



Assessing socio-economic status through occupation

AN UPDATE OF THE NEW ZEALAND
SOCIOECONOMIC INDEX (NZSEI)

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Outline



- **Socio-economic status (SES)**
 - What is it? Why measure it? How to measure it?
- **Theory and construction of NZSEI**
- **Validation**
 - Smoking and other socio-economic correlates
- **Conclusions**

Socio-economic status (SES)



- Also called socio-economic position (SEP)
- Not claiming it is the same as ‘class’
 - CLASS
 - ✦ “A group of people who share a common economic situation, based upon their relationship to the means of production, and whose interests inevitably clash with those of others”
 - SOCIO-ECONOMIC STATUS
 - ✦ “The patterned unequal distribution of opportunities, advantages, resources and power among the population. Distinct ‘socio-economic groups’ may thus be said to exhibit different life chances, living standards and associated cultural practices”
- Interested in measuring stratification in SES, without making assumptions about class

Why measure SES?



- **Research**
 - Can test hypotheses about the impact of unequal distribution of opportunities, advantages, resources and power on
 - ✦ Health, wellbeing, life choices, use of services, crime
 - ✦ Moderating the impact of other risk factors
 - Can investigate SES stability and mobility, both within one's life and inter-generationally
- **Describing populations**
- **Funding allocation**
 - Social and health services are sometimes funded (in-part) based on the socio-economic characteristics of the areas that they serve.

SES Measures



- All measures have their advantages and drawbacks
 - Income – face validity, often recorded administratively; often reluctantly reported, known under-reporting
 - Education – stable past a certain age; but inversely associated with age
 - Deprivation measures
 - ✦ Area-based – proven validity, easily coded, summarises multiple adversities; individuals within area may differ, address may mislead
 - ✦ Individual-based – proven validity, summarises multiple adversities; need specific questionnaire, focus on deprived end
 - Occupation – readily recalled, often recorded, proven validity; coding not straightforward, how to code those not in workforce?

NZSEI – Theory

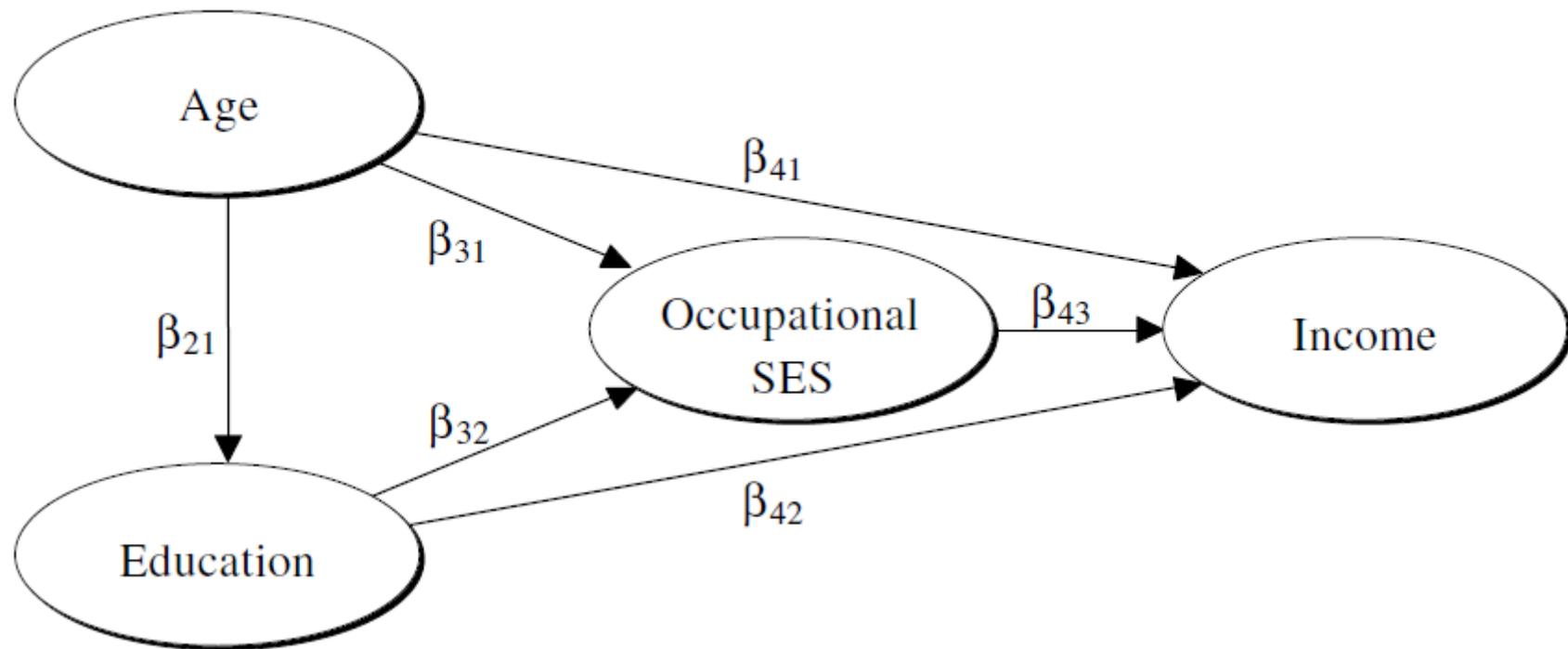


- ‘Returns to human capital’ model
 - The relationship between cultural capital or resources (education) and access to material rewards (income) is mediated through occupational structure.
 - In capitalist societies, division of labour is “the kernel of social inequality” and occupation, by implication, is a pivotal factor underpinning socio-economic stratification.
 - Thus, variations in occupational order translate into variations in social stratification and differentiation in lifestyles and life chances.
 - Developed by Ganzeboom (1992); used previously in NZ, Australia and internationally

NZSEI – Theory



Representation of the NZSEI path model



NZSEI – Construction



The path model can be represented by three linear regression equations.

$$(1) \quad i = \beta_{41} a + \beta_{42} e + \beta_{43} o + \varepsilon$$

$$(2) \quad o = \beta_{31} a + \beta_{32} e + \varepsilon$$

$$(3) \quad e = \beta_{21} a + \varepsilon$$

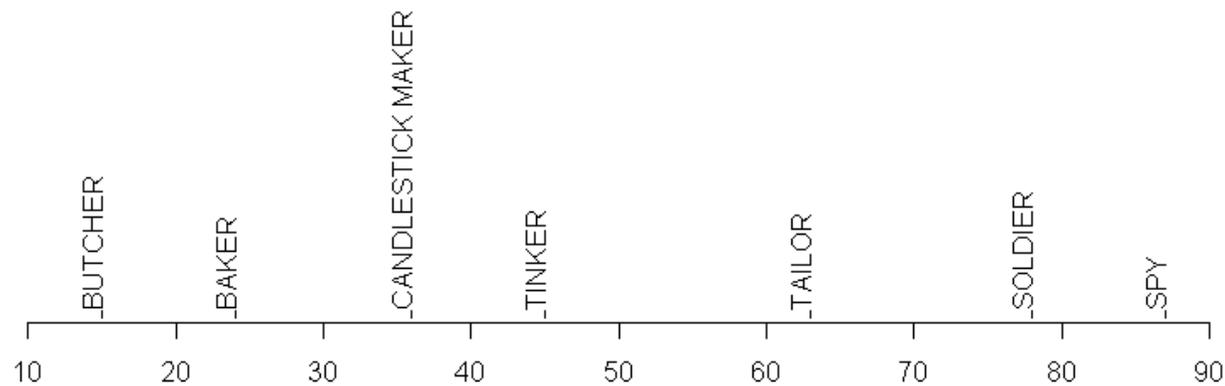
i , e and a are normalised income, education and age variables, and o is our unknown occupational SES variable, also normalised. The beta coefficients represent the arrows on the path diagram.

- Optimally weight age-corrected education & income
- Set β_{42} to zero
- Vary values of 'o' until the summed residual sum of squares of equations 1 & 2 are minimised.

NZSEI – Construction



- Scale scores to be from 10 (low SES) – 90 (high SES)



NZSEI-06 - Data



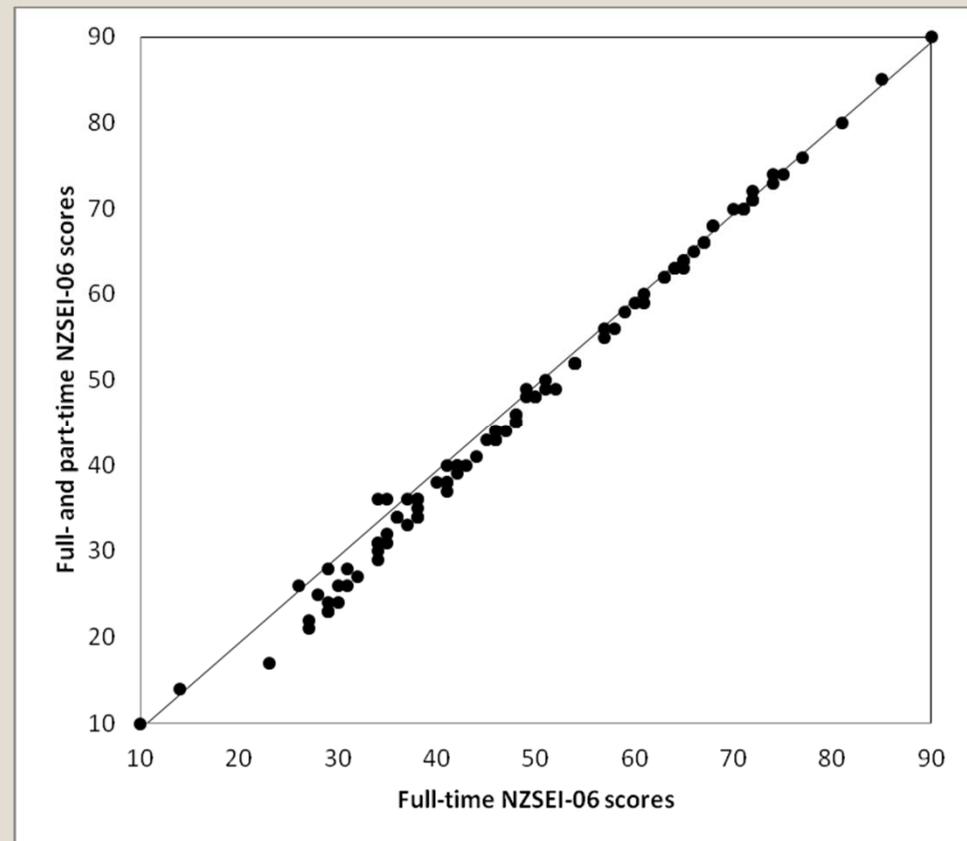
- **Data from 2006 Census**
 - Restricted to full- and part-time workers aged 21-69 (n≈1,700,000)
- **Education**
 - Highest qualification converted into years of education
- **Occupation**
 - Grouped into 97 occupations (ANZSCO classification – same used in Australia)
- **Income**
 - Annual income for full-time workers
 - Part-time workers included, with annual income “equalised” to a full-time equivalent

NZSEI-06 – Results



Scores for full-time workforce and with part-time workers added very similar

- $R > .99$
- Most occupations change <1-2 points
- Very few rank-order changes



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NZSEI-06 – Results



High SEI Scores	2006	Low SEI Scores	2006
Medical Practitioners	90	Food Preparation Assistants	10
Tertiary Education Teachers	85	Cleaners and Laundry Workers	14
Legal Professionals	80	Packers and Product Assemblers	23
Natural and Physical Science Professionals	76	Miscellaneous Factory Process Workers	27
Education, Health and Welfare Services Managers	74	Miscellaneous Labourers	27
Health Therapy Professionals	74	Mobile Plant Operators	29
Accountants, Auditors and Company Secretaries	73	Food Process Workers	29
School Teachers	72	Machine Operators	29
ICT Managers	71	Truck Drivers	30
Information and Organisation Professionals	71	Farm, Forestry and Garden Workers	28

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NZSEI-06 – Results



ANZSCO major group	NZSEI06 Score (Mean)	NZSEI06 score (range)
1. Manager	52	36 - 74
2. Professional	70	49 - 90
3. Technician and Trades Workers	40	28 - 58
4. Community and Personal Service Workers	38	26 - 52
5. Clerical and Administrative Workers	44	36 - 52
6. Sales Workers	39	28 - 55
7. Machinery Operators and Drivers	26	23 - 37
8. Labourers	21	10 - 30

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NZSEI-06 – Results



- Path weights in line with Australian (ANU4 [1996] & AUSEI06) and international (ISEI88) scales

	NZSEI91	NZSEI96	NZSEI06	ANU4	AUSEI06	ISEI88
β_{32} Education-Occupation	0.23	0.25	0.57	0.63	0.65	0.58
β_{43} Occupation-Income	0.79	0.79	0.30	0.30	0.35	0.47

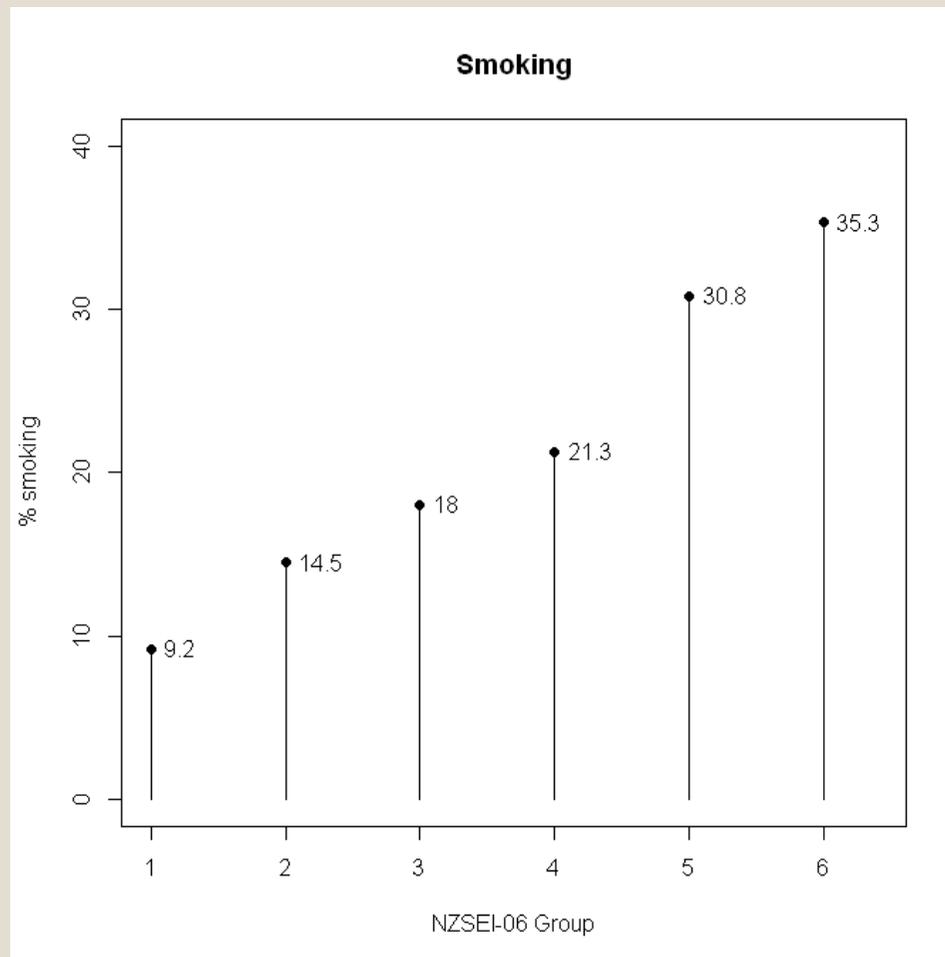
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NZSEI – Validation



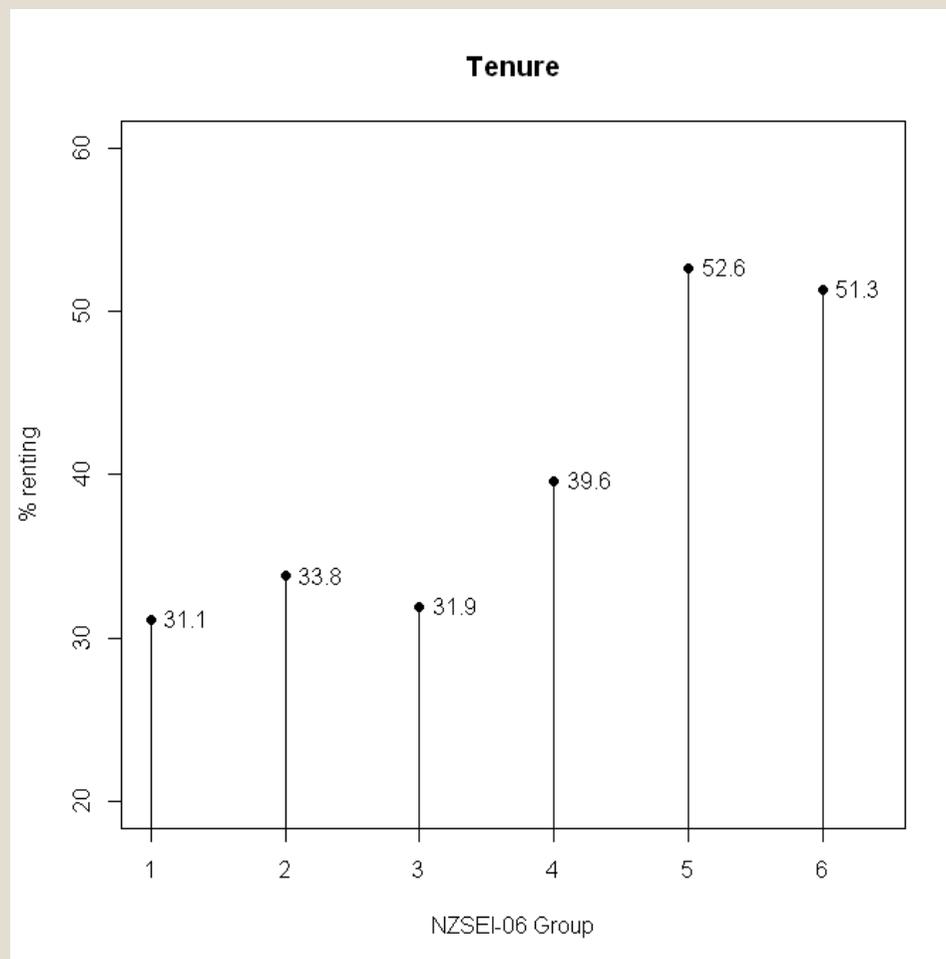
- Does the NZSEI-06 replicate known socio-economic patterns for health and other socio-economic indicators?
 - Smoking prevalence (%)
 - Home ownership (%)
 - Motor vehicle access (% access to 2 or more cars)
 - Neighbourhood deprivation (NZDep scores: 1=least deprived; 10=most deprived)
- Based on 2006 data for 21-69 year olds in the workforce (n≈1,700,000)

NZSEI-06 – Validation - Smoking



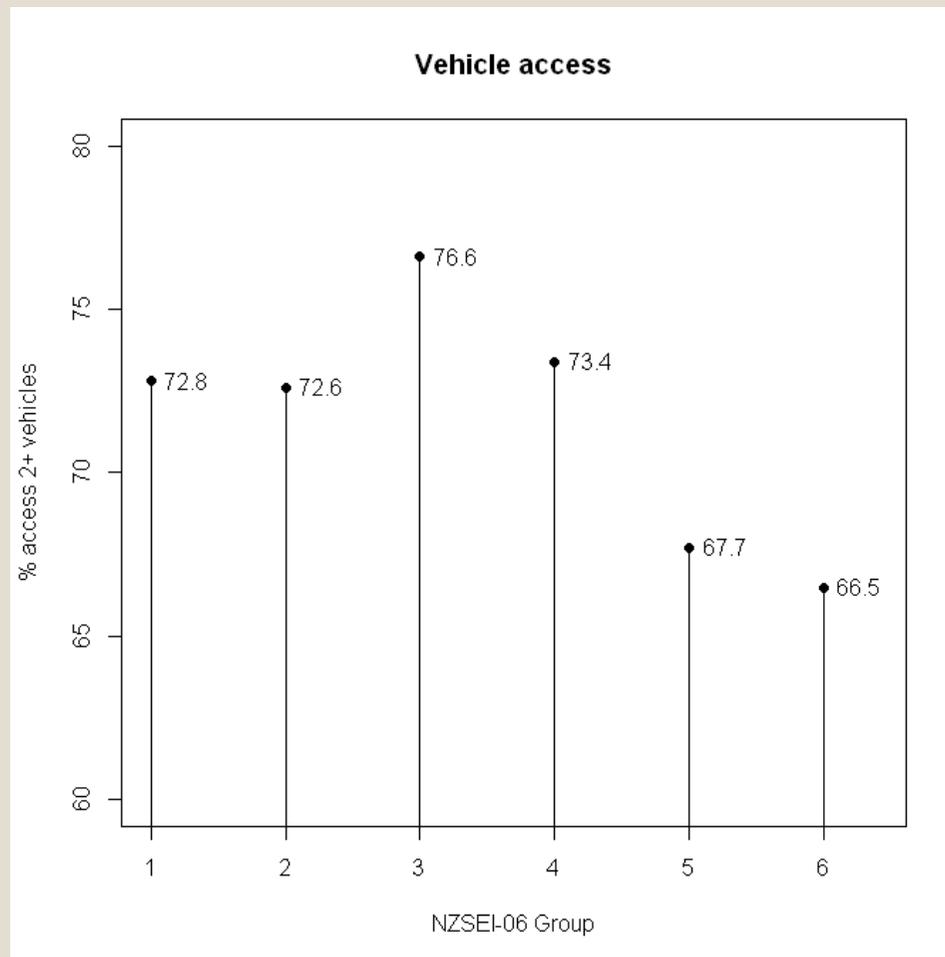
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NZSEI-06 – Validation – Home ownership



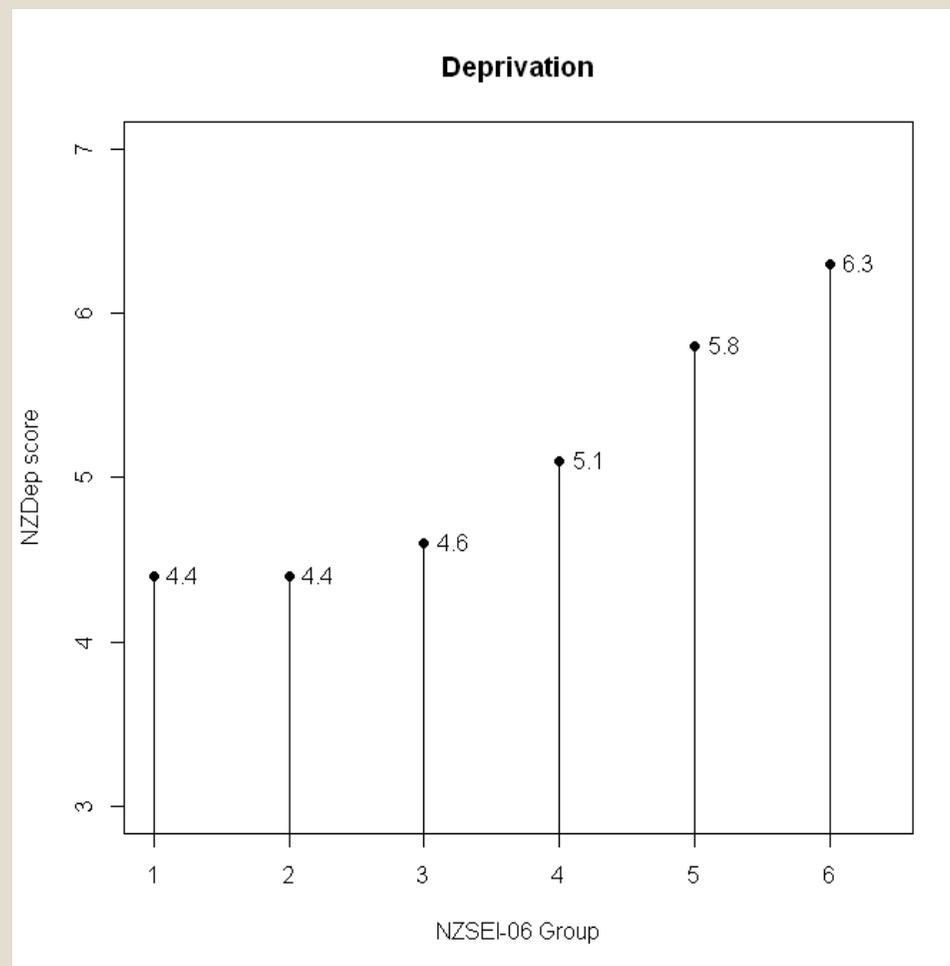
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NZSEI-06 – Validation – Vehicle access



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NZSEI-06 – Validation – Deprivation



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NZSEI-06 – Coding those not in workforce



- A problem with occupation-based SEI measures is how to classify those outside the workforce
- A number of solutions have been suggested
 - Treat household as unit of analysis and assign SEI scores to all household members on the basis of occupation of one (or more) household members
 - ✦ Necessarily done with children
 - ✦ Anachronistic? (coding wife based on husband's occupation)
 - ✦ What if no-one in workforce?
 - Previous occupation
 - ✦ Considered suitable proxy measure, especially for retirees or those taking break from employment

NZSEI-06 – Coding those not in workforce



- A number of solutions have been suggested
 - Separate category(ies) for those not in the workforce
 - ✦ E.g., unemployed category, homemakers category
 - ✦ Long-term unemployed might be considered separate ‘underclass’
 - ✦ But ... heterogeneity in short-term unemployed, homemakers
 - ‘Occupational potential’: use model developed to assign SES on the basis of known association between SEI, age and education (income affected by being out of workforce so cannot be used)
 - ✦ Consistent - assigns scores using essentially the same algorithm
 - ✦ Still just ‘potential’, which might be fulfilled, unmet or exceeded
 - ✦ Results of this approach shown here...

NZSEI-06 – Coding those not in workforce



Qualifications	Age (years)				
	21-30	31-40	41-50	51-60	61-69
Doctorate Degree	68.1	72.9	75.3	74.5	73.9
Masters Degree	60.1	62.2	63.6	65.2	65.1
Post-Graduate and Honours Degree	61.3	63.4	65.2	65.5	64.1
Bachelor Degree and Level 7 Qualification	57.3	60.2	61	61.5	60.9
Level 6 Diploma	50.4	57.2	58.7	58.8	56.4
Level 5 Diploma	45.1	50.2	50.7	51.2	50.2
Level 4 Certificate Gained Post-school	40.9	43.5	44.5	44.7	44.1
Level 3 Certificate Gained Post-school	39.7	43.1	43.7	43	43.2
Level 2 Certificate Gained Post-school	38.3	41.4	42.2	42.9	42.5
Level 1 Certificate Gained Post-school	38.5	41.6	42.2	42.4	45.9
Overseas Secondary School Qualification	36.9	41.1	41.2	41.8	42.2
Level 3 or 4 Certificate Gained at School	42.5	47.5	48.8	48.1	47.1
Level 2 Certificate Gained at School	40.8	44.8	45.8	45.8	45.3
Level 1 Certificate Gained at School	37	40.2	41	42.1	41.6
No school qualification	32.3	33.4	34	35.4	35.7

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Conclusions



- NZSEI-06 classifies occupations as expected
- Path weights (education-occupation; occupation-income) differ from earlier versions, now more in line with international scales
- Correlates with smoking and socio-economic correlates as expected
- Classification of those not in workforce also has reasonable construct validity

Issues



- Occupation being coded less frequently on national surveys.
 - Utility requires occupation data to be readily available
- Only 97 occupations coded (level of detail to which Statistics NZ releases occupation data)
 - Likely heterogeneity among some of these groups
 - Would a more fine-grained classification produce a better scale or just more noise?
 - ✦ 358 groups if next level was made available, 998 if finest level of detail was made available
 - ✦ Harder for user: coding more difficult for finer-grained classification

Future work



- **More validation**
 - Is the construct the same across different ethnic and gender groups (calculate separately and compare)?
 - Additional health measures. Another sample required - only data on smoking in Census
 - Children. Lots of work on socioeconomic disparities in children. If NZSEI-06 is a good measure of SES, it should also differentiate children in terms of health and other outcomes
- **Produce report for discussion**

Thanks!



- Any questions?
- Thanks to Alan Lee, Brian Byun, Peter Davis, Statistics NZ

