



**TEXAS A&M**  
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# Directional Sense in Familiar Environments Misaligned with the Cardinal Directions

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# Background & Research Questions

*What causes differences in people's ability to navigate effectively through environmental-scale spaces, such as cities and college campuses?*

Previous research has investigated the source of variability in directional sense, or the skill with which individuals can identify, maintain, and compare allocentric headings, as a source of differences in navigational effectiveness. Allocentric headings are important to navigation as they are facing directions fixed within the environment.

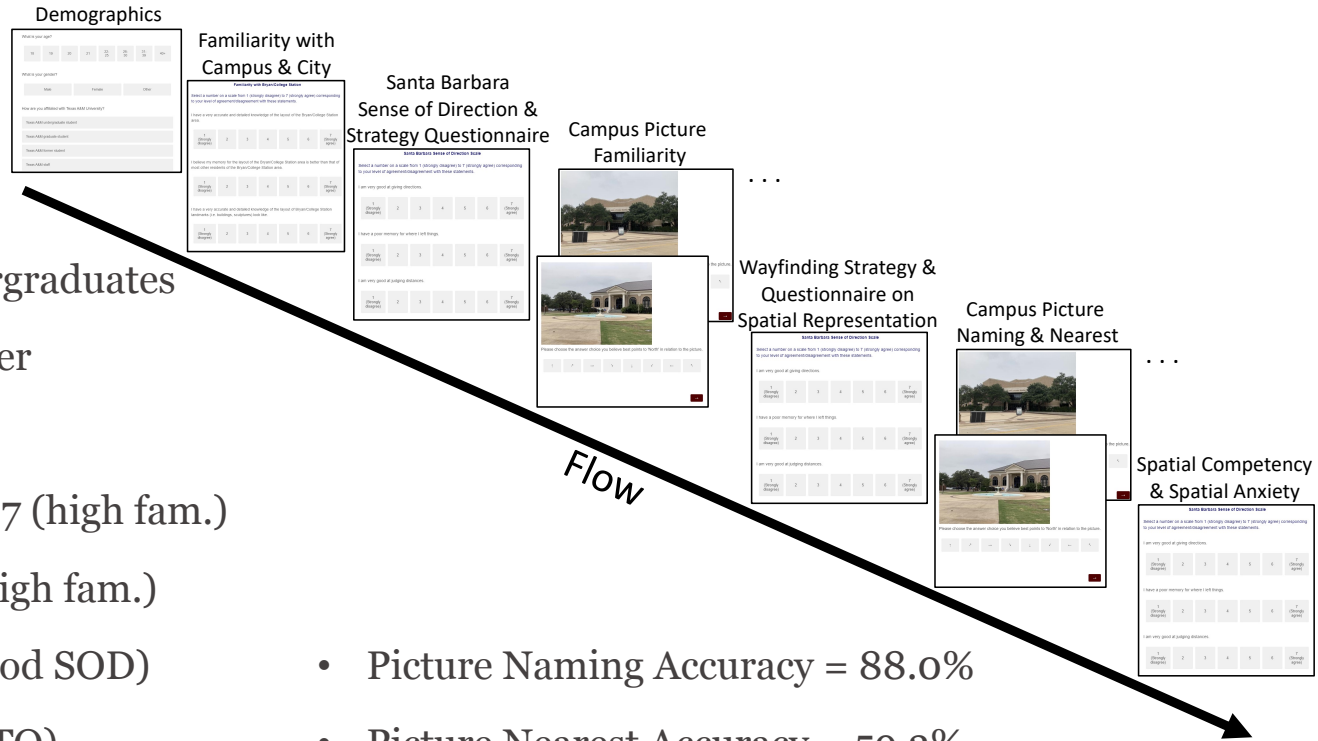
That research found that gender, self-reported sense-of-direction, and environmental familiarity all predicted directional sense (Burte et al., 2018).

*What other factors predict directional sense? How might this differ in environments misaligned with the cardinal directions?*



# Pre-Test Methods

- N = 105 Texas A&M undergraduates
- 50 Male, 54 Female, 1 Other
- Median Age = 20
- Fam. with Campus = 4.1 / 7 (high fam.)
- Fam. with City = 3.5 / 7 (high fam.)
- SBSOD Score = 4.4 / 7 (good SOD)
- Strategy Questionnaire (STQ)
- Picture Fam. = 5.1 / 7 (high fam.)
- Wayfinding Strategy Scale (WSS)
- Questionnaire on Spatial Representation (QSR)



- Picture Naming Accuracy = 88.0%
- Picture Nearest Accuracy = 59.3%
- Spatial Anxiety = 2.6 / 5 (high anx.)
- Spatial Competency = 3.4 / 5 (high comp.)



# What is the relationship between environmental-scale factors?

1. Self-reported sense-of-direction
2. Campus familiarity (objective)
3. Allocentric reference frames / Survey perspective
4. Egocentric reference frames / Route perspective
5. Local familiarity (subjective)

SBSOD

STQ-SOD

Spatial Comp.

QSR-SOD Route

QSR-SOD Survey

QSR-Route

Campus Fam.

Picture Fam.

Picture Naming

Picture Nearest

STQ-Allo

WSS-Allo

QSR-Cardinal

QSR-Survey

STQ-Ego

WSS-Ego

QSR-Survey

QSR-Route

Campus Fam.

City Fam.



# Experiment Methods

- N = 13 Texas A&M undergraduates
- 6 Male, 6 Female, 1 Other
- Median Age = 19
- Median Time Spent on Campus = 1 year



## Relative Heading Task (Burte & Hegarty, 2014)

- Mean Training Accuracy = 68.2%
- Mean Task Accuracy = 28.8%
  - 0-degree heading disparity = 27.3%
  - 90-degree heading disparity = 29.8%
  - 180-degree heading disparity = 28.7%



# Conclusions & Next Steps

From the pre-test, the environmental-scale questionnaires and tasks measure similar constructs.

From the experiment, while participants did well learning the Relative Heading task in the training session, they struggled once in the main task.

***What other factors predict directional sense? How might this differ in environments misaligned with the cardinal directions?***

We'll be able to evaluate if factors, such as sense-of-direction, environmental familiarity, reference frame / strategy use and demographics, predict directional sense after in-person data collection.

We have preliminary evidence that directional sense is similar (but perhaps less precise) in environments that are misaligned to the cardinal directions.



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