Travel mode attitudes, urban context, and demographics: Do they interact differently for bicycle commuting and cycling for other purposes?

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Background
Cycling, a clean and active transportation mode has become an increasingly important component of strategies to address issues of public health, climate change, air quality, and inner-city mobility (Oja et al., 2011). Ecological models suggest that the combination of individual (i.e., intrapersonal sociodemographic) and environmental variables will best explain physical activity (Sallis et al., 2015). Although cycling behavior is often believed to be influenced by both environmental and individual factors, little is known about the interaction effects between these factors in relation to cycling behavior. The conceptual framework for this study (Figure 1) is partly based on previous studies (Willis et al., 2015; Xing et al., 2018).

Methods
• Attitudinal factors concerning different travel modes, namely bus, car, cycling, and train, were constructed by means of factor analysis.
• Multivariate Tobit model: Censored distribution (Excess of zeros due to lack of cycling trips).
• Separate models for commuting and other purposes cycling duration and bicycle usage were used to test the interaction of each of the included variables with cycling attitudinal factors.

Results

Interaction analysis results
Compensatory mechanism
• Positive cycling attitude among those
  • with children less than 12 years old
  • always have a car available
  • having a positive attitude toward bus use

Synergetic mechanism
• Positive cycling attitude among those
  • the middle aged (50-59)
  • senior citizens (60-69, 70+)
  • women

• Positive cycling attitude among those
  • senior citizens (60-69, 70+)
  • Very highly urbanized areas

Conclusions
• Our findings provide partial support for the interactions between environmental and individual factors in relation to cycling behavior, as postulated by sociocological models (Sallis et al., 2015).
• A positive attitude toward cycling was positively related to bicycle commuting duration, but this association was less strong among those with a positive attitude toward bus use.
• Having a positive cycling attitude had a weaker association with both bicycle commuting usage and duration in those who do not always have a car available.
• Regarding cycling for other purposes, cycling attitude had a stronger positive association with cycling duration among residents of very highly urbanized area, compared to residents of less urbanized areas.
• The available evidence, though limited, suggests that targeting attitudes can have a measurable impact on bicycling, but not to the same extent among all people.

References