SUMMER TRANSITION PACK

AS/ALEVEL PSYCHOLOGY

Year 12
Summer
Induction pack

Southam College- Social Sciences Department- Psychology teachers:

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The Structure of the Course

There is no coursework in Psychology

The AS Year

Paper 1 – PSY1- INTRODUCTORY TOPICS IN PSYCHOLOGY
Social Influence, Memory and Attachment
1 hour 30 minutes exam, 72 marks, 50% of the total AS
Structured questions using: multiple choice, short answer and extended writing (up to 12 marks), totaling 24 marks.

Paper 2 – PSY2- PSYCHOLOGY IN CONTEXT
Approaches in Psychology, Clinical Psychology and Mental Health and Research Methods
1 hour 30 minutes exam, 72 marks, 50% of the total AS
Structured questions using: multiple choice, short answer and extended writing (up to 12 marks), totaling 24 marks.

The Full A Level

PAPER 1 – PSY1- INTRODUCTORY TOPICS IN PSYCHOLOGY
Social Influence, Memory, Attachment and Clinical Psychology and Mental Health
2 hour exam, 96 marks, 33.3% of the total A Level
Structured questions using: multiple choice, short answer and extended writing (up to 16 marks), totaling 24 marks.

PAPER 2 – PSY2- PSYCHOLOGY IN CONTEXT
Approaches in Psychology, Biopsychology and Research Methods
2 hour exam, 96 marks, 33.3% of the total A Level
Structured questions using: multiple choice, short answer and extended writing (up to 16 marks), totaling 24 marks.

PAPER 3– PSY3- ISSUES AND OPTIONS IN PSYCHOLOGY
Issues and Debates,
Topic- Schizophrenia
Topic- Aggression
Topic- Relationships
2 hour exam, 96 marks, 33.3% of the total A Level
Structured questions using: multiple choice, short answer and extended writing (up to 16 marks), totaling 24 marks.

100% Exams

Level 6 needed in Mathematics, English & Science

Linear Rules: AS exams DO NOT contribute to final A' level grade

Materials:

You will be given topic booklets throughout the course each year with key information, tasks to take part in and the basic structure of what you need to know. You will also have exercise books which you will use every lesson and an assessment/FAR folder where all assessed work is stored once marked and responded to. These will be used every lesson and so it is vital that you bring these to all of your lessons. Any replacements for lost or misplaced booklets will be charged. In addition, it is essential that students have the following equipment:

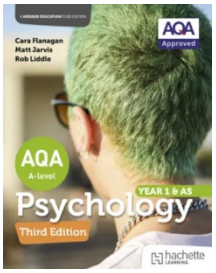
- One folder exclusively for psychology (even if this is kept at home)
- A set of dividers to keep topics separated
- lined paper pads as none is provided by the department unless it is for assessed essays
- Pens, pencils, ruler, calculator- study equipment.

We also strongly recommend that you have the following:

- Coloured pens for consolidation & essay planning
- Highlighter pens for reading and annotating articles- we use highlighters regularly!
- **At least one course** textbook which you will need to purchase for year 1 Psychology – Our chosen book is the Green Haired girl book by Hachette Learning. This will need to be brought to each of your lessons.
-
- N.B. There is no one perfect book for psychology but these are the 'top three choices'. Students should not feel obliged to buy more. One book only is needed (funding support can be available on discussion with the Sixth Form team).

NEW EDITION OF OUR TEXTBOOK- Third EDITION- This one

- **The chosen book for use during the course-**
  AQA Psychology for A Level Year 1 & AS
  Student Book: 2nd Edition
  Cara Flanagan (author), **Matt Jarvis** (author),**Rob Liddle** (author)
  Look out for discount codes before purchasing!



- " The Complete Companions: AQA Psychology Year 1 and AS Student Book (Sixth Edition) 2025 "Mike Cardwell (Author), A good all round book HOWEVER we will provide photocopied pages to support you.

Other Optional Costs- stretch and challenge resources:

1) *Magazine:*

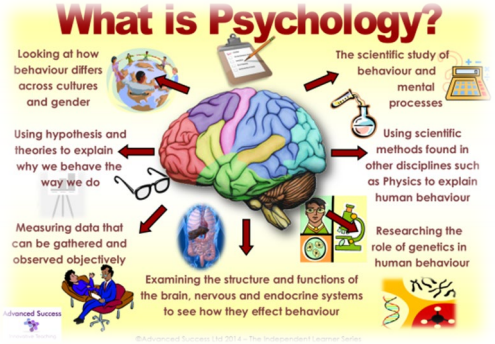
You can purchase a yearly subscription to the Psychology Review, which has articles for students at A Level standard on research in Psychology, linked to not only your specification but all Psychology A Levels. This gives greater depth for some topics, and breadth of knowledge beyond the constraints of the specification to moving towards Psychology at University. It is a good thing to write about on a UCAS application for any social science. You get four magazines throughout the year. You do not need to purchase this though.

2) *Student Membership to the British Psychological Society-* **Student membership** costs around £25 per annum if you are not earning a taxable income. You subscribe for this yourself and the benefits of Student membership of the Society include the below. Again- you do not need to purchase this but if considering to study Psychology at University it may be of some use :

- **The Psychologist** magazine every month.
- **PsychTalk**, the quarterly magazine with a careers focus from the Society's Student Member Group.
- **The recognition** of belonging to a professional body, the opportunity to get involved, and the Society's support at the start of your career.
- **Membership** of the Society's Student Members Group.

Psychology is about…

Psychology has been defined as the science of mind and behaviour. Essentially, psychology is all about people. We are all amateur psychologists, every time we try and work out why someone acted the way they did or try to predict how someone might behave or react. Psychology tries to find answers to some of these questions by investigating them in a more scientific manner.



If you would like a fuller understanding of both yourself and others, psychology is the subject for you!

Psychology is a subject where there are **no definite answers** rather it tends to focus on various alternative approaches and schools of thought. Therefore the most important skills you can develop is to be able to look at different options, theories and research studies and to judge how appropriate each one is to explaining the behaviour you are looking at.

To do this you will need to be able to:

- **Read** different research studies and theories.
- **Reflect** on you past experiences and **share** these in a whole class setting. However- no opinions are used in our work, only official research!
- **Evaluate** how well they explain the behaviour you are looking at.
- **Interpret** findings of research both in terms numerical and written data.
- Carry out simple **numerical analysis** of presented material.
- **Research** psychological phenomena for yourself using a variety of methods.
- **Speak out** about your experiences, thoughts and opinions.
- Be prepared to **experience** psychological phenomena though practical demonstrations.
- Be an **active participant** in the classroom
- Be able to retain LOTS and LOTS of information! It is a content heavy subject. But absolutely worth it!

You lessons will involve:

- Debating ideas
- Reading articles
- Writing essays
- Lots of content!
- Tests of knowledge
- Mock- PPE exams
- Independent research
- Demonstrations
- Reflecting
- Making mistakes
- Being human!

Psychology can lead to specific careers such as Clinical, Educational and Forensic Psychologists, counselling and therapy, but it is also a useful qualification to have if you are thinking of any career that involves dealing with people (almost everything!). An understanding of psychological procedures and principles would also be useful in careers such as teaching, health service related occupations, law (including police) and social work. If you are interested in Psychology specific careers as a starting point, take a look here! https://www.bps.org.uk/public/become-psychologist/career-options-psychology

THE FOLLOWING PAGES WILL EXPLAIN YOUR SUMMER PROJECT WORK WHICH IS COMPULSORY- PLEASE TYPE ALL OF YOUR ANSWERS TO THE TASKS ON A WORD DOCUMENT.

Be ready to hand in and be tested on this during the first week, second lesson back to school after the summer holidays. Enjoy!

Sixth Form
The Department of Social Sciences

The compulsory summer project tasks to be completed for Psychology will now follow on these next pages. You will be tested on all elements of the topics included during a Head Start test once you start Sixth Form. Please use the photocopy pages of the textbook to complete these tasks.

PLEASE TYPE ALL OF YOUR ANSWERS TO THE TASKS ON A WORD DOCUMENT.

PSYCHOLOGY SUMMER PROJECT

TOPIC AREA 1: SOCIAL INFLUENCE

Topic 1 Social influence

Task 1: See the photocopies of the textbook. Read and answer the following questions. Remember to use a computer for your work as you are likely to need to improve this at a later date. Type out the question and answers to the following below:

a. Define conformity (3 marks)
b. Explain what is meant by compliance (3 marks)
c. Explain what is meant by internalisation (3 marks)

Topic 1 Social Influence

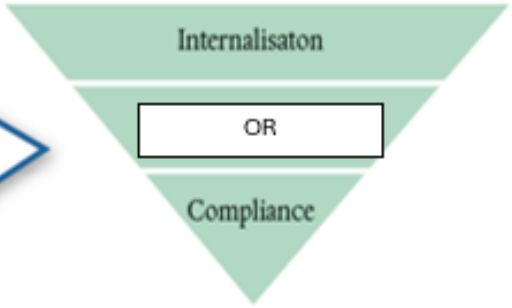
Task 2: After completing your reading, complete the application questions on the sheet on the following page (7 marks in total). Fill in your Reponses to the worksheet in the spaces provided or you can simply type the answer onto your word document.

CHAPTER 1: SOCIAL INFLUENCE
CONFORMITY: TYPES AND EXPLANATIONS
16–17

Compliance or Internalisation

1.2

Do you remember the definitions of each of these terms? Check that you could define each term in an exam!



Now look at the examples below and decide which type of conformity it is and enter your answer next to the illustration.

		Compliance or Internalisation
Lewis is eating alone at a Chinese restaurant. Although he finds eating with chopsticks rather tedious and inconvenient, he uses them because he feels too awkward to ask for a fork.		
Harsa puts some money in a charity box even though she doesn't particularly agree with the cause because she feels uncomfortable walking past the collector in the local small supermarket.		
Len slows down to 30 mph as soon as he reaches that speed zone because he believes it is wrong to drive faster than that in a built-up area.		
Jack is on a solo visit to London for the day. At a pedestrian crossing everyone suddenly surges across as soon as there's a gap in the traffic even though the lights are red. Jack follows, feeling uncomfortable but too embarrassed to be the only one not to cross.		

PSYCHOLOGY SUMMER PROJECT
TOPIC AREA 2: MEMORY

Topic 2, Task 1: Read through the following research study and answer the questions. Please type up the answers to these- ensure you write out the questions also. See the additional resource (cat book) AND green haired girl textbook photocopies for the full reading on this.

Loftus and Palmer (1974) The Effects of Leading Questions on Memory

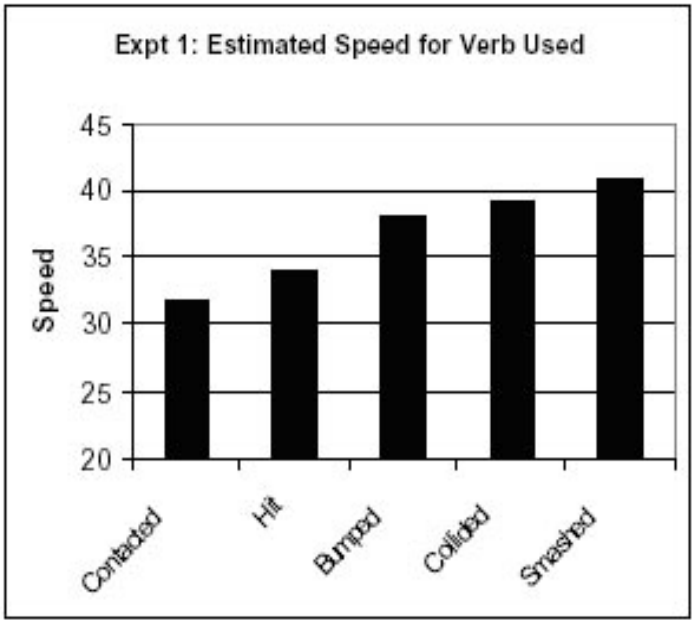
Loftus and Palmer wanted to test their hypothesis that the language used in eyewitness testimony can alter memory. They aimed to show that leading questions could distort eyewitness testimony as the account would become distorted by cues provided in the question.

To test this Loftus and Palmer (1974) asked people to estimate the speed of cars using different forms of questions. Estimating vehicle speed is something people are generally poor at and so they may be more open to suggestion.

Forty-five American students formed an opportunity sample. This was a laboratory experiment with five conditions, only one of which was experienced by each participant (an independent measures design).

Participants were shown slides of a car accident involving a number of cars and asked to describe what had happened as if they were eyewitnesses. They were then asked specific questions, including the question "About how fast were the cars going when they (hit/smashed/collided/bumped/contacted) each other. A week after the participants saw the slides they were asked "Did you see any broken glass?" There was no broken glass shown in the slides.

The estimated speed was affected by the verb used. The verb implied information about the speed, which systematically affected the participants' memory of the accident. Participants who were asked the "smashed" question thought the cars were going faster than those who were asked the "hit" question. The participants in the "smashed" condition reported the highest speeds, followed by "collided", "bumped", "hit", and "contacted" in descending order. When people were asked a week after viewing the film whether they saw any broken glass at the scene (there was none), people in the smashed group were more likely to say yes. Therefore, a leading question that encouraged them to remember the vehicles going faster also encouraged them to remember that they saw non-existent broken glass. The question appears to have changed their memory of what they saw.



This research suggests that memory is easily distorted by questioning techniques and information acquired after the event can merge with original memory causing inaccurate recall. The addition of false details to a memory of an event is referred to as conflabulation. This has important implications for the questions used in police interviews of eyewitnesses.

Small questions:

a. What was the aim of Loftus and Palmer's research?
[This should be one sentence]

b. Describe how Loftus and Palmer conducted their research? Consider the Aim, Procedure
[This should be no more than 100 words]

c. Why might only using university students in the research be a problem?
[This should be no more than 30 words]

d. What are the key findings from the research study?
[This should be no more than 30 words]

e. Conclusion- What does this research suggest about leading questions and memories for events?
[This should be no more than 30 words]

f. What implications might these findings have for police interviews?
[This should be no more than 30 words

g. Evaluate this study by explaining why the artificial tasks in this study might be a problem

[This should be no more than 30 words)

Topic 2 Memory

Task 2: Now please ensure you fully learn a **second study- AO1 Knowledge and AO3 Evaluation.**

Write up the Aims, Procedures, Findings, Conclusions for Loftus & Palmer experiment two (this is on the ADDITIONAL photocopy resource/print screen at the end of the booklet- Cat book)

Be as creative as you wish in terms of presentation of this. We also need to consider evaluation. We attempt to write this in PEE format. We will work on this writing style once you start the course. Please read the evaluation for this study from the textbook page and also include this in your handout.

Guidance:

Aim = what was it the psychologists set out to find.

Procedure = what did the psychologist do in their research (Step by step).

Findings = what did they find from their research, specific results.

Conclusion = what did they summarise from the research

PSYCHOLOGY SUMMER PROJECT
TOPIC AREA 3: ATTACHMENT

Use the attached resources (textbook photocopy pages) to help you.

Topic 3 Attachment

Task 1: On paper/typed document please complete the following:

1). Define attachment (2 marks)

2.) According to Maccoby (1980) there are four key behaviours of attachment. What are these four characteristics?

3.) Describe the different attachment types namely (3 marks each)

a) Secure attachment.

b) Insecure Resistant.

c) Insecure Avoidant.

Topic 3 Attachment

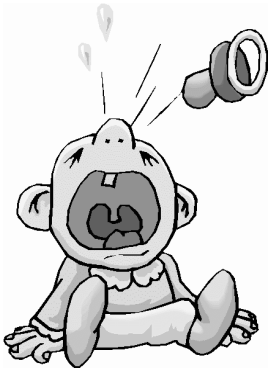
Task 2:

Describe Ainsworth and Bells (1970) Strange Situation study which investigated individual differences in attachment:

Task – Watch the strange situation technique/study on You tube.

Task – Read about the strange situation study using AS Psychology textbook pages and websites (Simply Psychology).

Task- Draw a comic strip/ step by step instruction guides to illustrate the Strange Situation Procedure i.e. the steps/stages of the study. (on paper and attach) You can do this by hand! Or you can do via the computer as images if you prefer – your choice on this one, be as creative as you wish.



PSYCHOLOGY SUMMER PROJECT
TOPIC AREA 4: RESEARCH METHODS

Topic 4 Research Methods

Task 1:

1. **Create a word document and complete a glossary of key terminology** for this topic of research methods. It is more important than you understand the term than you have the exact wording of the definition right at this stage. I would suggest to do this on an A3 sized document but A4 is fine. Use the green haired girl Psychology textbook (online book or photocopies).

Quantitative data

Qualitative data

Experimental method

Laboratory Experiment

Field experiment

Natural Experiment

Quasi Experiment

Aim

Hypothesis

Variables

Independent variable

Dependent variable

Operationalisation

Randomisation

Standardisation

Experimental design

Independent groups Design

Repeated Measures Design

Matched Pairs design

Counterbalancing

Ethical issues

Observation

Self report technique

Questionnaire

Correlation

Positive correlation

Negative correlation

Zero correlation

Descriptive statistics

Statistical testing

Population

Sample

Sampling methods

Topic 4 Task 2: Read the research methods topic pages below 'data handling and analysis' section of the specification and make basic reduction notes (you could present as a a table if you wish as a suggestion or continuous prose document) from your reading, types up on a word document- this knowledge will be included in the head start test. AO1 KNOWLEDGE, AO3 EVALUATION

- Data analysis- types of data (Quantitative, Qualitative, Primary, Secondary and meta analyses)- AO1 and AO3– pages 192-193
- Data analysis- descriptive statistics – Measure of central tendency- (mean, median and mode) pages 194 AO1 and AO3
- Data analysis- descriptive statistics – Measure of dispersion (standard deviation and the range) page 195 AO1 and AO3
- Presentation of data- tables and graphs (table, bar charts, histograms, scattergrams)
- Mathematical content- page 198/199

Please bring this booklet with you along with your printed completed tasks for the first lesson of Psychology.

Have a lovely summer and we look forward to welcoming you to your Psychology course in September!

Best of luck for results day!

Mrs Campbell-Birch and Ms Pitts.

APPENDIX- RESOURCES/READING IN ORDER TO COMPLETE THE SUMMER TASKS.

SOCIAL INFLUENCE- CONFORMITY

THE SPECIFICATION SAYS...

Types of conformity: internalisation, identification and compliance.

Explanations for conformity: informational social influence and normative social influence.

We all like to think that we know our own minds, that we make our own decisions and can tell when someone is trying to manipulate us. In short, we like to think we act *independently*. But is it possible that this is just an illusion? Psychologists believe that we are all subject to the forces of *social influence*. Many of our everyday decisions are the result of pressures to conform to the opinions and behaviours of other people.

KEY TERMS

Conformity – A change in a person's behaviour or opinions as a result of real or imagined pressure from a person or group of people' (Elliot Aronson 2011).

Internalisation – A deep type of conformity where we take on the majority view because we accept it as correct. It leads to a far-reaching and permanent change in behaviour, even when the group is absent.

Identification – A moderate type of conformity where we act in the same way with the group because we value it and want to be part of it. But we don't necessarily agree with everything the majority believes.

Compliance – A superficial and temporary type of conformity where we outwardly go along with the majority view, but privately disagree with it. The change in our behaviour only lasts as long as the group is monitoring us.

Informational social influence (ISI) – An explanation of conformity that says we agree with the opinion of the majority because we believe it is correct. We accept it because we want to be correct as well. This may lead to internalisation (see above).

Normative social influence (NSI) – An explanation of conformity that says we agree with the opinion of the majority because we want to be accepted, gain social approval and be liked. This may lead to compliance (see above).

Types of conformity

Herbert Kelman (1958) suggested that there are three ways in which people **conform** to the opinion of a majority:

Internalisation

Internalisation occurs when a person genuinely accepts the group norms. This results in a private as well as a public change of opinions/behaviour. This change is likely to be permanent because attitudes have been internalised, i.e. become part of the way the person thinks. The change in opinions/behaviour persists even in the absence of other group members.

Identification

Sometimes we conform to the opinions/behaviour of a group because there is something about that group we value. We identify with the group, so we want to be part of it. This may mean we publicly change our opinions/behaviour to achieve this goal, even if we don't privately agree with everything the group stands for.

Compliance

This type of conformity involves simply 'going along with others' in public, but privately not changing personal opinions and/or behaviour. Compliance results in only a superficial change. It also means that a particular behaviour or opinion stops as soon as group pressure stops.

Explanations for conformity

Morton Deutsch and Harold Gerard (1955) developed a **two-process theory**, arguing that there are two main reasons people conform. They are based on two central human needs: the need to be *right* (ISI), and the need to be *liked* (NSI).

Informational social influence (ISI)

Informational social influence (ISI) is about who has the better information – you or the rest of the group. Often we are uncertain about what behaviours or beliefs are right or wrong. For example, you may not know the answer to a question in class. But if most of the class agrees on one answer, you accept that answer because you feel they are likely to be right. The reason individuals follow the behaviour of the group (the majority) is because people want to be right. ISI is a cognitive process because it is to do with what you *think*.

ISI is most likely to happen in situations that are new to a person (so you don't know what is right) or situations where there is some ambiguity, so it isn't clear what is right. It is also typical in crisis situations where decisions have to be made quickly. It also occurs when one person (or group) is regarded as being more of an expert.

Normative social influence (NSI)

Normative social influence (NSI) is about norms, i.e. what is 'normal' or typical behaviour for a social group. Norms regulate the behaviour of groups and individuals so it is not surprising that we pay attention to them. People do not like to appear foolish and prefer to gain social approval rather than be rejected. So NSI is an *emotional* rather than a cognitive process.

MEMORY- MISLEADING INFORMATION- FACTORS AFFECTING EWT

FACTORS AFFECTING EYEWITNESS TESTIMONY: MISLEADING INFORMATION

THE SPECIFICATION SAYS...

Factors affecting the accuracy of eyewitness testimony: misleading information including leading questions and post-event discussion.

The next three spreads consider how memory research can be applied to a very important topic – the reliability of **eyewitness testimony**. We begin by looking at the effects of **misleading information** on what eyewitnesses recall after experiencing an incident.

KEY TERMS

Eyewitness testimony (EWT) – The ability of people to remember the details of events, such as accidents and crimes, which they themselves have observed. Accuracy of EWT can be affected by factors such as misleading information, leading questions and anxiety.

Misleading information – Incorrect information given to the eyewitness usually after the event (hence often called '*post*-event information'). It can take many forms, such as leading questions and post-event discussion between co-witnesses and/or other people.

Leading question – A question which, because of the way it is phrased, suggests a certain answer. For example: 'Was the knife in the accused's left hand?'. This suggests the answer is 'left hand'.

Leading questions

Procedure Elizabeth Loftus and John Palmer (1974) arranged for participants (students) to watch film clips of car accidents and then gave them questions about the accident. In the *critical question* (a **leading question**) participants were asked to describe how fast the cars were travelling: *'About how fast were the cars going when they hit each other?'*

This is a leading question because the verb 'hit' suggests the speed the car was going. There were five groups of participants, each was given a different verb in the critical question. One group had the verb *hit*, the others had *contacted*, *bumped*, *collided*, *smashed*.

Findings The **mean** estimated speed was calculated for each participant group. The verb *contacted* resulted in a mean estimated speed of 31.8 mph. For the verb *smashed*, the mean was 40.5 mph. The leading question biased the eyewitness recall of an event.

Why do leading questions affect EWT?

The **response-bias explanation** suggests that the wording of the question has no real effect on the participants' memories, but just influences how they decide to answer. When a participant gets a leading question using the word '*smashed*', this encourages them to choose a higher speed estimate.

Loftus and Palmer (1974) conducted a second experiment that supported the **substitution explanation** – the wording of a leading question actually changes the participant's memory of the film clip. This was demonstrated because participants who originally heard 'smashed' later were more likely to report seeing broken glass (there was none) than those who heard 'hit'. The critical verb altered their memory of the incident.

Post-event discussion

When co-witnesses to a crime discuss it with each other (**post-event discussion**), their eyewitness testimonies may become contaminated. This is because they combine (mis)information from other witnesses with their own memories. Research has demonstrated how this happens.

Evaluation

Useful real-life applications

A great strength of all research into misleading information is that it has hugely important practical uses in the real world, where the consequences of inaccurate EWT can be very serious indeed. For example, Loftus (1975) believes that leading questions can have such a distorting effect on memory that police officers need to be very careful about how they phrase their questions when interviewing eyewitnesses.

Research into EWT is one area in which psychologists believe they can make an important positive difference to the lives of real people, for instance by improving the way the legal system works and by appearing in court trials as expert witnesses.

The tasks are artificial

A real limitation of Loftus and Palmer's study is that their participants watched *film clips* of car accidents. This is a very different experience from witnessing a real accident, mainly because such clips lack the stress of a real accident. There is some evidence that emotions can have an influence on memory (see the next spread).

This is a limitation because studies that use such artificial tasks may tell us very little about how leading questions affect EWT in cases of real accidents or crimes. It could even be that researchers such as Loftus are too pessimistic about the accuracy of EWT – it may be more reliable than many studies suggest.

Individual differences

There is evidence that older people are less accurate than younger people when giving eyewitness reports. For example Anastasi and Rhodes (2006) found that people in age groups 18–25 and 35–45 were more accurate than people in the group 55–78 years. However, all age groups were more accurate when identifying people of their own age group (called **own age bias**).

Research studies often use younger people as the target to identify and this may mean that some age groups *appear* less accurate but in fact this is not true.

Evaluation eXtra

Demand characteristics

Zaragosa and McCloskey (1989) argue that many answers participants give in **lab** studies of EWT are the result of **demand characteristics**. Participants usually do not want to let the researcher down, and want to appear helpful and attentive. So when they are asked a question they don't know the answer to, they guess, especially if it's a yes/no question. Imagine you are a participant in a study. You have seen a film of a street robbery and now you are answering some yes/no questions. One is: '*Did you see the blue car?*' There was no blue car in the clip, but you still answer 'yes' to this question because that seems a more helpful answer.

Consider: *Explain why demand characteristics are a problem for studies of EWT.*

Consequences of EWT

Foster *et al.* (1994) point out that what you remember as an eyewitness can have some very important consequences in the real world, but the same is not true in research studies.

Consider: *What difference do you think this makes to how leading questions affect the accuracy of EWT in the real world compared to in studies?*

ADDITIONAL RESOURCE- MISLEADING INFORMATION

Accuracy of eyewitness testimony: Misleading informa

Eyewitnesses (or earwitnesses) frequently play a critical role in criminal investigations, yet there is good reason to suspect that their testimony may not be reliable. The importance of this issue is highlighted by the Innocence Project (*www.innocenceproject.org*) who claim that 72% of convictions overturned by DNA testing involved **eyewitness testimony** (EWT) that was not accurate.

There are various reasons why eyewitness testimony may not be accurate. One of these concerns anxiety, which is explored on the next spread. On this spread we look at the effect of **misleading information** that may affect what you remember and/or recall about an event. There are two examples of this: **leading questions** and **post-event discussion**.

▲ How fast were the cars going when they hit each

LEADING QUESTIONS

Key study: Loftus and Palmer (1974)

Experiment 1: procedure

Forty-five students were shown seven films of different traffic accidents. After each film the participants were given a questionnaire which asked them to describe the accident and then answer a series of specific questions about it. There was one *critical question*: 'About how fast were the cars going when they hit each other?' One group of participants was given this question. The other four groups were given the verbs *smashed*, *collided*, *bumped* or *contacted* in place of the word *hit*. This critical question was a leading question because it suggested the answer that a participant might give.

Findings

The findings are shown in the table on the right, which demonstrate that leading questions affect the response given by participants.

Verb	Mean speed estimate
smashed	40.8
collided	39.3
bumped	38.1
hit	34.0
contacted	31.8

▲ Speed estimates for the different verbs.

Experiment 2: procedure

The leading question may bias a participant's response or may actually cause information to be altered before it is stored.

To test this, a new set of participants was divided into three groups and shown a film of a car accident lasting 1 minute, and again asked questions about speed. The participants were then asked to return one week later when they were asked a series of 10 questions about the accident, including another critical question, 'Did you see any broken glass?' There was no broken glass in the film but, presumably, those who thought the car was travelling faster might be more likely to think that there would be broken glass.

	Verb condition		
	Smashed	Hit	Control
Yes	16	7	6
No	34	43	44

▲ 'Yes' and 'No' responses to the question about broken glass.

Findings

The findings (in the second table on the right) show that the leading question did change the actual memory a participant had for the event.

POST-EVENT DISCUSSION

The memory of an event may also be altered or contaminated through discussing events with others and/or being questioned multiple times.

Conformity effect

Co-witnesses may reach a consensus view of what actually happened. This was investigated by Fiona Gabbert and colleagues (2003). Participants were in pairs where each partner watched a different video of the same event so that they each viewed unique items. Pairs in one condition were encouraged to discuss the event before each partner individually recalled the event they watched. A very high number of witnesses (71%) who had discussed the event went on to mistakenly recall items acquired during the discussion.

Repeat interviewing

Each time an eyewitness is interviewed there is the possibility that comments from the interviewer will become incorporated into their recollection of events. It is also the case that an interviewer may use leading questions and thus alter the individual's memory for events. This is especially the case when children are being interviewed about a crime (LaRooy *et al.*, 2005).

What is eyewitness testimony?

Psychologists tend to use the term 'eyewitness memory' instead of 'testimony' when carrying out research to test the accuracy of eyewitness testimony.

Eyewitness memory goes through three stages:

1. The witness encodes into LTM details of the event and the person involved. Encoding may be only partial and distorted, particularly as most crimes happen very quickly, frequently at night, and sometimes accompanied by rapid, complex and often violent action.
2. The witness retains the information for a period of time. Memories can be lost or modified during retention (most forgetting takes place within the first few minutes of a retention interval) and other activity between encoding and retrieval may interfere with the memory.
3. The witness retrieves the memory from storage. The presence or absence of appropriate retrieval cues or the nature of the questioning may significantly affect the accuracy of what is

MEET THE RESEARCHER

Elizabeth Loftus is Distinguished Professor at the University of California, Irvine. Her experiments have revealed how memories can be changed by things that we are told after the event. The legal field has been a significant application of her memory research.

Real-life conformity effect

The Oklahoma bombing was an infamous crime in the US in 1995. One witness claimed to have seen the murderer, Timothy McVeigh, with an accomplice. No other witnesses could describe this person but later they too claimed to have seen the person.

Eventually the first witness realised that their recollection was wrong. How did the other two witnesses make the same mistake? The first confident witness unintentionally influenced them, leading them too to believe there was

56

ATTACHMENT- STRANGE SITUATION

THE SPECIFICATION SAYS...

Ainsworth's 'Strange Situation'. Types of attachment: secure, insecure-avoidant and insecure-resistant.

Ainsworth worked with Bowlby on the development of attachment theory. Her particular contribution was to produce a method, still used today, to assess the strength of attachment between an infant and others. This method of assessment is called the Strange Situation.

KEY TERMS

Strange Situation – A controlled observation designed to test attachment security. Infants are assessed on their response to playing in an unfamiliar room, being left alone, left with a stranger and being reunited with a caregiver.

Secure attachment – Generally thought of as the most desirable attachment type, associated with psychologically healthy outcomes. In the Strange Situation this is shown by moderate stranger and separation anxiety and ease of comfort at reunion.

Insecure-avoidant attachment – An attachment type characterised by low anxiety but weak attachment. In the Strange Situation this is shown by low stranger and separation anxiety and little response to reunion – an avoidance of the caregiver.

Insecure-resistant attachment – An attachment type characterised by strong attachment and high anxiety. In the Strange Situation this is shown by high levels of stranger and separation anxiety and by resistance to be comforted at reunion.

The Strange Situation

The **Strange Situation** was developed by Mary Ainsworth (1969). The aim was to be able to observe key attachment behaviours as a means of assessing the quality of a child's attachment to a caregiver.

Procedure

The Strange Situation is a **controlled observation** procedure designed to measure the security of attachment a child displays towards a caregiver. It takes place in a room with quite controlled conditions (i.e. a **laboratory**) with a **two-way mirror** through which psychologists can observe the infant's behaviour.

The behaviours used to judge attachment included:

- **Proximity seeking**: an infant with a good attachment will stay fairly close to the caregiver.
- **Exploration and secure-base behaviour**: good attachment enables a child to feel confident to explore, using their caregiver as a secure base, i.e. a point of contact that will make them feel safe.
- **Stranger anxiety**: one of the signs of becoming closely attached is a display of anxiety when a stranger approaches.
- **Separation anxiety**: another sign of becoming attached is to protest at separation from the caregiver.
- **Response to reunion** with the caregiver after separation for a short period of time under controlled conditions.

The procedure has seven episodes, each of which last three minutes.

Beginning: Child and caregiver enter an unfamiliar playroom.	
1. The child is encouraged to explore.	Tests exploration and secure base.
2. A stranger comes in and tries to interact with the child.	Tests stranger anxiety.
3. The caregiver leaves the child and stranger together.	Tests separation and stranger anxiety.
4. The caregiver returns and the stranger leaves.	Tests reunion behaviour and exploration/ secure base.
5. The caregiver leaves the child alone.	Tests separation anxiety.
6. The stranger returns.	Tests stranger anxiety.
7. The caregiver returns and is reunited with the child.	Tests reunion behaviour.

Securely attached children are happy to be reunited with their caregiver. Other children may show avoidance or resistance at reunion and are classified as insecure-avoidant or insecure-resistant respectively because of this.

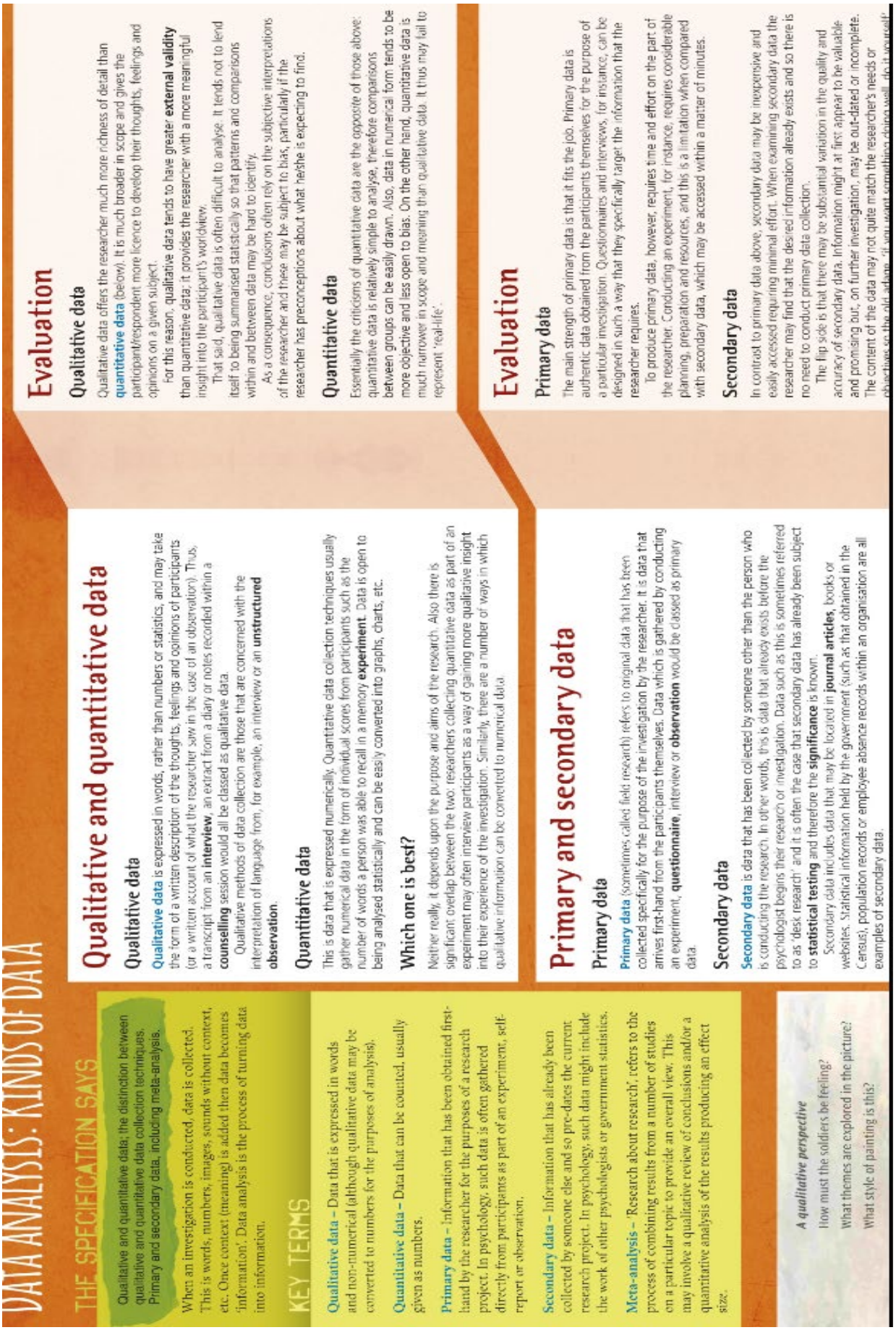
Findings

Ainsworth *et al.* (1978) found that there were distinct patterns in the way that infants behaved. She identified three main types of attachment:

- **Secure attachment** (Type B). These children explore happily but regularly go back to their caregiver (proximity seeking and secure base behaviour). They usually show moderate separation distress and moderate stranger anxiety. Securely attached children require and accept comfort from the caregiver in the reunion stage. About 60–75% of British toddlers are classified as secure.
- **Insecure-avoidant attachment** (Type A). These children explore freely but do not seek proximity or show secure base behaviour. They show little or no reaction when their caregiver leaves and they make little effort to make contact when the caregiver returns. They also show little stranger anxiety. They do not require comfort at the reunion stage. About 20–25% of toddlers are classified as insecure-avoidant.
- **Insecure-resistant attachment** (Type C). These children seek greater proximity than others and so explore less. They show huge stranger and separation distress but they resist comfort when reunited with their carer. Around 3% of British toddlers are classified as insecure-resistant.

RESEARCH METHODS- DATA HANDLING AND ANALYSIS

RESEARCH METHODS- TYPES OF DATA



DATA ANALYSIS: KINDS OF DATA

THE SPECIFICATION SAYS

Qualitative and quantitative data; the distinction between qualitative and quantitative data collection techniques. Primary and secondary data, including meta-analysis.

When an investigation is conducted, data is collected. This is words, numbers, images, sounds without context, etc. Once context (meaning) is added then data becomes 'information'. Data analysis is the process of turning data into information.

KEY TERMS

Qualitative data – Data that is expressed in words and non-numerical (although qualitative data may be converted to numbers for the purposes of analysis).

Quantitative data – Data that can be counted, usually given as numbers.

Primary data – Information that has been obtained first-hand by the researcher for the purposes of a research project. In psychology, such data is often gathered directly from participants as part of an experiment, self-report or observation.

Secondary data – Information that has already been collected by someone else and so pre-dates the current research project. In psychology, such data might include the work of other psychologists or government statistics.

Meta-analysis – 'Research about research', refers to the process of combining results from a number of studies on a particular topic to provide an overall view. This may involve a qualitative review of conclusions and/or a quantitative analysis of the results producing an effect size.

A qualitative perspective

How must the soldiers be feeling?

What themes are explored in the picture?

What style of painting is this?

Qualitative and quantitative data

Qualitative data

Qualitative data is expressed in words, rather than numbers or statistics, and may take the form of a written description of the thoughts, feelings and opinions of participants (or a written account of what the researcher saw in the case of an observation). Thus, a transcript from an **interview**, an extract from a diary or notes recorded within a **counselling** session would all be classed as qualitative data.

Qualitative methods of data collection are those that are concerned with the interpretation of language from, for example, an interview or an **unstructured observation**.

Quantitative data

This is data that is expressed numerically. Quantitative data collection techniques usually gather numerical data in the form of individual scores from participants such as the number of words a person was able to recall in a memory **experiment**. Data is open to being analysed statistically and can be easily converted into graphs, charts, etc.

Which one is best?

Neither really, it depends upon the purpose and aims of the research. Also there is significant overlap between the two: researchers collecting quantitative data as part of an experiment may often interview participants as a way of gaining more qualitative insight into their experience of the investigation. Similarly, there are a number of ways in which qualitative information can be converted to numerical data.

Evaluation

Qualitative data

Qualitative data offers the researcher much more richness of detail than **quantitative data** (below). It is much broader in scope and gives the participant/respondent more licence to develop their thoughts, feelings and opinions on a given subject.

For this reason, qualitative data tends to have greater **external validity** than quantitative data; it provides the researcher with a more meaningful insight into the participant's worldview.

That said, qualitative data is often difficult to analyse. It tends not to lend itself to being summarised statistically so that patterns and comparisons within and between data may be hard to identify.

As a consequence, conclusions often rely on the subjective interpretations of the researcher and these may be subject to bias, particularly if the researcher has preconceptions about what he/she is expecting to find.

Quantitative data

Essentially the criticisms of quantitative data are the opposite of those above: quantitative data is relatively simple to analyse, therefore comparisons between groups can be easily drawn. Also, data in numerical form tends to be more objective and less open to bias. On the other hand, quantitative data is much narrower in scope and meaning than qualitative data. It thus may fail to represent 'real-life'.

Primary and secondary data

Primary data

Primary data (sometimes called field research) refers to original data that has been collected specifically for the purpose of the investigation by the researcher. It is data that arrives first-hand from the participants themselves. Data which is gathered by conducting an experiment, **questionnaire**, interview or **observation** would be classed as primary data.

Secondary data

Secondary data is data that has been collected by someone other than the person who is conducting the research. In other words, this is data that already exists before the psychologist begins their research or investigation. Data such as this is sometimes referred to as 'desk research' and it is often the case that secondary data has already been subject to **statistical testing** and therefore the **significance** is known.

Secondary data includes data that may be located in **journal articles**, books or websites. Statistical information held by the government (such as that obtained in the Census), population records or employee absence records within an organisation are all examples of secondary data.

Evaluation

Primary data

The main strength of primary data is that it fits the job. Primary data is authentic data obtained from the participants themselves for the purpose of a particular investigation. Questionnaires and interviews, for instance, can be designed in such a way that they specifically target the information that the researcher requires.

To produce primary data, however, requires time and effort on the part of the researcher. Conducting an experiment, for instance, requires considerable planning, preparation and resources, and this is a limitation when compared with secondary data, which may be accessed within a matter of minutes.

Secondary data

In contrast to primary data above, secondary data may be inexpensive and easily accessed requiring minimal effort. When examining secondary data the researcher may find that the desired information already exists and so there is no need to conduct primary data collection.

The flip side is that there may be substantial variation in the quality and accuracy of secondary data. Information might at first appear to be valuable and promising but, on further investigation, may be out-dated or incomplete. The content of the data may not quite match the researcher's needs or objectives so the old adage 'if you want something done well, do it yourself'

DATA ANALYSIS: DESCRIPTIVE STATISTICS

THE SPECIFICATION SAYS

Descriptive statistics: measures of central tendency – mean, median and mode; calculation of mean, median and mode; measures of dispersion: range and standard deviation; calculation of range.

We have seen how data may come in two forms: qualitative or quantitative. Here we shall focus on the latter. There are various ways of summarising and analysing numerical data in order to draw meaningful conclusions. These are collectively known as **descriptive statistics** – which include measures of central tendency and measures of dispersion and also graphs (on the next spread).

KEY TERMS

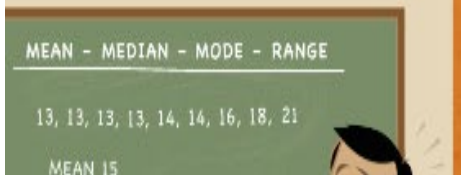
Descriptive statistics – The use of graphs, tables and summary statistics to identify trends and analyse sets of data.

Measures of central tendency – The general term for any measure of the average value in a set of data.

Mean – The arithmetic average calculated by adding up all the values in a set of data and dividing by the number of values there are.

Median – The central value in a set of data when values are arranged from lowest to highest.

Mode – The most frequently occurring value in a set of data.



Measures of central tendency

Measures of central tendency are 'averages' which give us information about the most *typical* values in a set of data. There are three of these to consider: the **mean**, the **median** and the **mode**.

Mean

The mean is what most of us will recognise as the average. It is calculated by adding up all the scores or values in a data set and dividing this figure by the total number of scores there are.

For instance, in the following data set of scores:

5, 7, 7, 9, 10, 11, 12, 14, 15, 17

The total is 107 divided by the number of scores (10), which gives us a mean value of 10.7.

The mean is the most sensitive of the measures of central tendency as it includes all of the scores/values in the data set within the calculation. This means it is more representative of the data as a whole.

However, the mean is easily distorted by extreme values. If we replace 17 in the data above with the number 98, the mean becomes 18.8 which does not really seem to represent the data overall!

Median

The median is the middle value in a data set when scores are arranged from lowest to highest. In an odd number of scores, the median is easily identified. In an even number of scores (just as the ten numbers above) the median is halfway between the two middle scores. These are 10 and 11, so the median is 10.5.

The strength of the median, unlike the mean, is that extreme scores do not affect it, so whether 98 replaces 17 in the data above or not, the median remains the same. It is also easy to calculate (once you have arranged the numbers in order). However, it is less sensitive than the mean as not all scores are included in the final calculation.

Mode

The mode is the most frequently occurring score/value within a data set. In some data sets there may be two modes (**bi-modal**) or no mode if all the scores are different.

Although the mode is very easy to calculate, it is a very crude measure. Notice how in the set of scores above, the mode is 7, which is quite different from the mean and the median (and not really representative of the data as a whole).

For some data – data in categories – the mode is the only method you can use. For example, if you asked your class to list their favourite dessert, the only way to identify the most 'typical' or average value would be to select the **modal group**.

Measures of dispersion

Measures of dispersion are based on the *spread* of scores, that is, how far scores vary and differ from one another. We shall focus on two of these: the **range** and the **standard deviation**.

Range

The range is a simple calculation of the spread of scores and is worked out by taking the lowest value from the highest value and (usually) adding 1.

Thus, the range for the data on the left is (17 – 5) + 1 = 13.

Adding 1 is a mathematical correction that allows for the fact that raw scores are often rounded up (or down) when they are recorded within research. For instance, someone may complete a simple task (such as crossing out all the letter e's in a paragraph) in 45 seconds. However, it is unlikely they took exactly 45 seconds to complete this task (in fact it may have taken them anywhere between 44.5 and 45.5 seconds), so the addition of 1 accounts for this margin of error.

The advantage of the range is that it is easy to calculate. However, it only takes into account the two most extreme values, and this may be unrepresentative of the data set as a whole. For instance, pupils in a maths class achieved the following test scores:

0, 47, 49, 50, 50, 50, 51, 53, 54, 56, 56, 57, 100

The range here is 101: one student was ill during the test and scored nothing, the top-scoring student had been given the paper for homework by mistake! This illustrates the problem with the range that it may not give a fair representation of the general spread of scores as, in this example, most students achieved around half marks in the test and the range, more accurately was 11.

Standard deviation

A much more sophisticated measure of dispersion is the standard deviation. This is a single value that tells us how far scores deviate (move away from) the mean.

The larger the standard deviation, the greater the dispersion or spread within a set of data. If we are talking about a particular condition within an experiment, a large standard deviation suggests that not all participants were affected by the IV in the same way because the data are quite widely spread. It may be that there are a few **anomalous** results.

A low standard deviation value reflects the fact that the data are tightly clustered around the mean, which might imply that all participants responded in a fairly similar way.

The standard deviation is a much more precise measure of dispersion than the range as it includes all values within the final calculation. However, for this reason – like the mean – it can be distorted by a single extreme value.

Presentation of quantitative data

The specification says...

Presentation and display of quantitative data: graphs, tables, scattergrams, bar charts, histograms.

Distributions: normal and skewed distributions; characteristics of normal and skewed distributions.

On this spread, we continue our discussion of descriptive statistics and look at some of the ways in which data can be presented and how it may be distributed.

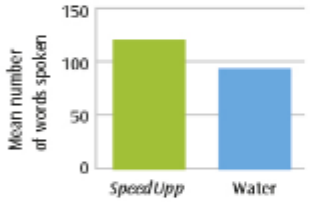
Key terms

Scattergram A type of graph that represents the strength and direction of the relationship between co-variables in a correlational analysis.

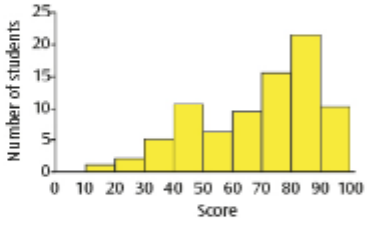
Bar chart A type of graph in which the frequency of each variable is represented by the height of the bars.

Histogram A type of graph which shows frequency but, unlike a bar chart, the area of the bars (not just the height) represents frequency. The x-axis must start at a true zero and the scale is continuous.

Bar chart showing the mean number of words spoken in five minutes for the *SpeedUpp* condition and the water condition.



Histogram showing percentage scores in a maths test.



Apply it Methods

Other types of graphs: Line graphs

Line graphs, like histograms, represent continuous data and use points connected by lines to show how something changes in value, for instance, over time. Typically, the IV is plotted on the *x*-axis and the DV on the *y*-axis. For instance, in an investigation of how the passage of time affects our ability to remember information, the decline in recall would be shown as a continuous line.

Questions

What graphical display would be most appropriate to represent the following: a bar chart, a scattergram, a histogram or a line graph? *(1 mark each)*

1. The change in a person's body temperature over the course of a day.
2. The difference in average annual rainfall between Manchester and Paris.
3. The relationship between daily temperature and people's ratings of how happy they are.
4. The frequency of people who chose 'snow' as their favourite weather condition broken down into subcategories of age.

Tables and graphs

Summarising data in a table

There are various ways of representing data. One of these is in the form of a summary table. It is important to note that when tables appear in the results section of a report they are not merely **raw scores** (like the example seen at the bottom of page 194) but have been converted to **descriptive statistics**.

Table showing the mean number of words spoken in five minutes and standard deviations for the *SpeedUpp* condition and the water condition.

	SpeedUpp condition	Water condition
Mean	119	96
Standard deviation	53.8	35.8

It is standard practice to include a summary paragraph beneath a table explaining the numbers and drawing conclusions, for example:

We can see from the mean values that there were more words spoken, on average, in the five minutes following the consumption of the energy drink (119 mean words) than the water drink (96 mean words). This suggests that drinking an energy drink makes people more talkative than drinking water.

The standard deviation is higher in the SpeedUpp *condition (53.8) suggesting that there was a larger spread of scores than in the water condition (35.8). This suggests that not all participants were equally affected by the energy drink. In the water condition, scores were clustered around the mean to a greater degree.*

Bar charts

Data can be represented visually using a suitable graphical display so the difference in mean values can easily be seen. The most suitable **graph** in this case is a bar chart (see top left). Bar charts are used when data is divided into categories, otherwise known as **discrete data**. In the example above, the categories are our two conditions (the *SpeedUpp* condition and the water condition) and these occupy the horizontal *x*-axis. The frequency or amount of each category is plotted on the vertical *y*-axis (effectively the height of the bar). Bars are separated on a bar chart to denote that we are dealing with separate conditions.

Histograms

In a histogram (see middle left), the bars touch each other, which shows that *x*-axis data is **continuous** rather than discrete (as in a bar chart). The *x*-axis is made up of equal-sized intervals of a single category, for instance, percentage scores in a maths test broken down into intervals such as 0–9, 10–19, 20–29, etc. The *y*-axis represents the frequency (number of people who scored a certain mark) within each interval. If there was a zero frequency for one of the intervals, the interval remains but without a bar.

Scattergrams

We came across scattergrams earlier in this chapter, during our discussion of **correlations** on page 190. Unlike the other forms of graph on this spread, scattergrams do not depict differences but *associations* between **co-variables**. Either of the co-variables occupies the *x*-axis and the other the *y*-axis (it does not matter which) and each point on the graph corresponds to the x and y position of the co-variables.

Study tip

When presenting a table or graph, always have a title and clearly label columns or axes.

Mathematical content

The specification says...

There is a list of the required mathematical skills on page 217.

On this spread, we cover some of the mathematical skills identified in the specification. No – don't run away! Many of you may be concerned about the maths content in psychology – some of you may be excited! For the worried ones, rest assured that we have already covered, on other spreads, a number of the mathematical skills. These include working out the mean, median and mode, drawing conclusions from tables and graphs, recognising different forms of data, etc.

Here we cover much more, so, take a deep breath – there's nothing to be scared of...

Maths. Officially not as scary as being chased by an alligator.

Apply it
Methods

Estimate results

It may be necessary to comment on the average or dispersion of a set of data, which may require estimating the answer.

The most words spoken in the *SpeedUpp* condition was 206 and the lowest was 59 (this data is at the bottom of page 194).

What would you estimate the range would be? (Use rounded figures such as 200 – 60.) See answer on facing page.

Question

Now do the same for the water condition. (*1 mark*) (Data also in table at bottom of page 194.)

Mathematical content

Percentages

With reference to the raw data at the bottom of page 194, what percentage of participants spoke more words in the *SpeedUpp* condition than the water condition?

There were 6 participants whose word score was higher for the *SpeedUpp* condition than the water condition out of a total of 10 participants.

To calculate the percentage we use the following formula:

$$\frac{\text{Number participants who spoke more after } SpeedUpp}{\text{Total number of participants}} \times 100 = \frac{6}{10} \times 100 = 60\%$$

Converting a percentage to a decimal

To convert a percentage to a decimal, remove the % sign and move the decimal point two places to the left. For example:

37% is 37.0 then move the decimal point two places to left = 0.37

So, for the percentage of participants who spoke more words in the *SpeedUpp* condition: 60% is 60.0, move the decimal point two places to the left = 0.60 (0.6).

Decimal places

The term **decimal places** refers to the number of digits to the right of the decimal point.

Converting a decimal to a fraction

Start by working out the number of decimal places in your number. For example, 0.81 has two decimal places (two digits after the decimal point) and 0.275 has three decimal places.

If there are two decimal places then you divide by 100, if there are three decimal places you divide by 1,000. The number of decimal places equals the number of zeros.

The fractions you get are 81/100 and 275/1000

Sometimes you can reduce the fraction by finding the *highest common factor*, the biggest number that divides evenly into both parts of the fraction.

In the case of 275/1000 you can divide both by 25 and get 11/40

In the energy drink experiment, 0.6 of the total group spoke more words in the *SpeedUpp* condition. There is only one decimal place here, so we divide by 10. The fraction is 6/10.

The biggest number that will divide into both parts of the fraction is 2 therefore, after dividing both parts of the fraction by 2, we are left with 3/5 (or three-fifths).

Ratios

We can also express the information above as a **ratio**. Considering the *SpeedUpp* example, we could calculate a **part-to-whole ratio**, that is, the ratio of the number of participants who spoke more words in the *SpeedUpp* condition (6) to the total number of participants (10) = 6:10 (which can be reduced to 3:5).

This could also be written as a **part-to-part ratio**. The number of participants who spoke more words in the *SpeedUpp* condition (6) to the number of participants who spoke more words in the water condition (4) = 6:4 (which can be reduced to 3:2).

Ratios should always be reduced as with a fraction, by finding the *highest common factor*.

Estimates

These are discussed in the Apply it on the left, and aim to produce ballpark figures (e.g. 10,000 instead of 9,569). Such estimates can be used to provide a broad idea of what the results of a calculation will be, for example if I want to subtract 5,492 from 9,569 I can estimate this as 10,000 less 5,000.

Apply it
Methods

Percentages, decimals, fractions, ratios

Task:

For further practice, why not work through all the calculations in the main text (above), this time using the number of participants who spoke more words in the water condition. Make sure you always show all your workings for any calculation so your teacher can assess the method(s) you used.

Significant figures

When we are faced with a long number, for the sake of clarity, we might round it off to the nearest thousand, or nearest million. This is the basis of making an estimate – using a specific number of significant figures. So, for example 432,765 to 2 **significant figures** (s.f.) is 430,000. Similarly, when there are many digits coming after a decimal point (as there often are when we have used a calculator to work out, say, a percentage) we may round this off to 1, 2 or 3 significant figures. For example:

0.002047 would be:
- 0.002 (1 s.f.)
- 0.0020 (2 s.f.)
- 0.00205 (3 s.f., note that we round up or down if necessary)

305,620 would be:
- 300,000 (1 s.f.)
- 310,000 (2 s.f.)
- 306,000 (3 s.f.)

(Sometimes a zero is just a placeholder and sometimes it counts as one of the significant figures as in the last example above.)

Standard form

Standard form is a shorthand used to express very large or very small numbers. The formula to use is:

[number between 1 and 10] $\times 10^{[\text{to the power of } x]}$

The number between 1 and 10 is called the *mantissa*. The power of 10 is called the *exponent*.

3.2×10^5 is 320,000 (move decimal point 5 places to right).

If the number was 323,000 we could use 3.2 or 3.23 (round up) or just 3 as the mantissa.

If the number was 327,000 we could use 3.3 or 3.27 or 3 as the mantissa.

3.2×10^{-5} is 0.000032 (move decimal point 5 places to left).

Or we could just use 3 as the mantissa.

Order of magnitude calculations

Order of magnitude calculations are another kind of estimate, this time using standard form and comparing the exponents. You can then say how many times bigger or smaller one number is than another.

Mathematical symbols

You will need to be able to understand and use the following mathematical symbols:

Symbol	Symbol name	Meaning / definition	Example
=	equals sign	equality	$4 = 3 + 1$
>	strict inequality	greater than	$3 > 2$
<	strict inequality	less than	$2 < 3$
>>	inequality	much greater than	$3000 >> 0.02$
<<	inequality	much less than	$0.02 << 3000$
∝	proportional to	proportional to	$f(x) \propto g(x)$
≈	approximately equal	weak approximation	$11 \approx 10$

Apply it Estimate results: The range from 59 to 206 is 147 (or 148 with

Maths at school should just be one lesson... how to divide a restaurant bill between three people.

A level only

Substituting values

You may be required to substitute numerical values into algebraic equations. All this means is:

1. You are given an equation, such as $a = b + c$.
2. You are given values for b and c (for example, $b = 4$ and $c = 7$).
3. What is a? (answer: $a = 11$).

Let's try a slightly more difficult equation, the one for standard deviation – which gives you the opportunity to understand standard deviation better.

The formula is $\sqrt{\frac{\sum(x-\bar{x})^2}{N-1}}$

x represents each value in the data set.

$\bar{x}$ is the symbol for the mean for the data set.

Calculate the difference between the mean and each value, and then square this difference.

$\sum$ is the symbol for 'sum of', so we add all the squared differences.

N means 'number' (how many numbers did we have?).

$\sqrt{\ }$ means square root (we press that key on our calculator).

If you are told $\sum(x-\bar{x})^2 = 56$ and $n = 12$, you can work out the standard deviation:

Square root (56 / 11) = 2.26 (to 2 decimal places).

Japan's Akira Haraguchi holds the current world record for reciting decimal places of pi from memory. He managed 100,000 decimal places in 6 hours in October 2006.

π

Check it

1. Steve scored 18 out of 20 in a memory test as part of a psychology experiment.
   (a) Express Steve's mark as a percentage. *[1 mark]*
   (b) Express Steve's mark as a decimal. *[1 mark]*
   (c) Express Steve's mark as a fraction of the maximum mark. *[1 mark]*
2. Express the value 0.01678365 to 3 decimal places. *[1 mark]*

IF YOU ARE STRUGGLING TO SEE THE PRINT SCREEN OF THE TEXTBOOK PAGES PLEASE REFER TO THE DIGITAL TEXTBOOK PASSWORDS AND LOGIN GIVEN TO ACCESS AN ONLINE TEXTBOOK TO HELP YOU. OR EMAIL Campbell-birch.s@stowevalley.com or pitts.r@stowevalley.com IF YOU WERE ABSENT FOR THE INDUCTION.

IF YOU WERE ABSENT FOR THE INDUCTION, PLEASE PRINT THIS BOOKLET AND BRING THIS READY TO HAND IN WITH YOUR COMPLETED PROJECT – WE WILL ASK FOR THIS DURING YOUR FIRST PSYCHOLOGY LESSON.

Have a lovely summer and we look forward to welcoming you to your Psychology course in September! Best of luck for results day!

Mrs Campbell-Birch and Ms Pitts

SOUTHAM COLLEGE SIXTH FORM
The Department of Social Sciences