

## **Can measures of disadvantage perpetuate the problems they seek to solve?**

**A discussion of the use of car ownership as a variable in multidimensional measures of disadvantage.**

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### **Conference strand:**

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### **Abstract**

Improved understanding of the multidimensional nature of disadvantage has led to development of a wider range of measurement variables than traditional income poverty lines. One variable commonly included in indexes of disadvantage, is households that do not have a car. The use of this variable in the Townsend Index, the Index of Relative Socio-Economic Disadvantage and the Child Social Exclusion Index is discussed in this paper.

This paper challenges the logic of including 'not having a car' as an indicator of disadvantage and argues that the inclusion of this variable distorts the true picture of the distribution of advantage and disadvantage in wealthy nations such as Australia. It presents evidence to show that zero car ownership may be a positive feature of low income households and that conversely high car ownership can put significant financial stress on households with low income.

An examination of these measures of disadvantage can help to illuminate the vital role of transport in addressing social exclusion and economic inequality. The purpose of this paper is to open debate and contribute to the development of more accurate measures of disadvantage.

## **Introduction**

This paper presents a discussion of the use of car ownership or 'having a car' as a measurement variable in multidimensional indexes of disadvantage. Three indexes using the car ownership variable are discussed, followed by the arguments for and against inclusion of car ownership as a valid variable for measuring disadvantage. Evidence is presented from the United Kingdom and Melbourne, Australia demonstrating that the car ownership variable may be misleading if the composition and spatial distribution of disadvantage is not fully understood.

## **1. Multidimensional measures of disadvantage**

There is increasing interest in multidimensional measures of disadvantage due to the recognition that income poverty alone is not an adequate measure. A person's living standards and life chances will be influenced by a range of factors in addition to income, such as social participation and the ability to access goods and services. Authors in the field of social exclusion for example argue that in addition to income poverty, disadvantage is a result of a person's non-participation in the key activities of their society which may be understood to be differentiated from income poverty, due to evidence of [social inequality existing within groups who have income equality. Examples include differences in access to education or social networks, health, or discrimination on the basis of gender or race \(Scutella et al., 2009\).](#)

A number of multidimensional measures of disadvantage include car ownership, or having a car, as a measurement variable. Three are discussed in this paper:

- the Townsend Index (Townsend et al., 1988);
- the Index of Relative Socio-Economic Disadvantage (Australian Bureau of Statistics, 2008) ;and
- the Child Social Exclusion Index (Tanton et al., 2006).

### **1.1. Townsend Index of Material Deprivation**

The Townsend Index of Material Deprivation was originally developed using variables from the 1981 census in the UK. The index provides a framework for understanding material, as opposed to social deprivation. The four indicators are 'unemployment', 'car ownership', 'home ownership' and 'overcrowding' (Townsend et al., 1988 p.36). The car ownership variable 'percentage of private households who do not possess a car' is included based on the assertion by Townsend that 'a number of studies show that it is probably the best surrogate for current income' (p.37).

The index has been used in a range of applications in research, in particular in health studies and consequently informs service development, delivery and resource distribution. Some recent examples include a study exploring the influence of deprivation on patients entering a psychotherapy service (Saxon et al., 2007) and another aiming to assess physical activity in cohorts of adolescents (Brodersen et al., 2007).

### **1.2. Index of Relative Socio-Economic Disadvantage (IRSED)**

The Index of Relative Socio-Economic Disadvantage or IRSED is one of four indexes developed by the Australian Bureau of Statistics, known as the Socio-Economic Indexes for

Areas, or SEIFA. These indexes, published since 1971, are derived from census data at the collector district (CD) level in order to measure socio-economic differences across the Australian population, by geographic area (Australian Bureau of Statistics, 2003 p.1).

The SEIFA indexes include three levels of variables. The first level includes education, income and occupation, which the ABS asserts represent the core variables associated with socio-economic status (Australian Bureau of Statistics, 2003 p.1). The second level variables relate to wealth, living conditions and access to services. The third level includes variables that the ABS associates with disadvantage, but that may not cause it, for example a high proportion of Indigenous people living in an area (Australian Bureau of Statistics, 2003 p.2).

The IRSED is made up of 17 variables relating to disadvantage (Australian Bureau of Statistics, 2008), drawn from across the three levels of variables described above (Australian Bureau of Statistics, 2004 p.39). The variable of interest in this paper is 'NOCAR' that represents the '% occupied private dwellings with no car' (Australian Bureau of Statistics, 2008 p.41).

As with the Townsend Index, important decisions of resource distribution are based on IRSED. For example, the Victorian Department of Human Services (DHS), that 'plan, fund and deliver health, community and housing services' (Department of Human Services, 2007) promotes the use of IRSED to its staff to (quote) '...quickly and easily identify geographic areas that are relatively disadvantaged' (Department of Human Services, 2003 p.1).

IRSED was endorsed by Australian education ministers as 'the most suitable basis for collecting data nationally, and school systems agreed to use it when submitting Socio-Economic Status related data for national reports' (Ministerial Council on Education Employment Training and Youth Affairs, 1998 p.40)

### **1.3. Index of child social exclusion (CSE Index)**

The National Centre for Social and Economic Modelling (NATSEM) used data from the Australian Bureau of Statistics 2001 Census of Population and Housing in the development of an area index of children at risk of social exclusion (Tanton et al., 2006 p.4).

The 35 indicators used include income, measured in conjunction with variables representing family type, education and employment, language other than English spoken at home, use of computer at home and 'proportion of children aged 5 – 15 in household with no motor vehicle' (p.5).

The index has been used to demonstrate the proportion of children aged 0 - 15 at risk of social exclusion within Statistical Local Areas.

Each of these three indexes are used to identify locations of disadvantage based on demographic data and do not account for material differences in provision and accessibility of services which in turn influence social inclusion.

The growing influence of these multidimensional measures of disadvantage in research and policy is likely to strengthen with the further development of the social inclusion agenda in Europe and Australia. However it is important that they are only adopted with a full understanding of the complexity of the composition and spatial distribution of disadvantage and the variables that can properly measure it.

## **2. Arguments for 'no car' variables**

There appear to be two key reasons supporting the inclusion of 'not having a car' as a valid measure of disadvantage. These are:

- the correlation between car ownership and income ;and
- the impact not having a car has on participation.

### **2.1. The correlation between car ownership and income**

Traditionally, households with higher incomes have been shown to be more likely to have one or several cars compared to those on lower incomes (Clifton and Lucas, 2004, Hine and Mitchell, 2003, Giuliano and Dargay, 2006, Pucher and Renne, 2003).

In metropolitan Melbourne, analysis of 2001 Census data by Currie and Senbergs (2007) identified that 7.3 percent of lower income households (incomes below \$500 per week) did not own a motor vehicle, compared to only 2.9 percent of households with incomes above this (p.5). Conversely only 4.8 percent of the low income households owned two or more cars, compared to 47.2 percent of the higher income households (p.5). These figures demonstrate a strong present link between income and car ownership, which could support the validity of including possession of a car as an indicator of advantage, at least insofar as it is an indicator of assets or material possessions.

### **2.2. The impact of not having a car on participation**

Participation impacts of transport disadvantage have been widely documented and in the case of non car ownership, a number of specific issues have been identified.

The UK Social Exclusion Unit (SEU, 2003) found that people without cars paid higher grocery prices at walk accessible local shops. It was also found that almost one-third (31%) of people without a car reported difficulties accessing their local hospital compared to 17 percent of people with a car. Rugg and Jones (1999) found that young people working in rural England needed their own transport to maintain employment (p. 22).

Qualitative research by Bostock conducted with low-income, non car owning mothers in the UK describes:

- stress from walking with young children
- difficulty in maintaining social networks
- mothers not accessing health and community services
- families not having recreational day trips.

Australian examples include (from Hurni in western Sydney) the inability to access after school activities and sports for children (and from Gippsland) the perception by young people that owning a car was the most significant factor in their decisions regarding undertaking post-secondary education

Importantly, within groups of socially disadvantaged people, those without cars tended to travel less (Stanley and Stanley, 2007), thus possibly reducing their well being and opportunities for inclusion.

### **3. Arguments against 'no car' variables**

There is an implicit assumption inherent in much recent research that cars are essential to participation. With cars being described as 'a virtual necessity' (Pucher and Renne, 2003 p.55) and the lack of a car as 'one of the key defining factors in people's disadvantage' (Clifton and Lucas, 2004 p.22). Hine (2007) also suggested that public transport has a role to play in 'ameliorating aspects of social exclusion for non-car owning households' (2007 p.04.1). This can be said to infer that the car is the key to participation and inclusion in today's society.

The following evidence argues against including 'no car' variables as a measure of disadvantage.

#### **3.1. Evidence from the UK**

Comparisons between the UK and Australia need to be treated with caution, due to higher population densities and lower overall rates of car ownership in the UK. In 2002 in the UK, there were 44 private vehicles per 100 inhabitants compared to 52 per 100 in Australia (OECD, 2005 p.121). Nonetheless the following exploration of the relationship between car ownership and disadvantage supports the argument that the relationship may not be as strong as previously believed. In 2003, Christie and Fone explored the validity of the car ownership census variable in the Townsend Index (described earlier) for rural districts of Wales. They aimed to assess:

1. whether 'the relation between lack of car ownership and socio-economic deprivation varies between urban and rural enumeration districts in Wales, UK' ;and
2. if '...excluding car ownership from the Townsend Index substantially affects the deprivation ranking of enumeration districts' (p.113).

Christie and Fone calculated the Townsend score for each enumeration district<sup>1</sup> and then recalculated it without the car ownership variable. They found that the proportion of households without a car was lower in rural districts and that the correlation between car ownership and the other seven variables was higher in urban than rural areas. This suggests that the link between owning a car and experiencing multiple disadvantage is less correlated in rural areas, than in urban areas. Their results by excluding car ownership variables reclassified urban areas as less deprived and rural areas as more deprived than represented by the standard Townsend Index (p.115).

These findings are corroborated by earlier work from Focas (1998) who found that in parts of Central London with good public transport and restricted car parking, car ownership is relatively low but these locations are comparatively wealthy. So the correlation between income and car ownership is not as clear where there is good public transport and parking limitations. Although this evidence supports the case for removing zero car ownership from indicators of disadvantage, the context of Central London can hardly be said to be typical of Australian communities.

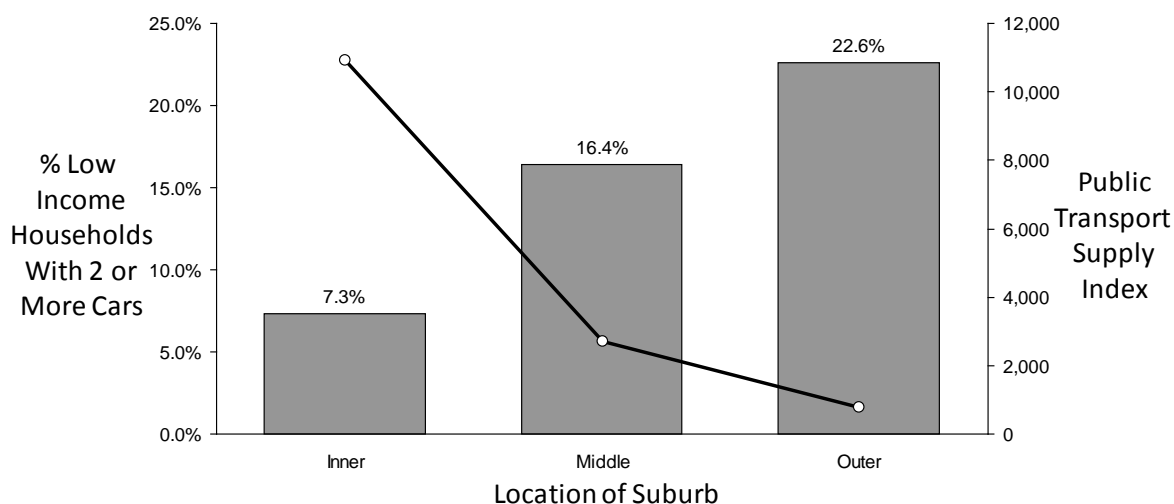
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<sup>1</sup> Census data collection area

### 3.2. Evidence from Melbourne, Australia

An analysis of income, car ownership and travel in metropolitan Melbourne also found evidence that car ownership and income are not well correlated although in rather different ways to the evidence from Central London.

Currie and Senbergs (2007) found that the share of low income households (income below \$Aust 500/week) with high car ownership (2 or more cars per household) increased considerably in areas where public transport supply is low (Figure 1).



Source: Based on Currie and Senbergs (2007)

Note: PT Supply Index score is based on number of services per week factored by the spatial coverage of the areas by public transport.  
Higher values imply greater supply and coverage of areas by Public Transport

**Figure 1: Share of low income households with two or more cars**

Evidence of the existence of low income households with high car ownership, combined with a lack of alternatives such as good walk accessibility or public transport, has been used to suggest that some households may be 'forced' into car ownership and use (Banister, 1994). Currie and Senbergs (2007) found 20,831 outer Melbourne households with low income and high car ownership. These households had zero or very low walk access to local activities and limited public transport (p.22). According to Australian National Roads and Motorists' Association (NRMA, figures cited by Currie and Senbergs), the cost of operating even the smallest cars would represent as much as 50 per cent or more of total income for these households. Where car ownership is high it is likely to represent a considerable financial burden regardless of the impacts which it may have on travel and participation.

Another insight from the Currie and Senbergs research was the contrasting behaviour of low income households without a car in fringe urban areas. Travel in low income households with high car ownership was highly car dependent (80% of travel) whilst low income households without a car primarily walked (58% of travel) or used public transport (17% of travel). This is because households without a car lived near to activity centres where walking is feasible and where public transport service tended to be concentrated (e.g. around railway stations). This contrasts with low income families with high car ownership who lived in areas inaccessible to public transport.

These findings suggest a much more complex relationship between disadvantage, car ownership and income. In this case low income households without a car might be seen to be considerably better off than those with a car because they:

- do not have to spend a high share (over 50%) of income on running a car

- can walk to activities
- can access public transport.

Clearly in this context zero car ownership as a variable describing disadvantage is a very blunt and potentially misleading tool.

Another finding from the Currie and Senbergs review put the scale of this debate into context. While 20,831 low income fringe urban households were identified with high car ownership there were only 16,357 without a car. Hence high car ownership considerably outweighs zero car ownership in outer urban areas. If one accepts that high car ownership on low income is a very important indicator of disadvantage it is possible to conclude that having a car in outer Melbourne has a positive relationship to disadvantage not a negative one as is implied by the measures of disadvantage described earlier.

#### **4. Discussion**

These results suggest that in order to be able to adequately identify and respond to disadvantage in Australia, the relationship between socio-economic disadvantage and locational disadvantage needs to be better understood.

The use of 'not having a car' as a variable in measures of disadvantage may be problematic because, areas of low car ownership are defined as disadvantaged when, as demonstrated, this may not be the case. Inner urban residents may be in a position to choose to not have a car because of high levels of public transport and services accessibility. Evidence of high public transport patronage, walking and cycling to work in inner Melbourne suburbs (PIRD, 2007 p.11) supports this proposition.

The costs and trade-offs associated with car ownership in low income households are clearly not adequately represented when a 'no car' variable is used. A key question emerges: what social, health or educational opportunities are being foregone in households where up to 50 percent of household income is being used to maintain private auto mobility?

#### **The compounding influence of climate change**

Research describing carbon use by low income Victorian households (Unkles and Stanley, 2008) corroborates the findings of Currie and Senbergs. Households whose principal source of income is government pensions and/or benefits represent 12.4 percent of the Victorian population and account for many, but not all low income households in the State (p.1). The spatial distribution of carbon use in these households reflects to a high degree, the spatial distribution of high car ownership in low income households on the outer fringe of Melbourne as identified in the work of Currie and Senbergs. This is suggestive of a combined problem; high costs of car ownership and high carbon emission footprints for low income households.

Unkles and Stanley identify that with the exception of one Local Government Area (LGA), the poor households in high carbon use areas, have relatively lower spending on public transport and relatively higher spending on private cars, than their counterparts in lower carbon use LGAs. Both sets of authors propose that the reasons for this distribution pattern of car ownership are poor public transport accessibility and limited local provision of goods and services; both leading to increased necessity for car travel for people in outer Melbourne areas.



It is likely that the veracity of car ownership as a measure of disadvantage will be further diminished as the impacts of climate change and climate change amelioration policy affect the Victorian community. In addition to fuel price increases, the introduction of an emissions trading scheme in 2010 (Australian Government Department of Climate Change, 2008) will introduce a carbon price on about 70 percent of goods and services (Wong, 2008) and is likely to include the costs of owning and running cars.

Calculations by the National Institute of Economic and Industry Research (2007) estimate that a utility adjusted (weighted to reflect the relative prosperity of the people receiving the benefit or bearing the cost) overall carbon price of \$25 per tonne would account for a 2.5 per cent increase in household expenditure for poor households and a 0.4 per cent increase for high income tertiary educated households (p.17). Given the spatial distribution of carbon use in the poor households described above, it can be anticipated that the impact of a carbon price will impact more heavily in areas identified as having poor public transport and poor walk accessibility. The regressive nature of this pricing will have significant equity impacts (Unkles and Stanley p.5).

There are two possible outcomes of this increased carbon cost. Poor people will relinquish their cars, which in the absence of good public transport will severely limit their participation and their access to goods and services. The alternative is that they will bear the significantly increased costs of car travel, which will further constrain non-transport spending and entrench economic disadvantage.

It is also likely that households (both poor and higher income) will choose to relinquish their car as a way of reducing their carbon footprint. This will further diminish the representativeness of the car as an indicator of advantage.

## **5. Conclusion**

Indexes of disadvantage are currently used to define research samples and influence policy and the distribution of resources. This paper has questioned the logic of including not having a car as an indicator of disadvantage. Arguing that the inclusion of this variable distorts the real picture of the distribution of advantage and disadvantage in wealthy nations such as the UK and Australia. The distribution of advantage may more closely correlate to the accessibility of goods and services available through a range of transport options, such as public transport or walk accessibility. Clearly car ownership has a more complex link to disadvantage than implied by conventional indicators of disadvantage. If they misrepresent the true distribution of disadvantage, there is a risk that inequity can become reinforced. When areas of high car ownership are excluded from research exploring issues faced by disadvantaged communities, or are not targeted for provision of social and community services, accessibility problems are likely to become more entrenched. There is a real danger that measures of disadvantage act to perpetuate problems not solve them.

Development of multi-dimensional indexes will be improved if car ownership variables are taken into consideration in relation to public transport supply and the accessibility of goods and services. A more comprehensive understanding of this complex picture of disadvantage will help generate more accurate indices of disadvantage. To this end a number of areas for further research in this field are warranted:

- It is unclear from existing research how the participation and mobility provided by car ownership trades off against the high costs for low income families. Research should better clarify the expenditure trade-offs being made for low income families in outer urban areas.

- Conversely it is unclear if walk accessibility and public transport act to meet the mobility and participation needs of low income families without a car in fringe urban areas. The lead author's PhD research currently underway is considering both of these aspects in particular in relation to cultural inclusion.
- A major trade off being made by both groups involves housing costs and quality. It is likely that low income families living near activities will face a higher cost and a smaller/poorer quality housing stock compared to those living further away with cheaper and larger stock housing. Research needs to explore these trade offs and the extent to which home location decision processes are made in a manner which is informed by the trade-offs between cost, accessibility and mobility.
- A major benefit of the current multi variable measures of disadvantage is that they can be relatively simple and cost effective to assemble. A more informed use of car ownership variables within these measures needs to avoid a complex methodology or it will risk omission from indices of disadvantage. This would be unfortunate since there is much evidence from Australian and international research that transport is an important aspect of wider disadvantage. A more accurate and effective means of better representing transport and car ownership factors in measures of disadvantage is required.

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