Research Methods Q's

1.

Um, erm and ah

Disfluencies are disruptions in the flow of spoken language, including stuttering and hesitations, such as 'um', 'erm' and 'ah'. These often indicate emotions, such as feelings of anxiety and distress. A psychologist wants to investigate this further by conducting a correlation study to see if there is a relationship between the disfluencies a person makes and how anxious they feel while making a public speech.

(a) Write a null hypothesis for this study. **(3)**

(b) Explain how you would conduct a correlation study to investigate if there is a relationship between the disfluencies a person makes and how anxious they feel while making a public speech. Justify your decisions as part of your explanation. **(15)**

You must refer to:

- how you would use self-selected sampling to obtain participants for the study
- how you would operationalise the variable 'disfluencies'
- how you would operationalise the variable 'anxiety'
- the control of one extraneous variable. You should use your own experience of practical activities to inform your response.

(c) Outline one strength and one weakness of conducting this study using the correlation technique. **(6)**

(d) Outline one weakness of using self-selected sampling in this study. **(3)**

2.

Slipping up can be good

Psychologists have investigated many ways that could improve how children learn. However, most of these have concentrated on studying the effect of different teaching styles, rather than focusing on the child themself. A psychologist taking a more child-focused approach wants to study if being more relaxed affects concentration levels. They want to investigate if young children can concentrate better when wearing comfortable slippers on their feet compared to wearing shoes. The study is to be conducted in one large primary school with 240 children on the register.

(a) Write a one-tailed alternative hypothesis for this study. **(3)**

(b) Explain how you would conduct a study using the laboratory experimental method to investigate if wearing slippers affects a child's ability to concentrate. Justify your decisions as part of your explanation. **(15)**

You must refer to:

- how you would use random sampling to obtain 30 participants for the study
- the experimental design you would use in this study
- how you would operationalise the dependent variable to obtain quantitative data
- the control of one extraneous variable. You should use your own experience of practical activities to inform your response.

(c) Outline one strength of the use of open questions in this study. **(3)**

(d) Outline one strength of conducting this study as a laboratory experiment. **(3)**

(e) Explain two factors that could affect the external validity of this study. **(6)**

3.

Sounds familiar

Memory can be influenced by many different things. However, there are techniques which we can use to improve our memory. One such technique involves reading aloud the information we want to remember. A psychologist investigated this by giving participants a set of 30 words to try and remember. Six participants studied the words in silence. A different group of six participants were instructed to read the words aloud when trying to learn them. The data collected is presented in the table below.

Number of words correctly recalled (max. 30)					
Reading aloud group			Silent study group		
Participant	Score	Rank	Participant	Score	Rank
a	24	9.5	a	14	2
b	27	11	b	16	3
c	21	6	c	12	1
d	20	5	d	29	12
e	23	8	e	17	4
f	22	7	f	24	9.5
$n_1 = 6$			$n_2 = 6$		

(a) Outline one conclusion that can be made from the raw data presented in this table. **(3)**

(b) Give one reason why the Mann-Whitney U test is the appropriate inferential test to use to analyse the data from this study. **(2)**

(c) Before using the formula for the Mann-Whitney U test, the data obtained must be ranked. In the results, two participants have the same score of 24. Explain how this is dealt with when ranking the data. **(3)**

(d) Calculate the U value for the Mann-Whitney U test for the data collected in this study. Show your workings. You may use the formula presented below. U = the smaller of U1 and U2. **(5)**

Where U_1 is ...

$$U_1 = R_1 - \frac{n_1(n_1 + 1)}{2}$$

and U_2 is ...

$$U_2 = R_2 - \frac{n_2(n_2 + 1)}{2}$$

(e) How is the critical value used to determine if the findings are statistically significant? **(1)**

4.

Steps to increase bin use

Research suggests that, when trying to encourage people to change their behaviour in some way, 'telling people what to do' is not always effective and a more subtle approach may be better ('nudge theory'). To investigate this, a psychologist conducted an observation study monitoring people's use of two different types of litter bin situated close to each other in the pedestrian area of one large town centre – one that had steps printed on the pavement leading up to it and another without the steps. Recordings were made each time any item was deposited in the bin throughout a continuous period from 10am to 2pm. The data on how many people used the bins is presented in the table below.

Table showing the number of times each bin was used by males and females

	Males	**Females**
Bin with steps	9	14
Bin without steps	5	12

(a) Calculate the percentage of people who used the bin with steps leading up to it. Show your workings and present your finding to two significant figures. **(3)**

(b) Outline two conclusions that can be obtained from the data collected in this study. **(6)**

(c) The psychologist used the Chi-square test to analyse the data from this study. Give one reason why this would be the appropriate non-parametric inferential test to use. **(2)**

(d) Calculate the degrees of freedom for use with the Chi-square test in this study. Show your workings. **(2)**

(e) Using the extract from the table of critical values presented below, what is the critical value for use with the Chi-square test in this study at the 5% level of probability? **(1)**

	Probability level					
df	**0.5**	**0.10**	**0.05**	**0.02**	**0.01**	**0.001**
1	0.455	2.706	3.841	5.412	6.635	10.827
2	1.386	4.605	5.991	7.824	9.210	13.815
3	2.366	6.251	7.815	9.837	11.345	16.268
4	3.357	7.779	9.488	11.668	13.277	18.465
5	4.351	9.236	11.070	13.388	15.086	20.517

(f) The psychologist obtained a calculated value of 0.4058 after analysing the data with the Chi-square test. Write a significance statement presenting this finding showing if the results are significant at the 5% level of probability or not. **(3)**

(g) What does the analysis from the Chi-square test inform us regarding the use of the two different types of bin from this study? **(3)**

5.

(a) If the variance is 36, what is the standard deviation? **(1)**

A 3

B 6

C 18

D 1296

(b) What type of data is used to calculate the Chi-square test? **(1)**

A interval

B nominal

C ordinal

D ordinal and interval

(c) Which is the simplest form of the ratio 12:8? **(1)**

A 2:3

B 3:1

C 3:2

D 6:4

(d) What decimal is represented by the fraction 1/25? **(1)**

A 0.25

B 0.04

C 0.02

D 0.05

(e) Which inferential statistical test simply involves counting the number of times the values in one condition are higher or lower than those in the other? **(1)**

A Chi-square

B Binomial Sign

C Spearman's Rho

D Wilcoxon Signed Ranks

(f) What type of question or scale allows respondents to express how much they agree or disagree with a statement? **(1)**

A leading

B likert

C open

D semantic differential