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## LAND USE AND ACTIVE TRAVEL: A COMPLEX RELATIONSHIP

*A dissertation provides clarity on transportation-land use interaction, framing land use mix as a multidimensional construct.*

### The Issue

Smart growth principles have emphasized the importance of land use mixing as an intervention beholding of lasting planning and public health benefits. Transportation planners have identified potential in efficiency gains achieved by increasing land use mix and the subsequent shortening of trip lengths, and public health research has accredited increased land use mixing as an effective policy for facilitating greater physical activity. While it's generally accepted that dense, mixed-use development promotes active travel, researchers don't have a consensus on exactly how, and to what degree, land use determines people's travel patterns.

Urban policies encouraging active travel behavior and reducing auto dependence are often rooted in smart growth management strategies promoting improved efficiencies of the built environment. Plans informed by these policies have envisioned mixed-use neighborhoods with an assortment of residential options surrounded by diverse out-of-home activity locations. This land development strategy maximizes the ability of the built environment to offer residents quick and efficient travel connections. Consequently, an improvement in local accessibility to employment, retail, and recreational opportunities for residents of compact and mixed-use environments has been the subject of rewarding examination for urban planning researchers studying the travel behavior outcomes associated with smart growth policies.

### The Research

NITC dissertation fellow Steven Gehrke focused his research on transportation-land use interaction, and sees land use mix as a multidimensional construct.

### THE ISSUE

While it's accepted that mixed-use development promotes active travel, researchers don't have a consensus on exactly how land use determines people's travel patterns.

### THE RESEARCH

The research examined:

- The relationship between pedestrian travel and land use mix;
- The impact of land use mix on pedestrian travel;
- How operationalizing land use mix influences individual travel behavior.

### IMPLICATIONS

This work contributes theoretical and empirical tools for research and practice in transportation and land use planning.

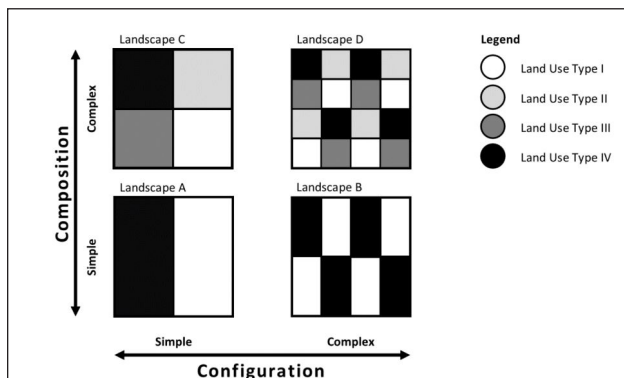
*Photo: On-street bicycle parking near a restaurant; an example of development promoting active travel*

His dissertation, *Land Use Mix and Pedestrian Travel Behavior: Advancements in Conceptualization and Measurement*, provides some clarity on the topic. According to Gehrke's research, more density does not necessarily equal more walking. Rather, the complementarity, composition, and configuration of land use types is key in cultivating walkability.

Gehrke conducted three empirical studies. The first focused on improving measurements of land use mix. The second looked at other potential determinants of why we decide to walk, like employment concentration and pedestrian-oriented design, while the third study was concerned with the geographic scale at which we measure the built environment. The research aims to introduce an improved theoretical and empirical measure of land use mix and systematically explore its connection to pedestrian travel within a comprehensive and behaviorally sensitive conceptual framework. To realize this goal and provide transportation planners and engineers with greater insight into the relative impact of land development patterns on pedestrian travel, Gehrke addressed three primary research questions: 1. What is the relationship between pedestrian travel and land use mix when the complementarity, composition, and configuration of local land use types is considered? 2. What is the impact of land use mix and other related smart growth features on pedestrian travel for transportation-related and discretionary trip purposes? 3. How, if at all, does operationalizing land use mix and other built environment features at varying geographic scales influence their hypothesized connection to individual travel behavior?

## Implications

This dissertation introduced an improved conceptualization and measurement of land use mix and then systematically explored its connection to pedestrian travel in a comprehensive, behavioral framework. By providing insight into



### Complexity in Land Use Composition and Configuration

This schematic shows how increased complexity in composition and configuration, exemplified in traditional downtown settings, provides diverse activity locations and supports walking.

these unresolved

issues, this work aims to help clarify land use mix as a multifaceted environmental construct with clear and beneficial pedestrian travel implications.

The increased availability of land use data has resulted in the wide adoption of an array of built environment indicators in recent studies of pedestrian travel behavior. While these indicators are potentially informative and helpful in building an evidence base, a strong theoretical connection to anticipated behavioral responses is necessary for the appropriate selection of such environmental measures. By deconstructing land use mix and reimagining it as a collection of complementary landscape pattern metrics, this dissertation provides important theoretical and empirical contributions for transportation-land use planning research and practice.

## PROJECT INFORMATION

**TITLE:** Active Travel Behavior and Spatial-Temporal Land Use Mixing

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**PROJECT NUMBER:** 2016-973

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**MORE INFORMATION** <http://nitc.trec.pdx.edu/research/project/973>