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The Theory of Travel Decision-Making: A Conceptual Framework of Active Travel Behavior

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The theory of travel decision-making: A conceptual framework of active travel behavior

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Portland State University – Portland, Oregon

TREC Friday Transportation Seminar
30 January 2015 – Portland, Oregon



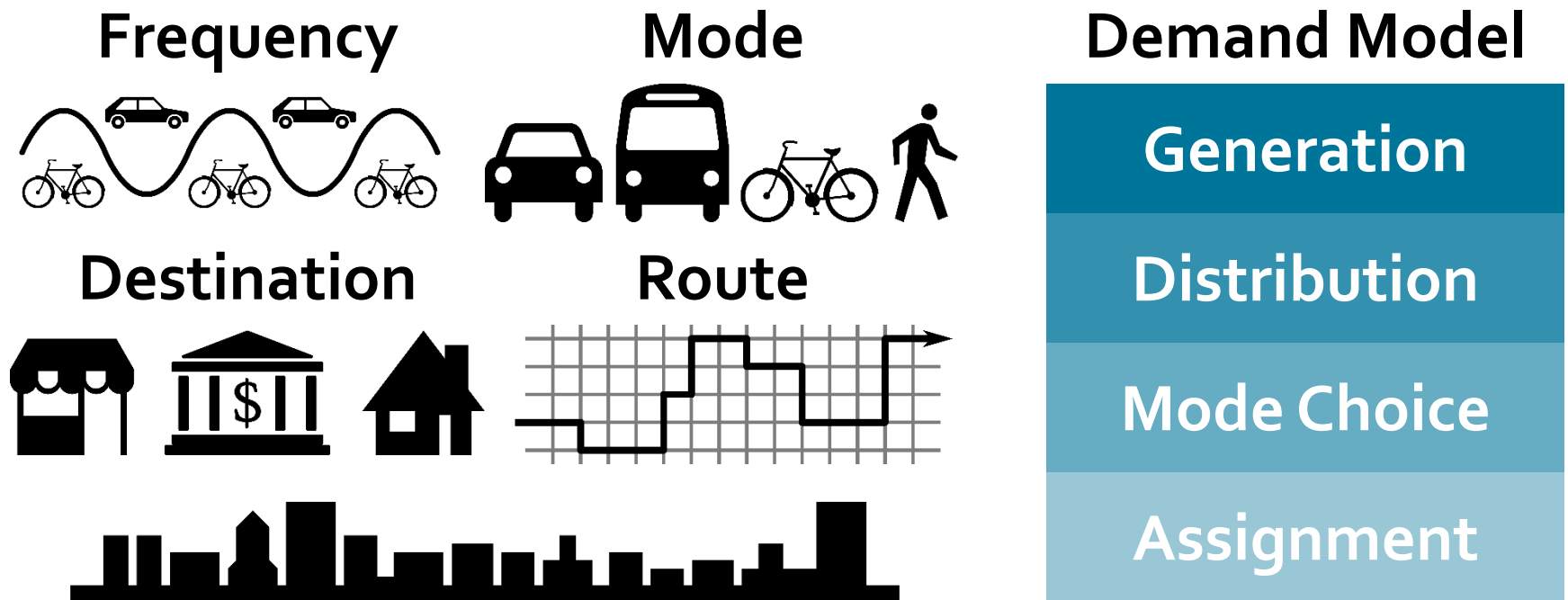
TREC

Transportation Insight for Vibrant Communities



Portland State
UNIVERSITY

Who, What, When, Where, Why, How of Personal Transportation



Active travel behavior



Reduce automobile use & externalities

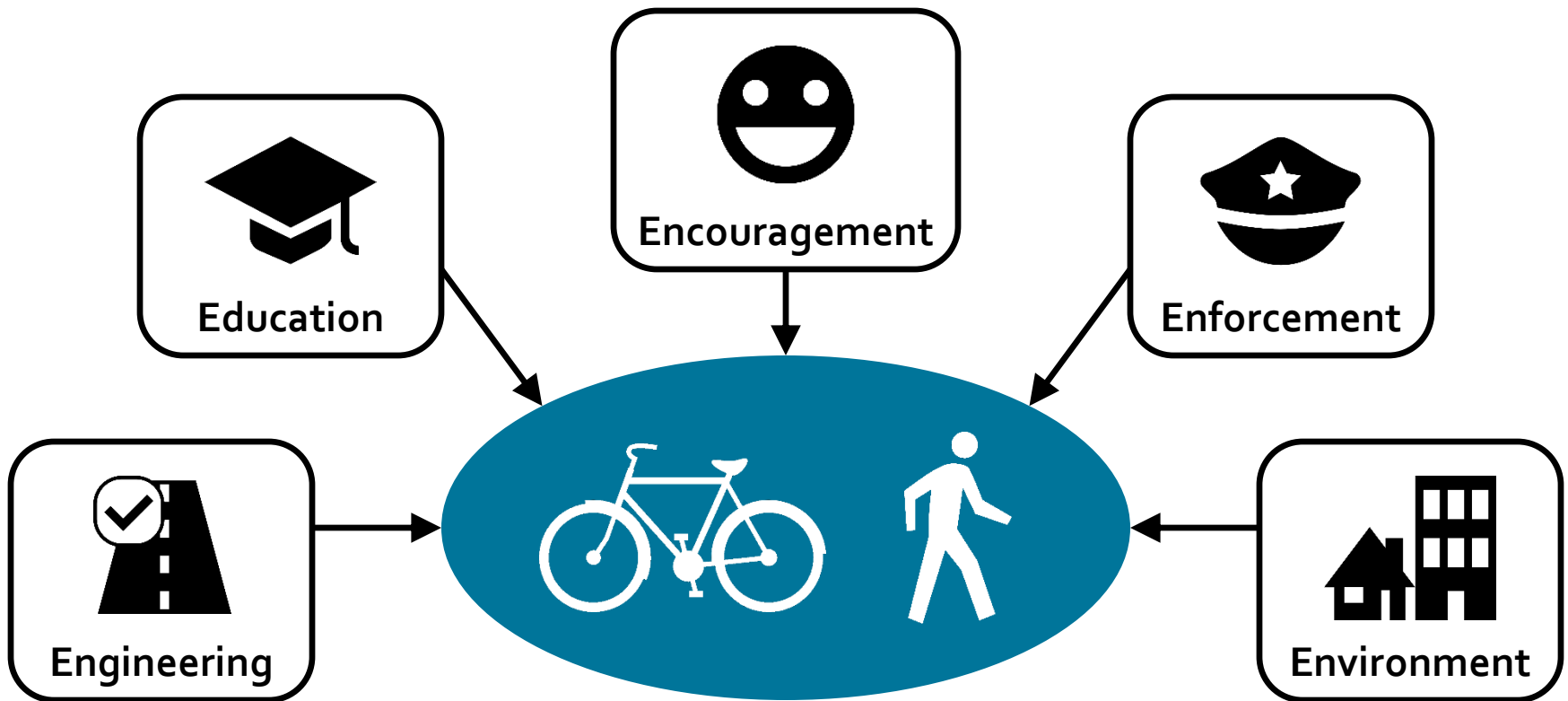


Save government & consumer costs



Improve personal & social health outcomes

Policy/Program/Project Evaluation



Planning Tools (Travel Demand Models)

Large Metropolitan Planning Organization Models (48)

Motorized and
Non-motorized (30)

Motorized
Only (18)

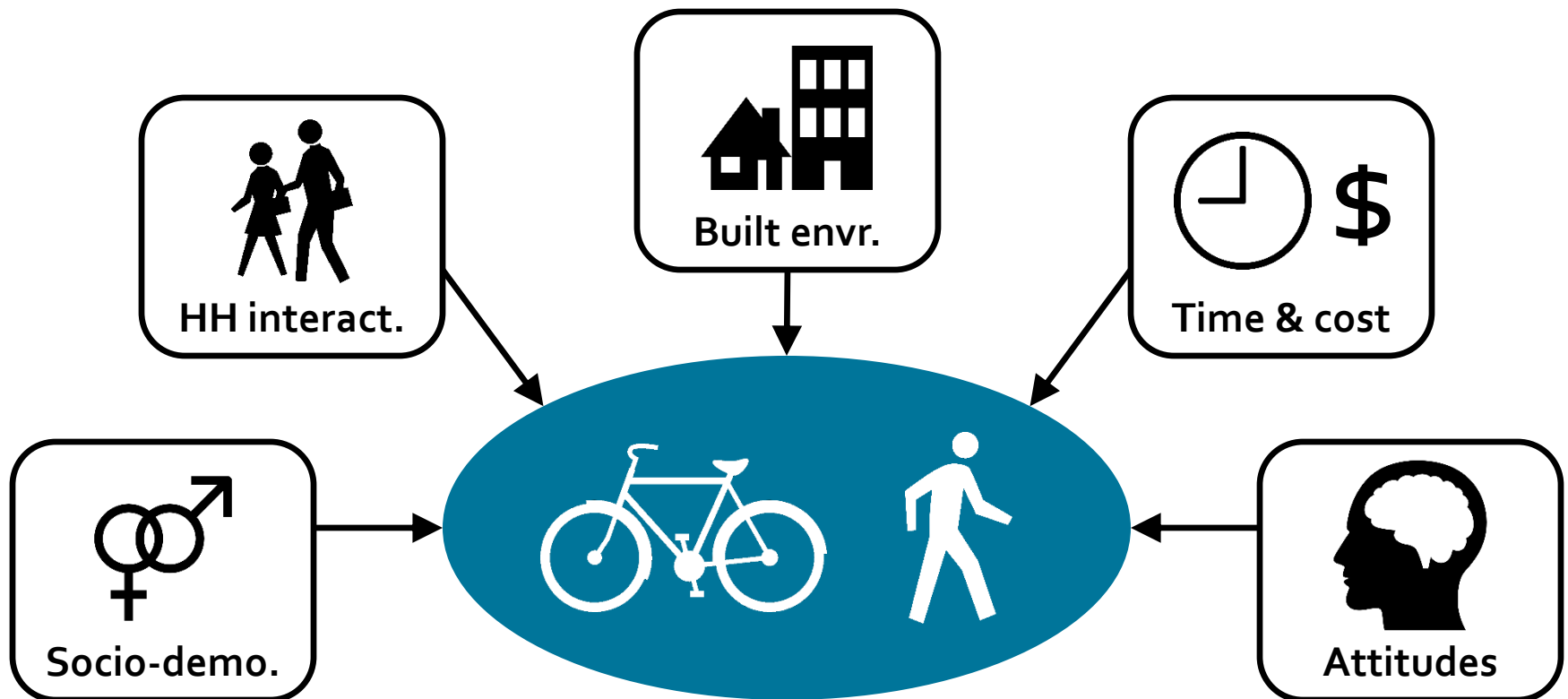
Walk and
Bike (14)

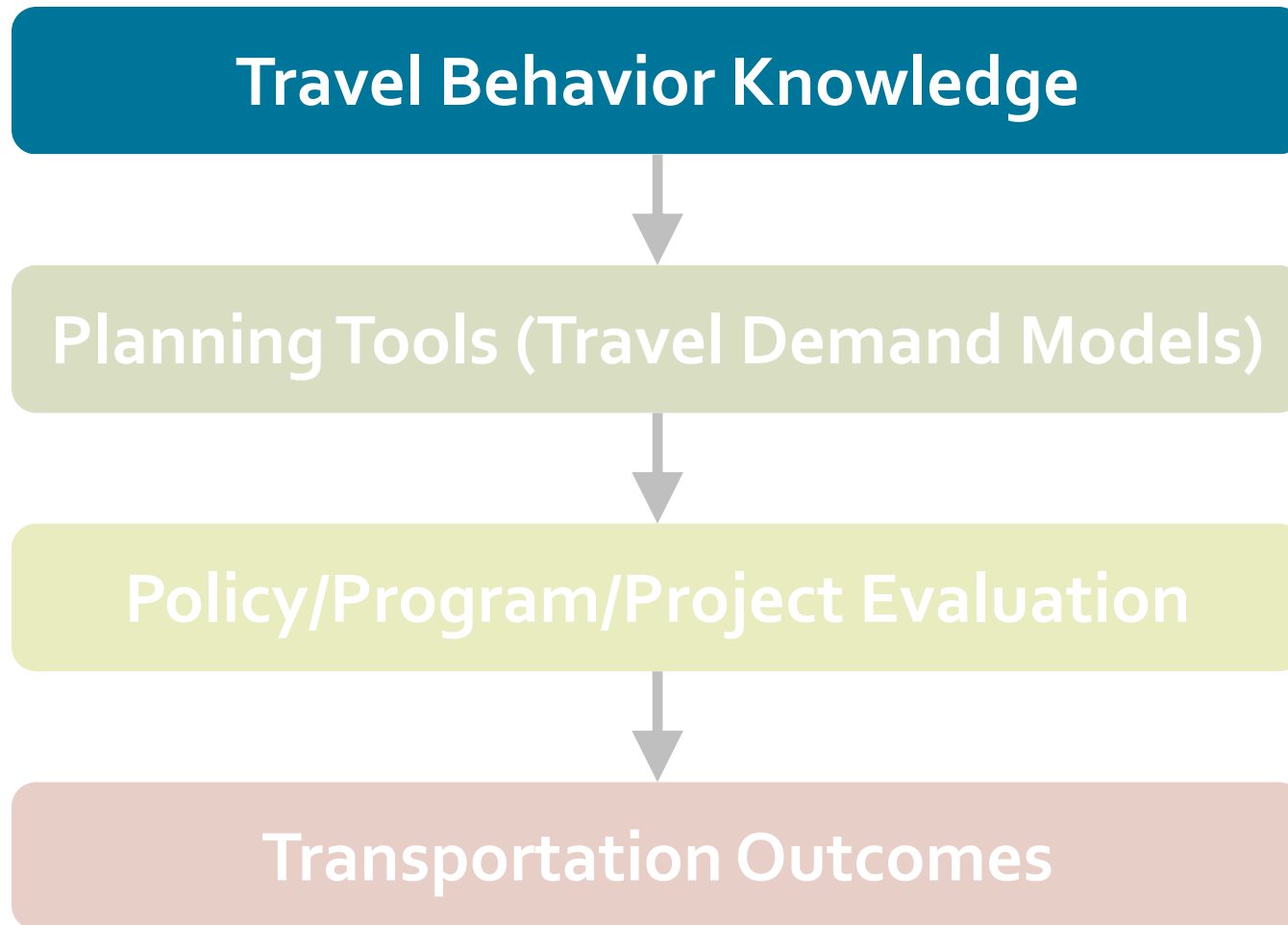
Non-motorized
(16)

Motorized
Only (18)

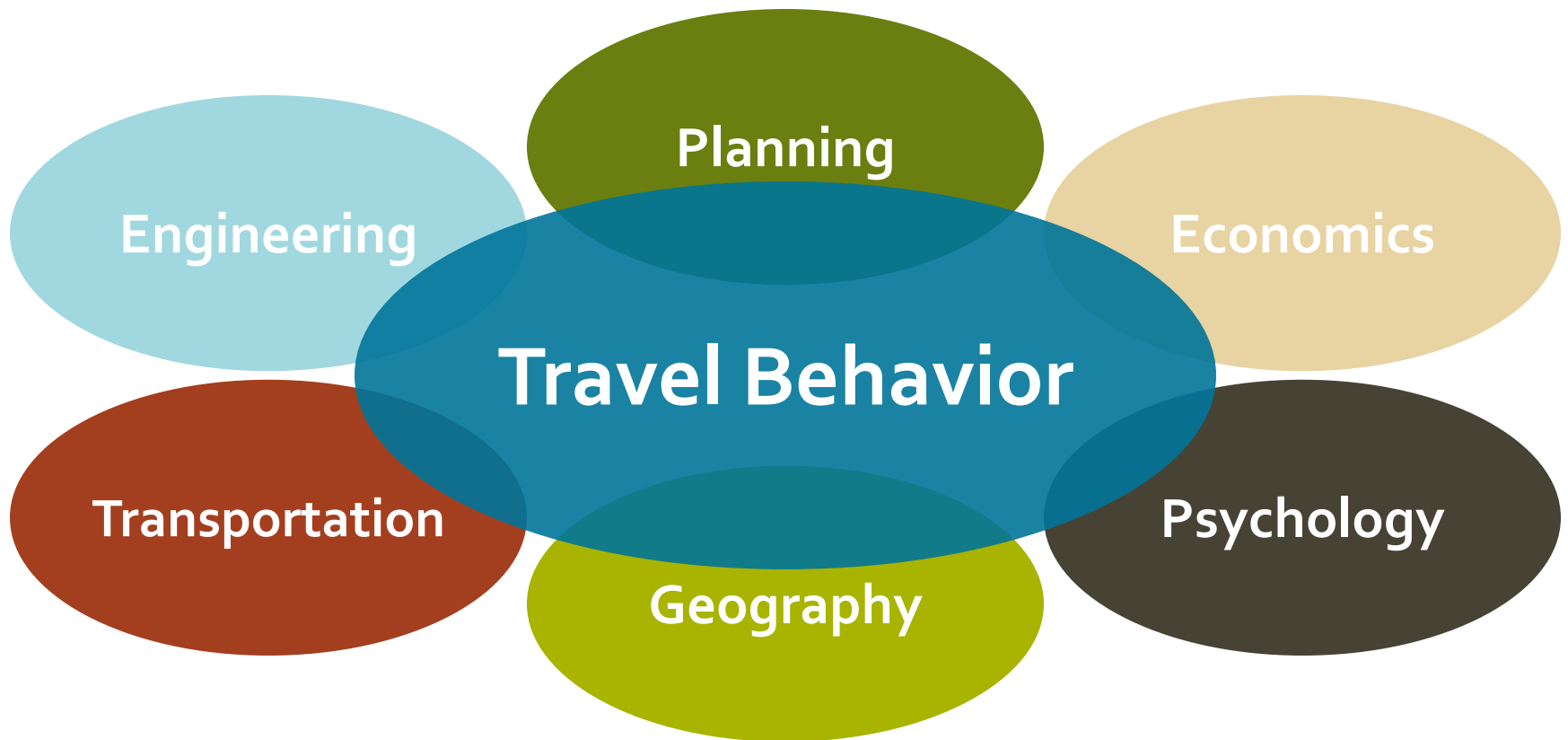
(Singleton & Clifton, 2013)

Travel Behavior Knowledge

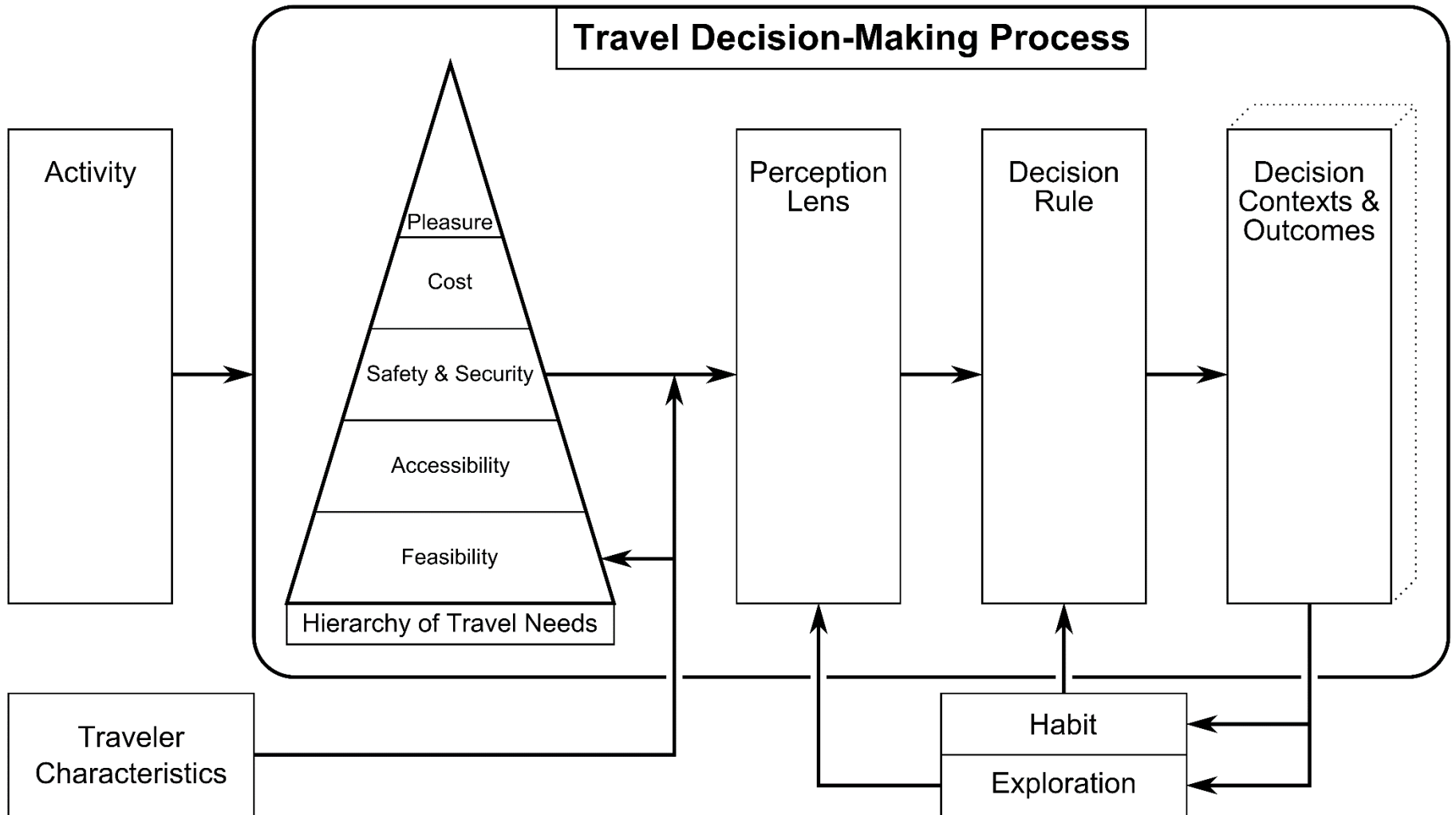


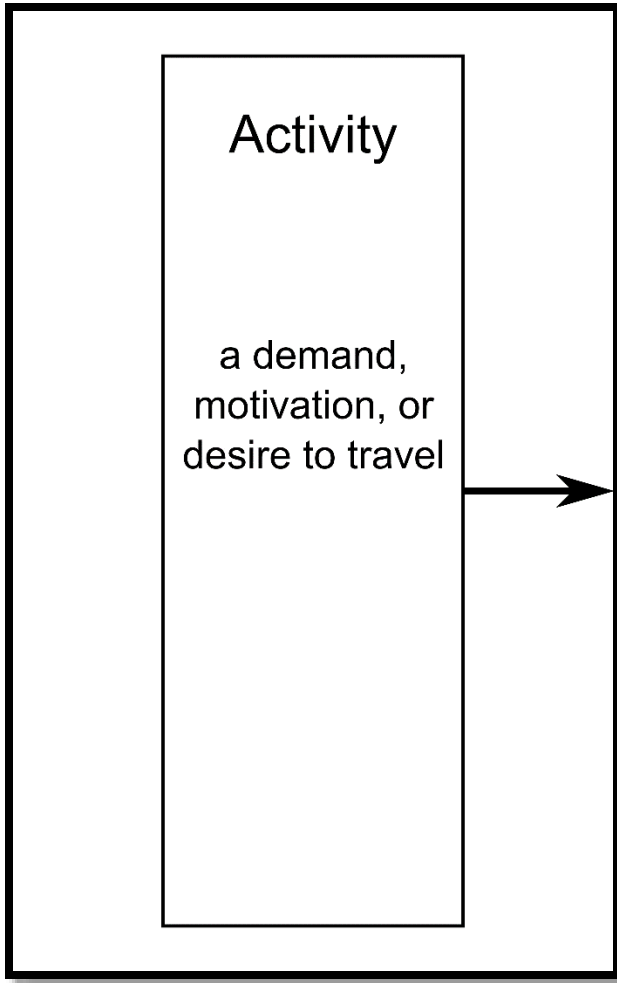


Reviewed theoretical & empirical literature



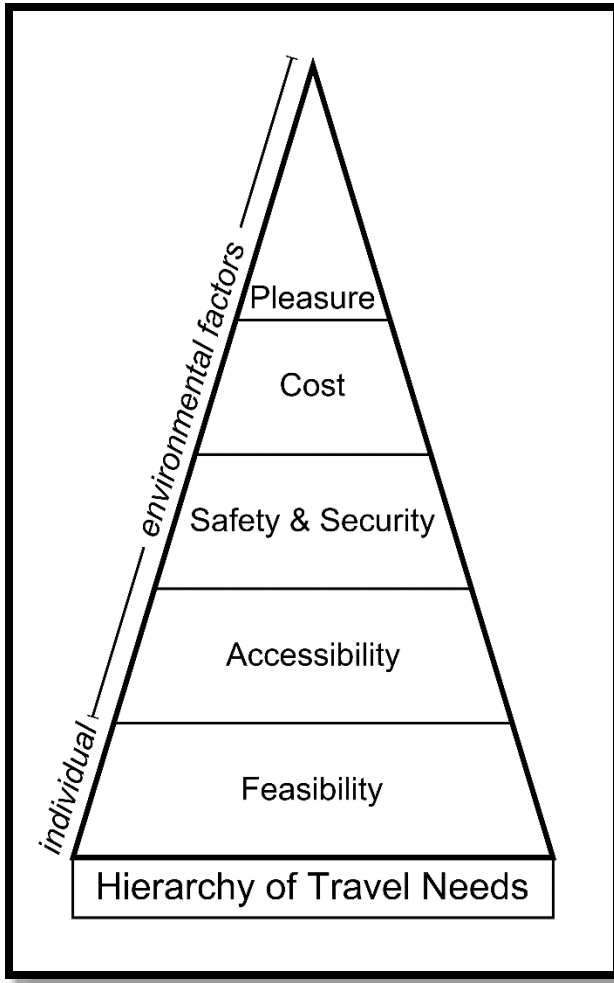
Conceptual framework



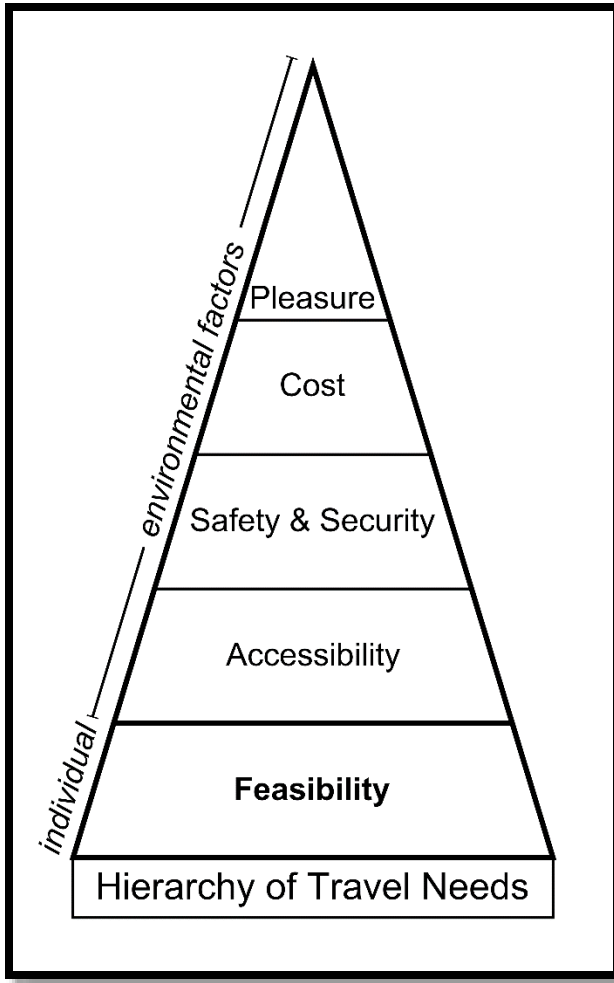


- **Work, school, shopping, ...**
- **Activity-based approach;
travel as derived demand**
(Pas, 1985; Kitamura, 1988)
- **Space-time constraints;
human activity patterns**
(Hägerstrand, 1970; Chapin, 1974)

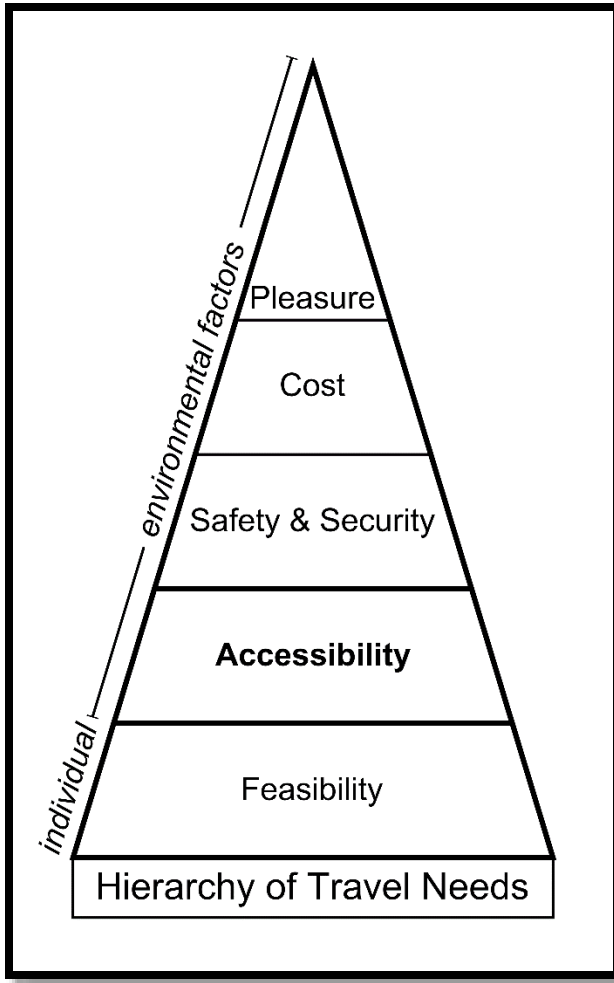
Hierarchy of travel needs



- **Influential factors; or attributes of alternatives**
- **Human motivation theory**
(Maslow, 1943; Maslow 1954)
- **Hierarchy of walking needs**
(Alfonzo, 2005)
- **Routine mode choice theory**
(Schneider, 2013)



- **Individual & HH constraints:**
 - **Capability:** mobility, skill, modal availability
 - **Coupling:** schedules, HH interactions, responsibilities(Hägerstrand, 1970)
- **Barriers to active travel**
(Ball et al., 2000; Clifton, 2004)

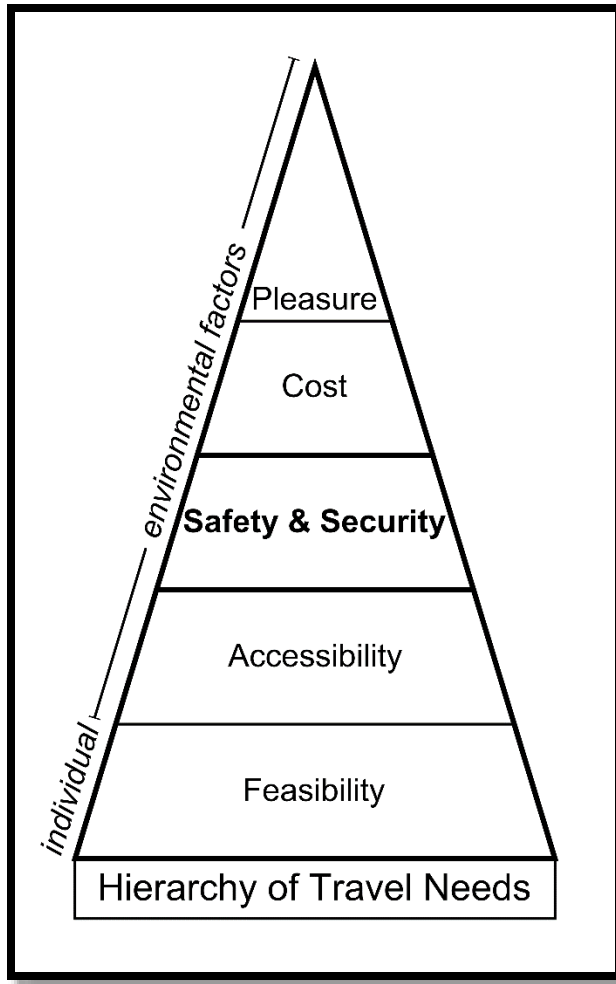


- **Environmental constraints:**
 - Proximity to destinations
 - Network connectivity btw. origins & destinations

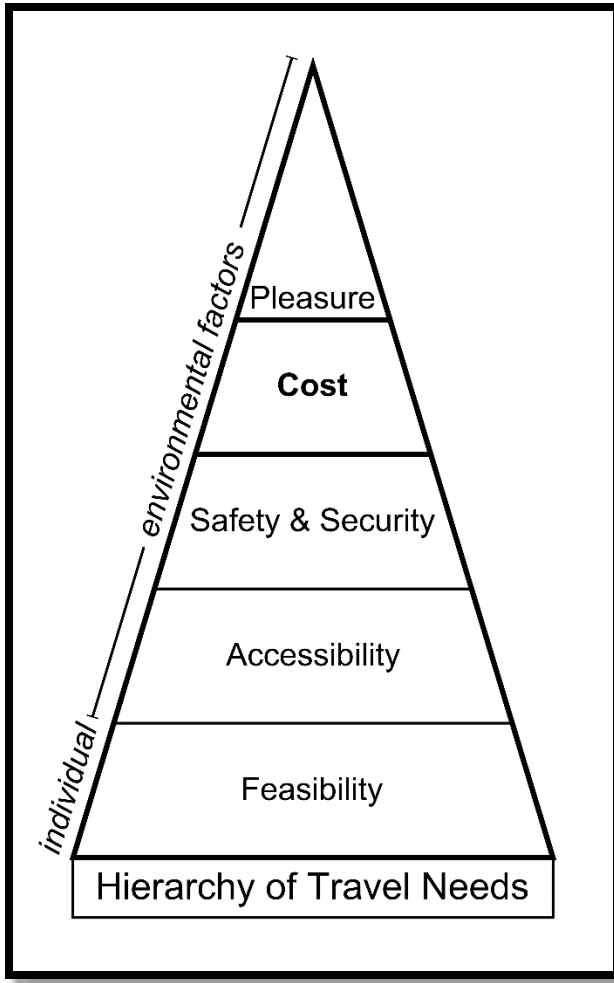
(Tal & Handy, 2012)
- **Residential density, land use diversity → walking**

(Ewing & Cervero, 2010; Saelens & Handy, 2008)

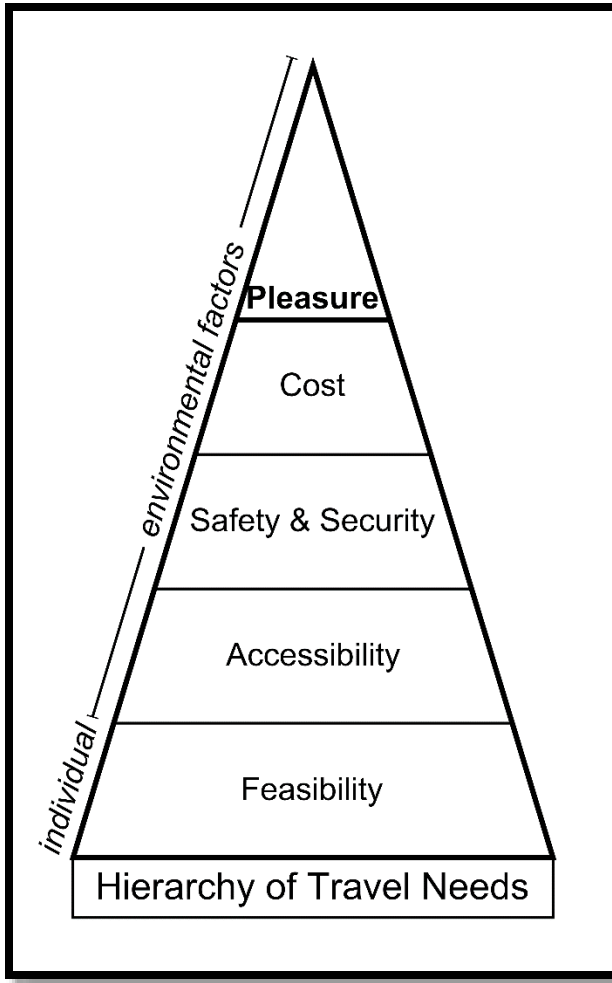
Safety and security



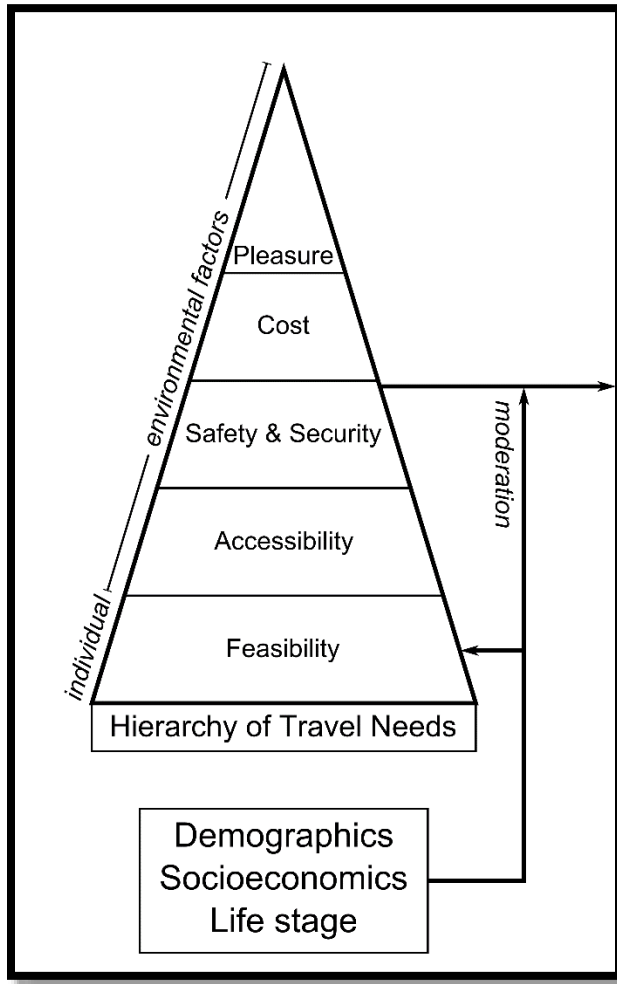
- **Traffic safety (collisions) vs. personal security (crime)**
- **Limited and inconclusive empirical evidence**
(Singleton & Wang, 2014)
- **Safety & security → women & bicycling**
(Garrard, Handy, & Dill, 2012)



- **Disutility of travel:**
 - Time, cost, physical exertion, mental effort, unreliability
- **Walk route choice: distance**
(Agrawal, Schlossberg, & Irvin, 2008)
- **Bicycle route choice: distance and grade**
(Broach, Dill, & Gliebe, 2012)

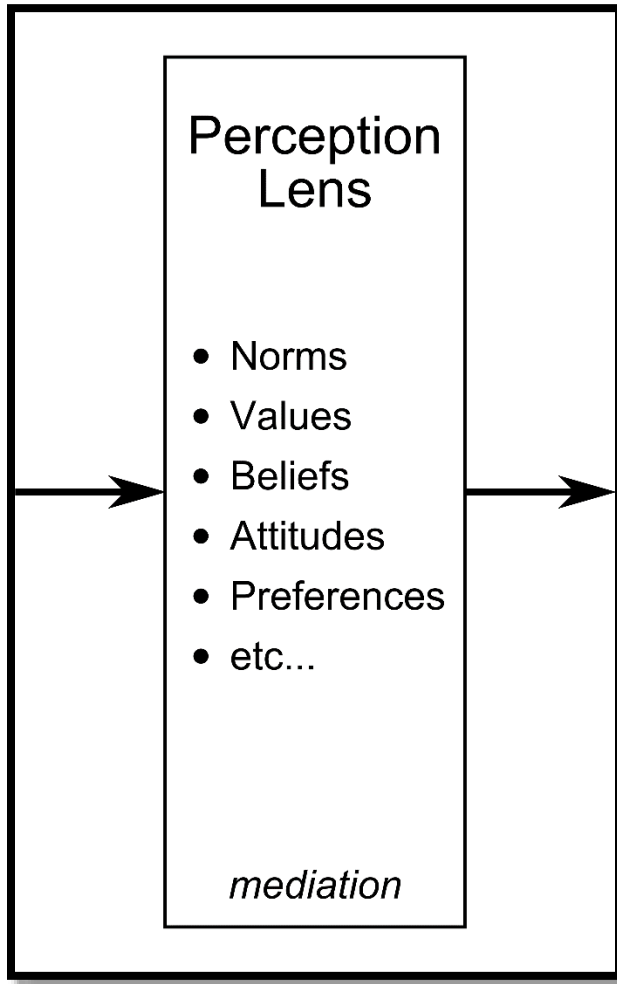


- **Positive utility of travel:**
 - Physical benefits (comfort, exercise)
 - Mental/emotional benefits (enjoyment, pleasure)(Mokhtarian & Salomon, 2001)
- **People walk/bicycle have**
↑ enjoyment/well-being
(Páez & Whalen, 2010; Smith, 2013)

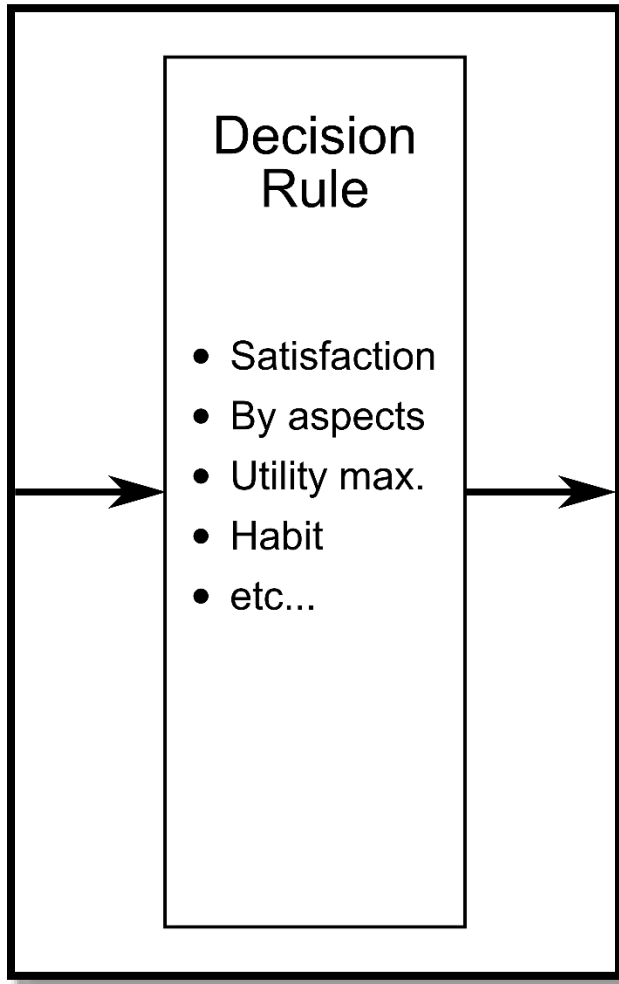


- **Moderation / taste variation**
- **Factors for mode choice:**
 - Age, gender, race, income, vehicle ownership, size(Koppelman & Bhat, 2006)
- **Accessibility → walking varied by age**
(Cao, Mokhtarian, & Handy, 2010)

Perception lens



- **Theory of planned behavior**
(Ajzen, 1991)
- **Perceived environment > measured environment**
(Ma, Dill, & Mohr, 2014)
- **Attitudes & social norms**
→ **travel mode choice**
(Bamberg, Ajzen, Schmidt, 2003)



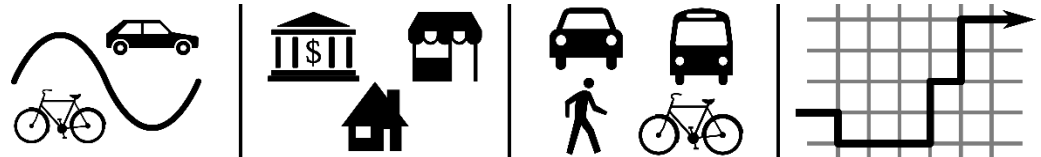
- **Compensatory:**
 - **Utility maximization**
(Ben-Akiva & Lerman, 1985)
- **Non-compensatory:**
 - **Satisfaction**
 - **Lexicography**
 - **Elimination by aspects**
(Tversky, 1972)

Decision Contexts & Outcomes

- Frequency
- Destination
- Mode
- Time of day
- Route
- etc...

(by multiple
dimensions)

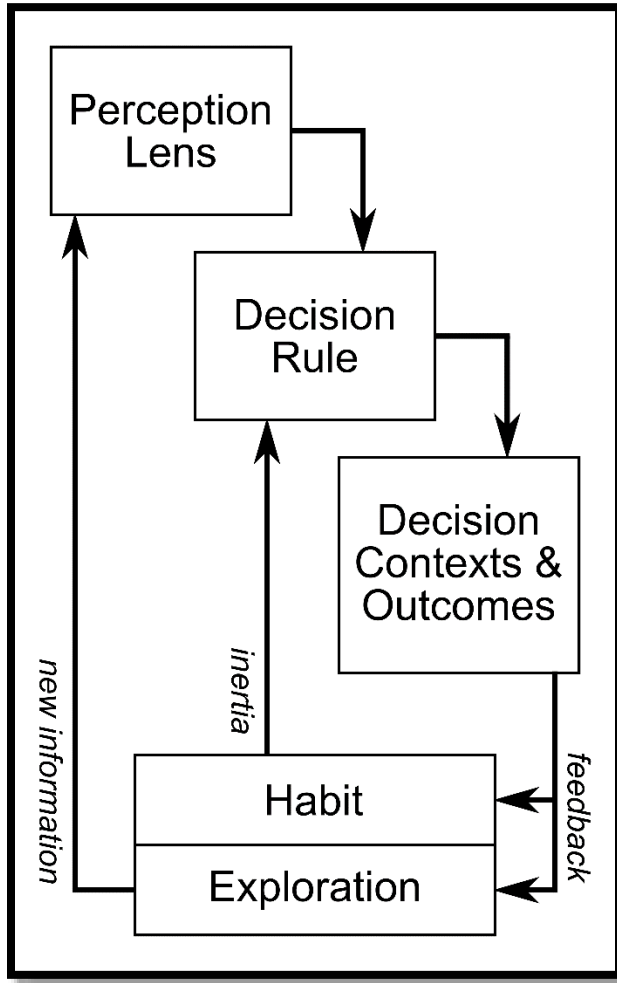
- **Multiple choice dimensions**



- **Sequential:**
(destination → mode)

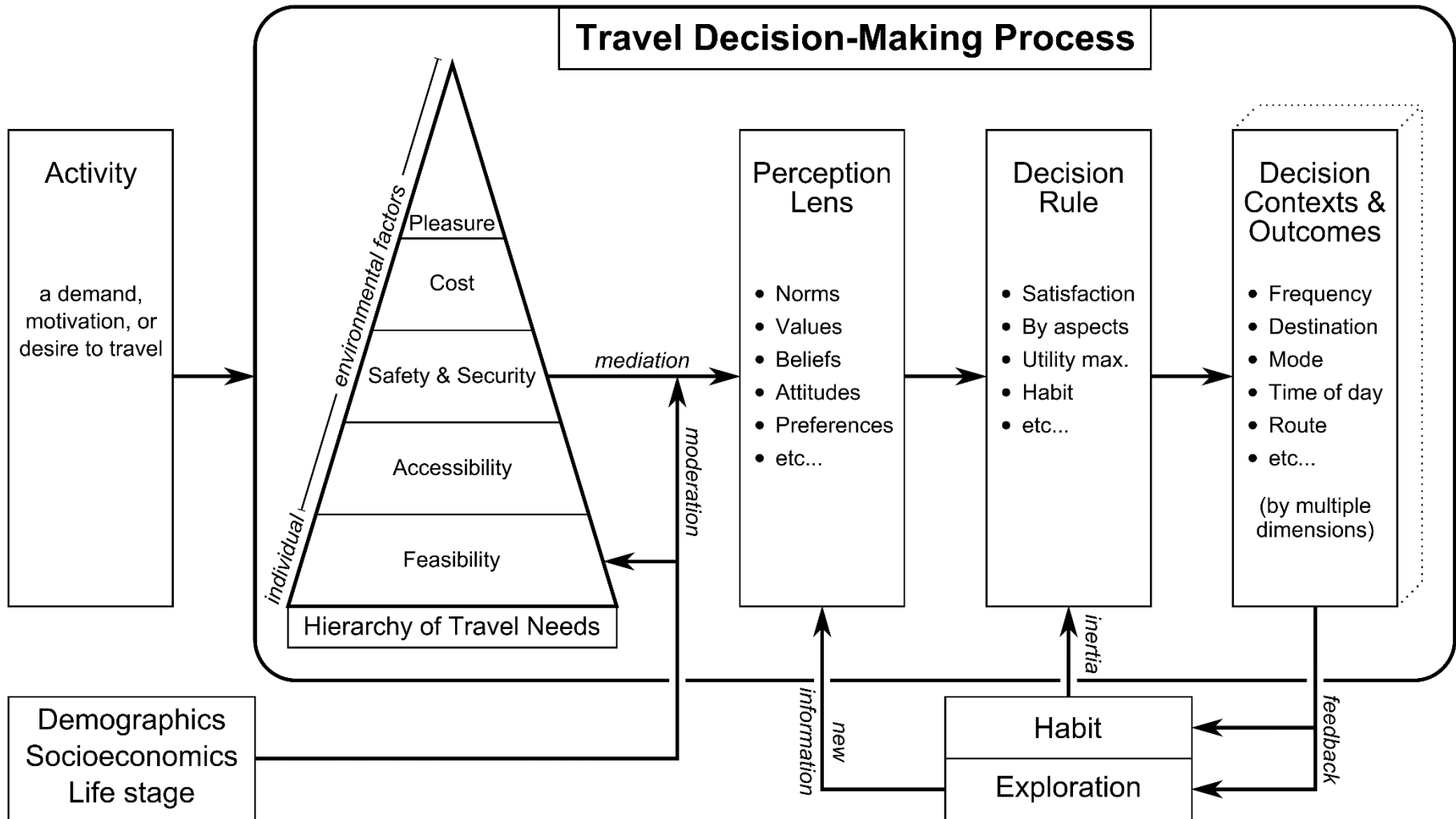
- **Simultaneous:**
(destination & mode)

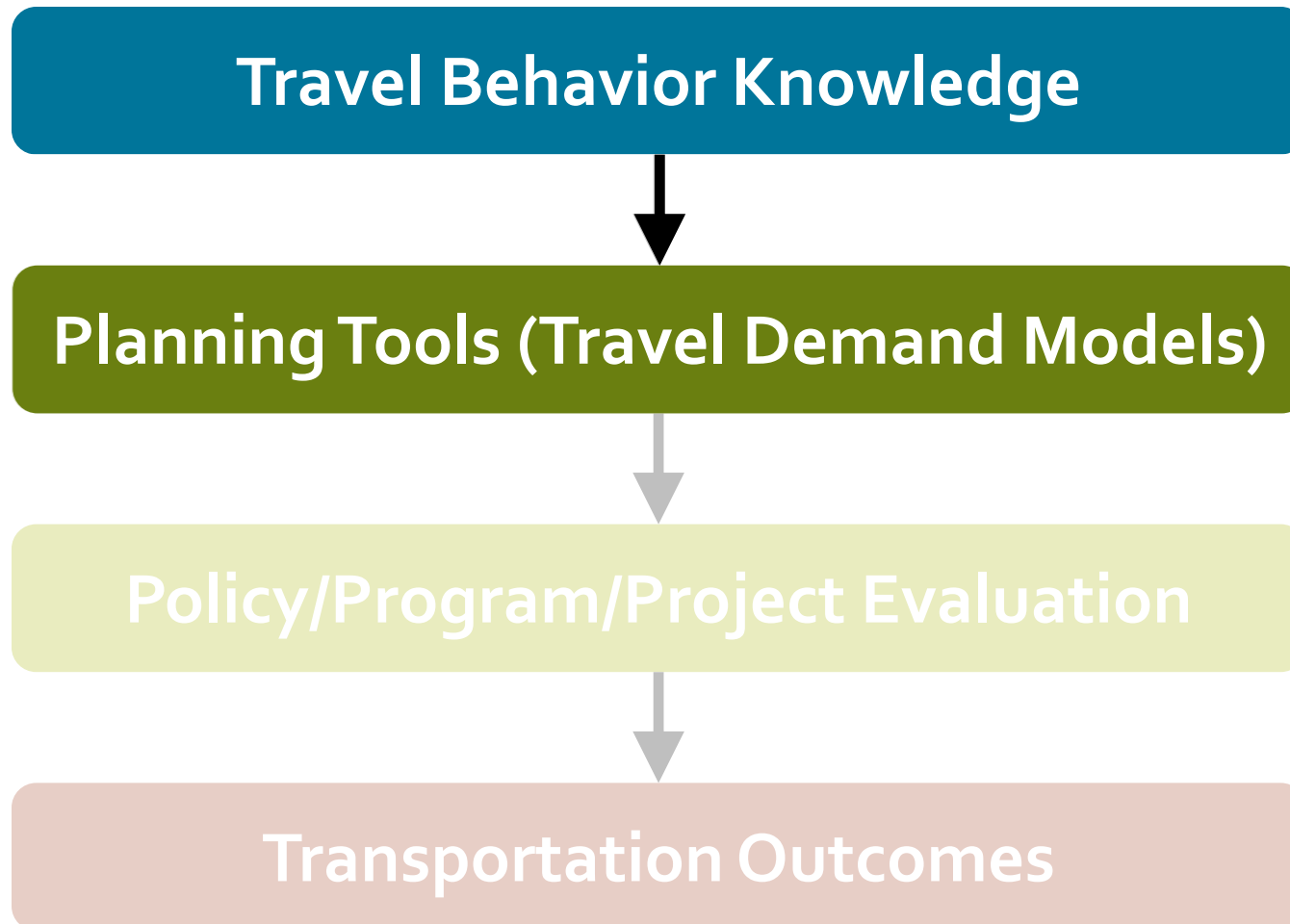
Habit and exploration



- **Habit → inertia**
(repeated travel decisions)
 - “Vicious circle of car use”
(Domarchi, Tudela, & González, 2008)
- **Exploration → information**
(new decision or choice)
 - **Feedback → mode shifts**
(Jariyasunant et al., 2013)

Conceptual framework





Acknowledgements



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