



Incorporating the safe system and sociodemographics into the built environment model of traffic safety: A transtheoretical model

Never Stand Still

Science

Faculty of Built Environment & Transport and Road Safety (TARS) Research

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Built Environment and Traffic Safety

(Ewing & Dumbaugh's Conceptual Framework, 2009)

BUILT ENVIRONMENT



- Development Patterns
- Roadway Designs

MEDIATORS



- Traffic Volume
- Traffic Conflicts
- Traffic Speed

TRAFFIC SAFETY

- Frequency
- Severity



Sociodemographics

ROAD USER

- Age/Gender
- Ethnicity
- Economic Level
- Education Level
- Car Ownership

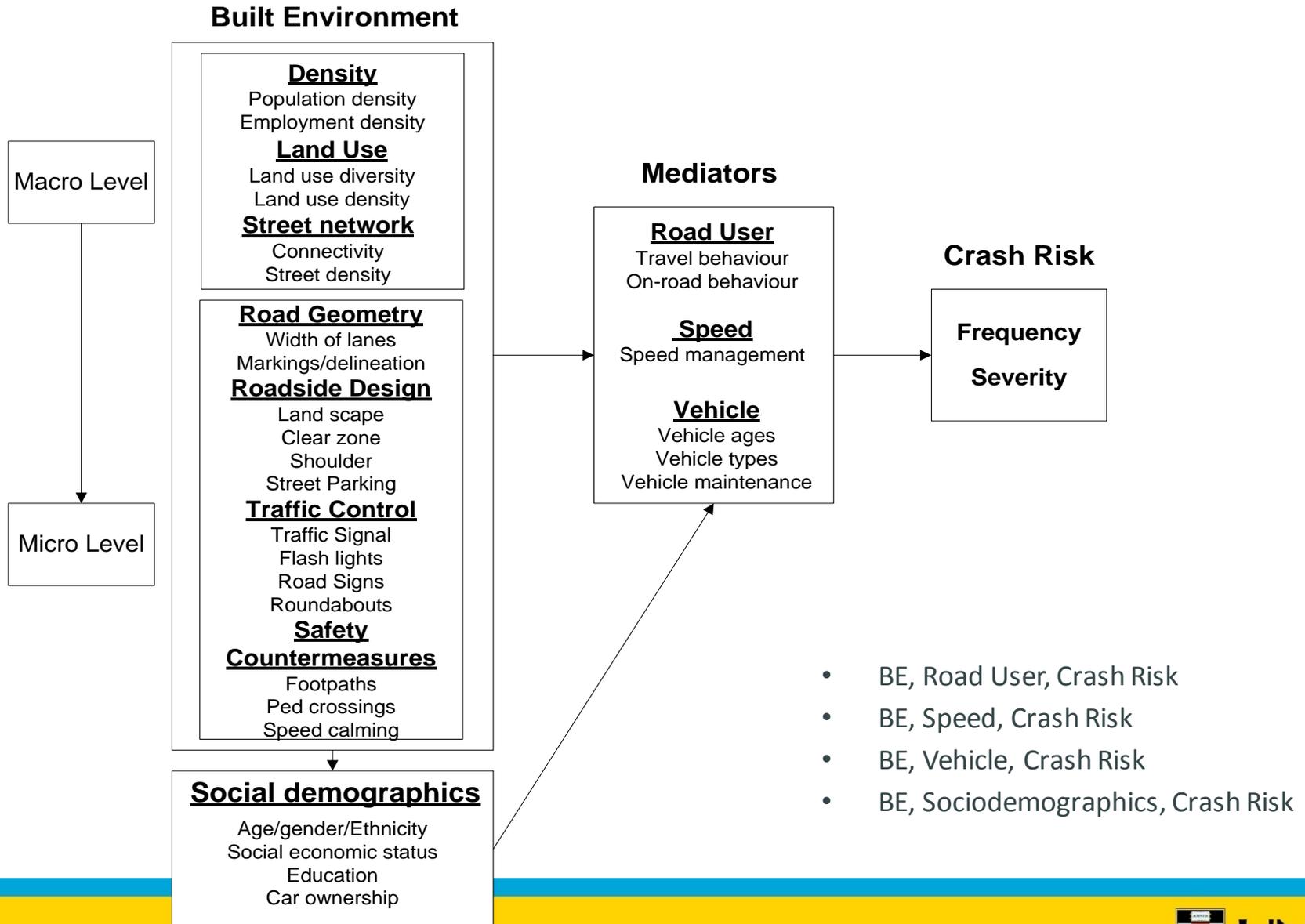
AREA

- Socio Economic Level
- Education Level
- Car Ownership

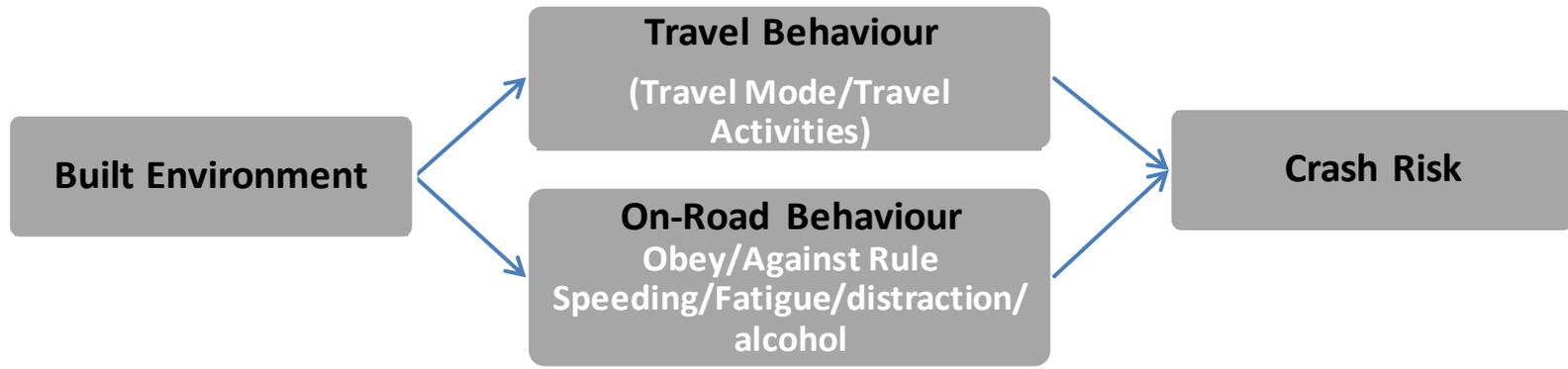
Determine the (psychological/physical) responses to road safety issues



Proposed Transtheoretical Model



BUILT ENVIRONMENT, ROAD USER AND CRASH RISK



Built Environment and Travel Behaviour

- Walk trips positively associated with street connectivity, land use diversity
- Car use was more frequent in areas with long blocks and sparse residents
- Certain land uses (Schools, shopping centres, railway stations and large commercial strips) would generate significant volumes of both motorised traffic and pedestrians
- Pedestrian friendly design could increase the walk trips

Built Environment and On-Road Behaviour

- Slower speeds and increased driver vigilance were found in compacter urban form
- Increased impaired driving and drunken pedestrian behaviour was found in area with higher alcohol availability
- Arduous design would induce risky pedestrian behaviours (walking across busy roads)
- Monotonous design would decrease driver's vigilance and induce fatigue
- Roadside advertising billboards would increase the outside of vehicle distraction to drivers

BUILT ENVIRONMENT, SPEED AND CRASH RISK

Urban Form/Functional Street Network Design

- Travel Speeds are typically lower in higher density urban areas
- The functional design direct the higher speed traffic volumes to the non-residential arterial streets, decreases the speeds in residential area

Engineering design

- Narrow roads can lower traffic speeds
- Traffic calming designs are self-enforcing of traffic speeds
- Speed warning facilities



BUILT ENVIRONMENT, VEHICLE AND CRASH RISK

Vehicle ages/types and crashworthiness

- Improvement in crashworthiness with increasing year of manufacture
- Light cars tend to have lower aggressiveness but also poor crashworthiness

Neighbourhood design and vehicle choice

- Choice of passenger cars correlated to compact neighbourhood
- Choice of utilities were associated with suburban designs (large yards, off-street parking)



BUILT ENVIRONMENT, SOCIODEMOGRAPHICS AND CRASH RISK

Built Environment and Sociodemographics

- It was assumed that lower socio economic rural and remote areas have worse roads conditions and the residents usually have older cars, possibly leading to poorer road crash outcomes.

Sociodemographics & Road User, Vehicle, Speed

- A higher level of walking was associated with a lower level of socioeconomic status
- Young drivers and male drivers are more likely to engage in risky driving (e.g. Speeding, drunk driving) than their older driver and female counterparts
- Car ownership is influenced by income and young drivers and low socioeconomic drivers tend to drive older vehicles
- Individuals with higher household incomes have a greater tendency to drive 4WDs than passenger cars and utilities and well-educated people have less utilities



CONCLUSIONS AND IMPLICATIONS

IMPLICATIONS

- It is important to incorporate road safety issues at the beginning of planning stage, especially the local government planning for a particular land use

FUTURE WORK

- Based on the proposed framework, a further study is needed to address a specific road safety issue in Australia.
- Identify and gather evidence of the multiple relationships, a further study is needed to provide policy implications for transport planning & engineering in the future.



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