Trinity College Dublin
Coláiste na Tríonóide, Baile Átha Cliath
The University of Dublin

SCHOOL OF PSYCHOLOGY and INSTITUTE OF NEUROSCIENCE

TRINITY COLLEGE DUBLIN

Debriefing Sheet

Title of the research study:

The formation of multisensory object categories

Background

Thank you for your participation in this study.

- In the categorisation of objects, it is assumed that all the senses contribute to their formation. So, for example, different types of dogs are categorised as 'dog' based on the shape of their bodies (vision) and the bark sound (audition). This is an example of how multiple senses are integrated to create our overall perception [1, 2].
- The ability to effectively integrate information is important, because it is associated with better object recognition [4].
- Object perception can be affected by object familiarity [3, 4, 5, and 9].
- Objects are organized in memory though a categorical hierarchical structure. For example, when seeing a rainbow, a common experience is to perceive stripes of colour despite the stimulus being a continuous wave of light. Green and yellow colours are more easily discriminable than two different shades of green (see Figure 1). This phenomenon is called categorical perception (CP) and it represents the ability of perceptual systems to adapt and facilitate efficient recognition. Familiar objects, facial expression and the sex of faces have been reported to be categorically perceived. [9, 10, 11]

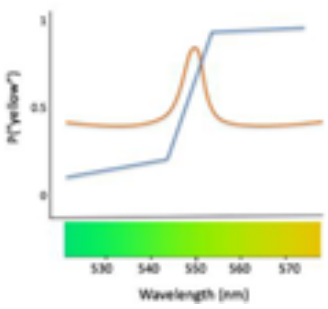

Figure 1 – On the left: a continuous wave of light. On the right: a graph illustrating the Categorical Perception phenomenon. In blue are shown the responses to categorization and in red are shown the responses to discrimination. The blue peak represents shift in categorization response, and the red peak represents the increase in discrimination responses.

- However, how sensory information contributes to the formation of categories is unknown.
- Object categories help us to recognise novel objects and allow us to interact with the things in the world.

The aim of this study is to examine how sound and vision contribute to the formation of object categories by the brain. We are also interested in how multisensory categories are formed and represented in memory.

What tasks did you experience?

In this experiment you were presented with objects (images and/or sounds) which you had to first learn and then, once those were learned, we asked to what extent new objects are similarly categorised based on their visual or auditory similarity to the learned objects.

In our analysis, we will investigate if objects are stored in memory as multisensory by comparing the categorization performance among groups assigned to different learning conditions. i.e., some individuals learned by hearing an object, some by seeing an object, some seeing and hearing an object. For example, we will compare categorization performance for a set of bottles between individuals that had previously learnt the visual image of the bottles, or by its sound perception or by both visual and sound perception.

If objects are represented as multisensory categories in memory, individuals should be able to correctly categorize them even when presented just vision or just audition. This would indicate that individuals are able to recollect information about objects when presented to just one sense (e.g. just seeing or just hearing an object). Essentially, learning the visual and sound properties of an object would significantly increase an individual's ability to correctly categories an object. This is because the individual has successfully integrated information from both senses.

Importance of this research

Your data will contribute to our knowledge of how information from the senses contributes to our understanding of object categories. Object recognition is one of the most fundamental tasks that our human brain can perform, yet our understanding of how this is achieved is relatively poor. This study is therefore important because we hope to provide greater insight into the role of multisensory information in the representation and recognition of objects.

Contact details of the researchers

The principal investigator for this study is Prof. Fiona Newell.

If you have any questions or comments about this study, please contact us at the email address/phone number listed below:

Researchers

Martina Seveso, email: sevesom@tcd.ie, Isabella Devine, email: isdevine@tcd.ie, Jack Cotter, email: cotterj2@tcd.ie

Lab office email: multisensorylab@gmail.com

Lab office phone number: 01 896 8418

Principal Investigator

Prof. Fiona Newell, email: fnewell@tcd.ie

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