A Spatial Gist Phenomenon While Locomoting in an Immersive Virtual Environment

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BACKGROUND

- Gist, or meaningful context, is determined quickly in static scenes¹,²,³.
- Most dynamic navigation tasks do not assess gist for spaces.
- Individuals show good memory for district layout after navigating in a 3D virtual environment⁴.

RESEARCH QUESTIONS

1. How and when are individuals perceiving changes in spatial gist during navigation?
2. What is the perceived magnitude of these changes?

Design

- Within-Subjects
- Independent Variables:
  - Type of Change: Architecture, Size, Both, None
  - Sequence (repeated once)
  - Speed (constant at 3 m/s; jogging)
- Dependent Variables:
  - Flag a change whenever perceived (open-ended)
  - Magnitude rating of perceived change (scale of 1-5)

PROCEDURE

- Consent
- Practice Video
- 20 Minute Virtual Reality Environment
  - Press button for every perceived change
  - Rate perceived change on scale of 1-5
- Qualtrics Survey
  - Demographic Information
  - Gaming Experience

RESULTS

1. Change Type Affects Perceived Gist
   - Flags Included: closest button press to boundary within 10 meters on either side (based on M = 20 meters distance from boundary)
   - Size < Both, p=0.011, \(\eta^2=0.142\)
   - Gaming Experience and Total Flags are not significant covariates

2. Change Type Affects Perceived Magnitude
   - Flags Included: closest button press to boundary within 10 meters on either side (based on M = 20 meters distance from boundary)
   - Size < Both, p=0.006, \(\eta^2=0.165\); Size < Arch, p=0.002, \(\eta^2=0.211\)
   - Gaming Experience not sig. covariate and Total Flags is sig. covariate

3. Change Type Affects Weighted Distance
   - Flags Included: button presses within half a block on either side of boundary
   - Weighted Distance = \(\frac{\sum (\text{Flag Distance} - \text{Magnitude Rating})}{\text{Total Magnitude Ratings}}\)
   - Size > Both p=0.019, \(\eta^2=0.121\)
   - Gaming Experience not sig. covariate and Total Flags is sig. covariate

DISCUSSION & FUTURE DIRECTIONS

- Perceived changes in spatial gist can be identified and characterized during locomotion.
- The results from weighting distance suggest that changes in size may be detected sooner than other types of changes.
- Future research focusing on manipulating speed of locomotion, testing wildland environments and those with foliage, and eye tracking to determine elements that evoke feelings of change.

REFERENCES

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