

Volume 30, Number 3, January 2025

Answers

Split brain studies: 80 years of research and still a mystery

Mandy Wood

These answers relate to the PSYCHOLOGY REVIEW Vol. 30, No. 3 article on split brain research. Try the quiz before checking your answers here.

Part 1

True or false

1 According to the article, the midbrain is primarily involved in cognitive processes such as language and memory

False, the midbrain is primarily involved in bodily functions and motor regulation.

2 The hemispheres are connected via a bundle of nerve fibres or axons known as the corpus callosum.

True, a so-called split-brain is created when these fibres are cut in a surgery called a callosotomy, used to treat severe epilepsy.

3 The first studies of split-brain patients were conducted in the 1960s.

False, although Robert Sperry won the Nobel prize for his work with split brain patients in the 1960s, this research began in the 1940s, pioneered by William van Wagenen and Yorke Herren.

4 In a split-brain patient, the right visual cortex only receives input only from the left visual field in the right eye

True, if the optic chiasm is severed then the right visual cortex receives input only from the left visual field in the right eye.

Part 2

Multiple choice

1 If a picture of an object is presented to the left visual field, a split brain patient can...

~~a) name the object~~

~~b) draw the object with their right hand~~

c) draw the object with their left hand

~~d) name the object but not draw it with their left hand~~

2 Pinto et al. (2017) found that two split-brain patients in Italy were 95–100% correct in detecting a red dot on a screen regardless of whether it was presented to the left or right visual field or whether they were asked to respond verbally or pointing with their left or right hand. This finding...

~~a) increased the reliability of previous research.~~

b) was unexpected and difficult to explain using existing explanations.

~~c) had high predictive validity.~~

d) demonstrated the importance of replicating classic research.

3 Pinto et al. (2017) thought that their patients might not be 'proper' split-brain patients but this was not the case; they demonstrated this by...

a) presenting stimuli simultaneously to the left and right visual half-fields and asking whether the stimuli were the same or different (proper split-brain patients struggle with this task).

~~b) asking two independent doctors to examine MRI scans for each patient.~~

~~c) asking the patients to detect red dots on a screen using their left and right hands.~~

~~d) presenting the word 'Texas' to their left visual field and asking them to draw an object, e.g. a cowboy hat.~~

Part 3

Know your terms

Split-brain patients: People who have had their corpus callosum severed usually as a treatment for severe epilepsy. This limits communication between the left and right hemispheres.

"Split brain patients typically cannot name objects presented to the right eye because this information cannot be processed by the left hemisphere which deals with language".

Hemispheres: The two halves of the brain; the left hemisphere contains brain centres associated with speech and language and the right hemisphere is often associated with spatial awareness.

"The brain's hemispheres are connected by the corpus callosum meaning that they typically work together, despite their specialised functions".

Corpus Callosum: A thick band of nerve fibers (axons) that connects the left and right hemispheres, allowing communication between them.

"Damage to the corpus callosum can result in difficulties in coordinating activities that require both hemispheres to work together".

Consciousness: Awareness or subjective experience of the environment, thoughts and bodily sensations.

"Neuroscientists have tried to locate neuronal correlates of consciousness (NCC) or brain regions associated with conscious experience; one candidate is the 'posterior hot zone' (Koch 2018).

Optic chiasm: Brain structure where the optic nerves from each eye cross over so visual information from the left visual field is processed in the right hemisphere, and vice versa.

“The optic chiasm is situated near to the hypothalamus and is important for creating a coherent image from the information received from both left and right visual fields”.

Paradox: A statement which is contradictory or contrary to expectation (common sense)

A paradox in split brain research is that some of the original split brain patients said they saw ‘nothing’ when a stimulus was presented in the left visual field whereas patients in more recent studies were able to detect and locate dots presented in both visual fields.

This resource is part of PSYCHOLOGY REVIEW, a magazine written for A-level students by subject experts. To subscribe to the full magazine, go to hachettelearning.com/psychologyreview