LONGITUDINAL SURVEYS OF AUSTRALIAN YOUTH

TECHNICAL REPORT 68

An investigation of wellbeing questions in the Longitudinal Surveys of Australian Youth

John Stanwick
Shu-Hui Liu

National Centre for Vocational Education Research

Longitudinal Surveys of Australian Youth

NCVER

Longitudinal Surveys of Australian Youth

An investigation of wellbeing questions in the Longitudinal Surveys of Australian Youth

John Stanwick
Shu-Hui Liu
NCVER

LONGITUDINAL SURVEYS OF AUSTRALIAN YOUTH
TECHNICAL PAPER 68

This document should be attributed as Stanwick, J & Liu, S-H 2012, *An investigation of wellbeing questions in the Longitudinal Surveys of Australian Youth*, NCVER, Adelaide.

This work has been produced by NCVER through the Longitudinal Surveys of Australian Youth (LSAY) Program, on behalf of the Australian Government and state and territory governments, with funding provided through the Australian Department of Education, Employment and Workplace Relations.

ISBN 978 1 922056 14 6

TD/TNC 108.21

Published by NCVER
ABN 87 007 967 311

Level 11, 33 King William Street, Adelaide, SA 5000
PO Box 8288 Station Arcade, Adelaide SA 5000, Australia

P +61 8 8230 8400 **F** +61 8 8212 3436 **E** ncver@ncver.edu.au **W** <http://www.ncver.edu.au>

About the research

An investigation of wellbeing questions in the Longitudinal Surveys of Australian Youth

John Stanwick and Shu-Hui Liu, NCVER

This report forms part of the Longitudinal Surveys of Australian Youth (LSAY) suite of research. The particular focus of this report was an examination of the LSAY survey instruments vis-a-vis their coverage of wellbeing questions. Wellbeing is an area of significant interest to policy-makers, because, at the end of the day, it is what policy-makers are trying to achieve. Having a valid set of wellbeing questions in LSAY will enhance the capacity to research the links between wellbeing and other domains of interest for young people in Australia.

Key messages

- LSAY contains a set of happiness/satisfaction questions which can be used to construct three clear factors relating to young people's wellbeing: social wellbeing, material wellbeing and career. The three factors are shown to be robust over two different cohorts of LSAY and have sufficient variation in factor scores to be useful analytically.
- The factors obtained do not capture all of the dimensions of wellbeing described in the literature and in other wellbeing questionnaires; for instance, the psychological aspects of wellbeing are not represented in the LSAY surveys.
- To enhance the capacity of LSAY as a tool for researching wellbeing, the current happiness/satisfaction questions could be replaced by existing validated questionnaires that capture the main dimensions of wellbeing.

Tom Karmel
Managing Director, NCVER

Contents

Tables and figures

Tables

Figures

Executive summary

This report examines possible measures of wellbeing in the Longitudinal Surveys of Australian Youth (LSAY). Wellbeing is important from a policy perspective as it is related to a variety of factors, including educational outcomes and transition from education to work; hence, it is important to have effective measures of this.

Wellbeing is, however, a multi-dimensional concept that involves a range of constructs encompassing physical, social and emotional aspects (Nguyen 2011). This is reflected in the variety of wellbeing measures that currently exist.

In this report, we compare the findings of our analysis with a theoretical framework of wellbeing developed by Fraillon (2004) — although his framework was developed in the context of the young person at school — and a selection of wellbeing questionnaires. In his analysis of the literature, Fraillon argues that two dimensions are sufficient as a measurement model for (student) wellbeing. The first of these is the intrapersonal or psychological dimension, which refers to the person's sense of self and their ability to function within the (school) community. The second, the interpersonal or social dimension, on the other hand refers to the assessment of one's social circumstances, leading to the capacity to function in the (school) community.

The approach taken to the analysis presented in this report is as follows. Firstly, we undertook factor analysis of potential wellbeing variables in the LSAY 2003 cohort (LSAY Y03) and compared the results of this to Fraillon's findings as well as to the dimensions of wellbeing used in a selection of other wellbeing questionnaires. Secondly, we tested the factor structure obtained on the same questions in a different cohort of LSAY: the 2006 (Y06) cohort. This analysis indicates whether the factor structure is robust. Thirdly, we tested the factors obtained in terms of their discrimination ability; that is, we looked to see whether there is enough variance in the factor scores obtained to be useful in research.

The analysis of our original variable selection did not indicate a clear or useful factor structure. Consequently, it was decided to focus on a subset of questions related to happiness/satisfaction which seemed more intrinsic to wellbeing. This revealed three clear factors, which we term social wellbeing, material wellbeing and career. The factors demonstrated adequate reliability in terms of Cronbach's alpha (a measure of internal consistency). We then compared the three-factor structure obtained with data in wave 2 of the Y06 cohort. This comparison indicated that the factor structure is valid for a different population group. Correlations obtained between scores for each factor model were very high (around 0.99 for each factor). Goodness of fit indicators showed that the factor model obtained from the Y03 cohort fits the Y06 data well. Thus we are happy with the robustness of our construct.

As a final test of the three-factor model we looked at how well the factor scores are able to discriminate between population subgroups. To do this we ran regression models (one for each of the three factors), using factor scores as outcome variables and five other variables (gender, health status, disability status, volunteering and employment status) considered to influence wellbeing as predictor variables.

The regression results indicated that there is enough variation in the factor scores to discriminate between groups. In particular, the results for health status and employment status were highly significant ($P < .0001$) across all three factors and also had large estimates; for instance, young

people reporting good or excellent health were much more likely to report substantially higher levels (46—54%) of wellbeing across the three factors.

Weighing up the results, we can say that the analysis of the happiness/satisfaction questions indicated a stable three-factor structure with acceptable reliability. Importantly from a policy perspective, the factor structure has analytical power.

The main shortfall of this model is that it only partly captures wellbeing as described by Fraillon (2004) and the selection of wellbeing questionnaires that were examined. In particular, this set of variables does not capture the intrapersonal or psychological dimension of wellbeing. This suggests that more rounded measures of wellbeing are needed to supplement the current questions. The best way to do this may be to replace the current satisfaction questions with a proper wellbeing questionnaire. Consideration could be given to including the two wellbeing questionnaires PERMA (aimed at adults) and EPOCH (aimed at adolescents), which cover five dimensions of wellbeing, including Fraillon's dimensions. Importantly, these two questionnaires are derived from the same theoretical basis and therefore would be suitable.

Introduction

The purpose of this report is to analyse possible measures of wellbeing in the Longitudinal Surveys of Australian Youth (LSAY).[1] The Melbourne Declaration (Ministerial Council on Education, Employment, Training and Youth Affairs 2008) recognises the importance of the intellectual, physical, social, emotional, moral, spiritual and aesthetic development and wellbeing of young Australians in progressing the nation's social and economic prosperity. This notion is also reflected in the priorities of the LSAY research program, which aims to support young people to lead full and meaningful lives by gaining insight into their wellbeing and social activities.

The Australian Institute of Health and Welfare (2011) notes that the wellbeing of young people affects their educational outcomes, their transitions into full-time employment, their adult health and their family formation. Young people's wellbeing has become a focus of school and education policy (Nguyen 2011).

Understanding the concept of wellbeing is, however, not a straightforward issue. It is a multi-dimensional concept: it incorporates a range of constructs that encompass physical, social and emotional aspects (Nguyen 2011). As a result, there is no single indicator or set of indicators available to measure wellbeing. Nevertheless, if we want a simple definition of wellbeing we could look to Fraillon (2004), who refers to the psychological perspective of wellbeing, which can be defined as the prevalence of positive attributes in an individual.

LSAY is a potentially useful resource for examining the effects of the wellbeing of young people. While wellbeing questions were not originally explicitly included in the LSAY instrument, it does contain a number of questions that are relevant to the concept of wellbeing.

The approach taken in this report is as follows. Firstly, there is a brief review of existing literature, particularly drawing on synthesis work in Australia by Fraillon (2004). This literature will be used to develop a framework of the main factors relating to wellbeing for young people. As much of the synthesis work has already been done, this is a relatively modest exercise. A selection of wellbeing questionnaires are also examined in terms of their underlying constructs. From this, a concept map of wellbeing for young people is developed.

Next, using information obtained from frameworks in the literature and the questionnaires, the current LSAY instrument is examined to identify questions relating to wellbeing. These questions are then analysed, using a factor analysis,[2] to identify any underlying constructs. The validity and reliability of the factors is also examined.

Following the initial analysis and consideration of Fraillon's framework and the constructs in existing questionnaires, options for LSAY are considered. This includes indentifying gaps in the current LSAY survey instrument.

[1] LSAY tracks young people aged 15—25 from school to further study, work and other destinations. It asks questions about education and training, work and social development. Further information can be found at <http://www.lsay.edu.au>.

[2] Factor analysis is an analytical technique that reduces a number of variables to one or more underlying constructs.

The analysis we undertook found that the happiness/satisfaction questions that currently exist in LSAY have some efficacy in terms of:

- loading on to three clear factors, which can be called social wellbeing, material wellbeing and career
- having a stable factor structure across two cohorts of LSAY
- having enough variability in the factor scores to discriminate between groups where there is expected to be a difference in wellbeing.

We find however that there is a shortfall in these questions, in that they do not capture one of the main dimensions of wellbeing, namely, the intrapersonal or psychological aspect of wellbeing. Options for improving the measurement of wellbeing in LSAY include supplementing the existing happiness/satisfaction questions to capture the psychological dimension, or replacing these questions with an established wellbeing questionnaire. One example of this is PERMA, which is a new wellbeing questionnaire currently undergoing validation and which covers five dimensions of wellbeing.

Dimensions of wellbeing

We draw on Fraillon (2004), who synthesised the literature on wellbeing largely from the perspective of the young person within the school community. We also refer to Hamilton, Redmond and Muir (2010), who summarised some surveys relevant to young people's wellbeing.

In his analysis of the literature, Fraillon (2004) discusses five dimensions that are consistently represented in the wellbeing literature: physical, economic, psychological, cognitive and social. Each of these five dimensions is evaluated in the context of its capacity to contribute to the measurement of the construct of student wellbeing.

Fraillon (2004) argues that the psychological (intrapersonal) and social (interpersonal) dimensions should define the model of measurement of student wellbeing. The intrapersonal dimension of student wellbeing includes the aspects of wellbeing which relate to a person's sense of self and their capacity to function in their school community. This is also referred to as the psychological dimension. The interpersonal dimension of student wellbeing includes those aspects of wellbeing which look at a student's judgment of their social circumstances and their consequent capacity to function in their school community. This is also referred to as the social dimension.

While wellbeing is something that is innate to the individual, it can be influenced by a variety of factors that are conceptually different from actual wellbeing. Fraillon (2004), for instance, mentions that the physical and economic dimensions are more appropriately considered as influencing student wellbeing than as fundamental to the measurement of wellbeing. Other literature also points to factors influencing a person's wellbeing. The New Economics Foundation (undated), in a discussion of differences in wellbeing between groups, suggests several variables that can influence wellbeing. Examples include gender, income, employment status, health and volunteering.

Returning to Fraillon's framework, we need to keep in mind that LSAY extends beyond the boundaries of school, while Fraillon's discussion focuses on student wellbeing at school. We do find however that the literature Fraillon draws on is still relevant outside the school context, and we can see that the framework dimensions are actually broad enough to apply to a range of contexts and ages.

Within each of Fraillon's intra- and interpersonal dimensions he identifies various 'aspects' that contribute to the make-up of that dimension, as shown in table 1. Explanations of each of these aspects are contained in appendix 1. We need to keep in mind that there are issues with translating constructs that can be stated qualitatively into realistic measures. Hence, the aspects of Fraillon's dimensions should be seen as a guide rather than prescriptive.

Table 1 Fraillon's wellbeing dimensions

Intrapersonal dimension (psychological)	Interpersonal dimension (social)
▪ autonomy	▪ communicative efficacy
▪ emotional regulation	▪ empathy
▪ resilience	▪ acceptance
▪ self-efficacy	▪ connectedness
▪ self-esteem	
▪ spirituality	
▪ curiosity	
▪ engagement	
▪ mastery orientation	

Source: Fraillon (2004).

In addition to Fraillon's framework, we also reflect on a handful of established wellbeing instruments in terms of the constructs they measure. Note that there is no consistency among these instruments in what is being measured, although the intra- and interpersonal dimensions summarised by Fraillon seem to be apparent in all of these to varying degrees.

Table 2 provides a very brief summary of six survey instruments. Four of these were chosen, as they have been identified as wellbeing surveys relevant to young people in a report for the Australian Research Alliance for Children and Youth and the Australian Institute of Health and Welfare (Hamilton, Redmond & Muir 2010). The other two (PERMA and EPOCH) are new surveys, which, while currently under development, have so far had promising results. PERMA and EPOCH are similar surveys in terms of their dimensions, although PERMA is aimed at adults, while EPOCH is focused on adolescents.

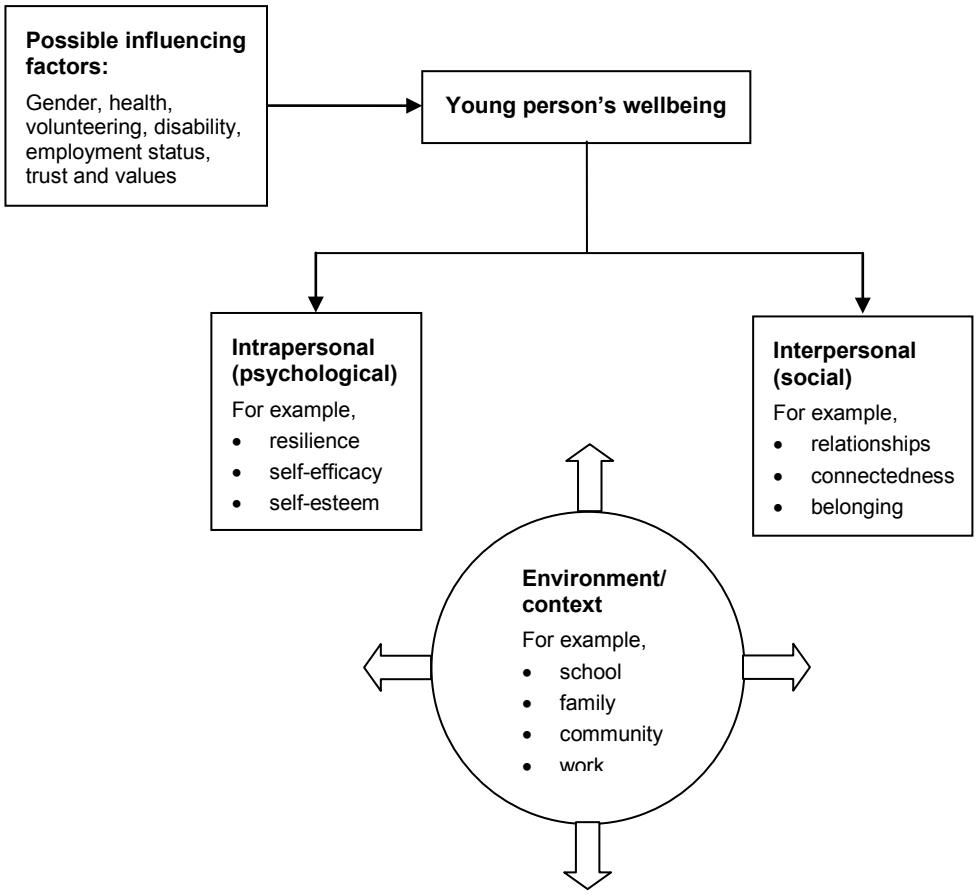
Table 2 Summary of constructs in a selection of wellbeing surveys

Survey	Constructs measured	Validity/reliability issues and other comments
Personal Wellbeing Index (The International Wellbeing Group 2006)	A single satisfaction type wellbeing factor covering eight domains in the adult version. There is also an optional question on satisfaction with life as a whole. There are three parallel versions aimed at school children and adolescents, pre-school children, and people with an intellectual disability or other cognitive impairment. The eight domains in the adult version are: standard of living, health, life achievement, personal relationships, personal safety, community-connectedness, future security, and spirituality. The spiritual dimension does not appear in the version for school children.	Various reliability and validity tests have been undertaken over time and the construct is stable.
ACER Social-Emotional Wellbeing Survey (Bernard, Stephanou & Urbach 2007)	Assesses students' social-emotional competencies (resilience, attitudes and coping skills, social skills and values, work management and engagement skills), and environmental influences (perceptions of home life, school life and their community)	Construct validity confirmed using Rasch measurement scales. However, the survey has not been implemented on a systematic basis.
Multi-dimensional Students' Life Satisfaction Scale (Huebner 2001)	Assesses student satisfaction along the domains of family, friends, school, living environment, and self.	Factor analysis (both exploratory and confirmatory) supports the dimensions of the survey. Convergent and discriminant validity have also been demonstrated. The scales all show acceptable reliability.
European Social Survey (New Economics Foundation undated)	Assesses personal wellbeing (emotional wellbeing, satisfying life, vitality, resilience and self-esteem, positive functioning), social wellbeing (supportive relationships, trust and belonging), wellbeing at work.	Factor analysis did not provide conclusive evidence about the underlying structure of wellbeing as the factors were dominated by response code effects.
PERMA (Seligman 2011)	Assesses wellbeing for adults along the following five dimensions from which the acronym PERMA is derived: Positive emotion, Engagement, Meaning, Relationships, Accomplishment.	Validation is underway with promising results so far. The final measure should be available later in 2012.
EPOCH (Kern, Steinberg & Steinberg 2012)	Assesses wellbeing for adolescents along the following five dimensions from which the acronym EPOCH is derived: Engagement, Perseverance, Optimism, Connectedness, Happiness	Validation is underway with promising results so far. The final measure should be available later in 2012

Note: The above surveys are administered in a variety of ways including written (e.g., the ACER Social-emotional Wellbeing Survey, and the Multi-dimensional Students' Life Satisfaction Scale), face to face (European Social Survey), and electronically (e.g. PERMA). The Personal Wellbeing Index can be administered either in written form or verbally.

Figure 1 represents a concept map of the essential elements of wellbeing for young people, based mainly on Fraillon's framework. This map will be used later in the report to reflect on the results of our analysis.

Figure 1 Concept map of young person's wellbeing



Selection of questions for analysis

Table 3 lists possible question areas in the LSAY Y03 cohort with potential relevance to wellbeing. We focus on wave 3 of the Y03 cohort as it includes questions of this nature that do not appear in other waves of Y03 or in other cohorts. We use Fraillon's two dimensions and the constructs from the other wellbeing questionnaires shown in table 2 as a broad guide to identifying potential wellbeing questions within LSAY.

Table 3 Topic areas where there might be wellbeing questions in the LSAY Y03 cohort by wave

Topic area	Wave number						
	1	2	3	4	5	6	7
Average age (years)	15.7	16.7	17.7	18.7	19.7	20.7	21.7
Schooling	√						
Employment area		√	√	√	√	√	√
Seeking employment		√	√	√	√	√	√
Disability			√				√
Health			√				√
Finance						√	√
Life satisfaction/happiness questions	√	√	√	√			
Aspirations	√		√		√	√	√
Problems			√				
Community perceptions			√				
Relationships				√			

When considering questions for analysis there are a couple of issues raised in the literature that warrant consideration. Hamilton, Redmond and Muir (2010) argue that indicators of wellbeing should be universal; that is, they should be relevant to all groups and context-free (for example, school, community, work). This can further be expanded to the intent of the question. If a question is specific to a particular situation, then it may well only capture a small segment of the population. For example, questions about those who are unemployed and who are seeking work would only be applicable to a small proportion of the survey population.

Given the constraints involved in selecting questions for analysis we have taken a fairly simple approach and use the following rules:

- The questions can apply to various contexts (that is, school or post-school).
- The topic of the question is directly relevant to overall wellbeing and not referring to another issue such as employment or disability status or environmental factors such as schooling.
- The majority of respondents to the survey are captured by the questions.

Given these general rules, table 4 provides comments on which questions from the previous table are to be included or not included in our analyses.

Table 4 Proposed question areas

Topic area	Include	Comments
Schooling	×	Refers to school context only and this only covers two or three waves of LSAY
Employment area	×	Refers to employed persons; subgroup only
Seeking employment	×	Refers to unemployed persons only; subgroup only
Disability	×	Refers to one specific subgroup
Health	✓	General question on health; suitable scale
Finance	×	General question on ability to manage financially and suitable scale however appears in wave 7 only
Life satisfaction/ happiness	✓	General questions on life satisfaction; suitable scale
Social	✓	Range of questions about social aspects of life; suitable scales

In summary, we focus mainly on questions on life satisfaction and the social aspects of the student's life, as these most closely accord with concepts of wellbeing and are context-free. The question on general health is also included. Table 5 provides more detail on the questions chosen for the initial analysis.

Table 5 Questions to be used in the analysis

Topic area	Wave(s)	Question	Scale
Health	3	In general, would you say your health is ...	5-point categorical (excellent – poor)
Life satisfaction/ happiness	2–7	I am now going to read out a list of different aspects of your life. How happy are you with ... (various response options)	4-point categorical (very happy – very unhappy)
Aspirations	3	How likely do you think that it is you will achieve your goals in life?	4-point categorical (very likely – not at all likely)
Problems	3	How much of a problem do you think these are for young people you know ... (various response options)	10-point scales (not a problem – a major problem)
Other social capital questions	3	A variety of questions about the young person's social life	Generally 4-point categorical scales

Analysis

The analysis focuses mainly on wave 3 of the Y03 cohort. The approach we take to examining wellbeing questions in this paper is threefold. Firstly, we undertake factor analysis of the variables and compare the results of this to Fraillon's findings as well as to the dimensions of wellbeing used in the wellbeing questionnaires described in table 2. Secondly, we test the factor structure obtained as far as possible using another cohort of LSAY. If the analysis of the other cohort produces a very similar structure, then the factor structure is robust. Thirdly, we test the factors obtained in terms of their discriminant ability. That is, we look to see if there is enough variance in the factor scores obtained to pick up variations in population subgroups where there is expected to be a difference.

A note on analytical tools

Various analytical approaches are used in this report, which may require some description. The initial analysis uses exploratory factor analysis, which is a very common technique that looks for a small set of theoretical constructs (or underlying factors) to explain the data. Eigenvalues are used to determine the number of factors in a model. Eigenvalues are a measure of the amount of variance extracted from all the variables in the model for a given factor (StatSoft Inc. 2012).The higher the eigenvalue, the greater the amount of variance that is accounted for.

A technique known as exploratory structural equation modelling (ESEM) is also used to refine the results and to obtain factor scores, as well as more diagnostic information such as goodness of fit statistics (which are used to refine factor models). This technique was developed by the MPlus team[3] to incorporate the measurement model parts of exploratory factor analysis but with more diagnostic information such as that found in confirmatory factor analysis (CFA).

Confirmatory factor analysis, which is a higher-order factor analytic technique, assumes a pre-existing theoretical structure and compares data with a pre-existing model. It is used in this paper to see how well the model obtained in the analysis of wave 3 of the Y03 LSAY cohort data fits the data in wave 2

[3] Mplus is a statistical modelling package. The website for Mplus is <http://www.statmodel.com>.

of the Y06 LSAY cohort. As indicated by the name of the technique, this analysis confirms pre-existing theoretical (or factor) models using a different population group. This approach is not suitable as an exploratory tool as it places predetermined restrictions on the data.

Goodness of fit statistics provide diagnostic information on how well the factor model fits the data. In our analysis we use the root mean square error of approximation (RMSEA), and the comparative fit index (CFI) as fit statistics. The RMSEA reflects the differences between the observed and estimated factor model. Ideally, this would be zero (that is, observed and predicted are the same) but Hooper, Coughlan and Mullen (2008) suggest that an RMSEA of less than 0.06 provides a good fit. One of the strengths of this statistic is that confidence intervals can be calculated, allowing for more precise tests. It is suggested that, for good fits, the upper limit should be 0.08 and the lower limit close to 0.

Another statistic that is commonly used is the comparative fit index. This index compares the model in the analysis to a baseline model that assumes there are no relationships between the variables being used in the model. The index measures how much better the fitted model is to the baseline model. Index values can range from 0 to 1, with values close to 1 indicating a good fit.

The standard Cronbach's alpha measure is used to measure reliability in this study.[4] Cronbach's alpha has been criticised as a measure of reliability for this type of analysis as it will underestimate the true reliability. However, it does provide a conservative estimate of reliability. If this is in the acceptable range (generally considered to be greater than 0.70), it should therefore be suitable for our analysis.

To compare factor models between the Y03 and Y06 cohorts we calculate scores for individuals based on each factor model and then correlate them. Scores are calculated for each factor in the model. The score for a given individual for each model can be described by the following equations:

$Score_i/03\ weightings$ =

$Score_i/06\ weightings$ =

where

q_{ji} = answer to the j_{th} question, and

w_j = factor weight (loading)

To overcome the problem of comparing models drawn from different populations we pool the data across the two cohorts. Pearson correlations are used to compare the two sets of factor scores. In this context, Pearson correlations measure how similar the pattern of scores is between the factors for the Y03 data and the factors for the Y06 data.

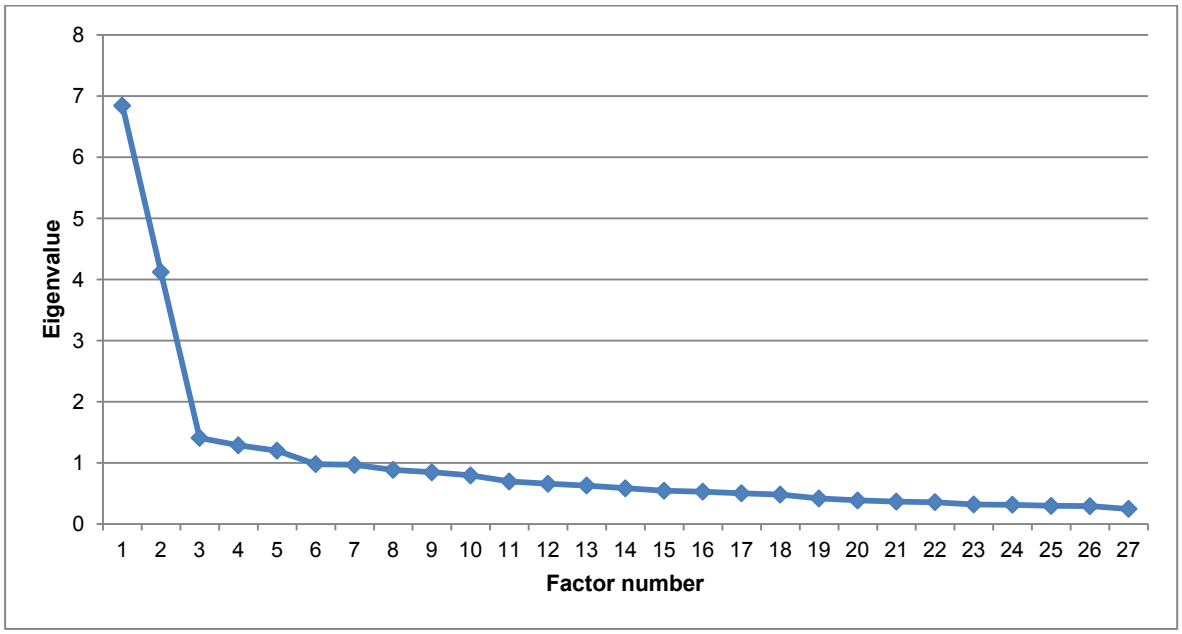
[4] Reliability in this sense refers to the internal consistency of the items or subscales of a test. More particularly, it measures whether items that purport to measure the same construct produce similar scores.

Findings

Factor analysis for the initial set of variables

Figure 2 shows the scree plot for the original exploratory factor analysis, which included the variables as discussed in table 5. The scree plot graphs the eigenvalues obtained from the factor analysis procedure against the factor number.

Figure 2 Scree plot for initial factor analysis



An examination of the scree plot indicates a solution of two factors, although table 6 shows five eigenvalues greater than 1. The two-factor solution is shown in table 7.

Table 6 Eigenvalues and variance

Factor number	Eigenvalue	% variance explained	Cumulative variance
1	6.842	25.34	25.34
2	4.121	15.26	40.60
3	1.411	5.23	45.83
4	1.289	4.77	50.60
5	1.202	4.45	55.05

The two most significant factors account for about 41% of the variance in the model, which is quite low. The standardised Cronbach alphas for the two factors were 0.79 and 0.73 respectively. These are in the acceptable range, although they are not particularly high.

Table 7 Initial two-factor solution for all variables chosen from Y03 cohort, wave 3

Variable	Factor 1	Factor 2
H12: General health	0.35	0.10
J2A: Happy with the work you do	**0.62**	0.05
J2B: What you do in your spare time	**0.67**	0.02
J2C: How you get on with people	**0.70**	-0.01
J2D: The money you get each week	**0.46**	0.04
J2E: Your social life	**0.68**	-0.02
J2F: Your independence	**0.60**	-0.02
J2G: Your career prospects	**0.68**	0.05
J2H: Your future	**0.76**	0.03
J2I: Your life at home	**0.77**	0.04
J2J: Your standard of living	**0.78**	0.05
J2K: Where you live	**0.70**	0.05
J2L: Your life as a whole	**0.84**	0.02
J4A: Extent suffering from low self-esteem	0.05	**0.66**
J4B: Being unfairly treated by police	0.05	**0.70**
J4C: Being unfairly treated by teachers	0.05	**0.71**
J4D: Being unfairly treated at work	0.07	**0.73**
J4E: Being pressured by others	0.01	**0.73**
J4F: Having their property vandalised	0.03	**0.76**
J4G: Extent of conflict	0.03	**0.75**
J7: Number of close friends	-0.18	-0.05
J13: Likelihood of achieving life goals	**0.42**	-0.01
J14: Feeling of safety walking alone after dark	0.20	0.13
J15: Likelihood of lost property being returned	0.25	0.08
J16: Likelihood of expressing different opinions	0.11	0.01
J17: Expectation of fair treatment from police	0.23	0.17
J18: Trustworthiness of Australians	0.17	0.14

Note: Loadings >=0.40 on a factor are bolded.[5]

The table indicates that the factor structure falls out according to two main question categories. The first factor refers primarily to the happiness/satisfaction bank of questions and the other to the problems bank of questions. The other questions included in the initial analysis do not load onto either factor, so can be discarded.

The factor structure is problematic because there appears to be a response effect inherent in the structure. That is, the variables are loading onto specific question groups, namely, questions relating to happiness/satisfaction and questions relating to problems. This particular structure also does not accord with what was found in the previous section on dimensions of wellbeing.

On reflection, the problem questions, apart from the one on low self-esteem, may be influencing factors on wellbeing rather than factors intrinsic to wellbeing. It seems reasonable to argue that being unfairly treated at school, at work or by police is an influence on one's wellbeing rather than intrinsic to it. The happiness/satisfaction variables on the other hand seem more intrinsic to wellbeing.

[5] High factor loadings indicate that there is a lot in common between the variable and the factor. There is no definite cut-off point for defining a high loading, but many researchers use 0.4 as a cut-off, although others recommend 0.6 (Sharma 1996, p.118). For the purposes of this paper we use 0.4 as a guideline.

Given these issues, we decided to analyse the happiness/satisfaction questions on their own. The other advantage of taking this approach is that the happiness/satisfaction questions are replicated across waves and cohorts, meaning that results can be compared over time, which would add to the analytical value of the factor structure.

Exploratory factor analysis for the satisfaction/wellbeing questions shows two eigenvalues with a value of greater than 1 accounting for 60% of the variance in the model.

Table 8 Eigenvalues for the satisfaction/happiness questions, Y03 cohort, wave 3

Factor number	Eigenvalue	% variance explained	Cumulative variance
1	6.17	51.44	51.44
2	1.04	8.70	60.14
3	0.82	6.80	66.94

We initially examined a two-factor solution for these variables. This solution is shown in appendix 2. This model shows a reasonably clear factor, which can be termed work/career and another factor that is less clear and appears to include more than one construct. Consequently, it was decided to run a three-factor model to see whether this provided further clarification. This model is clearer and seems to show three distinct constructs (see appendix 2).

Exploratory structural equation modelling was undertaken to further refine this model. The results of this are shown in table 9.

The standardised Cronbach alphas for the three factors are 0.78, 0.84 and 0.75 respectively. All of these are in the acceptable range.

Table 9 Three-factor solution for the satisfaction/happiness questions, Y03 cohort, wave 3

Happiness variables	Factor 1	Factor 2	Factor 3
The work you do	0.13	0.18	**0.42**
What you do in your spare time	**0.61**	0.14	0.0
How you get on with people	**0.60**	0.16	-0.01
The money you get	0.01	0.28	0.25
Social life	**0.97**	0.00	-0.23
Independence	0.36	0.25	0.06
Career prospects	-0.01	-0.05	**0.90**
Your future	0.20	0.01	**0.69**
Your life at home	0.05	**0.78**	0.00
Standard of living	0.00	**0.84**	0.00
Where you live	-0.06	**0.82**	-0.02
Your life as a whole	0.37	**0.42**	0.14
RMSEA = 0.032 with a 90% confidence interval of 0.029 to 0.036, which indicates a good model fit.			
CFI = 0.996 indicating a good model fit.			

Note: Loadings > = 0.40 on a factor are bolded.

The solution indicates three factors, which can roughly be labelled as social wellbeing (factor 1), material wellbeing (factor 2) and career (factor 3). The LSAY happiness variables clearly converge on these factors, with the possible exception of 'the money you get' and 'independence'. In addition, there are only marginal loadings for 'the work you do' and 'your life as a whole'. In terms of Fraillon's

framework, the factor model, while broadly capturing elements of the social dimension, does not capture the intrapersonal or psychological dimension.

The model also captures some of the dimensions of the wellbeing questionnaires summarised in table 2. For example, the social wellbeing factor appears in one form or another across all six of the questionnaires in that table. The material wellbeing factor is related to the living environment dimension in Huebner's Multi-dimensional Students' Life Satisfaction Scale (questions on where you live). The career factor does not appear in the other questionnaires (although there is a work component to the European Social Survey). However, this factor is a useful addition, in the context of young people transitioning from school to work, as it provides some indication of their confidence in work and career.

Five of the six wellbeing questionnaires in table 2 cover some aspects of the intrapersonal or psychological dimension of wellbeing. The exception to this is the Personal Wellbeing Index, which bears the greatest resemblance to the happiness/satisfaction questions in LSAY. (See the comparison of questions in appendix 3.) The lack of an intrapersonal factor is the greatest shortfall in our model.

Comparing factor structure to a later LSAY cohort

As a test of validity, we also examine the factor structure of the happiness/satisfaction questions in a later cohort, namely the Y06 cohort, wave 2. In particular, we want to assess the stability of the factor structure. We do this by replicating a three-factor model for the Y06 cohort, wave 2, and then compare this with the one we obtained for the Y03 wave 3 cohort.[6]

Exploratory structural equation modelling was used to obtain the factor model. The results are shown in table 10. The standardised Cronbach alphas for the three factors are 0.79, 0.81 and 0.78 respectively. All of these are in the acceptable range.

Table 10 Three-factor solution for the satisfaction/happiness questions, Y06 cohort, wave 2

Happiness variables	Factor 1	Factor 2	Factor 3
The work you do	0.03	0.31	0.35
What you do in your spare time	**0.51**	0.19	0.02
How you get on with people	**0.51**	0.26	-0.01
The money you get	-0.07	**0.41**	0.20
Social life	**0.94**	0.00	-0.16
Independence	0.28	0.33	0.05
Career prospects	-0.08	0.00	**0.89**
Your future	0.02	0.11	**0.72**
Your life at home	0.05	**0.83**	-0.07
Standard of living	0.00	**0.82**	0.00
Where you live	-0.03	**0.79**	-0.07
Your life as a whole	0.27	**0.56**	0.05

Note: Loadings > = 0.40 on a factor are bolded.

On face value the factor structure seems quite similar to that obtained for the Y03 cohort, wave 3. We used two approaches to investigate this more formally. Firstly, we correlated the individual scores that were calculated for each factor model, as described earlier in the report. The correlations

[6] Note we could only test for the happiness questions because the other questions used in our initial analysis do not appear again in later waves of Y03 or other cohorts of LSAY.

obtained were 0.989 for factor 1, 0.995 for factor 2 and 0.995 for factor 3, indicating a very high degree of similarity between the factor models.

The second approach was to undertake confirmatory factor analysis of the Y06 variables using the factor model obtained for the Y03 wave 3 analysis and then to examine the goodness of fit statistics obtained. The RSMEA fit statistic is 0.056, which is in the acceptable range, and the CFI statistic is 0.98, which indicates a good fit. Overall, we can say that the factor structure is robust across the two sets of data.

Discrimination ability

From a policy perspective, one of the main reasons for having a wellbeing measure is to see whether there are differences in wellbeing between the groups of interest. If the factor scores we have derived from our factor model do not have the power to identify any differences in wellbeing, then our measure is of little use.

To test this we consider the variables discussed by the New Economics Foundation (undated) that are known to affect wellbeing to see whether they show up the expected effect on our factor structure for the happiness/satisfaction variables. Some of these variables are readily available in LSAY. Examples include:

- Gender: males are expected to score higher on personal wellbeing but lower on social wellbeing.
- Income: wellbeing is expected to increase overall with increasing income.
- Volunteering: volunteering is associated with higher levels of wellbeing.
- Health and disability: poorer health is associated with lower levels of wellbeing.
- Employment status: unemployment is associated with lower levels of wellbeing.
- Trust and values: there are varying relationships to wellbeing among trust and value-related aspects of society.

We test this by running generalised linear regression models for each of the three factors, where the dependent (or outcome) variables are the wellbeing factor scores and the independent (or predictor) variables are the measures such as those listed above. The models return tests of significance for the overall model and for each predictor variable and also estimates for each predictor variable, the latter indicating the size of the differences between groups for each variable.

In this present analysis we use variables relating to gender, health, disability, volunteering and employment from the Y03 cohort, wave 3, to test for differences between groups. For the purpose of this exercise, all variables were coded as dichotomous. Separate analysis is conducted for each of the three factors.

Table 11 shows the results for tests of differences for the five variables we are considering. Overall, the three models (reflecting the three sets of factor scores) were all significant at $p < .0001$.

Table 11 Results of discriminant ability

Parameter	Factor 1		Factor 2		Factor 3	
	P value	Estimate	P value	Estimate	P value	Estimate
Gender						
Male	0.660	0.009	0.578	0.012	0.018	0.050
Female		*0.000*		*0.000*		*0.000*
Health						
Good/excellent	<.0001	0.462	<.0001	0.538	<.0001	0.465
Fair/poor		*0.000*		*0.000*		*0.000*
Disability						
None reported	0.011	0.125	0.012	0.126	0.053	0.094
Reported		*0.000*		*0.000*		*0.000*
Volunteering						
Never	0.021	-0.053	0.003	-0.068	0.005	-0.064
At least sometimes		*0.000*		*0.000*		*0.000*
Employment						
Not employed (excl. studying)	<.0001	-0.416	<.0001	-0.491	<.0001	-0.544
Employed		*0.000*		*0.000*		*0.000*

Table 11 shows that the factors do demonstrate discriminant ability. Two of the five variables we examined, namely, self-reported health and employment status, were highly significant across all three factors. In addition, they had large estimates associated with them in the direction expected by theory. That is, young people reporting good or excellent health were significantly more likely to report higher levels of wellbeing across the three factors. Similarly, young people not employed (excluding those in study) were considerably less likely to report higher levels of wellbeing across the factors.

The variable concerning volunteering is significant but has rather small estimates, to the extent that one could say that never volunteering is associated with slightly lower wellbeing than that of those who volunteer at least sometimes.

The results for gender and disability status are slightly more nuanced. Looking at gender, there is a significant result for factor 3 (concerning career prospects), but with a small estimate. This means that males are likely to have a marginally higher score on this factor than females, which is perhaps not an unexpected finding. The results for the other two factors for gender were not significant. For disability, there were significant results for the first two factors (social wellbeing and material wellbeing), but only a marginally significant result for factor 3 (career prospects), with a small estimate.

This analysis overall does indicate that the three-factor model of wellbeing, based on the happiness/satisfaction group of variables in LSAY, is of some use from an analytical perspective.

Discussion

The analysis showed that the happiness/satisfaction bank of questions in LSAY provides three robust constructs, which can be termed social wellbeing, material wellbeing and career factors. Importantly from a policy perspective, the factor structure has analytical power, as there is sufficient variation in the factor scores to discriminate between groups where there is expected to be a difference in wellbeing.

There are, however, gaps in our measure of wellbeing. In terms of the concept map developed (figure 1) and other wellbeing questionnaires (table 2), the measure fails to capture the intrapersonal or psychological element of wellbeing. For instance, issues such as resilience, self-esteem and self-efficacy are not captured by our analysis. In addition, the analysis indicated that some of the questions appear not to be particularly useful and can be dispensed with, in particular 'the money' you get, but also possibly 'your life as a whole' and 'independence'.

If we want more rounded measures of wellbeing in LSAY we need to supplement the current questions. The best option for doing this is to replace the current questions with a proper wellbeing questionnaire. We can look to the wellbeing questionnaires in table 2 for a guide to suitable instruments.

The simplest of these is the Personal Wellbeing Index (PWI), which loads onto one factor and has eight questions. However, the Personal Wellbeing Index does not cover Fraillon's intrapersonal (or psychological) dimension, so it also is incomplete. Nevertheless, it may be better than the current set of questions in LSAY, as it is deliberately theoretically constrained to 'form a single tight factor' with high construct validity; it takes a parsimonious approach (International Wellbeing Group 2006, p.7).

Another alternative is the inclusion of the recent PERMA and EPOCH questionnaires, which cover five dimensions of wellbeing, including the intrapersonal aspects of wellbeing. These questionnaires are quite short, so do not involve any great respondent burden. The EPOCH questionnaire is aimed at adolescents and could therefore be asked in the first couple of waves of LSAY cohorts. The PERMA questionnaire is aimed at adults and could therefore be inserted in the questionnaire when the young person reaches 18 or thereabouts. While PERMA and EPOCH are slightly different questionnaires, they are derived from the same theoretical basis, so are comparable for the purposes of analysis.

The other wellbeing questionnaires, such as the Australian Council for Educational Research (ACER) survey, Huebner's satisfaction scales and the European Social Survey questions could also be considered. These questionnaires are multi-dimensional and cover aspects of self and the social and living environments. However, they are quite long and so could probably not be asked in each wave. If they were to be included in only one or two waves, they should be included in a school wave and a post-school wave. ACER's Socio-emotional Wellbeing Survey and Huebner's Multi-dimensional Students' Life Satisfaction Scale are also aimed specifically at school-aged children, so would have to be adapted. The European Social Survey has not yet been applied in Australia and also has not, as far as we are aware, been properly validated. It is also very long.

In conclusion, the current set of happiness questions in LSAY provides useful information on young people's wellbeing, but has some deficiencies in terms of the intrapersonal or psychological aspects of wellbeing. These questions could be replaced by the PERMA/EPOCH questionnaires, which cover five dimensions of wellbeing.

References

Australian Institute of Health and Welfare 2011, *Young Australians: their health and wellbeing 2011*, AIWH, Canberra.

Bernard, ME, Stephanou, A & Urbach, A 2007, *ASG student social and emotional health report*, viewed November 2011, <http://www.asg.com.au/Assets/Files/ASG_Student_Social_Emotional_Health_Report_Full.pdf>.

Fraillon, J 2004, *Measuring student well-being in the context of Australian schooling: discussion paper*, viewed November 2011, <http://www.mceecdya.edu.au/verve/_resources/Measuring_Student_Well-Being_in_the_Context_of_Australian_Schooling.pdf>.

Hamilton, M, Redmond, G & Muir, K 2010, *Conceptualisation of social and emotional wellbeing for children and young people, and policy implications*, viewed November 2011, <http://www.aracy.org.au/cmsdocuments/SEWB%2007_071%20(2).pdf>.

Hooper, D, Coughlan, J & Mullen, MR 2008, 'Structural equation modelling: guidelines for determining model fit', *Electronic Journal of Business Research Methods*, vol.6, issue 1, pp.53—60, viewed 26 June 2012, <http://www.ejbrm.com>.

Huebner, S 2001, *Manual for the Multidimensional Students' Life Satisfaction Scale — 2001 version*, viewed November 2011, <http://www.cas.sc.edu/psyc/pdfdocs/huebslssmanual.doc>.

International Wellbeing Group 2006, *Personal wellbeing index — adult, manual*, 4th edn, viewed November 2011, <http://www.creativityaustralia.org.au/docs/PersonalWellbeingIndex.pdf>.

Kern, P, Steinberg, E & Steinberg, L 2012, 'Development of a self-report measure of adolescent well-being', presented at a Metric of Wellbeing teleconference, Adelaide, 23 February.

Ministerial Council on Education, Employment, Training and Youth Affairs (MCEETYA) 2008, *Melbourne Declaration on educational goals for young Australians*, viewed January 2012, <http://www.mceecdya.edu.au/verve/_resources/National_Declaration_on_the_Educational_Goals_for_Young_Australians.pdf>.

New Economics Foundation undated, *National accounts of wellbeing: bringing real wealth onto the balance sheet*, viewed November 2011, <http://cdn.media70.com/national-accounts-of-well-being-report.pdf>.

Nguyen, N 2011, *Trends in young people's wellbeing and the effects of the school-to-work transition*, NCVER, Adelaide.

Seligman, M 2011, *Flourish: a visionary new understanding of happiness and well-being*, Free Press, New York.

Sharma, S 1996, *Applied multivariate techniques*, Wiley, New York.

StatSoft Inc. 2012, *Electronic statistics textbook*, Tulsa, OK, viewed, June 2012, <http://www.statsoft.com/textbook/>.

Appendix 1: Fraillon's aspects of student wellbeing

Aspects of the intrapersonal dimension[7]

Autonomy: a person is autonomous when their behaviour is experienced as willingly enacted and when they fully endorse the actions in which they are engaged and/or the values expressed by them.

Emotional regulation: in the school context, emotional regulation is manifested by the degree to which a student's emotional responses are of an appropriate type and magnitude to the events that surround them.

Resilience: resilience is the capacity to manage, recover and move on from critical challenging events that tax or exceed a person's resources.

Self-efficacy: self-efficacy refers to the degree to which a person believes themselves able to organise, execute and adapt strategies to meet desired outcomes.

Self-esteem: self-esteem describes the affective component of self-concept; it refers to the way people feel about themselves.

Spirituality: spirituality is defined as a positive sense of meaning and purpose in life.

Curiosity: curiosity is the intrinsic desire to learn more.

Engagement: student engagement includes both engagement with the learning process and engagement with the school community.

Mastery orientation: mastery orientation is defined as the desire to complete tasks to the best of one's ability.

Aspects of the interpersonal dimension

Communicative efficacy: communicative efficacy is the use of communicative skills in context to achieve a purpose.

Empathy: empathy includes two constructs — cognitive empathy is intellectually taking the role or perspective of another person, while affective empathy is responding with the same emotion to another person's emotion.

Acceptance: acceptance is the construal of society through the character and qualities of other people. Acceptance is founded in beliefs about the fundamental goodness of others and includes respect, tolerance, trust and understanding.

Connectedness: interpersonal connectedness is the subjective awareness of being in a close relationship with the social world. It represents a meaningful linkage with a wide range of people.

[7] Source: Fraillon (2004, pp.8—9).

Appendix 2: additional factor models

Table A1 Two-factor solution for the satisfaction/happiness questions, Y03 cohort, wave 3

Happiness variables	Factor 1	Factor 2
The work you do	**0.52**	0.38
What you do in your spare time	0.31	**0.61**
How you get on with people	0.32	**0.63**
The money you get	0.34	0.33
Social life	0.24	**0.67**
Independence	0.30	**0.53**
Career prospects	**0.84**	0.21
Your future	**0.75**	0.38
Your life at home	0.30	**0.74**
Standard of living	0.30	**0.75**
Where you live	0.25	**0.68**
Your life as a whole	**0.45**	**0.72**

Note: Loadings > = 0.40 on a factor are bolded.

Table A2 Three-factor solution for the satisfaction/happiness questions, Y03 cohort, wave 3

Happiness variables	Factor 1	Factor 2	Factor 3
The work you do	0.27	0.30	**0.51**
What you do in your spare time	**0.57**	0.32	0.28
How you get on with people	**0.58**	0.34	0.29
The money you get	0.17	0.30	0.33
Social life	**0.79**	0.26	0.17
Independence	**0.42**	0.35	0.28
Career prospects	0.16	0.20	**0.83**
Your future	0.32	0.26	**0.73**
Your life at home	0.36	**0.68**	0.28
Standard of living	0.34	**0.71**	0.28
Where you live	0.28	**0.68**	0.24
Your life as a whole	**0.52**	**0.52**	**0.42**

Note: Loadings > = 0.40 on a factor are bolded.

Appendix 3: comparison of LSAY and Personal Wellbeing Index questions

Personal wellbeing questionnaire	**LSAY happiness/satisfaction question**
Scale on how satisfied you are, ranging from 1 to 10	Scale on how happy you are, ranging from 1 to 10
Your standard of living	The work you do, at study, at home, or on the job
Your health	What you do in your spare time
What you are achieving in life	How you get on with people in general
Your personal relationships	The money you get each week
How safe you feel	Your social life
Feeling part of your community	Your independence – being able to do what you want
Your future security	Your career prospects
Your spirituality or religion	Your future
Your life as a whole	Your life at home
	Your standard of living
	Where you live
	Your life as a whole

Australian Government

Department of Education, Employment and Workplace Relations

National Centre for Vocational Education Research Ltd
Level 11, 33 King William Street, Adelaide, South Australia
PO Box 8288, Station Arcade, SA 5000 Australia
Telephone +61 8 8230 8400 Facsimile +61 8 8212 3436
Website www.ncver.edu.au Email ncver@ncver.edu.au