MaGuire Taxi Drivers Study

Psychology: “study of the mind and the behavior”
1. Introduction

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- This experiment was about if taxi drivers had a bigger hippocampus than the average person, assumingly because of the need to be able to navigate in their profession
- Conducted in 2000 by MaGuire et al on males only
Aim:
The aim was to find out if it is possible for the brain to adapt itself according to the circumstances, in this case, to navigate

"Psychology helps to measure the probability that an aim is attainable."
- Edward Thorndike, a psychologist
3. Independent & dependent variables

- **Independent variable:**
  The total number of navigational skills tested within two states:
  1. Licensed London taxi drivers
  2. Non-taxi drivers

- **Dependent variable:**
  The volume of the hippocampus
4. Study: method

Method:
- Natural experiment, conducted in everyday life
5. **Study: procedure**

Procedure:
- Quantitative research
- Scanning: structural MRI (magnetic resonance imaging):
  - VBM: measures the structure of the brain and the location
  - Pixel counting: measures the volume of the brain and the size, done by an experienced observer
6. Study: findings

Findings:
- **VBM**: taxi drivers had increased grey matter
- **Pixel counting**: the taxi drivers had a significantly larger volume in one part of the hippocampus while the control group in another

Correlations:
- **Positive** between time as taxi driver and right posterior hippocampal volume
- **Negative** for the right anterior section
7. Description of area

- Primitive part of the limbic system
- Handles memory, learning, emotion, spatial learning, spatial navigation
  - transfers information from short-term to long-term memory
- Taxi drivers had bigger hippocampus than normal
  - because of the increase in neurons and the connections between those
  - assumed to literally have a spatial map laid out in their brains, which affects the structure
8. Mapping

**TAXI DRIVER’S BRAIN**

- Medial prefrontal cortex (tracking distance to destination)
- Right lateral prefrontal cortex (seeing unexpected features, e.g., blocked off road)
- Anterior prefrontal cortex (spontaneous route planning - e.g., if need to make a diversion)
- Hippocampus (initial route planning)
- Retrosplenial cortex (seeing expected landmarks, streets, and destinations)

*Source: UCL*
9. Ethics, validity & reliability

- Ethics:
  - Informed consent
  - Debriefing
  - Confidentiality

- Validity
  - High internal validity
  - Low external validity
  - High ecological validity
  - Low cross-cultural validity

- Reliability
  - High reliability -> replicable
10. Conclusion/Discussion

- Results of experience would mean stroke patients, victims of brain damage, etc., could recover to live a normal life.

- Brain’s ability to adapt applies to compensation of capacity loss as well.
• Slide 1: MaGuire et al. (2000), http://en.wikipedia.org/wiki/Eleanor_Maguire
• Slide 2: MaGuire et al. (2000), http://www.holah.co.uk/study/maguire/
• Slide 3: MaGuire et al. (2000)
• Slide 4: MaGuire et al. (2000)
• Slide 5: MaGuire et al. (2000)
References

- Slide 6: MaGuire et al. (2000)
- Slide 8: http://www.ucl.ac.uk/
- Slide 9: MaGuire et al. (2000)
- Slide 10: http://video.nationalgeographic.com/video/london-taxi-sci