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DOES RHYTHM ENHANCE RECOGNITION MEMORY? EVIDENCE FROM BEHAVIOUR AND ELECTROENCEPHALOGRAPHY

Emma V. Ward; Alexander Jones; Jon Silas

Middlesex University London

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Background/Aims: This project aims to investigate how the rhythmic presentation of stimuli affects recognition memory and the underlying cognitive and neural mechanisms. Temporal expectation refers to the anticipation that an event will occur at a particular point in time, which has been shown to enhance various cognitive processes. However, little research has been done to examine how temporal expectancies affect memory. Therefore, this project is systematically manipulating the temporal structure with which to-be-remembered objects are presented in order to examine the effect on subsequent recognition.

Method: In all experiments participants are presented with a continuous stream of images of everyday objects during an encoding phase, prior to completing a recognition test in which they are asked to discriminate between previously presented and new objects. The presentation of objects is either temporally structured in terms of stimulus onset timings (e.g., rhythmic and/or predictive onset timings), or unstructured (e.g., arrhythmic, non-predictable onset timings).

Preliminary results and conclusions: In our initial experiment, we uncovered a benefit of temporal structure on recognition, and an interaction with spatial attention. Rhythmic presentation of stimuli benefited memory for spatially attended but not unattended objects, and was associated with differential neural activity compared with when stimuli were presented in an arrhythmic manner (Jones, Ward, Csiszer & Szymczak, under revision, *Journal of Cognitive Neuroscience*). In addition, we have had an in-principle acceptance of a Registered Report in journal *Cortex*, for our second experiment that introduced a temporal sequence condition in which participants learn when to expect the next item to appear based on a repeating sequence of presentation timings. In this condition the presentation of items is temporally predictive, but not rhythmic, allowing us to disentangle whether the benefit of temporal structure to memory is due to rhythm or non-rhythmic temporal expectancies. Although data collection has unfortunately been delayed by the Covid-19 pandemic, we are pleased that we are now able to push forward and are very pleased with the project outcomes to date. The finding of a benefit of temporal structure to memory comes with a range of practical benefits, and we intend to disseminate these findings widely both within academia and among the public.

Keywords: Rhythm, Temporal expectation, Recognition memory, EEG

E-mail contact: e.ward@mdx.ac.uk