Cyclists’ perceived safety and its impact on bicycle mode choice

Other Conference Item

Author(s): Nazemi, Mohsen

Publication date: 2017

Permanent link: https://doi.org/10.3929/ethz-b-000207225

Rights / license: In Copyright - Non-Commercial Use Permitted
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).

These results are aligned with the factors cited in literature on individuals’ decisions to cycle, which shows how availability of cycling infrastructure, cyclists’ safety and comfort levels influence bicycle mode share (Figure 2).

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?

CASE STUDY 1: CYCLISTS’ PERCEIVED SAFETY
Subjective methods to study cyclists’ perceived safety:
- 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
- It is not possible to provide the same cycling environment for all of the participants while they are cycling in naturalistic studies

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

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

Cycling simulator at FCL (Schramka, 2017)

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.

Figure 5. Attributes of interest in bicycle mode choice survey

The output of case study 2 identifies the relative importance of safety attributes in the choice of bicycle. Figure 6 shows a part of the survey.

ACKNOWLEDGEMENTS
The research is being conducted at the Future Cities Laboratory at the Singapore-ETH Centre, which was established collaboratively between ETH Zurich and Singapore’s National Research Foundation (FI 370074016) under its Campus for Research Excellence and Technological Enterprise programme.

REFERENCES