Bicycling in developing countries – the role of gender

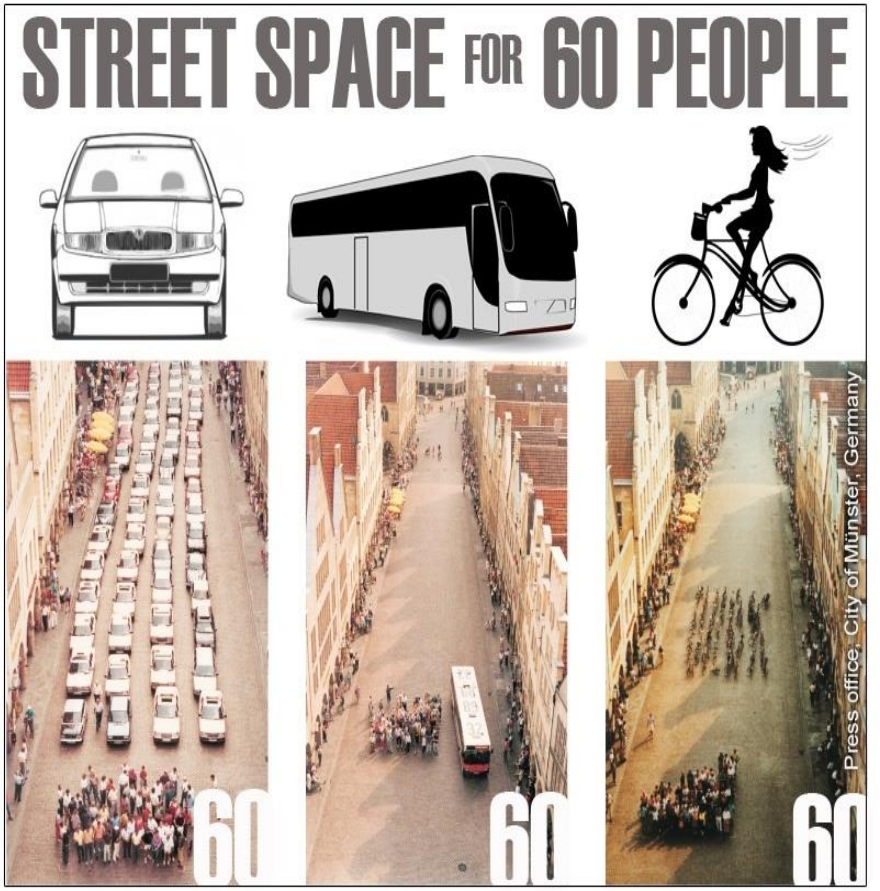
DR. RAHUL T.M
DEPARTMENT OF CIVIL ENGINEERING
AMRITA SCHOOL OF ENGINEERING
COIMBATORE

Index

- Introduction
- Gender differences in transportation
- Objective
- Data collection
- Data Analysis and modeling
- Results
- conclusions

Introduction

- NUTP (2006) –sustainability and equity
- Bicycles –sustainable modes of urban transport
- Bicycling promotion –three pronged approach
  - Individual activity
  - Infrastructure
  - Institutional framework
- Acceptability depends on – Azjen (1991)
  - Individuals' attitude
  - inculcated habits
  - subjective norms


STREET SPACE FOR 60 PEOPLE
60
60
60
Press office, City of Münster, Germany

Gender differences in transportation

- Women - lesser tendency to take risks
  - Internalize traffic rules compared with men (Granie, 2009)
- Women - preference for cycling friendly environment
  - Beecham and Wood (2014) – London
- A higher preference for e-bikes among women
  - Norway and China (Fyhri and Fearnley, 2015; Bicycling in Asia, 2008)
- Gender difference in perception of amenities and facilities for bicycling
  - Krizek et al. (2005)

Objectives of the current study

- Habit and subjective norm influence bicycling
- Gendered effects on willingness of commuters to cycle
  - Safety, environmental consciousness and dressing pattern
- Policy guidelines to promoting bicycling
  - In an Indian scenario

Data collection

- Study are – Bangalore
- Questionnaire data collection
- The questionnaire had five sections
  - Attitudes and subjective norms on cycling
  - Income levels and physical activity
  - Demographic details
  - factors currently limiting their cycle usage
  - factors that might motivate bicycle use in future
- Likert scale varying from 1 (strongly disagree) to 5 (strongly agree)

Data analysis and modeling

- Gender difference among attitudinal variables
  - Statistical comparison
- Regression model estimation
  - Categorical dependent variable
  - Whether the respondent would use a bicycle or not in future

2-sample test

- Statistical analysis
  - For all the sub-groups - sample size >30
  - Use Z-test (10% significance level)

$$z = \frac{(Y_1 - Y_1) - D_0}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$$

Y_1, Y_2 = mean trip distances of the two classes

s_1 , s_2 =standard deviations of the two classes

n_1, n_2 = Sample size of the two classes

Regression structure

$$P(1) = \int_{-\infty}^{v_{1n}-v_{2n}} f\,(\varepsilon_{2n} - \varepsilon_{1n}) d\,(\varepsilon_{2n} - \varepsilon_{1n}) \quad \rightarrow 1$$

$$= \int_{-\infty}^{v_{1n}-v_{2n}} [\mu \frac{e^{-(\varepsilon_{2n}-\varepsilon_{1n})}}{\{1 + e^{-\mu(\varepsilon_{2n}-\varepsilon_{1n})}\}^2}] d\,(\varepsilon_{2n} - \varepsilon_{1n}) \quad \rightarrow 2$$

$$= \frac{1}{1 + e^{-(v_{1n}-v_{2n})}} = \frac{e^{v_{1n}}}{e^{v_{1n}} + e^{v_{2n}}} \quad \rightarrow 3$$

v_{in} = Systematic component of utility for 'i' th mode of an individual 'n'

ε_{in} = Error portion of utility unknown to analyst

Results

Statistical comparison of gender influence

Factors	Males (mean)	Females (mean)	P-value
Natural predisposition to motor vehicle	3.39	3.45	0.68
Unsafe traffic conditions	3.16	3.28	0.37
Difficulty due to Dress / Attire	2.92	3.18	0.022
Environmental Consciousness	3.96	4.02	0.49

Results

Parameters estimated in regression modelling

Variable Name	Parameter value	t-Statistic	Significance level
Alternate specific constant	-11.8	-6.96	0.00
Education level	-0.137	-0.61	0.54
Subjective Norm	-0.0872	-0.76	0.45
Habit	1.54	1.54	0.12
Peer group pressure	-0.329	-2.41	0.02
Unsafe traffic conditions	-0.171	-0.83	0.40
Environmental Consciousness	2.30	6.81	0.00
Unsafe traffic conditions * Gender	0.205	0.88	0.38
Environmental Consciousness * Gender	-0.268	-0.93	0.35
Rho-square	0.360		

Conclusions

- Difficulty among women because of the dress worn
- Increase in education level
  - Decreased the willingness to use bicycle among people
- Higher environmental consciousness among women

THANK YOU