OUT OF SIGHT

THE IMPACT OF HIDDEN OBJECTS ON VISUAL SEARCH IN 3D SCENES.

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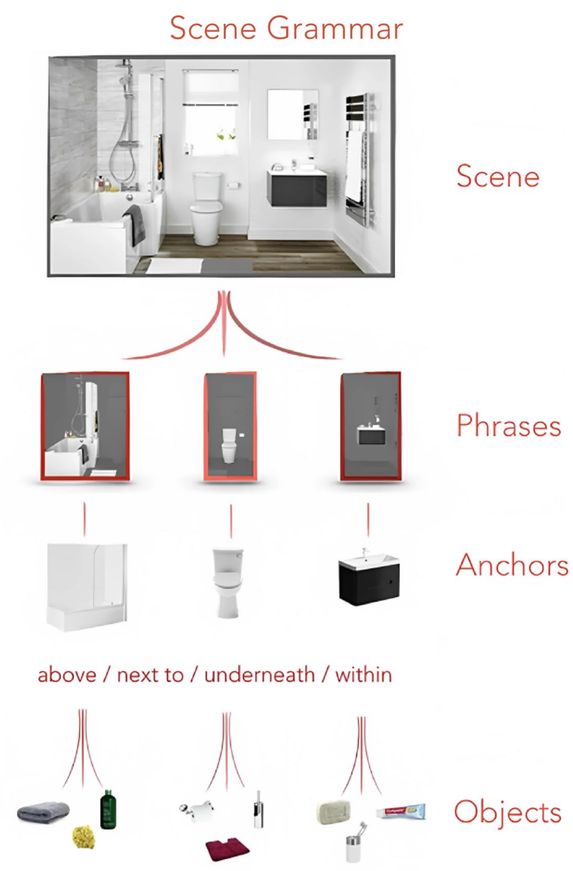
INTRODUCTION

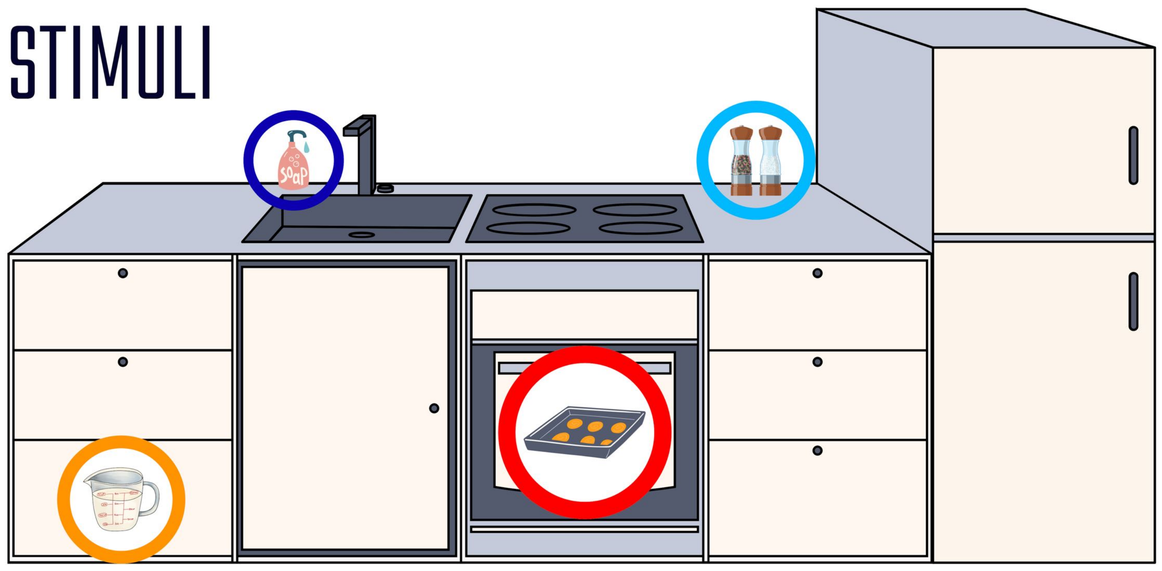
- Research on **visual search** and **Scene Grammar** has primarily focused on objects in plain sight, often overlooking the complexity of everyday objects that are hidden. For instance, Searching for a baking tray that is "hidden" in an oven might entail different search strategies and behaviors.
- **We explored the characteristics of searching for these hidden objects in virtual reality.**



METHODS

- **Visual Search; 49 Objects in 28 Scenes**
- 3D virtual environments; Vive Pro Eye headset
- **Target Object conditions**:
  - Target Visibility: (Hidden/Visible)
  - Scene Grammar constraint: (Constrained/Diffused)
- **25% target-absent trials**
- Participants could **interact** (e.g. open furniture)
- 22 participants ♀ 13 ♂ 9; mean age = 24.2

STIMULI



Target Objects

Visible Diffused

Visible Constrained

Hidden Diffused

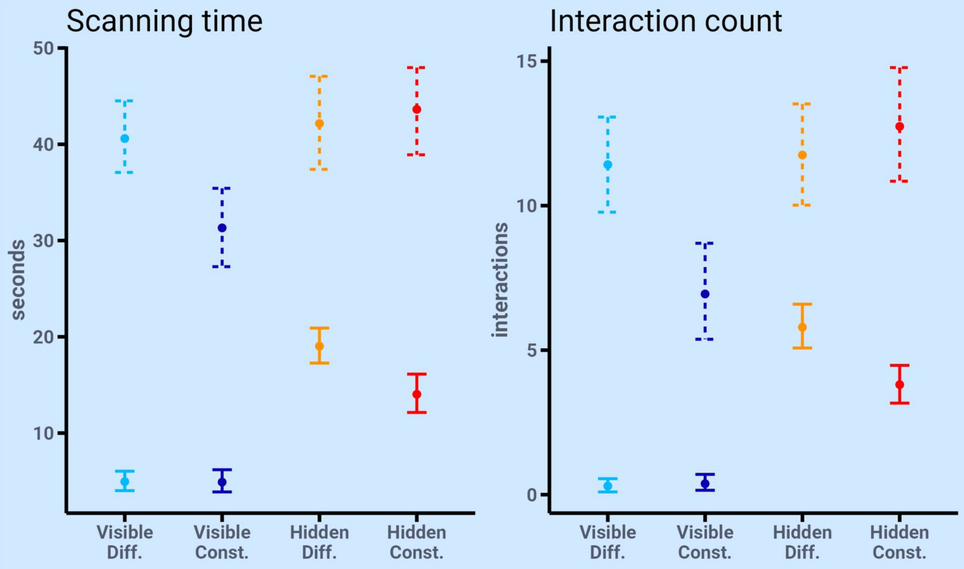
Hidden Constrained

Present ———

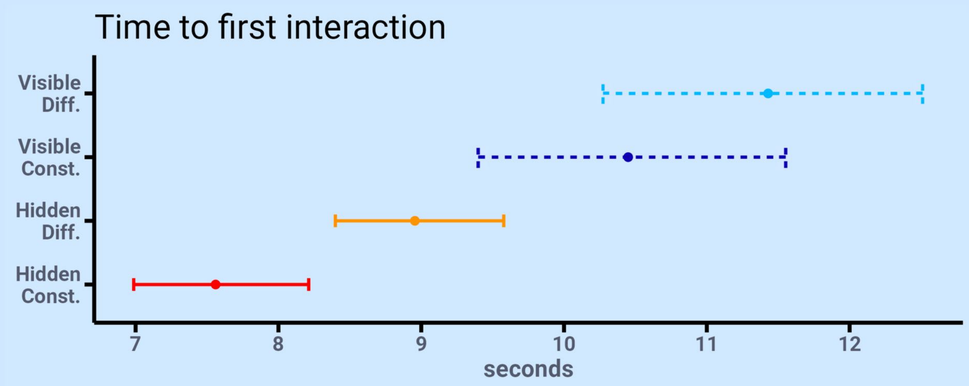
Absent ----------

KITCHEN OFFICE BEDROOM LIVINGROOM

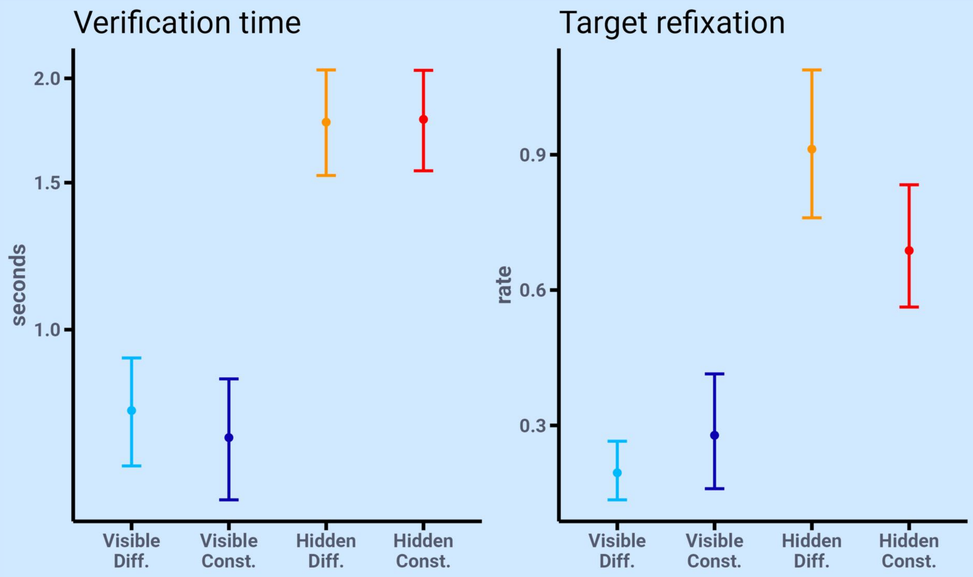
RESULTS



- **Constrained hidden objects were identified faster** and with **fewer interactions** than diffused ones.
- Participants marked visible objects as absent faster if they were constrained.



Participants started interacting later when visible Objects were absent compared to hidden ones.



Searching for hidden objects elicits **longer verification times due to limited peripheral processing** and more target refixations because of restricted visibility.

DISCUSSION

- **We possess knowledge of an object's likelihood to be hidden or visible** and adapt our search strategies accordingly.
- **Hidden objects follow scene grammar rules**, and their search strategies align closely with those used for visible objects.
- Underscores the importance of tracking behavior in intricate environments to **understand how humans navigate the world with such ease.**

RELATED LITERATURE

David, E., Beitner, J., & Võ, M. L. H. (2021). The importance of peripheral vision when searching 3D real-world scenes: A gaze-contingent study in virtual reality. *Journal of Vision*, 21(7), 3.

David, E., & Võ, M. L. H. (May 2022). Searching for hidden objects in 3D environments. *Vision sciences society annual meeting 2022* (VSS 2022). St Pete Beach, Florida.

Võ, M. L. H. (2021). The meaning and structure of scenes. *Vision Research*, 181, 10-20

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