



Psychology

Worksheet 3.1

Example answer to short answer question 3 (Chapter 3)

This model answer is a guide for students in terms of structure and content. It represents above-average work.

3 Explain how technology can be used to investigate cognitive processes. [8 marks]

The studies I discuss show the two most important contributions that studies based on fMRI can make: identifying which areas of the brain are involved in decision-making and helping to decide between competing psychological theories of behaviour.

fMRI technology monitors blood flow in the brain over time. All studies relying on fMRI are based on the premise that the more active a brain region is, the more blood it needs. So, fMRI can be used to identify brain areas involved in decision-making. Huettel et al. (2006) provide a very good example of the second, and increasingly very important, use of fMRI technology – helping us to decide which among competing psychological theories are more likely to be valid when it is not easy to compare the theories by relying on purely behavioural methods.

Many fMRI studies have been carried out in attempts to identify brain regions involved in decision-making. In general, the activation of areas in the prefrontal cortex and the parietal cortex increases during decision-making (Platt, 2002). Moreover, the activation is stronger when the decisions studied involve risk (Paulus et al., 2001).

Huettel et al. (2006) used fMRI technology to differentiate between ambiguous decisions and risky decisions, a distinction which has proved very difficult to draw based only on behavioural decision-making research.

Risk and ambiguity can be defined as follows: a decision with several possible outcomes involves risk if the probabilities of the various outcomes are known. A decision with several outcomes involves ambiguity if the probabilities with which the various outcomes can occur are not known. Huettel et al. addressed the following question: Would decisions involving risk be associated with different brain activation patterns? They presented participants with pairs of monetary gambles. The gambles included, among others, ambiguous and risky gambles and the participants had to choose among them.

Huettel et al. confirmed earlier findings about the brain regions that are activated in decision-making tasks. Thus, the list of brain structures showing high levels of activation included the prefrontal cortex and parietal cortex. More importantly, Huettel et al. were able to identify brain regions that showed a selective increase in activation for decision-making under ambiguity compared to decision-making under risk. Preference for ambiguity was associated with increased activation in the lateral prefrontal cortex, while preference for risk was associated with increased activity in the posterior parietal cortex. Huettel et al. concluded that ambiguous decision-making does not represent a special case of risky decision-making but a different type of decision-making.