**MOTIVATION**

- Spatial information can be learned from a survey (allocentric) perspective, using absolute reference terms (e.g., north, south), or from a route (egocentric) perspective using relative reference terms (e.g., straight ahead, to your right).

- Data regarding the nature of mental representations constructed from route and survey information are ubiquitous. Some maintain that spatial memories are perspective-invariant, and maintain the point of view adopted during learning (e.g., Roskos-Ewoldsen, McMamara, Shelton, & Carr, 1998; Wang & Spelke, 2000, 2002). Others argue that they are abstracted, perspective-flexible representations, referred to as spatial mental models (e.g., Burgess, 2000; Mou, McMamara, Valiquette, & Rump, 2004; Taylor & Tversky, 1992).

**METHODS**

**Experiment 1 (Spatial Descriptions):**
- 48 undergraduates (31 female, mean age = 20.27 ± 1.7 years)
- Read descriptions of 16 environments in survey or route perspective once at a time, self-paced.
- After each environment, completed a statement verification task, which required drawing inferences from both survey and route perspectives.
- Route descriptions: navigator entered heading north, east, west, or south.
- Survey descriptions: viewer entered heading north, east, south, or west.

**RESULTS**

**Experiment 1 (Spatial Descriptions):**
- Collected across all sentences, route descriptions that entered heading north were read faster than the other 3 headings directions (NvS t(35)=5.25, p<0.01, d=0.88; NvE t(35)=2.49, p<0.05; NvW t(35)=2.53, p<0.05).
- Survey descriptions were read fastest when heading south (starting in the north) (SwE t(35)=3.31, p<0.01; SwS t(35)=3.16, p<0.01, d=0.59).
- No difference in route inference response times after reading survey descriptions (ps > 0.05).
- Survey inferences were read faster when the layout was described heading north to south, similar to typical Western visual scanning paths (e.g., Pollatsek et al., 1981; Spelke & Hammad, 2005).

**CONCLUSIONS**

- When reading spatial descriptions, entering an environment heading northward facilitates language comprehension in the form of faster reading times, and aided in developing spatial memories that afford across-perspective (i.e., survey) inferencing.
- Survey descriptions were read fastest when the layout was described heading north to south, similar to typical Western visual scanning paths (e.g., Pollatsek et al., 1981; Spelke & Hammad, 2005).
- Beginning virtual environment navigation with an initial north-heading direction results in faster verification of survey inference statements.
- Aligning absolute reference terms (i.e., cardinal directions) with relative reference terms (e.g., left, right) while learning environments from the first-person (route) perspectives facilitates construction of perspective-flexible spatial memories, integrating ego- and allocentric information.

Present findings provide evidence that readers and navigators use allocentric cues to structure their memory for environments learned from an egocentric perspective.

**REFERENCES**


