

Essay Title: Describe and evaluate evidence of plasticity and functional recovery after trauma in the brain. (16 marks)

Brain plasticity refers to the brain's ability to change and adapt because of experience. Research has demonstrated that the brain continues to create new neural pathways and alter existing ones in response to changing experiences.

A clear introduction that shows understanding of plasticity.

Kuhn et al. found a significant increase in grey matter in various regions of the brain after participants played video games for 30 minutes over a two-month period. Similarly, Davidson et al. demonstrated the permanent change in the brain generated by prolonged meditation: Buddhist monks who meditated frequently had a much greater activation of gamma waves (which coordinate neural activity) than did students with no experience of meditation.

Research evidence is used to demonstrate knowledge of plasticity.

There is further research to support the notion of brain plasticity. Maguire et al. found that the posterior hippocampal volume of London taxi drivers was positively correlated with their time as a taxi driver and that there were significant differences between the taxi drivers' brains and those of controls. This shows that the brain can permanently change in response to frequent exposure to a particular task.

Further research is explained well and used to support the idea of plasticity.

However, some psychologists suggest that research investigating the plasticity of the brain is flawed. For example, Maguire did not test the taxi drivers before they became taxi drivers so a clear change in the structures of the brain as a result of their experiences cannot be concluded. It could be that they already had larger hippocampi before becoming taxi drivers. Therefore, as a cause and effect relationship between experience and changes in the brain cannot be definitively established, further research into plasticity is necessary.

Evaluation of the research support is presented. An effective criticism that demonstrates a strong understanding of psychology as a science.

The brain also appears to show evidence of functional recovery: the transfer of functions from a damaged area of the brain after trauma to other undamaged areas. It can do this through a process termed neuronal unmasking where 'dormant' synapses (which have not received enough input to be active) open connections to compensate for a nearby damaged area of the brain. This allows new

Excellent knowledge of functional recovery is presented with a

connections in the brain to be activated, thus recovering any damage occurring in specific regions.

wealth of specialist terminology used.

Stem cells are also used as a way of recovering functions of the brain. These are unspecialised cells that can take on the characteristics of nerve cells, allowing the brain to create new neural pathways and recover any damage to existing cells that may otherwise prevent effective neurotransmission.

There is research to support the claim for functional recovery. Taijiri et al. (2013) found that stem cells provided to rats after brain trauma showed a clear development of neuron-like cells in the area of injury. This demonstrates the ability of the brain to create new connections using neurons manufactured by stem cells.

Research evidence is effectively presented to support the idea of functional recovery.

While there is evidence for functional recovery, it is possible that this ability can deteriorate with age. Elbert et al. concluded that the capacity for neural recognition is much greater in children than in adults, meaning that neural regeneration is less effective in older brains. This may explain why adults find change more demanding than do young people. Therefore, we must consider individual differences amongst people when assessing the likelihood of functional recovery in the brain after trauma.

An effective discussion that considers the wider issues when investigating functional recovery in the brain.

[514 Words]

Examiner style comments: **Mark Band 4**

This essay demonstrates a clear understanding of plasticity and functional recovery. It is well planned in that each topic mentioned in the question is outlined and evaluated equally. There is a range of evidence used that both describes and evaluates the topics and specialist terminology is used correctly throughout.