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Quiz 1

Please read this newspaper article and answer the questions on the reverse side. In case you are unfamiliar with the term "pedophilia," the pedophiles in this study were convicted of sexual crimes against children.

# Study links brain defects to pedophilia

## MISSING TISSUE

Psychiatrist says he was taken aback by results

BY TOM BLACKWELL

A Canadian study involving MRI brain scans has uncovered intriguing new evidence that pedophiles are compelled to commit their reviled crimes because of neurological flaws.

The brains of such offenders seem to contain considerably less white matter than those of non-sexual criminals, the research concluded. That missing tissue could indicate a breakdown in the neurological network that processes erotic signals — leading to an abnormal attraction to children, the authors theorize.

Dr. James Cantor, the psychologist who led the study, said he was taken aback by the variations between the pedophiles and non-sexual offenders.

"It's actually quite a dramatic difference," he said. "I expected ... to find some tiny little area of the brain that might be different between one group and the other. Instead I found these large swaths of material that was very low in volume [in pedophiles]."

Those brain deficiencies might be caused by something that harmed the fetus while their mothers were pregnant. If so, identifying that influence could help prevent the creation of potential new pedophiles, said the paper just published in the *Journal of Psychiatric Research*.

Outside experts raised some questions about the validity of the results, but said the findings, if borne out with more research, would be a major step forward in understanding sexual impulses generally.

"If it turns out to be found in everyone who has this problem, it would [point to] the mechanism for not only normal sexual interest but abnormal sexual interest too," said Paul Federoff, a psychologist at the Royal Ottawa Hos-

pital who works with pedophiles. "That would be a huge development."

However, he said the research shows only a correlation between the brain deficiency and pedophilia, not necessarily a cause-and-effect relationship.

Scientists have traditionally believed that having a sexual preference for children was the result of environmental factors, such as sexual abuse or other trauma in childhood.

The focus of Dr. Cantor's research, though, has been exploring possible biological causes. Other studies he conducted, for instance, have found that pedophiles are more likely to be left-handed and have low IQs, both potential indicators of a neurological deficit.

For the latest research, he had MRI brain scans performed on 65 people he identified as pedophiles, and a control group of 62 criminals with no history of sexual offences.

Digital analysis of the MRI images indicated that the pedophiles tended to have smaller volumes of white matter over a relatively large area of the brain.

In simple terms, white matter is like the computer cable that links segments of grey matter, the brain's computers. The areas of white matter where pedophiles had deficiencies happen to connect cortical regions that, other research suggests, process and respond to sexual clues. It is possible pedophiles have a disconnection, or insufficient connection, in that sexual-response network, the paper says.

That may either lead to pedophilia directly, or make people more susceptible to the problem if they are victims of outside influences, like child abuse, the study suggests.

1. (2 Points) Is the study observational, or experimental? Choose one. No explanation is necessary. (Observational)
  
2. (2 Points) There are two primary variables in this study. It looks like one is categorical and one is quantitative. What are they? Write your answers below. (The categorical variable is pedophile vs. non-sexual offender. The quantitative variable is volume of white matter in the brain.)
  
3. (3 Points) In this study, it may be a bit tricky to figure out which variable is independent and which variable is dependent. Let us say that the “independent” variable is the one that in theory, may be contributing to (or causing) the dependent variable. From this viewpoint,
  - What is the main independent variable? (The independent variable is pedophile vs. non-sexual offender.)
  - What is the main dependent variable? (Dependent variable is volume of white matter in the brain.)
  
4. (3 Points) One comment by an outside researcher implies that there could be confounding variables involved. What is the comment? Please copy the exact words from the article. You do *not* have to say what the confounding variables might be. Just copy the words from the article below. *The correct answer is one sentence, or a part of one sentence. Marks will be deducted for extra words.*

("... the research only shows a correlation between the brain deficiency and pediphilia, not necessarily a cause-and-effect relationship.")