E. Hwang, A. Park, B. Lee, V. Spicer, A. Sixsmith. Spatial behavior of older adults in real and virtual environments. Gerontechnology 2010;9(2):221; doi:10.4017/gt.2010.09.02.254.00 **Purpose** The purpose of this study is to analyze how older adults make path choices while freely exploring a walking environment. This research is aimed at contributing to knowledge about the roles of the physical environment and local visual stimulus in path choices. In particular, we consider whether a 3D virtual reality (VR) simulation of the neighborhood results in similar spatial behavior and decision-making as a walking route in the real environment. **Method** The Chinatown area in Vancouver, Canada was chosen for the study since it offers socially mixed diversity and intersections are frequently spaced and offer path choices that vary in width, activity level and land use. The unit of analysis is the path segment, which is a section of the route between two decision points (e.g., intersections). To audit the real environment, we evaluated 12 segments (south of Pender-Carrall street) where four senior housing and community centers are located. Using the Seniors Walking Environmental Audit Tool - Revised (SWEAT-R)[1], we evaluated functionality (e.g. land use, sidewalks), safety, aesthetics (e.g. quality of micro-scale urban design), and possible destinations in the neighborhood. During the audit, digital photographs were taken and later joined together, using 3D Studio Max, to construct a virtual reality model. Then, we invited 30 older adults to analyze whether or not they navigated their neighborhood in the same way in both VR and real environments. The participants were recruited from the senior housing and community center located in the neighborhood where we carried out the environmental audit. To ascertain the participants' health and mobility, participants were asked, before the experiment, if they used assistive walking devices and/or had experienced any health problems in the past 6 months. We also asked about the participants' physical activity levels in the community, using the International Physical Activity Questionnaire (IPAQ; short version). The short version of the IPAQ includes questions about respondents' frequency and duration of participation, in the past 7 days, in vigorous and moderate physical activity including walking. The IPAQ data provided information about path segment use and routes, and motivations for outdoor activities. During the VR experiment, the participants were asked to demonstrate their favorite routes to get to three key destinations (e.g. the grocery store, the community centre, the skytrain station) in the neighborhood. To analyze the agreement on whether the choices are the same or different in the VR and real environments, we conducted the Wilcoxon-T test. **Results & Discussion** The path choices for the real and virtual environments were not statistically different although clear preferences were expressed. Street features such as corridor length and store content affected overall choices among the participants. In either case, the participants selected the segments where they did not have to cross the streets and where many stores were located. However, in the real environment, they avoided the segments with heavy traffic, which was not necessarily well presented in the VR experiment. In the real environment, many participants mentioned activities and aesthetically pleasing features (e.g. trees and awnings) used to make their decision, but in the VR, street signs were important features. The research indicated the need for further development of the VR model, as path choices are multi-featured and complex. However, VR simulation has huge potential both in the research of the spatial behavior and decision-making of older people and in the practical design and planning of age-friendly urban environments.

References

1. Michael YL, Keast EM, Chaudhury H, Day K, Mahmood A, Sarte AFI. Revising the Senior Walking Environment Assessment tool. Preventive Medicine 2009;48(3):247-249

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