MODELLING CHILDREN'S MOBILITY AND SCHOOL COMMUTING: *A REVIEW AND KEY CHALLENGES FOR FURTHER RESEARCH*

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PROBLEM STATEMENT

Children's mobility and school travelling are relatively underdeveloped in transport research, especially when compared with commuting to work. Despite it is often argued that a profound analysis of school-travel patterns has the potential to generate many important insights that may impact transport-system policy and management, the modelling of children mobility, is still in an early stage of development and children are often only considered as constraints to adults' mobility. In this paper, we argue that innovative modelling frameworks that were recently developed in the field of transportation could be adapted and applied to the mobility of children in order to develop both novel scientific insights and inform the development of policies aiming at increasing active and independent mobility of children, in a broader vision of sustainability.

DETERMINANTS

Research on child and youth mobility has mainly focused on:

- Declining use of active commuting (cycling and walking)
- Children's independent mobility (the opportunity for children to move freely in the environment without an accompanying adult)
- Increasing prevalence of physical inactivity and obesity among children and youth.

Likelihood of walking or cycling to school decreases as travel distance increases

OBJECTIVES

Increase the behavioral realism in the modeling of children's mobility

- A synthesis of research about the **determinants** of school commuting and active/independent mobility of children to better understand the specificities of children's mobility and the factors to **integrate** in modelling frameworks
- A comprehensive state-of-the art of **transportation modelling** frameworks with a specific emphasis on safety modelling
- Overview of the knowledge with regard to **route choice** modelling.
- Literature with respect to the **information provision** of active transport itineraries
- Guidelines and **key challenges** to address in future research relating to the modelling of children's mobility

TRANSPORT MODELS

- Provide an adequate behavioral basis for school transport, especially in the context of evidence suggesting that children are often accompanied by caregiver(s).
- Imply a shift from aggregate to disaggregate micro-simulation models
- Guarantee integrity
  - The use of time as the integrating framework at both individual and household level reassures intra-person integrity.
  - Intra-household integrity is achieved by coordinating individual daily activity-travel patterns at the household level, considering task and resource allocation, joint activities and joint travel.

ROUTE CHOICE MODELS

- Key determinants pedestrian route choice
  - Physical and social environment, e.g. building design, signage, and streetscape
  - Infrastructure, e.g. pavement, pedestrian crossover, landmarks and waypoints
  - Safety, e.g. traffic safety, congestion, presence of school crossing guard
  - Socio-demographic, e.g. age, gender, ethnicity
  - Trip and route characteristics: travel distance, scenery, number of turns
- Particular determinants cycling route choice
  - Presence of dedicated cycling infrastructure (bicycle lanes and pathways)
  - Physical characteristics (e.g. hilliness, pavement condition, and street configuration)
  - Aesthetical aspects (embedment in green and aquatic areas)
  - Safety aspects (e.g. functional class of the road)
  - Land-use (e.g. residential density and land-use mix)

FRAMEWORK

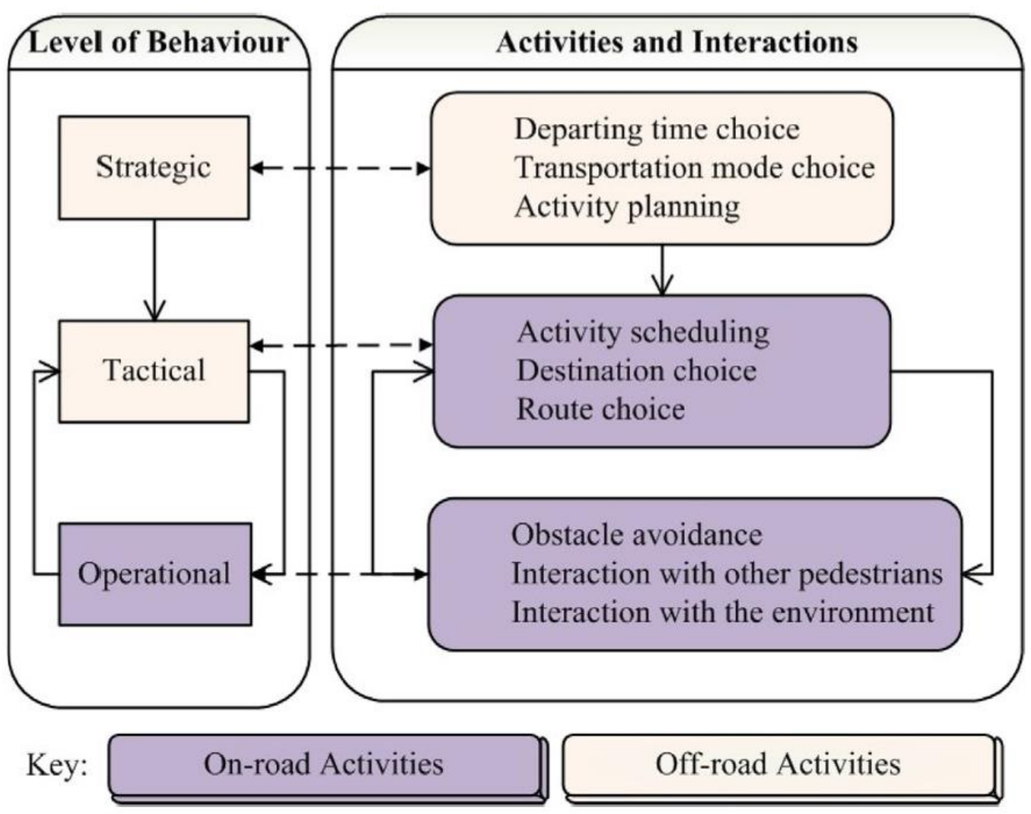

Figure 1: Hierarchical classification of pedestrian walk trips
(Nasir et al., 2014, based on Hoogendoorn et al. 2002)

RESEARCH PERSPECTIVES

- Extending the scope of
  - agents envisaged by agent-based travel demand modelling frameworks.
  - variables incorporated in the modelling framework by adopting a high level of multidimensionality
- Incorporation of various route choice mechanisms in a single modelling framework

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