# Can a workplace self-help intervention enhance the effects of an infrastructural intervention? The design and baseline results of a cluster randomised trial (iConnect-IPAC)

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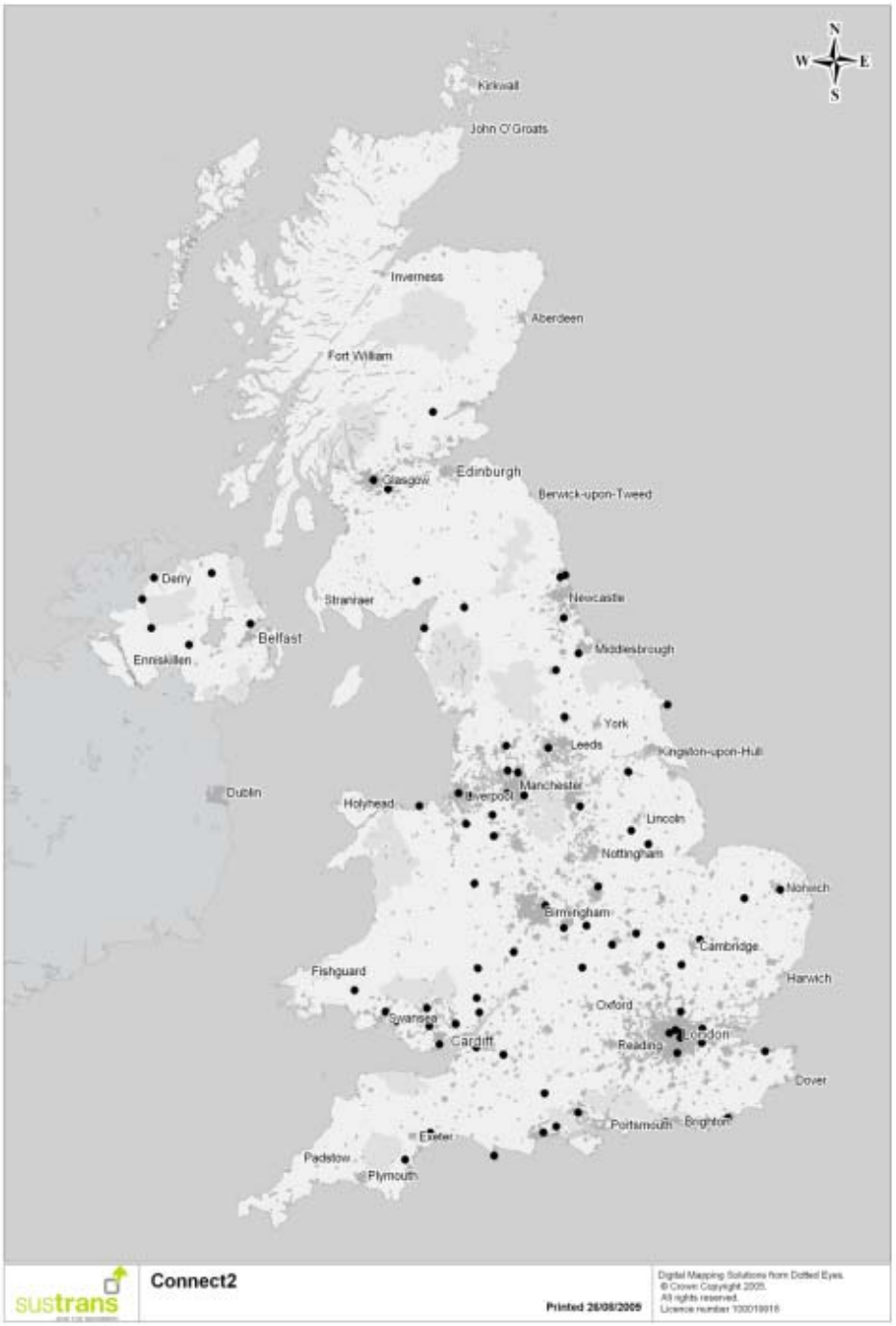
on behalf of the iConnect consortium

# Overview

- Background
- Systematic review of behaviour change techniques
- Development and evaluation of visualisation technology
- Practical issues around natural experiments
- Next steps




# Sustrans Connect2

- UK-wide project
- Aims to transform local travel in 84 communities
- Part funded by £50 million Big Lottery Fund grant
- £174million invested overall

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# iConnect research objectives

1. To develop an evaluation framework and measurement tools

2. To apply the framework to the case study Connect2 sites

3. To determine whether an additional tailored self-help intervention can enhance the effects of an infrastructural intervention.

4. To evaluate the Connect2 programme in terms of its economic performance

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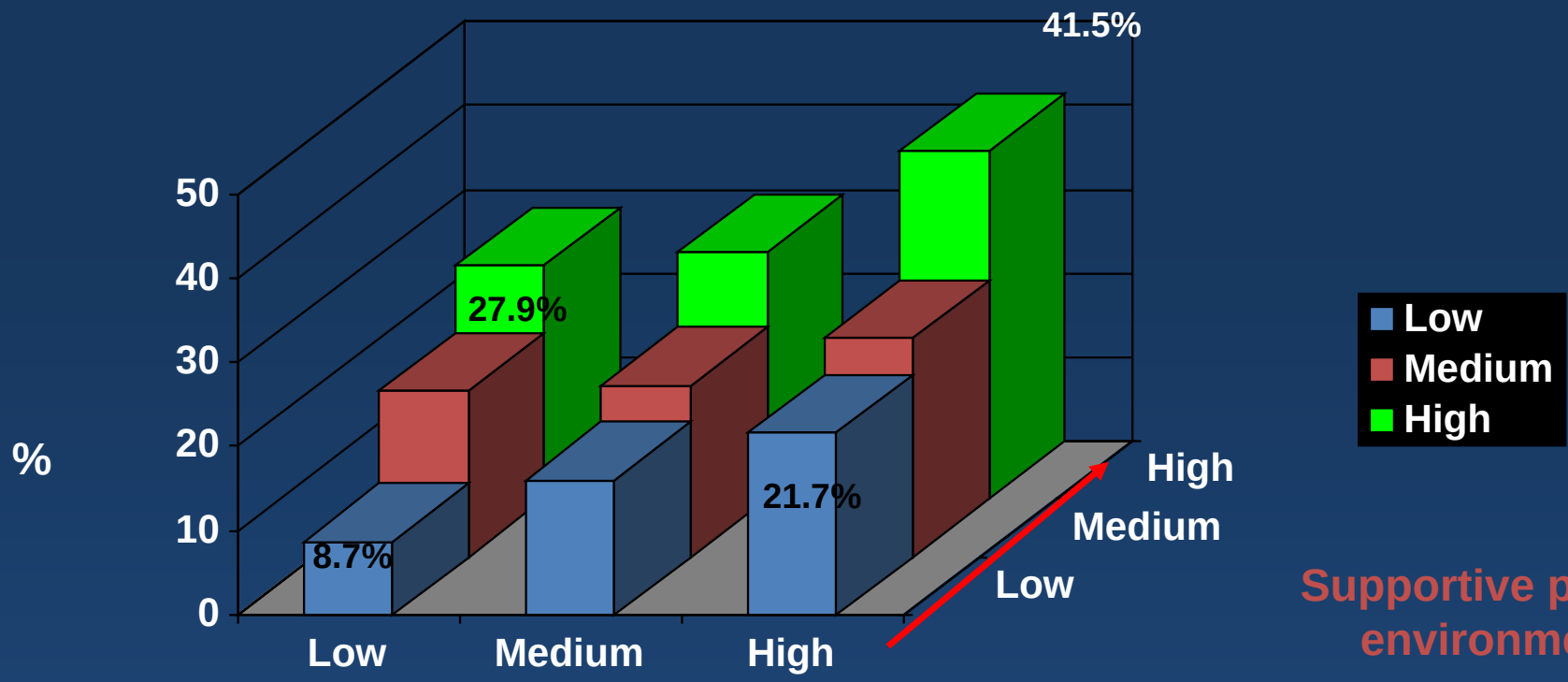
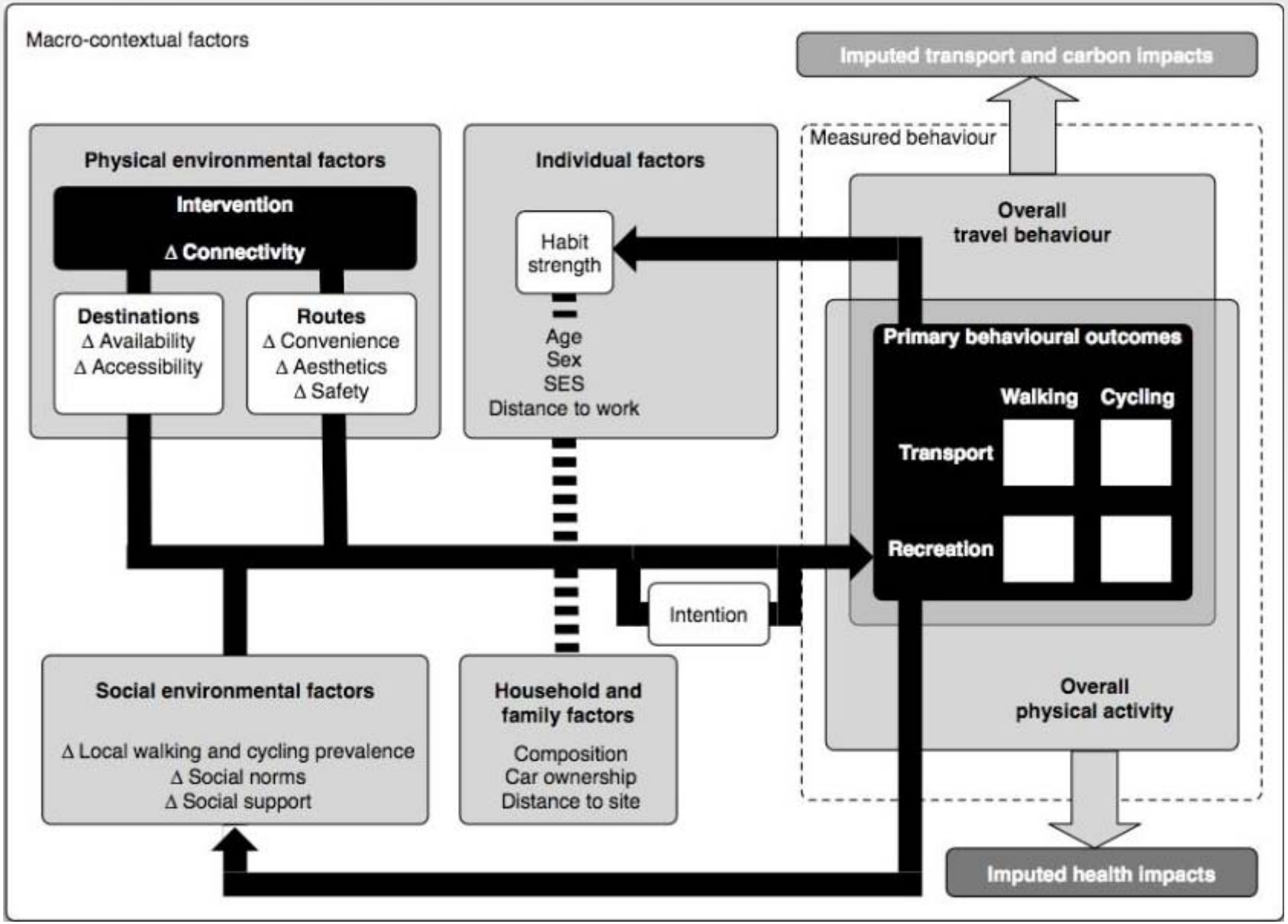
# Prevalence of sufficient walking by joint influence of individual and environmental factors ( ≥150 minutes/wk)

Giles-Corti JSAMS 2006 (9):357-366.




Courtesy Billie **Giles-Corti**




Ogilvie et al., Am J Public Health 2011, 101(3): 473-481

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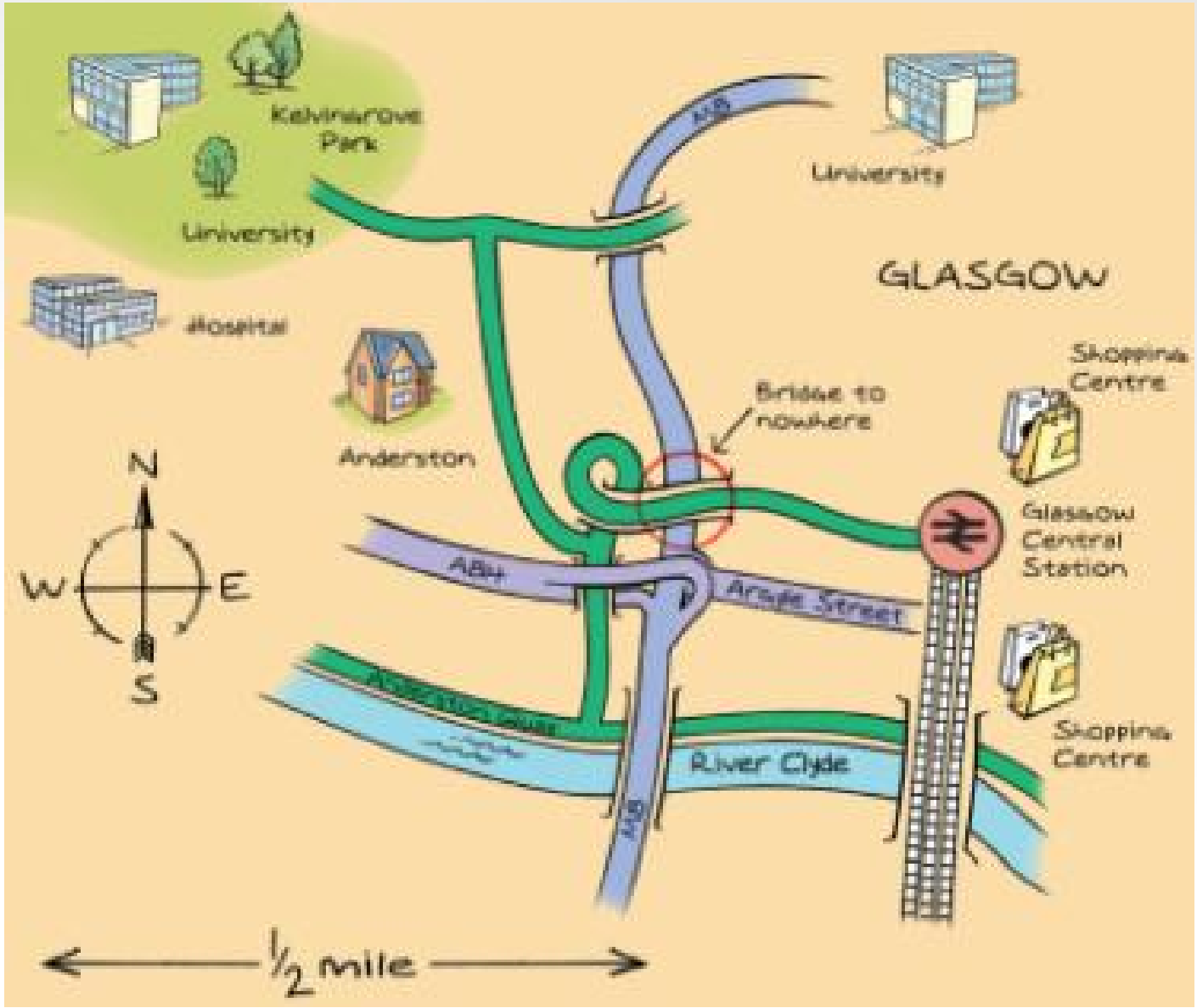

Kelvingrove Park
University
Hospital
Anderston
A82
University
GLASGOW
Bridge to nowhere
Shopping Centre
Glasgow Central Station
A814
Argyle Street
Shopping Centre
River Clyde
M8
N
W
E
S
½ mile

Photo courtesy of Raynesway Construction

Photo courtesy of Raynesway Construction

Photo courtesy of Raynesway Construction

# Intervention Development

- Aim of IPAC intervention is to increase active commuting
- Use what is known from existing evidence base about behaviourally oriented materials that can influence walking and cycling **( Ogilvie et al., 2007; Yang et al., 2010; NICE guidance 2012)**
- Intervention based on previous self-help materials (for example Walk in to Work Out; **Mutrie et al,. 2002**), tailored for the population, target behaviours and local context and delivered via web
- Identify successful studies and extract behavioural change techniques (BCT) using 26-item taxonomy **(Abraham and Michie, 2008)**
- Incorporate use of novel visualisation technology

# Systematic Review of Behaviour change techniques as applied to walking and cycling

Bird, E. L., Baker, G., Mutrie, N., Ogilvie, D., Sahlqvist, S., & Powell, J. (2013). Behavior Change Techniques Used to Promote Walking and Cycling: A Systematic Review. *Health Psychology*. Advance online publication. doi: 10.1037/a0032078

# Behavior Change Techniques Used to Promote Walking and Cycling: A Systematic Review.

## BACKGROUND

- Mixed overall findings of previous interventions **(Ogilvie et al, 2007; Yang et al, 2010)**

- Potentially attributable to:
  - Differences in study design and methodological quality
  - Differences in intervention content and program theory
    - Behavioral change techniques (BCTs) reported

- Taxonomy of BCTs **(Abraham & Michie, 2008)**
  - Not previously applied specifically for walking and cycling interventions

# Behavior Change Techniques Used to Promote Walking and Cycling: A Systematic Review.

## RESEARCH QUESTIONS

1.What are the behaviour change techniques used in walking and cycling interventions targeted at adults?

2.What characterizes interventions that appear to be associated with changes in walking and cycling in adults?

# Systematic Review of BCTs applied to walking and cycling

**METHODS – Selection and Inclusion**

- Individually targeted interventions
- Published randomised and non-randomised
- “No intervention” or “standard care” control/comparison
- Before and after outcome measures

# Systematic Review of BCTs applied to walking and cycling

**METHODS – Extraction and appraisal**

- Multiple interventions (in one study) considered separately
- Extracted data included:
  - Context
  - Sample characteristics
  - Methods applied
  - Results

# Systematic Review of BCTs applied to walking and cycling

**METHODS – Intervention Content**

- 26-item taxonomy **(Abraham & Michie, 2008)**
- Independently coded by 2 reviewers
  - mean kappa value for interrater reliability was 0.58
  - average percentage of disagreement was 16%
- Additional information sourced where possible (methods papers)
- Quality control of coding
  - 20% randomly selected and coded by two additional reviewers
- Final coding was discussed and agreed by several authors

# Systematic Review of BCTs applied to walking and cycling

**METHODS – Study Quality**

| Study (a) | Pre- and post-data (b) | Comparability (c) | Randomization (d) | Response rate (e) | Attrition rate (f) | Statistics (g) | Follow-up (h) | Total |
|---|---|---|---|---|---|---|---|---|
| **Interventions reported to have a statistically significant effect** | | | | | | | | |
| Hemmingsson | YES | YES | YES | YES | YES | YES | YES | 7 |
| Butler | YES | YES | YES | YES | YES | YES | YES | 7 |
| Coull | YES | YES | YES | YES | YES | YES | - | 6 |
| Halbert (2000) | YES | YES | YES | YES | YES | YES | - | 6 |

- Studies scoring 6–7 were deemed *higher* quality
- 4–5 as *medium* quality
- *0–3 as lower* quality

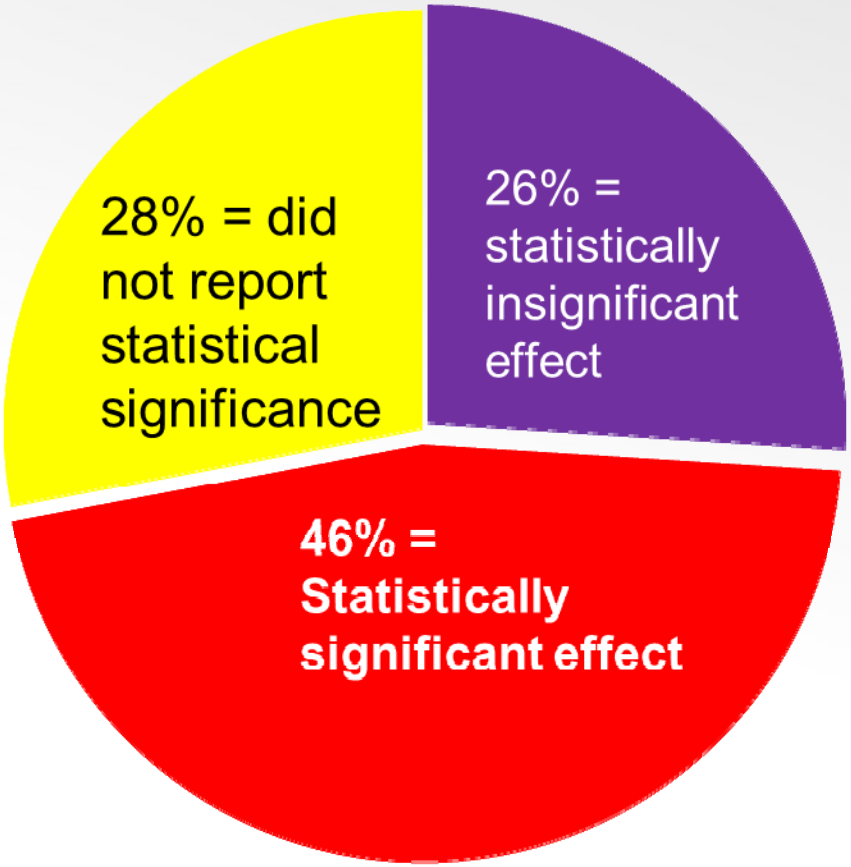
# Systematic Review of BCTs applied to walking and cycling

## METHODS – INTERVENTION CATEGORISATION

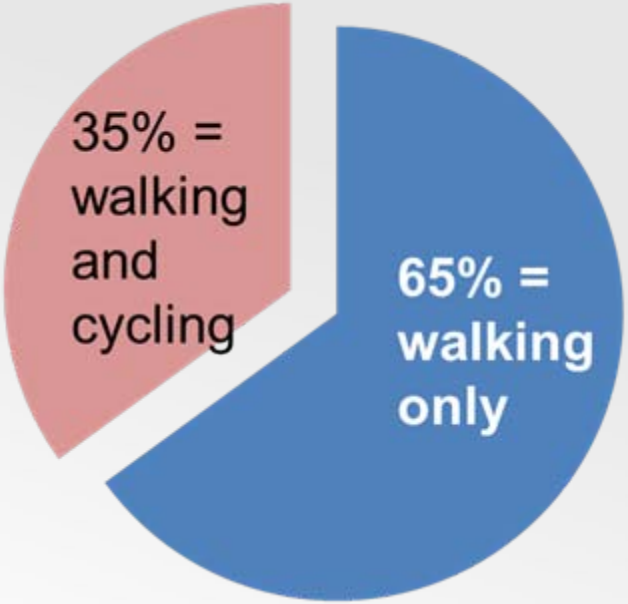
•Studies of interventions were divided into one of three categories:

1. Studies of interventions reported to have a **statistically significant effect**
2. Studies of interventions reported to have a **statistically insignificant effect**
3. Studies of interventions with **statistical effects not reported**

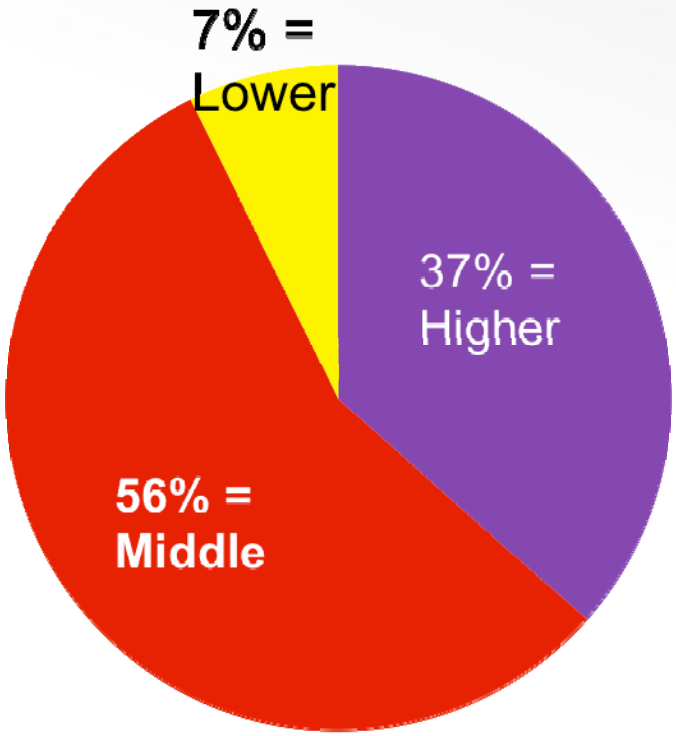
# 41 studies describing 46 distinct interventions




Intervention categorisation

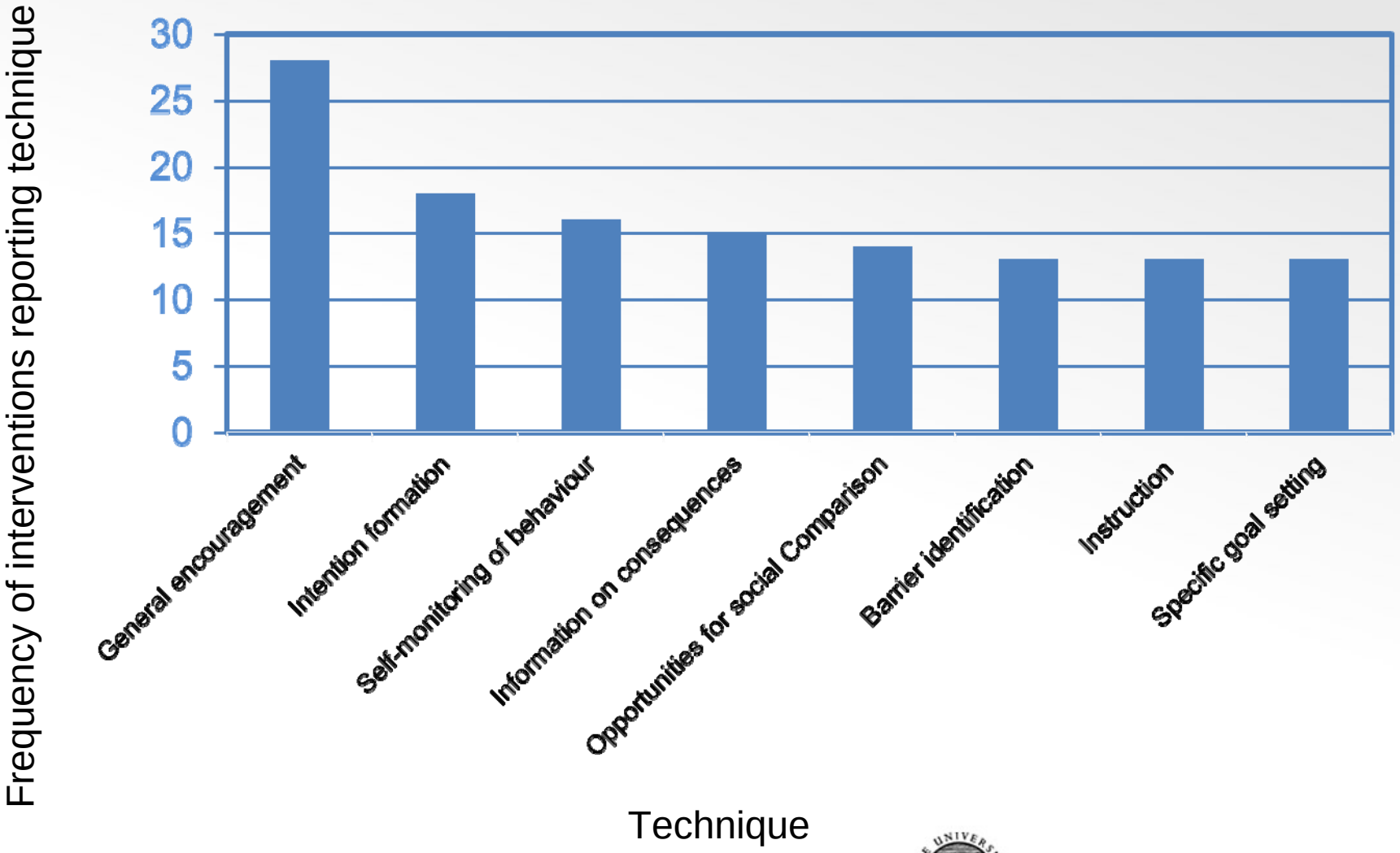



Target Behaviour

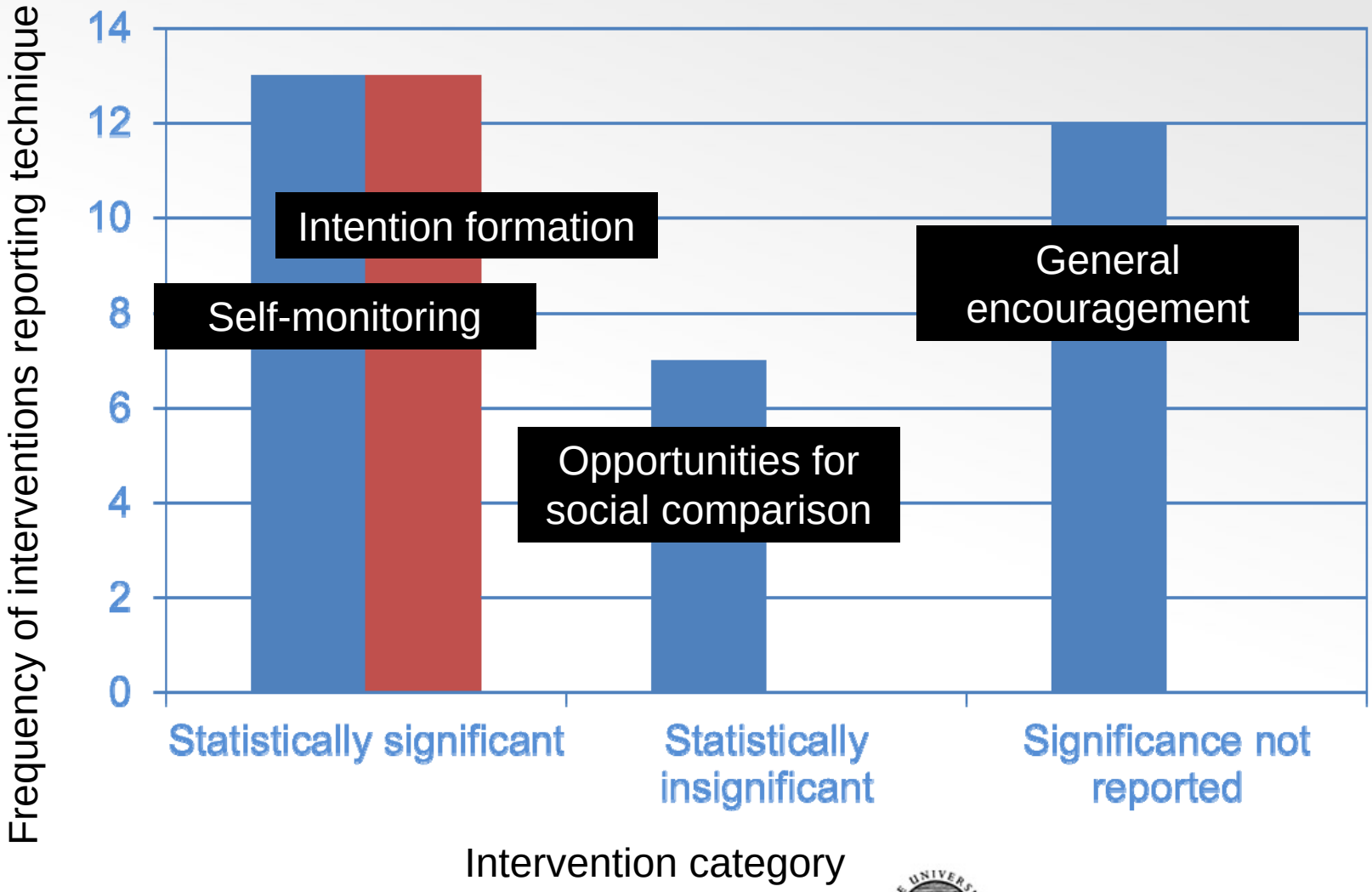



Study Quality

# Most commonly reported BCTs



# Most commonly reported BCT per study category



# Findings

- Across all interventions: no. of BCTs coded ranged from 0 – 12

| Intervention category | Mean no. of BCTs coded (SD) |
|---|---|
| Statistical significance | 6.43 (3.92)* |
| Statistical insignificance | 4.42 (3.29) |
| Significance not reported | 1.69 (1.32) |

* significantly different than “significance not reported” category, $p < 0.05$

# Summary of systematic review

- First study to classify intervention content of walking and cycling interventions using a reliable taxonomy

- Supports previous research **(e.g. Michie et al., 2009)** that **self-monitoring** and **intention formation** are important BCTs

- Consider the role of other intervention characteristics

# Implications for Future Research

1. More detailed reporting of intervention design required

2. Further exploration of BCTs (and combination of) required

3. Further exploration of associations between BCTs and study design characteristics required

# Development and evaluation of visualisation technology

**Bill, E.M., Baker, G., Ferguson, N.S., Drinkwater, D., Mutrie, N. Representing active travel: A formative evaluation of a computer animation visualisation model showing a new walking and cycling route in Glasgow.** ***(under review)***

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# Visualisation Development

**BACKGROUND**

- Visualisation used for variety of purposes
  - Raising awareness of global environmental problems
  - Representation of walking and cycling futures
  - Skill within iConnect team

- Technical possibilities exceed
  - Knowledge of behaviour change
  - Active commuting behaviour change


Elderslie Street
Kelvingrove Park 850Metres


UEA
M8 pedestrian and cycle bridge
urban modelling group
Glasgow Central Station 800Metres 5 Minutes by bike

# Visualisation

# Visualisation Evaluation

**AIMS**

1.to investigate the potential utility of computer animation visualisation in promoting a new walking and cycling facility

2.to identify any limitations of this approach to change behaviour

3.to consider potential improvements for future visualisation models.

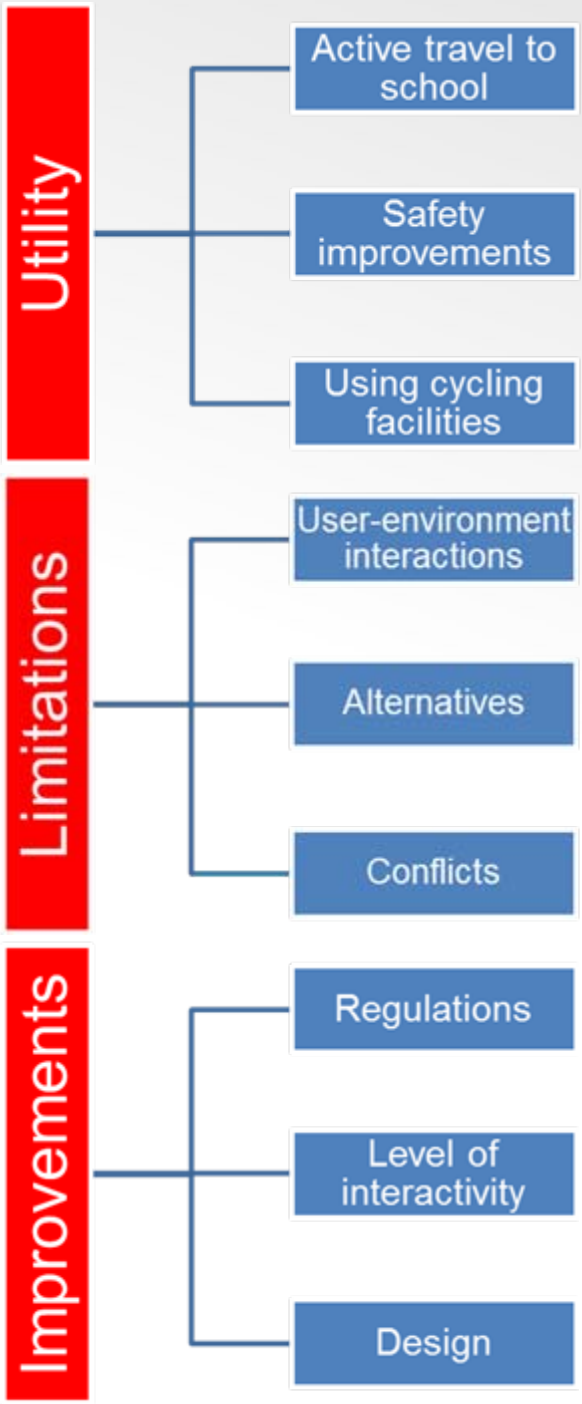
# Visualisation Evaluation

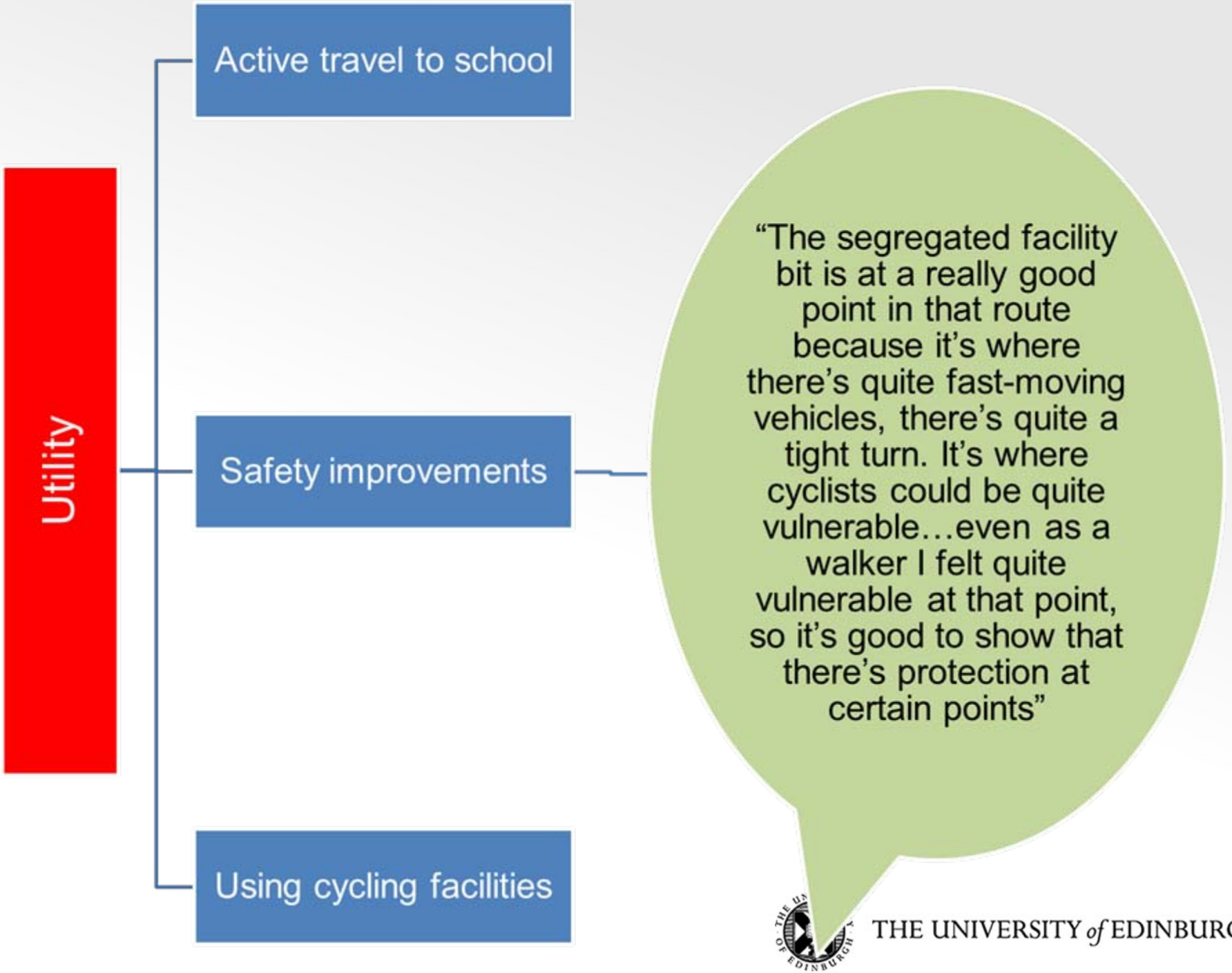
**METHODS**

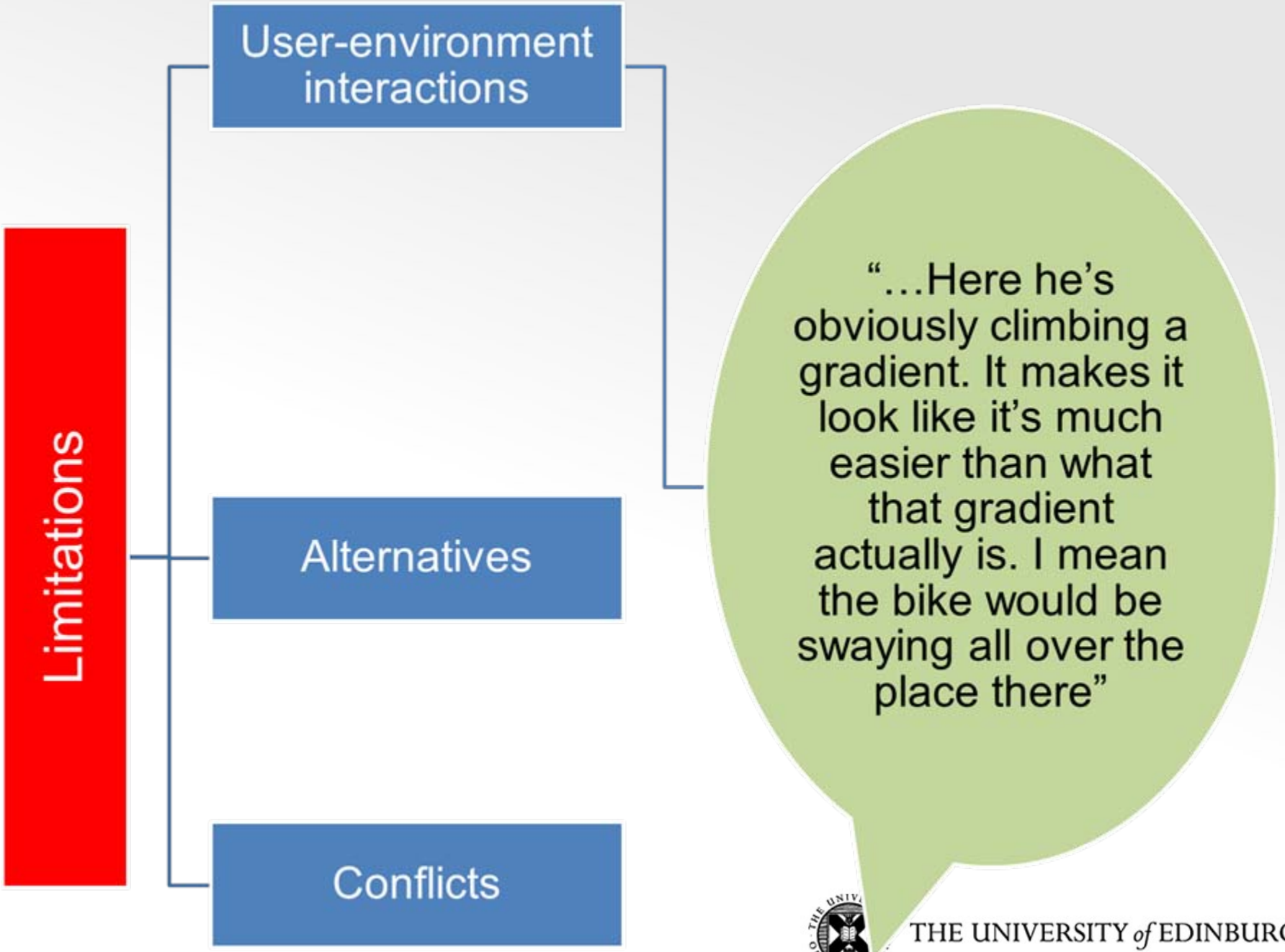
- 19 participants from two workplaces
  - 11 individual interviews, 2 focus groups (n= 5, 3)

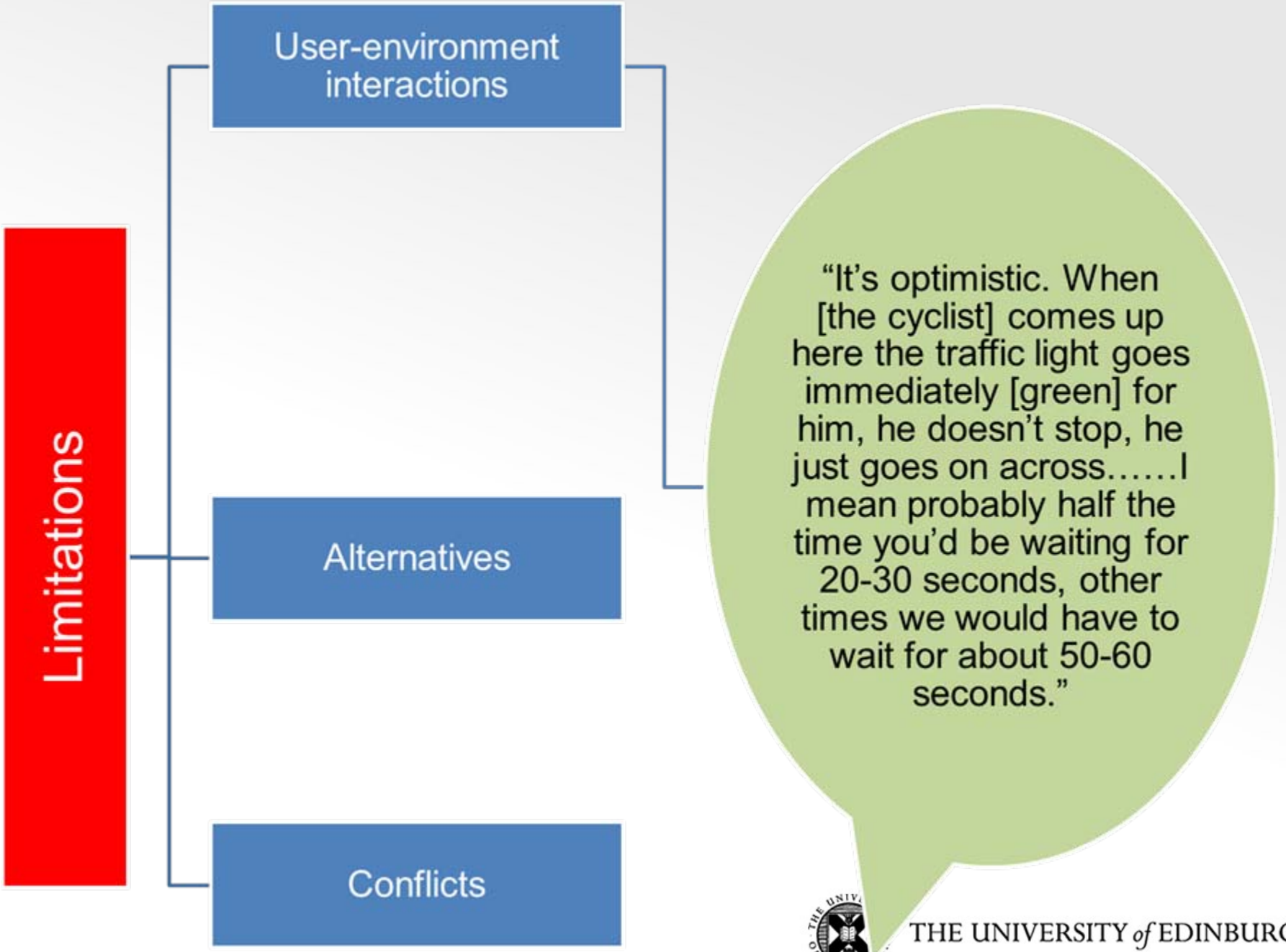
- Transcripts, field notes, written text analysed using NVivo

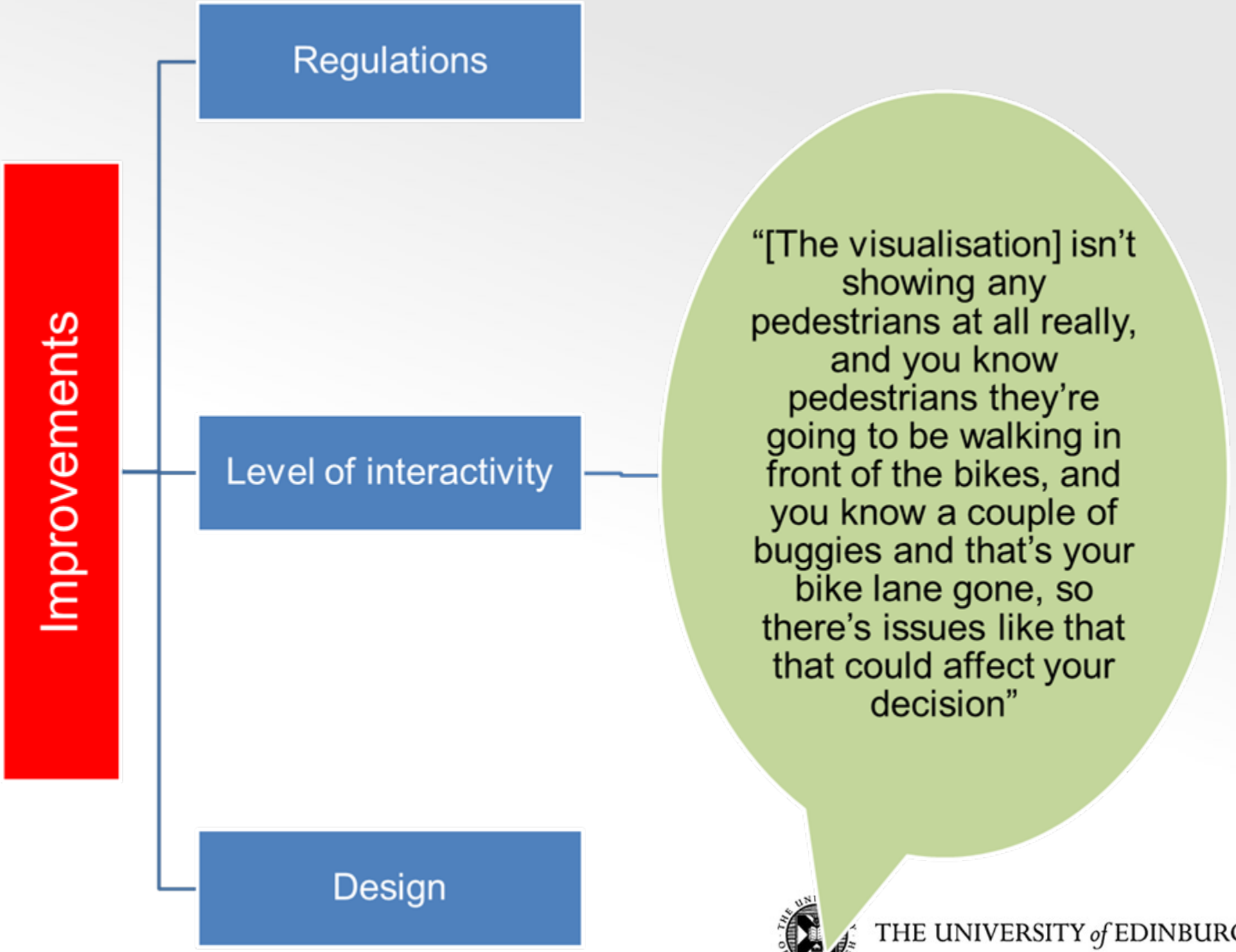
- Thematic analysis approach utilised

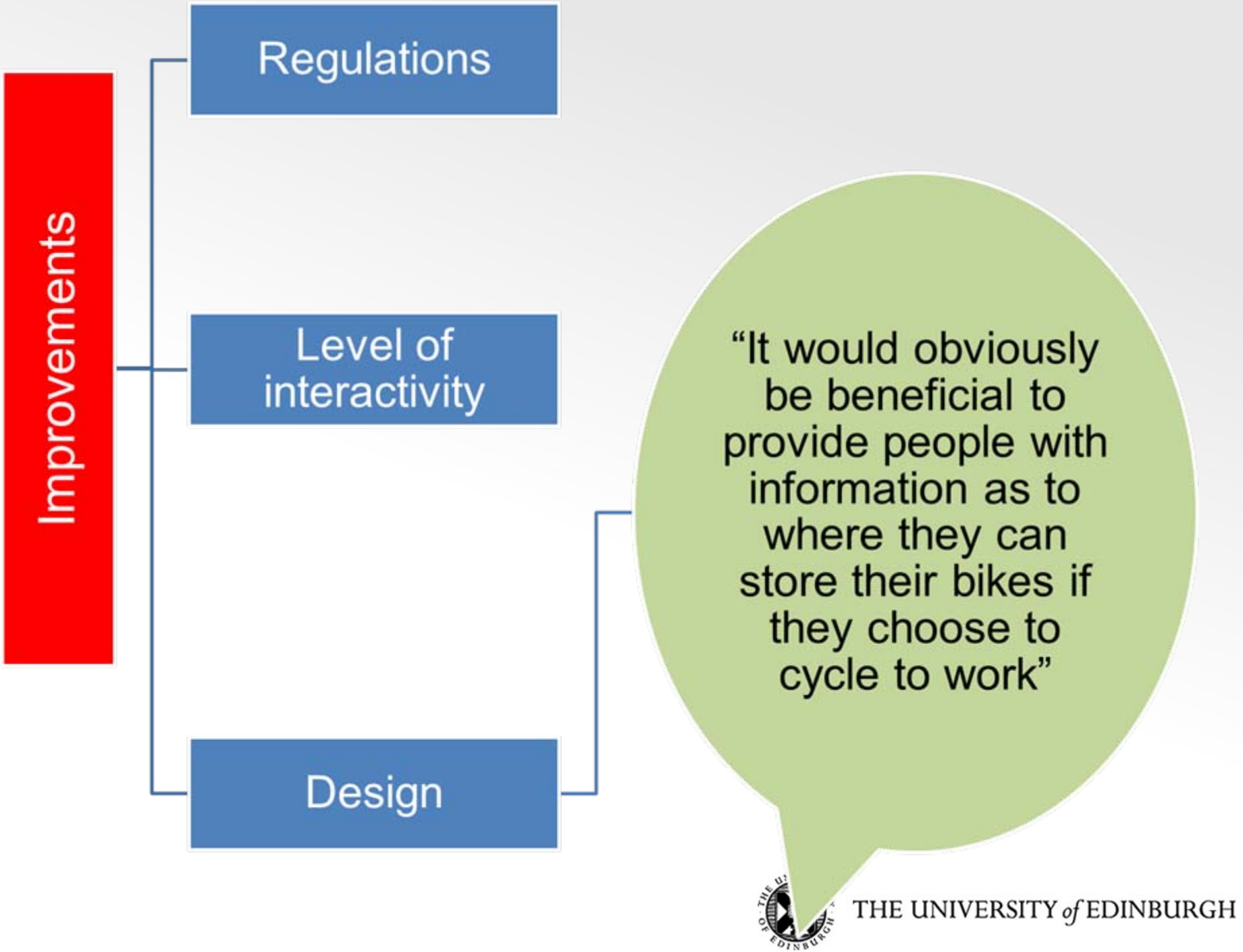

Utility
Active travel to school
Safety improvements
Using cycling facilities
Limitations
User-environment interactions
Alternatives
Conflicts
Improvements
Regulations
Level of interactivity
Design


Utility
Active travel to school
Safety improvements
Using cycling facilities
"The segregated facility bit is at a really good point in that route because it's where there's quite fast-moving vehicles, there's quite a tight turn. It's where cyclists could be quite vulnerable…even as a walker I felt quite vulnerable at that point, so it's good to show that there's protection at certain points"


Limitations
User-environment interactions
Alternatives
Conflicts
"…Here he's obviously climbing a gradient. It makes it look like it's much easier than what that gradient actually is. I mean the bike would be swaying all over the place there"


Limitations
User-environment interactions
Alternatives
Conflicts
"It's optimistic. When [the cyclist] comes up here the traffic light goes immediately [green] for him, he doesn't stop, he just goes on across……I mean probably half the time you'd be waiting for 20-30 seconds, other times we would have to wait for about 50-60 seconds."


Improvements
Regulations
Level of interactivity
Design
"[The visualisation] isn't showing any pedestrians at all really, and you know pedestrians they're going to be walking in front of the bikes, and you know a couple of buggies and that's your bike lane gone, so there's issues like that that could affect your decision"


Improvements
Regulations
Level of interactivity
Design
"It would obviously be beneficial to provide people with information as to where they can store their bikes if they choose to cycle to work"

# Visualisation Evaluation

**CONCLUSIONS**

- First study to evaluate the use of visualisation technology in promotion of activity travel
- Potential uses:
  - stimulate discussion on how participants' view active travel
  - novel way to communicate infrastructure changes that improve the safety of pedestrians and cyclists', and, promote new walking and cycling routes
- Limitations:
  - misrepresents the physical (effort) and cognitive (stress) demands of active commuting
  - misrepresents physical and social environmental factors
- Process evaluation of intervention to assess role in behaviour change

# Practical issues around natural experiments

# Practical Issues

- MRC Guidance on using natural experiments

  (MRC., 2011; www.mrc.ac.uk/naturalexperimentsguidance)

  – "events, interventions or policies which are **not under the control of researchers**"

- Delays in implementation of natural experiment (will) occur

# Completion of Connect2 infrastructure - Glasgow

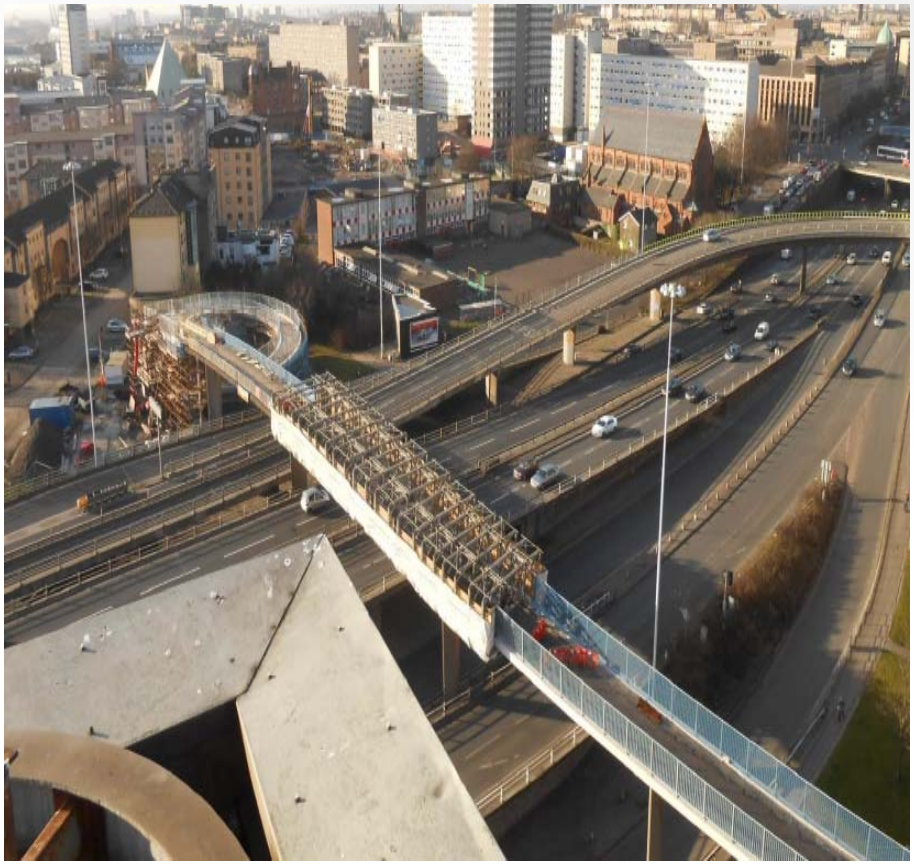


Photo courtesy of Raynesway Construction

<u>Scheduled dates for completion:</u>

1.April 2011
- then delayed due to financial issues

2.April 2012
- then delayed due to site access and legal issues

3.March 2013
- then delayed due to design issues

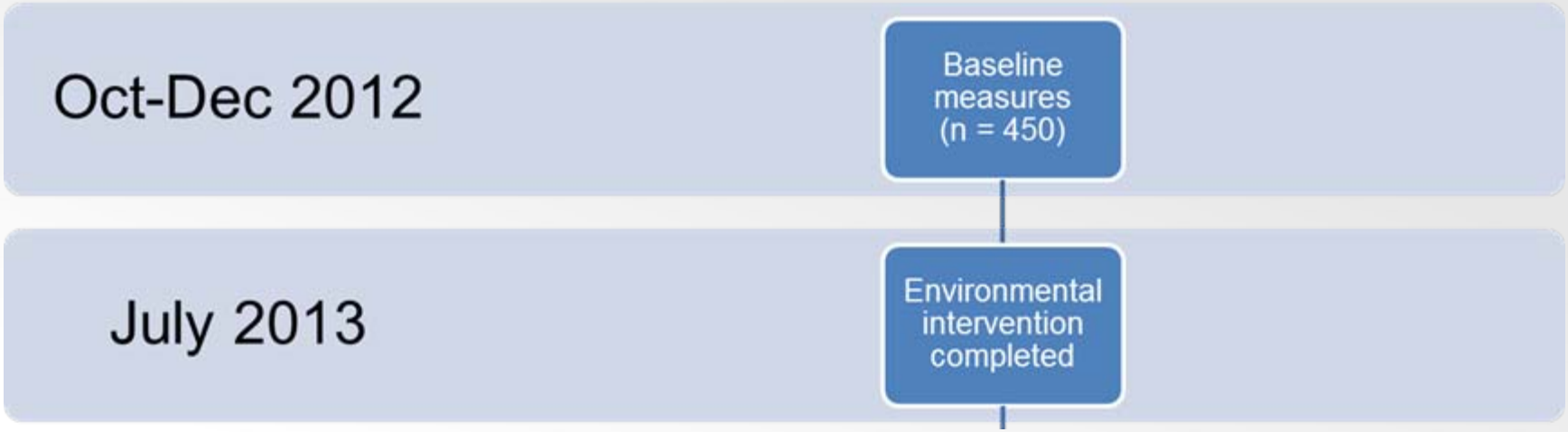
4.July 2013
- finalised date

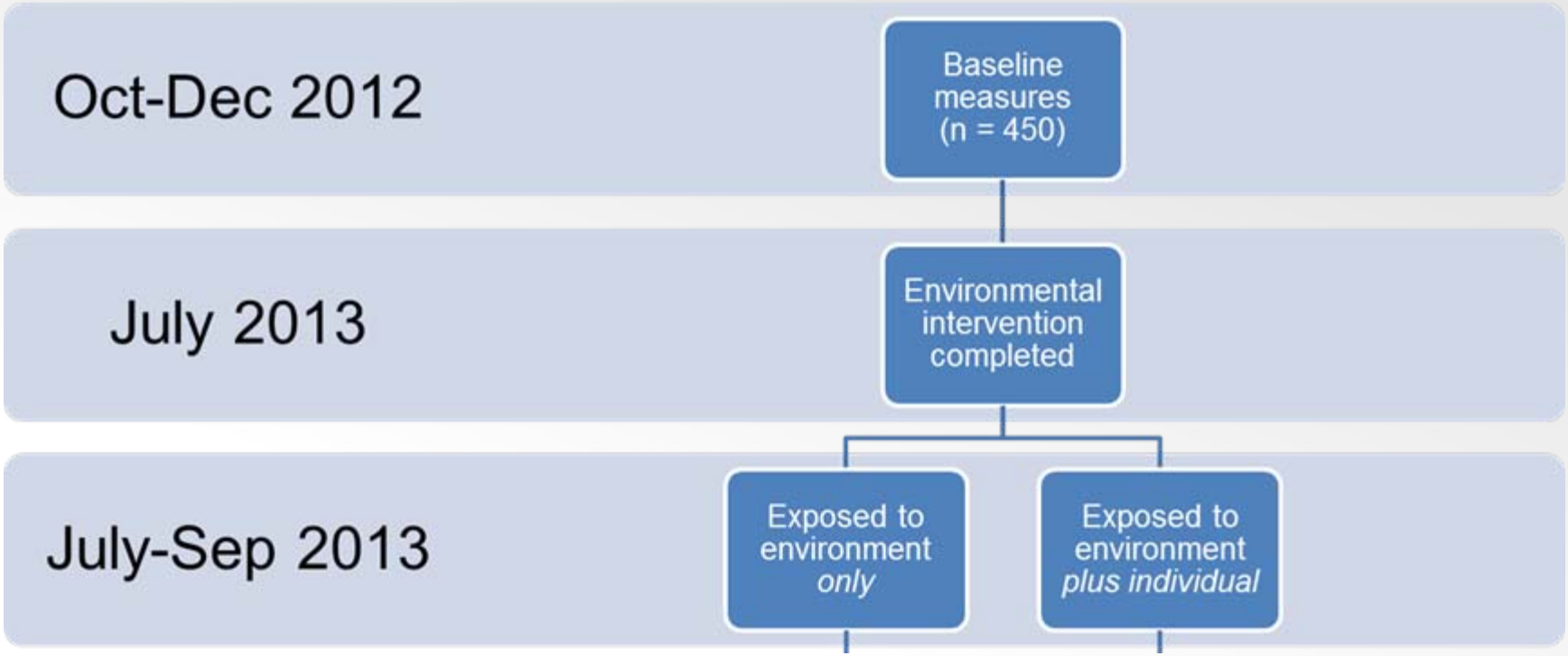
# Practical Issues

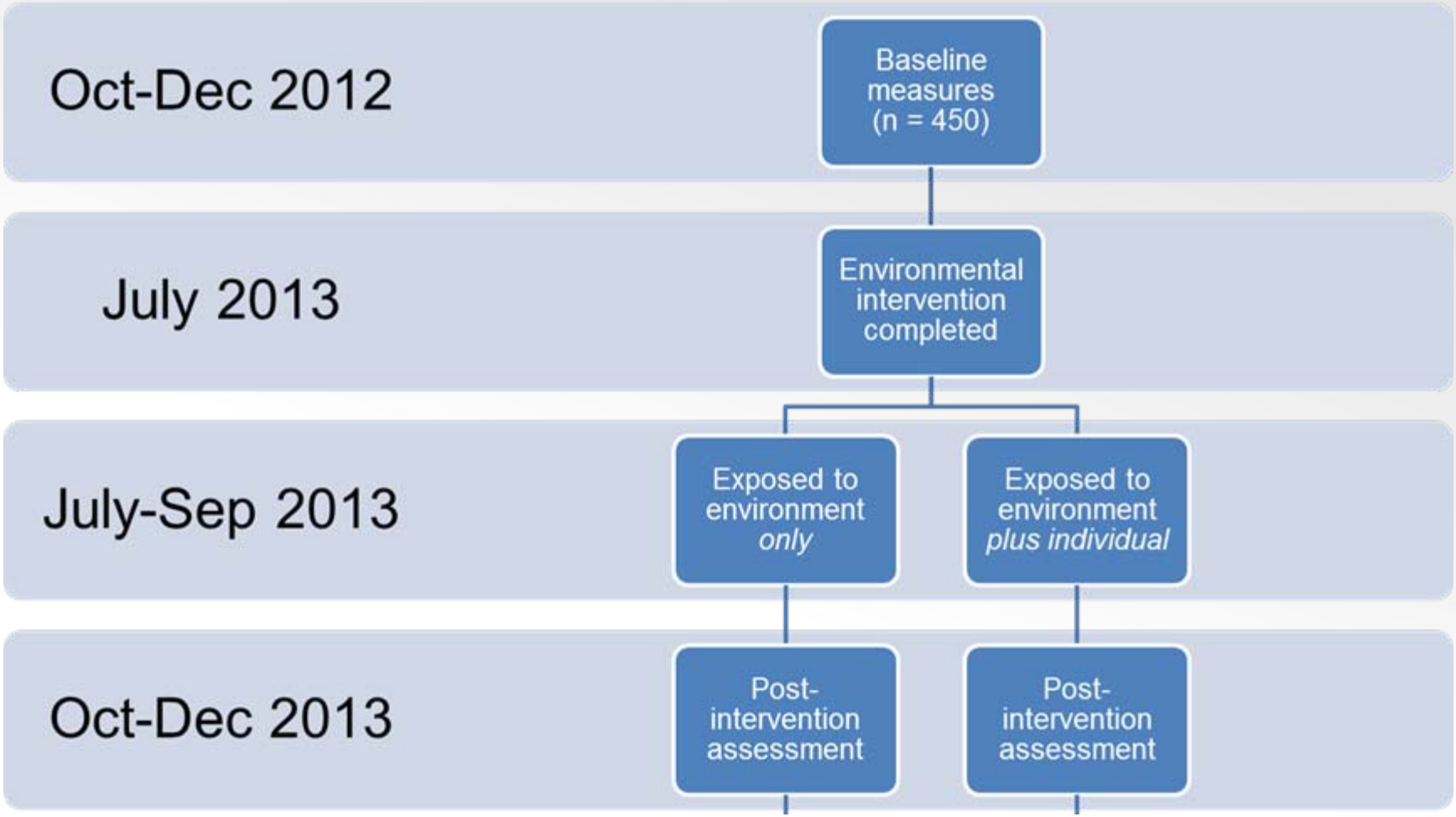
- Communication with key stakeholders
  - e.g., Representation on respective steering group members
- Contingency plans must be considered from outset
  - Can research question still be answered?
  - Ensure maximize investments
  - Can developmental work be enhanced?
  - Contribute to future funding?

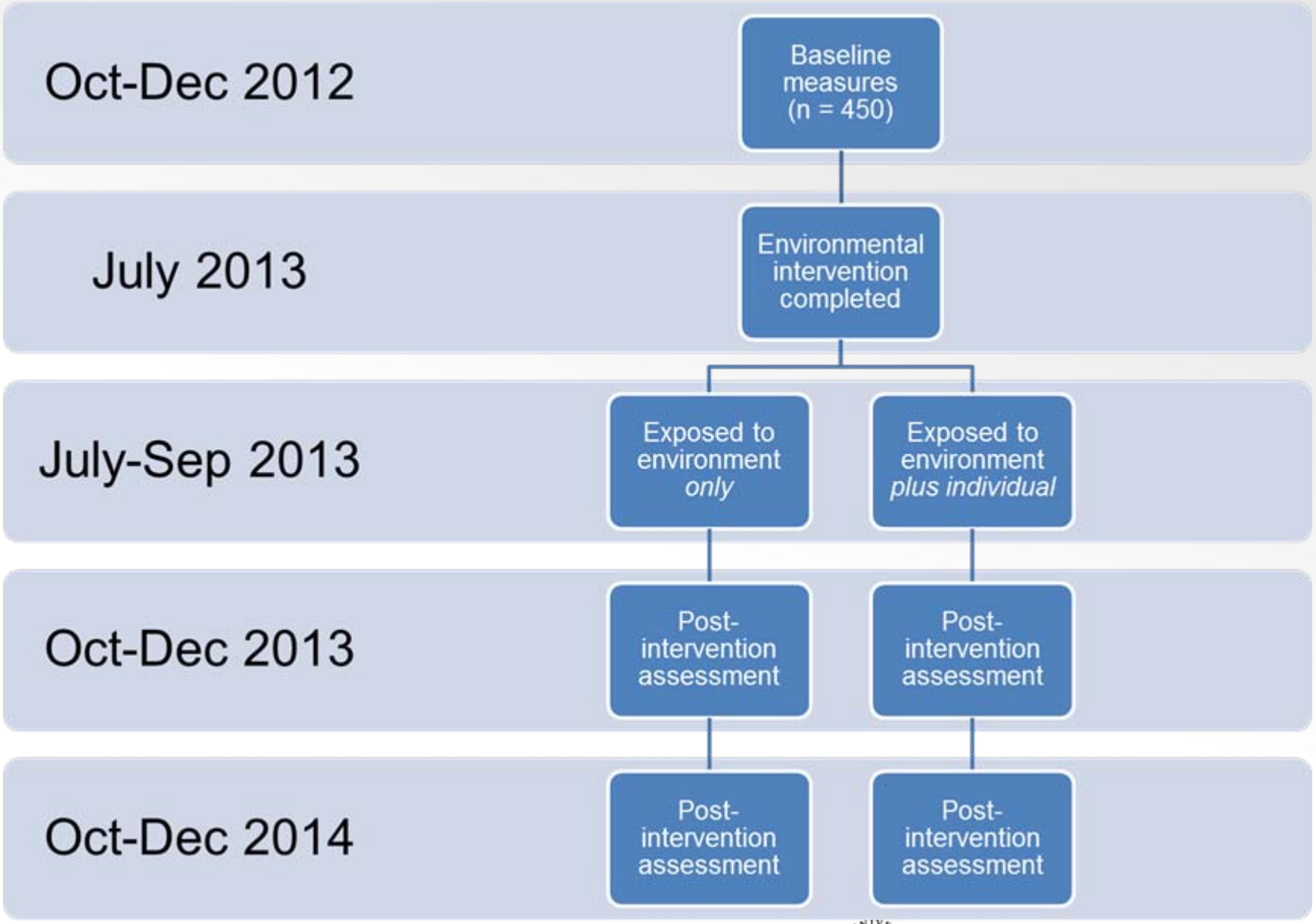
Oct-Dec 2012

Baseline measures (n = 450)


Oct-Dec 2012
Baseline measures (n = 450)
July 2013
Environmental intervention completed


Oct-Dec 2012
Baseline measures (n = 450)
July 2013
Environmental intervention completed
July-Sep 2013
Exposed to environment *only*
Exposed to environment *plus individual*


Oct-Dec 2012
Baseline measures (n = 450)
July 2013
Environmental intervention completed
July-Sep 2013
Exposed to environment *only*
Exposed to environment *plus individual*
Oct-Dec 2013
Post-intervention assessment
Post-intervention assessment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Post-intervention assessment
Post-intervention assessment
Oct-Dec 2014
Post-intervention assessment
Post-intervention assessment

# Thanks to:


- Dr Graham Baker (University of Edinburgh)
- Prof. Jane Powell (University of West of England)
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- Dr Shannon Sahlqvist (Deakin University)
- Mr David Drinkwater (University of East Anglia)
- Miss Emma Bill (University of Strathclyde)