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The idiosyncrasy of movement: GIS as a tool for exploring individual differences

The concept of individual differences continues to gain considerable attention within the discipline of psychology. A recent workshop at the 2006 *Spatial Cognition* conference (in Bremen, Germany) made evident that much can be learned by focusing on the individual and the particularities of both planned and unplanned navigation. Individuals vary in their ability to learn and navigate large-scale environments. These differences however are often treated as secondary, aggregated and at times even forfeited for statistical significance testing. Researchers in geography, especially those dealing with behaviour and movement, must take care to partake in this discussion and continue to develop analytical methods that can account for the heterogeneity of human spatial behaviour.

Researchers (Tellevik, 1992; Hill 1993) have used different video coding techniques to analyse and identify patterns and strategies used to explore familiar and unfamiliar environments. Most of these techniques require the recording of movement with a video camera and the isolation of different exploratory strategies by reviewing the recording as a sequence of frames. Despite a series of advances in real-time digital tracking technology (Schinazi, 2005) some researchers (Gaunet, 1996; Thinus-Blanc & Gaunet, 1999) continue to employ video based techniques in their analysis, questioning the academic value of these technological novelties. Data acquired from real-time digital tracking devices, much like video data, needs to be re-coded in order to be analyzed. The finer precision of GPS systems has allowed for tracking data to be collected and automatically coded into GIS software for analysis. This type of data collection has recently been used with considerable success in the analysis of children's activity patterns in their local environment (Mackett et al., 2006). GPS unfortunately is still not accurate enough to deal with small-scale spaces where satellite data cannot capture enough detail on the sequential propinquity of body movement and turn angles. Taken together, it seems that changes are necessary not at the *data capturing stage* but during coding and analysis. Zacharias & Schinazi (2003) have used GIS software to code and analyse the spatial behaviour in small-scale settings - the corridors of a shopping centre in Downtown Montreal.[1] However, the movement data for the most part was aggregated and

[1] Shopping centres are a good example of GPS unfriendly environment given limited strength of satellite signals.

coded as layers of polylines representing different spatial distributions and flow patterns, yet again overlooking the peculiarities of individual behaviour.

The present study will describe a technique used to examine the locomotor strategies employed by individuals who are blind or visually impaired when exploring a complex novel environment. Subjects were asked to explore a large-scale maze (45 X 30 meters), locate and remember the position of six different targets. They were then put through a series of spatial tasks and asked to make heading judgements, estimate distances and complete a cued model of the maze. The movement pattern of each subject was recorded and entered into GIS software (ArcGis) as individual polylines. The *Tracking Analyst* extension was used to view and isolate the movement patterns into specific space frames for coding. Performance in the various spatial tasks was then related to the different identified exploratory strategies.

The talk will conclude with a discussion on the complexity involved in the identification and classification of exploratory strategies that are both spontaneous and distinct. Some limitations of GIS based tracking analysis will also be presented and these will be evaluated in relation to past research and current analytical tools that allow the focus to placed on the individual.

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