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Visit to the University of Guadalajara,
Mexico
18-19th January 2017

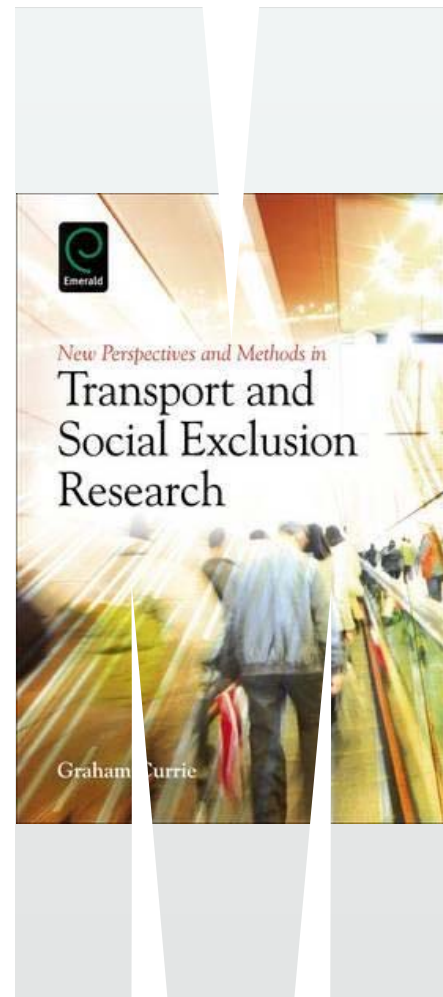
New Perspectives and Methods in Transport and Social Exclusion Research

Professor Graham Currie
Public Transport Research Group
Institute of Transport Studies
Monash University



Institute of Transport Studies (Monash)

The Australian Research Council Key Centre in Transport Management



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Introduction

Motivation

Method

Needs Gap

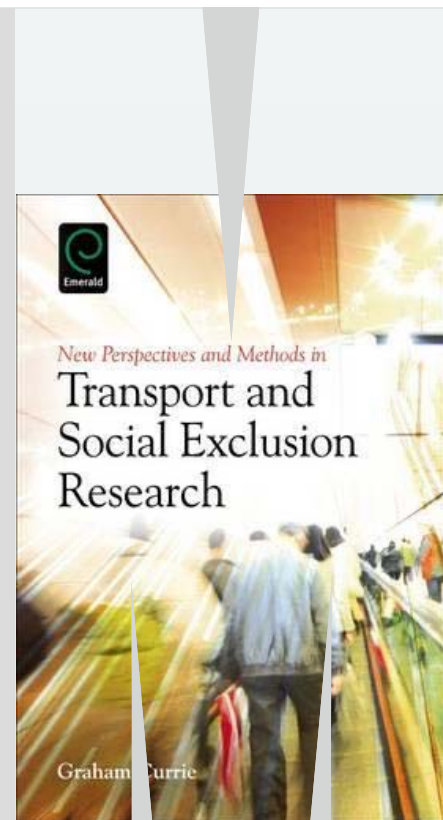
Fringe Car Ownership on Low Income

Spatial Perspectives

Decomposing Transport Disadvantage

The Value of Mobility

Structural Equation Modelling



This is an overview of research findings on a major international program exploring links between social exclusion, well being & transport disadvantage

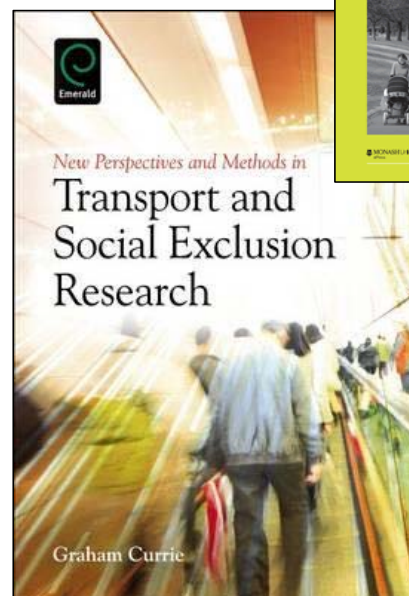
- The research is part of an Australian Research Council funded project
 - ‘Investigating Transport Disadvantage, Social Exclusion and Well Being in Metropolitan, Regional and Rural Victoria’ (RMO 2006/1020 LP0669046).
- Key aims were to:
 - Measure transport disadvantage, social exclusion and well being
 - Measure links between each factor
 - Explore how this varies (spatially, by group)
 - Explore quantification and how new open defendable tools might be developed



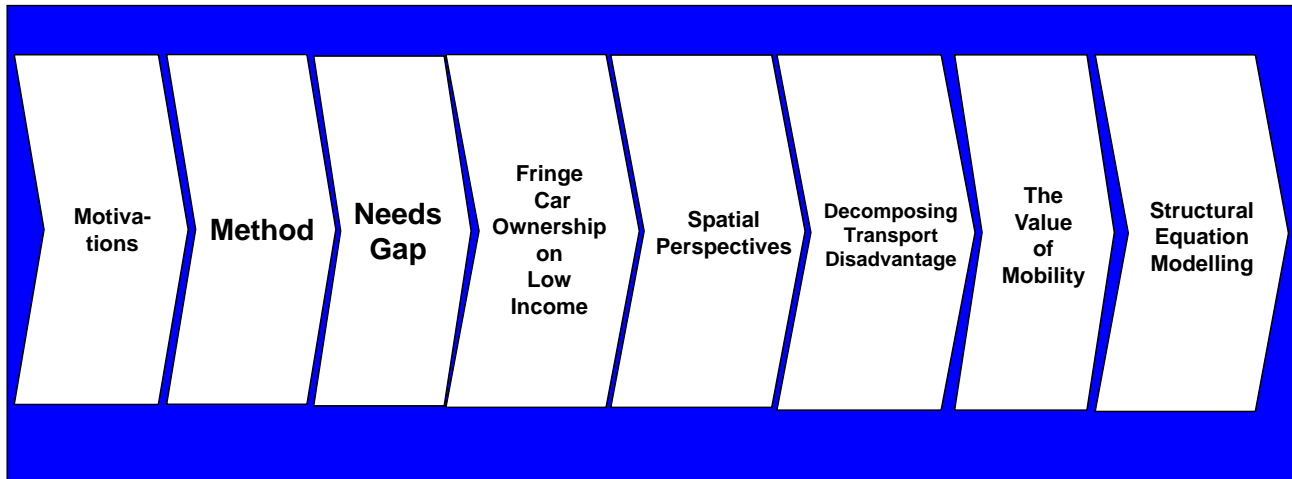
It overviews lots of published outputs (2 books; 20 plus journal papers)

Journal Papers

1. Currie, G. (2010) Quantifying spatial gaps in public transport supply based on social needs, JOURNAL OF TRANSPORT GEOGRAPHY 18 (2010) 31–41
2. Currie, G. and Delbosc A (2010) 'Modelling the Social and Psychological Impacts of Transport Disadvantage' TRANSPORTATION Vol 37 pp 953–966
3. Delbosc A and Currie, G. (2011) 'Transport Problems That Matter – Social and Psychological Links to Transport Disadvantage' JOURNAL OF TRANSPORT GEOGRAPHY Volume 19, Issue 1, January 2011, Pages 170-178
4. Delbosc A and Currie, G. (2011) 'Exploring the relative influences of transport disadvantage and social exclusion on well-being' TRANSPORT POLICY Transport Policy, 18: 204-210.
5. Delbosc A AND Currie, G. (2011) 'The spatial context of transport disadvantage, social exclusion and well-being' JOURNAL OF TRANSPORT GEOGRAPHY 19 (2011) pp1130-1137
6. Delbosc A and Currie, G. (2012) 'Choice and disadvantage in low-car ownership households', TRANSPORT POLICY 23 8–14
7. Currie, G. Richardson, T. Smyth, P. Vella-Brodrick, D. Hine, J. Lucas, K. Stanley, J. Morris, J. Kinnear, R. Stanley, S. (2009) 'Investigating links between transport disadvantage, social exclusion and well-being in Melbourne—Preliminary results' TRANSPORT POLICY, 16 (3): 97-105, Sp. Iss. SI; JUL 2009
8. Johnson V Currie, G. and Stanley J (2010) 'Measures of disadvantage: Is car ownership a good indicator?' SOCIAL INDICATORS RESEARCH: Volume 97, Number 3, 439-450
9. Currie G (2009) 'Australian Urban Transport and Social Disadvantage' Australian Economic Review Special Forum Edition on Urban Transport, THE AUSTRALIAN ECONOMIC REVIEW, vol. 42, no. 2, pp. 201–8
10. Johnson V Currie G and Stanley J (2010) 'A critique of Zero Car ownership as a Measure of Disadvantage' SOCIAL INDICATORS RESEARCH: Volume 97, Issue 3 (2010), Page 439. (Impact Factor 0.955, 2008)
11. Stanley J, Hensher DA, Stanley J, Currie, G., Greene WH, Vella-Brodrick D (2011) 'Social Exclusion and the Value of Mobility' JOURNAL OF TRANSPORT ECONOMICS AND POLICY, Vol 45, No 2, May 2011, pp. 197-222(26)
12. Johnson V Curr Currie, G. Richardson, T. Smyth, P. Vella-Brodrick, D. Hine, J. Lucas, K. Stanley, J. Morris, J. Kinnear, R. Stanley, J. (2010) 'Investigating Links Between Transport Disadvantage, Social Exclusion And Well-Being In Melbourne – An Update On Results' RESEARCH IN TRANSPORT ECONOMICS Volume 29, Issue 1, 2010, Pages 287-295
13. Johnson V Currie, G. Stanley J (2011) "Exploring Transport to Arts and Cultural Activities as a Facilitator of Social Inclusion" TRANSPORT POLICY, 18 (1): 68-75; Jan 2011
14. Currie, G. Stanley, J. Investigating links between social capital and public transport, 2008, TRANSPORT REVIEWS, Vol. 28, Issue 4, pp. 529-547.
15. Stanley, J., & Vella-Brodrick, D. (2009). The usefulness of social exclusion to inform social policy in transport. TRANSPORT POLICY, Vol. 16, (3), Pp. 90-96.
16. Stanley, J. Stanley, J. Vella-Brodrick, D. and Currie, G. (2010) 'The place of transport in facilitating social inclusion via the mediating influence of social capital' RESEARCH IN TRANSPORTATION ECONOMICS Volume 29, Issue 1, 2010, Pages 280-286



It is structured as follows



Prof G Currie - Background

Researcher National Advisory Unit of Community Transport, UK

Msc Transport Graduate Cranfield University UK

Planner – London Buses

Planner – Midland Metro Light Rail Project (VIPS)

Planning Consultant – Travers Morgan Australia

Planning Consultant – Booz Allen Hamilton Australia

Professor of Public Transport, Monash University, PhD Monash University

Chair – Light Rail Transit Systems Committee US Transportation Research Board, Washington DC

Projects / Interests

Metropolitan Public Transport Network Planning

Olympic Games Public Transport Networks (Atlanta, Sydney, Athens, Beijing, London, Rio)

Transit Demand Forecasting

Public Transport Priority and Traffic Simulation Modelling

Transport Needs Planning

Economic Appraisal of public transit projects

Public Transport Research Group



\$5M Joint Industry (PTV) – Cross Faculty
Monash Research Group – Est. 2015
Running since 2003



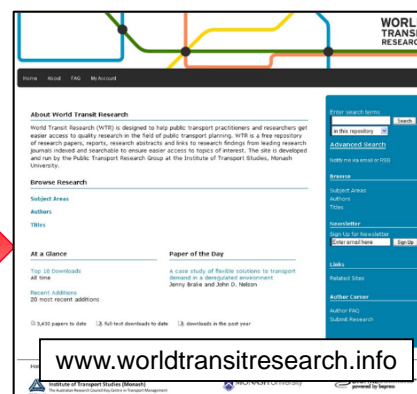
World Review of Public Transport Research (2009-2013)
Heilig L and Vos S (2015) 'A Scientometric Analysis of Public Transport Research'
Journal of Public Transportation Vol 18 No 2

Top 3 world universities in Public Transport Research

- Uni of Toronto, UCal Berkeley, **MONASH UNIVERSITY**

Operate the 'World Transit Research' Database

- aim: improve industry access to quality research
- Collaboration – journal publishers & Monash Uni
- All published research in the field
- 250,000 users in 170 countries



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Public Transport Research Group



Recent Successes



Best policy paper prize
14th World Conference on
Transport Research in
Shanghai, June 2016

Best Research Paper – 2017
Transportation Research Board
Annual Meeting Washington DC



Rahaman M Currie G Muir C (2016) Development and Application of a Scale to Measure Station Design Quality for Personal Safety' TRANSPORTATION RESEARCH RECORD No. 2540 pp 1-12



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PTRG run the worlds largest PT PhD Program - Sustainable and Effective Public Transport – Graduate Research Industry Program (SEPT-GRIP)

1. Land Use & PT
Homayoun Rafati

3. Network Synchronisation
Rejitha Ravindra

5. Changing Travel Behaviour
Laura McCarthy

7. Reliability Engineering Approaches in Best Practice Railways
Maryam Nawaz

8. Improving Gender Diversity in the Public Transport Workforce
Rachel Mence

2. Big Data & Visualisation
Homayoun Rafati

4. Shared Mobility
Taru Jain

6. Tourism & Public Transport
Victoria Radnell

9. Future Train
Lisa Fu

10. Designing Urban Rail to Reduce Vandalism
Amy Killen

11. Bus & Tram Priority Implementation
James Reynolds

12. Simulating Bus & Tram Priority
Samithree Rajapaksha

13. Placemaking & Street Redesign
Matthew Diemer

14. Passenger Falls in Trams
Luke Valenza

15. Transit Network Design
Nora Estgfaller

16. Future Bus
Sarah Roberts

17. The New Bus Rider
Prudence Blake

18. Road Safety Impacts of Bus Safety Inspections
Jianrong Qiu

PUBLIC TRANSPORT VICTORIA PT

Linking Australia with Mexico



Comparisons Australia; Mexico

- **Population**
 - Mexico 122.3M Australia 23.1M
- **Land Area**
 - Mexico 1.97M km² Australia 7.7M km²
- **Cities above 1M**
 - Mexico 10 Australia 5
- **Population in Urban Areas**
 - Mexico 50% Australia 89%
- **Largest Cities**
 - Mexico ; Mexico City 8.9M Australia ; Sydney 4.9M
- **Home Cities**
 - Guadalajara; 1.5M
 - Melbourne; 4.5M

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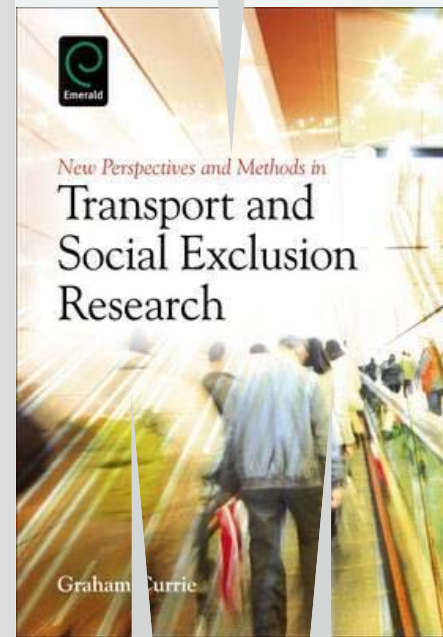
Fringe Car Ownership on Low Income

Spatial Perspectives

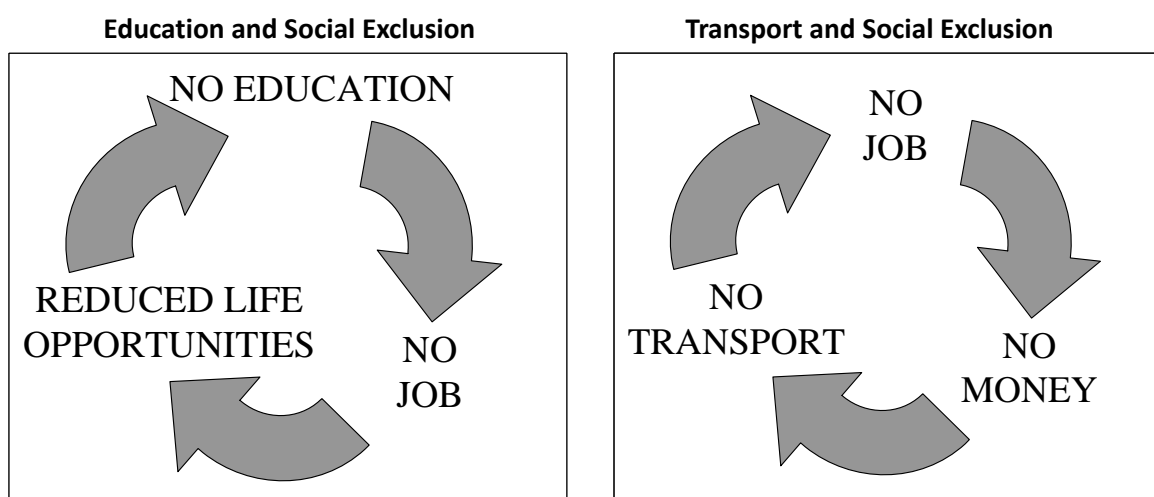
Decomposing Transport Disadvantage

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It is widely acknowledged that TRANSPORT PROBLEMS much like lack of education, can fundamentally limit life opportunities [but by how much?]



(Source: Based on *Wheels to Work in Shropshire UK* sourced from "Transport for Young People in Rural Areas" Community Transport Association UK March 2002)

TRANSPORT PROBLEMS are also widely documented [but which are more important? Which should be tackled first? Whats the priority?]

Transport Issues and Older Australians

1. Communication and Information <ul style="list-style-type: none"> Information not accessible to people with visual impairments and other barriers (language etc) Lack of promotion of new services Lack of promotion of transport service options Lack of communication and information about available transport options for people with different needs Educating transport users to be more vocal about their needs Difficulties in using timetables and ticketing procedures 	2. Security <ul style="list-style-type: none"> Concerns about safety 	7. Timetabling/Connectivity <ul style="list-style-type: none"> Lack of integration between walk, cycle, community transport, public transport and taxis
	3. Responsive to Changing Needs <ul style="list-style-type: none"> Replacement of Bus Fleet with accessible buses Impact of fuel price rises (and future rises) Transport not responsive to needs of active healthy seniors Lack of door to door services 	8. Staffing and Human Assistance <ul style="list-style-type: none"> Lack of staff training Lack of staff to support users
	4. Lack of Fringe/Rural Services <ul style="list-style-type: none"> Inadequate relative to the city 	9. Community Perceptions <ul style="list-style-type: none"> Lack of understanding of the importance of accessible transport
	5. Physical Accessibility to Transport <ul style="list-style-type: none"> Need to improve walking environment 	10. Policy Planning <ul style="list-style-type: none"> Lack of integration between agencies/Govt Land use not coordinated Current solutions don't maintain independence
	6. Physical Accessibility onto Transport <ul style="list-style-type: none"> Vehicle and stop infrastructure 	

Source: Conference on Transport, Social Disadvantage and Well Being, Melbourne 2006 – Workshop on Older Australians and Those with Disabilities

The transport disadvantaged are widely known as are types of transport exclusion [But who and what should get priority?]

	Clifton and Lucas 2004	Murray and Davis 2001	Dodson et al 2004	Wixey et al 2005	Humi 2005	Currie 2004
No / limited car access	✓	✓				✓
Low income	✓		✓	✓		✓
Women	✓		✓		✓	
Elderly	✓	✓	✓	✓		✓
Single parents	✓				✓	
Minority ethnic groups	✓	✓	✓	✓		
Youth		✓	✓	✓		
Disabled		✓	✓	✓		✓
Unemployed			✓	✓	✓	✓
Beneficiaries			✓			
Outer-urban dwellers			✓			
Shift workers				✓		
Parents travelling with children				✓		
Students						✓

- Categories of transport exclusion (Wixey et al, 2005):
 - Spatial
 - Temporal
 - Personal
 - Financial
 - Environmental
 - Infrastructural
 - Institutional

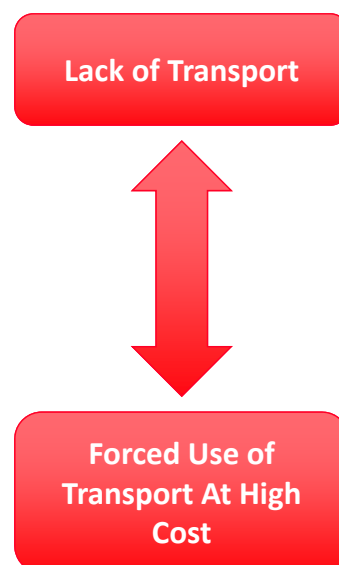
[Is TRANSPORT DISADVANTAGE more or less important than TRANSPORT POVERTY?]

■ Transport Disadvantage Definition:

- People who face frequent access constraints due to lack of suitable mobility and locational disadvantage [Lack of transport]

■ Definition of Transport Poverty:

- “Transport poverty occurs when a household is forced to consume more travel costs than it can reasonably afford, especially costs relating to motor car ownership and usage” (Gleeson and Randolph, 2002, p.102). [Too expensive transport]
 - Voluntary and forced car ownership (Banister, 1994) – FCO = no alternatives and ownership at low income (rural areas)
 - Forced car ownership - in these circumstances theorised an inverse relationship between car ownership and well being (Jones, 1987)
 - Forced ownership implies no access to pt.

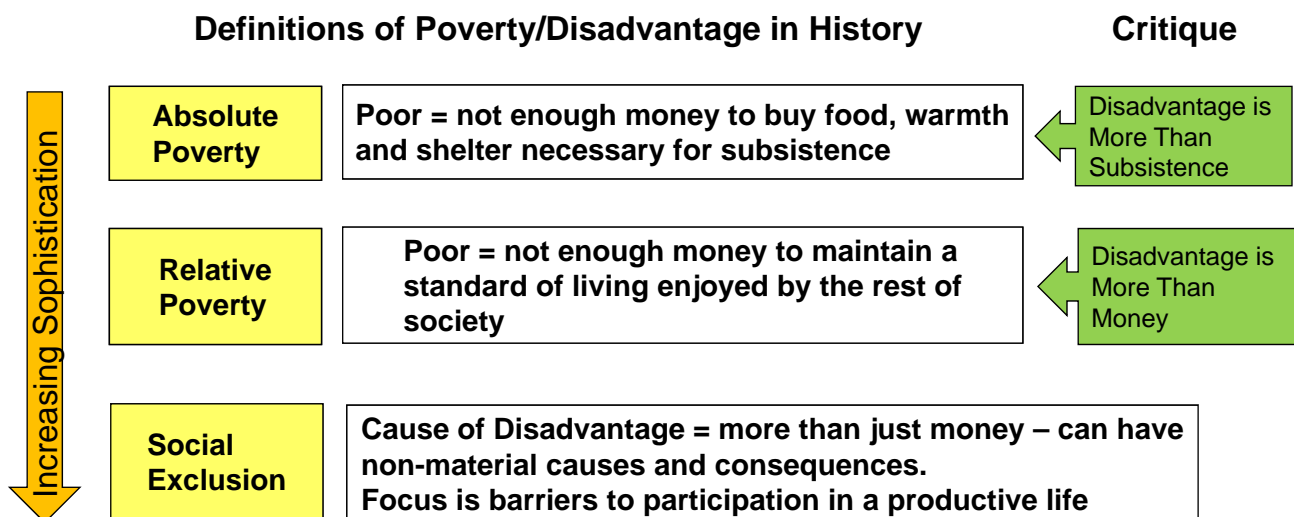


A major barrier to understanding is weak, unclear and undefendable policy because we cannot measure transport need

Type of Transport Need	Description	Measurement Issues
FELT NEED	People who need transport and don't have access to private alternatives	Who? Where? When? Cannot Systematically Measure Its Anecdotal, Most Don't Express Need What are the Priorities?
EXPRESSED NEED	People who say they need transport	What are the Priorities? Its all anecdotal They Who Shout Loudest are Herd What About People Who Don't Shout at All
NORMATIVE NEED	Define a 'standard' for transport provision and identify areas below this standard e.g. access to a bus within 400M of home	What should the standards be? Can we have standards for all travel needs? What are the priorities?
COMPARATIVE NEED	Measure the quality of travel in one area and compare it to others	Useful approach in that it identifies inequity. But it doesn't gage overall service quality

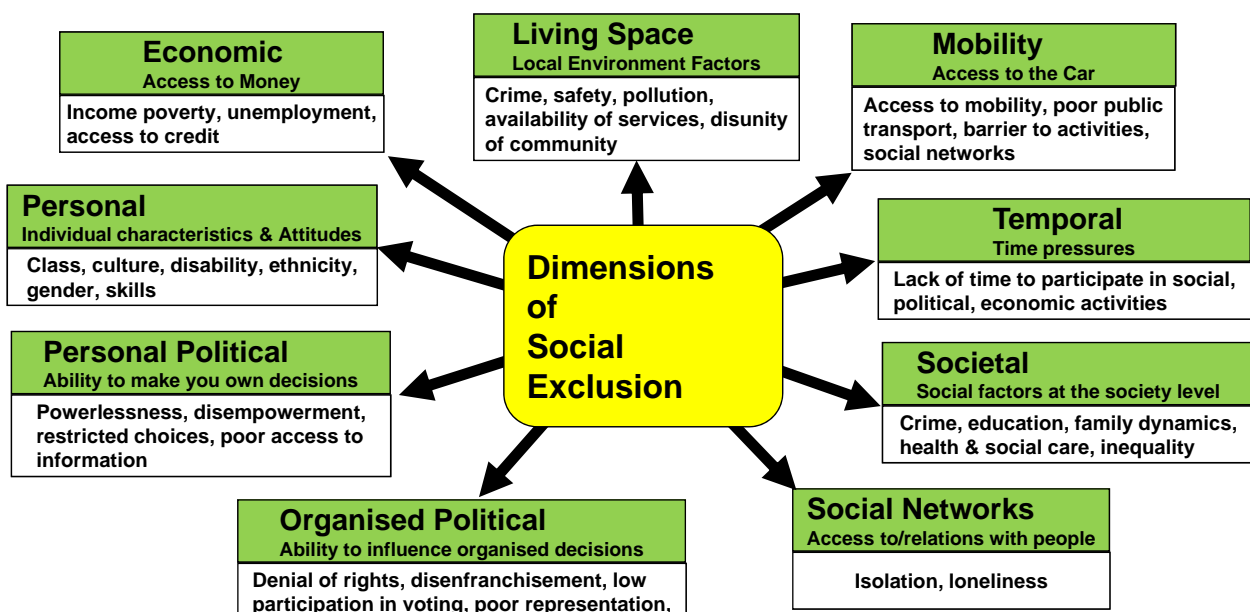
New methods to (quantitatively) measure and understand needs are needed to make policy clear, open and defensible

New measures might enable TD to be related to SE - the next generation in a progression of concepts relating to poverty & disadvantage...



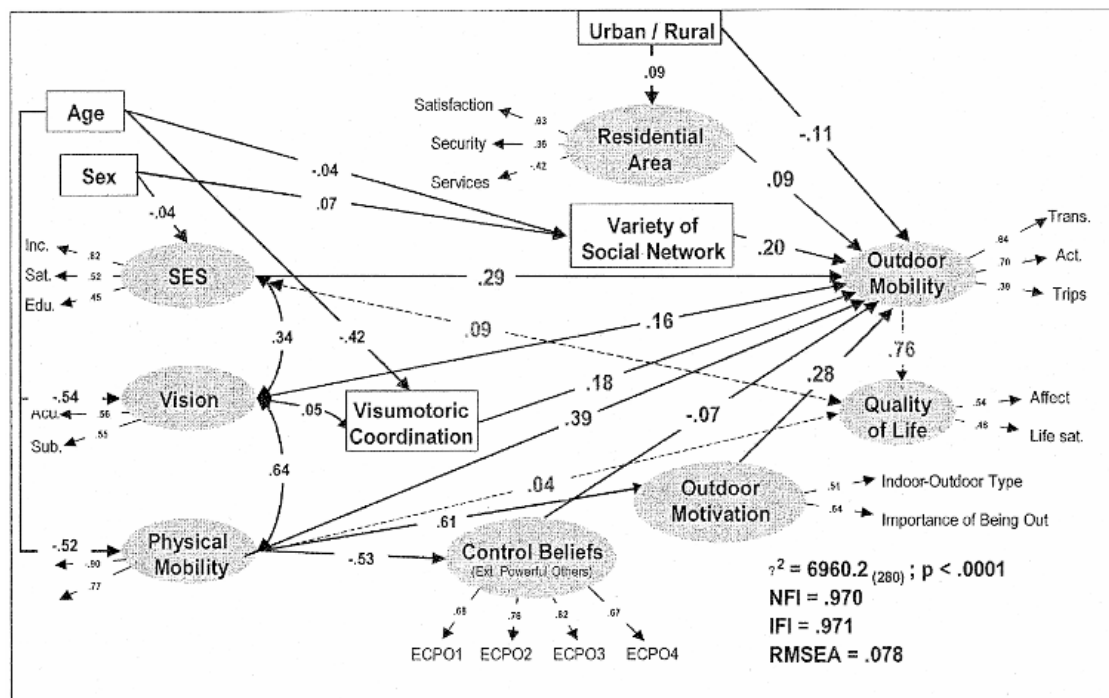
Source: Kenyon S (2003) 'Understanding social exclusion and social inclusion' Municipal Engineer 156 Issue ME 2 pp97-104

...SE is deliberately multi-dimensional to encapsulate barriers to participation and which might better relate transport problems to human life barriers



Source: Kenyon S (2003) 'Understanding social exclusion and social inclusion' Municipal Engineer 156 Issue ME 2 pp97-104

We were also inspired by EU research on aging and how it related to QoL – could this framework be adopted in TD/SE/WB research?



Mollenkopf, H., F. Marcellini, I. Ruoppila, Z. Szeman, and S. Tacken, eds. *Enhancing mobility in later life : personal coping, environmental resources and technical support ; the out-of-home mobility of older adults in urban and rural regions of five European countries*. 2005, IOSPress. 340

This was the rationale for the international program exploring links between social exclusion, well being & transport disadvantage

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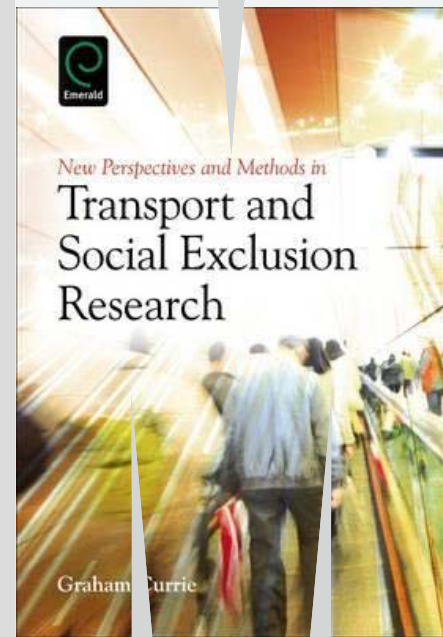
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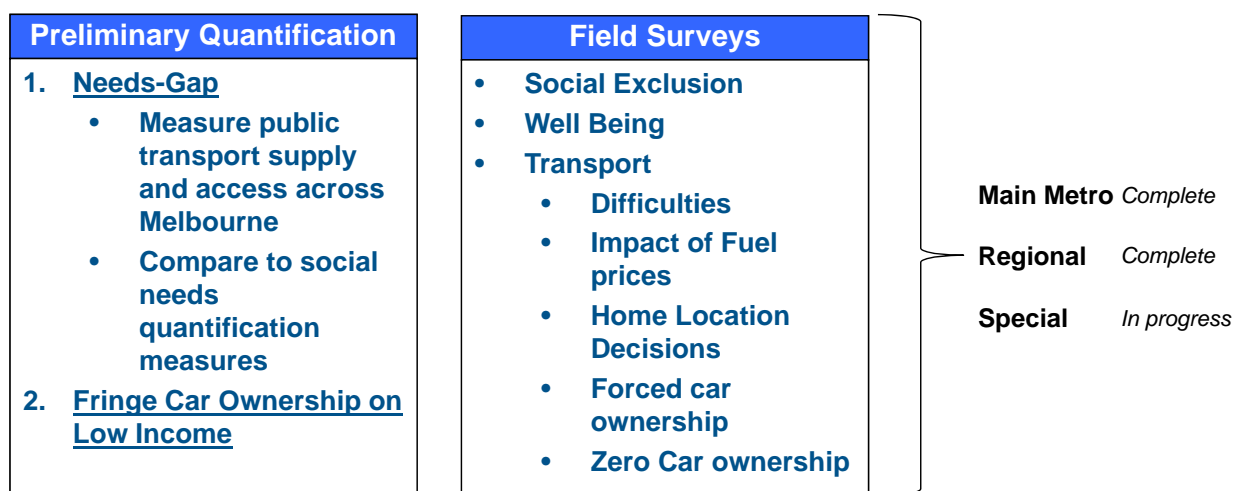
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Key components are needs quantification & field surveys



TD, SE and WB were measured using scales developed as part of the research

Transport Disadvantage	Social Exclusion	Well Being
<ul style="list-style-type: none"> • Self reported disadvantage using scales on 18 separate indicators of 'problems' with transport including: <ul style="list-style-type: none"> - Covering the costs of your transport - Getting to places quickly - Finding transport so you can travel - Being able to travel when you want to - Having to rely on others for transport - Etc etc • Also examined self reported difficulties accessing activities due to transport related problems 	<ul style="list-style-type: none"> • A multi-dimensional construct using the following indicators: <ul style="list-style-type: none"> - Income - Unemployment - Political engagement - Participation - Social support • Last 3 measures derived from survey questions on social/ community engagement • Score 0/1 on each criteria • Can be excluded on 0 to all 5 factors i.e. a range 	<ul style="list-style-type: none"> • Mature topic in social psychology • Many measures used including: <ul style="list-style-type: none"> - <u>Satisfaction with Life Scale (SWLS)</u>: Participants indicate how much they agree with five statements about their life conditions and how close their life is to their ideal (Diener, Emmons, Larsen, & Griffin, 1985) - <u>Personal Well Being Index (PWI)</u> - <u>Positive Affect Schedule (PA)</u>: Participants rate how much they generally feel a range of positive emotions (Watson, Clark, & Tellegen, 1988) - <u>Negative Affect Schedule (NA)</u>: Participants rate how much they generally feel a range of negative emotions (Watson, et al., 1988).

Sample size is 1,019 with selected demographic characteristics

	Metro overall	Inner Melb	Outer Melb	Peri-Urban	Regional
Number completed interviews	784	195	589	79	235
Percent from "special survey" sample	32%	35%	31%	41%	37%
Adults in HH	2.1	2.0	2.1	1.9	1.9
Proportion who have children in HH	43%	37%	45%	51%	66%
Average age	44	43	45	46	45
Retired	20%	16%	22%	23%	26%
Proportion with income below \$Aust 1,100pw	58%	56%	59%	58%	70%

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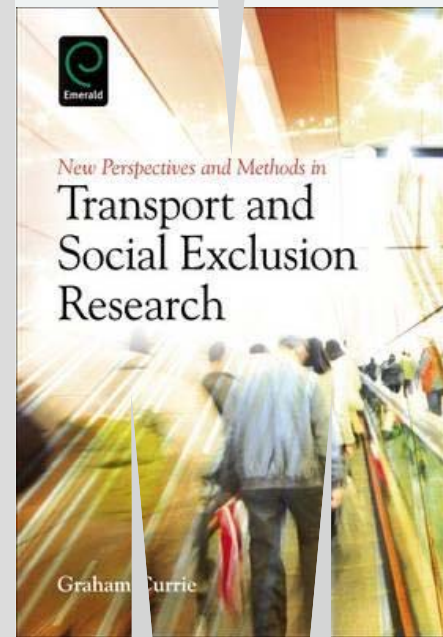
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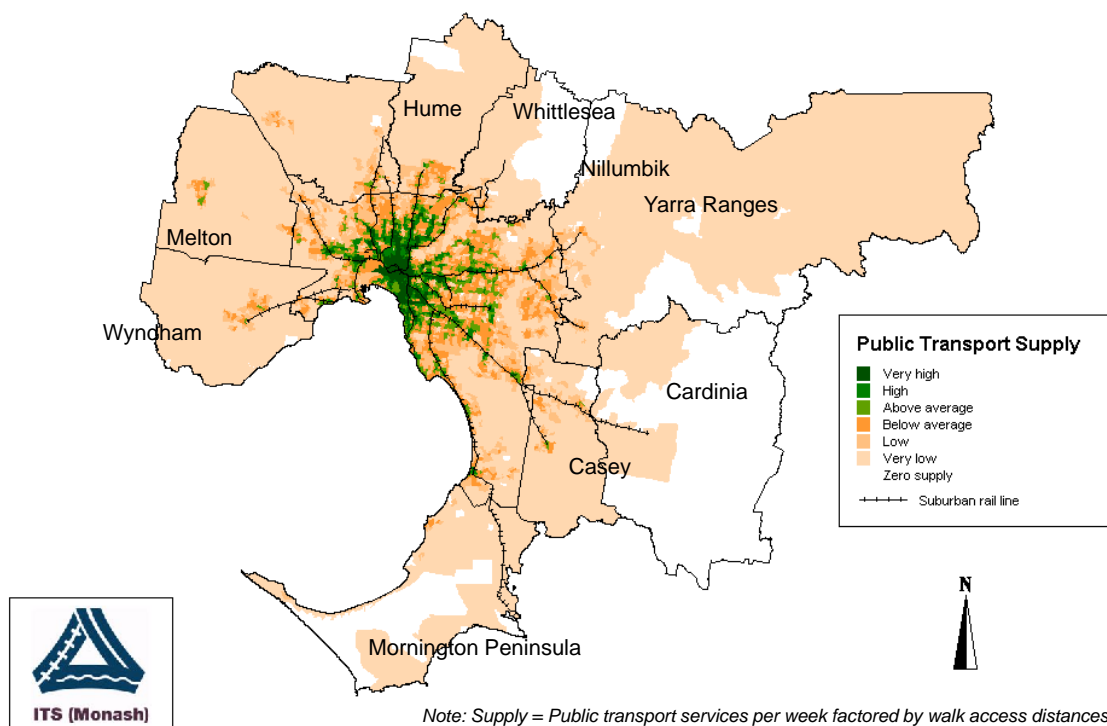


NEEDS-GAP measured spatial gaps between public transport (PT) supply & social needs

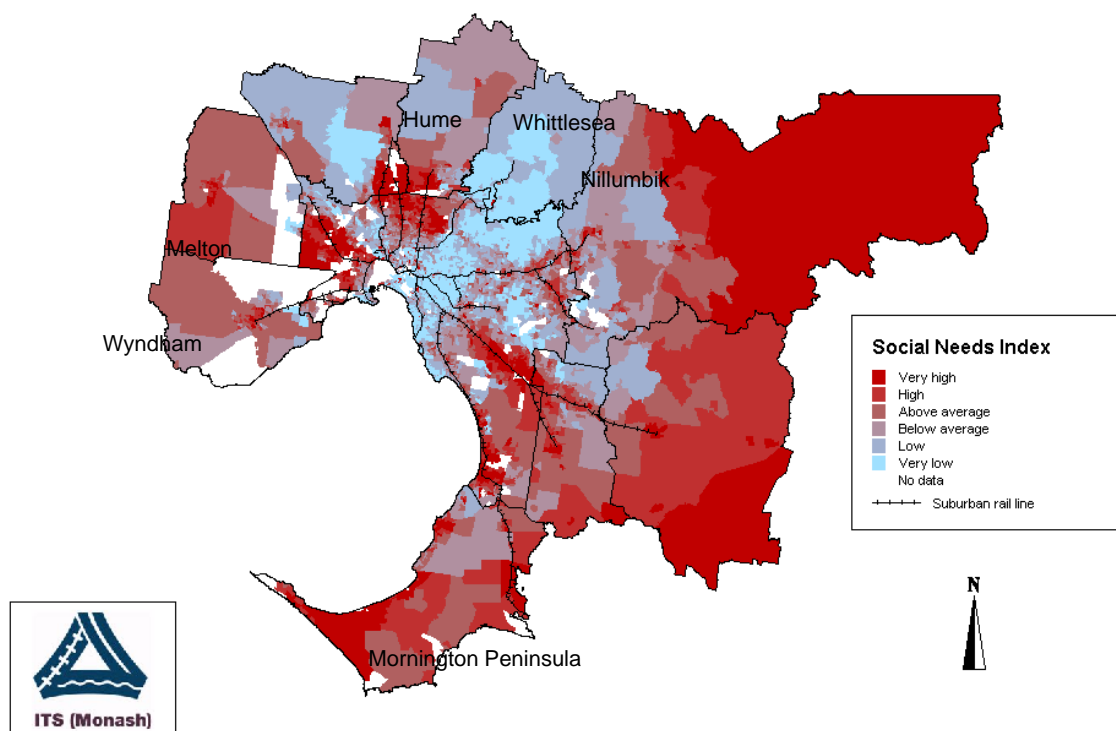
- **Social needs**
 - ABS Index of Relative Socio-Economic Advantage/Disadvantage (IRSAD)
 - > e.g. Unemployment level, low educational qualifications, low income
 - Transport needs index
 - > e.g. Adults without cars, persons aged over 60, low income, students, young children
- **Transport disadvantage**
 - Access to bus, tram and rail stops
 - Service level at these stops

Note: all methods and findings detailed in Currie, G. (2010) Quantifying spatial gaps in public transport supply based on social needs, Journal of Transport Geography 18 (2010) 31–41

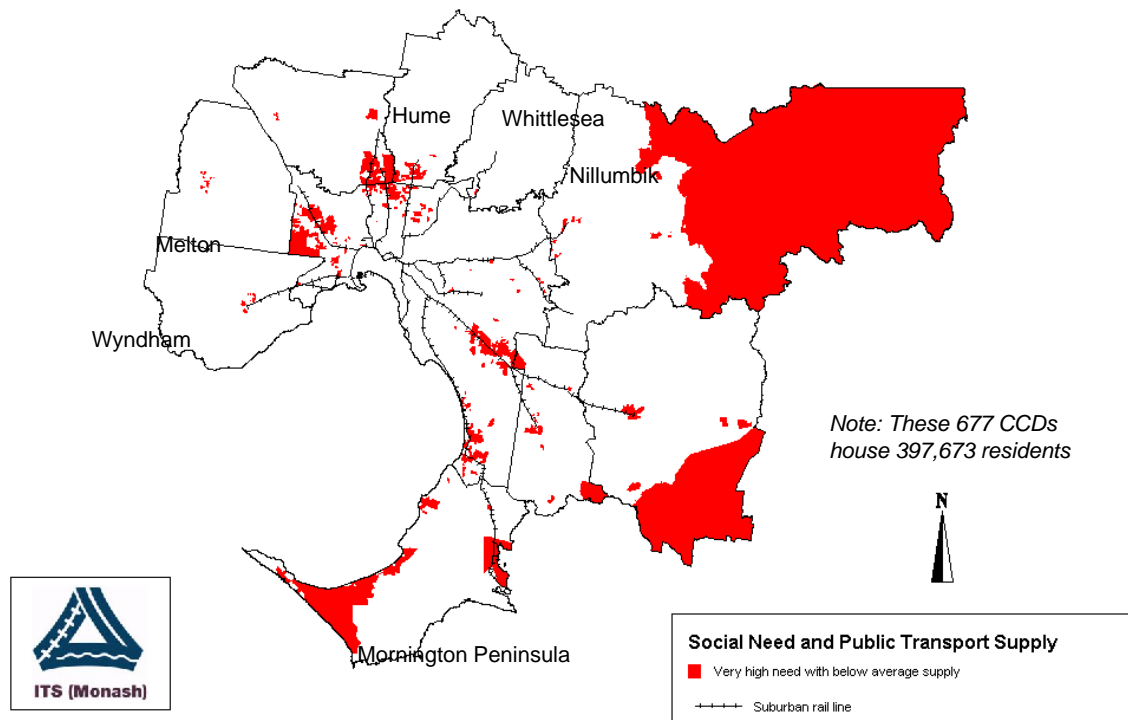
PT supply is concentrated centrally



While Social Needs have a fringe spread



The "Gap" (very high social need/ below average PT supply) is a fringe issue



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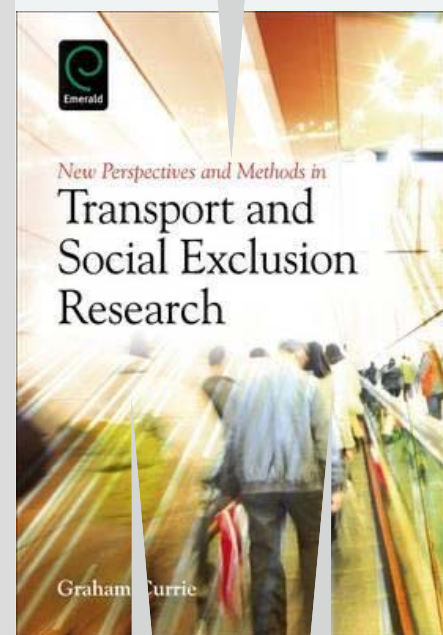
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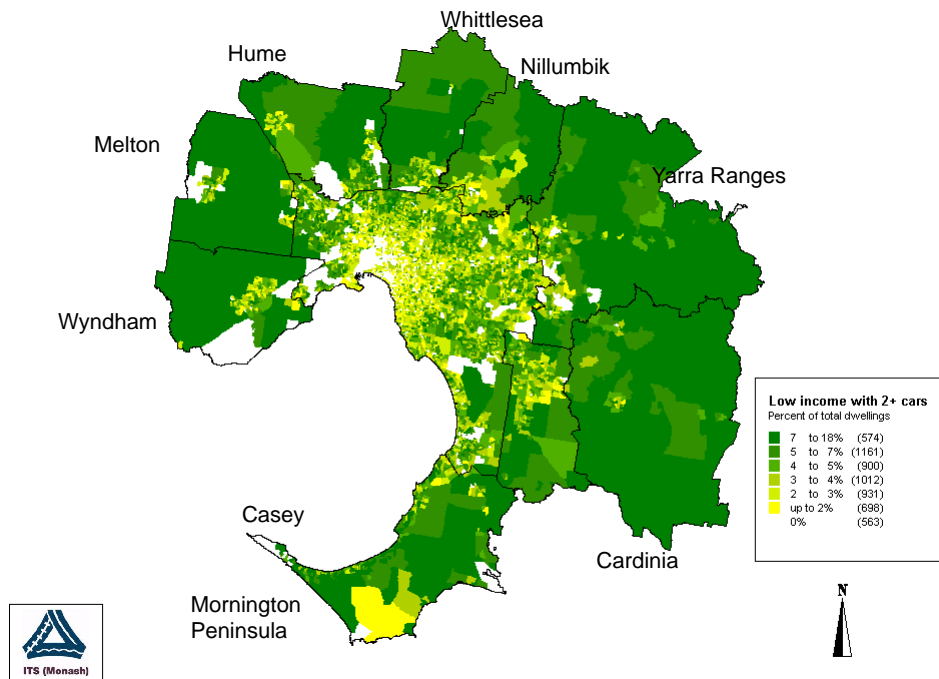
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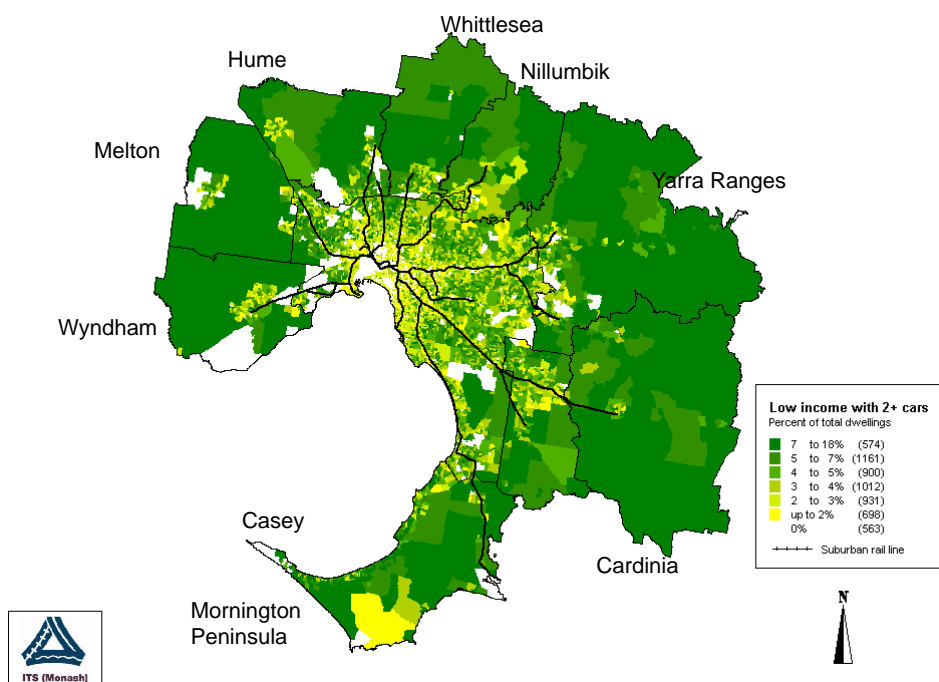
Structural Equation Modelling



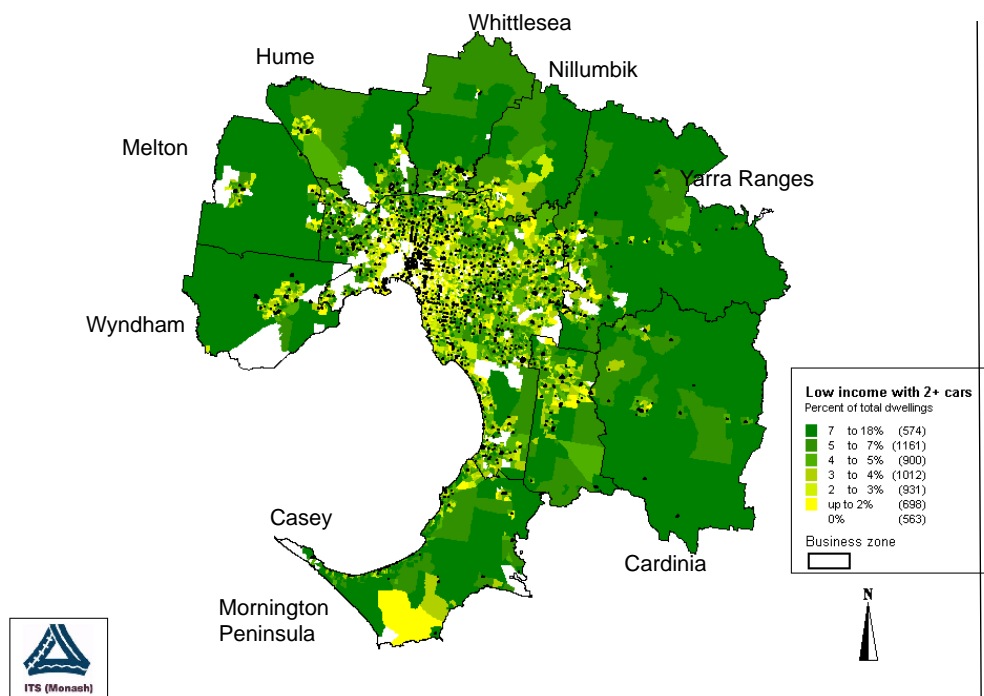
High car ownership on low income is concentrated in outer suburbs.....



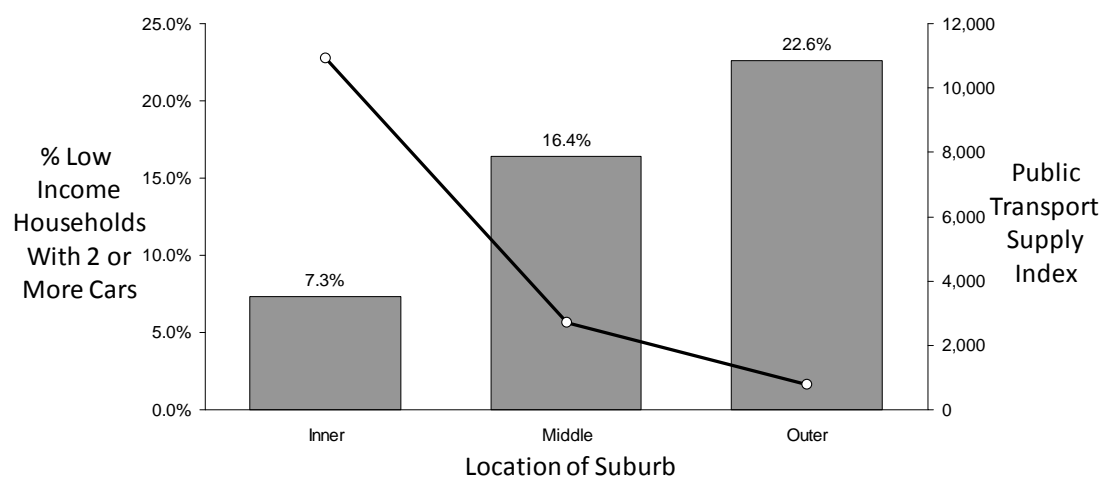
....remote from public transport.....and...



...remote from local activity centres



There is a link between lack of PT & high car ownership on low income



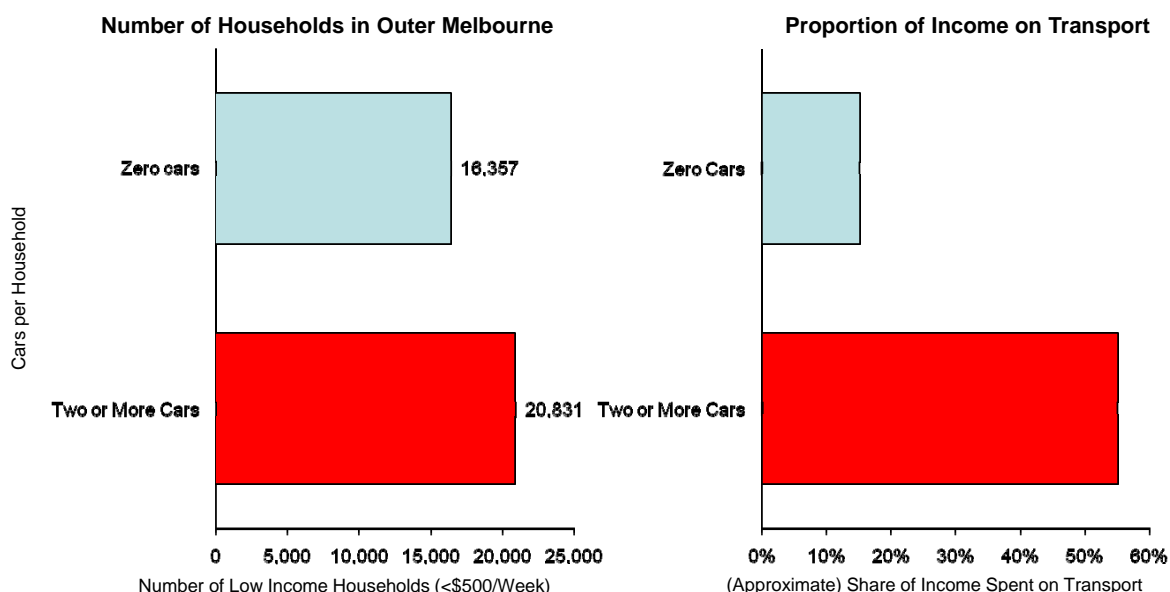
Source: Based on Currie and Senbergs (2007)

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

Source: Johnson V Currie G and Stanley J (2010) 'A critique of Zero Car ownership as a Measure of Disadvantage' Social Indicators Research: Volume 97, Issue 3 (2010), Page 439.

Research suggests fringe car ownership may be a bigger problem than zero car ownership – Transport Poverty is a bigger issue than Transport Disadvantage



Source: Currie G and Senbergs Z (2007) 'Exploring Forced Car Ownership in Metropolitan Melbourne' Australasian Transport Research Forum 2007

Not having a car on the fringe (transport disadvantage) could be an advantage compared to car ownership on low income (transport poverty)

High Car Ownership on Low Income

- **20,831 HH - low income and high car ownership**
- **Zero/very low walk access to local activities and limited public transport**

Zero Car Ownership on Low Income

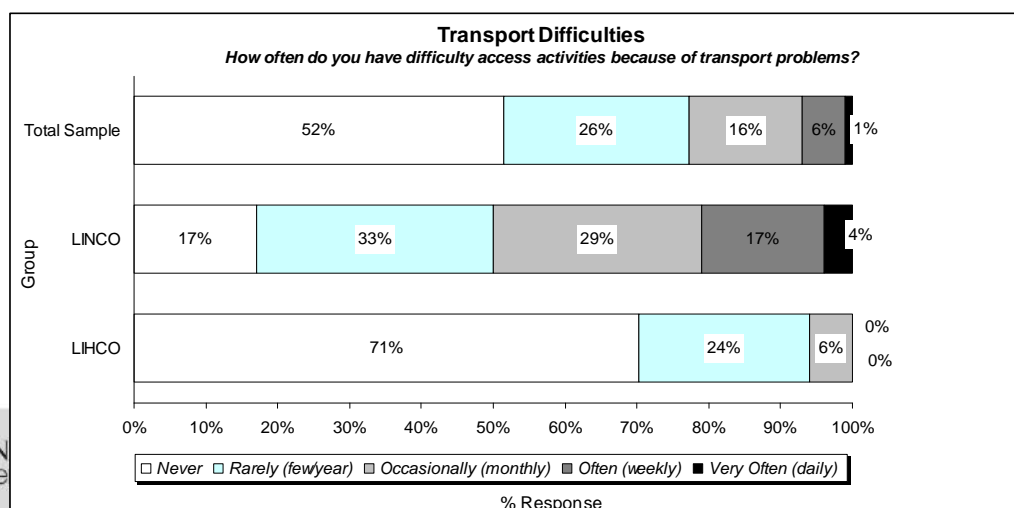
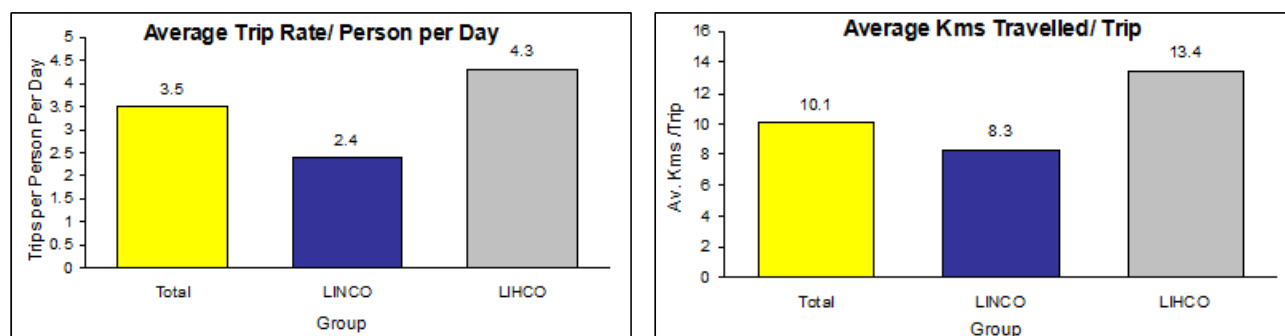
- **16,357 HH without a car**
- **Better off ? :**
 - Live close to activity centres
 - Walk and use public transport
 - do not have to spend a high share (over 50%) of income on running a car
 - can walk to activities
 - can access public transport

Source: Johnson V Currie G and Stanley J (2010) 'A critique of Zero Car ownership as a Measure of Disadvantage' Social Indicators Research: Volume 97, Issue 3 (2010), Page 439.
: Monash University Australian Research Council Project LP0669046 (2008-9)

Analysis contrasts fringe low income groups with high and zero car ownership

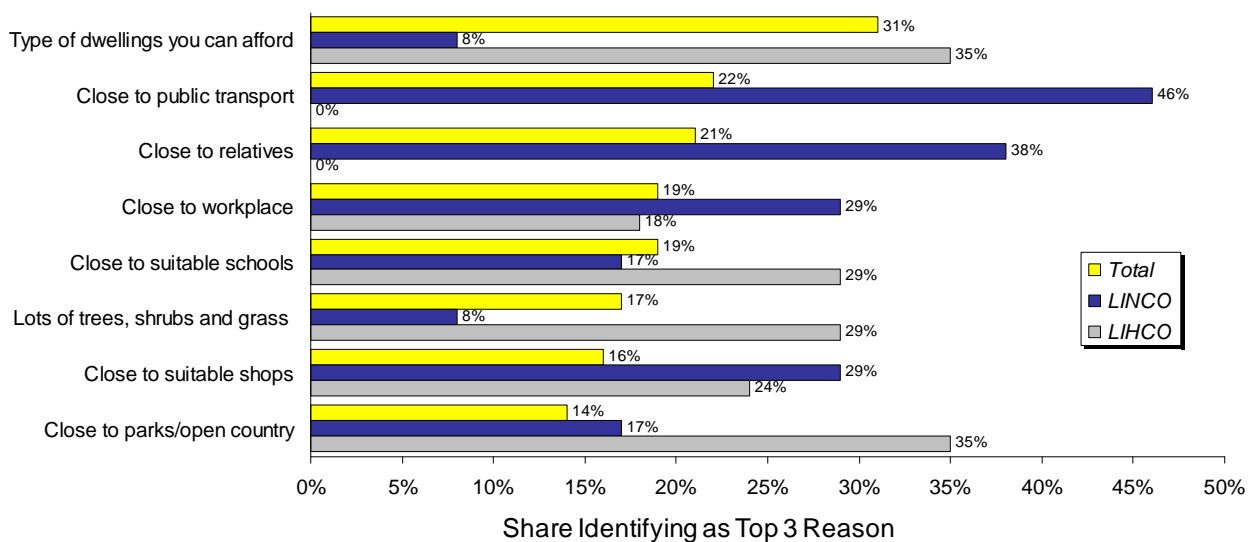
- **Key research question:**
 - Is low or high car ownership and on the Urban Fringe a Benefit or Hindrance?
- **Examining**
 - LINCO – Low Income No Car Ownership; and
 - LIHCO - Low Income High Car Ownership
- **Areas explored:**
 - Realised travel rates
 - Difficulties with travel
 - Home location decision making and its relation to transport
 - Transport coping strategies
 - Perceived impacts on travel and activities
 - Links with measures of social exclusion and well being

LIHCO make more travel & report less travel difficulties....



...and locate for home affordability. LINCO locate for PT & proximity to activities

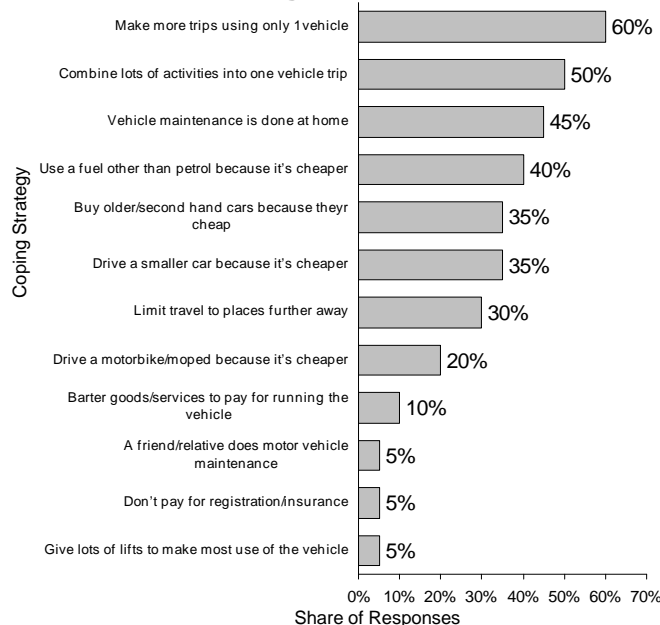
Figure 2 : Factors Affecting Home Location Decisions



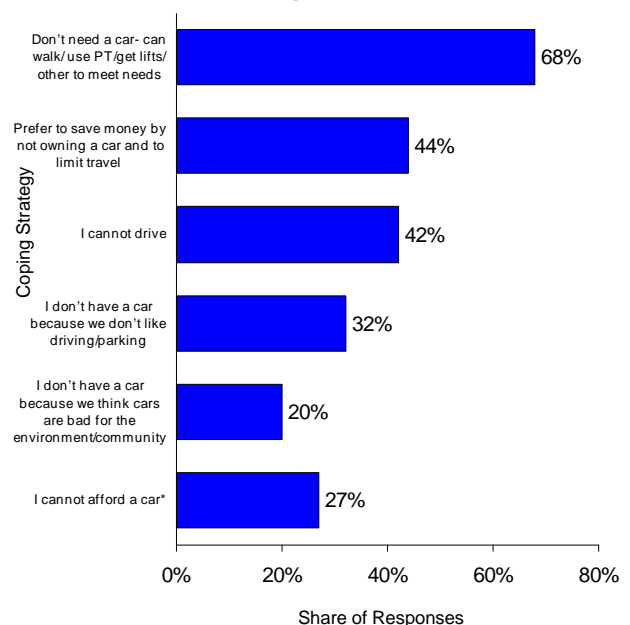
Source: Main Metropolitan Survey, Monash University

LIHCO cope by trip reduction, LINCO say PT/Walk meet needs – they prefer cost saving

Coping - LIHCO



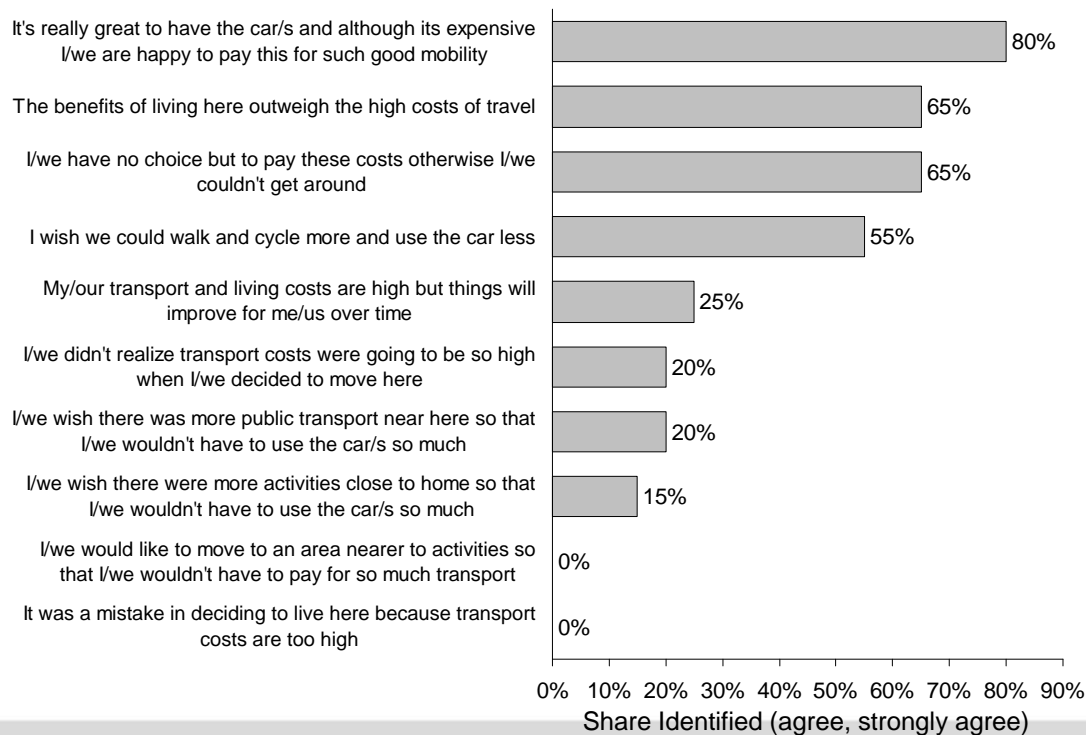
Coping - LINCO



Note: LIHCO - 65% said they did not use all of vehicles more than twice a week
LIHCO - 35% of respondents agreed that transport costs were a substantial portion of their income

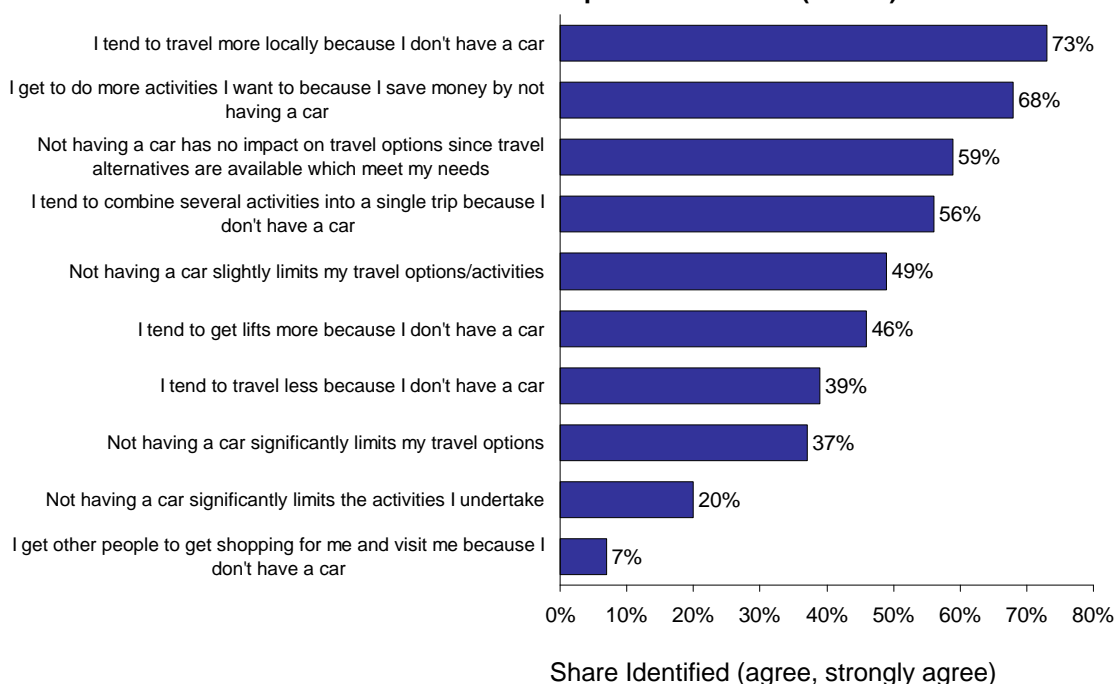
LIHCO like mobility/access impacts but 65% say they have little choice

IMPACTS ON LIFE - High Car Ownership on Low Income (LIHCO)



LINCO travel locally but 68% said they did more activities due to saving in car costs

LIFE IMPACTS - No Car Ownership on Low Income (LINCO)



LINCO are more socially excluded than LIHCO....

Table 1: Car Ownership Groups and Social Exclusion Measures

Social Exclusion Measures	LINCO	LIHCO	Total sample
Average number of dimensions excluded	1.67	.71	.77
Component Dimensions			
• Lowest income**	67%	12%	23%
• Unemployed*	17%	6%	5%
• No political engagement	29%	29%	27%
• No regular activities**	25%	6%	6%
• Low social support	29%	18%	17%

*Chi-square significant to $p < .05$

**Chi-square significant to $p < .01$

Source: Main Metropolitan Survey, Monash University

...but is this due to person type or mobility and access?

Table 1: Car Ownership Groups and Social Exclusion Measures

Social Exclusion Measures	LINCO	LIHCO	Total sample
Average number of dimensions excluded	1.67	.71	.77
Component Dimensions			
• Lowest income**	67%	12%	23%
• Unemployed*	17%	6%	5%
• No political engagement	29%	29%	27%
• No regular activities**	25%	6%	6%
• Low social support	29%	18%	17%

*Chi-square significant to $p < .05$

**Chi-square significant to $p < .01$

Source: Main Metropolitan Survey, Monash University

Typology:

- Single Person HH
- Older
- On a Pension
- Rented Accommodation
- Sub-group - single parent families

Typology:

- Young families
- New Mortgagees
- Home Maker & Child
- Single HH Worker

Note: No statistically significant well-being differences

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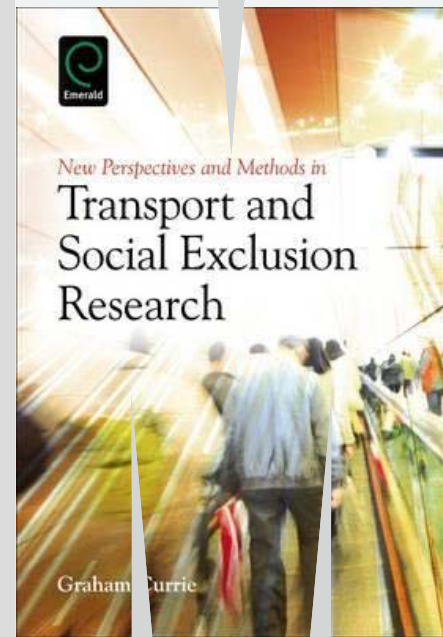
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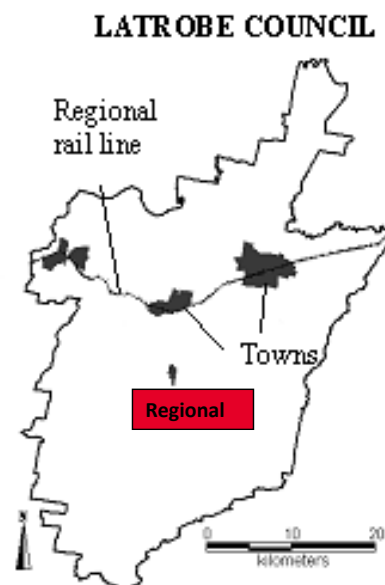
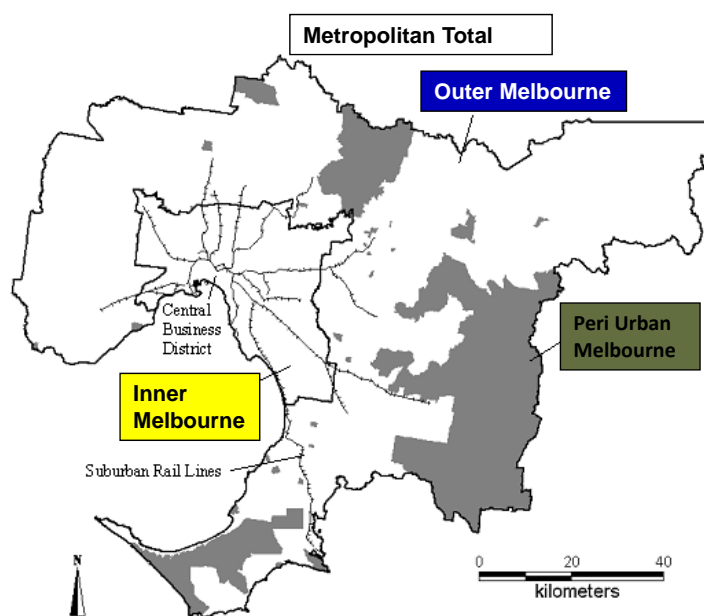
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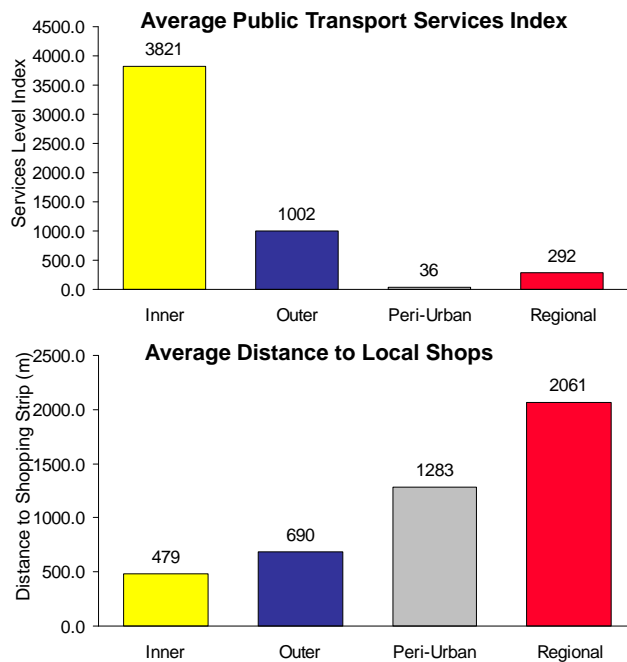
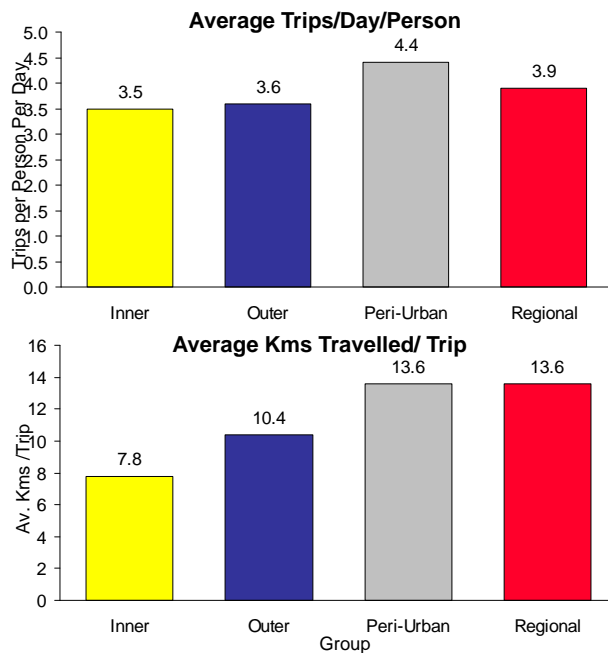
Structural Equation Modelling



Spatial research contrasts social exclusion (SE), well being (WB) & transport disadvantage (TD) by area...

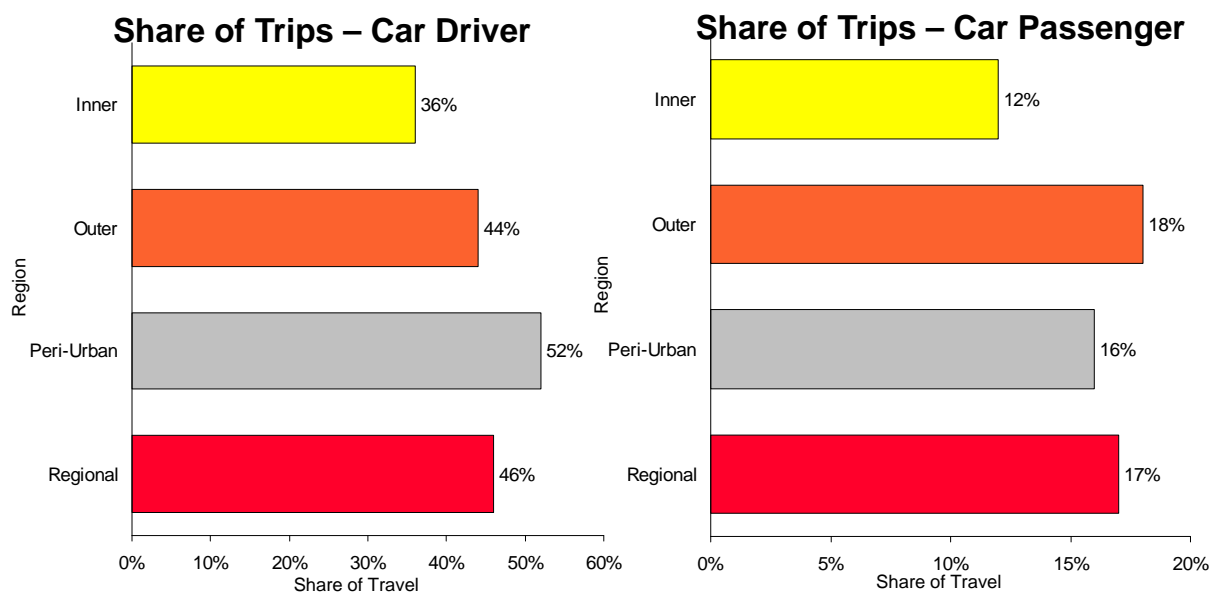


Fringe/regional residents have a bigger transport task but far less Public Transport...



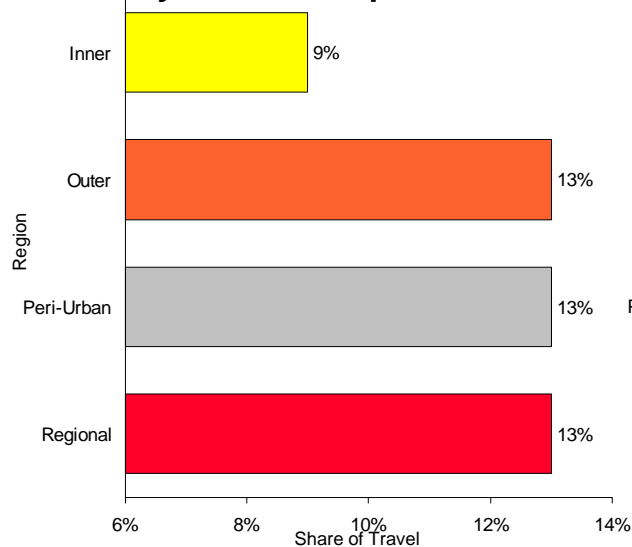
Source: Monash University Australian Research Council Project LP0669046 (2008-9)

...car reliance results

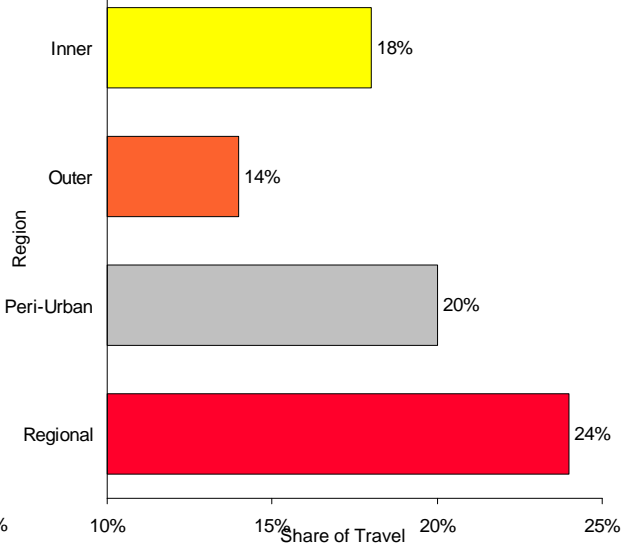


Fringe/Regional report more problems – regional most activity barriers

Often/Very Often Transport Problems

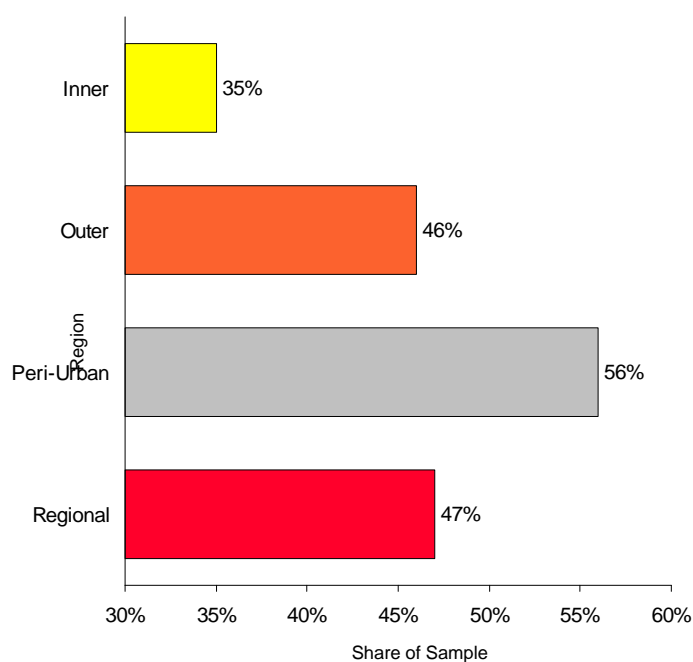


Activities Restricted by Transport

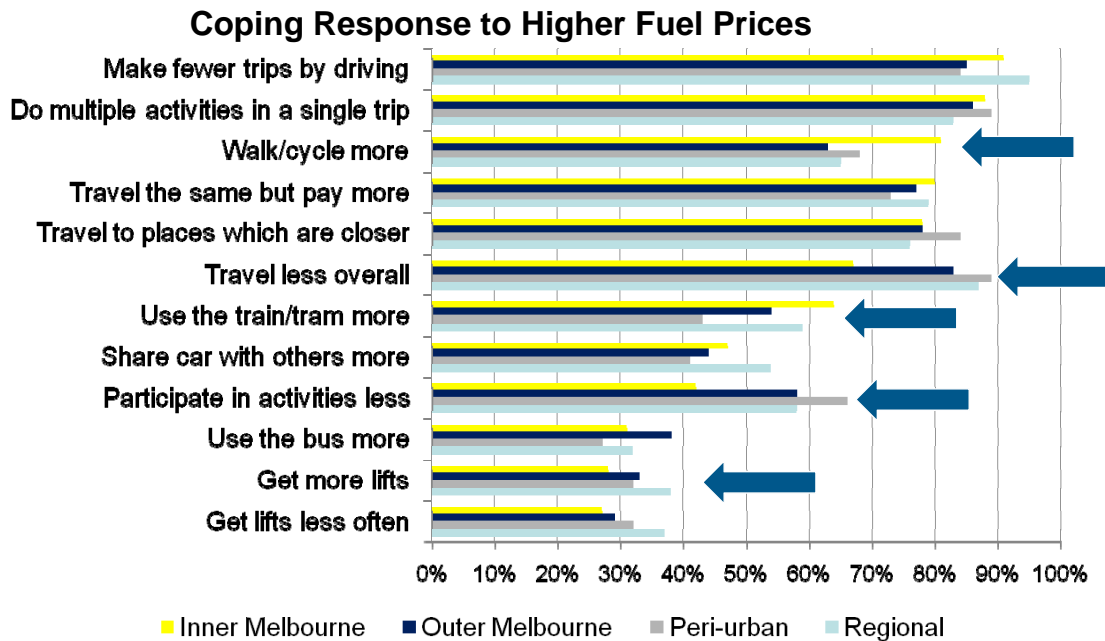


Peri-urban are most likely to be affected by fuel price increases

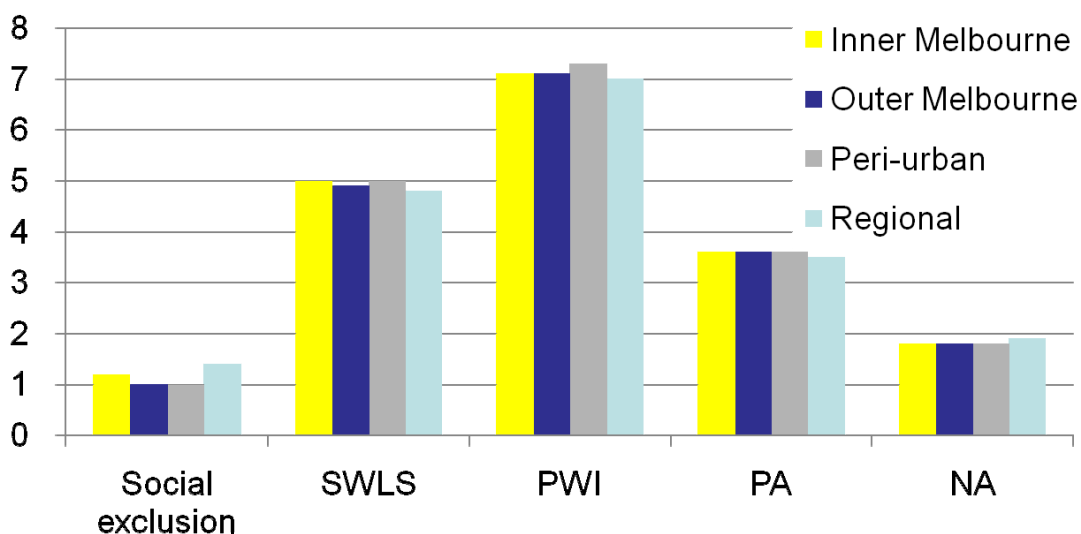
Is Your Travel Affected by Higher Fuel Prices? - Yes



Major coping strategies varied by location



Social exclusion and well-being were the same across locations



SE/TD correlations were small or not-significant

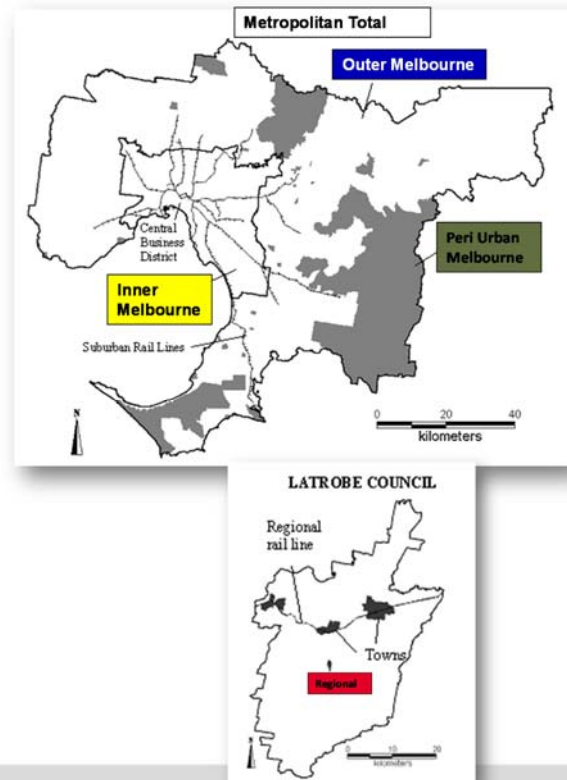
Correlation between SE and...	Metro overall	Inner Melb	Outer Melb	Peri-Urban	Regional
"Frequency of difficulties accessing activities due to transport problems"	.10**	.18**	.07	.12	.20**
"Number of activities cannot do due to transport problems"	.02	.13	-.02	.11	.12

WB/TD correlations were strongest in regional and peri-urban sample

Correlation between "frequency of difficulties" and...	Metro overall	Inner Melb	Outer Melb	Peri-Urban	Regional
SWLS	-.19**	-.28**	-.15**	-.20	-.41**
PWI	-.21**	-.29**	-.18**	-.33**	-.44**
PA	-.02	-.10	.00	-.10	-.08
NA	.21**	.15*	.23**	.18	.34**
Correlation between "activities cannot do" and...	Metro overall	Inner Melb	Outer Melb	Peri-Urban	Regional
SWLS	-.14**	-.10	-.15**	-.32**	-.30**
PWI	-.07*	-.08	-.07	-.24*	-.33**
PA	.05	-.01	.06	-.08	.06
NA	.07	-.06	.10*	.19	.22**

Spatial Analysis - Conclusions

- Distance from CBD decreases PT, increases trip rates and car dependence, increases fuel price sensitivity but...
- Peri-urban (not regional) experiences highest car dependence and transport disadvantage
- Regional area used more car-sharing to cope
- Correlation between TD and WB highest in peri-urban and regional areas
 - E.g., *if* someone in regional area suffered TD, they were more likely to have low WB



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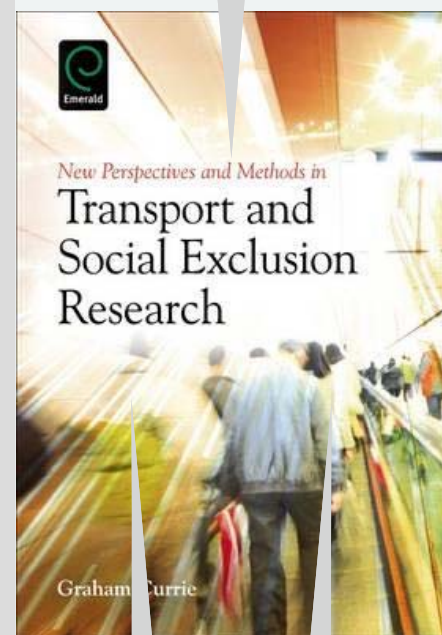
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Is transport disadvantage one thing, or several different things? What are the more important elements of TD?

- Looked at the set of 18 questions about transport difficulties in survey
 - Conducted a Principal Component Analysis with a Varimax rotation
 - Statistical calculation that looks at how groups of questions “hang together”
 - PCA is an “exploratory” test; there’s no statistical significance test

Degree of difficulty with travel attribute
Buses/trains/trams being available at night
Buses/trains/trams being available at weekends
Buses/trains/trams operating frequently
Being able to make bus/train/tram connections
Being able to get to bus/train/tram stops/stations
Being able to travel when you want to
Finding transport so you can travel
Being able to get around reliably
Getting to places quickly
Finding the time to travel when you need to
Being able to physically get onto/off buses/trains/trams
Needing help to get around on your own
Being able to understand where to go
Feeling safe from theft/attack when travelling on your own
Having to rely on others for transport
Finding someone to provide assistance when transport is available
Covering the costs of your transport

Source: Delbosc A and Currie G (2010) 'Transport Problems That Matter – Social and Psychological Links to Transport Disadvantage' *Journal of Transport Geography* Published on line Feb 2010 Doi:10.1016/j.jtrangeo.2010.01.003

The analysis came up with 4 factors...

Factor	% of variance (rotated)	Cumulative %
1	18%	18%
2	17%	36%
3	11%	47%
4	10%	57%

57% of variance is explained by these four factors

Source: Delbosc A and Currie G (2010) 'Transport Problems That Matter – Social and Psychological Links to Transport Disadvantage' *Journal of Transport Geography* Published on line Feb 2010 Doi:10.1016/j.jtrangeo.2010.01.003

...associated with groups of degree of difficulty types...

Modelled Factors for Degree of Difficulty with Transport

Degree of difficulty with travel attribute	Factors			
	Transit Disadvantage	Transport Disadvantage	Vulnerable / Impaired	Rely on Others
Buses/trains/trams being available at night	.788			
Buses/trains/trams being available at weekends	.787			
Buses/trains/trams operating frequently	.687			
Being able to make bus/train/tram connections	.617			
Being able to get to bus/train/tram stops/stations	.428	.417	.420	
Being able to travel when you want to		.744		
Finding transport so you can travel		.688		
Being able to get around reliably		.685		
Getting to places quickly		.634		
Finding the time to travel when you need to		.585		
Being able to physically get onto/off buses/trains/trams			.682	
Needing help to get around on your own			.609	
Being able to understand where to go		.439	.584	
Feeling safe from theft/attack when travelling on your own			.514	
Having to rely on others for transport				.674
Finding someone to provide assistance when transport is available				.659
Covering the costs of your transport				.607

Note: Bold variables were used to formulate that factor for further analyses

Source: Delbosc A and Currie G (2010) 'Transport Problems That Matter – Social and Psychological Links to Transport Disadvantage' *Journal of Transport Geography* Published on line Feb 2010 Doi:10.1016/j.jtrangeo.2010.01.003

All relate to fringe areas but only one relates to Social Exclusion & Poor Well Being

Modelled Degree of Difficulty Factors – Access, Segment Type and SE/WB

Transit Disadvantage	Transport Disadvantage	Vulnerable / Impaired	Rely on Others
<u>38% of sample</u> <ul style="list-style-type: none"> ▶ Working adults ▶ Mid age, income ▶ Av. public transport use 	<u>18% of overall sample</u> <ul style="list-style-type: none"> ▶ Busy working adults ▶ Lowest public transport supply but highest use 	<u>10% of sample</u> <ul style="list-style-type: none"> ▶ Older females ▶ Low income ▶ Poor health, disability pension ▶ Feel unsafe on transit and in home 	<u>25% of sample</u> <ul style="list-style-type: none"> ▶ Av. age and household ▶ Unemployed ▶ Lower income ▶ Poor health, disability pension ▶ Feels unsafe ▶ Lack of trust
<u>Access</u> <ul style="list-style-type: none"> ▶ Outer/remote ▶ Low PT Supply 	<u>Access</u> <ul style="list-style-type: none"> ▶ Outer/remote ▶ Lowest PT Supply 	<u>Access</u> <ul style="list-style-type: none"> ▶ Outer/remote ▶ Low/Av. PT Supply 	<u>Access</u> <ul style="list-style-type: none"> ▶ Outer/remote ▶ Average PT Supply
<u>Self Reported Difficulties</u> <ul style="list-style-type: none"> ▶ Lack of Time ▶ Moderate Travel Difficulties ▶ High Activity Barriers ▶ High Fuel Price Impact 	<u>Self Reported Difficulties</u> <ul style="list-style-type: none"> ▶ Lack of Time ▶ High Travel Difficulties ▶ Very High Activity Barriers ▶ High fuel Price Impact 	<u>Self Reported Difficulties</u> <ul style="list-style-type: none"> ▶ Low Travel Difficulties ▶ Very High Activity Barriers 	<u>Self Reported Difficulties</u> <ul style="list-style-type: none"> ▶ Lack of time ▶ Moderate Travel Difficulties ▶ High Activity Barriers ▶ V. High Fuel Price Impact
<u>Social Excluded</u> Low <u>Well Being</u> Slightly Low	<u>Social Excluded</u> Low <u>Well Being</u> Slightly Low	<u>Social Excluded</u> High <u>Well Being</u> Low	<u>Social Excluded</u> Some (Social Support) <u>Well Being</u> Low

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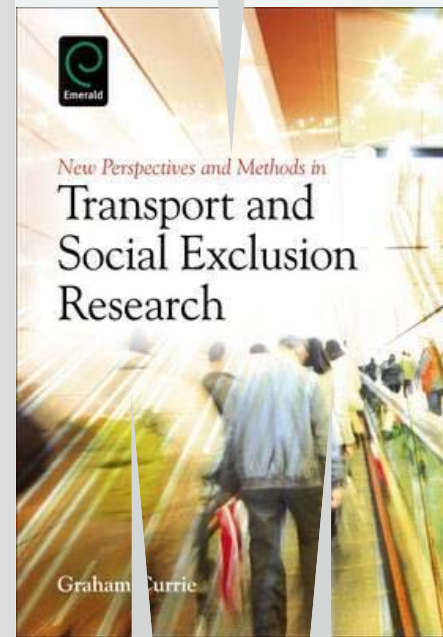
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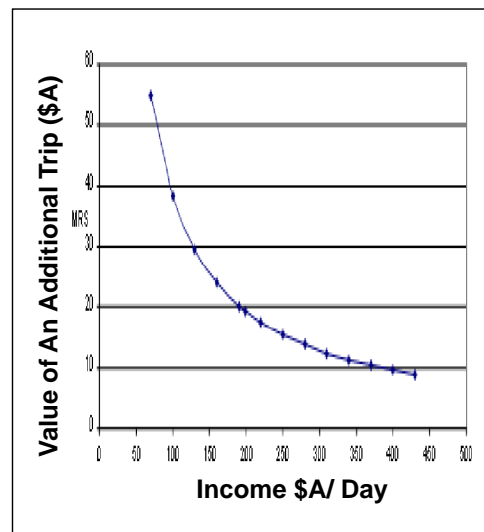
Economics values travel using a Value of Time which is based on income – new trips are typically worth \$ Aust 4-5 in most analysis

- Wage rates are used to value travel time in all economic appraisals world wide
- For low income groups this is particularly problematic since it means their travel is valued less than higher income groups
- Using economic rule of a half in transport appraisals values a new trip at between \$A3.54 and \$A4.78

Source: Stanley J., Hensher DA, Stanley J., Currie, G., Greene WH, Vella-Broderick D (2011) 'Social Exclusion and the Value of Mobility'
JOURNAL OF TRANSPORT ECONOMICS AND POLICY, Vol 45, No 2, May 2011, pp. 197-222(26)

A new method was developed in the research to value new trips that otherwise would not have been made with an average value of \$19.30/trip

Approach
<ol style="list-style-type: none"> 1. A logit model associates social exclusion with explanatory factors; <ul style="list-style-type: none"> • well being, distance travelled and age were key output factors • Includes a non-linear link between income and the marginal willingness to pay for trips 2. The marginal rate of substitution is higher for those that have less travel 3. Substituting factors in the equation it is possible to estimate the value of additional trips



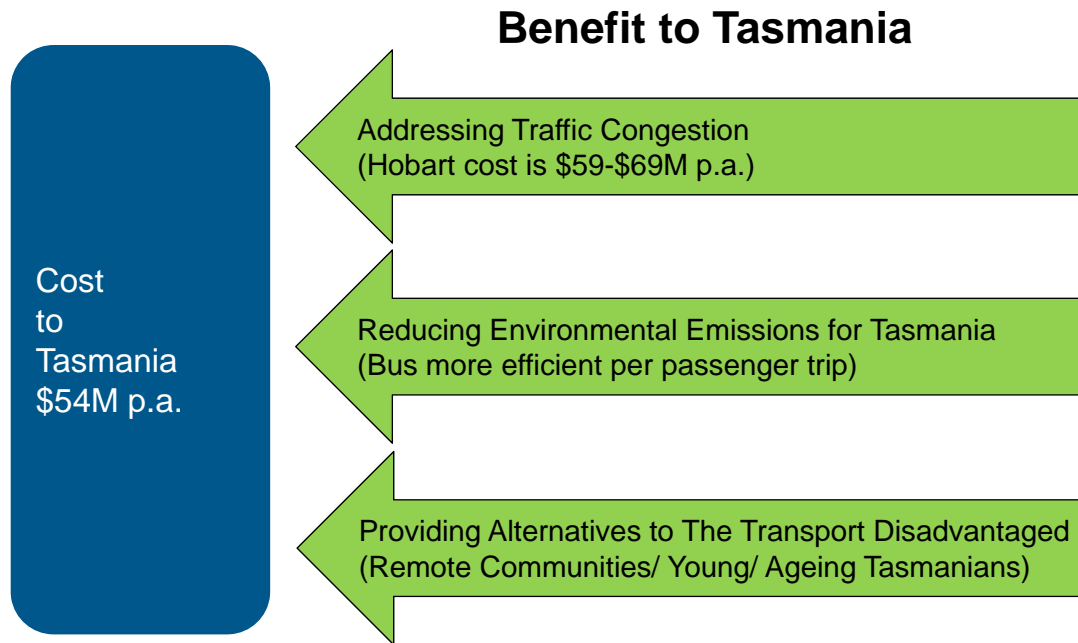
Source: Stanley J., Hensher DA, StanleyJ, Currie, G., Greene WH, Vella-Broderick D. (2011) 'Social Exclusion and the Value of Mobility'
JOURNAL OF TRANSPORT ECONOMICS AND POLICY, Vol 45, No 2, May 2011 , pp. 197-222(26)

This is a very powerful new tool; EXAMPLE : cost to Government of buses in Tasmania is \$53.8M for 18M trips (2005/6)

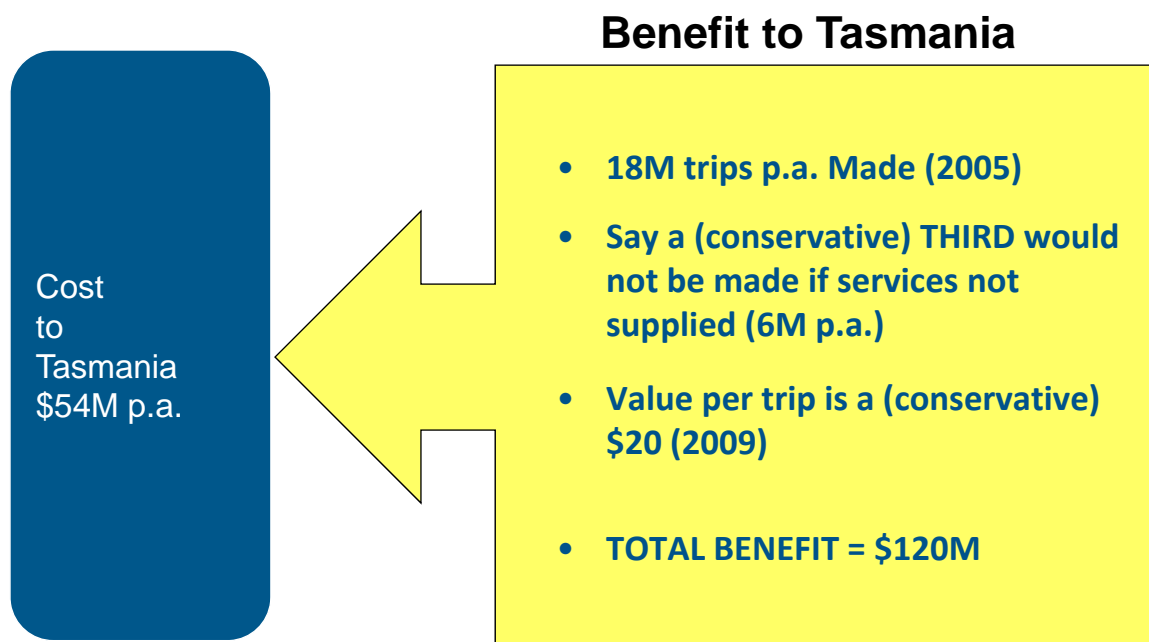
Public Transport Travel and Government Subsidy (2005/6)

Service Type	Passenger Trips p.a.	Government Subsidy p.a. (\$M)
Urban Bus	9.21	\$26.20
Fringe Urban	2.98	\$ 9.72
Rural Bus	5.10	\$14.86
Regional Town	0.47	\$ 0.49
Long Distance	0.39	\$ 2.54
Total	18.15	\$53.81

Source: 'Connected Communities: Better Bus Services in Tasmania'
– Report of the Core Passenger Service Review, Nov 2007



Adopting results values social benefit at \$120M p.a. a 200%+ return on investment



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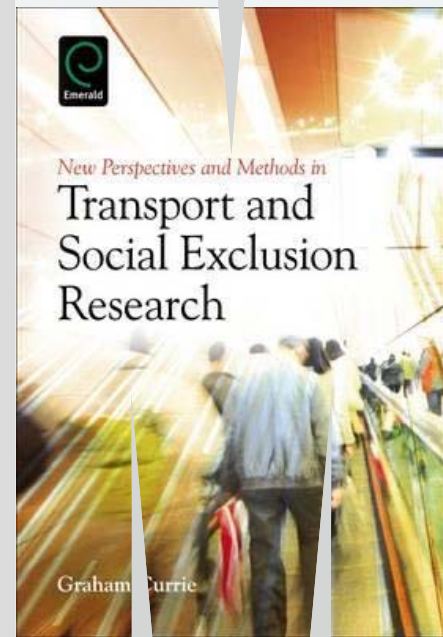
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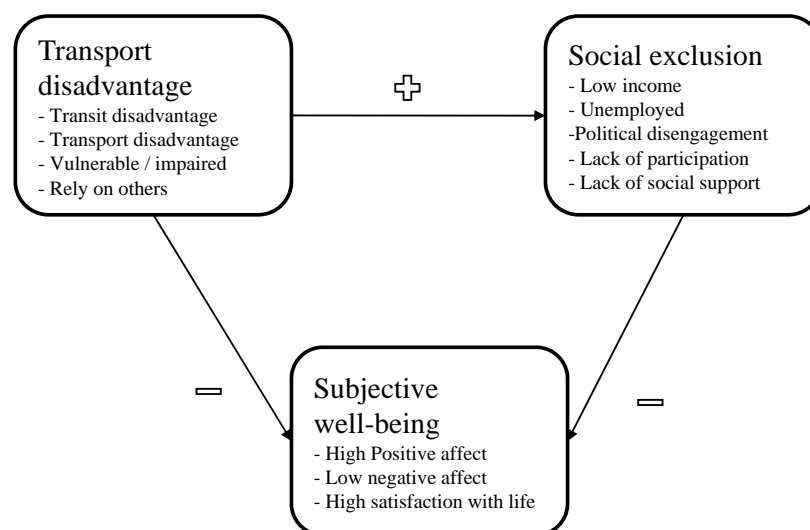
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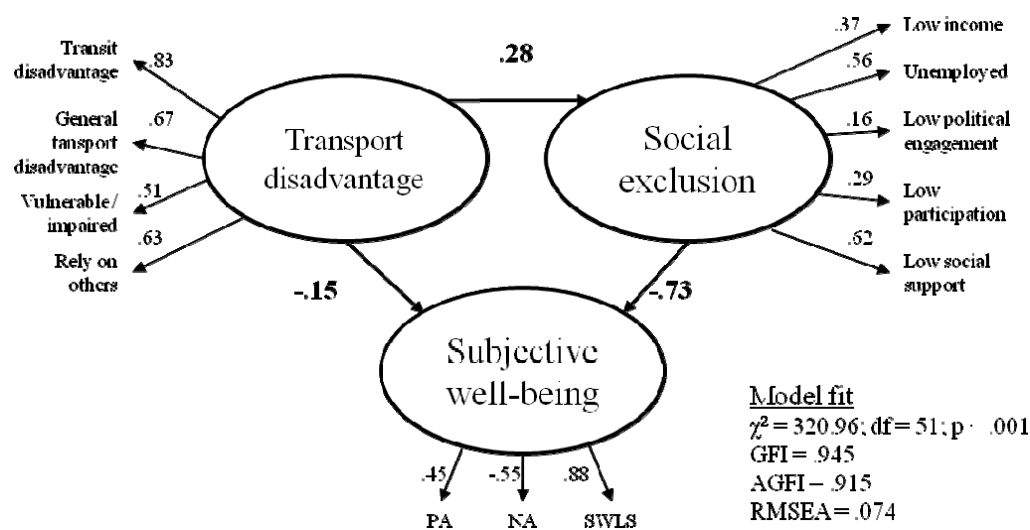


A SEM was theorised using the 4-factor transport disadvantage split

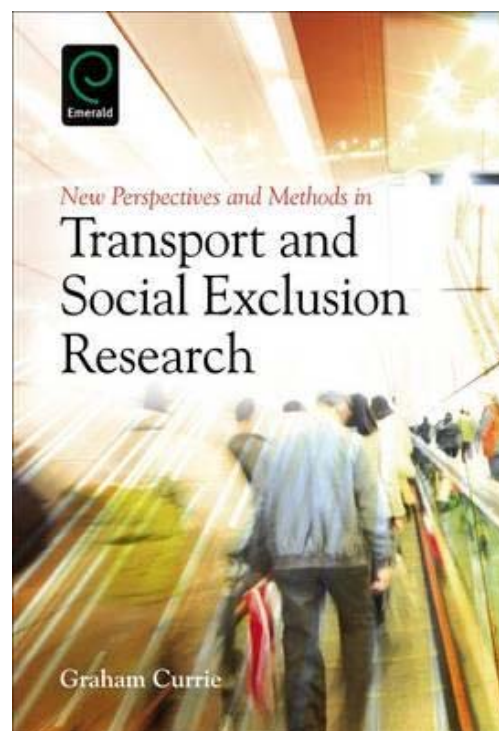


Source: CURRIE, G. & DELBOSC, A. 2010 Modelling the social and psychological impacts of transport disadvantage. *Transportation*, 37, pp953–966

Results of SEM model showed strong SE-SWB links but poor TD/Well-being links; SWB is more indirectly links to transport disadvantage via SE



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