

## The dimensional representation of real-world scenes

The experiment you just completed investigates how people effectively perceive and remember complicated information in the real world. The specific focus of this experiment was to test if our visual system can decompose real-world scenes into meaningful dimensional structures. To investigate this question, we asked you to perform a visual search task where you had to discriminate a target scene from foil scenes that look very similar to the target. Specifically, a target scene could be distinguished from foil scenes along one or two feature dimensions (e.g., indoor lighting, layout, amount of wood material, etc.) depending on experimental conditions. To successfully complete the task, you had to decompose the scenes into meaningful feature dimensions and selectively attend to diagnostic feature dimensions that are critical for discriminating the target from the foils.

The particular hypothesis we tested from the current experiment was the difference of visual search speed depending on how many feature dimensions are required for the target search. Specifically, we expected that when attending to only one feature was enough to distinguish the target from the foils, the search performance would be very efficient without much cognitive effort. Contrarily, we anticipated that if two features are required for target discrimination from the foils, the search performance would slow down since the visual system needs extra time and effort to extract the two feature dimensions separately and again combine them to perceive them as a holistic scene.

Completion of this project will inform theories of perception and memory by characterizing how people see and remember complex scenes in such a task context. This project will also inform future studies we will conduct that investigate different brain regions critical for successful perception and memory ability. If you are interested in this topic, check out the materials below:

Treisman, A. M., & Gelade, G. (1980). A feature-integration theory of attention. *Cognitive psychology*, 12(1), 97-136.

Arguin, M., & Saumier, D. (2000). Conjunction and linear non-separability effects in visual shape encoding. *Vision Research*, 40(22), 3099-3115.

Hebart, M. N., Zheng, C. Y., Pereira, F., & Baker, C. I. (2020). Revealing the multidimensional mental representations of natural objects underlying human similarity judgements. *Nature human behaviour*, 4(11), 1173-1185.

If you have any questions, please contact Dr. Michael Mack at 416-978-4243 or by email at [mack@psych.utoronto.ca](mailto:mack@psych.utoronto.ca).

Thanks for participating in our experiment!