The Paths from Walk Preference to Walk Behavior: Applying Latent Factors in Structural Equation Modeling

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Presented by
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Goal is to show that model is...

- Simple
- Transparent
- Behavioral
Understanding How Individuals Make Travel and Location Decisions: Implications for Public Transportation

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Ajzen’s Theory of Planned Behavior has been applied in over 1,000 published research papers, many in the analysis of transportation.
Structure of the Presentation

• Background
  – Integrate Social Psychology into Transport Analysis
    • Theory of Planned Behavior
• Preview of the Model
• Method
  – The Importance of Latent Factors
• Discussion of the Model
Method

- Focus group
  - Support Theory of Planned Behavior
    - Guided by Prof. Ajzen
    - Direct elicitation
- Survey data
- Hierarchical multiple regression
- Exploratory Factor Analysis
- Creation of the Measurement Model
- Creation of the Structural Model
- Analysis of Results
The Sample: 579 Respondents

• Drawn only from…
  – Those who had moved in past two years
  – Those considering a new location in next two years

• From ten metropolitan US areas with good transit

NOT DESIGNED TO REFLECT THE POPULATION OF THE USA!
Target Groups for the Sample

Source: NHTS
Sample $n=579$

- 49% were under 30 years of age
- 81% were White/Caucasian
- Females comprised 77% of the sample
- 64% had a college degree
- .87 cars per adults in the sample
- The net response rate is estimated at 42%
TPB: The Three Antecedents to Intent

- Social Norm
- Attitude to the Behavior
- Perceived Behavioral Control

→ Intent to Undertake the Behavior
Interpretation of the TPB Direct Factors

- Normative Forces and Pressures
- Desire to Undertake the Behavior
- Overcoming Difficulty in Undertaking the Behavior
- Intent to Undertake the Behavior
• For me, to live within walking distance to stores, restaurants, a public library and a school would be…
  [extremely undesirable/extremely desirable]

• It would be easier for me to move to a compact neighborhood if I could find an affordable home there.
  [strongly disagree/strongly agree]

• If I moved to a compact neighborhood I would take public transportation to work or for other trips.
  [strongly disagree/strongly agree]

• I need to drive my car to get where I need to go.
  [strongly disagree/strongly agree]

• For my household to need to own fewer cars would be…
  [extremely undesirable/extremely desirable]

• How likely is it that you could get by with fewer household cars in the coming year?
  [very unlikely/very likely]
Stradling’s Interpretation

- My Volition/Desire to Undertake the Behavior
- Factors which facilitate or impede my volition
- Social Norm

Behavior
Stradling’s Interpretation

Willing

Able

Behavior

Social Norm
Stradling’s Interpretation

My Volition/
Desire to Undertake the Behavior

Factors which facilitate or impede my volition

Social Norm

Behavior
Hierarchical Regression, Applied to Results of Exploratory Factor Analysis

Preferences and Values

Neighborhood Form

House Format

Auto Orientation

Satisfaction/ Social Norm

Walking Behavior
Creating the Measurement Model

- Indicators were selected to maximize the quality of model fit
- Consistent with underlying theory
- Model was developed in AMOS 17
Confirmatory Factor Analysis was used to transform from a large group on candidate indicators to the final set of indicators.
The Structural Model

- The structural model was created through traditional procedures in SEM
- Model modification
- Model trimming (delete link if $p > .05$)
- Specification search
Interpreting the Results….

<table>
<thead>
<tr>
<th>Walk Behavior</th>
<th>Walk Preference</th>
<th>Urban Neighborhood Form</th>
<th>Suburban House Format</th>
<th>Auto Dependence</th>
<th>Satisfaction Social Norm</th>
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<td>.360</td>
<td>-.421</td>
<td>-.386</td>
<td>.054</td>
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</tbody>
</table>
Conclusions

• Model format is
  – Simple
  – Transparent
  – Behavioral
  • (Consistent with theory)
We deal with preferences and values…

- We have attitudinal information about preferences and values.
- Values and preferences directly influence:
  - Density and design of neighborhood
  - Level of auto orientation
  - Amount of utilitarian walking

- SEM is another way to express the interactions (easier than covariance)
The Built environment does not cause anyone to walk

• The individual forms a preference, 
  – Based on attitudes and beliefs…
    • This forms my volition

• The built environment either facilitates the attainment of my volition
  – or

• The built environment impedes the attainment of my volition
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