A Case of Congenital Aphantasia: Is Imagery Apparent in Visual Brain Areas?

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METHODS

PARTICIPANT:
• A 25 year old male with congenital aphantasia
• Normal visual acuity and contrast sensitivity (Hamiltion - Veale)
• VVIQ: 4.9/5

APPARATUS & MATERIALS:
• IWORX EEG (Labscribe) system
• Electro-cap with 19-electrodes
• IWORX EM-220 Event Marker
• VVIQ (Marks, 1973)
• HP-Probook & Dell 16” monitor for stimulus presentation

STIMULI:
• Supra-threshold audio of letter ‘H’
• 1 deg x 1 deg low contrast grey ‘H’ or ‘Y’

PROCEDURE:
• 3 sessions of 100 trials per session for two conditions
  • Condition 1: Attempted Imagery
  • Condition 2: No Imagery

RESULTS (Target “H” with and without preceding attempted imagery)

• There were differences in ERP profiles between the Attempted Imagery and No Imagery conditions.
• ERP differences were not always close to zero, and there were periods of replicated outlying differences (e.g. at P300 in the Occipital lobes, and N700 in the Temporal lobes).
• P300 and N700 represent working memory and conscious stimulus recognition processing (Bender et al., 2008).
• Earlier P300 with Imagery in occipital lobes (see around 400ms)
• Earlier N700 with Imagery in temporal lobes (see around 600ms).
• There may be some evidence of unconscious imagery priming in this case of aphantasia.
• A comprehensive account of visual image generation in aphantasia requires more experiments.

REFERENCES


RESULTS CONTINUED

• Is there neural evidence for imagery in aphantasia?

INVESTIGATION

• The experiment was based on past findings that imagining a stimulus before it is presented, influences ensuing stimulus-locked event-related potentials (ERPs; Farah et al. 1988).

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BACKGROUND

• Visual imagery involves recreating experiences in the absence of stimuli.
• A person living with aphantasia is unable to create images in their mind’s eye (Zeman et al., 2015).
• The biological foundation of the mind’s eye is not fully understood.
• fMRI studies have shown that the early processing areas of the visual cortex are activated during mental imagery tasks (Ishai et al., 2002).

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DISCUSSION

• P300 and N700 represent working memory and conscious stimulus recognition processing (Bender et al., 2008).
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