



Urmston Grammar Sixth Form - Transition
Work
Psychology Department

Maths in Psychology



Transition Work

MISS MATTHEWS



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Introduction:

Hello everyone, I will be teaching you the topic Research Methods and as part of that topic we will cover some maths content. In Psychology about 10% of the marks available are maths skills – in terms of overall marks this equates to about a grade. The Maths skills are an equivalent level to that of Higher GCSE Maths/Stats– this booklet is designed to help you become more familiar with some of the mathematical content that you will need to know for the course.

1) Standard form:

Sometimes psychologists will come across very large or very small numbers. Because of the nature of very large numbers, it is often necessary to simplify these using shorthand, this is known as standard form.

Write in standard form

- a) 70×10^5
- b) 40×10^5
- c) 0.8×10^6
- d) 0.4×10^8
- e) 0.3×10^8
- f) 0.7×10^6
- g) 150×10^4
- h) 480×10^2
- i) 0.044×10^5
- j) 0.073×10^7



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2) Rounding to decimal places

Round to 1 decimal place

- a) 0.374
- b) 0.798
- c) 0.393
- d) 0.584

Round to 2 decimal places

- e) 0.136
- f) 0.138
- g) 0.464

Round to three decimal places

- h) 29.9757
- i) 46.2317
- j) 79.0919

Round the numbers in the table.

Number	1 decimal place	2 decimal places
0.181	0.2	k)
8.928	l)	m)
0.4923	n)	o)
45.7053	p)	q)



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3) Rounding to significant figures

Round to 1 significant figure

- a) 15
- b) 983
- c) 0.0097
- d) 1.9

Round to 2 significant figures

- e) 0.133
- f) 0.0403
- g) 90054

Round to 3 significant figures

- h) 0.6402
- i) 160.7

Round the numbers in the table.

Number	1 significant figure	2 significant figures	3 significant figures
4.915	5	j)	k)
5253	l)	m)	n)
197.196	o)	p)	q)
0.4063	r)	s)	t)



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4) Using percentages, fractions and decimals

Convert to a decimal

- a) $\frac{1}{2}$
- b) $\frac{3}{40}$
- c) 65%
- d) 153%
- e) 51.6%
- f) 41%

Convert to a fraction, reduced to simplest form

- g) 0.2
- h) 0.62
- i) 90%

Convert to a percentage

- j) 0.87
- k) 2.11
- l) 0.017
- m) 2.91
- n) $\frac{9}{10}$
- o) $\frac{2}{5}$

Convert to a fraction:

- p) 67%



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Sample Question

Look at the pie chart below What fraction of divorced adults had a type B attachment?

A pie chart to show the distribution of infant attachment types of divorced adults



- A. $1/5$
- B. $3/10$
- C. $2/5$
- D. $1/2$

5) Ratios

Simplify

- a) 5 : 10
- b) 15 : 5
- c) 5 : 50
- d) 52 : 56
- e) 52 : 12
- f) 52 : 56
- g) 18 : 22 : 12
- h) 16 : 52 : 48
- i) 42 : 15 : 24



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Sample question

The findings from the study are presented below:

A table to show the number of participants who perceived the ambiguous image as a monkey or as a teapot from both conditions: image presented with animals and image presented with kitchen items.

	Perceived as a monkey	Perceived as a teapot
Presented with animals	15	10
Presented with kitchen items	5	12

- a) Identify and simplify the ratio of the number of participants who perceived a monkey in the first condition and the number who perceived a monkey in the second condition.
- b) Identify and simplify the ratio of the number of participants who perceived a teapot in the first condition and the number who perceived a teapot in the second condition.

6) Measures of Central tendency.

- a) Find the mean of the data given below.

6 6 1 2 1 8

mean =

- b) Find the mean of the given data below, rounding your answer to the nearest whole number.

11 12 28 17 21 24 27

mean =



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c) Find the mean of the given data below, rounding your answer to 1 decimal place

11.9 4.8 16.4 18.2 12.3 3.6 2.8 25.6 10.8 0.6

mean =

d) Find the median of the data given below.

15 20 10 15 14 23 14

median =

e) Find the median of the data given below.

20 13 10 20

median =

f) Find the median of the data given below.

23.1 11.1 13.1 30.9 13.5 18.1 14.1 0.3

median =

g) Find the median of the data given below

26.3 18.6 8.8 23.2 29.3 20.9 1.5 0.2

median =

h) Find the mode of the data given below.

1 4 6 2 10 11 12 8 10

mode =

i) Find the mode of the data given below.

9 2 4 3 6

mode =

j) Find the mode of the data given below.

8 6 5 3 3 6



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mode =

Sample question

A Psychologist investigated whether recall was affected by the way the material was presented. One group was given pictures to recall, the other group were given words.

Number of Pictures Recalled	Number of Words Recalled
7	4
5	6
10	7
8	5
7	6
5	5
7	9
9	3

Calculate the measures of central tendency for the following set of raw

data. **Condition 1 (Numbers of pictures recalled)** a) Mode =

b) Median =

c) Mean =

Condition 2 (Number of words recalled)

d) Mode =

e) Median =

f) Mean =

7) Displaying Data

Graphs, charts and tables are all used to describe data and make it easier for the data to be understood.

There are a number of graphs and charts that you need to be able to draw and interpret, they include:

- Tally chart (frequency table)
- Line graph
- Pie chart
- Bar chart
- Histogram
- Scatter diagram

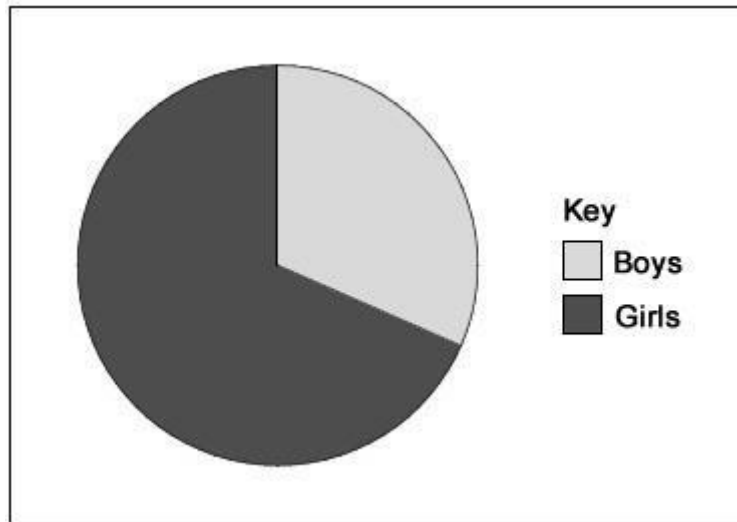
Sample questions



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A researcher is investigating gender differences in classification of attachment. They conduct a study using Ainsworth's 'Strange Situation'. The results are shown in the figure below.

The proportions of boys and girls who are classified as securely attached



- (a) Using the information in the figure, estimate the percentage of **boys** and **girls** that are securely attached.

Boys =

Girls =

(2)

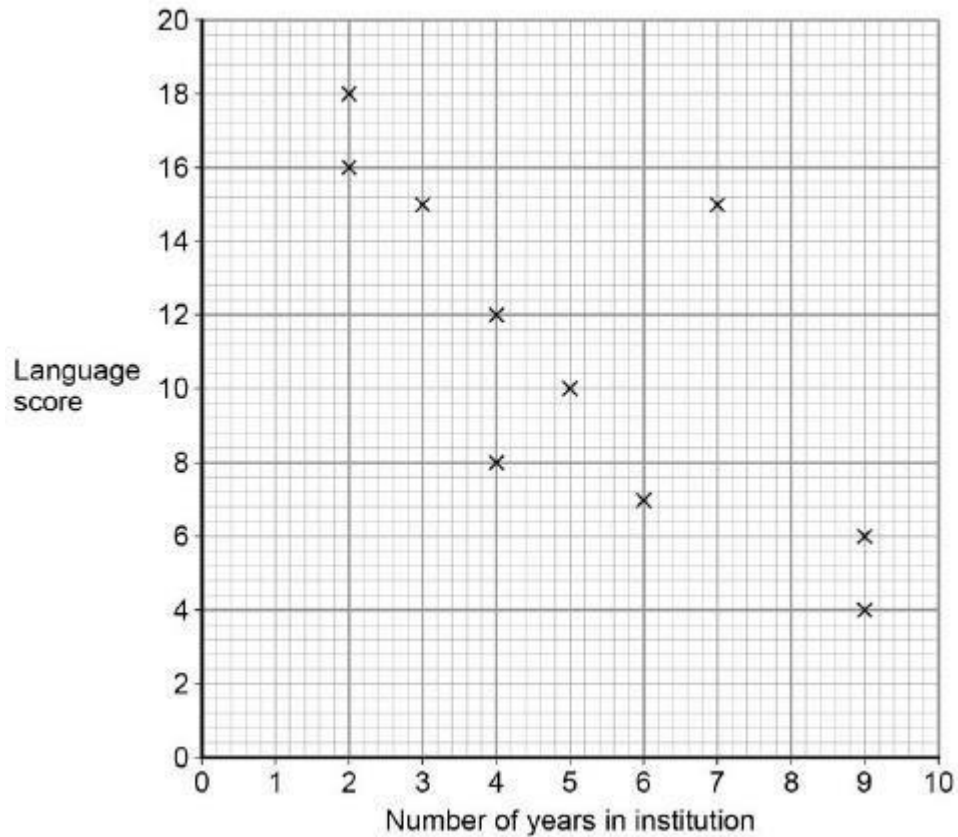
- (b) In a different study, 150 children were classified as securely attached. Of these, 40% were boys. How many of the 150 children were girls? Show your workings.

(2)

A psychologist thinks that there may be a link between language ability and institutionalisation. She tests the language skills of 8-year-old institutionalised children. A high score on the test indicates good language ability and a low score on the test indicates poor language ability. She also records the number of years that each child has been institutionalised. The findings are shown in the figure below.



The relationship between time spent in institution and language score



(c) Identify the type of graphical display in the figure.

- A Histogram
- B Bar graph
- C Line graph
- D Scattergram

(1)

(d) How many children took part in the study?

(1)

(e) What does the pattern of data in the figure suggest about language ability and institutionalisation?

(2)



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(f) Calculate the range for the language scores. Show your workings.

(2)



Task Two: Psychological Research

delivered at least 300V shocks (also lethal) to another citizen.

Conclusions: Americans are no less 'evil' than Germans and in fact humans simply

“Psychology is the scientific study of the human mind and behaviour.”

Psychology is about more than just “thinking about” why we behave the ways we do. We have to conduct RESEARCH to back up our claims and find EVIDENCE to support it. Below are summaries of 5 famous psychological research studies and a series of questions for you to answer after each. If you are interested or want further information, there are great YouTube videos of these studies you can watch.

Milgram 1963

Aim: to investigate if American citizens would be obedient even if it meant harming others, or if Germans in World War II were just 'evil'.

Method: a laboratory experiment

Sample: 40 American males between 20 and 50 years of age from the New Haven area.

Procedure: Participants were told they were taking part in a learning & memory experiment. They took the role of 'teacher', giving what they thought were painful shocks to an actor who they believed was a fellow participant. In truth, there were no shocks. The fake shocks increased from 15 volts (a bit of a painful shock) up to 450 volts (which would kill you).

Findings: 65% of Americans delivered 450V shocks (a lethal shock) to another citizen simply because they were told to do so whenever the actor pretended to get an answer wrong. 100% of the Americans

are compelled to obey authority, even if it may cause harm to other humans.

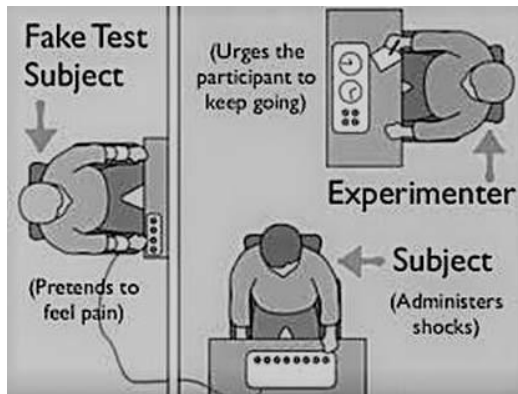
Questions:

- (i) Do you think this is a good study? Are the findings useful? Why/why not?
- (ii) Are the findings convincing?
- (iii) Is the sample sufficient for the study or is it small/biased?

<https://www.youtube.com/watch?v=y6GxluljT3w>



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Questions:

- (i) Why might it be a good thing that this study was conducted in a real subway instead of a lab like Milgram's research?
- (ii) Is the sample of this study good?
- (iii) Why is it helpful/useful to know the conclusions this study found?

Piliavin, Rodin & Piliavin 1969

Aim: to investigate if people will help out someone who is suffering on a train, depending on their race, age, how many people are around and if the suffering person is drunk/old.

Method: a field experiment

Sample: around 4500 passengers on the New York subway.

Procedure: Experimenters got an actor to fake collapsing on the New York subway, and the number of people who helped and the time taken to help were recorded by secret (covert) observers. The race of the participants was also recorded. They changed the race of the actor, their gender and also whether or not they were pretending to be ill and collapsed or drunk and relaxed.

Findings: 79% of victims (who were actors) received help from participants, but this number fell to 50% for the "drunk" victim. There was a race effect: black people were more likely to help black victims and white people were more likely to help white victims. The more people that were present in the train, the more likely it was that the passenger would receive help.

Conclusions: Ill people are more likely to receive help than drunk ones, women are unlikely to intervene and help out men, there is a race effect in helping behaviour, and the more people are present the more likely people are to help. This study showed an example of helping behaviour in a real setting.



<https://www.youtube.com/watch?v=28Rm-fjGM6w>



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- (iii) What are some of the ethical issues with the way the study was conducted?

Loftus & Palmer 1974

Aim: to investigate if leading questions can actually change people's memories of an event they witnessed.

Method: laboratory experiment

Sample: 195 students at American universities

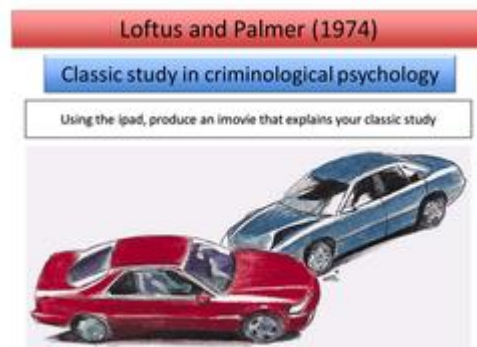
Procedure: in study one, 45 students watched films of car crashes. They were then asked to estimate the car's speed in response to a question. In the question, the verb used changed. The question was: "about how far were the cars going when the cars **hit** each other?" but the word hit could be changed to smashed, contacted, bumped or collided. In study two, 150 students went through the same process but later were asked if they had seen any broken glass at the scene (but there was no broken glass – it was a misdirect).

Findings: In study one, the 'contacted' condition led people to estimate the car was going at around 32mph but in the 'smashed' condition they estimated it was going at around 41mph. In study two, people who had the 'smashed' condition were more than twice as likely to report seeing broken glass at the scene, even though there was none.

Conclusion: the findings suggest that the way questions are worded can either change the memories of the participants or they indicate to participants that they should remember them in a certain way.

Questions:

- (i) Why would this be useful for police interviewers? How might they change their questions?
- (ii) What is the problem with the fact that the car crashes were seen on videos? However – why did they HAVE to be videos and not real life?



<https://www.youtube.com/watch?v=gCswq5JDTaw>



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violent/horror movies and
playing violent/horror video
games?

- (iii) Is this a good study? What are
some of the issues with the
study?

Bandura, Ross & Ross 1961 & 1963

Aim: to investigate the extent to which
children will repeat aggression that they've
observed an adult doing on a doll.

Method: laboratory experiment

Sample: 72 children

Procedure: One group of children saw an
adult attack an inflatable doll (called a
Bobo doll) in a play room. Another group
of children saw the adult behave in a
friendly way with the doll. All the children
were then deliberately frustrated (by being
taken to a room with toys but not being
allowed to play with them) and then were
left in the room with the Bobo doll and
observed.

Findings: Children who watched the
aggressive adult also repeated highly
aggressive behaviour. The children who
had not seen the aggressive adult
however were not aggressive with the
Bobo doll. Boys were more likely to imitate
an aggressive man and girls were more
likely to imitate an aggressive woman.
Some children even used hammers and
fake guns on the doll, if they had seen the
adults doing the same. If they had not
observed an adult doing this, they would
not do this.

Conclusions: Children are highly likely to
imitate adult violence when given the
opportunity to do so.

Questions:

- (i) What does this study suggest
about serious cases like the case of
Jamie Bulger?
- (ii) What are the implications of this
for letting children watch

[https://www.youtube.com/watch?v=TB
y1-Fkiqk0](https://www.youtube.com/watch?v=TB
y1-Fkiqk0)

Casey et al 2011

Aim: to test whether delaying rewards
in childhood also leads to delaying
rewards in adulthood

Method: a longitudinal natural
experiment

Sample: 135 individuals completing a
task at age 4 and again in their thirties.

Procedure: At age 4, a group of
children were asked if they would have
one cookie now or wait and get two
cookies later. Their responses were
recorded. They also conducted brain
scans at the same time and found that
one area of the brain (the inferior
frontal gyrus) was associated with
impulse control. In their thirties, they
had to complete a questionnaire
asking about their behaviour such as
their gambling behaviour.

Findings: Participants who took the
cookie 'now' (low impulse control) at
age 4 also showed low impulse control
in their thirties; this was related to low
activity in the inferior frontal gyrus.

Participants who waited for two
cookies (high impulse control) at age 4
also showed high impulse control their
thirties; this was related to high activity
in the inferior frontal gyrus.

Conclusion: The ability to have impulse
control and to resist temptation differs
between individuals but is likely to be
lifelong; it also seems to be a



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biological thing over which individuals have little say.

Questions:

- (i) Do you agree with the findings that impulse control seems to be biological?
- (ii) Why might this be a questionable conclusion- think for example about rapists/serial killers...
- (iii) What does this show about the nature Versus nurture debate
- (iv) What are the potential strengths/limitations of this study – do you think it is a good piece of research? Why or why not?

Who might you choose to study?
Why would they be a good sample?

What do you expect to find (or if you actually DO the study, what DID you find)?

Type this up as a 'Research Design' which should be approximately one typed A4 page.

Task Three: Designing Research

Now that you've had a bit of an introduction to what psychology is all about and the all-important research focus of psychology, I want you to design your own research you will conduct on the issue given to you below. You do not HAVE to conduct the study (although you could if you wanted), but you do have to DESIGN the research. Your research question is as follows:

"Is there a relationship between how much time someone spends outside and happiness levels?"

Make sure to include the following information:

Why is this area of interest to psychologists? What use could the findings be?

How would you go about researching it? Be detailed.