Write your name here

Surname
StemUp Model Solution

Other names

Pearson Edexcel
International Advanced Level

Centre Number

Candidate Number

Psychology

International Advanced Level
Paper 4: Clinical Psychology and Psychological Skills

Thursday 2 November 2017 – Afternoon
Time: 2 hours

Paper Reference
WPS04/01

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.
- Candidates may use a calculator.

Advice

- Read each question carefully before you start to answer it.
- 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	0.833	0.833	0.867
10	0.564	0.684	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	0531
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.

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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 BEGINS ON THE NEXT PAGE.

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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 learned about either unipolar depression or anorexia nervosa.

(a) Describe the features and/or symptoms of unipolar depression or anorexia nervosa.

(4)

Mental health disorder *Unipolar depression*

There are two forms of unipolar depression: major depressive disorder and dysthymic disorder. Major depressive disorder involves a persistently depressed mood and/or a loss of interest or pleasure in almost all activities (anhedonia) for at least two weeks, alongside symptoms such as changes in sleep and appetite, fatigue, feelings of worthlessness or guilt, poor concentration and recurrent thoughts of death. Episodes of major depression tend to come and go in a cycle, unlike dysthymic disorder, where milder depressive symptoms remain fairly constant for two years or more. Unipolar depression is diagnosed more often in women than in men.

(b) You will have studied cognitive behavioural therapy (CBT) as a treatment for unipolar depression or anorexia nervosa.

Give **two** principles of cognitive behavioural therapy (CBT).

(2)

1 *CBT focuses on identifying an individual's negative, irrational thoughts and the maladaptive behaviours that come from them.*

2 *The therapy aims to challenge and rationalise faulty thinking so it is replaced with more realistic, positive thoughts and behaviours (eg through homework tasks).*

(Total for Question 1 = 6 marks)

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2 In your studies of clinical psychology, you will have learned about the following classic study:

- Rosenhan (1973) On being sane in insane places.

(a) Explain **two** strengths of Rosenhan's (1973) study.

(4)

1 *The study had a real-life setting, as the pseudo-patients were admitted to 12 genuine psychiatric hospitals in the USA and staff did not know they were being studied. This means staff behaved naturally, so the findings have high ecological validity for the experiences of patients in psychiatric institutions.*

2 *The study was conducted in a variety of hospitals, both public and private, old and new, in five different states on the east and west coasts of the USA. Therefore, the findings are more generalisable to psychiatric hospitals in the USA at that time, as the sample represented a range of psychiatric care rather than one unusual hospital.*

(b) Explain **two** weaknesses of Rosenhan's (1973) study.

(4)

1 *The observational data came from the pseudo-patients themselves, who were recording their own experiences on the ward, so their reports could have been affected by their emotions and expectations. This means the data about how staff behaved towards patients may have been subjective and biased, lowering its reliability.*

2 *The hospital staff were deceived, as the pseudo-patients reported fake symptoms and the staff were not told they were being studied, so they could not give informed consent or withdraw. Therefore the study can be considered unethical under the BPS code of ethics, and it may have damaged trust between psychiatric staff and genuine patients.*

(Total for Question 2 = 8 marks)

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3 Dr Ashton wanted to compare the effectiveness of different therapies in treating patients with schizophrenic symptoms. He assigned patients into three different groups. One group had drug therapy, one group had family therapy, and one group had both therapies.

(a) Describe the research method used by Dr Ashton in his study.

(2)

Dr Ashton used a randomised controlled trial (an experiment with an independent groups design). Patients with schizophrenic symptoms were randomly assigned to one of three treatment conditions (drug therapy, family therapy or both combined), and the number of symptoms in each condition was compared over seven weeks to see which therapy was most effective.

(b) Dr Ashton also gathered quantitative data during his study. He recorded the total number of times participants in each of the conditions reported symptoms of schizophrenia. The results are shown in **Table 1**.

	Drug therapy Condition A	**Family therapy Condition B**	**Combined therapy Condition C**
Week 1	44	41	43
Week 2	32	37	30
Week 3	25	34	21
Week 4	18	31	14
Week 5	20	26	12
Week 6	18	26	10
Week 7	19	24	7

Table 1

Describe the level of measurement for the data in **Table 1**.

(2)

The data is ratio data, because the number of reported symptoms is measured on a scale with equal intervals between each value and a true, meaningful absolute zero (zero means no symptoms were reported), so 20 symptoms is twice as many as 10 symptoms.

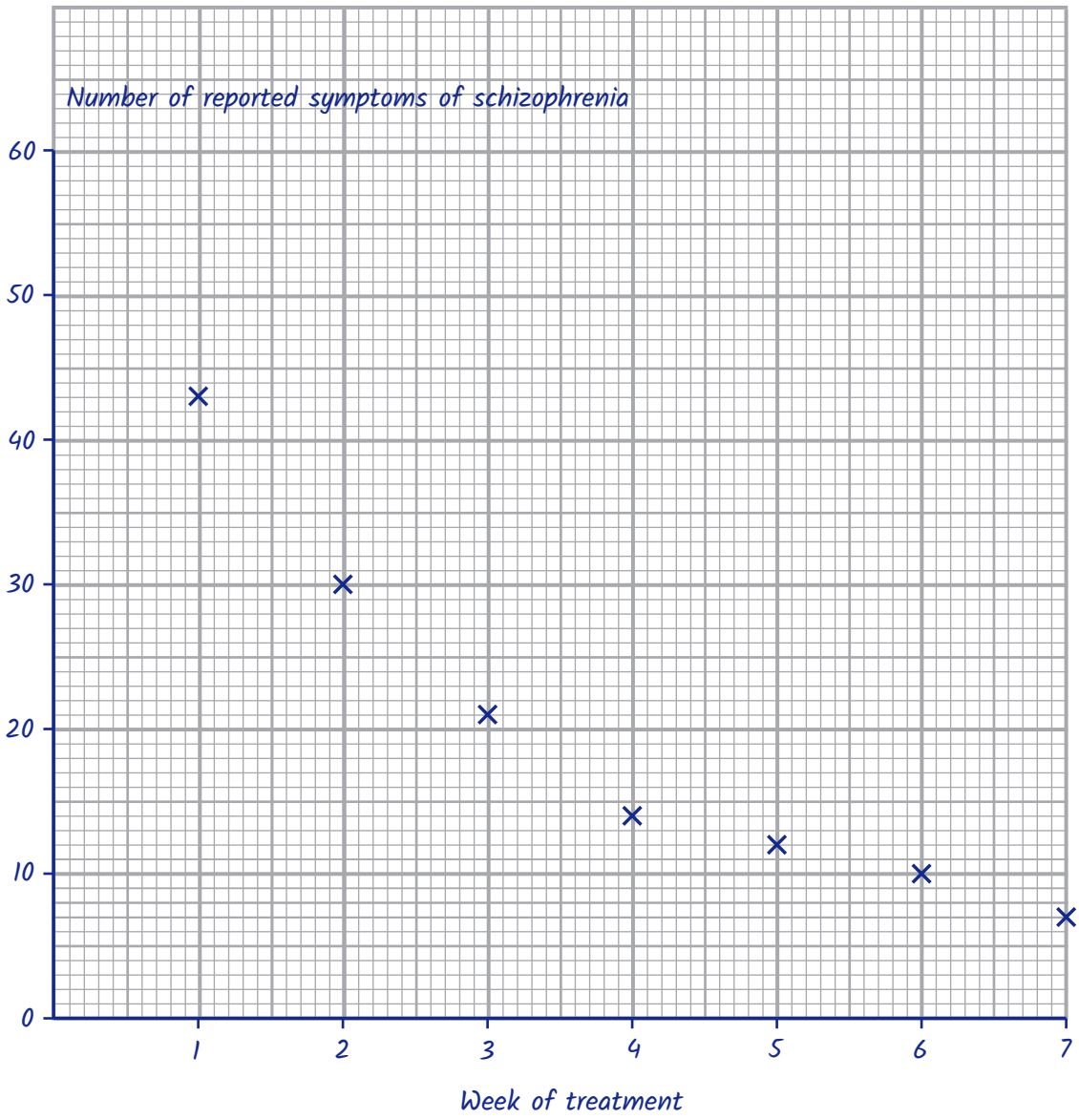
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(c) Draw a scatter diagram to represent the results of combined therapy (Condition C).

(3)

Title *A scatter diagram to show the number of reported symptoms of schizophrenia for participants receiving combined therapy (Condition C) in weeks 1 to 7*



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(d) State **two** conclusions that Dr Ashton could make from the results of his study.

(2)

Conclusion 1

Combined drug and family therapy is the most effective treatment, as it reduced reported symptoms the most, from 43 in week 1 to 7 in week 7.

Conclusion 2

Family therapy on its own is the least effective treatment, as symptoms only fell from 41 to 24, and it reduced symptoms more slowly than drug therapy (44 to 19).

(Total for Question 3 = 9 marks)

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

(a) Describe the procedure you used to gather data in your practical investigation.

(4)

My practical was a content analysis of attitudes towards mental health in the media. First we operationalised positive, neutral and negative attitudes into coding categories, such as "danger to others", "danger to self", "medical condition" and "contribution to society". As a group we searched for newspaper articles about mental health published within the previous four weeks and read ten of them, then selected three final articles (two tabloid and one medical report) based on the credibility of the source. Each person then read all three articles and highlighted every place where the content matched one of our operationalised categories, using a tally chart to count how often each category appeared. Finally, we checked inter-rater reliability by working in pairs and comparing our highlighted themes and tallies against each other's, discussing and resolving any differences, before totalling the positive, neutral and negative references for each source.

(b) State **one** conclusion you made in your practical investigation.

(1)

I concluded that the tabloid press showed a more negative attitude to mental health than medical reports, as tabloid articles more often described people with mental illness as a danger to others.

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(c) Explain **one** weakness of the sources you gathered for your practical investigation.

(2)

The sources were a small sample of articles found online using only one search engine and all came from one country's English-language press. This limits the generalisability of my findings, as the sources may not represent attitudes to mental health in other media, such as television or social media, or in other cultures, so the results are ethnocentric.

(Total for Question 4 = 7 marks)

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5 Daniel is 24 years old and has been diagnosed with schizophrenia. He has had negative symptoms of schizophrenia for three years and positive symptoms of schizophrenia for six months.

His doctor tells him that 1% of people in the population have schizophrenia. In every 200 patients with schizophrenia, drug therapy successfully prevents relapses in around 80 of those cases.

(a) Convert the percentage of 1% of people in the population to a ratio.

(1)

Space for calculations

1% = 1 out of every 100 people

1 : 100

Ratio 1 : 100

(b) Calculate the success rate of drug therapy preventing relapse as a fraction.

You **must** simplify this fraction to its lowest form.

(1)

Space for calculations

$\frac{80}{200} = \frac{8}{20} = \frac{2}{5}$

Fraction $\frac{2}{5}$

(Total for Question 5 = 2 marks)

TOTAL FOR SECTION A = 32 MARKS

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SECTION B

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

6 In your studies of clinical psychology, you will have learned about two biological explanations for schizophrenia. One of these is the function of neurotransmitters and the other is an alternative biological explanation.

Evaluate **two** biological explanations for schizophrenia. One **must** be the function of neurotransmitters.

(16)

The dopamine hypothesis explains schizophrenia as the result of an imbalance of the neurotransmitter dopamine, with excess dopamine activity or overactive/oversensitive D2 receptors. Too much dopamine in the mesolimbic pathway is thought to cause positive symptoms such as hallucinations and delusions, while low dopamine activity in the mesocortical pathway is linked to negative symptoms such as avolition and flat affect. Evidence comes from drugs that increase dopamine, which can produce schizophrenia-like symptoms in people without the disorder.

There is supporting evidence for the dopamine hypothesis. Iversen (1979) found high levels of dopamine in post-mortem brains of people with schizophrenia. Also, phenothiazine drugs, which block dopamine receptors, reduce symptoms in many patients, suggesting dopamine plays a causal role. Aarsland et al (1999) found that L-dopa, given to Parkinson's patients to raise dopamine, produced hallucinations and delusions, which further supports a link between too much dopamine and positive symptoms.

However, the evidence is contradictory. Dépatie and Lal (2001) found that apomorphine, which stimulates dopamine receptors, did not produce schizophrenia symptoms, suggesting dopamine may not be the cause. Amphetamines raise dopamine in the synapse but only produce positive symptoms, so the theory struggles to explain negative symptoms. Krystal et al (2005) found that ketamine, which acts on glutamate NMDA receptors, can cause both

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positive and negative symptoms, so other neurotransmitters such as glutamate are also involved and the dopamine hypothesis is incomplete. There is also a cause and effect problem: high dopamine in post-mortem brains may result from years of the illness or its treatment rather than causing it, and antipsychotics do not help every patient.

The genetic explanation argues that schizophrenia is inherited, so the closer the genetic relationship to someone with schizophrenia, the greater the risk. MZ twins share 100% of their genes and DZ twins 50%, so if genes cause schizophrenia MZ twins should show higher concordance. Genetic mutations may also explain cases where there is no family history of the disorder.

There is strong evidence for a genetic influence. Kendler et al (1985) found that first-degree relatives of people with schizophrenia were 18 times more likely to develop it than the general population. Gottesman (1991) found a 48% risk of schizophrenia for someone whose MZ twin had the disorder and 46% when both parents had it, compared with about 1% in the general population. Walsh et al (2008) found that patients with no family history often had rare copy number variations (CNVs), so mutations can explain non-inherited cases.

However, MZ concordance is not 100%, even though the twins are genetically identical, so environmental factors must also be involved. Families also share an environment, so high family concordance could be due to upbringing rather than genes. MRI scans of MZ twins where only one has schizophrenia show brain differences, suggesting it may be a brain disease rather than purely a genetic disposition. Genetics is also deterministic, as it suggests people with a family history will inevitably develop the disorder.

Comparing the two, both are reductionist biological explanations that ignore social and

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cognitive factors, yet both are supported by scientific, objective evidence such as post-mortems, drug trials and twin studies. The genetic explanation may be a more underlying cause, as genes could lead to dopamine abnormalities, while the dopamine hypothesis explains how symptoms are produced and has practical value in drug therapy. In conclusion, neither explanation is complete alone: genes appear to create a vulnerability and dopamine (along with glutamate) shapes the symptoms, so a diathesis-stress approach, in which environmental stress triggers a biological predisposition, best explains schizophrenia.

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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 in this section. Write your answers in the spaces provided.

7 Researchers in psychology can use primary or secondary data sources to gather qualitative and quantitative data.

(a) Describe what is meant by **qualitative** data as used in psychological research.

(2)

Qualitative data is descriptive, non-numerical information, such as detailed accounts gathered through case study histories or unstructured interviews. It is used to find in-depth reasons and meanings behind the behaviour the researcher is studying, eg why a patient feels anxious.

(b) Describe what is meant by **quantitative** data as used in psychological research.

(2)

Quantitative data is numerical data, such as scores from Likert scales, a tally of responses or the number of words recalled. It can be statistically analysed, eg with an inferential test, to test the significance of results about the behaviour being investigated.

(c) Define what is meant by primary and secondary data.

(2)

Primary data is data gathered first hand by the researcher for the purpose of their own study. Secondary data is data that has already been gathered by someone else, for another purpose, which the researcher then uses, eg government statistics or published studies.

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(d) Explain **one** strength of using secondary data.

(2)

Secondary data is already in the public domain, so the researcher can access a large amount of information about the topic quickly. This makes it cost-effective, because the researcher does not need to recruit participants or use specialist equipment to gather the data themselves.

(Total for Question 7 = 8 marks)

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8 Jacob is a psychology student. He has decided to investigate differences in memory recall when an interference task is used to prevent rehearsal.

He will use a set of three letter nonsense trigrams to test recall (for example CQF, PXM). Jacob plans to prevent rehearsal using interference tasks that last 3 seconds, 8 seconds, 13 seconds and 18 seconds. His participants will be his peers who are also students. He will conduct his research using a laboratory experiment method. Jacob has asked you for help with the planning of his research.

(a) Jacob is unsure how to develop his hypothesis.

State a suitable directional (one-tailed) fully operationalised hypothesis for Jacob's research.

(3)

Participants will recall significantly fewer three-letter nonsense trigrams correctly as the length of the interference task preventing rehearsal increases (3 seconds, 8 seconds, 13 seconds and 18 seconds).

(b) Jacob will need to gather a sample of students to be his participants.

Explain **one** sampling technique that Jacob could use in his research study.

(2)

Jacob could use random sampling by putting the names of all the students in his psychology class or college into a hat and drawing out the number he needs. This gives every student an equal chance of being selected for his memory study, which reduces researcher bias.

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(c) Jacob has asked you to help him with planning the procedure for his experiment.

Explain how Jacob can ensure reliability and validity in his laboratory experiment.

(6)

Jacob should use an independent groups design, randomly allocating students to the 3, 8, 13 or 18 second interference conditions. This removes order effects such as practice or fatigue, which could occur if the same person did the recall test more than once, so differences in recall are due to the interference time. He should use identical, standardised trigram lists and the same interference task (eg counting backwards in threes) for every group, with the same instructions read from a script. This makes the procedure standardised, so it can be replicated and the results retested to check they are consistent, increasing reliability. He should also control extraneous variables that could affect rehearsal, such as noise or interruptions, by testing everyone in the same quiet laboratory room at the same time of day. This increases internal validity, as Jacob can be sure the IV (length of interference) is the only variable affecting the DV (number of trigrams recalled).

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(d) State why Jacob's results may not be generalisable.

(1)

His sample is only his peers, who are students of a similar age and education, so it is not representative of the wider population, eg older adults.

(Total for Question 8 = 12 marks)

TOTAL FOR SECTION C = 20 MARKS

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SECTION D

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

9 One key question for society is whether day care is beneficial for a child's development. Day care refers to care that is provided by someone other than the primary caregiver for a child during the day.

Belsky (2002) conducted a longitudinal study of 1083 children in the USA attending day care. He studied the levels of aggression and defiance shown by the children. Aggression and defiance were operationalised and included fighting, arguments, cruelty and demanding attention.

His findings showed that children who attended day care for 30 hours or more per week were three times more likely to show aggressive and defiant behaviour than those children who attended for 10 hours or less per week. This was especially evident in children who attended day care during the first 12 months of childhood.

He concluded that long hours spent in day care have a negative effect on children's levels of aggression and defiance.

Discuss the key question of whether day care is beneficial for a child's 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)

Day care involves regular separation from the primary caregiver, which Bowlby's maternal deprivation hypothesis suggests could harm development. Bowlby argued there is a critical period between birth and about two years when a strong attachment must form, and that deprivation of this attachment can lead to delinquency, affectionless psychopathy and problems in adult relationships, as in his 44 juvenile thieves study (1944).

Belsky's (2002) findings support this. Children in day care for 30 hours or more per week were three times more likely to be aggressive and defiant than those in day care for 10 hours or less, and the effect was strongest when day care started in the first 12 months. As this is within Bowlby's critical period, long hours away from the primary caregiver may disrupt attachment, so day care would not be beneficial, especially full-time care for babies.

However, the children attending for 10 hours or less showed less aggression, so it may be the

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amount of time away from the caregiver, rather than day care itself, that causes difficulties. Belsky also operationalised aggression to include behaviours such as demanding attention and arguing, which are developmentally normal at this age, so his findings may exaggerate the harm and day care may have little real impact on development. His study is also correlational, so family factors such as parental stress or income could explain the aggression.

The quality of the day care setting may matter more. Brendgen et al (2005) found that environmental factors influence social aggression, so a low-quality setting with poor discipline and high staff turnover could increase aggression regardless of hours. In contrast, Sylva et al (2004) found that high-quality pre-school improved children's intellectual and social development.

In conclusion, day care is not beneficial when it is long-hours, low-quality and starts before age one, but part-time, high-quality day care can be beneficial, so society should limit hours for babies and invest in quality.

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(Total for Question 9 = 8 marks)

TOTAL FOR SECTION D = 8 MARKS

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SECTION E

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

10 Assess the argument that nature plays a greater role in human behaviour than nurture.

(20)

Nature refers to the inherited, biological aspects of a person that they are born with, such as genes, hormones and brain structure. Nurture refers to the environment and the experiences and interactions a person has over their lifetime, which learning theories argue shape behaviour because we are born a blank slate. Many explanations, such as those of language and attachment, include both.

There is strong evidence that nature plays a major role in aggression. Raine et al (1997) found that murderers pleading not guilty by reason of insanity had lower activity in the prefrontal cortex than controls, suggesting violence results from brain functioning. Lindman et al (1987) linked testosterone to aggression in males, highlighting the role of hormones. However, Bandura, Ross and Ross (1961) found that children who watched an aggressive adult model hit a Bobo doll imitated the specific behaviours they saw, suggesting aggression is learned. This shows nurture determines how aggression is expressed, even if the biological arousal (eg adrenaline release) is natural, so nature cannot fully explain aggression.

Memory also shows both influences. The case of HM shows memory is a function of the brain, as removal of his hippocampus left him unable to form new long-term memories, so brain structure is key. On the other hand, Bartlett (1932) showed that people reconstruct stories such as The War of the Ghosts to fit their own cultural schemas, so prior experience (nurture) shapes what we recall. The brain provides the capacity for memory, but nurture affects its content.

Emotional reactions can be explained by nurture. Watson and Rayner (1920) classically

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conditioned Little Albert to fear a white rat by pairing it with a loud noise, showing the environment can create emotional responses. In contrast, evolutionary explanations of attachment suggest bonding with a caregiver is innate and adaptive. Bowlby (1944) argued the need to bond is instinctive, but his research showed that the quality and consistency of the attachment determine behaviour into adulthood, so nurture is also required.

Mental health provides further evidence. Gottesman and Shields (1972) found a 58% concordance rate for schizophrenia in MZ twins, supporting genetic inheritance. However, as concordance is not 100% in genetically identical twins, environmental factors must be involved. Also, non-drug therapies such as CBT and systematic desensitisation have high success rates, suggesting that not all mental disorders have a purely biological basis in the brain.

Language is another example. Chomsky claimed humans have an innate language acquisition device (LAD) built into the brain, which explains why children everywhere acquire language quickly and in similar stages. Yet children only learn the particular language they hear around them, so the environment is still essential.

The strength of the evidence also matters. Biological evidence such as brain scans and hormone measurements is objective and scientific, giving it credibility. However, nature explanations are often reductionist, explaining behaviour through single factors such as hormones or neurotransmitters and ignoring a holistic view of the person, and they can be deterministic. Nurture evidence, such as Bandura's laboratory study, may lack ecological validity, as aggression towards a doll is not the same as real violence.

In conclusion, nature does not play a greater role than nurture overall. Nature provides the

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potential for behaviour, such as a genetic vulnerability, brain structures for memory or a capacity for language, but nurture determines whether and how that potential is expressed. The two are difficult to separate in research, and the most convincing view is an interactionist one, such as the diathesis-stress model, in which biological predispositions are triggered by environmental experiences.

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