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Activity Spaces, Route Choices, and Neighborhoods: Assessing the Built Environment Associations with Walking Trips

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Physical inactivity is one of the leading causes of the obesity epidemic. Encouraging bicycling and walking for transportation, also called active travel, is one strategy to address inactive lifestyles. There is growing evidence that supportive built environments, known as walkability, can encourage active travel. The goal of this dissertation is to conduct an in-depth inquiry into the spatial and quality relationships between walking and the built environment with three interrelated studies.

The first study develops methods for assessing walkability within individual activity spaces: the geographic region accessible to an individual during a given walking trip. It classifies these spaces using three walkability summary measures: average, variation, and spatial coherence. Results indicate that the activity space regions and their summary measures capture considerable variation in the built environment that is obscured using Census geography summaries, a common practice. The second study develops a novel combination of a datadriven technique with route choice modeling for leveraging highly dimensioned walkability data. It compares estimated route choice models of data-driven with theory-driven models. Findings indicate that data-driven models are slightly less interpretable, but provide much better model fit and point to specific features of the built environment for policy makers to address to encourage walking. The third study compares self-defined neighborhoods with activity spaces for explaining home-based walking trips. It examines the spatial relationship between self-defined neighborhoods and activity spaces derived from participant GPS data using objective and perceived qualities of the built environment. Results suggest that researchers need to carefully consider the appropriate spatial and temporal scale when using perceived and objective built environment measures for assessing active travel correlates.

This dissertation contributes empirical findings to the relationship between built environment qualities and walking. Also, this dissertation advances analytical methods that provide insight on the appropriate spatial scales to measure the influence of the built environment on walking trips. This work contributes to our understanding of the role of the built environment on active travel and physical activity at the intersection of public health and transportation research.

