

# Measuring the socioeconomic status of young people

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## Abstract

Developing an accurate measurement of individual socioeconomic status (SES) is important, particularly because of current policy interest in increasing educational participation among those from a low SES background. Typically, we do not have data on all the underlying characteristics that make up the concept of SES. Consequently, SES is usually measured indirectly, such as through the Socioeconomic Indexes for Areas (SEIFA) or through parental occupation or education. The issue is how well these proxies do in measuring ‘true’ SES.

Using the 2003 cohort of the Longitudinal Surveys of Australian Youth (LSAY), this paper focuses on measuring the SES of young people aged 15 to 25. We create a measure of individual SES that captures the impact of cultural and educational resources, as well as parental education and occupation.

The results of this paper show that:

- SEIFA greatly misclassifies SES at the individual level (40% of individuals are wrongly classified as high or low SES)
- SEIFA composites result in only a marginal improvement in classification accuracy
- SEIFA and SEIFA composites perform reasonably well when reporting participation in higher education at aggregate levels

The implications are that SEIFA is satisfactory when determining aggregate relationships, but performs very poorly when classifying individuals. This is problematic for programs which direct resources to individuals – use of an area-based measure of SES will result in the misallocation of resources. We demonstrate this using a simple experiment in which we increase higher education participation for low SES individuals by 25 percent

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## **Introduction**

The measurement of socioeconomic status (SES) is currently receiving considerable policy attention in Australia. This attention is fuelled by the Government's objective to increase access to higher education for youth from low-SES backgrounds (Commonwealth of Australia 2010). Initiatives aimed at low-SES groups are reliant on available measures of SES. Although geographic measures, such as the Socio-Economic Indexes for Areas (SEIFA; ABS 2008), are widely used in social and economic research, these measures have been criticised for their imprecision in determining SES at the individual level (Coelli 2010; Jones 2001). Such imprecision can affect the implementation of policies intended to enhance social participation options for individuals, as well as the monitoring of the effects of these policies.

Our main focus lies on inter-generational mobility. Specifically, we wish to define SES in terms of family characteristics in order to ascertain how the outcomes of young people are affected by their family circumstances. In this context, the Longitudinal Surveys of Australian Youth (LSAY), with its rich set of background characteristics, is an ideal data source to investigate the performance of different measures of SES. If we were interested in social disadvantage for older individuals then the impact of parental characteristics would be relatively less important compared to other variables in determining SES.

In this paper, we first discuss the different types of information that should be included in an "ideal" measure of SES for young people. We then create a measure of SES that attempts to approximate this "ideal" measure using the Longitudinal Surveys of Australian Youth (LSAY), within the constraints of the variables collected in this dataset. Finally, we use our constructed measure of SES as a benchmark against which we assess the performance of several alternative measures of SES. SEIFA is the primary alternative measure for comparison against our derived benchmark. In addition to SEIFA alone, we investigate whether SEIFA can be substantively improved by combining it with other variables (parental occupation and education) which could potentially be collected from student enrolment forms. Alternative measures are assessed by investigating how well they perform at estimating participation in higher education at an aggregate level. We conclude our analysis by investigating the performance of SEIFA when used as a selection tool.

We show that the use of SEIFA leads to severe misclassification of SES at the individual level. By contrast, SEIFA and SEIFA composites are reasonably accurate measures of SES at the aggregate level, as shown by our examination of aggregate participation in higher education. Supplementing SEIFA with information on parental occupation or education results in only marginal improvements of individual-level classification accuracy. This means that SEIFA and SEIFA composites are inappropriate measures for programs delivered to low-SES individuals, because the majority of such individuals are, in fact, not low-SES.

## **SES**

SES is a multi-dimensional, relative concept that can be measured in a variety of ways. Scutella (2009) has recently suggested a number of critical dimensions that affect SES and social inclusion. Important dimensions include material resources, social and economic participation, education and health, political or community participation, as well as access to services. Similar dimensions have been proposed by other researchers (see Pantazis 2006; Saunders 2007).

In discussing the SES of young people, the consideration of parental background characteristics is particularly critical. Such characteristics include parental occupation, parental education, as well as several dimensions of household income and wealth. Individually and collectively, these parental background characteristics determine family access to social, economic and cultural resources. It is therefore important that these characteristics be reflected by any good measure of SES.

The following sections briefly outline ways of measuring some of the important contributors to creating an individual level SES of young people.

### *Parental Occupation*

An accurate measure of SES for youth should consider the impact of parental occupation as an important determinant of individual socioeconomic position. There are numerous occupational classification schemes in operation in Australia and internationally. In Australia, the most recent classification of occupations is the Australian and New Zealand Standard Classification of Occupations (ANZSCO; ABS 2009). This is a categorical measure that can be used to create a ranking of occupations based on skill level or some related criterion. McMillan (2008) uses the ANZSCO classification to create a continuous measure of occupational prestige by converting ANZSCO to the Australian Socioeconomic Index 2006 (AUSEI06). The AUSEI06 scale represents a composite socioeconomic index that reflects the linkages between education, occupation and income.

An important international system is that of The International Standard Classification of Occupations (ISCO; ILO 1990). Occupations coded to ISCO can be further converted to the continuous scale of the International Socio Economic Index of occupational status (ISEI; Ganzeboom et al 1992).

Continuous occupational scales (such as AUSEI06 and ISEI) are useful as they can be used in regression modelling, as well as categorization into quartiles or quintiles for cross-tabulation.

The LSAY Y03 data-set codes an individual's mothers and fathers occupation to ISCO and ISEI. In considering the creating of a parental occupation measure, the question of which parent's occupation to measure also has to be decided. In this paper, we have chosen to focus on the father's occupation or, if missing or unknown, the mother's occupation. This approach is useful in that it helps to overcome missing values that may arise due to male detachment from the labour force. Moreover, it is likely that young people are able to identify the occupation of at least one of their parents or parent figures.

### *Parental Education*

Parental education attainment is another important element of an accurate SES measure for young people. There are multiple measures of educational attainment. In Australia, two common classifications include the Australian Qualifications Framework (AQF; AQF Advisory Board 2007) and the Australian Standard Classification of Education (ASCED; ABS 2001). An alternative approach to measuring attainment is to use the length of formal education. However, in the Australian context substantial differences exist in the duration of qualifications, particularly for VET courses.

Internationally, education attainment is often classified using the International Standard Classification of Education (ISCED; UNESCO 1997). ISCED facilitates the comparison of education statistics and indicators within and between countries.

Again, the question regarding which parents' education attainment should be used in the measure of SES? In this paper, we focus on mother's education, or, if missing or unknown, father's education. The reasons for this are two fold, firstly it alleviates the problem of missing values, as children are likely to be able to identify the educational attainment of at least one of their parents or parental figures, and secondly, it reduces the relationship between education and occupation in the measure of SES.

Parental education is measured using ISCED in LSAY, and as such it is this classification scheme that has been included in the individual measure of SES.

### *Household Income and Wealth*

Household income and wealth are routinely used as indicators of SES because they represent direct measures of access to economic resources. However, given that respondents frequently perceive income-related questions as intrusive, and that adolescents may not know their parents' income or may be unwilling to disclose such information, LSAY refrains from collecting income-related information directly. As an alternative, LSAY contains information on the presence of consumer and cultural items in the home.

### *Other dimensions of SES*

There are a range of other factors that could be included in a measure of SES. These include family structure, regionality, immigration and Indigenous status. However, the current literature is divided over the benefits of including any of these ancillary dimensions in a measure of SES. For this reason, we do not include them in the construction of our measure of SES.

## **Constructing the measure**

We use data from the 2003 cohort of the Longitudinal Surveys of Australian Youth (LSAY) to create a reference measure for SES. LSAY is a nationally representative survey that tracks young people from the age of 15 to 25 as they move from school into further study, work and other destinations. In particular, LSAY contains a rich set of background variables that can be used to create an accurate SES reference measure. There are 16 variables within LSAY that form the basis of our SES reference measure (Table 1).

**Table 1: LSAY Variables Used as a Basis for Creating an SES Reference Measure**

Variable	Type or Categories	Valid n	$\hat{p}$	SE
Own desk at home	Dichotomous	10366	0.902	0.003
Own room at home	Dichotomous	10366	0.915	0.003
Own study place at home	Dichotomous	10367	0.834	0.004
Computer software at home	Dichotomous	10366	0.669	0.005
Internet at home	Dichotomous	10366	0.849	0.003
Calculator at home	Dichotomous	10366	0.971	0.002
Literature at home	Dichotomous	10365	0.363	0.005
Poetry at home	Dichotomous	10366	0.406	0.005
Art at home	Dichotomous	10366	0.556	0.005
Textbooks at home	Dichotomous	10366	0.802	0.004
Dictionary at home	Dichotomous	10366	0.973	0.002
Dishwasher at home	Dichotomous	10362	0.594	0.005
Number of books at home	0 – 10	447	0.043	0.002
	11 – 25	883	0.085	0.003

	26 – 100	2848	0.275	0.004
	101 – 200	2347	0.226	0.004
	201 – 500	2205	0.213	0.004
	More than 500	1486	0.143	0.003
Parental occupation	Continuous	9417	46.635*	17.246
Parental education	None	310	0.031	0.002
	ISCED 1	84	0.084	0.001
	ISCED 2	2064	0.206	0.004
	ISCED 3B,C	319	0.032	0.002
	ISCED 3A, 4	3174	0.317	0.005
	ISCED 5B	1201	0.119	0.003
	ISCED5A, 6	2872	0.286	0.005
Own computer at home	Dichotomous	10364	0.939	0.002

Note: Sample sizes and proportions are unweighted. Proportions represent the percent respondents to whom the listed variable condition applies.

\*Value represents the mean, not the proportion.

We use factor analysis to derive our SES reference measure (results not shown). The results of an initial analysis found that the variable own computer at home produced a strange result. The cause of this is likely to be the strong correlation between the presence of a computer in the home, the availability of software and internet access. The final factor analysis excludes the variable “own computer at home” and the resultant factor scores are shown in Table 2.

**Table 2: Loadings for the Single-factor Model**

LSAY Variable	Composite SES Factor
Desk	0.628
Own room	0.340
Study place	0.618
Software	0.598
Internet	0.499
Calculator	0.640
Literature	0.844
Poetry	0.803
Art	0.653
Textbooks	0.659
Dictionary	0.782
Dishwasher	0.426
No. of books	0.523
Parental occupation	0.359
Parental education	0.380

This single factor model produces the reference category of SES (SES-C) to which we compare the SEIFA based measures.

### Comparing SEIFA & SES-C

Each of the four SEIFA indexes is available for a range of different geographical entities, such as Collection Districts, Statistical Local Areas, Local Government Areas, State suburbs and Postal areas. We exclusively consider indexes for Postal Areas because information contained in the LSAY dataset is limited to respondents’ residential postcode. The correlations between our SES-C reference measure and each of the four indexes for postal area are weak but highly similar (Table 3).

**Table 3: Correlation of the four SEIFA Indexes for Postal Areas with SES-C**

Variable	Correlation with SES-C
SEIFA Index of Education and Occupation (for Postal Areas)	0.30
SEIFA Index of Economic Resources (for Postal Areas)	0.26
SEIFA Index of Relative Advantage (for Postal Areas)	0.29
SEIFA Index of Relative Disadvantage (for Postal Areas)	0.29

For the remainder of this paper, we use the SEIFA Index of Education and Occupation for comparison as this is the most highly correlated with the SES-C individual measure. This index is henceforth referred to as simply *SEIFA*.

Further, we create three SEIFA composites as a basis for testing whether supplementary information on parental occupational or educational background can enhance classification performance in area-based measures of SES. The three SEIFA composites include:

- SEIFA + Parental Occupation (using the International Socio-Economic Index of Occupational Status)
- SEIFA + Parental Education (using the International Standard Classification of Education)
- SEIFA + Parental Occupation + Education

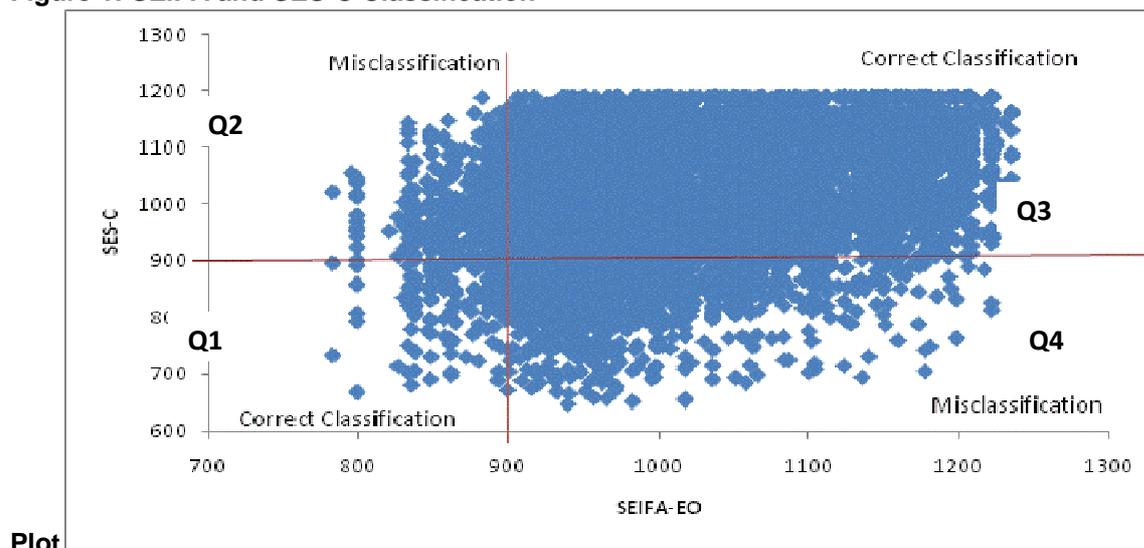
To create these measures, we conducted a series of regressions, whereby SES-C was regressed against the factors of each SEIFA composite. Predicted mean scores were computed and used as the respective SEIFA composite measure (regressions not shown).

### **Performance of SES measures**

In this section, we test the classification performance of the alternative SES measures by comparing them to our SES-C measure. The measures are tested at the individual and aggregate levels. Further, we investigate how well SEIFA performs in targeting individuals for specific programs. To do this, we undertook a simple exploratory analysis in which we assumed that participation in higher education for low-SES individuals (measured using SEIFA) expanded by 25 percent and we measured the true SES (based on SES-C).

We use two approaches to assess the classification performance of SEIFA against that of SES-C. In the first we create a classification plot for comparing SEIFA against SES-C (Figure 1). The low correlation between the two measures is clearly reflected in the shape of the plot. Assuming a score of 900 or below (i.e. one standard deviation or more below the SES mean score of 1000) to represent low SES, we examine the classifications of individuals by each of the two measures. Quadrants Q1 and Q3 represent those individuals who are correctly classified in both measures (although there is substantial variation within these two quadrants), and quadrants Q2 and Q4 represent those who have been incorrectly classified as low or high SES in either measure. In particular, Q2 shows those individuals who are classified as low-SES using SEIFA and not being low-SES using SES-C. Conversely, quadrant Q4 show those classified as low-SES using SES-C, but incorrectly classified as non low-SES using SEIFA.

**Figure 1: SEIFA and SES-C Classification**



Cross-tabulation of quintiles is the second approach used to assess the classification accuracy of SEIFA with the SES-C reference measure. The following tables present the cross-tabulation of the quintiles of SES-C with each of the quintiles for each of the SEIFA measures described above. In the tables below, quintile values of 20 along the diagonal vector indicate a perfect relationship between SEIFA measures and SES-C.

All the tables show a high level of misclassification. The maximum correct classification is 32 percent for the SEIFA + parental occupation + parental education measure. Table 4 shows that SEIFA severely misclassifies (severe misclassification defined as second-order and above differences) almost 40 percent of the sample, a result similar to that found by Coelli (2010) who compared SEIFA’s SES classifications with data on income levels using the Household, Income and Labour Dynamics in Australia (HILDA) Survey. The level of severe misclassification drops to 32 percent when parental occupation and education are included with SEIFA (Table 7).

**Table 4: SEIFA and SES-C Quintiles**

SES-C	SEIFA					Total
	1	2	3	4	5	
1 = lowest	<b>5.53</b>	5.19	4.09	3.38	1.80	20
2	4.57	<b>4.51</b>	4.34	4.04	2.52	20
3	4.20	4.24	<b>4.29</b>	4.03	3.30	20
4	3.54	3.72	4.04	<b>4.03</b>	4.65	20
5 = highest	2.03	2.42	3.59	4.30	<b>7.64</b>	20
Total	20	20	20	20	20	100

**Table 5: SEIFA + Parental Occupation and SES-C Quintiles**

SES-C	SEIFA + Parental Occupation					Total
	1	2	3	4	5	
1	<b>6.24</b>	5.21	3.87	2.47	1.28	20
2	4.90	<b>4.78</b>	4.49	3.43	2.44	20
3	4.10	4.38	<b>4.35</b>	4.31	3.11	20
4	3.35	3.48	3.85	<b>4.73</b>	4.85	20
5	1.40	2.15	3.42	5.08	<b>8.33</b>	20
Total	20	20	20	20	20	100

**Table 6: SEIFA + Parental Education and SES-C Quintiles**

SES-C	SEIFA + Parental Education					Total
	1	2	3	4	5	
1	<b>7.31</b>	5.05	3.91	2.30	1.04	20
2	5.27	<b>4.95</b>	4.43	3.13	2.12	20
3	3.47	4.41	<b>4.46</b>	4.40	3.35	20
4	2.90	3.75	3.78	<b>5.13</b>	4.66	20
5	1.09	1.84	3.37	5.04	<b>8.85</b>	20
Total	20	20	20	20	20	100

**Table 7: SEIFA + Parental Occupation + Education and SES-C Quintiles**

SES-C	SEIFA-EO + Parental Occupation + Education					Total
	1	2	3	4	5	
1	<b>7.37</b>	5.19	3.29	2.14	0.82	20
2	5.43	<b>5.01</b>	4.38	3.15	1.93	20
3	3.46	4.50	<b>4.67</b>	4.65	3.00	20
4	2.89	3.40	4.17	<b>5.00</b>	4.96	20
5	0.85	1.88	3.49	5.05	<b>9.29</b>	20
Total	20	20	20	20	20	100

The above tables show that all measures involving SEIFA perform poorly in classifying individual level SES. If the aim is to direct resources or programs to individuals, then using an area-based measure of SES will result in the misallocation of resources.

In the next section, we compare the performance of the SEIFA measures and SES-C at the aggregate level. That is, how well do the measures perform when looking at overall participation?

### **Performance of SES Measures at the aggregate level**

To assess aggregate-level performance, we consider the SES classifications of each measure with regards to a particular outcome of interest. Specifically, we examine higher education participation rates of young people by the time they have reached the age of 19. Based on the LSAY sample, Table 8 presents the higher education participation rates by quintile for each of the SES measures.

**Table 8: Percentage of Quintile Participating in Higher Education by Age 19**

Quintile	SES-C	SEIFA	SEIFA + Par Occ	SEIFA + Par Ed	SEIFA + Par Occ+Ed
1	20.07	26.53	25.57	22.01	21.51
2	30.50	30.07	26.58	29.36	28.09
3	37.46	33.96	33.32	32.39	33.80
4	42.59	40.31	45.16	46.42	45.45
5	55.00	60.31	61.81	60.85	63.09

While SEIFA and SEIFA composites overstate participation rates in the lowest and highest SES quintiles, deviations from SES-C remain within relatively moderate bounds. Overall, Table 8 demonstrates that SEIFA and SEIFA composites produce satisfactory results at the aggregate classification level, despite performing poorly at the individual classification level.

The final aspect to this paper is how well does SEIFA perform when used as a selection mechanism?

### Expanding higher education participation

The poor performance of SEIFA as an individual-level SES classifier prompted further investigation into the potentially damaging effects of basing social inclusion policies on geographic measures. To illustrate these effects, we devised a scenario that assumed an expansion of the higher education sector with the objective to augment participation rates among youth from the lowest SES quintile by 25 percent. Our focus was on determining the extent to which this expansion would actually benefit the low-SES target population, as opposed to youth from higher-SES strata.

In order to investigate this, we assume that selection of these extra 25 percent is based on SEIFA quintiles. Logistic regression (not shown) was used to compute the respective probabilities of higher education participation for each individual in our sample based on a set of relevant predictors. We then select those individuals who were not participating in higher education and rank-ordered their participation probabilities.

The use of our SES-C reference measure in lieu of SEIFA revealed substantial classification bias, leading to undesirable outcomes in post-expansion participation patterns. Only 17 percent of the individuals identified by SEIFA as being low-SES truly belonged to the lowest SES quintile according to our SES-C reference measure. Well over 45 percent were from the two highest SES-C quintiles. When replacing SEIFA with our SES-C reference measure, it became apparent that individuals from the upper two SES quintiles benefitted substantially from the 25 percent capacity increase (see Table 9).

**Table 9: Higher Education Participation by SES-C Quintiles**

SES-C Quintile	n	% Pre-expansion Participation	n	% Post-expansion Participation	Difference in %	% Change
1	251	20.0	267	21.3	1.3	6.4
2	386	30.3	401	31.4	1.2	3.9
3	519	37.3	533	38.3	1.0	2.8
4	605	43.5	629	45.3	1.7	4.0
5	734	54.5	751	55.7	1.3	2.3

These results confirm those found earlier which suggest that SEIFA does a poor job in classifying individuals. The conclusion is that any programs which direct resources to individuals will be greatly misaligned if the allocation is undertaken using an area-based measure of SES<sup>1</sup>.

## **Conclusion**

For young people, an accurate SES measure should capture a rich set of parental background characteristics that mirror access to social, cultural, and economic resources. The limited availability of such information frequently necessitates the use of area-based SEIFA indexes as proxies for SES. Against this backdrop, we have created a reference measure that contains the rich set of parental background variables necessary to accurately classify youth into SES categories. Subsequently, we have considered available alternative SES measures and tested the performance of alternative SES measures at individual and aggregate levels.

Our analysis has produced the following key findings:

- SEIFA greatly misclassifies SES at the individual level.
- Supplementing SEIFA with information on parental occupation or education results in only marginal improvements of individual-level classification accuracy.
- SEIFA and SEIFA composites perform satisfactorily with respect to reporting participation in higher education at aggregate levels.
- Programs which direct resources to individuals using an area-based measure of SES will result in the misallocation of resources.

Our overall conclusion is that SEIFA is satisfactory for aggregate relationships but results in serious misclassification at the individual level. The implication is that SEIFA is an inappropriate tool to use for program delivery. Individuals identified as low-SES using SEIFA, are, in fact, not low-SES. Moreover, supplementing SEIFA with data on parental occupation or education does not lead to substantive improvements of individual classification accuracy.

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<sup>1</sup> The Department of Education, Employment and Workplace Relations (DEEWR) use an interim measure of SES that includes the use of an area-based measure (at the collection district (CD) and postcode level), and Centrelink data. In particular, the measure includes: the lowest 25 percent of postcodes ranked by the SEIFA Index of Education and Occupation (EO), the lowest 25% of CD's ranked by SEIFA-EO and selected Centrelink student payments received by students from low income families (below \$42,000 pa).

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