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Cyclists’ perceived safety and its impact on bicycle mode choice

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MOTIVATION
An increasing uptake of active mobility will improve public health, address widespread levels of inactivity in the population and simultaneously reduces air and noise pollution by replacing car trips with walking or cycling. It is important to establish what increases the propensity to cycle to better encourage and foster this mode of transport.

Active mobility study address:
- Macroscopic level to build strategic plans
- Microscopic level to address safety and comfort issues

This study has a microscopic point of view and particularly focuses on cycling perceived safety, which has been constantly cited in the literature as one of the major barriers to increasing cycling.

In Singapore, the bicycle mode share is less than 1% (LTA, 2014). Infrastructure, safety, and weather are the main barriers of cycling in Singapore (Figure 1).

CASE STUDY 1: CYCLISTS’ PERCEIVED SAFETY

**Methods**
- Survey to study people’s preferences in the non-naturalistic, controlled setting.
- Sensors to observe cyclists’ behaviour while cycling

**Limitations of previous studies**
- Different perception of reality and what is perceived in text/pictures/videos used in SP surveys
- Pictures cannot replicate moving objects which highly influence cyclists’ perceived safety

Modeller’s point of view
- Building 3D inexistant scenarios
- Controlled environment to focus on the attributes of interest
- Better observation of the participant’s behaviour in the laboratory setting

Virtual reality added values:
- Participant’s point of view
- Eye-level perspective
- Better sense of the environment
- Better perception of speed, volume, and proximity of moving traffic

**Cycling simulator at FCL (Schramka, 2017)**

Figure 3: Cycling simulator

- VR hardware and sensors to replicate steering, speed, pedalling, and tilting
- VR model is based on a 3D model animated with traffic microsimulations to generate other agents’ movements
- Game engine integrates scenes and traffic trajectories for a better graphic representation.

Figure 4 shows four of the designed scenarios for the cyclists’ perceived safety experiment with different variations in infrastructure, traffic volume and traffic speed.

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REFERENCES


Future Cities: Methodologies
Quantitative Models and Statistical Methods
Cyclists’ Perceived Safety and its Impact on Bicycle Mode Choice
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Aims and Significance
- Study cyclists’ perceived safety
- Explore virtual reality as a research tool
- Assessing role of safety in bicycle mode choice

Approach
- Virtual reality experiment along with survey to study cyclists’ perception of safety
- Web-based stated preference survey to find out the relative importance of perceived safety in bicycle mode choice

Progress and Outcome
- Evidence-based design guidelines for planners
- Understand the added value of virtual reality
- Help decision-makers better understand cyclists’ needs
- Find solutions to improve bicycle mode share

Figure 2. Factors affecting decision to cycle

This results in the following questions
- How to study and measure safety related attributes?
- What is the relative importance of each of these attributes?
- What criteria should decision makers consider to increase bicycle mode share in Singapore?