SYMPOSIUM SCHERER

Spatial knowledge acquisition: using technology, training, and techniques to enhance spatial learning for two special populations

James Marston

Abstract Visual cues are a very helpful means of learning an environment easily and quickly. People who are blind cannot access many of the cues that guide most people. Likewise, those with developmental disabilities can often not understand signs and cues in the environment. This talk will look at several studies that have pointed out technologies, training, and techniques that can assist these two groups to better understand spatial information and lead to better spatial decision making and cognitive maps. People who are blind or visually impaired exhibit a wide range of spatial abilities, just like their sighted counterparts. The literature shows an equally wide range of theories on the ability of this group to accurately acquire spatial knowledge and the ability to construct valid and useful cognitive maps. Spatial information is especially important when dealing with novel environments. This presentation first reports on an experiment that used auditory cues (Talking Signs ┌ Remote Infrared Audible Signage [RIAS]) to increase environmental awareness in a multi-modal urban transit station. One group of participants used their regular methods of orientation and travel while the others used the additional auditory cues. Two types of tests were conducted to measure spatial knowledge acquisition. Participants were given two opportunities to make a shortcut, if they were aware of its presence. In both instances, those that used the auditory cues were vastly superior in their ability to make distance-saving shortcuts. In addition, a set of spatial relationship questions was examined. Those that used the auditory cues answered these questions much more accurately than those that used their regular methods. Participants' times to complete various search and travel tasks, the number of errors made, and the number of requests for help from others were all superior when using the auditory cues. These additional auditory cues gave information that is not normally available and it appears that poor spatial awareness (a major problem of blind navigation) is the lack of accessible cues in various environments, not an inherent cognitive processing flaw of these individuals. Examples from work by other researchers will be discussed in the presentation. We summarize a study that tested RIAS in a subway station with a group of people who had developmental disabilities. They better understood the auditory signage information then when they tried to read that information. We also give examples from studies that tested various techniques to help blind people learn an environment, such as making sure that all cues at decision points were salient to the user, making a verbal report, constructing a model, and pointing at various visited objects. Two studies showed that when blind people were trained in these techniques, they preformed much better than without this training, and in one study, blind people were able to learn a complicated route almost as well as a sighted control group.

Keywords Accessibility · Vision-impaired · Spatial knowledge acquisition · Cognitive maps · Environmental cues · Blind navigation

J. R. Marston (✉)
Department of Geography, University of California Santa Barbara, Santa Barbara, USA
e-mail: marstonj@geog.ucsn.edu