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|                                                   |                      |                      |
|---------------------------------------------------|----------------------|----------------------|
| Candidate surname<br><i>StemUp Model Solution</i> |                      | Other names          |
| Centre Number                                     | Candidate Number     |                      |
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**Pearson Edexcel Level 3 GCE**

|              |                                   |
|--------------|-----------------------------------|
| Time 2 hours | Paper reference<br><b>9PS0/01</b> |
|--------------|-----------------------------------|

**Psychology**

**Advanced**

**PAPER 1: Foundations in Psychology**

|                          |             |
|--------------------------|-------------|
| Calculators may be used. | 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 90.
- 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.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ►

P70811A

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Q:1/1/1/



## 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**

$$\chi^2 = \sum \frac{(O-E)^2}{E}$$

$$df = (r - 1)(c - 1)$$

**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.

**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**

| $N_a$                                                                               | $N_b$ |    |    |    |    |    |    |    |    |    |     |     |     |     |     |     |
|-------------------------------------------------------------------------------------|-------|----|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|
|                                                                                     | 5     | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15  | 16  | 17  | 18  | 19  | 20  |
| <b><math>p \leq 0.05</math> (one-tailed), <math>p \leq 0.10</math> (two-tailed)</b> |       |    |    |    |    |    |    |    |    |    |     |     |     |     |     |     |
| <b>5</b>                                                                            | 4     | 5  | 6  | 8  | 9  | 11 | 12 | 13 | 15 | 16 | 18  | 19  | 20  | 22  | 23  | 25  |
| <b>6</b>                                                                            | 5     | 7  | 8  | 10 | 12 | 14 | 16 | 17 | 19 | 21 | 23  | 25  | 26  | 28  | 30  | 32  |
| <b>7</b>                                                                            | 6     | 8  | 11 | 13 | 15 | 17 | 19 | 21 | 24 | 26 | 28  | 30  | 33  | 35  | 37  | 39  |
| <b>8</b>                                                                            | 8     | 10 | 13 | 15 | 18 | 20 | 23 | 26 | 28 | 31 | 33  | 36  | 39  | 41  | 44  | 47  |
| <b>9</b>                                                                            | 9     | 12 | 15 | 18 | 21 | 24 | 27 | 30 | 33 | 36 | 39  | 42  | 45  | 48  | 51  | 54  |
| <b>10</b>                                                                           | 11    | 14 | 17 | 20 | 24 | 27 | 31 | 34 | 37 | 41 | 44  | 48  | 51  | 55  | 58  | 62  |
| <b>11</b>                                                                           | 12    | 16 | 19 | 23 | 27 | 31 | 34 | 38 | 42 | 46 | 50  | 54  | 57  | 61  | 65  | 69  |
| <b>12</b>                                                                           | 13    | 17 | 21 | 26 | 30 | 34 | 38 | 42 | 47 | 51 | 55  | 60  | 64  | 68  | 72  | 77  |
| <b>13</b>                                                                           | 15    | 19 | 24 | 28 | 33 | 37 | 42 | 47 | 51 | 56 | 61  | 65  | 70  | 75  | 80  | 84  |
| <b>14</b>                                                                           | 16    | 21 | 26 | 31 | 36 | 41 | 46 | 51 | 56 | 61 | 66  | 71  | 77  | 82  | 87  | 92  |
| <b>15</b>                                                                           | 18    | 23 | 28 | 33 | 39 | 44 | 50 | 55 | 61 | 66 | 72  | 77  | 83  | 88  | 94  | 100 |
| <b>16</b>                                                                           | 19    | 25 | 30 | 36 | 42 | 48 | 54 | 60 | 65 | 71 | 77  | 83  | 89  | 95  | 101 | 107 |
| <b>17</b>                                                                           | 20    | 26 | 33 | 39 | 45 | 51 | 57 | 64 | 70 | 77 | 83  | 89  | 96  | 102 | 109 | 115 |
| <b>18</b>                                                                           | 22    | 28 | 35 | 41 | 48 | 55 | 61 | 68 | 75 | 82 | 88  | 95  | 102 | 109 | 116 | 123 |
| <b>19</b>                                                                           | 23    | 30 | 37 | 44 | 51 | 58 | 65 | 72 | 80 | 87 | 94  | 101 | 109 | 116 | 123 | 130 |
| <b>20</b>                                                                           | 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  |
| <b><math>p \leq 0.01</math> (one-tailed), <math>p \leq 0.02</math> (two-tailed)</b> |       |    |    |    |    |    |    |    |    |    |    |    |    |     |     |     |
| <b>5</b>                                                                            | 1     | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14  | 15  | 16  |
| <b>6</b>                                                                            | 2     | 3  | 4  | 6  | 7  | 8  | 9  | 11 | 12 | 13 | 15 | 16 | 18 | 19  | 20  | 22  |
| <b>7</b>                                                                            | 3     | 4  | 6  | 7  | 9  | 11 | 12 | 14 | 16 | 17 | 19 | 21 | 23 | 24  | 26  | 28  |
| <b>8</b>                                                                            | 4     | 6  | 7  | 9  | 11 | 13 | 15 | 17 | 20 | 22 | 24 | 26 | 28 | 30  | 32  | 34  |
| <b>9</b>                                                                            | 5     | 7  | 9  | 11 | 14 | 16 | 18 | 21 | 23 | 26 | 28 | 31 | 33 | 36  | 38  | 40  |
| <b>10</b>                                                                           | 6     | 8  | 11 | 13 | 16 | 19 | 22 | 24 | 27 | 30 | 33 | 36 | 38 | 41  | 44  | 47  |
| <b>11</b>                                                                           | 7     | 9  | 12 | 15 | 18 | 22 | 25 | 28 | 31 | 34 | 37 | 41 | 44 | 47  | 50  | 53  |
| <b>12</b>                                                                           | 8     | 11 | 14 | 17 | 21 | 24 | 28 | 31 | 35 | 38 | 42 | 46 | 49 | 53  | 56  | 60  |
| <b>13</b>                                                                           | 9     | 12 | 16 | 20 | 23 | 27 | 31 | 35 | 39 | 43 | 47 | 51 | 55 | 59  | 63  | 67  |
| <b>14</b>                                                                           | 10    | 13 | 17 | 22 | 26 | 30 | 34 | 38 | 43 | 47 | 51 | 56 | 60 | 65  | 69  | 73  |
| <b>15</b>                                                                           | 11    | 15 | 19 | 24 | 28 | 33 | 37 | 42 | 47 | 51 | 56 | 61 | 66 | 70  | 75  | 80  |
| <b>16</b>                                                                           | 12    | 16 | 21 | 26 | 31 | 36 | 41 | 46 | 51 | 56 | 61 | 66 | 71 | 76  | 82  | 87  |
| <b>17</b>                                                                           | 13    | 18 | 23 | 28 | 33 | 38 | 44 | 49 | 55 | 60 | 66 | 71 | 77 | 82  | 88  | 93  |
| <b>18</b>                                                                           | 14    | 19 | 24 | 30 | 36 | 41 | 47 | 53 | 59 | 65 | 70 | 76 | 82 | 88  | 94  | 100 |
| <b>19</b>                                                                           | 15    | 20 | 26 | 32 | 38 | 44 | 50 | 56 | 63 | 69 | 75 | 82 | 88 | 94  | 101 | 107 |
| <b>20</b>                                                                           | 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  |
| <b><math>p \leq 0.025</math> (one-tailed), <math>p \leq 0.05</math> (two-tailed)</b> |       |    |    |    |    |    |    |    |    |    |    |    |     |     |     |     |
| <b>5</b>                                                                             | 2     | 3  | 5  | 6  | 7  | 8  | 9  | 11 | 12 | 13 | 14 | 15 | 17  | 18  | 19  | 20  |
| <b>6</b>                                                                             | 3     | 5  | 6  | 8  | 10 | 11 | 13 | 14 | 16 | 17 | 19 | 21 | 22  | 24  | 25  | 27  |
| <b>7</b>                                                                             | 5     | 6  | 8  | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 26 | 28  | 30  | 32  | 34  |
| <b>8</b>                                                                             | 6     | 8  | 10 | 13 | 15 | 17 | 19 | 22 | 24 | 26 | 29 | 31 | 34  | 36  | 38  | 41  |
| <b>9</b>                                                                             | 7     | 10 | 12 | 15 | 17 | 20 | 23 | 26 | 28 | 31 | 34 | 37 | 39  | 42  | 45  | 48  |
| <b>10</b>                                                                            | 8     | 11 | 14 | 17 | 20 | 23 | 26 | 29 | 33 | 36 | 39 | 42 | 45  | 48  | 52  | 55  |
| <b>11</b>                                                                            | 9     | 13 | 16 | 19 | 23 | 26 | 30 | 33 | 37 | 40 | 44 | 47 | 51  | 55  | 58  | 62  |
| <b>12</b>                                                                            | 11    | 14 | 18 | 22 | 26 | 29 | 33 | 37 | 41 | 45 | 49 | 53 | 57  | 61  | 65  | 69  |
| <b>13</b>                                                                            | 12    | 16 | 20 | 24 | 28 | 33 | 37 | 41 | 45 | 50 | 54 | 59 | 63  | 67  | 72  | 76  |
| <b>14</b>                                                                            | 13    | 17 | 22 | 26 | 31 | 36 | 40 | 45 | 50 | 55 | 59 | 64 | 67  | 74  | 78  | 83  |
| <b>15</b>                                                                            | 14    | 19 | 24 | 29 | 34 | 39 | 44 | 49 | 54 | 59 | 64 | 70 | 75  | 80  | 85  | 90  |
| <b>16</b>                                                                            | 15    | 21 | 26 | 31 | 37 | 42 | 47 | 53 | 59 | 64 | 70 | 75 | 81  | 86  | 92  | 98  |
| <b>17</b>                                                                            | 17    | 22 | 28 | 34 | 39 | 45 | 51 | 57 | 63 | 67 | 75 | 81 | 87  | 93  | 99  | 105 |
| <b>18</b>                                                                            | 18    | 24 | 30 | 36 | 42 | 48 | 55 | 61 | 67 | 74 | 80 | 86 | 93  | 99  | 106 | 112 |
| <b>19</b>                                                                            | 19    | 25 | 32 | 38 | 45 | 52 | 58 | 65 | 72 | 78 | 85 | 92 | 99  | 106 | 113 | 119 |
| <b>20</b>                                                                            | 20    | 27 | 34 | 41 | 48 | 55 | 62 | 69 | 76 | 83 | 90 | 98 | 105 | 112 | 119 | 127 |

| $N_a$                                                                                | $N_b$ |    |    |    |    |    |    |    |    |    |    |    |    |    |    |     |
|--------------------------------------------------------------------------------------|-------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|
|                                                                                      | 5     | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20  |
| <b><math>p \leq 0.005</math> (one-tailed), <math>p \leq 0.01</math> (two-tailed)</b> |       |    |    |    |    |    |    |    |    |    |    |    |    |    |    |     |
| <b>5</b>                                                                             | 0     | 1  | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 7  | 8  | 9  | 10 | 11 | 12 | 13  |
| <b>6</b>                                                                             | 1     | 2  | 3  | 4  | 5  | 6  | 7  | 9  | 10 | 11 | 12 | 13 | 15 | 16 | 17 | 18  |
| <b>7</b>                                                                             | 1     | 3  | 4  | 6  | 7  | 9  | 10 | 12 | 13 | 15 | 16 | 18 | 19 | 21 | 22 | 24  |
| <b>8</b>                                                                             | 2     | 4  | 6  | 7  | 9  | 11 | 13 | 15 | 17 | 18 | 20 | 22 | 24 | 26 | 28 | 30  |
| <b>9</b>                                                                             | 3     | 5  | 7  | 9  | 11 | 13 | 16 | 18 | 20 | 22 | 24 | 27 | 29 | 31 | 33 | 36  |
| <b>10</b>                                                                            | 4     | 6  | 9  | 11 | 13 | 16 | 18 | 21 | 24 | 26 | 29 | 31 | 34 | 37 | 39 | 42  |
| <b>11</b>                                                                            | 5     | 7  | 10 | 13 | 16 | 18 | 21 | 24 | 27 | 30 | 33 | 36 | 39 | 42 | 45 | 48  |
| <b>12</b>                                                                            | 6     | 9  | 12 | 15 | 18 | 21 | 24 | 27 | 31 | 34 | 37 | 41 | 44 | 47 | 51 | 54  |
| <b>13</b>                                                                            | 7     | 10 | 13 | 17 | 20 | 24 | 27 | 31 | 34 | 38 | 42 | 45 | 49 | 53 | 56 | 60  |
| <b>14</b>                                                                            | 7     | 11 | 15 | 18 | 22 | 26 | 30 | 34 | 38 | 42 | 46 | 50 | 54 | 58 | 63 | 67  |
| <b>15</b>                                                                            | 8     | 12 | 16 | 20 | 24 | 29 | 33 | 37 | 42 | 46 | 51 | 55 | 60 | 64 | 69 | 73  |
| <b>16</b>                                                                            | 9     | 13 | 18 | 22 | 27 | 31 | 36 | 41 | 45 | 50 | 55 | 60 | 65 | 70 | 74 | 79  |
| <b>17</b>                                                                            | 10    | 15 | 19 | 24 | 29 | 34 | 39 | 44 | 49 | 54 | 60 | 65 | 70 | 75 | 81 | 86  |
| <b>18</b>                                                                            | 11    | 16 | 21 | 26 | 31 | 37 | 42 | 47 | 53 | 58 | 64 | 70 | 75 | 81 | 87 | 92  |
| <b>19</b>                                                                            | 12    | 17 | 22 | 28 | 33 | 39 | 45 | 51 | 56 | 63 | 69 | 74 | 81 | 87 | 93 | 99  |
| <b>20</b>                                                                            | 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

| <i>n</i> | Level of significance for a one-tailed test |       |      |
|----------|---------------------------------------------|-------|------|
|          | 0.05                                        | 0.025 | 0.01 |
|          | Level of significance for a two-tailed test |       |      |
|          | 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: Social Psychology**

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

- (a) Describe how you gathered qualitative data in your social psychology practical investigation.

(2)

*Our practical was a questionnaire on in-group favouritism towards students from different groups in college. We included open-ended questions, such as 'How do you feel about students who take different courses from you?', so respondents could write detailed opinions in their own words about students from other groups.*

- (b) Describe how you gathered quantitative data in your social psychology practical investigation.

(2)

*We used closed statements with a Likert scale from 0 (strongly disagree) to 10 (strongly agree), e.g. 'Students on my course are more hardworking than students on other courses'. Respondents rated how far they agreed, and we added the ratings to give each student a numerical in-group favouritism score.*



- (c) Explain **one** improvement you could make to your social psychology practical investigation.

(2)

*We could have conducted a pilot study, testing our questions about in-group favouritism on a few students before giving the questionnaire to our sample. This would increase the validity of the findings, because we could check that the students accurately understood every question and remove any ambiguous or leading statements.*

(Total for Question 1 = 6 marks)



- 2 Belinda investigated whether personality had an impact on levels of obedience at work. She selected 10 senior managers from different companies, five with high scores for authoritarian personality traits and five with low scores.

The participants were asked whether they would dismiss an unpopular employee based on false allegations if the company director told them to.

The results of the investigation are shown in **Table 1**.

| Authoritarian personality score | Would dismiss the employee | Would not dismiss the employee |
|---------------------------------|----------------------------|--------------------------------|
| High                            | 4                          | 1                              |
| Low                             | 1                          | 4                              |

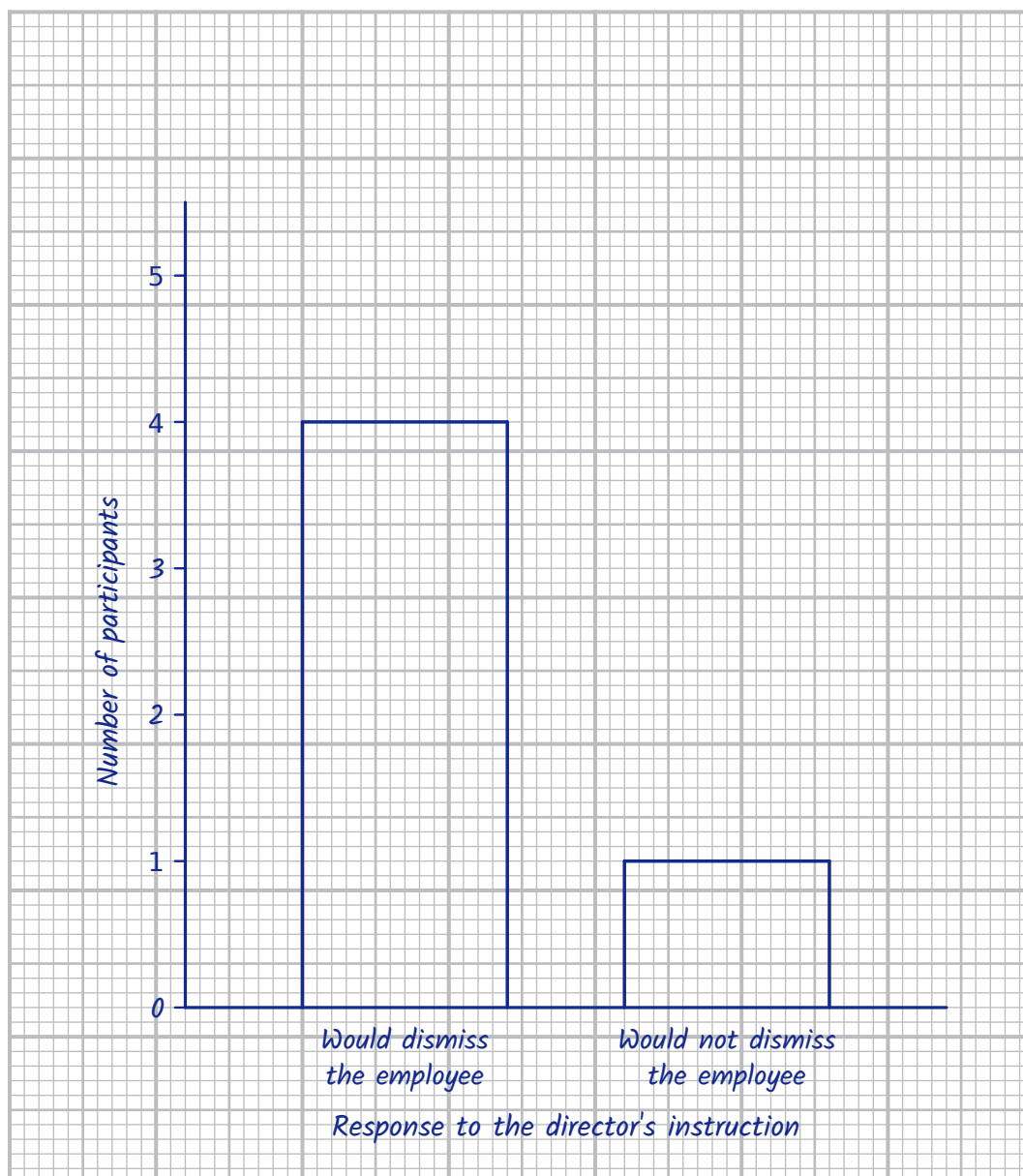
**Table 1**



Draw a bar chart to show the number of participants with high scores for authoritarian personality who would and would not dismiss the employee.

(3)

Title *A bar chart to show the number of participants with high scores for authoritarian personality who would or would not dismiss the employee*



(Total for Question 2 = 3 marks)

### 3 Assess how far culture can influence prejudice.

(8)

Culture is the shared values, ideas, customs and behavioural norms of a group of people or a society. Individualistic cultures, such as the USA, emphasise the individual within the group, while collectivist cultures stress the importance of the whole group as a collective. Prejudice is a negative attitude towards a group; intergroup prejudice is directed at different cultural groups, while intragroup prejudice is held within a culture about its own subcultural groups.

Culture may influence prejudice because collectivist cultures place great value on loyalty to the in-group. Al-Zahrani and Kaplowitz (1993) found that Saudis, a collectivist culture, self-reported more negative out-group bias than Americans, an individualistic culture, which suggests that the type of culture a person grows up in affects how prejudiced they are.

Multiculturalism, where the diversity of all cultures is accepted and no group is seen as superior, also shows the power of culture. Guimond et al. (2013) studied cultural norms and government policy in multicultural societies and found that anti-Muslim attitudes were lower where pro-diversity policy was high, so prejudice can be reduced when a culture promotes diversity.

However, prejudice may not be caused by culture alone. Adorno et al.'s (1950) authoritarian personality suggests that individuals with rigid, conventional traits, formed by harsh parenting, are hostile to minority groups whatever their culture, so prejudice may be an individual difference. Situational factors also matter: negative attitudes within a culture towards the unemployed may not be intragroup cultural values but a result of conflict over access to material resources, as realistic conflict theory (Sherif, 1966) predicts.

In conclusion, culture influences prejudice to a large extent, as shown by cross-cultural



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differences and the effect of multicultural policy, but personality and competition for resources also play a role, so culture is an important influence rather than the only cause.

(Total for Question 3 = 8 marks)

TOTAL FOR SECTION A = 17 MARKS



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**SECTION B: Cognitive Psychology**

4 Lei investigated the effect of word length on short-term memory capacity. She used a volunteer sampling technique to gather 20 participants. Lei allocated her participants randomly to one of two conditions.

- Condition A: participants are given 14 monosyllabic words (words with only one syllable such as cat, tub, or red) to learn in 30 seconds.
- Condition B: participants are given 14 polysyllabic words (words with more than one syllable such as elephant, happiness, or carpet) to learn in 30 seconds.

Lei recorded the number of words recalled correctly by participants.

- (a) State the fully operationalised independent variable (IV) and dependent variable (DV) in Lei's investigation.

(2)

Independent variable (IV)

*Whether the 14 words to be learned are monosyllabic (one syllable) or polysyllabic (more than one syllable).*

Dependent variable (DV)

*The number of words (out of 14) recalled correctly after 30 seconds of learning.*

(b) Complete **Table 2** and calculate the Mann-Whitney U for the results of Lei's investigation.

(4)

| Condition A: monosyllabic words    |              | Condition B: polysyllabic words    |             |
|------------------------------------|--------------|------------------------------------|-------------|
| Number of words recalled correctly | Rank         | Number of words recalled correctly | Rank        |
| 9                                  | 16.5         | 5                                  | 5           |
| 8                                  | 13.5         | 7                                  | 11          |
| 9                                  | 16.5         | 6                                  | 8           |
| 7                                  | 11           | 5                                  | 5           |
| 10                                 | 19           | 6                                  | 8           |
| 9                                  | 16.5         | 9                                  | 16.5        |
| 7                                  | 11           | 3                                  | 2           |
| 6                                  | 8            | 5                                  | 5           |
| 8                                  | 13.5         | 4                                  | 3           |
| 11                                 | 20           | 2                                  | 1           |
| <b>Total</b>                       | <b>145.5</b> | <b>Total</b>                       | <b>64.5</b> |

**Table 2**

**SPACE FOR CALCULATIONS**

$$U_a = n_a n_b + n_a(n_a + 1)/2 - R_a = (10 \times 10) + (10 \times 11)/2 - 145.5$$

$$= 100 + 55 - 145.5 = 9.5$$

$$U_b = n_a n_b + n_b(n_b + 1)/2 - R_b = (10 \times 10) + (10 \times 11)/2 - 64.5$$

$$= 100 + 55 - 64.5 = 90.5$$

*U is the smaller value, so  $U = 9.5$*

$$U_a = 9.5$$

$$U_b = 90.5$$

$$U = 9.5$$



- (c) Using the Mann-Whitney U value that you calculated for 4(b), determine whether Lei's data were significant at  $p \leq 0.05$  for a directional (one-tailed) hypothesis.

(1)

*The calculated U value of 9.5 is less than the critical value of 27 ( $N_a = 10$ ,  $N_b = 10$ ,  $p \leq 0.05$  one-tailed), so Lei's results are significant.*

(Total for Question 4 = 7 marks)



5 Describe the working memory model (Baddeley and Hitch, 1974).

The working memory model replaces the unitary short-term store of the multi-store model with an active system of several components.

The central executive controls the subsystems and allocates attention to them; it has limited capacity and is involved in tasks such as problem solving and decision making.

The visuospatial sketchpad is a subsystem that processes visual input such as images, shapes and colour, and spatial information such as direction and location.

The phonological loop processes auditory information: the phonological store (inner ear) temporarily holds sounds, and the articulatory control process (inner voice) subvocalises words to rehearse them.

(Total for Question 5 = 3 marks)



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6 In your studies of cognitive psychology, you will have learned about one of the following contemporary studies in detail:

- Schmolck et al. (2002)
- Steyvers and Hemmer (2012)
- Sebastián and Hernández-Gil (2012).

Evaluate your chosen contemporary study.

(8)

Chosen study *Sebastián and Hernández-Gil (2012)*

*Sebastián and Hernández-Gil (2012) investigated the development of digit span, a measure of the capacity of the phonological loop, in a Spanish population. The sample was 570 children aged between 5 and 17 years from a range of public and private schools in Madrid, who were divided into five age groups. Each child was tested individually; they were read increasing sequences of digits and had to recall them in the correct order, and digit span was recorded as the maximum number of digits recalled in the correct order without error. Digit span increased with age, but it was significantly shorter in the Spanish population than in Anglo-Saxon (English-speaking) samples, probably because of the word length effect, as Spanish digits contain more syllables and take longer to articulate.*

*A strength is the large sample of 570 children from different types of schools, which makes the findings more representative of Spanish children's development than a small sample would be.*

*The use of cross-sectional age groups was also a strength, because it allowed the researchers to track the development of digit span across childhood without the extended duration and participant attrition of a longitudinal study.*

*The procedure was standardised, with every child read the digits independently in the same way and span scored by the same rule, so the study can be replicated. This means verbal digit span can be tested across other cultures, helping to understand*



cross-cultural developmental and individual differences in phonological processing in working memory.

However, the sample is only representative of Spanish-speaking children in the Madrid region, so the findings cannot be generalised beyond this population to speakers of other languages, especially as the word length effect depends on the language spoken.

In addition, recalling digit sequences is an artificial task with limited task validity, as children are unlikely to learn random sequences of numbers in their day-to-day experiences, so it may not reflect how they use working memory in everyday life.

Cross-sectional designs also compare different children in each age group, so individual differences between the groups, such as schooling, may explain some of the age differences rather than development.

Overall, the study gives reliable, quantitative evidence about how phonological capacity develops and supports the word length effect, but its findings are limited to Spanish speakers and an artificial task, so they should be generalised with caution.



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(Total for Question 6 = 8 marks)

**TOTAL FOR SECTION B = 18 MARKS**



**SECTION C: Biological Psychology**

- 7 Tabitha wanted to investigate whether there is a difference in brain activity when people are exposed to aggressive stimuli and non-aggressive stimuli. She decided to gather a sample of female participants aged between 20 years old and 30 years old.

(a) Describe how Tabitha could use a volunteer sampling technique to gather participants for her investigation.

(2)

*Tabitha could post an advert on social media and a university noticeboard asking for female participants aged between 20 and 30 years old to take part in research about brain activity. She would give her contact details so that women who are willing to take part can respond and volunteer themselves.*

(b) Tabitha decides to use a PET brain-scanning technique for her investigation.

Describe how Tabitha could use a PET brain-scanning technique for her investigation.

(3)

*Tabitha would inject each participant with a radioactive tracer (e.g. radioactive glucose) before the scan, so that the PET scanner can detect which areas of the brain are most active in response to the stimuli.*

*She would first take a measure of each woman's resting brain activity before any aggressive or non-aggressive stimuli are presented, to give a baseline.*

*She would then show each participant aggressive film scenes, such as a violent car chase, and non-aggressive scenes, such as a calm walk in a park, and compare the brain activity (e.g. in the amygdala) recorded in response to each scene.*

- (c) Explain **one** strength of Tabitha using a PET brain-scanning technique for her investigation.

(2)

*A PET scan gives Tabitha an objective image of each participant's brain activity while she watches the aggressive and non-aggressive scenes, which can be checked by other researchers. This increases the reliability of her findings about aggression, as several researchers can interpret the same scans and achieve consistency.*

- (d) Explain **one** improvement that could be made to Tabitha's choice of participants.

(2)

*Tabitha could use a more representative sample by including males as well as females and a wider age range, e.g. 18 to 75 years old. This would improve the generalisability of her findings about brain activity and aggression to a wider target population of both genders and different generations of people.*

**(Total for Question 7 = 9 marks)**



- 8 Jinal wants to find out about recreational drug use and early childhood experiences. She has decided to focus on nicotine as the recreational drug.

She intends to see how often people use nicotine and find out about any negative life experiences they had experienced during early childhood.

Jinal believes that the more negative life experiences a person has, the more nicotine they will use.

Discuss how Jinal could use a correlational research method for her investigation.

You must make reference to the context in your answer.

(8)

Correlational research measures two co-variables to see whether there is a relationship between them, without manipulating either. Jinal would measure two co-variables in the same participants: the amount of nicotine each person uses and the number of negative life experiences they had in early childhood, so each participant is measured on both co-variables.

Jinal could measure nicotine use through cigarette smoking or vaping, for example by giving a questionnaire asking how many cigarettes each person smokes per day. She could ask the same participants to count the negative childhood experiences they had at different ages, e.g. a checklist of events such as parental divorce, bereavement or illness before the age of 10, giving a score for each person.

The results could be plotted on a scatter diagram with the number of negative childhood experiences on one axis and cigarettes smoked per day on the other. Jinal predicts a positive correlation, where as one variable increases the other also increases, so people with more negative childhood experiences would be expected to smoke more cigarettes per day.

As the data are at least ordinal, she could use Spearman's rho to find the correlation coefficient and decide whether the relationship is significant by comparing it with the critical value. The coefficient shows the strength of the relationship, from strong to weak. If the correlation between nicotine and negative childhood experiences is weak,

Jinal could then investigate other factors involved in nicotine use, such as peer pressure or stress.

Using a correlation is appropriate for Jinal, because it would be unethical to manipulate negative childhood experiences or to make people use nicotine, so naturally occurring co-variables must be measured instead. It also allows her to study a large sample quickly using questionnaires.

However, even a strong positive correlation would not show that negative childhood experiences cause nicotine use, as a third variable, such as poverty or parental smoking, could affect both co-variables. In addition, self-reported memories of early childhood and cigarette use may be inaccurate or affected by social desirability, so Jinal's data may lack validity.



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(Total for Question 8 = 8 marks)

**TOTAL FOR SECTION C = 17 MARKS**



### SECTION D: Learning Theories

- 9 Ruhee receives reward points at school when she behaves extremely well, helps other students, and does extra research for her homework tasks. When she has 25 points, she can get a free snack at break time from the canteen. Ruhee always works hard to receive the points.

Using operant conditioning, describe why Ruhee works hard to receive the points.

*The reward points are positive reinforcement: Ruhee receives a desirable consequence when she behaves well, helps others or does extra homework research, so she repeats these behaviours. The points are a secondary reinforcer that she accumulates to exchange for a primary reinforcer, a free snack at break time.*

(Total for Question 9 = 2 marks)

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- 10 Victor went to a local restaurant for a meal with friends. He ate pasta with a fish sauce but shortly afterwards he felt very poorly and was sick.

Two weeks later Victor walked past the restaurant and could smell the same fish sauce, which made him feel sick, so he hurried past. When his friends invited him to the restaurant again, Victor said he did not want to go.

- (a) Using classical conditioning, describe why Victor may no longer want to go to the restaurant.

(4)

*Before conditioning, the pasta in fish sauce (which made Victor ill) was the unconditioned stimulus (UCS) that produced the unconditioned response (UCR) of feeling sick.*

*The restaurant and the smell of the fish sauce were originally neutral stimuli (NS) that produced no instinctive reaction from Victor.*

*When the UCS was paired with the NS of the restaurant and its smell during his meal, the restaurant became a conditioned stimulus (CS).*

*Now the restaurant and the smell trigger Victor's conditioned response (CR) of feeling sick, so he hurries past it and no longer wants to go there with his friends.*

(b) Explain **two** weaknesses of classical conditioning as an explanation of human behaviour.

(4)

1 *Classical conditioning cannot explain behaviours such as a phobia where the person has never encountered the stimulus for pairing to take place, so it cannot be applied to a wide range of learned behaviour, unlike social learning theory, which explains learning through observing the actions of others.*

2 *Much of the evidence comes from animals, e.g. Pavlov's dogs salivating in confinement, which may not be representative of how human associations form, so when extrapolated it may not fully explain how humans are conditioned, as it ignores human cognition and free will.*

(Total for Question 10 = 8 marks)



**11** Evaluate Bandura's (1965) Bobo doll experiment with vicarious reinforcement.

(8)

Bandura (1965) investigated whether vicarious reinforcement affects the imitation of aggression. The participants were 33 boys and 33 girls aged between 42 and 71 months from the Stanford University Nursery School. They were randomly assigned to three groups, each with 11 boys and 11 girls. Each child watched a 5-minute film of an adult male model behaving aggressively towards a Bobo doll, e.g. hitting it with a mallet, after which the model was either rewarded, punished or given no consequences. Each child was then taken to a different room and observed playing with the Bobo doll for 10 minutes by two observers. Children who saw the model punished imitated fewer aggressive acts than the other groups, but when all children were offered rewards to copy the model, the differences disappeared, showing that learning had taken place in every group.

A strength is that the participants were an equal gender mix, which prevents androcentric bias, so the findings are more generalisable to children of both genders.

The standardised film clip showing the vicarious reinforcement gave internal consistency in exposure to the role model in each condition, increasing the reliability of the findings.

Using two observers also allowed inter-observer reliability to be checked.

However, randomisation meant the groups were not matched for prior aggression levels, so one group may have had higher aggression before exposure to the role model, reducing internal validity.

In addition, a 10-minute observation may not reflect how vicarious reinforcement influences children's learned behaviour in the long term, limiting the application of the findings about learned aggression. A Bobo doll is also designed to be hit and does not hit back, so the study has low ecological validity, and children may have shown demand characteristics.

Overall, the experiment provides well-controlled, reliable evidence that vicarious reinforcement affects the performance, but not the learning, of aggression, although its short-term, artificial nature means the conclusions should be applied to real life with caution.

(Total for Question 11 = 8 marks)

**TOTAL FOR SECTION D = 18 MARKS**



## SECTION E: Issues and Debates

12 Assess how far learning theories can be considered reductionist.

(8)

Reductionism means explaining behaviour by looking at smaller, isolated parts of it when studying and measuring it, whereas holism looks at the whole person, considering the influences of experience, culture and socialisation on behaviour.

Learning theories can be considered reductionist because classical conditioning reduces learning to stimulus-response associations. Watson and Rayner (1920) focussed only on pairing a white rat with a loud noise to explain Little Albert's emotional fear response. As they only studied stimulus-response associations, they ignored possible other factors in Albert's reaction, such as his temperament, so some features of learning theory are reductionist.

Operant conditioning is also reductionist, as it reduces learning to simple rewards and punishments, suggesting that a desired consequence is sufficient to explain learned behaviour. Learning theories are underpinned by empiricism and scientific testing, so complex human actions are reduced to isolated variables, such as Skinner's (1948) study of pigeons pecking for food. This may ignore the whole picture, such as thoughts, emotions and social context.

However, reductionism makes behaviour easier to test scientifically, and it has led to useful therapies such as systematic desensitisation and token economies.

Furthermore, not all learning theories are reductionist. Social learning theory is more holistic, as it includes cognitive processes such as attention, retention, reproduction and motivation, and the role of models that individuals identify with. Bandura (1961) showed that children imitated aggression depending on the gender of the model, so social context is considered.

In conclusion, classical and operant conditioning are largely reductionist, but social

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learning theory takes a more holistic approach by including cognition and social factors,  
so learning theories are reductionist to a large but not complete extent.

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(Total for Question 12 = 8 marks)



13 To what extent does nurture influence cognitive and biological psychology?

(12)

Nurture refers to the environment, interactions and experiences that a person has over their lifetime, whereas nature refers to the internal, innate aspects a person is born with, such as their genes and physiological attributes.

In cognitive psychology, nurture has a strong influence on memory. Bartlett's (1932) theory of reconstructive memory highlights how we use prior experiences and schemas that are part of our individual personal history and culture; in the 'War of the Ghosts' study, participants changed the story to fit their own cultural schemas. This shows memory is highly influenced by nurture.

Amnesia can also be caused by environmental influences. The case of HM shows that memory is a function of the brain, as removal of his hippocampi left him unable to form new long-term memories, but the cause was an environmental process, his surgery, so nature and nurture are linked. However, nurture is difficult to isolate when studying memory, as schemas and brain structures interact, so its influence may never be completely measurable.

In biological psychology, brain functioning can be influenced by nurture such as drug taking. Olds and Milner (1954) found that stimulating neural pathways in rats resulted in the experience of pleasure; while the neural response is an innate process, it is drug intake, an environmental behaviour, that triggers this reward pathway excitation, so nurture plays a role.

The environment can also influence the brain before birth, through exposure to toxins in the womb. Wu et al. (2011) claimed that cannabis use during pregnancy interferes with pre-natal brain maturation, leading to deficits in higher-order cognitive functions, which shows nurture can influence both biological and cognitive psychology simultaneously.

On the other hand, biological psychology often emphasises nature. Raine et al. (1997)

found differences in the prefrontal cortex of murderers pleading not guilty by reason of insanity (NGRIs), suggesting violence results from brain functioning, so nurture may not have a strong influence. Twin studies also show genetic influences on behaviour.

However, Raine et al. did not rule out environmental causes such as childhood abuse, which can itself affect brain development.

In conclusion, nurture strongly influences cognitive psychology through experience and schemas, and it also influences biological psychology through drugs, toxins and damage.

However, both approaches show that innate brain structures matter too, so an interactionist view is best: nurture influences both to a large extent, but always by acting on a biological system.



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(Total for Question 13 = 12 marks)

**TOTAL FOR SECTION E = 20 MARKS**

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