Children, Active Travel, Independent Mobility, Health and the Built Environment

Managing multi-disciplinary, multi-institutional research
...agenda

- Research aims
- From research aims to research design
- Developing a research protocol
- Some national “results”
- Some Perth “results”
The **RESEARCH AIMS** to determine the independent mobility and active travel of a sample of Australian children aged 10–13 in a variety of settings (inner suburb, middle/outer suburb, regional town).

This will be the first national study in Australia of children’s behaviours in relation to the built and social environments.

The use of a **multi-disciplinary team** of urban and transport planners, social geographers, and health promotion researchers will lead to an innovative and ground-breaking study that may influence current planning and design policies.
Two research projects

iMATCH and CATCH projects have various aims related to examining:

- how built and social environments influence children’s physical activity, active travel and independent mobility,
- the relationships between children’s activity behaviours and health outcomes, and
- the role of school policy environments on children’s active travel.

- Strengths of the research team
  - ARC aspirations
    - Strategic research priorities
    - Desire for multi-institutional
    - Desire for multi-disciplinary
- Recognition that research questions such as this do not have simple answers – cognisant of multiple variables
How to enact the research – from research aims to research design

Issue 1:
Sharing ideas
Sharing workload

Issue 2:
Conducting comparative research
Developing a robust methodology

DEVELOPING A PROTOCOL
(Singing from the same songsheet)
Issue 1: Sharing ideas...Sharing workload

- **Health Researchers**
  - Quantitative methodologies
  - Large sample sizes for robustness

- **Transport Researchers**
  - Quantitative methodologies
  - Large sample sizes for robustness

- **Social Researchers**
  - Qualitative methodologies
  - Use of words and photos - no concern with sample size

- **Planning Researchers**
  - Mixed methodologies
  - Policy/Applied basis

- **Linkage Partners**
  - Policy/Applied Basis

- **PhD Scholars**
  - Relationship between independent and team research

Conducting comparative research – Developing a robust methodology
Protocol included...

- Choosing Schools
- Choosing no. of children
- Working with children
- Ethics procedures
- Letters to Schools and D of Ed
- Design of survey instruments
- Using equipment
- Recording data
- Timelines
### Choosing Schools:

<table>
<thead>
<tr>
<th>Children (aged 10–13 years old)</th>
<th>recruited from schools varied by geographic location and BE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BE type</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>▸ a new master–planned community in the outer suburbs,</td>
</tr>
<tr>
<td></td>
<td>▸ a late 20th century automobile–dominated neighbourhood,</td>
</tr>
<tr>
<td></td>
<td>▸ an inner–city neighbourhood built in the late 19th century/early 20th century,</td>
</tr>
<tr>
<td></td>
<td>▸ and a regional city neighbourhood.</td>
</tr>
<tr>
<td><strong>Geographic location</strong></td>
<td>Rockhampton; Brisbane; Melbourne; Perth</td>
</tr>
<tr>
<td><strong>role of school policy environments as potential influences of children’s active travel</strong></td>
<td>▸ strong policy environment that supports active travel</td>
</tr>
<tr>
<td></td>
<td>▸ does not have a strong policy environment that supports active travel</td>
</tr>
</tbody>
</table>
Defining intervention schools

An ‘intervention’ school

Presently supports a TravelSmart or Active School Travel program:
- That is embedded into the curriculum
- That is actively promoted
- And has strong participation

A ‘control’ school:

Does not have a TravelSmart or Active School Travel program at present, and has not had a program for at least four years.

These schools may support ad hoc active travel activities (i.e. Walk to School Day) but only in simplistic and ad hoc ways and with low participation.
Controlling for socio-economic type

Eligible schools will be those located in each neighbourhood type that have:

- less than 1000 students in total (no super schools), and
- have a socio-economic position score of between 900–1100 (Index of Community Socio-Educational Advantage (ICSEA)).
Choosing number of children – Sample Size

- The primary aims are to:
  - examine associations between built environments and children’s participation in active travel and independent mobility, and
  - examine associations between children’s participation in active travel and independent mobility and health outcomes (minutes of light, and moderate-to-vigorous intensity physical activity, sedentary activity, BMI).

- FOR THIS WE NEEDED 600 CHILDREN PARTICIPATING NATIONALLY IN ORDER TO HAVE ENOUGH CASES FOR QUANTITATIVE ANALYSIS (To suit the health sciences and transport planners!)
  - This is to detect significant associations for primary outcomes using traditional significance (0.05) and power (0.80)
  - By using the G–Power program to estimate sample size it is estimated that approximately 358 children in total from all sites will be required to achieve study aims. This sample size allows for up to 12 covariates to be included in the analysis.
Seeking to look for effect of variation in the BE on children’s Active Travel (AT), Independent Mobility (IM) and health
- while controlling for:
  - Age of children
  - Socio–Economic status
  - AT policy intervention
<table>
<thead>
<tr>
<th>Survey instrument</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children’s survey</td>
<td>Licence to travel and preference; travel behaviour; attitudes to travel, the neighbourhhood; the school; sedentary activities</td>
</tr>
<tr>
<td>Parent’s survey</td>
<td>social–connectedness; the neighbourhood; socio–demographics and transport character of parent; busyness</td>
</tr>
<tr>
<td>4 day Travel Diary</td>
<td>Journey purposes; # trips; trip distance; trip time; mode; accompanied;</td>
</tr>
<tr>
<td>GPS</td>
<td>Comparing actual travel to trip diary records</td>
</tr>
<tr>
<td>Health biometrics:</td>
<td>RA measured – height, weight, waist</td>
</tr>
<tr>
<td>• BMI</td>
<td></td>
</tr>
<tr>
<td>• waist</td>
<td></td>
</tr>
<tr>
<td>Actiheart –4 days</td>
<td>Physical Activity – heart rate and steps</td>
</tr>
<tr>
<td>Camera &amp; Collage</td>
<td>The neighbourhood</td>
</tr>
<tr>
<td>BE</td>
<td>Density, proximity, permeability, accessibility</td>
</tr>
</tbody>
</table>
Some of the equipment – plus videos made for researchers on how to use and not trip up in relation to ethics and working with children.

Main piece clips on the inner electrode. Wire must be straight but.
Coping with Ethics!

- University Ethics x 3 (WA, QLD, VIC)
- State Dept Education Ethics x 3
  - QLD rejected waist and weigh measurement on school grounds – so either RA measured or self-reported – this despite QLD Health being a Linkage partner

- School selection
- Working with Children Card
## Measuring Built Form Characteristics – GIS, mapping and data availability across sites

<table>
<thead>
<tr>
<th></th>
<th>1 Inner Suburb</th>
<th>2 Middle Suburb</th>
<th>3 Outer Suburb</th>
<th>4 Regional town</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Residential Density</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Land Use Diversity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Street Connectivity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Streets with speedlimit &gt;60km/hr</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Ave Home to School Distance</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td># Signed Crossings</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Access to PT Stops</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Streets with footpath</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td># parks</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Timelines and contingencies

<table>
<thead>
<tr>
<th>Time period</th>
<th>Tasks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 0 – 0.5</td>
<td>Lit reviews</td>
</tr>
<tr>
<td>Years 0.5 – 1.5</td>
<td>Research Protocol, Survey instruments and ethics</td>
</tr>
<tr>
<td>Year 1.5 – 2</td>
<td>Training, Pilot, regroup</td>
</tr>
<tr>
<td>Year 2 &amp; 3</td>
<td>Data collection, data entry, validation, preliminary analysis</td>
</tr>
<tr>
<td>Year 4</td>
<td>Analysis and write up</td>
</tr>
</tbody>
</table>
...when you know you need a Plan B...C... D....

- Build time in to cater for things going wrong;
  - Flooding in QLD – pilot school under 2m water
  - QLD ethics!
  - PhD recruitment delays
  - RAs – training, commitment, longevity and ‘corporate knowledge’
  - Data Entry – in-house or ex-house??
  - Get the data entry design sorted!!
  - Cis – allow real time to work on project – avoid over committing
  - Read the protocol and USE IT!!!
... as a result ...

<table>
<thead>
<tr>
<th>Time period</th>
<th>Tasks</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 0 – 0.5</td>
<td>Lit reviews</td>
<td>– Mostly complete – but delayed by PhD recruitment</td>
</tr>
<tr>
<td>Years 0.5 – 1.5</td>
<td>Research Protocol, Survey instruments and ethics</td>
<td>Took a year</td>
</tr>
<tr>
<td>Year 1.5 – 2</td>
<td>Training, Pilot, regroup</td>
<td>Pilot was late and impacted on all other cases Further juggling due to CI availability and PhD deadlines</td>
</tr>
<tr>
<td>Year 2 &amp; 3</td>
<td>Data collection, data entry, validation, preliminary analysis</td>
<td>Yes... but validation and preliminary analysis eating into Yr4</td>
</tr>
<tr>
<td>Year 4</td>
<td>Analysis and write up</td>
<td>Sectoral analysis and publications emerging</td>
</tr>
</tbody>
</table>
# National sample

<table>
<thead>
<tr>
<th># participating children</th>
<th>Control</th>
<th>Intervention</th>
<th>totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inner City Urban</td>
<td>52</td>
<td>32</td>
<td>84</td>
</tr>
<tr>
<td>Middle Suburban</td>
<td>48</td>
<td>38</td>
<td>86</td>
</tr>
<tr>
<td>Outer Suburban</td>
<td>57</td>
<td>70</td>
<td>127</td>
</tr>
<tr>
<td>Regional town</td>
<td>78</td>
<td>n/a</td>
<td>78</td>
</tr>
<tr>
<td>totals</td>
<td>235</td>
<td>140</td>
<td>375</td>
</tr>
</tbody>
</table>

375 children – not 600 – so imputation required for some analyses
**National Sample: 24% recruitment rate; 2% drop out recruited children**

<table>
<thead>
<tr>
<th>City</th>
<th>BE type</th>
<th>Intervention / Control</th>
<th>Schools</th>
<th>No. of Children</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Invited</td>
<td>Recruited</td>
</tr>
<tr>
<td>Brisbane</td>
<td>Outer suburb (master planned)</td>
<td>C</td>
<td>S</td>
<td>162</td>
</tr>
<tr>
<td></td>
<td>Middle suburb</td>
<td>I</td>
<td>G</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Outer suburb (non-master planned)</td>
<td>I</td>
<td>R</td>
<td>160</td>
</tr>
<tr>
<td></td>
<td>Sub-total</td>
<td></td>
<td></td>
<td>422</td>
</tr>
<tr>
<td>Rockhampton</td>
<td>Regional town</td>
<td>C</td>
<td>MA</td>
<td>266</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C</td>
<td>A</td>
<td>151</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C</td>
<td>T</td>
<td>308</td>
</tr>
<tr>
<td></td>
<td>Sub-total</td>
<td></td>
<td></td>
<td>725</td>
</tr>
<tr>
<td>Melbourne</td>
<td>Inner City Urban</td>
<td>I</td>
<td>BE</td>
<td>104</td>
</tr>
<tr>
<td></td>
<td>Middle Suburban</td>
<td>C</td>
<td>GW</td>
<td>111</td>
</tr>
<tr>
<td></td>
<td>Sub-total</td>
<td></td>
<td></td>
<td>215</td>
</tr>
<tr>
<td>Perth</td>
<td>Inner City Urban</td>
<td>C</td>
<td>P</td>
<td>172</td>
</tr>
<tr>
<td></td>
<td>Sub-total</td>
<td></td>
<td></td>
<td>172</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td>1534</td>
</tr>
</tbody>
</table>
Health, physical activity, sedentary activity

Some broad results...but work in progress
No diff btwn site & school. No diff btwn gender
Male 19.19 (±4.21), Female 19.38 (±7.25)
Some variation here – could be interesting…Melbourne & Rocky have lower proportion of Healthy weight children
Daily Mins Sedentary activity

No Sig diff by gender. Sig diff between Perth and Brisbane
No Sig diff by gender. No Sig diff btwn sites.
Daily Mins Moderate Vigorous Physical Activity

Some variation here – Perth more PA but watch the range!
National sample – trips per person (over 4 day recording period)

Is variation a product of under-recording in some case studies – needs checking – or is it true that Perth children make way more trips!
Melbourne is different – effect of BE?? (inner city school)
National sample – Accompanied travel

Accompanied travel

- Adult present
- With other children
- By myself

Percentage of trips

Rockhampton
Melbourne
Perth
Brisbane

Melbourne again!
National sample – Journey purpose

Journey purpose

- other
- get to pub
- bike ride
- family friends
- shopping
- Park or playground
- Home
- School

Percentage of trips

- Rockhampton
- Melbourne
- Perth
- Brisbane

Perth and Parks… proximity??
Early days yet... but

- Appear to be differences in AT by location
- Appear to be differences in PA by location

- Way too soon for any multi-variate analysis – still validating data sets, trying to resolve technical problems with GPS, waiting for BE data and conducting preliminary and discrete analyses...
Perth ...preliminary look!
Characteristic of sample: children
(n = 51)

Age of Children
- < 10 yrs: 53%
- 10 yrs: 33%
- 11 yrs: 12%
- 12 yrs: 2%

Gender of children
- Boy: 63%
- Girl: 37%

Bike ownership
86%
Characteristics of sample: Parents (n =

Age of Respondents: Parent’s Survey

- 35-39: 10%
- 40-44: 19%
- 45-49: 25%
- 50-55: 27%

Number of People Per Household

- 2 People: 2%
- 3 People: 6%
- 4 People: 19%
- 5 People: 46%
- 6 People: 27%

Females = 82%
Males = 8%

Number of registered motor vehicles (cars, trucks, motorbikes) per household

- 1 Vehicle: 14.6%
- 2 Vehicle: 20.8%
- 3 Vehicle: 60.4%
- 4 Vehicle: 2%

Which of the following best describes the location of your home?

- On a highway: 2%
- On a busy road: 21%
- On a minor road: 17%
- In a cul de sac: 60%
Survey intervention April–June 2012; Average Temp = 23.4C; # rain days 6
So what’s standing in the way of AT to School?

- Walkability?
- Licence to travel
- Parents and busyness
High level of potential walkability out to 15 minute walk facilitated by grid-street layout
Licence to travel not supported by actual travel behaviour...children might be allowed to travel to/from school unaccompanied but in reality most are driven
Parents and busyness – are parents simply too busy to walk children to school?

- 21% (responding parent) involved in voluntary or paid work 40 hours or greater per week

- Majority work 38 hours or less (79%)
  - Of these one quarter work 10 hours or less
To conclude...

- Allow plenty of time to design research approach, test and revise it
- Have a Plan B when things don’t go to plan!
- Use a protocol document, train all researchers – don’t assume everyone will understand your research perspective
- Build in sufficient time (and a clear protocol) for data entry and validation
- In complex projects allow at least a year just for analysis and dissemination
Whoever said “never work with children and animals”...

Children are a delight to work with...

But proceed with caution when working with multi-agency, multi-disciplinary teams!!!