationship with the physical and with mental/emotional well-being factors.

The main demographic characteristics are gender (in this case being female), age and location (urban versus rural community). The square of age has been included in the model to allow for a non-linear (curved) relationship between age and well-being.

Ethnicity was recorded in ALL by multiple responses, so that one person can identify with several ethnic groups. Identification with each main ethnic group is treated as a separate variable. The model also looks at whether a person is born overseas and/or has English as an additional language.

The model includes the highest level of education, and also whether an individual completed education by 16 or continued in education until after 24. Undertaking remedial reading at school and attitude to maths at school are included as well.

The model also looks at whether a person is employed. Interactions between employment and age, and age squared, are included to see if these relationships are different for employed people.

Literacy skill is an average measure across prose literacy, document literacy, numeracy and problem-solving. Income is the individual's total income in thousands of dollars. As is common with income data, the raw income data in the ALL survey was highly skewed. A logarithm transformation was used to reduce this skew to make it suitable for regression modelling.

The model

Modelling was carried out in three stages:

1. literacy skill and income were excluded

2. literacy was included and income excluded

3. both literacy and income were included.

The variance explained by the model for the physical well-being factor was 9.4 percent in stage 1, 9.7 percent in stage 2 and 10.6 percent in stage 3.

For the mental/emotional well-being factor, the variance explained was 6.9 percent in stage 1, 6.9 percent in stage 2 and 7.8 percent in stage 3.

The variance explained by these models are of reasonable size, given the variable nature of the physical and mental/emotional well-being factors themselves and of educational and social data in general.

Relationships with well-being

The table on the last page provides the standardised regression coefficients (sometimes known as 'effect sizes') for each characteristic against the physical well-being and mental/emotional well-being factors.

The model for physical well-being indicates that, when other characteristics are controlled for, higher levels of education are associated with higher levels of physical well-being. However, once literacy skill or literacy skill and income together are controlled for, education is not related to physical well-being.

The model for mental well-being indicates that, when other characteristics are controlled for, education level is

not related to mental/emotional well-being. This does not change when literacy skill or literacy skill and income are also controlled for.

The models show that when all other characteristics in the models are controlled for:

— Higher levels of literacy skill and income are associated with better physical well-being.

— Being currently employed, and having had a positive attitude to maths at school, are both associated with higher levels of physical well-being.

— When literacy skill is included in the model, having English as an additional language is associated with higher levels of physical well-being.

— Being older or having had remedial reading at school are associated with lower levels of physical well-being (but not when literacy skill is controlled for).

— Completing education at age 24 or older is associated with lower physical well-being, but not when income is included in the model. In other words, those who completed their education at age 24 or older tend to have lower income and having lower income is more strongly associated with lower physical well-being than their educational completion age.

— Identifying with the Māori ethnic group is associated with lower physical well-being, but not when literacy skill is included in the model. In other words, those who identify as having Māori ethnicity tend to have lower literacy skill and having lower literacy skill is more strongly associated with lower physical well-being than their identifying as having Māori ethnicity.

— There are no significant relationships between physical well-being and gender, being born outside New Zealand, living in an urban community, leaving education before 17, or identifying as having Pasifika, Asian or Other ethnicity.

— Literacy skill and income have a non-significant relationship with mental/emotional well-being when included in the model.

— Being currently employed and having had a positive attitude to maths at school are associated with higher mental/emotional well-being.

— Mental/emotional well-being is significantly lower for females, those who live in urban communities, those completing education at age 24 or older, and those who had remedial reading at school.

— There are no significant relationships between mental/emotional well-being and being born outside New Zealand, leaving education before 17, having English as an additional language, or identifying as having Māori, Pasifika, Asian, or Other ethnicity.

References:

Ministry of Health (2008) *A Portrait of Health. Key Results of the 2006/07 New Zealand Health Survey*, Wellington: Ministry of Health.

Ministry of Social Development (2007) *The Social Report*, Wellington: Ministry of Social Development.

Satherley, P. & Lawes, E. (2007) *The Adult Literacy and Life Skills (ALL) Survey: An Introduction*, Wellington: Ministry of Education.

Satherley, P., Lawes E. & Sok S. (2008) *The Adult Literacy and Life Skills (ALL) Survey: Education, Work and Literacy*, Wellington: Ministry of Education.

Ian Schagen and Elliot Lawes
Comparative Education Research,
Ministry of Education

This fact sheet is available from the Education Counts website:
www.educationcounts.govt.nz

Standardised regression coefficients for well-being factors

	Physical well-being			Mental/emotional well-being		
Background characteristic	**Stage 1**	**Stage 2**	**Stage 3**	**Stage 1**	**Stage 2**	**Stage 3**
Literacy skill	*	**0.072**	**0.064**	*	0.012	0.021
Income	*	*	**0.049**	*	*	0.007
Female	-0.01	-0.011	-0.006	**-0.066**	**-0.066**	**-0.067**
Age	**-0.377**	**-0.361**	**-0.391**	0.025	0.028	0.002
Age squared	**-0.054**	**-0.055**	-0.034	**0.098**	**0.098**	**0.131**
Urban	0.004	0.004	0.002	**-0.048**	**-0.048**	**-0.049**
Born overseas	0.006	0.008	-0.006	0.007	0.007	0.013
Education level	**0.056**	0.027	0.033	0.031	0.026	0.027
Māori	**-0.037**	-0.025	-0.024	-0.022	-0.02	-0.014
Pasifika	0.010	0.022	0.013	-0.019	-0.018	-0.016
Asian	0.007	0.014	0.003	0.000	0.002	0.001
Other	-0.012	-0.011	-0.018	0.002	0.002	-0.001
Completed education by 16	-0.028	-0.028	-0.017	-0.024	-0.024	-0.025
Continued education after 24	**-0.031**	**-0.029**	-0.027	**-0.031**	**-0.031**	**-0.030**
Remedial reading at school	**-0.031**	-0.019	-0.024	**-0.050**	**-0.048**	**-0.047**
English as an additional language	0.023	**0.042**	**0.056**	0.013	0.016	0.015
Employed	**0.140**	**0.130**	**0.131**	**0.182**	**0.18**	**0.208**
Employed by age	**0.204**	**0.196**	**0.217**	**0.053**	**0.052**	**0.072**
Employed by age squared	0.039	**0.049**	0.038	-0.021	-0.02	**-0.046**
Maths attitude at school	**0.043**	**0.032**	**0.035**	**0.080**	**0.078**	**0.077**

Note: Statistically significant coefficients are shown in bold. Significance is at the five percent level.