Quantifying the barrier effect of main roads on pedestrian preferences and behaviour

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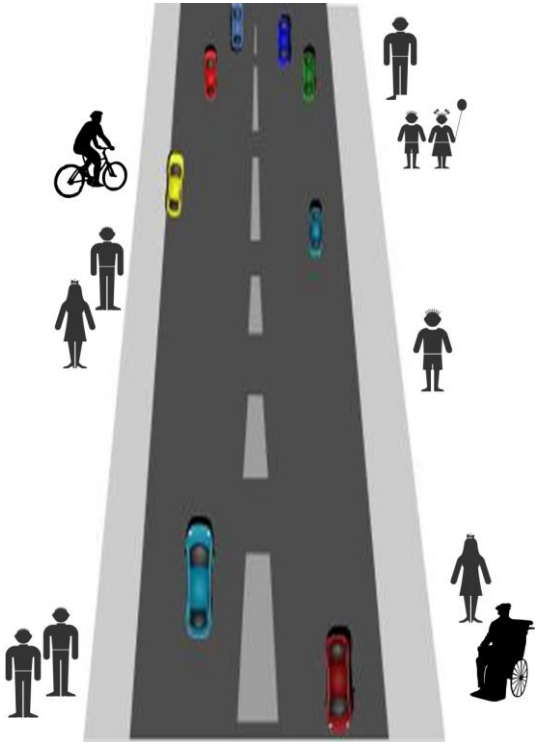
The barrier effect of roads (a.k.a. community severance)



Roads and motorised traffic → Difficult to cross → ↓ walking trips → ↓ health and wellbeing


200 yds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COROLLA

How to measure the barrier effect?

- Sweden, Denmark (old documents for transport appraisal):

  formulas combining traffic variables (density, composition, speed), crossing need, and unit monetary values per age group

- Pedestrian delay * value of walking time

- Stated preference:

  estimate willingness to contribute to projects that reduce severance

Stated preference survey

SP1
willingness to walk

SP2
willingness to pay

to avoid crossing a road in a place without crossing facilities

423 respondents in 4 areas around busy roads in England

SP1: design

Looking at the road conditions on the left, which of the three options would you choose?

Traffic density: **Low**		
Central reservation with no guard railing		
		Avoid crossing road at all
Cross at closest point (not at pedestrian crossing)	Use covered over road Adds 8 minutes to your journey	
Option A	Option B	Option C

OR OR

Attributes

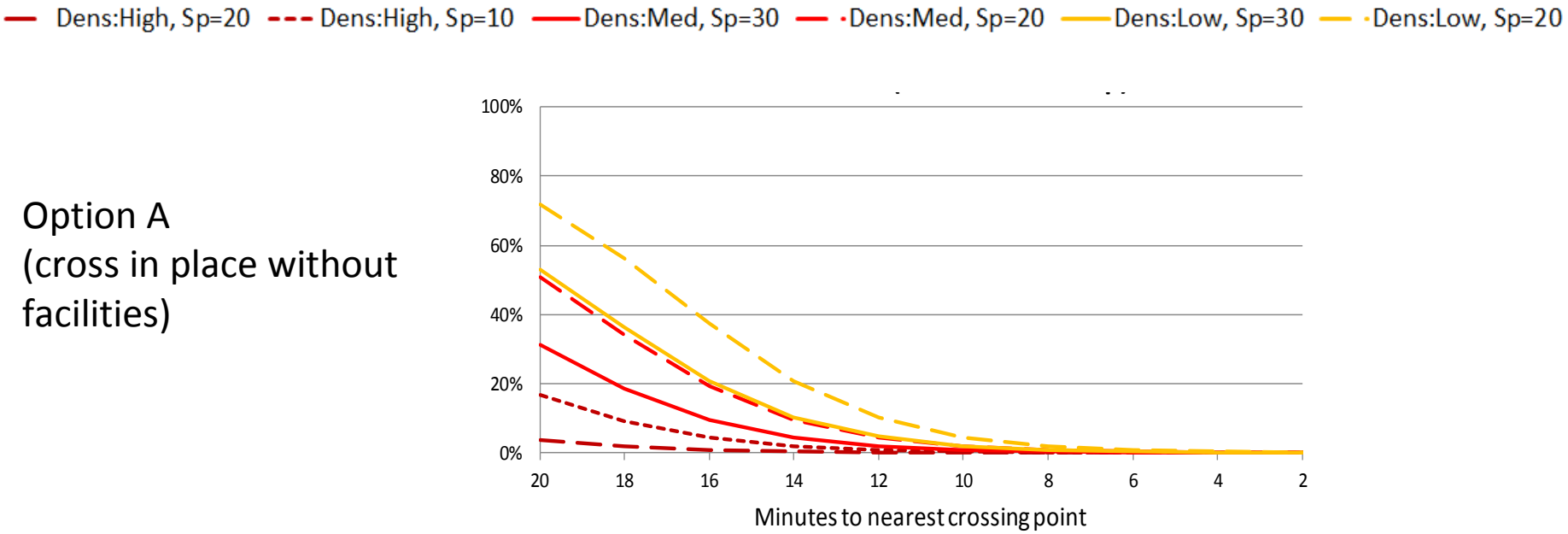
SP1: model results

Variables	MIXED LOGIT	
	coeff.	**willingness to walk** (minutes)
time	-0.43***	
Option A (cross)	-3.55***	
lanes=2	-2.51***	5.8
lanes=3	-2.14***	5.0
no central reservation	-2.08***	4.8
density=medium	-0.91***	2.1
density=high	-4.17***	9.7
speed=20mph	-1.65***	3.8
speed=30mph	-2.47***	5.7
Option C (don't cross)	-7.95***	

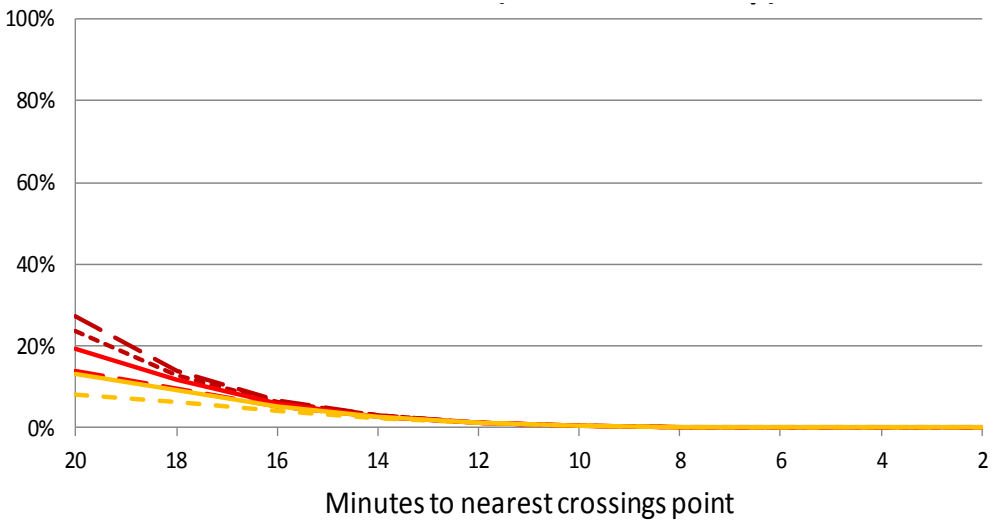
Higher for people aged>50 (vs. age<50)

SP1: probability of choosing options

Option A
(cross in place without facilities)



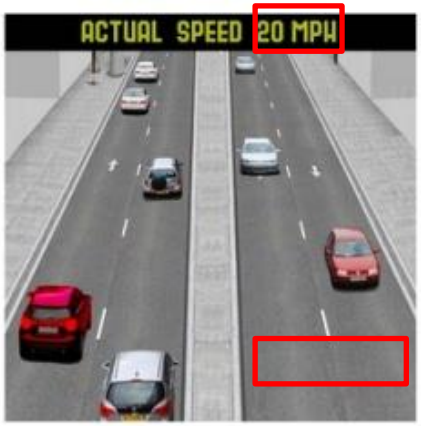
Option C
(avoid crossing)



SP2: design

Traffic density: **Low**

Central reservation with no guard railing



In this scenario, which of the two options would you choose?

Option A	Option B
Cross at this point Saving 80p off your one-way ticket cost	Do not cross the road and pay the higher ticket cost

○ Option A ○ Option B

Attributes

or shopping bill

SP2: model results

	RANDOM-EFFECTS LOGIT	
	coeff.	**willingness to pay (£)**
constant	-0.28	
saving	1.25***	
lanes=2	-1.38***	1.1
lanes=3	-1.73***	1.4
no central reservation	-1.39***	1.1
density=medium	-1.03***	0.8
density=high	-2.21***	1.8
speed>=30	-0.61***	0.5

Higher for people aged>50 (vs. age<50)

Higher for people with mobility restrictions (vs. full mobility)

Application: Tool for local authorities/general public

ROAD

Green: cells to be edited

How long is the section of the road? 500 meters (100 to 1000m only)

Use the dropdown menus to select the characteristics of the road

	CURRENT SCENARIO	FUTURE SCENARIO
Number of lanes (in each direction)	2	2
Central reservation	no	no
Traffic density	high	medium
Traffic speed	30mph	30mph

AREA

POPULATION

Insert information about the population living in the area

Green: cells to be edited

	CURRENT SCENARIO	FUTURE SCENARIO
Population	1000	1000
% over 50	30	40
% over 65	20	30
% with disabilities	5	5

FACILITIES

Use the dropdown menus to select the facilities available in the area

Green: cells to be edited

	CURRENT SCENARIO	FUTURE SCENARIO
Train station	yes	yes
Supermarket	no	yes
Health centre	yes	yes
Community centre	yes	yes
Park	no	no

Summary

The stated preference study showed that people are willing to walk additional times or to forego a cost saving in order to avoid crossing busy roads in places without crossing facilities

The reduction of the willingness to walk/pay associated to improvements in the road (for example, reducing traffic levels) is an indicator of the unit value of those improvements

Thank you for your attention!

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