Welcome Back!

SES 5394: Travel Behavior and Forecasting (Day 12)

Some vocabulary

Trips and tours

- A trip is a change in location with one origin and one destination.
- A tour is a series of trips that begins and ends in the same location.
  - Tour-based models commonly focus on home-based tours (those that begin and end at home.
  - It's possible to separately consider work-based tours (those that begin and end at work – but could also be considered as part of a larger home-based tour).

Trip purposes

- Home-based work (HBW)
- Home-based shopping (HBS?)
- Home-based school (HBS?)
- Home-based whatever you think is important
- Home-based other (HBO)
- Non-home-based (NHB)

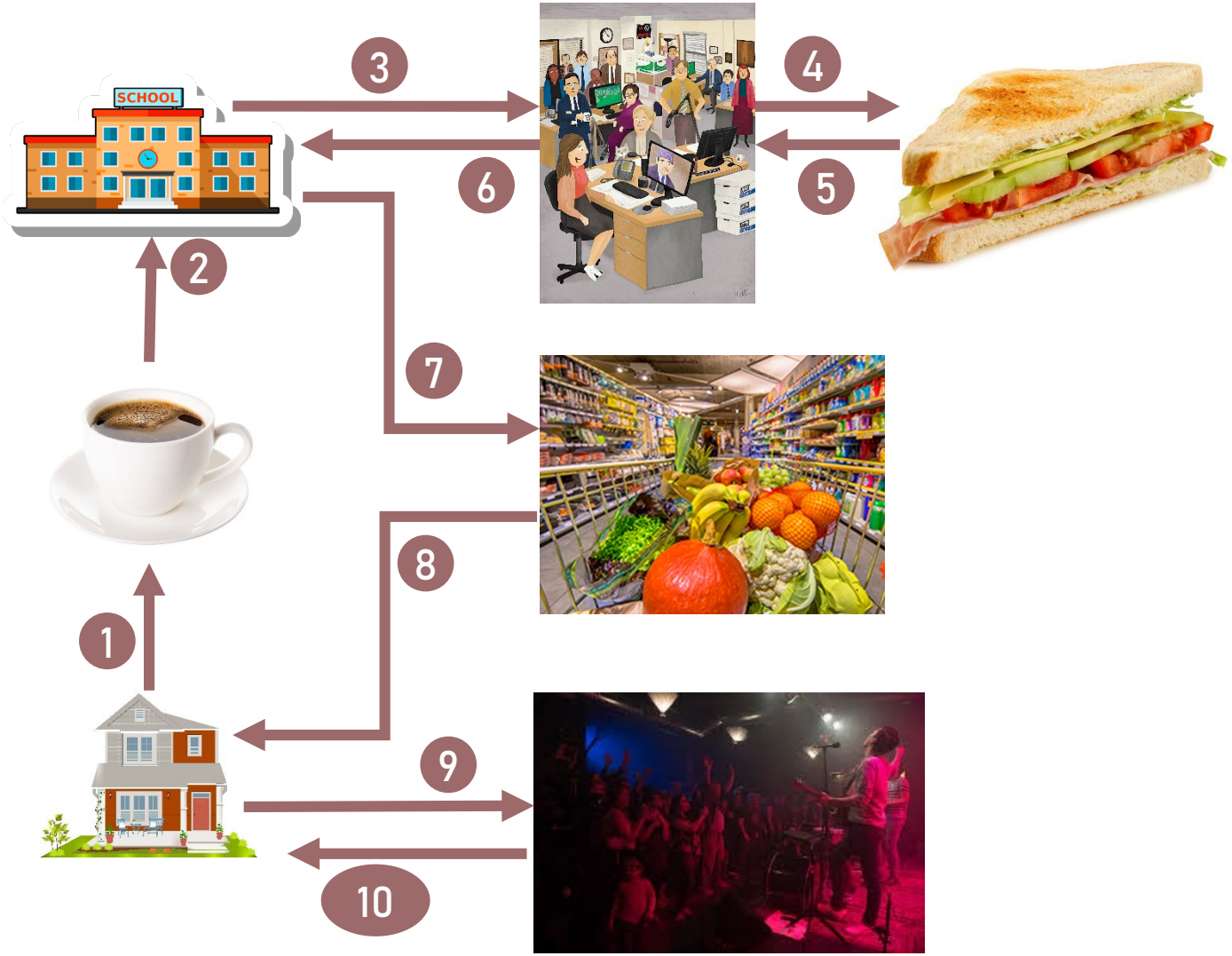
Trip ends

- Origin: Where a trip begins
- Destination: Where a trip ends
- Production:
  - Home, for home-based trips
  - The trip origin, for non-home-based trips
- Attraction
  - Non-home trip end, for home-based trips
  - The trip destination, for non-home-based trips

Example

- How many…
  - Trips?
    - HBW?
    - HBO?
    - NHB?
  - Tours?
  - Origins at each location?
  - Destinations at each location?
  - Productions at each location?
  - Attractions at each location?

Example



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Findings from the assigned readings

Ewing and Cervero (2001) study

Effects of…

- Neighborhood design
  - Categories like “traditional”, “auto-oriented”, “new urbanist”
- Land use pattern
  - Land use mix
  - Population density
  - Accessibility
- Transportation networks
  - Seems like a continuous version of ‘neighborhood design’
  - Also presence of sidewalks
- Urban design
  - Also presence of sidewalks
  - Presence of other aesthetic features
  - Sidewalk width and crosswalks

On…

- Trip frequency
- Trip length
- Mode choice/split

Steps of a 4-step travel demand model

- PMT
- VMT
- VHT

Outputs of a 4-step travel demand model

Ewing and Cervero (2001) findings

“Trip frequencies appear to be primarily a function of the socioeconomic characteristics of travelers and secondarily a function of the built environment…

Voulgaris et al (2017) study

Effects of…

- Five built environment factors
  - Dense
  - Diverse
  - Transient
  - Established
  - Accessible
- Seven neighborhood types
  - Mixed use
  - Old Urban
  - Urban residential
  - Established suburb
  - Patchwork
  - New development
  - Rural

On…

- PMT
- Number of trips
- Use of SOV (binary)
- Use of transit (binary)

Voulgaris et al. (2017 findings

- Substantial differences in total PMT by neighborhood type.
- No differences in number of trips by neighborhood type (without controlling for demographics)
- Older, denser neighborhoods with more diverse land uses have more trips, controlling for demographics.

Cordera et al. (2017) study

Effect of…

- Accessibility

On…

- Frequency of
  - HBW trips by car
  - HBW trips by other modes
  - HB school trips by car
  - HB school trips by other modes
  - HBO trips by car
  - HBO trips by other modes

Cordera et al. (2017) findings

- Accessibility associated with
  - Fewer HBW vehicle trips (-0.016)
  - More HBO non-vehicle trips

Thoughts to consider

Where should trip generation fit in the modeling process?

- If trip generation depends primarily on sociodemographic and employment characteristics, it can reasonably be the first step in a four-step model.
- If the effects of the built environment on trip generation vary by mode it should come after mode choice
  - One solution is to estimate vehicle access separately based on built environment characteristics
- If accessibility is an important predictor of trip generation (or vehicle ownership, we need to incorporate congestion levels)
  - This requires an iterative modeling process since congestion is both an input and an output.