

# Neighbourhood Design Perception, Preferences and Travel Behaviour in Tyne & Wear, North East England

Presentation prepared for EURA 10<sup>th</sup> Conference 'The Vital City' 2007  
University of Glasgow



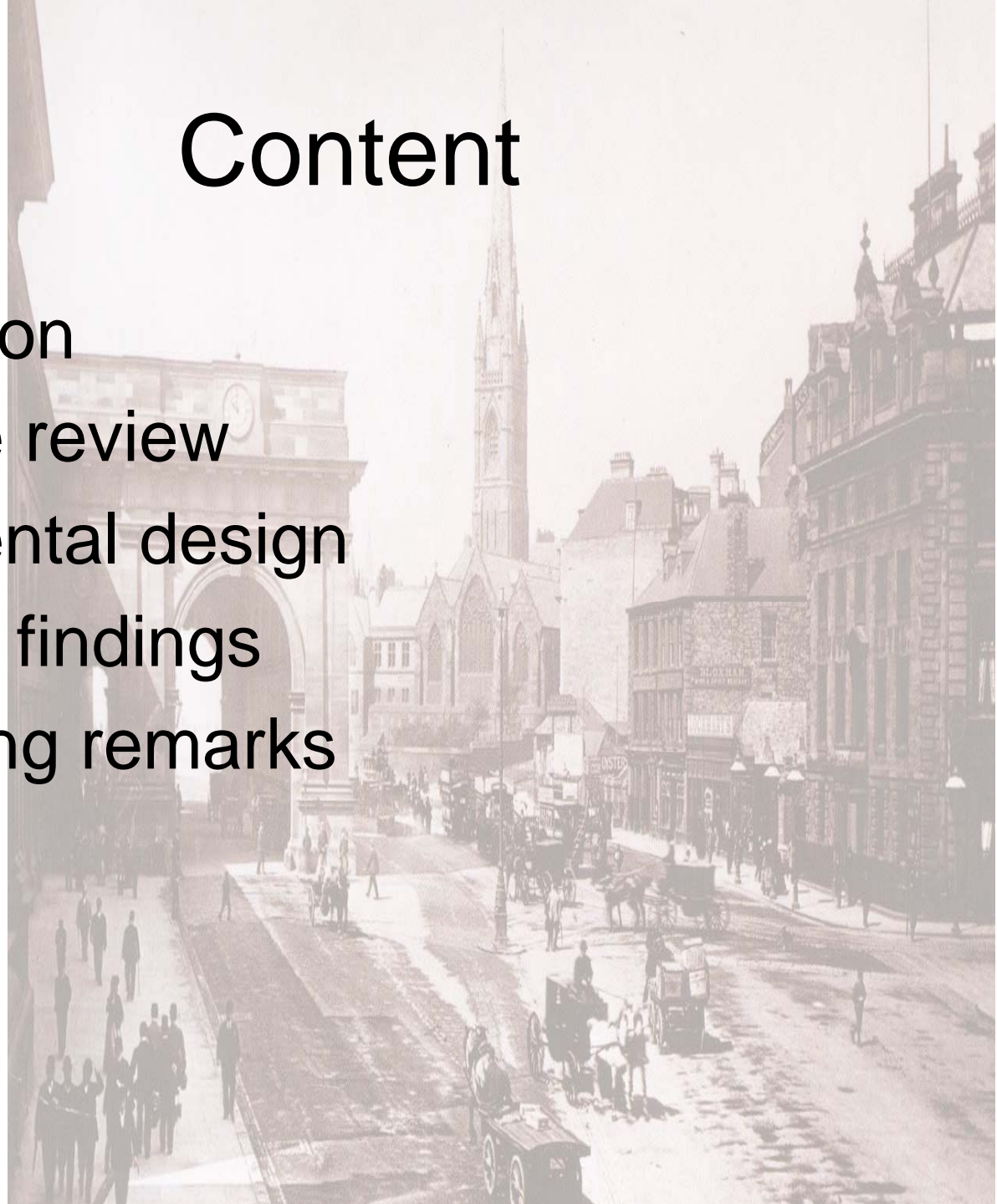
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# Content

- Introduction
- Literature review
- Experimental design
- Empirical findings
- Concluding remarks



# Introduction

- A State of Transport Sustainability
- New Urbanism and The Compact City
- UK current state of the art
- Aim and Objective



# Analysis of travel and urban form relationships

Descriptive studies

'What is'

Hypothetical studies

'testing'

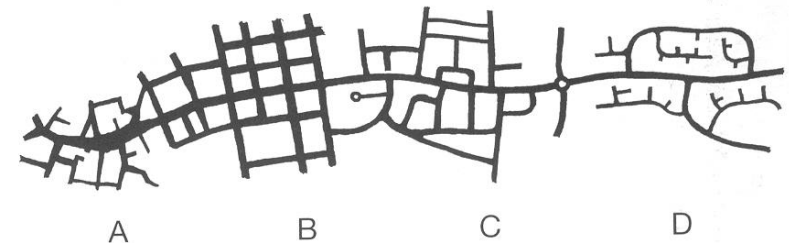
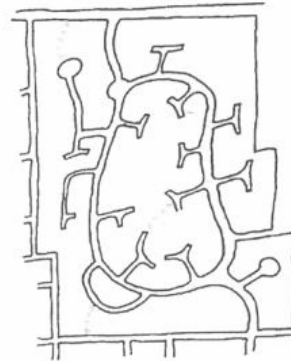
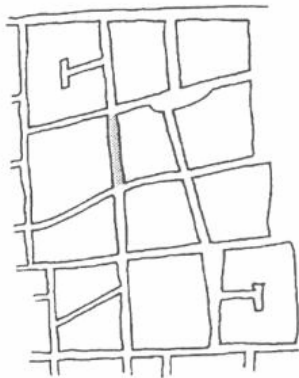
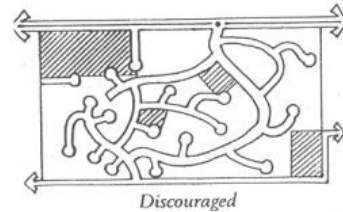
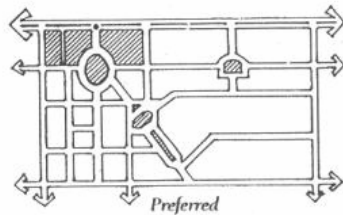
Multivariate statistical studies

'Why is'

Longitudinal studies

'time order'

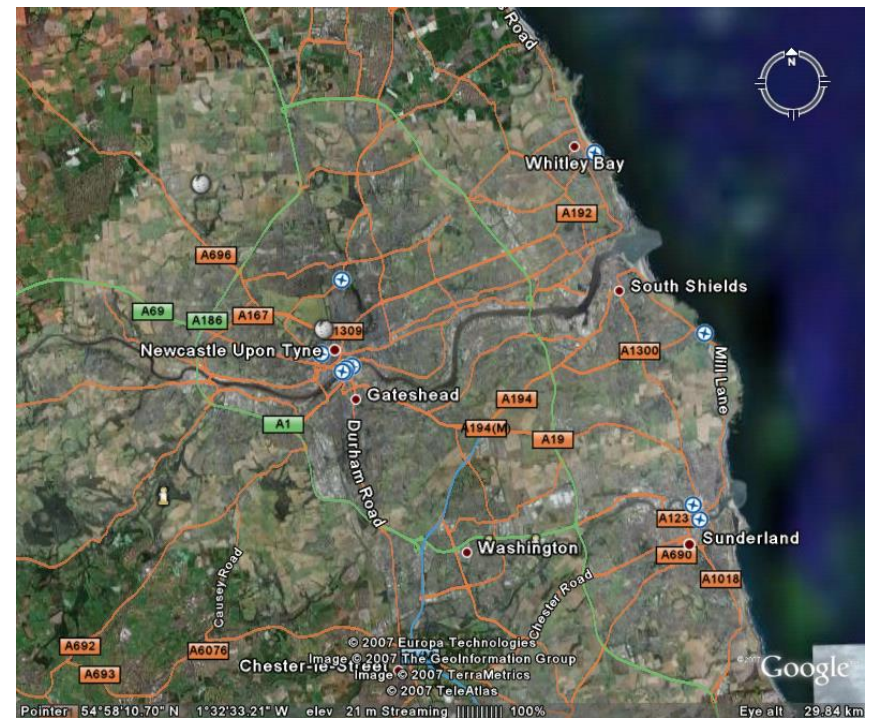
# Neighbourhood street layouts



(a) Preferred vs discouraged approach

(b) Typo-morphological approach

# Tyne and Wear, UK: the case study area and selection of 'hotspots'



Pop. in 2001: 1,075,938

# Sample and Population characteristics

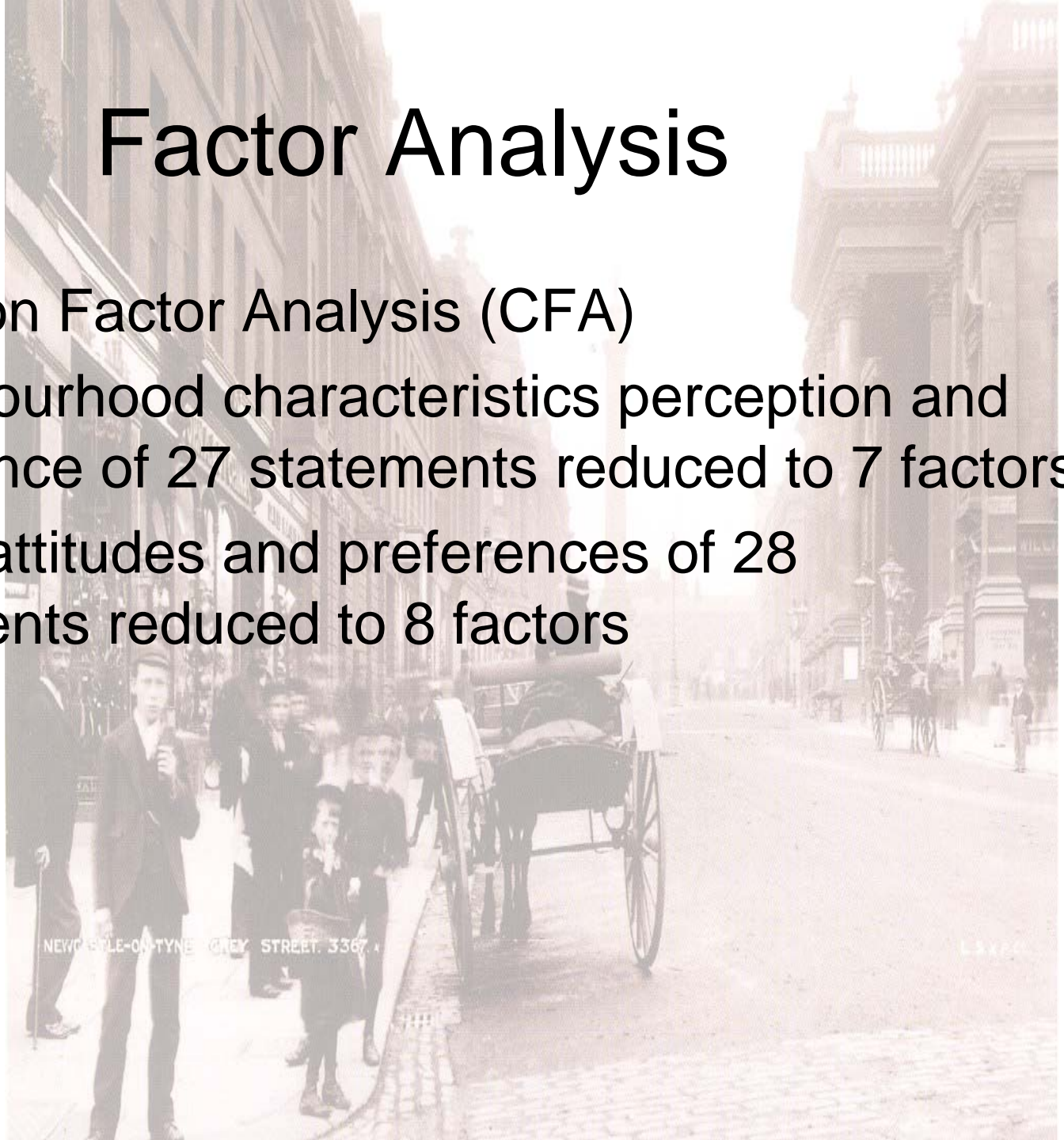
	Sample*		Population**	
	Traditional	Suburban	Traditional	Suburban
Sample H/H (Number)	<b>339</b>	<b>346</b>	<b>3281</b>	<b>3125</b>
Percent Female (%)	<b>50.86</b>	<b>43.52</b>	<b>51.55</b>	<b>50.69</b>
Percent age 25 – 44 (%)	<b>27.82</b>	<b>29.12</b>	<b>31.50</b>	<b>29.25</b>
Percent age 45 – 64 (%)	<b>39.60</b>	<b>44.06</b>	<b>23.91</b>	<b>27.41</b>
Percent age 65 above (%)	<b>29.80</b>	<b>21.80</b>	<b>18.14</b>	<b>12.66</b>
Average H/H size	<b>2.12</b>	<b>2.57</b>	<b>2.26</b>	<b>2.60</b>
H/H with dependent children (%)	<b>17.86</b>	<b>28.64</b>	<b>27.19</b>	<b>35.81</b>
No car available to H/H (%)	<b>19.32</b>	<b>11.54</b>	<b>29.51</b>	<b>17.22</b>
One car available to H/H (%)	<b>52.76</b>	<b>46.38</b>	<b>50.00</b>	<b>46.51</b>
Two cars available to H/H (%)	<b>22.94</b>	<b>34.26</b>	<b>17.94</b>	<b>29.70</b>
Percent home owner (%)	<b>87.30</b>	<b>90.60</b>	<b>84.52</b>	<b>86.98</b>
Avg. years lived at current address	<b>20.36</b>	<b>15.27</b>		
Avg. typical week mileage (work)	<b>77.14</b>	<b>120.06</b>		
Avg. typical week mileage (local)	<b>45.46</b>	<b>70.11</b>		
Avg. typical week mileage (total)	<b>122.59</b>	<b>190.18</b>		
Avg. units built after 1960s (%)	<b>10</b>	<b>82</b>		

\*Sample characteristics  
(Source: this study)

\*\*Population characteristics  
(Source: British Census 2001 <http://neighbourhood.statistics.gov.uk>)

# Factor Analysis

- Common Factor Analysis (CFA)
- Neighbourhood characteristics perception and preference of 27 statements reduced to 7 factors
- Travel attitudes and preferences of 28 statements reduced to 8 factors





# Accessibility attributes of neighbourhoods:

Factors	Statements	Loading*
Travel Accessibility	Easy access to a good public transport service	0.860
	Good public transport service	0.784
	Easy access to highway network	0.489
	Local shops within walking distance	0.457
	Pavements – easy walking routes	0.436
	Easy access to town centre	0.268
	Parks and open spaces nearby	0.263
Shopping/facilities Accessibility	Easy access to a district shopping centre	0.837
	Easy access to town centre	0.679
	Other amenities/facilities nearby	0.494
	Local shops within walking distance	0.374
	Easy access to highway network	0.280
Outdoor space Accessibility	Parks and open spaces nearby	0.578
	Extension of cycle routes	0.544
	Other amenities/facilities nearby	0.356
	Pavements – easy walking routes	0.296

\*Degree of association between the statement and the factor  
(Source: this study)

## ANOVA on VMT and neighbourhood characteristics between traditional and suburban neighbourhood group

	Avg. trad.	Avg. subr.	Avg. trad.	Avg. subr.
Avg. weekly vehicle miles travel (VMT)	122	190		
<i>Neighbourhood characteristics</i>	<i>perceived</i>		<i>preferred</i>	
Safety, attractiveness and parking space	-	+	+	-
Travel accessibility	+	-	+	-
Residential spaciousness	-	+	-	+
Shopping/facilities accessibility	+	-	+	-
Social factors	+	-	+	-
Neighbourhood attractiveness	-	+	-	+
Outdoor space accessibility	-	+	-	+

**+/-** Significantly different at 5% level comparing within trad. or subr.

 Significantly different at 5% level comparing between trad. vs subr.

## ANOVA on travel attitudes between neighbourhood group

	Avg. trad.	Avg. subr.
<i>Travel attitude/preferences characteristics</i>		
Pro-public transport use	+	-
Travel minimising awareness	+	-
Pro-cycling	-	+
Safety of car	-	+
Pro-walking	+	-
Car dependent	-	+
Pro-travel	+	-
Travel-time sensitivity	+	+

**+/-** Significantly different at 5% level comparing within trad. or subr.

 Significantly different at 5% level comparing between trad. vs subr.

## Causal Explanation of VMT traditional neighbourhood group


## Causal Explanation of VMT suburban neighbourhood group

Model Ln (VMT+1)	Std $\beta$	<i>p</i> -value	Std $\beta$	<i>p</i> -value
(Constant)		.059		.390
FEMALE	-.025	.457	-.039	.253
Employed	.081	.033	.128	.001
Driving license	.442	.000	.377	.000
Cars available to H/H	.322	.000	.374	.000
Pro-walking attitude	-.058	.072	.000	.994
Pro-public transport attitude	-.097	.006	-.183	.000
Safety of car attitude	.053	.096	.060	.087
Car dependent attitude	.191	.000	.152	.000
Residential spaciousness preference	.009	.774	-.079	.022
Shopping/facilities accessibility preference	-.083	.011	-.024	.502
Safety, neighbourhood attractiveness and parking space preference	-.065	.051	-.006	.859

N=276, R-square=.737, adjusted R-square=.726, (sig. with *p*-value of 0.000)

N=277, R-sq=.709, adjusted. R-sq=.697, (sig. with *p*-value of 0.000)

 Significant at 5% level

 Significant at 10% level

## Causal explanation in Tyne & Wear case study of land-use transport relationships

Model Ln (VMT+1)	Std $\beta$	p-value
(Constant)		.032
FEMALE	-.037	.111
Employed	.094	.000
Driving license	.402	.000
Cars available to H/H	.356	.000
Pro-walking attitude	-.035	.122
Pro-public transport attitude	-.137	.000
Safety of car attitude	.055	.015
Car dependent attitude	.173	.000
Residential spaciousness preference	-.022	.333
Shopping/facilities accessibility preference	-.059	.011
Safety, neighbourhood attractiveness and parking space preference	-.033	.155

N=553, R-square=.729, adjusted R-square=.723, (sig. with p-value of 0.000)



Significant at 5% level

# Concluding remarks

- Descriptive evidence of differences between neighbourhoods to support the contention that neighbourhood design influences different travel behaviour
- Different accessibility issues shown to explain differences in travel patterns
- Multivariate analysis shows a causal relationship between travel attitudes/preferences and neighbourhood design preferences and VMT but with different emphases between traditional and suburban neighbourhoods.

# Concluding remarks (2)

- The traditional neighbourhood model can predict better the neighbourhood design preferences which contribute to less car travel
- The suburban model confirms previous literature of residential spaciousness preference explaining the causal relationships;
- Land use policy designed to accommodate low carbon based travel neighbourhood design will have greater impact on traditional neighbourhood group than the suburban group.

# Concluding remarks (3)

- Although residents of a traditional neighbourhood have more advantage of better accessibility, the causal explanation revealed that they have a higher potential to travel further than their suburban counterparts if given the opportunity; suggesting that a persons desire to travel further is inherent even though they have better choices to other travel opportunities.
- This study so far has established causal links between land use and transport; further study is to include a longitudinal approach to establish an even stronger explanation of how neighbourhood design can change a persons travel behaviour.





Thank you

Any questions?

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