

The role personal norms in the choice of mode for commuting

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Conclusions

Results

Analysis

Methodology

Objective

What a piece of work is a man!

*How noble in **reason**,
how infinite in **faculty**!*

...

...

*In **apprehension** how like a god!*

...

The paragon of animals!...



Background

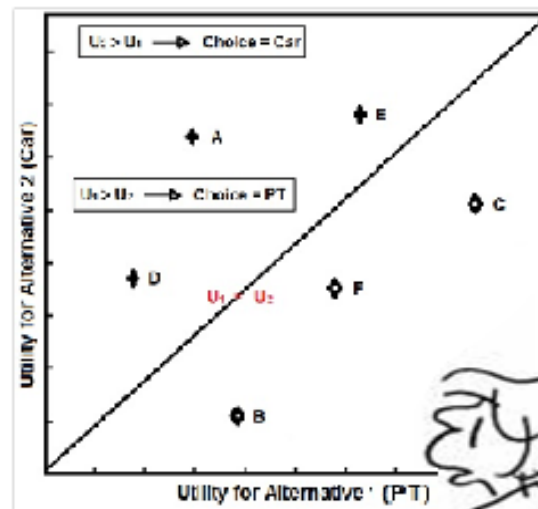
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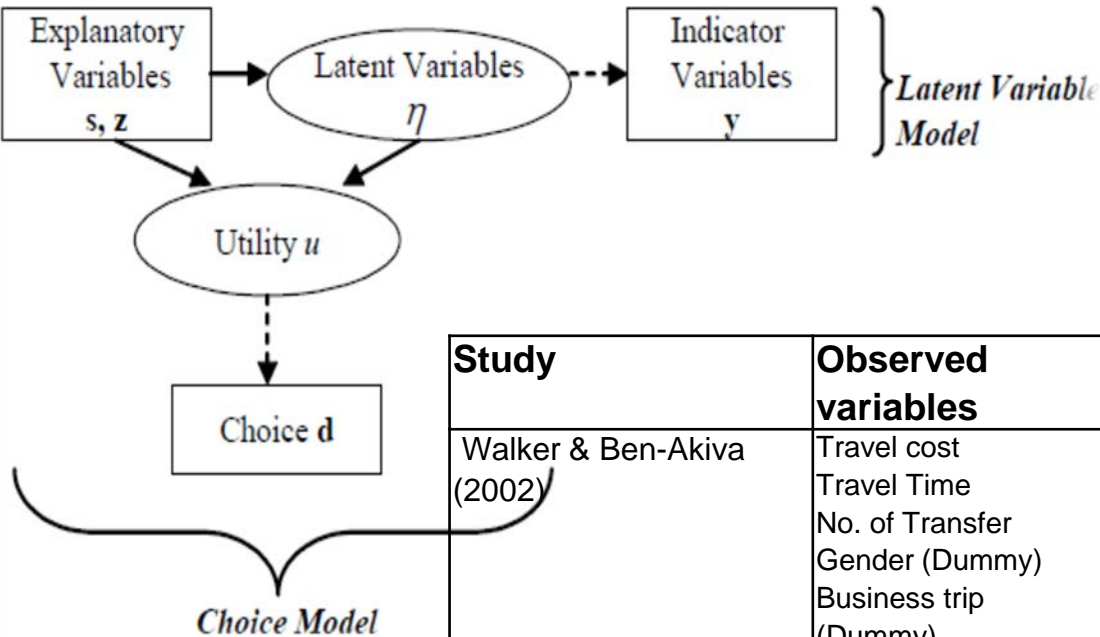
Objective



"I don't think he had a unique view of the world.
I think he lost a contact."



Background



Study	Observed variables	Latent variables	Application
Walker & Ben-Akiva (2002)	Travel cost Travel Time No. of Transfer Gender (Dummy) Business trip (Dummy)	Ride comfort Convenient	Travel mode choice
M.F. Yáñez Patricio Mansilla and J. de D. Ortúzar (2009)	Cost Walking time Waiting time Travel time	Accessibility comfort safety reliability	Choice
M.F. Yáñez, S. Raveau, and J. de D. Ortúzar (2010)	Travel Time, Travel cost Waiting time, Transfers Number of cars	accessibility safety/comfort reliability	Choice
S. Raveau, M.F. Yáñez and J. de D. Ortúzar (2012)	Income, Age No. of Children Education level	accessibility comfort safety reliability	Choice

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Behavioural economics and its implications for transport

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ABSTRACT

Increasing attention is being paid to behavioural economics in the social sciences and in public policy. We attempt to gather up the effects based on previous reviews of the literature and show the implications for transport and energy consumption. We show that there are several behavioural aspects of incentives on individual behaviour. We also show that there are a number of contextual factors on individual behaviour, such as **messengers, norms, defaults, salience, priming, affect, commitment, and ego**. We show the implications of this research for experimentation, and the measurement of wellbeing. In particular, we argue that transport research should use field experiments to carefully demonstrate causality in the evaluation of interventions.

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MINDSPACE

- Messenger
- Incentives
- **Norms**
- Defaults
- Salience
- Priming
- Affect
- Commitment
- Ego/Narcissism

change mitigation. We gather these up into a framework called **MINDSPACE**, which is a mnemonic for the contextual factors that impact on behaviour (i.e. messenger, incentives, norms, defaults, salience, priming, affect, commitment, and ego). We are interested in understanding the influences on behaviour rather than behaviour per se, so we focus on evidence from field experiments (mainly natural ones), where the causal effects on behaviour can be robustly assessed and has both very good internal and external validity. We also discuss some of the welfare implications from this



Background

Norms

- Social Norms
 - “standard form of behaviour to which individuals in a social group try to conform”
- Personal Norms
 - Personalised social norms
 - Individual values and principles
 - Internally motivated
 - Gives a sense of moral obligation
- Consumer behaviour research & Norm-activation model
 - Personal norm provokes the sense of moral obligation
 - Affect the behaviour of people

Conclusions

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The goal of this study was to
investigate the influence personal
Norms on the choice of transport for
commuting



Objective

Background

Case study

❖ PT System

- Well-developed
- Extensive
- Efficient
- comprising of bus and tram
- network covers almost all parts of the city

❖ Park and Ride



TOMTOM

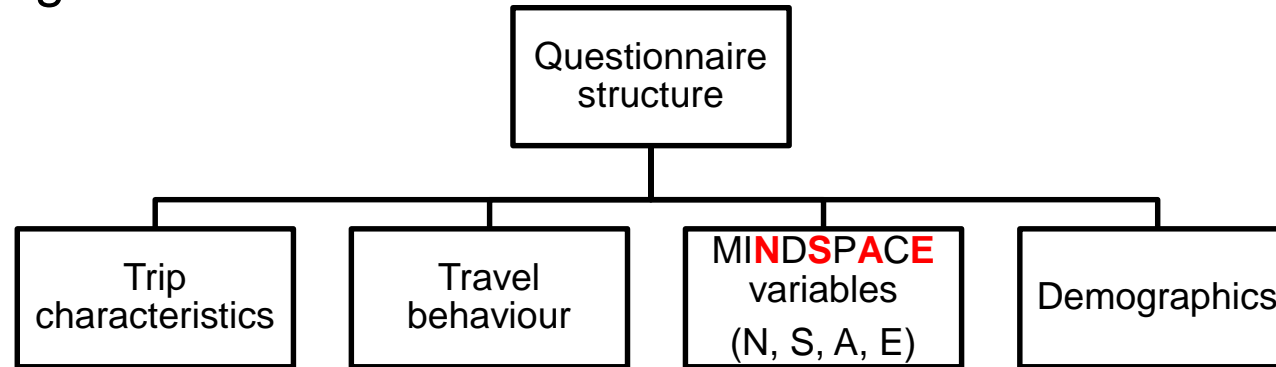
Traffic Index 2018

#	World rank	City	Country	Congestion level
1	27	Edinburgh	United Kingdom	40% ↑ 1%
2	40	London	United Kingdom	37% ↑ 1%
3	56	Bournemouth	United Kingdom	34% ↑ 3%



Data collection

- Postal questionnaire survey
- Edinburgh



Sample

- 500 valid responses
- Aged 18 to 90yrs



Methodology

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Analysis

Please to what extent do you agree or disagree with each of the following statements?

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
Driving is perceived to illustrate a person's power, financial status in society and provide the driver/owner with a positive self-image	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Public transport mode (i.e. local bus service) is seen as a second best option in society	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Public transport is generally perceived to provide environmentally cleaner choice of transport than a car	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There is a general belief that adopting public transport instead of car/van for work/educational journeys is beneficial to the environment and our health.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I believe most of my family and friends share the perception about the benefit of adopting public transport on the environment and our health	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Most of my family and friends use public transport for their work/educational journeys	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If my family and friends change their travel choices, then, maybe I would do same	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I think people should use public transport more for their work/educational journeys due to the increasing levels of traffic congestion and air pollution in the urban centres.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I believe most of the people important to me (family/friends etc) would agree if I use public transport instead of a private car for my normal trips	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I feel morally obligated to use more of public transport due to the impact of our travel behaviour on health and the environment (global warming)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

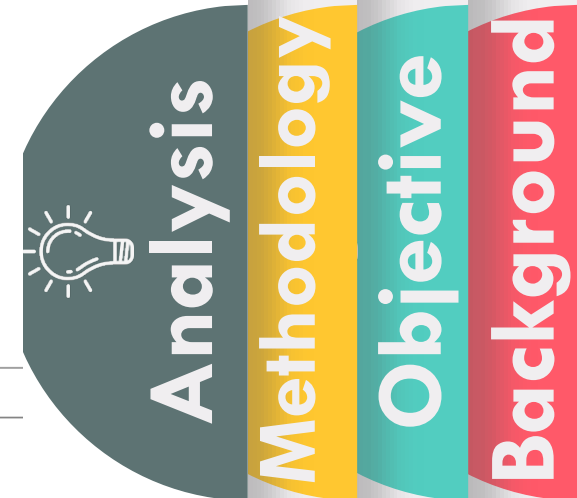
Factor Analysis

Factor Analysis				
Variables		Factor		
		Soc/env norm (33.57%) ^a	Per/env norm (15.82%)	Symbolism
	Cronbach's Alpha	0.779	0.759	0.724
Nr3 ^b	PT is perceived to provide environmentally cleaner transport	0.987		
Nr4	PT is beneficial to the environment and our health.	0.778		
Nr5	Family/friends believe PT is beneficial to the environment and our health	0.465		
Nr8	I think people should use PT more ...		0.663	
Nr9	... family/friends would agree if I use PT instead of car ...		0.660	
Nr10	I feel morally obligated to use more of PT for the environment...		0.604	
Nr1	Driving is perceived to illustrate a person's power ...			0.856
Nr2	PT is seen as a <u>second best</u> option in society			0.664
^a <u>Variance</u> explained; ^b variable name to be used in further analysis				

Please to what extent do you agree or disagree with each of the following statements?

Variable	Mean Rank		U	z-score	Exact Sig. (2-tailed)	
	Car	No Car				
	(341)	(156)				
1 : Driving is perceived to illustrate a person's power ...	231.85	284.10	20640	-3.903	0.000	***
2 : PT is seen as a second best option in society	239.58	272.70	23283	-2.496	0.013	**
3 : PT is perceived to provide environmentally cleaner transport	241.55	266.77	24056	-2.097	0.036	**
4: PT is beneficial to the environment and our health.	242.17	265.41	24270	-1.956	0.050	**
5 : Family/friends believe PT is beneficial to the environment and our health	253.00	243.46	25821	-0.742	0.458	
6 : Most of my family and friends use public transport	234.55	279.18	21671	-3.368	0.001	***
7 : If my family and friends change their travel choices, I may do same	247.67	247.13	26214	-0.043	0.966	
8 : I think people should use PT more ...	233.91	283.69	21343	-3.836	0.000	***
9 : ... family/friends would agree if I use PT instead of car ...	226.38	287.62	19336	-4.681	0.000	***
10: I feel morally obligated to use more of PT for the environment...	232.19	286.10	20755	-4.008	0.000	***
*: p<0.1, **: p<0.05, ***: p<0.01						

- Car vs No car
 - Car owners agree less on the symbolism of driving
 - Car and non-car owners differ in perception on:
 - Carbon foot print of transport both at societal and personal level



Please to what extent do you agree or disagree with each of the following statements?

Variable	Mean	Std Dev	Mean Rank			Chi- sq	Sig	
			NMT (130)	Car (192)	PT (170)			
1 : Driving is perceived to illustrate a person's power ...	2.44	1.174	282.35	213.93	254.47	20.48	0.000	***
2 : PT is seen as a second best option in society	2.77	1.202	261.82	235.15	250.40	3.10	0.212	
3 : PT is perceived to provide environmentally cleaner transport	3.94	0.855	261.95	227.02	257.87	8.30	0.005	***
4: PT is beneficial to the environment and our health.	3.99	0.808	258.98	232.16	254.53	4.79	0.091	*
5 : Family/friends believe PT is beneficial to the environment and our health	3.62	0.886	266.68	243.18	237.65	3.91	0.141	
6 : Most of my family and friends use public transport	2.92	1.110	256.19	207.37	281.77	28.06	0.000	***
7 : If my family and friends change their travel choices, I may do same	1.97	0.879	239.91	245.75	248.02	0.30	0.863	
8 : I think people should use PT more ...	3.91	0.995	270.78	207.16	273.65	28.23	0.000	***
9 : ... family/friends would agree if I use PT instead of car ...	3.56	0.979	283.46	183.89	279.88	62.45	0.000	***
10: I feel morally obligated to use more of PT for the environment...	3.12	1.194	273.27	213.46	263.35	18.55	0.000	***

*: p<0.1, **: p<0.05, ***: p<0.01

- Driving vs NMT and PT users
 - NMT users rate driving highly than car & PT users
 - NMT & PT users favour PT use than driving
 - NMT users agrees more to questions on general perception of transport and the environment



Analysis

Methodology

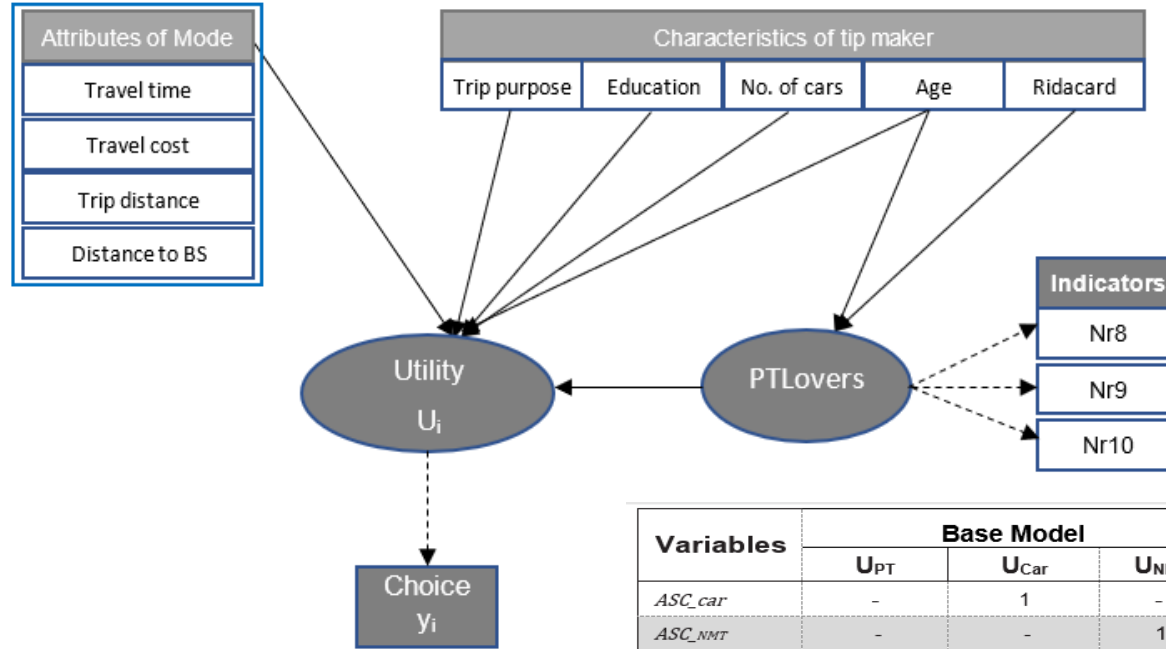
Objective

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ICLV Model Specification



Model estimation with
Biogeme

Variables	Base Model			Latent Choice Model		
	U_{PT}	U_{Car}	U_{NMT}	U_{PT}	U_{Car}	U_{NMT}
ASC_{car}	-	1	-	-	1	-
ASC_{NMT}	-	-	1	-	-	1
β_{Cost}	Cost	Cost	-	Cost	Cost	-
β_{Dist}	Distance	Distance	-	Distance	Distance	-
$\beta_{Dist_{NMT}}$	-	-	Distance	-	-	Distance
β_{Educ}	Educ	Educ	-	Educ	Educ	-
$\beta_{NCar_{PT}}$	NCars	-	-	NCars	-	-
$\beta_{NCar_{car}}$	-	NCars	-	-	NCars	-
$\beta_{TT_{Car}}$	Travel_Time	-	-	Travel_Time	-	-
$\beta_{TripPur}$	-	Trip_Purpose	-	-	Trip_Purpose	-
$\beta_{Dist_{to_BS}}$	-	Dist_to_BS	-	-	Dist_to_BS	-
$\beta_{Age_{car}}$	Age	-	-	Age	-	-
$\beta_{Age_{NMT}}$	-	-	Age	-	-	Age
$\beta_{PTLovers}$	-	-	-	-	PTLovers	-
Attitudes						
$ASC_{PTLovers}$				1		
$\beta_{Ridacard}$				Ridacard		
β_{Age}				Age		

I CLV Model



	Base Model				Latent Choice Model		
Variable	Estimate	t-test	p-value		Estimate	t-test	p-value
ASC _{Car}	-2.62	-3.56	0.000		-2.07	-2.55	0.011
ASC _{NMT}	0.25	0.28	0.780		0.48	0.48	0.632
β_{Age_Car}	0.23	2.19	0.028		0.26	2.16	0.031
β_{Age_NMT}	-0.31	-2.72	0.007		-0.36	-1.93	0.053
β_{Cost}	-0.07	-2.50	0.012		-0.08	-2.01	0.045
β_{Dist}	0.04	2.75	0.006		0.04	2.02	0.044
β_{Dist_NMT}	-0.04	-2.75	0.006		-0.04	-2.02	0.044
β_{Educ}	-0.72	-4.46	0.000		-0.81	-2.62	0.009
$\beta_{TripPur}$	-0.57	-2.00	0.045		-0.66	-2.29	0.022
β_{NCar_Car}	1.24	4.79	0.000		1.37	3.47	0.001
β_{NCar_PT}	-0.46	-1.64	0.101		-0.35	-0.98	0.327
β_{TT_car}	0.12	6.14	0.000		0.14	3.22	0.001
β_{TT_PT}	0.07	7.77	0.000		0.07	3.71	0.000
$\beta_{Dist_to_BS}$	0.38	2.09	0.037		0.34	2.02	0.043
$\beta_{PTLovers}$					5.62	5.46	0.000
Attitudes							
ASC _{PTLovers}					0.646	6.36	0.000
$\beta_{Ridacard}$					0.327	3.24	0.001
β_{Age}					0.061	1.97	0.049
Log-likelihood	269.81				245.03		
ρ^2	0.495				0.627		



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- ❖ The goal of this study was to investigate the influence of *Norms* on the choice of transport for commuting
- ❖ Starting from the work carried out we had initial assumptions that:
 - ❖ Personal norms could significantly explain mode choices
- ❖ Our assumptions was confirmed by our models:
 - ❖ Personal Norms adds to the predictive power of choice models
 - ❖ Persons scoring high on personal norms were more likely to commute with PT or NMT
 - ❖ Drivers significantly differ from PT and Active commuters in perception about PT
 - ❖ Car owners agree less on symbolism of driving –counterintuitive



Thank you