Virtual Reality and the Perception of Size: Examining Ensemble Perception in a 3D Virtual Environment

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Introduction

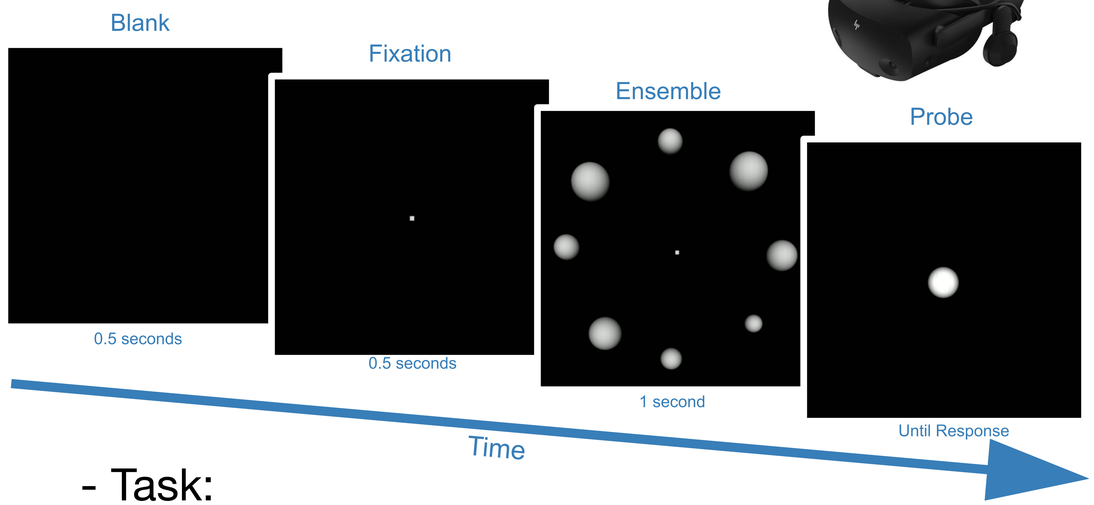
- Our visual system is efficient at summarizing complex scenes
- We use visual cues like size and depth to help us process these complex scenes

Research Question

- Is there a relationship between depth and ensemble size perception?
- How does VR influence results?

Ensemble Perception:
processing a group of items as a whole rather than as individuals

Methods



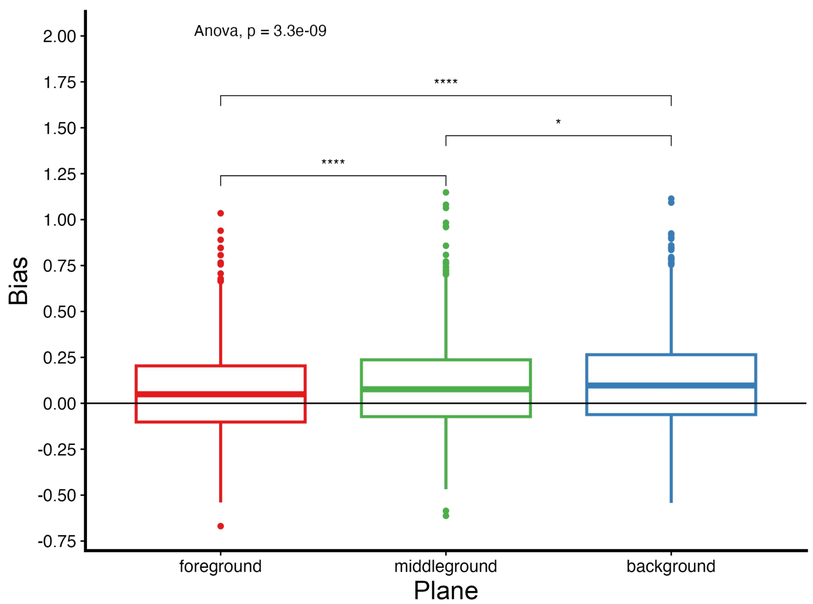
- Task:
  - Report average size of spheres
- Depth Conditions:
  - Foreground, Middleground, Background
- 17 participants
  - (M_{age} = 18.9; range: 18-21)

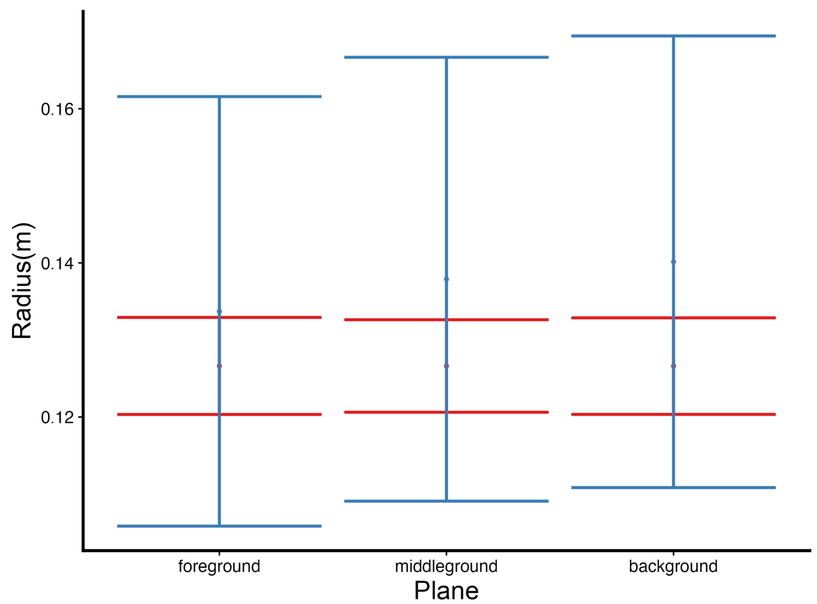
Discussion

- As depth increased, so did bias in responses
  - Participants had larger responses as ensembles got farther away
- Depth is difficult to perceive in VR compared to stereoscope experiments
  - Only 2 participants accurately judged depth
- Why?
  - VR environment was bare, rich environments improve perception
  - Low screen resolution of headset

$$\textbf{Bias} = \frac{\text{Probe radius - Average radius}}{\text{Average radius}}$$

Results





Conclusion

- Depth affected ensemble size perception
- Future Directions
  - Include rich environment to promote better depth perception in VR