

Mark Scheme

Question	Answer/Indicative content	Marks	Guidance
1	<p>Identify two ways Maguire et al (2000) matched the two groups of participants in their study of taxi drivers.</p> <p><u>Most likely answers:</u></p> <p>Matched for:</p> <ul style="list-style-type: none"> • Health/ healthy profile/ no health problems • Handedness (All right-handed). • All male. • Age range (32 or over 62) • Mean age (44 years old) • Generally healthy profile/no health problems. <p>Other appropriate explanations should be credited.</p>	2 [1+1]	<p>2 marks - Identification of two correct matching characteristics.</p> <p>1 mark - Identification of one correct matching characteristic.</p> <p>0 mark - No creditworthy information.</p> <p>NB. Matched on gender is not specific - saying they were all male is.</p> <p><u>Examiner's Comments</u></p> <p>Candidates were able to answer this question well and most made attempt at identifying matching characteristics. Those scoring partial marks on this question often gave vague responses. For example, they stated 'gender' or 'age' as characteristics. More clarity was needed in these responses, e.g. 'males', 'mean age' or 'age range'.</p>
	Total	2	
2	<p>Outline the procedure of Casey et al's (2011) study into neural correlates of delay of gratification and explain why this study has been placed in the biological area.</p> <p><u>Possible answers:</u></p> <p><i>Key features of procedure:</i></p> <ul style="list-style-type: none"> • Completed self-control scales in their twenties and thirties • Participated in two experiments when in their forties. • Experiment 1: participants took part in a behavioural version of a 'hot' and 'cool' impulse control test • Involved a 'Go/No-go' task • 'Cool' version consisted of male and female stimuli presented, one sex as a 'go' (target) stimulus which participants were instructed to press a button, and the other sex as a 'no-go' (non-target) stimulus where participants were instructed to withhold a button press. • Experiment 2: 'Hot' version of the 'Go/No-Go' task. • Fearful and happy facial expression served as stimuli 	6 4 AO1 + 2 AO2	<p><u>For description of the procedure of Casey et al's study:</u></p> <p>4 marks for a detailed and accurate description which identifies at least 5 features of the procedure, including both essential features.</p> <p>3 marks for an accurate description which identifies at least 4 features of the procedure, including at least one of the essential features.</p> <p>2 marks for a brief description of the study which identifies at least 3 of the key/essential features.</p> <p>1 mark for a vague description of the study which identifies one or two key/essential features</p> <p>0 mark - no creditworthy response.</p> <p>PLUS</p> <p><u>For application to the biological area:</u></p> <p>2 marks a clear link which is clearly explained.</p>

Mark Scheme

Question	Answer/Indicative content	Marks	Guidance
	<p><i>Essential features of Procedure:</i></p> <ul style="list-style-type: none"> • Use of fMRI imaging technique (operationalised DV) • Classifying as high or low delayers as children (IV operationalised) <p><i>Links to the biological area:</i> As the biological area assumes that behaviour can be largely explained in terms of physiological processes such as brain function, this study can be placed in the biological area as it shows that 'hot' and 'cool' processing systems in the brain influence self-control.</p> <p>Use of FMRI scan shows activity levels in brain areas responsible for delay of gratification. For example, there was diminished recruitment of the Inferior Frontal Gyrus in low delayers showing how physiological functions can influence our behaviour.</p>		<p>1 mark for a brief but relevant link</p> <p>0 mark - no creditworthy response information.</p> <p><u>Examiner's Comments</u></p> <p>Candidates who knew the core study responded well to this question. Responses varied in accuracy rather than detail; some candidates were inaccurate when referring to the Go/No-go task or mixed up the 'hot' and 'cool' task.</p> <p>Application to the biological area was achieved well by many candidates by showing an understanding of the findings of Casey et al. and making clear links to principles of the area (behaviour explained in terms of physiological processes such as brain function). When less clear application to the area was made, key terms were not well explained in relation to the core study 'we are influenced by brain function'. The best responses made direct references back to the procedure and findings of the study e.g. localisation of function and 'hot' and 'cool' processing systems.</p>
	Total	6	

Mark Scheme

Question		Answer/Indicative content	Marks	Guidance
3	a	<p>Identify one way that qualitative data was collected in Sperry's (1968) split brain study.</p> <p><u>Likely answers:</u></p> <ul style="list-style-type: none"> • Through responses to visual tasks, i.e. saying/drawing what they saw. • By asking participants to say in speech or writing what image they saw. • Through responses to tactile tasks, i.e. by picking the object out of a bag. • By asking participants to find an object in a 'grab bag'. • Observing reactions to the nude woman, i.e. giggling. 	1	<p>1 mark - For correctly naming one way that qualitative data was collected.</p> <p>0 mark - No or incorrect answer, e.g. whether they could do a task or not (as this is nominal/quantitative data).</p> <p><u>Examiner's Comments</u></p> <p>Candidates that did well named one way that qualitative data was collected and contextualised that to Sperry's study. Generic suggestions, such as observations, gained no credit. Some candidates gave ways that would produce quantitative data.</p>
	b	<p>Outline one weakness of collecting qualitative data in this study.</p> <p><u>Likely 2-mark answer:</u></p> <ul style="list-style-type: none"> • As qualitative data is time consuming to gather, it would take a long time to record the descriptions of the split-brain participants on the visual and tactile tasks. <p><u>Likely 1-mark answer:</u></p> <ul style="list-style-type: none"> • Researchers could not directly compare performance between participants/identify any trends in behaviour. • Other appropriate answer. 	2	<p>2 marks - Weakness is outlined in the context of the qualitative data collected in Sperry's study.</p> <p>1 mark - Weakness is outlined but not in context of Sperry's study.</p> <p>0 mark - No or incorrect answer.</p> <p>N.B. Sperry's 'split-brain study' is not creditworthy as context.</p> <p><u>Examiner's Comments</u></p> <p>Candidates performed well on this question by explaining a weakness of collecting qualitative data and contextualising the weakness. Some incorrect responses were not relevant to qualitative data, referring to generalisability for example.</p>

Mark Scheme

Question		Answer/Indicative content	Marks	Guidance
	c	<p>Outline <u>one</u> way in which Casey et al.'s (2011) study into neural correlates of delay of gratification can be said to lack ecological validity.</p> <p><u>Likely answers:</u></p> <ul style="list-style-type: none"> The tasks the participants had to complete were <u>unrealistic</u> (1) such as the ('go/no-go' task) and having to push a button when they saw a male/female face (1). The tasks did not represent a <u>true-life situation</u> (1) as the 'hot' and 'cool' impulse task is not realistic (1). The tasks <u>do not have a direct equivalent to real life</u> (1) as the 'go/no-go' task was a contrived test (1). They were asked to do <u>something a person would not have to do every day</u> (1) like being scanned with an fMRI scanner whilst doing a task ('go/no-go' task) (1). Other appropriate answer. 	2	<p>2 marks - A clear and accurate outline of one way Casey <i>et al.</i>'s study lacked ecological validity which shows a good understanding of the term ecological validity.</p> <p>1 mark - An identification of a way in which one feature of the study lacked ecological validity, but not in context of Casey <i>et al.</i>'s study.</p> <p>0 mark - No or incorrect answer, e.g. a definition of ecological validity.</p> <p>Examiner's Comments</p> <p>Understanding of ecological validity was good in answers to this question, but it needed clear contextualising to Casey et al.'s study to receive full marks. Stating 'laboratory' is not contextualisation whereas 'go/no-go task' and 'fMRI' scanner were. A few candidates made incorrect reference to sampling problems (i.e. unrepresentative or ethnocentric), instead of ecological validity. A few candidates identified the incorrect study such as Sperry.</p>
		Total	5	

Mark Scheme

Question	Answer/Indicative content	Marks	Guidance
4	<p>Outline three different results from Blakemore & Cooper's study into the impact of early visual experience.</p> <p>Possible findings:</p> <ul style="list-style-type: none"> • Regardless of whether the kittens had been exposed to vertical or horizontal stripes, they were initially extremely visually impaired. • Kittens showed 'behavioural blindness' in that the kittens raised in the horizontal environment could not detect vertically aligned objects and vice versa. • Only the eyes of the kitten brought up in vertical stripes followed a rod held vertically and only the eyes of the kitten reared in horizontal stripes followed the rod if it was held horizontally i.e. both kittens remained blind to contours perpendicular to the stripes they had lived with. • The kittens quickly recovered from many of the deficiencies and within a total of about 10 hours of normal vision they showed startled responses and visual placing and would jump with ease from a chair to the floor. • Some of the kittens' defects were permanent: they always followed moving objects with jerky head movements and often tried to touch things well beyond their reach. • The neurophysiological examination showed no evidence of severe astigmatism, which might have explained the behavioural responses. • Horizontal plane recognition cells did not 'fire-off' in the kitten from the vertical environment and vertical plane cells did not 'fire-off' in the kitten from the horizontal environment so there was distinct orientation selectivity, showing the kittens suffered from 'physical blindness'. • About 75% of cells in both kittens were clearly binocular and in almost every way the responses were like that of a normal kitten. • The distributions of preferred orientation were totally abnormal: not one neurone had its optimal orientation. • This anisotropy (the property of being 	<p>6</p> <p>(AO1) 2+2+2</p>	<p>For each result:</p> <p>1 mark for brief, vague or muddled statement of findings</p> <p>2 marks for developed, detailed and accurate statement of findings</p> <p><u>Examiner's Comments</u></p> <p>Candidates showed an understanding of the results of this study with the majority of candidates achieving at least 3 marks. Most of the results given were in brief, vague or muddled statements without development.</p>

Mark Scheme

Question	Answer/Indicative content	Marks	Guidance
	<p>directionally dependent) was significant at $p \leq 0.00001$: chi squared test.</p> <ul style="list-style-type: none">• No obvious large regions of 'silent' cortex corresponding to the 'missing' cortical columns were observed/found.		
	Total	6	

Mark Scheme

Question	Answer/Indicative content	Marks	Guidance
5	<p>Describe how the type of data collected and the equipment used differed between Sperry's (1968) study on hemisphere disconnection and Casey et al.'s (2011) study on neural correlates of delay of gratification.</p> <p>Likely answers:</p> <p>Type of data collected Sperry gathered qualitative data whereas Casey et al. gathered quantitative data (1).</p> <ul style="list-style-type: none"> • One extra mark for elaborating on either: e.g. • Sperry presented his findings qualitatively by describing what participants could and could not do in relation to visual and tactile tasks, e.g. information presented to the left visual field could not be described in speech or writing (1), • OR Casey et al. presented their findings quantitatively, e.g. for experiment 2 in the 'hot' No-Go trial, low delayers made more false alarms/errors (14.5%) compared to the high delayers (10.9%) (1). <p>The equipment used</p> <p>Sperry used a tachistoscope and objects (to test visual and tactile abilities) (1) whereas Casey et al. used a computer (for the Go/No-Go task) and a fMRI scanner (to examine neurocorrelates of delay of gratification) (1).</p>	2+2	<p>In relation to the type of data:</p> <p>2 marks – A description that:</p> <ul style="list-style-type: none"> • identifies that Sperry collected qualitative data whereas Casey collected quantitative data. • Elaborates through Contextualisation on either Sperry's OR Casey's data (numerical responses or description of quantitative data). <p>1 mark – A description that merely identifies that Sperry collected qualitative data whereas Casey collected quantitative data.</p> <p>0 mark – No or incorrect answer.</p> <p>In relation to the equipment used:</p> <p>2 marks – A description that clearly identifies the equipment used by both Sperry and Casey.</p> <p>1 mark – A description that either makes a vague attempt at describing the equipment used by both Sperry and Casey OR a clear description of the equipment used by one of the researchers.</p> <p>0 mark – No or incorrect answer.</p> <p><u>Examiner's Comments</u></p> <p>Both parts of this question required candidates to describe a difference and contextualise that difference. Candidates lost marks when describing the type of data collected by not providing sufficient context from one study. The minority of candidates lost marks when describing the equipment used by stating Casey used an MRI rather than an fMRI scan or making reference to Sperry using a computer. The minority of candidates provided similarities between the studies.</p>
	Total	4	

Mark Scheme

Question		Answer/Indicative content	Marks	Guidance
6	a	<p>Explain how Casey et al.'s study into delay of gratification relates to the theme of 'regions of the brain'.</p> <p>Possible content:</p> <ul style="list-style-type: none"> • The idea that different areas of the brain perform different psychological functions. • Different behaviours relate to different areas of the brain. • The concept of localisation of function. • The idea that regions of the brain impact on whether someone is a low or high delayer. • Use of fMRI to examine neural correlates. • Findings showed the right inferior frontal gyrus was involved in withholding a response. • The ventral striatum demonstrated a significant difference in recruitment between high and low delayers. <p><u>Example of a 4 mark answer</u> Casey et al.'s study relates to the theme of regions of the brain because they hypothesised that different parts of the brain are responsible for differences in behaviour (1). They predicted that people's ability to delay gratification would be centred on particular regions of the brain (1) and tested this by scanning specific parts of the brain during a cognitive task that measured delay of response (1). They found that specific areas of the brain – the right inferior frontal gyrus and the ventral striatum – were activated differently in low and high delayers. (1)</p>	4	<p>3–4 marks for a clear and accurate response which demonstrates knowledge and understanding of relevant features of Casey et al.'s study and of how they link to the theme of 'regions of the brain'.</p> <p>2 marks for a brief or vague response which shows some knowledge and understanding of Casey et al.'s study and makes some attempt to link to the theme of 'regions of the brain'.</p> <p>1 mark for an uncontextualised answer or mere reference to the theme 'regions of the brain'</p> <p>0 marks – no creditworthy response.</p> <p><u>Examiner's Comments</u></p> <p>Candidates who were more successful on this question provided a clear and accurate response which demonstrates knowledge and understanding of the relevant features of Casey et al.'s study and how they link to the theme 'regions of the brain'. There was some confusion on the exact terminology of the brain regions - right inferior frontal gyrus and ventral striatum. And there was further confusion on how these brain regions are different in high and low delayers. Some candidates appeared to misread the question and linked their response to Sperry's study.</p>

Mark Scheme

Question	Answer/Indicative content	Marks	Guidance
b	<p>Explain one way in which the procedure of Sperry's (1998) study into split brains increased the reliability of the research.</p> <p>Possible answers:</p> <ul style="list-style-type: none"> • All participants viewed screen with one eye covered and gazing at a fixed point. • Use of standard projector/screen. • All images presented for 1/10 second or less. • Use of standardised tachistoscope. 	3	<p>3 marks for a clear response which identifies:</p> <ul style="list-style-type: none"> • a relevant way the procedure's design increases reliability by outlining how it did, • a relevant way the procedure's design increases reliability by outlining why it did, • demonstrates an understanding of reliability used in the procedure of Sperry's study. <p>2 marks for a vague response with all three of the above points or for a clear response with two of the points.</p> <p>1 mark for identifying a relevant way the procedure addressed the issue of reliability.</p> <p>0 marks – no creditworthy response.</p> <p>NB A definition/understanding of reliability alone does not earn a mark.</p> <p><u>Examiner's Comments</u></p> <p>There were many good responses here with candidates showing a clear understanding of reliability and being able to provide a sound outline of how Sperry's procedure increased the reliability of his study. Other candidates needed to develop their understanding of the term 'reliability' and their ability to explain how this issue was addressed in the procedure of Sperry's study, i.e. go beyond responses such as 'The procedure was highly controlled and standardised,' which merely infers an understanding of the term.</p>
	Total	7	

Mark Scheme

Question	Answer/Indicative content	Marks	Guidance
7	<p>Briefly explain how Sperry's study of split brains can be related to the biological area.</p> <p>Possible answer:</p> <p>The biological area holds that the mind resides in the brain and so all thoughts, feelings and behaviours have a biological cause. Sperry was interested in the effect of hemisphere disconnection/severing the corpus callosum on the abilities of the right and left hemispheres of the brain and subsequent behaviour. By flashing an image to the RVF and therefore the left hemisphere of patients who had undergone a hemisphere disconnection operation, he found patients were able to name the item in speech whereas if the image was flashed to the LVF and therefore the right hemisphere they were unable to identify the item in speech. This showed that by severing the corpus callosum, information is not able to be transferred between the right and left hemispheres and that speech is controlled by the left hemisphere.</p>	3	<p>3 marks for a clear answer which;</p> <ul style="list-style-type: none"> • identifies a main principle of the biological area with clear reference to the brain, • identifies the parts of the brain relevant to this study i.e. corpus callosum, left/right hemispheres, • identifies the behaviours these part(s) of the brain impact on i.e. a result from Sperry's study <p>2 marks for an answer which addresses at least two of the above points.</p> <p>1 mark for a partial or vague answer which addresses at least one of the above points.</p> <p>0 marks – no creditworthy response.</p> <p><u>Examiner's Comments</u></p> <p>Successful candidates on this question were able to identify a main principle of the biological area with clear reference to the brain, identify parts of the brain relevant to Sperry's study and identify the behaviour these part(s) of the brain impact on. The more successful responses included the specific brain regions corpus callosum or left/right hemisphere. Other candidates gave a principle of the biological area that is not relevant, e.g. 'The area believes that genes cause behaviour...'</p>
	Total	3	

Mark Scheme

Question		Answer/Indicative content	Marks	Guidance
8	a	<p>Outline one ethical issue raised by Sperry's study into regions of the brain.</p> <p>Possible ethical issues:</p> <ul style="list-style-type: none"> • Informed consent – participants knew why they were doing the experiment. • Reducing harm – use of non-invasive techniques for studying the brain. • Protection of participants – made use of pre-existing conditions. • Causing distress – these people had already suffered brain damage and may have found the testing distressing because it made them feel inferior. <p>NB Do not credit references to debriefing as one was not required.</p> <p>=/-</p>	2	<p>2 marks for a response which identifies a relevant ethical issue that is considered in the context of the study.</p> <p>1 mark for identifying a relevant ethical issue either explicitly or implicitly.</p> <p>0 marks – no creditworthy response.</p> <p><u>Examiner's Comments</u></p> <p>Most candidates identified protection from harm (or similar) which was a creditworthy issue. A number of these candidates went on to apply this issue to the study to good effect. There were some responses which focused on other issues that Sperry addressed in his study (such as consent and confidentiality) which also produced good responses.</p>

Mark Scheme

Question	Answer/Indicative content	Marks	Guidance
b	<p>Discuss to what extent Maguire et al.'s contemporary study in biological psychology changes our understanding of brain plasticity when compared to Blakemore and Cooper's study from 1970.</p> <p>Possible discussion points:</p> <ul style="list-style-type: none"> • Use of humans over animals • Use of real-life context over experimental set-up • Use of MRI scans <p><u>Example of a top band response</u></p> <p>Both Maguire et al and Blakemore and Cooper allow us to understand the plasticity of the brain in response to environmental experiences. However, in Blakemore and Cooper's study these experiences were contrived and artificial due to the unusual environments that the cats were raised in whereas Maguire et al's study of taxi drivers and their experiences of navigating London's streets allows for findings with more ecological validity. This means we can better understand brain plasticity in a real-life context. In addition, Maguire et al's use of MRI scans means we now have hard evidence for how the brain has been affected by experience whereas this could only be inferred in the case of the Blakemore and Cooper study. This, in turn, secures our understanding as we can see ourselves the differing structures of the brain. One final and obvious way that our understanding changes is through the fact that Maguire et al studied humans rather than cats. This means we can now apply the theory of brain plasticity to the population that we are really interested in rather than making generalisations based on the study of non-human animals.</p>	5	<p>4–5 marks for a developed response which considers at least one discussion point by explaining the point and then effectively analysing the extent to which it changes our understanding of brain plasticity.</p> <p>2–3 marks for a response which considers at least one discussion point and then analyses the extent to which it changes our understanding of brain plasticity.</p> <p>1 mark for identifying a relevant discussion point.</p> <p>0 marks – no creditworthy response.</p> <p>NB It is permissible to credit a response (using the full range of marks) that argues there have been no changes in understanding.</p> <p>Examiner's Comments</p> <p>This was a challenging question which most candidates tackled and then scored marks on. The best responses tended to look at a number of ways in which Maguire et al's study has changed our understanding of brain plasticity with the use of humans over animals and the focus on later life experiences being two comparisons which worked well.</p> <p>A common error was to describe the two studies one after the other without making an explicit comment on how one had changed our understanding (or not) compared to the other. This kind of response scored no marks despite having very detailed and accurate descriptions of the two studies in a number of cases.</p> <p> OCR support</p> <p>A guide on the OCR website that is a good start point for looking at how core studies develop understanding.</p>
	Total	7	

Mark Scheme

Question		Answer/Indicative content	Marks	Guidance
9	a	<p>Give two ways in which the taxi drivers and the control group were matched in this study.</p> <p>Possible answers:</p> <ul style="list-style-type: none"> • health(y) • right-handed(ness) • sex (male) • mean age • age range 	2	<p>2 marks for two distinct and accurate answers.</p> <p>1 mark for one clear and accurate answer.</p> <p>0 marks – no creditworthy response.</p> <p>NB Candidates are not expected to quote the mean age or age range so do not assess this part of their answer.</p>
	b	<p>Outline one strength of the type of data collected in this study.</p> <p>Possible strengths:</p> <ul style="list-style-type: none"> • Easy to make comparisons / identify patterns • Objective / less open to interpretation • Easy to replicate <p><u>Example of 1 mark answer</u> Easy to compare data from each condition.</p> <p><u>Example of 2 mark answer</u> It was easy to make comparisons (1) to see if one group's hippocampi were structured differently from the other's (1).</p>	2	<p>2 marks for a response which identifies a relevant strength which is then developed in the context of the study.</p> <p>1 mark for identifying a relevant strength either explicitly, or implicitly through reference to the study.</p> <p>0 marks – no creditworthy response.</p>
	c	<p>Identify the dependent variable in Maguire et al.'s (2000) study into the brains of taxi drivers.</p> <p>Answer: the volume of (grey matter in) hippocampus (anterior, body, posterior, right / left) or data from (2D) pixel counting/(3D) voxel-based morphometry</p>	1	<p>1 mark - for a clear and accurate response.</p> <p>0 marks – no creditworthy response.</p> <p>NB Do not credit volume of brain, or a different measure of hippocampi e.g. size.</p>
Total			5	

Mark Scheme

Question	Answer/Indicative content	Marks	Guidance
10	<p>Compare Blakemore and Cooper's (1970) study with Maguire's study by suggesting either one difference OR one similarity between them.</p> <p>Possible differences:</p> <ul style="list-style-type: none"> • type of experiment used • manipulation of IV vs naturally occurring IV • human vs non-human sample/type of participants • quantitative vs qualitative data • ethics in terms of protection of participants <p>Possible similarities:</p> <ul style="list-style-type: none"> • use of experimental method • use of independent groups design • examination of brain • investigation of visual-spatial abilities <p><u>Example of a 4 mark answer</u></p> <p>Both studies used an independent measures design (1) which means that different subjects were tested in each on the conditions (1). In Blakemore & Cooper's study, kittens were either raised from birth in a horizontal or vertical environment so had to be one or the other (1). In Maguire's study the IV was naturally occurring so the participants were either taxi drivers or not but obviously could not belong to both groups (1).</p> <p>NB Other appropriate responses should be credited.</p>	4	<p>4 marks – for a clear response which;</p> <ul style="list-style-type: none"> • identifies a difference/similarity • further outlines that difference/similarity • illustrates the difference/similarity with reference to Blakemore and Cooper's study • illustrates the difference/similarity with reference to Maguire's study. <p>3 marks for a vague response with all of the above points or for a clear response with three of the points.</p> <p>2 marks for a vague response with three of the above points or for a clear response with two of the points.</p> <p>1 mark for a vague response with two of the above points or for a clear response with the difference identified/implied.</p> <p>0 marks – no creditworthy response.</p> <p>Similarities or differences should pertain to procedure or findings</p> <p>*Candidates cannot gain credit for comparing topics or areas of the core studies</p> <p>*If candidates compare on sample size their point should be in relation to one sample being larger than the other. The context marks can only then be credited for the correct numbers of participants</p> <p>*If candidates make a generic statement in relation to something every core study has then zero marks e.g. a difference is the sample.</p>
	Total	4	

Mark Scheme

Question			Answer/Indicative content	Marks	Guidance
11	a	i	<p>Give the sample used in Sperry's split-brain study.</p> <p><u>Possible answers:</u></p> <ul style="list-style-type: none"> • 11 participants/patients • Participants/<u>patients</u> who had undergone brain surgery • A small sample who had split-brain undergone brain surgery/a commissurotomy to control epilepsy. <p>Other appropriate answer.</p>	1	<p>1 mark for correctly identifying at least one appropriate feature of the sample e.g. 'patients', 'undergone brain surgery'. Accept small sample rather than actual number.</p> <p>0 marks – no creditworthy response</p>
		ii	<p>Outline one example of sampling bias in this study.</p> <p><u>Possible answers:</u></p> <ul style="list-style-type: none"> • Had to have had brain surgery (so leads to a small sample) (1) – difficult to generalise (1) • All had experienced epilepsy (1) which may have confounded the results of the study (1) <p><u>Examples of a 1-mark answer:</u></p> <p>The sample was small because all participants had had commissurotomies.</p> <p>All participants suffered from severe epilepsy.</p> <p><u>Examples of a 2-mark answer:</u></p> <p>The sample was small because all participants had had commissurotomies (1). It is therefore very difficult to generalise the findings (1).</p> <p>All participants suffered from severe epilepsy which may have influenced their brain function beyond the effects of the surgery (1), thus confounding the results (1).</p> <p>Other appropriate answer.</p>	3	<p>2 marks for identifying a bias in the sample and for explaining its impact in the context of this study.</p> <p>1 mark for identifying a bias in the sample with no explanation of its possible impactor for a muddled explanation/not contextualised.</p> <p>0 marks – no creditworthy response e.g. there were more men/women than women/men, it was androcentric – the study only identified that of the 11 participants, there was one woman and one man.</p>

Mark Scheme

Question	Answer/Indicative content	Marks	Guidance
b	<p>Describe the background to Casey et al.'s study of neural correlates in the delay of gratification.</p> <p><u>Most likely content:</u></p> <ul style="list-style-type: none"> • Previous research showed performance on a delay-of-gratification task in childhood predicted the efficiency with which the same individuals performed a cognitive control task (go/no go task) as adolescents and young adults (1-2). Casey et al. wanted to build on previous research to assess whether delay of gratification in childhood predicts impulse control abilities in adulthood (1-2). • Previous research had shown that those who as pre-schoolers directed their attention toward rewarding aspects of the classic delay-of-gratification situation, such as focusing on cookies (high-temptation-focus group) had more difficulty suppressing inappropriate actions than did their low-temptation-focus counterparts (1-2). Casey et al. wanted to build on this research to find out if there were regions of the brain that correlated with low self-control and diminished ability to defer gratification (1-2). • The findings suggested that performance in pre-school delay of gratification may predict the capacity, in adulthood, to control thoughts and actions, as reflected in performance on cognitive control tasks (1-2). Casey et al. wanted to build on this to find out if there were regions of the brain that correlated with low self-control and diminished ability to defer gratification (1-2). • Research has shown that alluring or social contexts can diminish self-control (1-2). Casey et al. wanted to build on this research to find out if there were regions of the brain that correlated with low self-control and diminished ability to defer gratification (1-2). <p><u>Answers may also refer to:</u></p> <ul style="list-style-type: none"> • The ability to control one's thoughts 	4	<p>3-4 marks for a detailed and accurate description of the background to the study that demonstrates sound knowledge <u>and</u> understanding of the subsequent aim of the investigation.</p> <p>1-2 marks for a brief or vague description of the background to the study which may contain some inaccuracies or irrelevancies.</p> <p>0 marks – no creditworthy response.</p> <p>NB: If the candidate merely refers to Casey et al.'s aim without any reference to the background, only 1 mark can be awarded.</p>

Mark Scheme

Question			Answer/Indicative content	Marks	Guidance
			<p>and actions can vary by the potency of interfering information.</p> <ul style="list-style-type: none"> • A correlation has been found between an avoidance of risky behaviour and greater excitation in the right inferior frontal gyrus. It has been found that the ventral striatum facilitates and balances motivation with both higher-level and lower-level functions, such as inhibiting one's behaviour in a complex social interaction. • This region has been found to be the region in the basal ganglia neural circuit most closely associated with reward. <p>Other appropriate answer.</p>		
			Total	7	
12			C	1	
			Total	1	

Mark Scheme

Question		Answer/Indicative content	Marks	Guidance
13	a	<p>Sperry carried out a study into split-brain patients.</p> <p>Identify the apparatus used in this study.</p> <p>Apparatus:</p> <ul style="list-style-type: none"> • Tachistoscope/projector and (translucent) screen. • Objects for visual/tactile tests. 	2	<p>2 marks for naming both apparatus used.</p> <p>1 mark for naming one of the apparatus used.</p> <p>0 marks – no creditworthy response, e.g. reference to just screen/projector/computer (screen), images flashed on screen.</p> <p>N.B. It is permissible to describe the tachistoscope rather than name it.</p> <p><u>Examiner's Comments</u></p> <p>Some candidates were able to identify the two pieces of apparatus used – a tachistoscope (projector and screen) and objects. Many candidates either referred to how visual material was presented to the participant or considered having a split brain/having their brain split as a piece of apparatus and therefore did not answer the question.</p>

Mark Scheme

Question	Answer/Indicative content	Marks	Guidance
b	<p>Casey et al. carried out a study into neural correlates of delay of gratification.</p> <p>Outline one way in which the researchers' procedure increased the reliability of their study.</p> <p>Possible answers:</p> <ul style="list-style-type: none"> • Use of participants for both conditions ('hot' and 'cool'), i.e. repeated measures. • Use of standardised self-control scales. • Timing of presentation of faces. • Order of presentation of faces. • Use of programmed laptop computers. • Use of same imaging equipment (fMRI)/use of scientific equipment (fMRI). • Electronic response pad for reaction times. • Conducted in a laboratory under controlled conditions. <p><u>Example of a 1- mark response</u></p> <p>The self-control scales used to categorise participants had been standardised (1).</p> <p><u>Example of 2-mark answer</u></p> <p>All participants were tested using the same fMRI equipment (1) to ensure consistency in measurement (1).</p> <p><u>Example of 3-mark answer</u></p> <p>The faces were presented following standardised times (1) otherwise there timing of presentation would have been an extraneous variable between participants and conditions (1) meaning performance could have been affected by the task itself rather than whether somebody was a high or low delayer (1).</p>	3	<p>3 marks for a clear response which identifies a relevant way the study addressed the issue of reliability, outlines how/why it did and demonstrates an understanding of reliability in the process.</p> <p>2 marks for a vague response with all three of the above features or for a clear response with two of the features.</p> <p>1 mark for identifying a relevant way the study addressed the issue of reliability.</p> <p>0 marks – no creditworthy response.</p> <p>N.B. If the answer just demonstrates an understanding of the term reliability but not in the context of Casey et al.'s study, then award 1 mark maximum.</p> <p><u>Examiner's Comments</u></p> <p>There were many good answers here with candidates showing a clear understanding of reliability and being able to provide sound outlines of how Casey et al.'s procedure increased the reliability of their study, e.g. 'As a controlled and standardised procedure, Casey et al.'s study was reliable. This is because in the first experiment for the Go/Nogo task, pre-programmed laptops were delivered to each person's home. This meant all participants were tested in exactly the same way and that the test could be replicated.' Other candidates needed to develop their understanding of the term 'reliability' and their ability to explain how this issue was addressed in the context of Casey et al.'s study, i.e. go beyond such responses as, 'The procedure was highly controlled and standardised', which merely infers an understanding of the term.</p>
	Total	5	

Mark Scheme

Question			Answer/Indicative content	Marks	Guidance
14			B	1	<u>Examiner's Comments</u> . Answered correctly by most candidates. A minority of candidates chose option D incorrectly.
			Total	1	

Mark Scheme

Question		Answer/Indicative content	Marks	Guidance
15	a	<p>From Sperry's 'split brain' study into the psychological effects of hemisphere disconnection: Outline one way the results may be considered valid.</p> <p>Possible answer:</p> <ul style="list-style-type: none"> • It can be considered valid as participants all had an image flashed to their left or right visual field for 1/10th of a second, therefore they were all tested in the same standardised way increasing internal validity. • Sperry's study was high in face validity as it was measuring what it claimed to measure. Sperry was clearly measuring whether each hemisphere possesses an independent stream of conscious awareness. • There is construct validity in the study as he restricted visual information to each visual field and seeing if the participants could name / drawn / select what they had been shown. • Other appropriate response 	2	<p>2 marks – Response demonstrates good evaluation of how the results of Sperry's study are valid.</p> <p>1 mark – Response demonstrates limited / basic evaluation of validity. Reason is identified <i>e.g. Participants could not lie about their responses</i></p> <p>0 marks – no creditworthy response</p> <p><u>Examiner's Comments</u></p> <p>Links to validity were often weak, and little understanding of Sperry's study was demonstrated with the lower scoring responses – for instance, simple reference to 'internal validity being improved with a controlled environment' without a link to the context of the study.</p>

Mark Scheme

Question		Answer/Indicative content	Marks	Guidance
	b	<p>Casey et al.'s study on the neural correlates of delay gratification, examined behavioural and neural correlates of delay of gratification using functional magnetic resonance imaging (fMRI): Outline how delay of gratification is linked to regions in the brain.</p> <ul style="list-style-type: none"> The (inferior) frontal gyrus was more active in high delayers. The ventral striatum was more active in low delayers than high delayers. (3) Low delayers had diminished recruitment in the inferior frontal gyrus and higher activity in the ventral striatum (3) Other appropriate response <p><i>Two specific region of the brain must be mentioned (i.e. frontal gyrus, ventral striatum) in relation to a finding to gain top marks</i></p>	3	<p>3 marks – Response demonstrates good analysis and interpretation that is relevant to the demand of the question. Two areas need to be mentioned and correctly linked to one group (high / low delayers) or delay of gratification</p> <p>2 marks – Response demonstrates reasonable analysis and interpretation that is partially relevant. One area of the brain needs to be mentioned linked to one group (High / Low delayer) or delay of gratification</p> <p>1 mark – Response demonstrates limited analysis and interpretation that is partially related to topic area. Vague or partial links are made / attempted between the study and the key theme but understanding is limited. One or more areas of the brain mentioned with no links to function, or incorrect link to function</p> <p>0 marks – no creditworthy response</p> <p><u>Examiner's Comments</u></p> <p>To gain full credit, candidates needed to refer to both the inferior frontal gyrus and the ventral striatum and correctly link them to a group high / low delayers. Many candidates were able to do this.</p>
		Total	5	

Mark Scheme

Question	Answer/Indicative content	Marks	Guidance
16	<p>Outline one difference between Blakemore and Cooper's study on the impact of early visual experience and Maguire's taxi driver study.</p> <p>Example answer:</p> <ul style="list-style-type: none"> One difference is the sample (1). Blakemore and Cooper's sample were non-human whereas Maguire's were human(1). For example Blakemore studied a sample of kittens to show visual development (1). Maguire however studied a sample of 16 taxi drivers to see if the volume of their hippocampus was different to a control group(1). <p><i>Elaboration means explaining the difference in some way rather than merely stating it and or providing an implication.</i></p>	4	<p>4 marks – An appropriate difference is <u>identified</u> and <u>elaborated</u> and appropriate evidence is given from <u>both</u> of the studies as detailed in the answer guidance</p> <p>3 marks – An appropriate difference is <u>identified</u> and <u>elaborated</u> and appropriate evidence is given from <u>one</u> of the studies <i>e.g. One difference is that Blakemore and Cooper studied a sample of non humans but Maguire studied a human sample (1). For example Blakemore studied a sample of kittens to see if the development of the primary visual cortex (in kittens) was innate or learned (1). Therefore the generalisability of results to human brain plasticity is more possible from Maguire's results (1).</i></p> <p>OR</p> <p>An appropriate difference is <u>identified</u> and appropriate evidence is given from <u>two</u> of the studies <i>e.g. One difference is that Blakemore and Cooper studied a sample of non humans but Maguire studied a human sample (1). For example Blakemore studied a sample of kittens to see if the development of the primary visual cortex (in kittens) was innate or learned (1). Maguire however studied a sample of 16 taxi drivers to see if the volume of their hippocampus was different to a control group of non taxi drivers (1).</i></p> <p>2 marks – An appropriate difference is <u>identified</u> and <u>elaborated</u> but <u>no</u> evidence is provided for either study <i>e.g. One difference is that Blakemore and Cooper studied a sample of non humans but Maguire studied a human sample (1). Therefore the generalisability of results to human brain plasticity is more possible from Maguire's results (1).</i></p> <p>OR an appropriate difference is <u>identified</u> (<u>not elaborated</u>) but appropriate evidence is given from <u>one</u> of the studies <i>e.g. One difference is that Blakemore and Cooper studied a sample of non humans but Maguire studied a human sample (1). For example Blakemore studied a sample of kittens to see if the development of the primary visual cortex (in cats) was innate or learned (1).</i></p> <p>1 mark – An appropriate difference is identified but is not elaborated and no</p>

Mark Scheme

Question			Answer/Indicative content	Marks	Guidance
					<p>evidence is provided for either study e.g. <i>One difference is that Blakemore and Cooper studied a sample of non humans but Maguire studied a human sample (1).</i></p> <p>0 marks – no creditworthy response</p> <p><u>Examiner's Comments</u></p> <p>Better candidates were able to identify a difference and elaborate on that difference. They then went on to give appropriate evidence from both of the studies. Some candidates gave differences that were weak in structure and muddled. More commonly, candidates contrasted the two studies rather than provide a clear comparison. Many candidates referred to the sample as a difference, for instance cats / kittens versus taxi drivers / non taxi drivers. Clear identification of a difference is needed with this question rather than candidates simply discussing the two studies separately without clearly stating 'A difference between Blakemore and Cooper's study and Maguire's study is the sample used.'</p>
			Total	4	

Mark Scheme

Question	Answer/Indicative content	Marks	Guidance
17	<p>Describe how visual information was presented to participants in Sperry's study into the effects of hemisphere disconnection.</p> <p>Possible answer:</p> <ul style="list-style-type: none"> The participant, with one eye covered, centred his gaze on a fixed point in the centre of an upright translucent screen. Visual stimuli, on 35-millimetre transparencies, were arranged in a standard projector and were then back-projected at $\frac{1}{10}$ of a second or less to the LVF, RVF (or both visual fields). Other appropriate descriptions should be credited 	[4]	<p>4 marks – A clear and accurate description is provided as detailed in the Answer Guidance. At least 4 features of the procedure should be included.</p> <p>3 marks – A fairly accurate description is provided which includes at least 3 features of the procedure.</p> <p>2 marks – A basic description is provided which includes reference to at least 2 features of the procedure.</p> <p>1 mark – An answer that refers merely to one feature of the procedure e.g. visual stimuli were projected onto a screen, there is evidence of some understanding of the procedure.</p> <p>0 marks – No creditworthy information e.g. what was presented to each / both visual fields.</p> <p>Individual features:</p> <ul style="list-style-type: none"> the participant had one eye covered. the participant centred his gaze on a fixed point on an (upright translucent) screen. visual stimuli were 35-millimetre transparencies. visual stimuli were arranged in a standard projector. visual stimuli were back-projected. stimuli were shown $\frac{1}{10}$ of a second or less / very fast. Visual stimuli were flashed onto a screen. Stimuli were presented to the RVF, LVF (or both visual fields). The apparatus used was called a tachistoscope. Visual information was flashed to either the right or the left side of the central fixation point. <p><i>Examiners should note that for each mark allocation the candidate is required to include AT LEAST a specified number of features. But, even if the candidate has included the required number of features, that number of marks does not have to be awarded e.g. even if three features</i></p>

Mark Scheme

Question			Answer/Indicative content	Marks	Guidance
					<p><i>have been included, if the answer does not read well / make much sense, 3 marks do not have to be awarded.</i></p> <p><u>Examiner's Comments</u> Overall, a well answered question with many candidates scoring full marks. There were still a few candidates who confused 'eye' and 'visual field'!</p>
			Total	4	

Mark Scheme

Question		Answer/Indicative content	Marks	Guidance
18	a	<p>From Casey et al.'s study on the neural correlates of delay gratification: Describe the sample used in experiment 1.</p> <ul style="list-style-type: none"> • 59 (23 males, 36 females) of the 117 agreed to participate in this longitudinal behavioural study (Experiment 1). 32 high delayers (12 male, 20 female) and 27 low delayers (11 male, 16 female). 	2	<p>2 marks – sample is accurately described</p> <p>1 mark – sample is partially described or may lack clarity</p> <p>0 marks – no creditworthy response</p> <p><i>Not all fine details needed to gain full marks</i></p> <p>Examiner's Comments This question was answered poorly overall, most candidates could not differentiate the sample of experiment 1 from other samples used within the longitudinal study. Although specific figures and details were not needed for every feature of the sample to gain full marks, a good overview of the sample was often lacking, with some candidates only being able to state the sample size but no other features. Most candidates only partially described the sample and were therefore only able to gain 1 mark.</p>

Mark Scheme

Question		Answer/Indicative content	Marks	Guidance
	b	<p>Casey et al.'s study was also longitudinal. Suggest one strength of conducting this study longitudinally.</p> <p>Possible answers:</p> <ul style="list-style-type: none"> • Conducting the study longitudinally meant that changes and developments in the delay of gratification abilities could be seen over time (4 years old, 20 years old and 30 years old) • Allowed Casey et al to establish internal reliability as the adults were tested at 20 and 30 years old on the self-control scale • Other appropriate response 	2	<p>2 marks – Response demonstrates good evaluation. Strength is explained in context of Casey et al's study</p> <p>1 mark – Response demonstrates limited / basic evaluation. Strength partially explained in context of the Casey study OR strength is explained not in context of Casey et al's study <i>e.g. shows changes and developments over time</i></p> <p>0 marks – no creditworthy response</p> <p><i>The question requires candidates to explain the strength in context of the study. If candidate refers to reliability then the context must relate to the point being made</i></p> <p>Examiner's Comments</p> <p>The question requires candidates to give a specific strength of a longitudinal study e.g. "shows developments in behaviour over time" and then explain how this was a strength in Casey et al's study e.g. "This means that Casey et al was able to see of those who were high or low delayers at the start of the study remained high or low delayers when they were in their 40's". Most candidates understood what a strength of a longitudinal study was, however again, many candidates did not contextualise their response in reference to Casey et al's study. Some candidates gave incorrect strengths that were not specific to longitudinal studies, such as "it increases validity" or "easier to analyse".</p>
		Total	4	

Mark Scheme

Question	Answer/Indicative content	Marks	Guidance
19	<p>Describe one similarity between Casey et al's study on delay of gratification and Sperry's study on the effects of hemisphere disconnection. [4]</p> <p>Possible similarities;</p> <ul style="list-style-type: none"> • Investigating (regions of) the brain • Both from biological area (nature over nurture) • Quasi experimental • Use of controls • High reliability • High validity • Scientific approach • Individual over situation <p>4 mark response</p> <ul style="list-style-type: none"> • e.g. Both Sperry's study and Casey's study were quasi experiments (1) where the IV was naturally occurring (1). For example Sperry's study was a quasi experiment because the independent variable - having a split brain or not - was not directly manipulated by the researchers (1). Also in Casey's study the independent variable - whether the participant was a high delayer or a low delayer - was naturally occurring (1). <p>3 mark responses</p> <ul style="list-style-type: none"> • e.g. Both Sperry and Casey were quasi experiments (1) where the IV not manipulated by the researchers (1). In Sperry having a split brain or not, could not be decided by the researchers (1). • e.g. Both Sperry and Casey had IV's that were naturally occurring. (1) In Sperry having a split brain or not, was not manipulated by the researchers (1) and in Casey's study whether the participant was a high delayer or a low delayer was naturally occurring (1). <p>2 mark responses</p> <ul style="list-style-type: none"> • e.g. Both Sperry and Casey were quasi experiments (1). In Sperry having a split brain or not, was not 	4	<p>4 marks – An appropriate similarity is identified and elaborated and appropriate evidence is given from both of the studies as detailed in the answer guidance.</p> <p>3 marks – An appropriate similarity is identified and elaborated and appropriate evidence is given from one of the studies <i>OR</i> an appropriate similarity is identified (not elaborated) and appropriate evidence is given from both of the studies.</p> <p>2 marks – An appropriate similarity is identified and elaborated but no evidence is provided for either study <i>OR</i> an appropriate similarity is identified (not elaborated) and appropriate evidence is given from one of the studies.</p> <p>1 mark – An appropriate similarity is identified but is not elaborated and no evidence is provided for either study.</p> <p>0 marks – No creditworthy response.</p> <p><i>Elaboration means explaining the similarity in some way rather than merely identifying it so the candidate will show an understanding of what the similarity is / means.</i></p> <p><i>N.B. Sampling technique in both Sperry and Casey is unclear so should not be credited.</i></p> <p><i>N.B. If the biological area is identified as the similarity referring to investigation of the brain when outlining studies would be considered relevant and appropriate.</i></p> <p>Examiner's Comments Many candidates did well on this question, with three marks often being awarded. The main reason for missing out on the fourth mark was because candidates did not elaborate on the similarity they had identified. In some cases, it is possible that they chose a point that was difficult to explain further so candidates may want to be more selective in the future if faced with this kind of question. Investigating the brain and the use of quasi-experiments were commonly quoted similarities, and</p>

Mark Scheme

Question		Answer/Indicative content	Marks	Guidance
		<p>manipulated by the researchers (1).</p> <p>1 mark response</p> <ul style="list-style-type: none"> e.g. Both Sperry and Casey were experiments. (1) 		this were often illustrated to good effect using the named studies. Some candidates briefly referred to studies to earn the application marks.
		Total	4	
20		<p><i>From Blakemore and Cooper's study into the impact of early visual experience:</i></p> <p><i>Outline how the visual environment in which the kittens were reared was manipulated.</i></p> <p><u>Example of a 2 mark answer</u></p> <p>The environment was manipulated so that one lot of kittens were reared while exposed only to vertical black and white stripes (1) whereas the other lot were exposed to horizontal black and white lines (1).</p>	[2]	<p>2 marks referring to both conditions i.e. an environment consisting of vertical lines and an environment consisting of horizontal lines</p> <p>1 mark for naming one condition, or for an inaccurate response with both conditions, or for identifying the change in conditions e.g. different types of stripes were used.</p> <p>0 marks – No creditworthy information e.g. other aspects of the visual environment, such as use of cylinder.</p> <p><u>Examiner's Comments</u></p> <p>Nearly every candidate was able to answer this question correctly earning both marks. Some candidates did write much more than was required however.</p>
		Total	2	