The memory representation of real-word scenes

The experiment you just completed investigates how people learn and remember new information. The specific focus of this experiment was observing the influences of category membership of the real-world scenes on the memory process of those scenes. To investigate this question, we asked you to perform two types of tasks – the categorization task and the following memory task.

In the categorization task, you had to selectively attend to diagnostic features and ignore the irrelevant features of the scenes to successfully learn their category membership. After category learning, therefore, we expected that the memory representations of the scenes change in the way to emphasize the diagnostic features. In the memory task, we measured this mnemonic change for the scenes depending on their category membership. We were particularly interested in how the typicality of the scenes for the category impacts the magnitude of mnemonic distortion. We hypothesized that the less typical the scenes were, the more distortion occurs on the memory representations of the scenes to optimize the categorization process. Here the typicality level was determined how closely a given scene is located to a category boundary arbitrarily set on the continuously changing scene dimension named 'scene wheel.' To measure the memory distortion, we asked you to reconstruct the scenes from the scene wheel. We expect that the scenes located closer to the boundary will be less precisely remembered than the scenes farther from the boundary due to mnemonic distortion.

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

Cacioppo, J. T., & Freberg, L. (2018). Discovering psychology: The science of mind (Chapter 9. The knowing mind: memory). Cengage learning.

Konkle, T., Brady, T. F., Alvarez, G. A., & Oliva, A. (2010). Scene memory is more detailed than you think: The role of categories in visual long-term memory. Psychological science, 21(11), 1551-1556.

Ester, E. F., Sprague, T. C., & Serences, J. T. (2020). Categorical biases in human occipitoparietal cortex. *Journal of Neuroscience*, *40*(4), 917-931.

'Learning & Memory' Part in the lecture material.

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

Thanks for participating in our experiment!

Questions

: Please try to answer the questions below to review what you have learned from participating in the experiment.

1. What is the purpose of the experiment?
2. What kind of cognitive processes can be involved in remembering scenes?
3. What is the independent variable in the experiment?
4. What is the dependent variable in the experiment?
5. What is the expected effect of the independent variable on the dependent variable?
6. What kind of future studies can be planned after this study?

(You can check the answers on the next page)

Answers

1. To investigate the influence of category membership on the memory process of real-world scenes.
2. Categorization, category learning, attention, etc.
3. Typicality level based on category membership of scene images (distance from category boundary)
4. Magnitude of memory distortion
5. Less typical images among the category members (more closely located images from the category boundary) will be more distorted and remembered less precisely.
6. Neural mechanisms of the category-based memory distortion, etc.