Defining Place: A Review of How Place Type Is Measured and Constructed

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Defining place:
A review of how place type is measured and constructed

Friday Transportation Seminar
Portland State University
January 26, 2018
Kelly Rodgers
• The relationship between built environment and travel behavior is the most studied (Ewing & Cervero, 2010)

• Looking beyond BE variables, researchers construct neighborhood or place types

• But if variables explain* travel behavior, why study place type?

*Demographic and attitudinal factors also play a role
• Ease of understanding; analytic constructs with fewer independent variables; planning and design (Song & Knapp, 2007)

• Places have bundles of land use and transportation characteristics

• These characteristics interact: potentially confounding, diminishing, or amplifying effects
• But what place type when? Modeling, design guidance?

• Various constructions: binary, composite, categorical, data-driven, intuitive

• Aim: to create a responsive, defensible, and transferable place type typology...
TRAFFIC CALMING

DESCRIPTION
Traffic Calming refers to street design features intended to reduce vehicle traffic speeds and volumes, often used to improve safety for pedestrians and bicyclists. Traffic Calming can be considered an engineering countermeasure to improve safety.

Traffic Calming can be implemented in problem spots (“black spots”) or as part of area traffic management. Studies suggest that area-wide implementation may be more effective.

SCALE & CONTEXT
Local scale. Urban street with low to moderate traffic volumes.

COMMON TACTICS
- Chicanes
- Diversions
- Pedestrian refuge islands
- Speed humps
- Roundabouts
- Traffic circles

PERFORMANCE DASHBOARD

Vehicle speed
Crash risk
Vehicle miles traveled

Physical activity
Walking
Air quality
Noise

EFFECT SIZE
- weak
- moderate
- strong
- emerging research

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The Modifiable Areal Unit Problem

Units make a difference when it comes to geographical analysis: Changing your areal boundaries can dramatically change your results.

<table>
<thead>
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<th>SICK</th>
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<tbody>
<tr>
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<td>REGION SET B</td>
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<td>ONE ILLNESS EVENT</td>
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<table>
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<th>SICK</th>
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<td>ILLNESS RATE 50%</td>
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</tbody>
</table>

Factors to consider

- **Unit of analysis**—Modifiable Areal Unit Problem (MAUP)
- Scale for outcome of interest; e.g., walking is local and VMT is regional (Galster, 2001; Chaskin, 1997; Handy, 1993)
- Residential self-selection
  - Demographics
  - Cross-sectional data

Built Environment Variables

• 5 Ds most frequently used for all types

• Street design, aesthetics for walking and urban design typologies

• Housing vacancy, age, and whether single-family for some data-driven
Urban Design Types

• Intuitive approach with a lasting influence on travel research and practice, particularly with Smart Growth (Handy et al., 2002)

• Rural–to–urban transect, Context Sensitive Design

• Employed for “neighborhood character” and transportation design guidance
Categorical Approaches

- Early work tended to be binary

- Salon (2013, 2015) and Ralph et al. (2016) used a factor–cluster analysis with census tracts
  - 5–7 place types
  - Heterogeneity and synergistic effects

- Categorical approaches better for some modeling applications
Composite Approaches

- Bagley and Mokhtarian (2002) resisted categorical
  - Mostly attitudinal, few BE variables
  - SEM

- Gehrke and Clifton (2017) latent construct of Smart Growth–ness
  - Predict walk mode choice and trip frequency
  - SEM
Area & Development Type

• SmartGAP/SHRP2 project
  • Derived from a Smart Growth transect
  • Caltrans Smart Mobility Framework
  • Census block group

• ODOT
  • Estimate travel behavior and VMT in their Regional Strategic Planning Model
  • Piloted SHRP2 typology (EPA Smart Location Database)
  • Adapted with local data–16 types

<table>
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<tr>
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<th>Suburban</th>
<th>Rural</th>
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<tr>
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Next Steps in a Research Agenda

• Further explore how unit of analysis and boundaries relate to outcomes of interest
  • Tracts vs. block groups
  • Walking vs. VMT
  • Threshold effects
• Which typologies do a good job of creating unique place types that produce significantly different effects on VMT? Validation testing.
• Presumption of moderating effect—what if place type is a mediator?

Thank You! Ask me questions at krodge2@pdx.edu or kelly@thinkstreetsmart.org
References


