Route Planning and Situated Navigation in Collaborative Wayfinding

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Research Questions

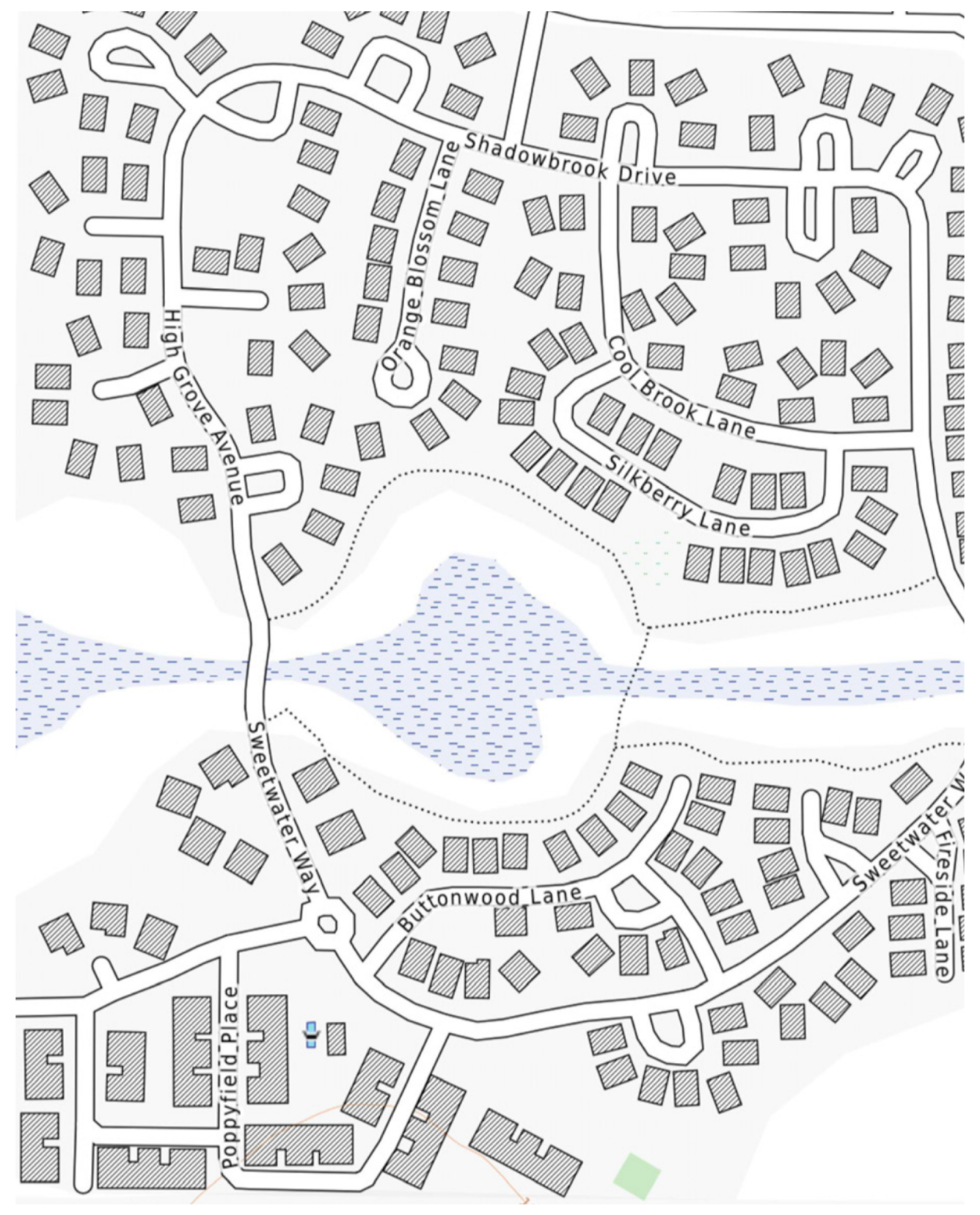
Primary: How do dyads (pairs) work together to plan navigational routes through a novel environment?

a. What characterizes prospective paired planning versus situated paired planning of a route?
b. How do route planning strategies differ based on individual differences in spatial ability, for instance as self-reported through existing sense of direction (SOD) measures?

Secondary: How do dyads coordinate their knowledge and behavior in a real-world spatial navigation task?

a. How efficient are different pairs of people in their navigation task performance, in terms of time and distance minimization? Which social interactive factors contribute to this performance?
b. How, when, and to what end are leadership and following roles adopted within the dyadic interaction?
c. How and when do individuals communicate trouble to their wayfinding partner, including social trouble or wayfinding uncertainty?

Study Description



Participants (*n* = 48 so far) collaborated on a task to both **plan** and **execute** a pedestrian route between a given origin and destination.

Interactions during both planning and navigation were **video-recorded** and will be coded for navigational strategies and interactional behavior.

Measures

Individual Measures of Spatial Ability and Personality

Santa Barbara Sense of Direction (SBSOD)

Self-report assessment of spatial ability, ranging from 1.0 to 7.0

- Individual SOD may relate to navigational success or flexibility in map-reading or interpretation
- Within-pair SOD differences may relate to joint navigational success or strategy use

Big Five Personality Inventory (BFI)

Assessment of personality characteristics along the dimensions of *Extraversion*, *Agreeableness*, *Conscientiousness*, *Neuroticism*, and *Openness to New Experience*

- Relate BFI characteristics to planning and wayfinding strategies, as well as within-pair leadership

Methodology

Phase I: Planning

- Participants were recruited into dyads with no prior familiarity with each other or the study site
- Each dyad was given a map with origin and destination points between which they had to plan a route (while video-recorded)
- Individuals were asked to draw and describe the planned route

Phase II: Navigation

- Dyads were taken to the study site and asked to navigate between the same origin and destination points as in the planning phase
- Participants wore a video camera and were GPS-tracked

Preliminary Results

- Wide variety in planned routes across dyads, with distances ranging from 0.36 to 0.61 miles
- Length of route during navigation phase ranged from 0.40 to 1.33 miles and averaged 0.63 miles
- Observed differences in planned routes and routes as executed *in situ* – shortcutting or getting lost
- Time ranged from 8 to 29 min, average 12.6 minutes

Profiles of Dyads

Dyad ID	Sex Pairing	SBSOD Difference [Individual Levels*]	Time Taken to Completion	Self-reported Social Role-taking
1	M / F	0.20 [Low/Low]	10:42	Leader & Follower
2	F / F	0.53 [High/High]	23:50	Leader & Follower
3	F / F	1.33 [High/Low]	9:44	Collaborative
4	M / F	2.53 [High/Low]	8:37	Leader & Follower
5	F / F	0.93 [High/Low]	9:03	Collaborative
6	F / F	1.47 [High/Low]	10:46	Collaborative
7	F / F	0.53 [Low/Low]	7:05	Collaborative
8	F / F	1.53 [High/Low]	8:08	Leader & Follower
…	…	…	…	…

**Median SBSOD score of 4.1 used to categorize participants as "high" or "low" SBSOD.*

Next Steps

- Code video recordings of planning phases, focusing on route suggestion sequences
- Code video recordings of navigation phases, with attention to coordinating spatial understanding and actions at decision points

Selected References

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