Candidate surname

Other names

**Pearson Edexcel
Level 3 GCE**

Centre Number

Candidate Number

Friday 14 June 2019

Morning (Time: 2 hours)	Paper Reference **9PS0/03**

Psychology

**Advanced
Paper 3: 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 80.
- 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 ▶

Pearson

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.

Chi-squared distribution formula

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

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.

P 5 7 0 6 0 R R A 0 3 3 2

Mann-Whitney U test formulae

$$U_a = n_a n_b + \frac{n_a(n_a+1)}{2} - \sum R_a$$

$$U_b = n_a n_b + \frac{n_b(n_b+1)}{2} - \sum R_b$$

(U is the smaller of U_a and U_b)

Critical values for the Mann-Whitney U test

$p \leq 0.05$ (one-tailed), $p \leq 0.10$ (two-tailed)

N_a \ N_b	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
5	4	5	6	8	9	11	12	13	15	16	18	19	20	22	23	25
6	5	7	8	10	12	14	16	17	19	21	23	25	26	28	30	32
7	6	8	11	13	15	17	19	21	24	26	28	30	33	35	37	39
8	8	10	13	15	18	20	23	26	28	31	33	36	39	41	44	47
9	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54
10	11	14	17	20	24	27	31	34	37	41	44	48	51	55	58	62
11	12	16	19	23	27	31	34	38	42	46	50	54	57	61	65	69
12	13	17	21	26	30	34	38	42	47	51	55	60	64	68	72	77
13	15	19	24	28	33	37	42	47	51	56	61	65	70	75	80	84
14	16	21	26	31	36	41	46	51	56	61	66	71	77	82	87	92
15	18	23	28	33	39	44	50	55	61	66	72	77	83	88	94	100
16	19	25	30	36	42	48	54	60	65	71	77	83	89	95	101	107
17	20	26	33	39	45	51	57	64	70	77	83	89	96	102	109	115
18	22	28	35	41	48	55	61	68	75	82	88	95	102	109	116	123
19	23	30	37	44	51	58	65	72	80	87	94	101	109	116	123	130
20	25	32	39	47	54	62	69	77	84	92	100	107	115	123	130	138

N_a \ N_b	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

$p \le 0.01$ (one-tailed), $p \le 0.02$ (two-tailed)

N_a	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
5	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
6	2	3	4	6	7	8	9	11	12	13	15	16	18	19	20	22
7	3	4	6	7	9	11	12	14	16	17	19	21	23	24	26	28
8	4	6	7	9	11	13	15	17	20	22	24	26	28	30	32	34
9	5	7	9	11	14	16	18	21	23	26	28	31	33	36	38	40
10	6	8	11	13	16	19	22	24	27	30	33	36	38	41	44	47
11	7	9	12	15	18	22	25	28	31	34	37	41	44	47	50	53
12	8	11	14	17	21	24	28	31	35	38	42	46	49	53	56	60
13	9	12	16	20	23	27	31	35	39	43	47	51	55	59	63	67
14	10	13	17	22	26	30	34	38	43	47	51	56	60	65	69	73
15	11	15	19	24	28	33	37	42	47	51	56	61	66	70	75	80
16	12	16	21	26	31	36	41	46	51	56	61	66	71	76	82	87
17	13	18	23	28	33	38	44	49	55	60	66	71	77	82	88	93
18	14	19	24	30	36	41	47	53	59	65	70	76	82	88	94	100
19	15	20	26	32	38	44	50	56	63	69	75	82	88	94	101	107
20	16	22	28	34	40	47	53	60	67	73	80	87	93	100	107	114

N_a \ N_b	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

$p \le 0.025$ (one-tailed), $p \le 0.05$ (two-tailed)

N_a	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
5	2	3	5	6	7	8	9	11	12	13	14	15	17	18	19	20
6	3	5	6	8	10	11	13	14	16	17	19	21	22	24	25	27
7	5	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34
8	6	8	10	13	15	17	19	22	24	26	29	31	34	36	38	41
9	7	10	12	15	17	20	23	26	28	31	34	37	39	42	45	48
10	8	11	14	17	20	23	26	29	33	36	39	42	45	48	52	55
11	9	13	16	19	23	26	30	33	37	40	44	47	51	55	58	62
12	11	14	18	22	26	29	33	37	41	45	49	53	57	61	65	69
13	12	16	20	24	28	33	37	41	45	50	54	59	63	67	72	76
14	13	17	22	26	31	36	40	45	50	55	59	64	67	74	78	83
15	14	19	24	29	34	39	44	49	54	59	64	70	75	80	85	90
16	15	21	26	31	37	42	47	53	59	64	70	75	81	86	92	98
17	17	22	28	34	39	45	51	57	63	67	75	81	87	93	99	105
18	18	24	30	36	42	48	55	61	67	74	80	86	93	99	106	112
19	19	25	32	38	45	52	58	65	72	78	85	92	99	106	113	119
20	20	27	34	41	48	55	62	69	76	83	90	98	105	112	119	127

P 5 7 0 6 0 R R A 0 5 3 2

N_a	\	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

Column header: N_b

$p \leq 0.005$ (one-tailed), $p \leq 0.01$ (two-tailed)

N_a	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
5	0	1	1	2	3	4	5	6	7	7	8	9	10	11	12	13
6	1	2	3	4	5	6	7	9	10	11	12	13	15	16	17	18
7	1	3	4	6	7	9	10	12	13	15	16	18	19	21	22	24
8	2	4	6	7	9	11	13	15	17	18	20	22	24	26	28	30
9	3	5	7	9	11	13	16	18	20	22	24	27	29	31	33	36
10	4	6	9	11	13	16	18	21	24	26	29	31	34	37	39	42
11	5	7	10	13	16	18	21	24	27	30	33	36	39	42	45	48
12	6	9	12	15	18	21	24	27	31	34	37	41	44	47	51	54
13	7	10	13	17	20	24	27	31	34	38	42	45	49	53	56	60
14	7	11	15	18	22	26	30	34	38	42	46	50	54	58	63	67
15	8	12	16	20	24	29	33	37	42	46	51	55	60	64	69	73
16	9	13	18	22	27	31	36	41	45	50	55	60	65	70	74	79
17	10	15	19	24	29	34	39	44	49	54	60	65	70	75	81	86
18	11	16	21	26	31	37	42	47	53	58	64	70	75	81	87	92
19	12	17	22	28	33	39	45	51	56	63	69	74	81	87	93	99
20	13	18	24	30	36	42	48	54	60	67	73	79	86	92	99	105

The calculated value must be equal to or less than 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.

Answer ALL questions.

SECTION A: RESEARCH METHODS

1 Working memory training

Working memory training is where people repeatedly practise increasingly difficult working memory tasks to attempt to improve their cognitive performance.

Researchers wanted to see how working memory training affected recognition performance of a list of words. They recruited 100 participants who were allocated to either the working memory training group (Condition 1) or the control group (Condition 2).

At the beginning of the study, all participants in Condition 1 and Condition 2 were read 20 target words. The participants then had to try and recognise the 20 target words from a list of 60 words, where 40 were new words. All participants were given two minutes to recognise as many of the target words as they could.

During the next three weeks:

- Condition 1 (working memory training group) completed a session of working memory training for 90 minutes, once a week.

- Condition 2 (control group) did no working memory training.

After the three-week period, the participants then performed another memory recognition task. As before, they had to learn a list of 20 words from a list of 60 words, where 40 were new words.

(Source: adapted from Matzen et al. (2016))

(a) State a fully operationalised directional (one-tailed) experimental hypothesis for the working memory training study.

(2)

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(b) The number of words correctly recognised (out of 20) by participants was recorded as a measure of memory performance by the researchers.

State which level of measurement the number of words correctly recognised (out of 20) for each participant would be in the working memory training study.

(1)

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(c) The working memory training study used a laboratory experiment to assess the memory of the participants.

Explain **two** strengths of using a laboratory experiment for the working memory training study.

(4)

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(d) The mean results of the working memory training study are shown in **Table 1**.

Group	**Performance on memory recognition task (out of 20) at the beginning of the study**	**Performance on memory recognition task (out of 20) at the end of the study**
Condition 1 (working memory training group)	13.3	10.7
Condition 2 (control group)	11.9	12.1

Table 1

Explain **two** conclusions that could be made using the data in **Table 1**.

(4)

Conclusion 1

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Conclusion 2

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The results of the working memory training group at the end of the study are shown in **Table 2**.

Number of words recognised correctly (out of 20) at the end of the study	Frequency
0 – 5 words	10
6 – 10 words	40
11 – 15 words	30
16 – 20 words	20

Table 2

(e) (i) Draw a histogram to display the data in **Table 2**.

(3)

Title

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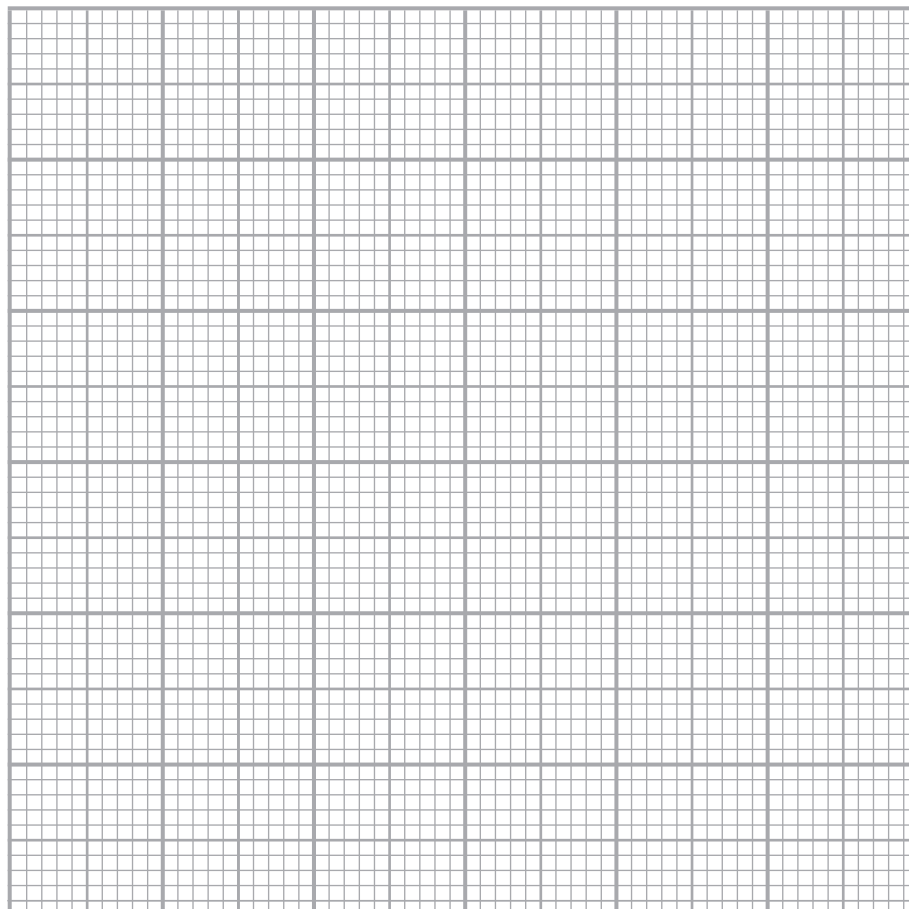
(ii) Interpret the histogram you have drawn for (e) (i).

(1)

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(Total for Question 1 = 15 marks)

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2 Job interview

Researchers wanted to investigate how long it took interviewers to make a decision to hire an employee through a job interview. The researchers wanted to see whether interviewers made an almost instant decision (in under a minute) to hire an employee, as suggested by previous research findings.

They collected data from 160 unstructured job interviews where students were hired for a job at a university careers fair. The researchers asked the interviewers to estimate how long it took them, in minutes, to make their hiring decision.

The estimated time that it took the interviewers to make a hiring decision was split into four categories:

- Under 1 minute
- 1 to 5 minutes
- 5 to 15 minutes
- More than 15 minutes.

The interviewers were fully informed about the aim of the study beforehand and gave their permission for their data to be used in a published research study.

(Source: adapted from Frieder et al. (2015))

The results of the job interview study are shown in **Table 3**.

Time taken to reach hiring decision	Percentage (%) of interviewers who reported making their hiring decision in this time period
Under 1 minute	5
1 to 5 minutes	30
5 to 15 minutes	20
More than 15 minutes	45

Table 3

(a) Calculate the ratio of those interviewers who reported making their decision in under 1 minute to those interviewers who reported making their decision in more than 15 minutes.

You must express the ratio to the lowest whole numbers.

(1)

SPACE FOR CALCULATIONS

Ratio ....

(b) The researchers also asked the interviewers who made a quick hiring decision to give some information about the factors that helped them make a quick decision.

The common themes given by the interviewers are shown in **Table 4**.

Contributing factor for quick decision in hiring an employee	Number of interviewers who reported this as a factor
Experience of interviewer	### //
Confidence of interviewer	///
Friendly pre-interview chat	### ### ###
Interview late in the day	### ###

Table 4

Analyse the data in **Table 4** to explain **one** conclusion that the researchers might draw from these results.

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(c) Explain **two** ways that subjectivity could have influenced the job interview study.

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(d) Explain **one** way the researchers could have made sure the job interview study was reliable.

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(Total for Question 2 = 9 marks)

TOTAL FOR SECTION A = 24 MARKS

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

SECTION B: REVIEW OF STUDIES

3 Monkeying around

Researchers wanted to investigate the role of reward in the behaviour of monkeys.

They gave monkeys a task where they had to learn a sequence of three coloured buttons.

The monkeys experienced one of the following conditions:

- Condition 1: For pressing the correct sequence of buttons five times in a row, a food treat was provided

- Condition 2: For pressing the correct sequence of buttons between two and four times in a row (the amount changed each time), a food treat was provided

- Condition 3: A food treat was provided every 60 seconds, provided the correct sequence of buttons was pressed at least once during this time period

- Condition 4: For pressing an incorrect sequence of buttons, a mild electric shock was given.

The number of attempted button presses (in 10 minutes) and the number of correct button sequences (in 10 minutes) were recorded by the researchers.

The mean results of the monkeying around study are shown in **Table 5**.

Condition	Mean number of attempted button presses (in 10 minutes)	Mean number of correct button sequences (in 10 minutes)
Condition 1	30	22
Condition 2	55	40
Condition 3	20	15
Condition 4	4	2

Table 5

(a) Explain **one** ethical consideration that the researchers of the monkeying around study would have had to consider when conducting their investigation.

(2)

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(b) Using research evidence, explain how operant conditioning could support the findings of the monkeying around study.

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(Total for Question 3 = 8 marks)

4 Evaluate the classic studies by Baddeley (1966b) and Watson and Rayner (1920) in terms of reductionism.

(16)

Turn over ▶

(Total for Question 4 = 16 marks)

TOTAL FOR SECTION B = 24 MARKS

SECTION C: ISSUES AND DEBATES

5 Aaondi is a country that has had the same president for 20 years. The president orders the citizens to grow specific vegetables in their gardens, reduce water consumption and minimise their disposal of non-recyclable waste. The president's orders are clearly displayed on billboards and are reinforced on television and radio every day. Aaondians have to pay a fine every time they do not follow the president's orders.

Evaluate how useful agency theory would be in explaining human behaviour such as that of the citizens of Aaondi. You must make reference to the context in your answer.

(12)

(Total for Question 5 = 12 marks)

6 Assess the role of both nature and nurture in psychology.

(20)

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(Total for Question 6 = 20 marks)

TOTAL FOR SECTION C = 32 MARKS
TOTAL FOR PAPER = 80 MARKS