New England University Transportation Center

NE University Transportation Center
77 Massachusetts Avenue, E40-279
Cambridge, MA 02139
Phone: 617-253-0753
Fax: 617-258-7570
web.mit.edu/utc

Principal Investigator:	Norman Garrick	**Co-Principal Investigator:**	Wesley Marshall
Title:	Associate Professor	**Title:**	Assistant Professor
University:	University of Connecticut	**University:**	University of Colorado, Denver
Email:	Norman.garrick@gmail.com	**Email:**	wesleyemarshall@gmail.com
Phone:	860 486 2990	**Phone:**	303 352 3741

Final Report

Improved Characterizing of Access for Assessing the Impact of Community Design on Active Transportation and Health Outcomes

Project Number:	Project End Date:	Submission Date:
UCNR23-1	8/31/2012	4/18/2013

This study was aimed at characterizing transportation access by incorporating the Street Smart Walk Score®. This was done by conducting an assessment of common measures of street design, street network design, land use, and Street Smart Walk Score®, and their impact on travel behavior. The overall goal was to better characterize the built environment in order to assess how the built environment might affect mode choice for active transportation and health outcomes.

We found the Street Smart Walk Score® to have a moderate correlation to street network density, street network configuration, and link-to-node ratio, while having a very low correlation with street design characteristics. We also found that the Street Smart Walk Score® has a synergistic effect with street network and street design measures in predicting mode choice outcomes, and does not simply replace these established street network measures. We conclude that the Street Smart Walk Score® does not fully account for the transportation infrastructure side of accessibility, and it is actually adding to the attraction side by measuring land use and amenities. More importantly, these findings enhance our ability to fully measure accessibility and to see how these variables interact to impact travel behavior.

The results from the 24 California cities show that even though the Street Smart Walk Score® metric takes intersection density and average block length into account in its formulation, the metric does not fully measure street network density and street network connectivity. Moreover, the metric fails to account for street network configuration and street design characteristics, which have also been shown to be critical parts of the transportation infrastructure. The Street Smart Walk Score® was found to be significant in our statistical model and plays an important role in predicting mode choice outcomes. We found that people living in denser neighborhoods, with high levels of amenities, will drive less and will have increased use of active transportation modes as opposed to people living in sparser neighborhoods with similar levels of amenities. More importantly, we found that in terms of reducing driving, increased levels of amenities were not as significant as intersection density, street network configuration, and street design characteristics. Overall, the results suggest that higher levels of amenities in places with gridded street networks correlated with more walking, biking, and transit use.

Although this study took into account as many factors of the built environment as feasible – including street network characteristics, street design features, socio-demographic data, and land use data – future research should focus on further pinpointing the underlying variables affecting travel behavior and accurately characterizing the concept of accessibility for transportation planning purposes. Since transit use is linked to level of transit available in an area, it was difficult to establish firm conclusions about the transit results. Work can be done to obtain more detailed and complete data for transit service, in all of the 24 cities, in order to improve our prediction power by including a measure of transit availability. In terms of the transportation infrastructure, future research can focus on identifying and compiling data for a different measure of connectivity. Our results for street network connectivity were complicated because the link-to-node ratio variable has been the focus of great debate and critics cite its inability to account for differences in area and inflated values for cul-de-sac style neighborhoods. Future work should also focus on the topic of self-selection bias issues, based on facility availability and over attractiveness of the environment for all users.

Based on the accessibility modeling of travel behaviors, we found that transportation infrastructure and land use both play critical roles in the decision for which mode people choose to travel. Street network density, street network configuration, and Street Smart Walk Score® have a

synergistic relationship in their impact of mode choice. The combination of increased intersection density, more gridded street network designs, and increased number of amenities all lead to decreases in driving and increased in active transportation modes. As policy makers, planners and engineers continue to promote the non-motorized modes and transit, it is critical to identify what characteristics of the transportation system, the built environment and land use encourage such behavior and which, in turn, have been shown to lead to better health outcomes.