Please check the examination details below before entering your candidate information

Candidate surname: StemUp Model Solution

Other names:

Centre Number

Candidate Number

Pearson Edexcel International Advanced Level

Tuesday 10 June 2025

Afternoon (Time: 2 hours)

Paper reference **WPS04/01**

Psychology

International Advanced Level

UNIT 4: Clinical Psychology and Psychological Skills

You do not need any other materials.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided – *there may be more space than you need.*

Information

- The total mark for this paper is 96.
- The marks for **each** question are shown in brackets – *use this as a guide as to how much time to spend on each question.*
- The list of formulae and statistical tables are printed at the start of this paper.
- Calculators may be used.

Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

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FORMULAE AND STATISTICAL TABLES

Standard deviation (sample estimate)

$$\sqrt{\left(\frac{\sum(x-\bar{x})^2}{n-1}\right)}$$

Spearman's rank correlation coefficient

$$1-\frac{6\sum d^2}{n(n^2-1)}$$

Critical values for Spearman's rank

	Level of significance for a one-tailed test				
	0.05	**0.025**	**0.01**	**0.005**	**0.0025**
	Level of significance for a two-tailed test				
N	**0.10**	**0.05**	**0.025**	**0.01**	**0.005**
5	0.900	1.000	1.000	1.000	1.000
6	0.829	0.886	0.943	1.000	1.000
7	0.714	0.786	0.893	0.929	0.964
8	0.643	0.738	0.833	0.881	0.905
9	0.600	0.700	0.783	0.833	0.867
10	0.564	0.648	0.745	0.794	0.830
11	0.536	0.618	0.709	0.755	0.800
12	0.503	0.587	0.678	0.727	0.769
13	0.484	0.560	0.648	0.703	0.747
14	0.464	0.538	0.626	0.679	0.723
15	0.446	0.521	0.604	0.654	0.700
16	0.429	0.503	0.582	0.635	0.679
17	0.414	0.485	0.566	0.615	0.662
18	0.401	0.472	0.550	0.600	0.643
19	0.391	0.460	0.535	0.584	0.628
20	0.380	0.447	0.520	0.570	0.612
21	0.370	0.435	0.508	0.556	0.599
22	0.361	0.425	0.496	0.544	0.586
23	0.353	0.415	0.486	0.532	0.573
24	0.344	0.406	0.476	0.521	0.562
25	0.337	0.398	0.466	0.511	0.551
26	0.331	0.390	0.457	0.501	0.541
27	0.324	0.382	0.448	0.491	0.531
28	0.317	0.375	0.440	0.483	0.522
29	0.312	0.368	0.433	0.475	0.513
30	0.306	0.362	0.425	0.467	0.504

The calculated value must be equal to or exceed the critical value in this table for significance to be shown.

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Chi-squared distribution formula

$$X^2 = \sum \frac{(O-E)^2}{E} \qquad df = (r-1)(c-1)$$

Critical values for chi-squared distribution

	Level of significance for a one-tailed test					
	0.10	**0.05**	**0.025**	**0.01**	**0.005**	**0.0005**
	Level of significance for a two-tailed test					
df	**0.20**	**0.10**	**0.05**	**0.025**	**0.01**	**0.001**
1	1.64	2.71	3.84	5.02	6.64	10.83
2	3.22	4.61	5.99	7.38	9.21	13.82
3	4.64	6.25	7.82	9.35	11.35	16.27
4	5.99	7.78	9.49	11.14	13.28	18.47
5	7.29	9.24	11.07	12.83	15.09	20.52
6	8.56	10.65	12.59	14.45	16.81	22.46
7	9.80	12.02	14.07	16.01	18.48	24.32
8	11.03	13.36	15.51	17.54	20.09	26.12
9	12.24	14.68	16.92	19.02	21.67	27.88
10	13.44	15.99	18.31	20.48	23.21	29.59
11	14.63	17.28	19.68	21.92	24.73	31.26
12	15.81	18.55	21.03	23.34	26.22	32.91
13	16.99	19.81	22.36	24.74	27.69	34.53
14	18.15	21.06	23.69	26.12	29.14	36.12
15	19.31	22.31	25.00	27.49	30.58	37.70
16	20.47	23.54	26.30	28.85	32.00	39.25
17	21.62	24.77	27.59	30.19	33.41	40.79
18	22.76	25.99	28.87	31.53	34.81	42.31
19	23.90	27.20	30.14	32.85	36.19	43.82
20	25.04	28.41	31.41	34.17	37.57	45.32
21	26.17	29.62	32.67	35.48	38.93	46.80
22	27.30	30.81	33.92	36.78	40.29	48.27
23	28.43	32.01	35.17	38.08	41.64	49.73
24	29.55	33.20	36.42	39.36	42.98	51.18
25	30.68	34.38	37.65	40.65	44.31	52.62
26	31.80	35.56	38.89	41.92	45.64	54.05
27	32.91	36.74	40.11	43.20	46.96	55.48
28	34.03	37.92	41.34	44.46	48.28	56.89
29	35.14	39.09	42.56	45.72	49.59	58.30
30	36.25	40.26	43.77	46.98	50.89	59.70
40	47.27	51.81	55.76	59.34	63.69	73.40
50	58.16	63.17	67.51	71.42	76.15	86.66
60	68.97	74.40	79.08	83.30	88.38	99.61
70	79.72	85.53	90.53	95.02	100.43	112.32

The calculated value must be equal to or exceed the critical value in this table for significance to be shown.

Wilcoxon Signed Ranks test process

- Calculate the difference between two scores by taking one from the other
- Rank the differences giving the smallest difference Rank 1

  Note: do not rank any differences of 0 and when adding the number of scores, do not count those with a difference of 0, and ignore the signs when calculating the difference
- Add up the ranks for positive differences
- Add up the ranks for negative differences
- T is the figure that is the smallest when the ranks are totalled (may be positive or negative)
- N is the number of scores left, ignore those with 0 difference

Critical values for the Wilcoxon Signed Ranks test

	Level of significance for a one-tailed test		
	0.05	0.025	0.01
	Level of significance for a two-tailed test		
n	0.1	0.05	0.02
N=5	0	–	–
6	2	0	–
7	3	2	0
8	5	3	1
9	8	5	3
10	11	8	5
11	13	10	7
12	17	13	9

The calculated value must be equal to or less than the critical value in this table for significance to be shown.

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SECTION A

Clinical Psychology

Answer ALL questions. Write your answers in the spaces provided.

1 In your studies of clinical psychology, you will have conducted a practical investigation.

(a) Describe the procedure you used in your clinical psychology practical investigation.

(4)

Our practical was a content analysis of attitudes to mental health in the media. Before collecting data we agreed a coding scheme of key words and phrases showing positive attitudes (eg "recovering", "brave"), negative attitudes (eg "dangerous", "psycho") and neutral, factual information. We used a standard online search engine to find news reports about people with mental health issues who had committed criminal offences, printed ten articles and numbered them, then randomly selected two to analyse. Each of us highlighted every word or phrase in the articles and tallied it into the positive, negative or neutral category, then we compared our tallies to check inter-rater reliability and turned the totals into percentages.

(b) Describe the results of your clinical psychology practical investigation.

(2)

We found that the tabloid and mass media articles contained a higher percentage of negative comments about mental health than positive or neutral comments. In one article 49% of the commentary was coded as negative, only 28% as positive and the remaining 23% as neutral, showing that people with mental health issues were often portrayed as dangerous.

(Total for Question 1 = 6 marks)

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2 In your studies of clinical psychology, you will have learned about cultural issues in the diagnosis of mental health disorders.

(a) Explain **one** reason why culture may have an influence on the diagnosis of mental health disorders.

(2)

Clinicians may view symptoms with an ethnocentric bias, judging behaviour against the norms of their own culture, so behaviour that is normal in the patient's culture may be seen as a symptom. Cooper et al. (1972) found that New York psychiatrists were twice as likely to diagnose schizophrenia as London psychiatrists when shown the same videotaped clinical interviews, suggesting culture influences diagnosis.

(b) Explain **one** reason why culture may not have an influence on the diagnosis of mental health disorders.

(2)

Classification systems such as the DSM contain clearly defined diagnostic criteria and symptoms for each disorder, which clinicians in different countries can apply in the same standardised way. Lee (2006) found that using the DSM to diagnose ADHD in Korea was as valid as using it in the USA, so cultural differences did not influence the diagnosis.

(Total for Question 2 = 4 marks)

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3 In your studies of unipolar depression **or** anorexia nervosa, you will have learned about one of the following contemporary studies in detail:

- Hans and Hiller (2013)
- Ma, Quan and Liu (2014)
- Becker et al. (2002)
- Reichel et al. (2014)

(a) Describe the procedure for your chosen contemporary study.

(4)

Chosen contemporary study

Becker et al. (2002)

Becker et al. studied girls in Nadroga, Fiji, which was chosen because it had an extremely low prevalence of eating disorders and had no television until it was introduced in mid-1995. A cross-sectional design was used, sampling two separate groups of ethnic Fijian adolescent schoolgirls: 63 girls in 1995, just before television arrived, and 65 girls in 1998, three years after television was introduced. All the girls completed the 26-item Eating Attitudes Test (EAT-26) and were asked about behaviours such as binge eating, self-induced vomiting and dieting. A semi-structured interview was then carried out with any girl who reported binge eating or purging in her EAT-26 responses, and in 1998 the girls were also interviewed about the impact of television on them.

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(b) Explain **two** strengths of your chosen contemporary study.

(4)

1 *Television was introduced to Nadroga at a known time, so Becker et al. could compare girls before and after its arrival in a natural setting. This means they can be confident that the natural IV of exposure to Western television is what influenced the DV of the girls' eating behaviour, so they could draw reliable and ecologically valid conclusions about the role of Western television in disordered eating.*

2 *The EAT-26 is a previously tested, standardised questionnaire for disordered eating such as binge eating and purging, so the study accurately measured changes in eating behaviour. Because the same EAT-26 was given to both groups in 1995 and 1998, it gave a consistent measure, increasing internal validity and making the comparison between the two samples replicable.*

(Total for Question 3 = 8 marks)

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4 Varsha has been experiencing hallucinations and delusions. She also struggled to leave the house. Varsha was admitted to hospital where she was diagnosed with schizophrenia. Varsha was given drug therapy by the doctors to help reduce her symptoms.

Varsha's symptoms are now controlled, and she is being discharged from hospital. The doctors have prescribed Varsha the same drug therapy which she has to take once a day.

(a) Explain **two** strengths of Varsha using drug therapy for her schizophrenia.

(4)

1 *Varsha is being given the same drugs that effectively suppressed her hallucinations and delusions in hospital, so they should keep her symptoms controlled at home. Emsley (2008) found that risperidone produced at least a 50% reduction in positive and negative symptoms in 84% of patients, so it could help Varsha manage her schizophrenia in the long term.*

2 *Varsha's antipsychotics reduced her symptoms more rapidly than therapies such as family therapy, quickly reducing her distress and dysfunction so she could be discharged. Meltzer et al. (2004) found patients taking haloperidol showed improvement in day-to-day functioning, so drug therapy may help Varsha return to her normal routines, such as leaving the house, sooner than other treatments.*

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(b) Explain **two** weaknesses of Varsha using drug therapy for her schizophrenia.

(4)

1 *Antipsychotics can have serious side effects, so Varsha needs to be monitored closely, which may be difficult as she still struggles to leave the house to attend appointments. For example clozapine carries a high risk of low blood pressure, which could make Varsha faint and possibly have to go back to hospital.*

2 *Varsha must be willing to take her tablet every day once she is home for the drugs to keep controlling her symptoms. However, Rosa et al. (2005) found only about 50% of patients complied with taking antipsychotics, so without staff checking on her, Varsha's medication may become ineffective if she stops taking it and relapses.*

(Total for Question 4 = 8 marks)

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5 In your studies of clinical psychology, you will have learned about one of the following mental health disorders in detail:

- Unipolar depression
- Anorexia nervosa

Analyse **one** non-biological explanation for your chosen mental health disorder.

(6)

Chosen mental health disorder

Unipolar depression

Beck's cognitive explanation assumes depression is caused by negative schemas and cognitive errors, such as overgeneralisation, that lead to the negative triad: negative views of the self, the world and the future. However, these are internal mental processes that are difficult to measure scientifically as they rely on introspection, so the explanation may lack reliable evidence of how negative thinking actually works.

There is support for the role of negative schemas and distorted processing of information. Alloy and Abramson (1999) carried out a longitudinal study and found that students with negative thinking patterns were more at risk of developing depression than those with positive thinking, which suggests the faulty thinking comes before the depression, supporting a causal role for schemas.

Bothwell and Scott (1997) found that faulty thinking and errors in cognitive processing, especially a need for approval and low self-esteem, were linked to the symptoms of depression. This gives further evidence that a negative self-concept, how people see and think about themselves, is a feature of unipolar depression.

(Total for Question 5 = 6 marks)

TOTAL FOR SECTION A = 32 MARKS

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SECTION B

Clinical Psychology

Answer the question. Write your answer in the space provided.

6 Evaluate whether the function of neurotransmitters is a complete explanation of schizophrenia.

(16)

The neurotransmitter explanation suggests schizophrenia is caused by an imbalance of neurotransmitters such as dopamine and glutamate. The dopamine hypothesis states that excess dopamine activity in the mesolimbic pathway causes positive symptoms such as hallucinations and delusions, while low dopamine activity (hypodopaminergia) in the mesocortical pathway to the prefrontal cortex, which regulates perception, cognition and attention, causes negative symptoms. People with schizophrenia have also been found to have more dopamine D2 receptors. The glutamate hypothesis suggests that low glutamate activity at NMDA receptors is involved, since ketamine, which blocks glutamate receptors, induces psychotic states similar to schizophrenia. The NRG-1 gene is involved in the expression and activation of glutamate and other neurotransmitter receptors.

There is strong evidence that neurotransmitters are involved. Bird et al. (1979) found that post-mortems of people with schizophrenia showed high levels of dopamine receptors in the brain, and Wong et al. (1986) used PET scans to find an increased density of dopamine receptors in living patients. Aarsland et al. (1999) found that L-dopa, a treatment for Parkinson's disease that increases dopamine, can produce hallucinations and delusions. Together these suggest that high dopamine activity can cause the positive symptoms of schizophrenia.

The explanation also accounts for more than positive symptoms. Krystal et al. (1994) found that glutamate NMDA receptor antagonists such as ketamine induce a broader range of symptoms resembling schizophrenia, including negative and cognitive symptoms, and Carlsson

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et al. (2000) proposed that hyperdopaminergia and hypoglutamatergia work together. Combining dopamine and glutamate therefore gives a more complete explanation than dopamine alone, and it has practical value because it led to antipsychotic drugs that reduce symptoms.

However, the evidence is correlational. Much of it comes from people who have had schizophrenia for some time and have often been taking antipsychotic medication, so it is hard to know whether dopamine caused the schizophrenia or the schizophrenia and its treatment caused the changes in dopamine activity. The direction of cause and effect is therefore unclear.

There is also contradicting evidence. Dépatie and Lal (2001) found that apomorphine, which stimulates dopamine receptors, did not produce schizophrenic symptoms, suggesting that high dopamine alone is not sufficient. Antipsychotics also do not work for all patients and are less effective for negative symptoms, which suggests other factors must be involved.

Other biological factors play a role. Gottesman (1991) found a 48% chance of developing schizophrenia if a person has an MZ twin with the disorder, so genes predispose people to schizophrenia. Genes may be the reason neurotransmitter function differs, so neurotransmitters may be part of a wider biological cause rather than a complete explanation on their own. Also, as the concordance is not 100%, the environment must be involved.

The cognitive explanation suggests that changes in neurotransmitters affect how internal information is processed, and it is this faulty processing, such as misattributing inner speech to an external source, that causes hallucinations, not the neurotransmitters on their own. The neurotransmitter explanation is also reductionist, as it ignores environmental factors such as

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stress, city life and family relationships, which are thought to trigger schizophrenia. The diathesis-stress model suggests a biological vulnerability only leads to schizophrenia when combined with environmental stressors, which neurotransmitters alone cannot explain.

In conclusion, there is strong evidence that dopamine and glutamate are involved in schizophrenia, and the explanation is useful in explaining symptoms and developing drug treatments. However, problems of cause and effect, contradictory findings such as Dépatie and Lal (2001), and the role of genes, cognition and the environment mean that the function of neurotransmitters is not a complete explanation. Schizophrenia is better explained by an interactionist approach in which neurotransmitter imbalance is one factor among several.

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(Total for Question 6 = 16 marks)

TOTAL FOR SECTION B = 16 MARKS

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SECTION C

Psychological Skills

Answer ALL questions. Write your answers in the spaces provided.

7 Leena is researching aggression. She has decided to use an fMRI brain scanning technique to research the functions of the brain (brain activity) when processing emotional information. Leena gathered a sample of eight adults and asked them to complete a questionnaire to rate their aggressiveness.

Leena then planned to show them aggressive and non-aggressive stimuli during an fMRI brain scan and record the responsiveness of their amygdala.

(a) Describe how Leena could have used an fMRI brain scan for her research.

(3)

Each of the eight adults would lie face up on the flat bed of the fMRI scanner and be asked to stay still while it slides into the scanner tube. Leena would show them the aggressive and non-aggressive stimuli, such as violent and neutral images, on a screen or through goggles with a digital display. The fMRI scanner would record changes in blood flow and oxygen in the brain, so activity in the amygdala in response to each type of stimulus can be measured and compared.

(b) Explain **one** strength of Leena using an fMRI brain scan for her research.

(2)

The fMRI scan gives Leena an objective measure of blood oxygen flow in the amygdala when the aggressive and non-aggressive stimuli are shown. This increases the reliability of her research, as the scan images remove researcher bias and subjective interpretation from the data she gathers about the amygdala and aggression.

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Leena wanted to see if there was a relationship between amygdala responsiveness and the self-rated aggression scores. She totalled the scores from the questionnaires, with a score of 0 being no aggression and 10 being high levels of aggression. Amygdala responsiveness was scored from 0, very little activity, to 10, high activity.

(c) Calculate the Spearman's rank correlation coefficient for the data gathered by Leena by completing **Table 1**.

The formulae and statistical tables can be found at the front of the paper.

You must show your working out and give your answer to three decimal places.

(4)

Self-rated aggression scores	**Rank 1**	**Amygdala responsiveness**	**Rank 2**	***d***	***d*²**
2	1	7	7	−6	36
5	3	4	4	−1	1
6	4.5	4	4	0.5	0.25
8	7.5	2	1	6.5	42.25
3	2	8	8	−6	36
7	6	3	2	4	16
6	4.5	4	4	0.5	0.25
8	7.5	5	6	1.5	2.25
				Total for *d*²	134

Table 1

Space for calculations

$$r_s = 1 - \frac{6\Sigma d^2}{n(n^2-1)} = 1 - \frac{6 \times 134}{8(8^2-1)} = 1 - \frac{804}{504}$$

$$= 1 - 1.5952\ldots = -0.595 \text{ (3 d.p.)}$$

Spearman's rank correlation coefficient ..... −0.595 .....

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(d) Determine, with reference to the data, whether Leena's results are significant at $P \leqslant 0.05$ for a two-tailed (non-directional) test.

The critical values table can be found at the front of this paper.

(1)

Not significant: with N = 8, two-tailed at p ≤ 0.05, the calculated value of 0.595 (ignoring the sign) is less than the critical value of 0.738, so there is no significant relationship.

(Total for Question 7 = 10 marks)

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8 Explain **one** strength and **one** weakness of using an independent groups experimental/research design.

Strength

Participants only take part in one condition of the independent variable, which prevents order effects such as practice, boredom or fatigue from affecting their performance. This means any difference in the DV between conditions is a more valid measure of the effect of the IV.

Weakness

Different participants take part in each condition, so participant variables such as personality, intelligence or memory ability may differ between the groups. These confounding variables, rather than the IV, may cause the difference in the DV, so the results may lack validity.

(Total for Question 8 = 4 marks)

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9 Shardul is investigating whether people feel happier on sunny days compared to rainy days. He decides to use a semi-structured interview to gather his data.

(a) Describe how Shardul can use a semi-structured interview to gather quantitative and qualitative data for his investigation.

(4)

Shardul could gather quantitative data by asking every participant the same pre-set closed questions with fixed responses, for example "On a rainy day, how do you feel?" Happy / Indifferent / Sad, or "Rate your happiness on a sunny day from 1 to 10". He could then count or compare the answers for sunny and rainy days. Because the interview is semi-structured, he can also ask follow-up open questions based on each person's earlier answers to gather qualitative data, for example "Describe why you feel happier on sunny days than on rainy days", giving detailed, rich explanations of how the weather affects their mood.

(b) Explain **one** reason why Shardul chose to gather primary data for his investigation.

(2)

Primary data would be collected directly for his own aim, so the questions are specifically about the effect of sunny and rainy weather on how happy people feel. This increases the construct validity of his investigation, as his results will measure exactly what he intends to study rather than relying on data gathered for another purpose.

(Total for Question 9 = 6 marks)

TOTAL FOR SECTION C = 20 MARKS

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SECTION D

Answer the question. Write your answer in the space provided.

10 One key question for society is whether children should learn a second language in the early years of their development.

Scovel (1988) explained that the 'critical period hypothesis' is the idea that language is best learned during a child's early years, and that after about 12 years old, there are difficulties in the ability to acquire a new language.

However, others have suggested that language is acquired through a process of rewards and the use of imitation, which encourage the correct use of language. This applies to the first and second languages people learn throughout their lives. Individuals can learn a second language through the use of online programs and apps.

Discuss the key question of whether children should learn a second language in the early years of their development. You should use concepts, theories and/or research studied in your psychology course.

You **must** make reference to the context in your answer.

(8)

Chomsky argued that children are born with an innate language acquisition device (LAD) which contains the basic rules of grammar common to all languages, so children can acquire language quickly from limited input. He suggested there is a critical period for language learning, with the innate ability lasting only until about puberty. This fits Scovel's (1988) critical period hypothesis that language is best learned in the early years and that after about 12 years old it becomes difficult to acquire a new language. This suggests children should learn a second language in their early years, while the LAD is still active, if they are to become fluent.

Evidence supports this. Genie, studied by Curtiss (1977), was isolated and not exposed to language until she was about 13; despite years of teaching she gained vocabulary but never mastered grammar, suggesting language must be acquired before the critical period ends. Johnson and Newport (1989) found that Korean and Chinese immigrants who arrived in the USA before age 7 performed like native speakers on English grammar tests, while those arriving later scored lower, supporting early second language learning.

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However, Skinner argued that children are a "tabula rasa" and learn language through operant conditioning. Correct words and phrases are positively reinforced, eg with praise, so they are repeated, and incorrect speech is not rewarded, while imitation of others also shapes language, as the context describes. This process can happen at any age, so it explains how people can learn second languages throughout their lives, beyond puberty.

This is supported by the online programs and apps in the context, which reward continued practice with points, streaks or gold stars, motivating adults to keep learning a second language. Therefore an early start may not be essential. However, Skinner cannot explain how children produce sentences they have never heard, and Genie showed reinforcement alone did not lead to full grammar later in life.

Overall, the evidence suggests children should learn a second language in the early years, when it is easiest to acquire native-like grammar and pronunciation, but learning through reinforcement, such as apps, means it is never too late to learn a second language to a useful level.

(Total for Question 10 = 8 marks)

TOTAL FOR SECTION D = 8 MARKS

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SECTION E

Answer the question. Write your answer in the space provided.

11 Assess whether nature is more influential on human behaviour than nurture.

(20)

Nature refers to the innate, inherited aspects of a person that they are born with, such as genes, brain structure, neurotransmitters and the endocrine system producing hormones. Nurture refers to the environment, interactions and experiences a person has over their lifetime, such as upbringing, learning and culture. The debate is about the extent to which each influences human behaviour.

There is strong evidence for nature in aggression. Lindman et al. (1987) linked the hormone testosterone with aggression in males, suggesting hormones play a significant role in violent behaviour. Raine et al. (1997) found that murderers pleading not guilty by reason of insanity had less activity in the prefrontal cortex than controls, suggesting violence results from brain functioning. Evolutionary explanations also claim that aggression and attraction are driven by survival of the fittest, to ensure strong genes are passed on. This research is scientific, using objective measures such as PET scans, which makes it convincing evidence.

Biological explanations of addiction also focus on nature. Olds and Milner (1954) found that stimulating neural pathways in rats' brains produced the experience of pleasure, suggesting pleasure, and so drug taking, is the activation of the reward pathway. The case of HM showed that removing the hippocampus caused amnesia, highlighting that brain structure is key to memory. Gender also seems to be strongly influenced by nature: David Reimer was born male but raised as a girl after an accident, yet he rejected his female identity and at 15 adopted his birth gender, suggesting nature was more significant than nurture.

However, explanations focusing on nature are often reductionist, explaining behaviour in terms

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of single factors such as neurotransmitters or hormones, and so fail to take a holistic view of a person. Much of the evidence is also correlational, for example Raine et al. could not show that brain differences caused the murders, and Reimer is a single case study, so it cannot be generalised.

There is strong evidence for nurture. Bandura, Ross and Ross (1961) found that children who observed an aggressive role model imitated the behaviour, suggesting aggression is learned through social learning. Freud's case study of Little Hans suggested that his phobia of horses came from his experiences with his father, and once his Oedipus complex was resolved the fear disappeared, attributing the phobia to nurture. Bartlett's (1932) theory of reconstructive memory shows that recall is shaped by prior experiences and schemas, so nurture plays a significant role even in a biological process like memory. However, Bandura's laboratory study lacks ecological validity and Freud's case study is subjective and not generalisable.

Much evidence shows that nature and nurture interact. Gottesman and Shields (1972) found a 58% concordance rate for schizophrenia in MZ twins, showing a genetic influence, but as concordance is not 100% the environment must also be involved, as the diathesis-stress model suggests. Genes such as MAOA-L have been linked to aggression, but McDermott et al. (2009) found that people with the low-activity MAOA gene were only more aggressive when they were highly provoked, so the environment triggers the genetic predisposition. Bowlby (1944) showed that although the need to attach is instinctive, the quality of the early bond affects behaviour into adulthood, so both nature and nurture are required. Even HM's brain was changed by an environmental event, surgery.

The significance of each also depends on the behaviour studied. Basic processes such as pleasure and memory storage seem mainly due to nature, whereas phobias, the specific form

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aggression takes and the content of memories seem more influenced by nurture. Nurture explanations are less deterministic, which matters because they suggest behaviour can be changed through therapies such as systematic desensitisation or by changing role models, whereas nature explanations are more useful for drug treatments.

In conclusion, nature has a significant influence on human behaviour, with strong scientific evidence from hormones, brain structure and genes. However, it is not more influential than nurture overall, because twin studies, McDermott's research and the diathesis-stress model show that genetic predispositions usually need environmental triggers. The most balanced judgement is that behaviour results from an interaction of nature and nurture, with the relative influence of each depending on the behaviour being explained.

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TOTAL FOR SECTION E = 20 MARKS
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