

# The retention of information taught online versus in-person

Angharad N. Williams, Andrew Mackenzie\*, & Lucy V. Justice\*

Department of Psychology, School of Social Sciences, Nottingham Trent University

\*these authors contributed equally to this work

angharad.williams@ntu.ac.uk

NTU



NTU

Nottingham Trent University  
Psychology

## Introduction

Due to COVID-19, there was a dramatic shift to online teaching and subsequent assessment. Interestingly, when exams took place, the initial learning and final examination environment differed. This is problematic from the perspective of context-dependent memory theory<sup>1</sup>, where more information is recalled when the environments match.

In addition, different tests used to assess learning are differentially sensitive to levels of knowledge retention. According to the dual-process theory of recognition memory<sup>2</sup>, information can be retrieved due to a sense of familiarity and/or recollection of details. Existing claims on the effectiveness of online teaching are confounded by the testing method used, as typically online assessment utilizes tests of recognition memory that can be completed with a sense of familiarity.

## Aims

The aim of this project is to test, in a controlled experimental study, the retention of information taught online versus in-person. This will involve an exploration of familiarity with material and recollection of lecture content, when learning and testing contexts match.

- 1) Is information taught and learnt online *recognised* to the same extent as information taught and learnt in an in-person teaching environment?
- 2) Is information taught and learnt online *recalled* to the same extent as information taught and learnt in an in-person teaching environment?
- 3) How do personality traits, levels of motivation, and participation factors (e.g., private study spaces) influence these findings?

## Method

Mixed design (environment=between, tests=within), N = 300

Tests of lecture-based content via:

- 1) Recognition: Alternative Forced Choice (AFC)  
Multiple Choice Question (MCQ) style memory test
- 2) Free recall  
Narrative descriptions and subsequent coding for the number of correct<sup>3</sup> and comprehensive details

Additional personality and demographic questionnaires

Online



Tests:

MCQ

Free Recall

In-person

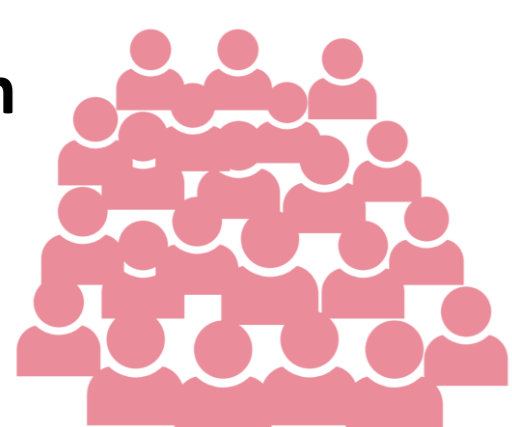


Figure 1. Schematic of methodology: Lecture content and tests (MCQ & Free Recall) delivered online vs in-person

## Hypotheses

- 1) MCQs can be done with a sense of familiarity and less depth of processing. Therefore, performance on the recognition AFC MCQs will be matched across the online and in-person conditions (with greater confidence judgements for the in-person condition).
- 2) Free recall recollection description details will be greater in the in-person compared to the online condition. In addition, in the in-person condition we expect greater sequential narration and expanded imbedded points, working with the content/beyond/use of the material provided, demonstrating comprehension and production<sup>4</sup>.

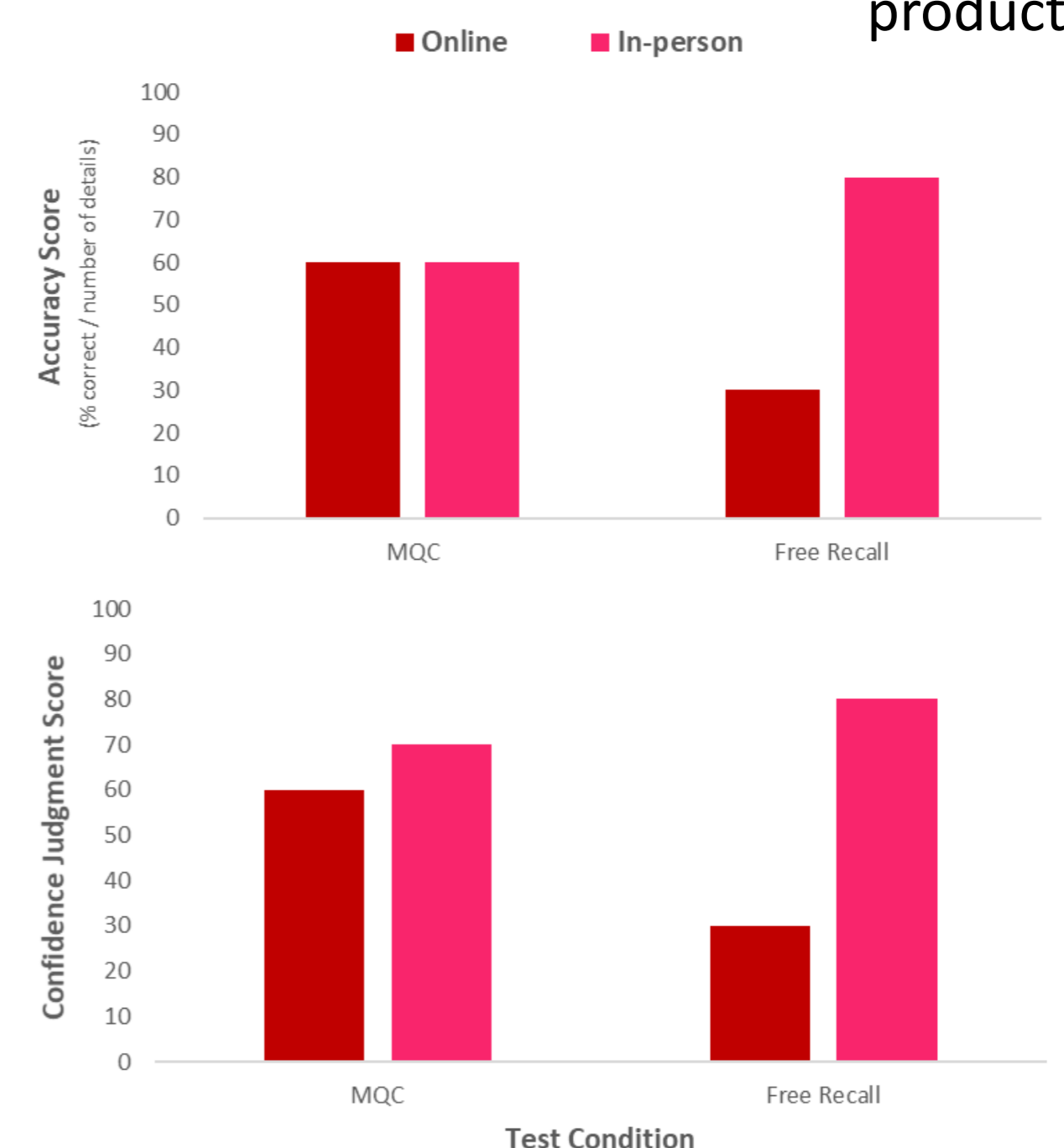
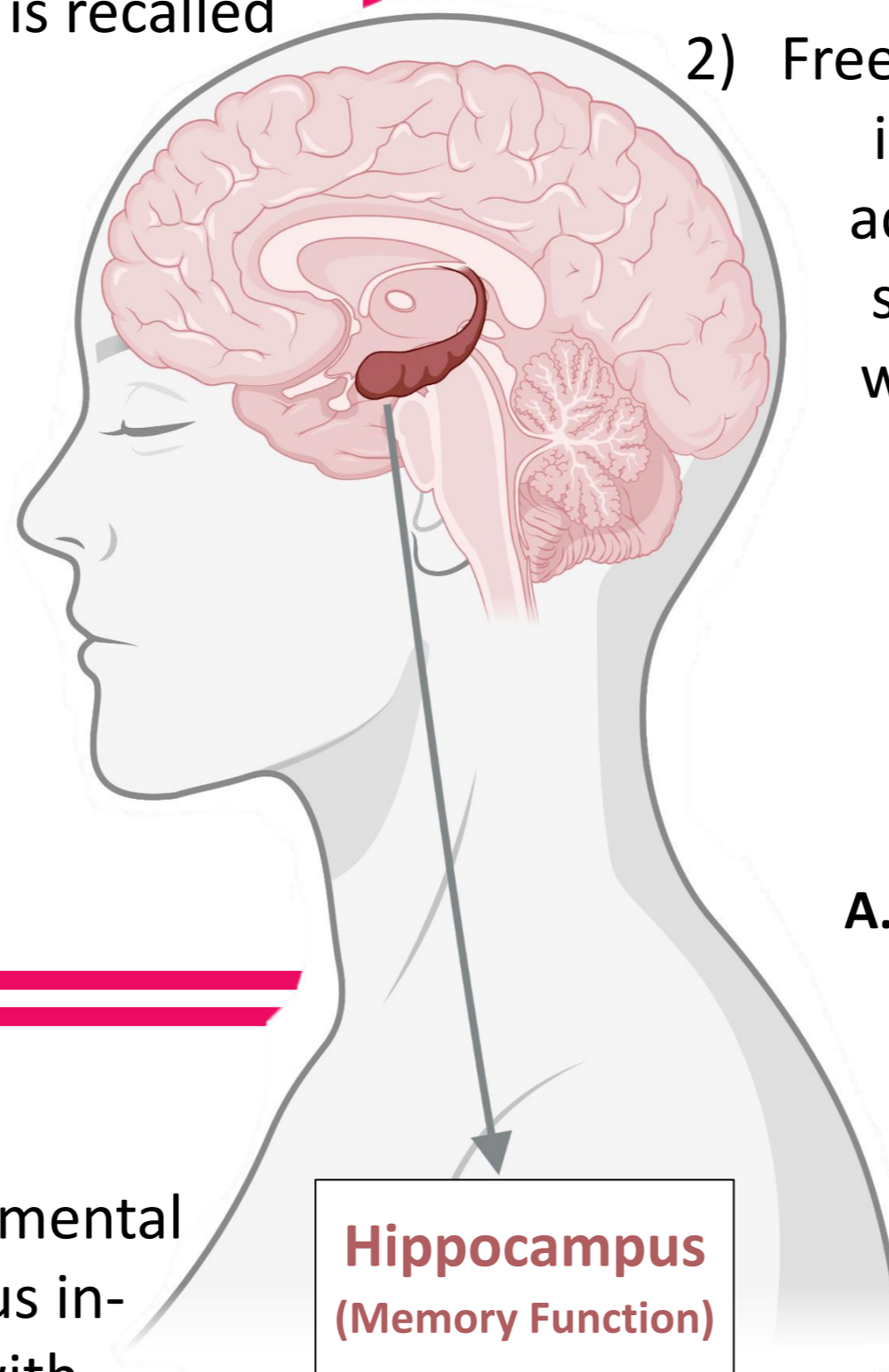


Figure 2. Simulated data: Expected pattern of results. A. Accuracy, B. Confidence

## Progress and next steps

- ✓ Ethical approval has been granted (from the Schools of Business, Law and Social Sciences Research Ethics Committee, BLSSREC, May 2022).
- ❖ Currently designing the lecture material and piloting the tests.
- Data collection is planned for Term 1.
- Following this there will be a period of manually coding the free recall data. This is a time-consuming process, and funding will be sought for research assistance.

## Impact

This study has wider implications for government and higher education institutional policy in the wake of the coronavirus pandemic. This applies to future seasonal adjustments to education delivery and to the continually evolving higher education landscape.

## References

- <sup>1</sup>Godden, D. R., & Baddeley, A. D. (1975). Context-dependent memory in two natural environments: On land and underwater. *British Journal of Psychology*, 66(3), 325-331.
- <sup>2</sup>Yonelinas, A. P. (1994). Receiver-operating characteristics in recognition memory: evidence for a dual-process model. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 20(6), 1341.
- <sup>3</sup>Williams, A. N., Ridgeway, S., Postans, M., Graham, K. S., Lawrence, A. D., & Hodgetts, C. J. (2020). The role of the pre-commissural fornix in episodic autobiographical memory and simulation. *Neuropsychologia*, 142, 107457.
- <sup>4</sup>Wood, D., Bruner, J.S. and Ross, G., 1976. The role of tutoring in problem solving. *Child Psychology & Psychiatry & Allied Disciplines*.

NTU

Nottingham Trent University  
Psychology

NTU