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**Diploma Programme answer cover sheet**

**PSYCHOLOGY**

**HL  
 PAPER ONE**

10 May 2019 (afternoon)

**Invigilator only:** Candidate absent (insert x if applicable)

**Candidate**

Section / Option	Question
A	ALL
B	4

**General instructions**

- Write in **blue** or **black** ink, and use a soft pencil that produces dark lines for graphs and diagrams. The use of colour is only permitted in geography examinations.
- Do not write on any QR code on this cover sheet.

**When using 4-page answer booklets**

- Write your session number and name in the appropriate boxes on the front page of the answer booklet.
- At the start of each answer to a question, write the question number in the box. If you make a mistake, fill in the box completely and use the next available box to write the question number.
- Parts of an answer, for example (a), (b), (c), must be written on the lines provided.
- Leave at least one line space between each part of an answer.

**At the end of the examination**

- Complete the candidate boxes (on the left) with the section(s)/option(s) and question(s) answered. If all questions have been answered, write ALL.
- Attach this cover sheet to your work using the string tag provided.
- In the box below, write the number of 4-page answer booklets attached to this cover sheet.

**Number of 4-page answer booklets attached**

E 2







At the start of each answer to a question, write the question number in the box. / Avant de répondre à une question, veuillez écrire le numéro de la question que vous allez traiter dans la case prévue à cet effet. / Al comienzo de cada respuesta, escriba el número de pregunta en la casilla.



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1

Localisation of function theory proposes that certain regions of the brain are responsible for the control and regulation of behavioral and cognitive ~~front~~ functions. ~~As~~ Therefore, should any damage be done to these specific areas of the brain, the theory proposes that there are to be impairments in the behaviors and cognitive processes localized in this region. ~~Conversely, however,~~ This theory is often studied in conjunction with neuroplasticity theory, given that if brain plasticity is to occur in order to accommodate for a particular cognitive demand by growing grey matter and reconnected networks in certain regions of the brain, it is indicated that there are the parts of the brain wherein such function must be localized.

One study which illustrates localization of function through the study of neuroplasticity is Maguire et al; the aim of this study was to investigate whether changes in the brain of those with ~~an~~ extensive experience with spatial memory and navigation could be detected.

To investigate this, an MRI was taken of the brain structures of 16 male, right-handed, London taxi drivers who had been driving for more than 1 and a half years and had taken the 'Knowledge test' of road map memory. MRIs were also taken of the brains of 50 right-handed males who didn't drive. Their

Their results showed that the MRIs of the taxi drivers with extensive experience with spatial navigation displayed a greater average



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size of the right posterior hippocampus, as well as increased grey matter ~~in~~ in the surrounding region, compared to those ~~in~~ who didn't drive. Furthermore, a correlation was observed between the increase in the volumes of the right posterior hippocampus, grey matter in this region, the progressive decrease in the size of the anterior hippocampus and the time that the taxi drivers had spent driving as an occupation. From these results it was

concluded that spatial memory was a cognitive function localized in the right posterior hippocampus, seeing as this is the region to which most changes occurred in response to increased engagement with spatial navigation. Furthermore, seeing as there was an increase in the amount of grey matter observed in this region, it is indicated that there was an increase in the

capacity for cognitive ~~the~~ spatial memory engagement, being related to an increase in the amount of synaptic and therefore rate of neurotransmission occurring in this area. Thus, this study illustrates the localization of spatial memory and its retrieval. ~~is~~



2 Reconstructive memory refers to the phenomenon whereby the retrieval of information from memory is not produced as an exact replica of what ~~occurred~~ it was when it was first encoded. Instead, it is rebuilt in a process of cognitive reconstruction. Schema theory proposes that the way memory is reconstructed is affected by the mental representations which ~~organize~~ ~~or~~ ~~knowledge~~, expectations and beliefs - or, schema. These schema, formed in an individualised ~~memory~~ manner due to experience, serve as a lens through which memory is reconstructed - suggesting that it is liable to distortion by way of the addition or removal of detail so that it ~~is~~ ~~is~~ is congruent with our schematic framework.

Loftus and Palmer investigated schema theory when aiming to investigate the ~~role of~~ whether leading questions would influence an ~~eye~~ ~~witness's~~ eye-witness's recall of the speed at which cars were going as they ~~see~~ ~~encountered~~ ~~each~~ each other in a collision. In their laboratory experiment, 45 participants were randomly allocated to one of five groups. All participants, however, were first presented with a video in which two cars crashed. After this video, participants were given a questionnaire with open and closed questions regarding the video. One question asked the participant to estimate the speed at which the cars were going when they <sup>'smashed'</sup> ~~'struck'~~. The final verb, however, was varied between each group. While some participants were prompted with the verb <sup>'smashed'</sup> ~~'struck'~~, others received 'hit', 'collided', 'bumped' or 'contacted' - denoting verbs of different intensity connotations. It was hypothesised that verbs of higher intensity would influence the individual's reconstruction of the event in recall, causing them to estimate a higher number. In a later study, the same procedure was repeated, however, after one week, participants who were prompted with the verb 'smashed', 'hit' or not asked to estimate speed at all, were asked if they



remembered seeing broken glass at the site as well. In reality, there was no broken glass shattered at all.

Their results showed that participants in both phases of the study estimated a higher speed of crash when prompted with the verb 'smashed' (40.8 mph), versus 'contacted' ~~33.8~~ ~~35~~ (31.8 mph).

Furthermore, participants prompted with the verb 'smashed' in the second phase of the experiment were more likely to recall there being broken glass when there wasn't any at the scene. This illustrates that memory is reconstructive in the sense that their memory of the event had been distorted depending on the context in which their retrieval was prompted. The verbs had facilitated schema processing differently for those ~~who~~ who had heard the verb 'smashed' ~~to those~~ to those who had seen the verb 'contacted'.

Because the verb has more intense and severe connotations, this facilitated the schema for more intense car crashes with which we associate higher crash speeds. Therefore, this study illustrates that memory is reconstructive and liable to distortion by schema, as we reconstruct our memory of events so that they align with the expectations, beliefs and knowledge organized in our schema.

3

Culture refers to the set of attitudes, beliefs and identities shared by a group of people, guiding them in their daily actions. Hofstede proposed that the behaviours of whole cultures can be shaped by a spectrum of measurement known as a dimension. A culture is supposedly more aligned with the values of one end of the dimension and from this the behaviour of their members can be predicted. One dimension is the individualism-collectivism dimension, referring to the degree to which





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one values themselves in relation to the group. Individualist cultures place greater priority on the individual over the group - thus engaging with behaviours which are unique to the individual, benefitting their personal prosperity and their independence. Collectivist cultures instead value <sup>the</sup> harmony and cohesion of the whole group - thus engaging in ~~the~~ behaviours which ensure the overall gain of the group.

Berry and Katz conducted a study which illustrated the influence of the individualistic and collectivistic cultural dimension on behaviour when investigating the role of culture on conformity in the Tsimme and Eskimo people. The Tsimme people are considered collectivistic, while the Eskimo are considered to be more individualistic. This quasi experiment involved each participant engaging with Asch's line paradigms in which they were shown a series of 8 lines - one which was denoted the 'target'. Participants had to choose which of the other 7 lines was closest in length to the 'target'. They were deceived with a false hint which was unambiguously wrong, claiming that 'this was what the others chose'.

Their results showed that the rate of conformity, measured by the number of people from each culture who chose the hinted line, was higher for the Tsimme people than the Eskimo. This is



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reflective of their cultural dimensions. Because the collectivist Tswana tribe is known to value the cohesion and agreement of the collective group, they conform so as to not disrupt this collective sense of agreement. However, individualistic Eskimo people tend to value uniqueness and individual prosperity, thus not conforming and instead acting more independently. Thus, the I-C dimension is seen to effectively predict and shape the behavior of these cultures.





4

Comparative Psychology is the study of the differences between and within species in order to hopefully apply these findings to a greater understanding of human behavior. Animal models are therefore used as ~~test~~ <sup>given that studies can be conducted</sup> subjects for experiments investigating the role of the brain in behavior, without the limitations placed on studying humans based on ethics. Seeing as animals have some anatomical and physiological similarity to humans, can be studied in larger samples and are able to be studied longitudinally for an understanding of the short and long term effects of certain variables, they are deemed suitable ~~and arguably suitable~~ for use in research. However, animal research is not unbounded in terms of the ethics involved in their study.

All research must pertain to the three R's: reducing the numbers of animals used, replacing them with alternative methods or lower taxa and refining procedures so as to ~~to minimize~~ <sup>minimize</sup> psychological and physiological harm. These are the three ethical considerations which will be discussed in this essay. <sup>This essay</sup> ~~which~~ will aim to give a considered review of the degree to which attaining and maintaining these standards is truly possible and ethical, considering the argument that a cost benefit analysis - of the harm being done to animals in this research ~~is~~ being worth the potential benefits it can yield - cannot be concluded until after application to humans is successfully demonstrated.

The first ethical consideration ~~of~~ <sup>of this</sup> essay will consider is measures taken to reduce the numbers of animals involved in study, with the purpose of not engaging more organisms than <sup>necessary</sup> ~~necessary~~ in research which may threaten their welfare ~~of~~ and health. This ~~that~~ consideration is put in play to ensure that researchers do not take advantage of the number of animals used in study unnecessarily, simply as a result of their ease of availability. However, the judge of the number of organisms deemed 'necessary' is dependent on the degree to which results are considered reliable and therefore ~~that~~ <sup>purposeful</sup> in application.



to human research. This is problematic as researchers will tend to continue replication on several species until the demonstration of their findings in application to humans is considered valid and useful, or not. A study by Rosenzweig and Bennett et al., for example, used several rats in the investigation of whether the degree to which an environment is enriched affects brain plasticity and neurochemistry. In their laboratory experiment, 10-12 rats per trial were placed in either an enriched environment, with ample space and furniture, a standard environment, with adequate space, and ~~an~~ a deprived environment, ~~with~~ <sup>in</sup> a small and isolated cage. In each environment, for which there were several trials, rats were kept for ~~to~~ 60 days - a significant amount of time considering their 2 year lifespan - then killed to see the structures of their brains. The results showed that rats in the enriched environment had heavier and thicker cortices, larger brains by 60%, and more grey matter ~~slightly <sup>increased</sup> than concentration of ~~Adapt-~~~~ ~~chromatin~~. From this they concluded that the degree to which an environment is enriched affects brain plasticity by improving their capacity for neural connections and cognitive engagement related to learning. Conversely, ~~with~~ deprived conditions yielded rats with the exact opposite of these findings. Relevance of this research was found years later in the study of Luby et al., who found a correlation between poverty in childhood and a depletion in the size of the amygdala, hippocampus and grey matter surrounding this region at school age. The findings of Rosenzweig and Bennett, who arguably used large numbers of rats in the test for their <sup>findings'</sup> reliability, enabled a greater understanding of the direction of causality of this correlational relationship in humans because it was able to control the exact conditions in which the rats were raised. ~~However, like the~~ <sup>with the help of animal</sup> research, this led to advances in social policy and social support in impoverished communities, deeming the cost <sup>to</sup> ~~of~~ <sup>animals</sup> ~~the animals~~ welfare through their use in large numbers to be lesser than their





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benefit. However, if these findings were not found in humans, their testing would have been of no use, deeming the harm of these animals to have been greater than their benefit, thus making it unethical. The point made here is that the <sup>benefit of</sup> ~~positivity~~ of animal research cannot be determined with certainty ~~or~~ until after application is found in humans. Until this point, it would seem that the use of testing on more animals is done in the effort to ensure the reliability of their findings; therefore questioning the degree to which the ethical guideline of reducing numbers of organisms in research can be and should be sustained.

Another ethical consideration <sup>involved</sup> ~~of~~ in animal research is refining procedures to minimize anatomical and physiological harm. This however, proves to be problematic due to their being a failure to communicate and understand the potential manifestations of distress presented in the animals. The researcher is inherently biased towards their understanding of distress in humans and may ~~therefore~~ therefore not recognise differences in symptoms in rats, thus questioning the extent to which this ethical guideline can ~~be~~ wholly be pertained to. In the study of Fadida et al, which aimed to investigate the role of Acetylcholine in anticipation, activity and memory, half of the rats ~~used~~ were used in a condition wherein they were trained to complete a T-maze to reach a sugary seed at the end of one arm. The control



were not trained. During the day of the final experiment, the trained rats and the control rats were probed with small needles that monitored ACh levels throughout the study. They then had to enter and complete the maze. The probing of humans is deemed unethical in humans, though not in animals. However, this is hard to determine as there is no communication between the species. Their results found a correlation between increased ACh in anticipation and during the final maze and performance by memory, as shown in the trained rats who completed the maze quicker. While a cost benefit analysis of this research would indicate that the potential harm undergone by the mice ~~was~~ <sup>was</sup> worth it, seeing as the findings had relevance ~~in~~ <sup>in</sup> ~~the~~ emphasising the importance of visualisation in performance particularly in athletes, there is still the question of whether ~~harm~~ <sup>harm</sup> was experienced to a minimum extent which is overridden by the benefit <sup>it</sup> granted to human research. It may be that the inability for the control rats to <sup>complete</sup> reach the maze quicker was due to distress caused by the probing and their attention to the environment, <sup>to</sup> ~~the~~ which trained rat rats were previously exposed. This illustrates that while refining procedures to minimise the extent to which animals in testing experience ~~harm~~ <sup>harm</sup> should still be considered, the extent to which it is actually completed is difficult to judge - therefore animal research may be entirely unethical, should their findings not ~~show~~ show relevance in human study.

In conclusion, while animal research is seen as useful in the study of brain and behavior as a result <sup>of being able to</sup> ~~of~~ ~~testing~~ experimental research without the limitations that human study studies are bounded by in terms of ethical, ethical measures to maintain the welfare of animals must still be ~~considered~~ taken. However, with consideration of the difficulty in ~~maintaining~~ ~~an~~ ~~ensuring~~



that the benefits of attaining greater benefit in findings than costs done to animals, & this essay has acknowledged that occasionally the reduction of the number of species tested on is an ethical consideration often breached in order to check the reliability of findings. <sup>The essay</sup> ~~I~~ has also acknowledged that minimizing harm to animals is somewhat subjective to the researcher; research may therefore still be unethical.



