Pearson Edexcel Level 1/Level 2 (9–1) GCSE Psychology

Topic Guide 11

Research Methods – How do you carry out psychological research?

CONTENTS

Research Methods – How do you carry out psychological research?

Specification requirements

This topic is a compulsory topic and will be examined in both Paper 1 and Paper 2, but in greater depth in Paper 2.

In Paper 1, candidates may be asked to apply their knowledge and understanding of research methods and how studies are conducted in new contexts. Any detail candidates need to know about a study will be detailed in the question.

In Paper 2, candidates' knowledge and understanding of research methods will be assessed in depth in this section. The contexts used in question papers for this topic will draw on the contexts used in the compulsory topics for Paper 1.

In the examination, candidates could be asked to design a research study and/or evaluate how a study has been carried out from stimulus material.

Section A of the Paper 2 examination will contain question types that include calculations, multiple-choice, short-open response questions and one extended open-response question on the topic of research methods.

Opportunities for practical activities

Candidates should gain hands-on experience of carrying out ethical, investigative activities to aid their understanding of this subject. To help centres identify opportunities for carrying out these activities, studies that can be replicated have been marked with an asterisk.

Practical activities should also be used to deliver Section C. For example, candidates could produce their own questionnaires to help them understand sampling methods.

Although candidates will not be directly assessed on practical activities, the experience they gain will give them a better understanding of this subject and may enhance their examination performance.

Mathematical requirements

Psychology requires the use of mathematical skills for handling data in investigations. The mathematical skills required for this qualification are set out in Section 11.2 of this Topic Guide.

Guidance

11.1 Designing psychological research

11.1.1 Be able to identify:
a. an independent variable (IV)
b. a dependent variable (DV)
c. extraneous variables, including
(i) situational variables
(ii) participant variables

Candidates should be able to identify different **variables** (11.1.1a, 11.1.1b) from stimulus material. Candidates may benefit from initially being taught what the different variables are, using examples, and then later by attempting to identify the variables from different sources; for example, an understanding of the **independent variable** (11.1.1a) being the manipulated variable, and then identifying it from a seen stimulus and later an unseen stimulus. The **dependent variable** (11.1.1b) would then be the variable being measured.

Jacob is carrying out psychological research into memory. He gives his participants a word list to learn and later recall. Half of his participants are allowed to rehearse the word list before recall and the other half of participants are not allowed to rehearse the word list before recall.

What is the independent variable (IV) and dependent variable (DV) in Jacob's study?

11.1.2 Understand the influence of extraneous variables and suggest possible ways to control for them, including:
a. use of standardised procedures
b. counterbalancing
c. randomisation
d. single-blind techniques
e. double-blind techniques

Candidates need to understand how **extraneous variables** (11.1.2) influence psychological research. This could affect the validity of the research findings if extraneous variables (e.g. the presence of other participants) could affect the performance of participants on a task (e.g. through being disturbed by the noise of others). Centres need to focus on how both **situational variables** (11.1.1ci) and **participant variables** (11.1.1cii) could influence research. For example, a **participant variable** (11.1.1cii) could be the age of the participants and how this causes their memory of a list of items to be affected. Candidates should also be able to suggest possible ways to control for **extraneous variables** (11.1.2). For example, researchers could use standardised procedures (11.1.2a) to minimise or prevent **situational variables** (11.1.1ci). To control for **participant variables** (11.1.1cii), **counterbalancing** (11.1.2b) could be used or even the use of **double-blind techniques** (11.1.2e) to attempt to eliminate the influence that the experimenter could have on the participants. Candidates may benefit from being given stimulus material to develop their understanding of extraneous variables, which could be done together initially and then later with unseen stimulus material.

Candidates may be asked to consider the following issues when evaluating studies:
- validity
- reliability
- generalisability
- ethics

- objectivity
- subjectivity.

Therefore, centres may want to evaluate the studies in terms of **extraneous variables** (11.1.2). For example, in Topic 2 (memory) candidates are required to learn about Bartlett (1932) and may consider the lack of standardised procedure, in terms of there being no fixed intervals between repeated reproductions of the story, as a weakness.

Jacob is carrying out psychological research into memory. He asks a group of participants to learn and later recall a word list. The participants sit together in a café to recall the word list.

What is one extraneous variable that could influence Jacob's study? How could Jacob control for extraneous variables in his study?

11.1.3 Be able to write a null hypothesis
11.1.4 Be able to write an alternative hypothesis

Candidates need to be able to write both a **null** (11.1.3) and an **alternative hypothesis** (11.1.4). It is not expected that candidates will know the difference between directional (one tailed) and non-directional (two tailed) hypotheses at this level but it might be useful for their understanding. Candidates would benefit from writing hypotheses using operationalised variables. Candidates could use their knowledge of **independent** and **dependent variables** (11.1.1a and 11.1.1b) to write their hypotheses. A **null hypothesis** (11.1.3) at this level would predict that there will be no difference/relationship between variables and an **alternative hypothesis** (11.1.4) would predict that there will be a difference/relationship between the variables. Candidates should be encouraged to write a full null hypothesis with the idea of chance ('Any difference will be due to chance').

Jacob is carrying out psychological research into the role of rehearsal in memory. He gives his participants a word list to learn and later recall. Half of his participants are allowed to rehearse the word list before recall and the other half of participants are not allowed to rehearse the word list before recall.

What is an alternative hypothesis for Jacob's study?

11.1.5 Methods of sampling, including strengths and weaknesses of each sampling method:

a. understand target population samples
b. understand random sampling
c. stratified sampling
d. volunteer sampling
e. opportunity sampling

Candidates need to know four methods of **sampling** (11.1.5), including strengths and weaknesses of each method. These include **random** (11.1.5b), **stratified** (11.1.5c), **volunteer** (11.1.5d) and **opportunity sampling** (11.1.5e). Candidates also need to understand what a **target population** and a **sample** are (11.1.5a). Candidates may benefit from initially gaining an understanding of the difference between the general population, target population and a sample. Subsequently, the methods of sampling could be delivered, which may be aided with the use of diagrams to represent the different conditions of the research. Strengths and weaknesses of the methods could either be taught after each sampling method or as a whole after all four sampling methods have been delivered. Centres may want to compare the different methods of sampling to further candidates' understanding. Candidates would benefit from using their understanding of sampling methods with unseen stimulus material.

Candidates may be asked to consider the following issues when evaluating studies:
- validity
- reliability
- generalisability
- ethics
- objectivity
- subjectivity.

Therefore, centres may want to evaluate the studies in terms of **sampling** (11.1.5). For example, in Topic 5 (social influence) candidates are required to learn about Haney, Banks, and Zimbardo (1973) (5.2.2). The participants in this study were recruited via a newspaper advertisement so this is an example of **volunteer sampling** (11.1.5d). Candidates can then look at the strengths or weaknesses of the use of this method of sampling in the Haney, Banks, and Zimbardo (1973) study.

Jacob is carrying out psychological research into memory. He goes to a local café and asks the first 10 people he meets to be participants in his study.

What is the sampling method used in Jacob's study? What is a strength and a weakness of the sampling method that Jacob used in his study?

11.1.6 Understand experimental and research designs, including strengths and weaknesses:

a. independent measures
b. repeated measures
c. matched pairs

Candidates need to understand three experimental and research designs, and strengths and weaknesses of each design. These include **independent measures** (11.1.6a), **repeated measures** (11.1.6b) and **matched pairs** (11.1.6c). Candidates may benefit from the use of diagrams to represent the conditions and to help them understand how participants are split into each condition of a research study. Strengths and weaknesses of the designs could either be taught after each experimental and research design or as a whole after all four experimental and research designs have been delivered. Centres may want to compare the different experimental and research designs to further candidates' understanding. Candidates would benefit from using their understanding of experimental and research designs with unseen stimulus material.

Candidates may be asked to consider the following issues when evaluating studies:
- validity
- reliability
- generalisability
- ethics
- objectivity
- subjectivity.

Therefore, centres may want to evaluate the studies in terms of the **experimental and research designs** used (11.1.6). For example, in Topic 2 (memory) candidates are required to learn about Peterson and Peterson (1959) (2.2.2) who used an **independent measures design** (11.1.6a) in part 2 of their experiment. Candidates can then look at the strengths or weaknesses of the use of this experimental and research design in the Peterson and Peterson (1959) study.

Jacob is carrying out psychological research into the role of rehearsal in memory. He gives his participants a word list to learn and later recall. Half of his participants are allowed to rehearse the word list before recall and the other half of participants are not allowed to rehearse the word list before recall.

What is the experimental and research design that Jacob used? What is a strength of the experimental design that Jacob used in his study?

11.1.7 Understand the reliability and validity of the following when analysing the planning and conducting of research procedures:

a. sampling methods
b. experimental designs
c. quantitative methods
d. qualitative methods

Candidates should understand the difference between **reliability** and **validity** (11.1.7). They need to have an understanding of how the reliability and validity of psychological research is influenced by the use of different **sampling methods** (11.1.5), **experimental designs** (11.1.6), and **quantitative** and **qualitative methods** (11.1.9–11.1.16, 11.2.5). Candidates should be able to state how the reliability and validity of psychological research could influence the process of planning, conducting or analysing a study.

Jacob is carrying out psychological research into the role of rehearsal in memory. He gives his participants a word list to learn and later recall under different conditions. Jacob uses a repeated measures design. Jacob gathers and analyses quantitative data in his study.

How could the validity of Jacob's results be affected by the use of a repeated measures design? Why did Jacob use quantitative data in his study?

11.1.8 Understand ethical issues in psychological research and how to deal with ethical issues, including:

a. informed consent
b. deception
c. confidentiality
d. right to withdraw
e. protection of participants

Candidates need to understand **ethical issues in psychological research** (11.1.8). The British Psychological Society (BPS) is the representative body for psychology in the UK. The BPS provides guidelines for psychologists to conduct research in an ethical way. They have published guidelines (Code of Ethics and Conduct, 2009; Code of Human Research Ethics, 2014) which are very comprehensive and give detailed guidance for researchers, teachers and practitioners regarding ethical issues that need to be considered. Teachers delivering the GCSE course (or any pre-tertiary psychology qualification) would be encouraged to read both published documents (see Resources and references). Candidates do not need a comprehensive understanding of the published guidelines.

Within the guidelines that have been published, candidates need to understand **informed consent** (11.1.8a), **deception** (11.1.8b), **confidentiality** (11.1.8c), **right to withdraw** (11.1.8d) and the **protection of participants** (11.1.8e). Candidates should be able to identify ethical issues with psychological research and be able to suggest how to deal with relevant ethical issues. Candidates would benefit from using their knowledge and understanding of ethical guidelines with unseen stimulus material.

Candidates may be asked to consider the following issues when evaluating studies:

- validity
- reliability
- generalisability
- ethics
- objectivity
- subjectivity.

Therefore, centres may want to evaluate the studies in terms of **ethics** (11.1.8). For example, in Topic 5 (social influence) candidates are required to learn two studies (5.2) that could be evaluated in terms of their ethics. Questions could be raised about the role of **informed consent** (11.1.8a) in Piliavin et al. (1969) and also the possible lack of **protection for the participants** (11.1.8e). In Haney, Banks and Zimbardo (1973) the participants may not have felt that they had the **right to withdraw** (11.1.8d) and the study had a noticeable mental and possibly physical impact on the participants, which may indicate violation of the **protection of participants** (11.1.8e).

Jacob is carrying out psychological research into memory. His participants learn and later recall a word list. Jacob puts the participant name and recall performance on the school website.

What is an ethical issue with Jacob's study? How could Jacob have avoided the ethical issue in his study?

Understand research methods, including the features, strengths and weaknesses of the following, and the types of research for which they are suitable:

11.1.9 laboratory experiment

11.1.10 field experiment

11.1.11 natural experiment

11.1.12 interview, including
- **a. structured**
- **b. semi-structured**
- **c. unstructured**

11.1.13 questionnaire, including
- **a. closed-ended questions to elicit quantitative data**
- **b. open-ended questions to elicit qualitative data**

11.1.14 correlation

11.1.15 case study

11.1.16 observation

Candidates need to understand eight research methods, including their features, strengths and weaknesses, and their suitability for psychological research. The methods include **experiments** (laboratory 11.1.9, field 11.1.10, natural 11.1.11), **surveys** (interviews 11.1.12, questionnaires 11.1.13), **correlation** (11.1.14), **case study** (11.1.15) and **observation** (11.1.16). The features of a method involve the defining characteristics of the method, which may be shared between different methods or may be unique to that method. For example, the manipulation of the **independent variable** (11.1.1a) is part of a laboratory experiment. The strengths and weaknesses of the methods could be considered in terms of **validity** or **reliability** (11.1.7) and how the features affect the results collected. For example, a laboratory experiment takes place in an artificial setting for the participants which could reduce **situational variables** (11.1.1ci) and therefore increase the internal validity of the results.

It could benefit candidates to use applied examples and unseen stimulus material when assessing the different methods. Centres are encouraged to generate scenarios that offer candidates the opportunity to demonstrate their knowledge and understanding of the research methods in their application to the scenario or stimulus material.

Candidates may benefit from having a study example for each method and it may be helpful to carry out practical activities for some of the research methods specified. For example, a **laboratory experiment** (11.1.9) could be used when studying memory (Topic 2), or a **questionnaire** (11.1.13) could aid understanding when studying social influence (Topic 5). It could be beneficial for candidates to study the methods within the compulsory or chosen optional topics – for example, the **interview** method (11.1.12) for psychological problems (Topic 3), or the **case study** (11.1.15) method for the brain and neuropsychology (Topic 4).

Candidates may be asked to consider the following issues when evaluating studies:

- validity
- reliability
- generalisability
- ethics
- objectivity
- subjectivity.

Therefore, centres may want to evaluate the studies in terms of the **research method** used (11.1.9–11.1.16). For example, Peterson and Peterson (1959) is a **laboratory experiment** (11.1.9) so candidates could consider that the study may lack ecological validity or have greater objectivity because of this.

Jacob is carrying out psychological research into the role of rehearsal in memory. He gives his participants a word list to learn and later recall under different conditions.

What is a feature of a laboratory experiment?

How could Jacob carry out his study using a laboratory experiment?

What is a weakness of using a laboratory experiment in Jacob's study?

Why might a laboratory experiment be the most suitable method to conduct Jacob's study?

11.2 Data analysis

In order to be able to develop their skills, knowledge and understanding in psychology, candidates need to have been taught, and demonstrate competence, to select and apply specified areas of mathematics relevant to research methods in psychology. These were specified in Appendix A of the DfE Psychology GCSE subject content (see Resources and references). All of the mathematical content specified must be assessed within the lifetime of the specification. Centres may want to use a mathematics specialist to deliver part (or all) of the data analysis area of the specification. The mathematics requirements could be delivered throughout the qualification, or as a single topic.

The mathematical requirements are exemplified below.

11.2.1 Arithmetic and numerical computation:

a. recognise and use expressions in decimal and standard form
b. estimate results
c. use an appropriate number of significant figures

Candidates need to be able to perform arithmetic and numerical computations, including the use of **decimals** (11.2.1a), **estimating results** (11.2.1b) and the **use of appropriate numbers of significant figures** (11.2.1c).

Jacob is carrying out psychological research into the role of rehearsal in memory. He finds that 60% of his participants are male and 40% are female. The mean recall for the males is 10.5654 words and the mean recall for the females is 12.1232 words.

What is the percentage of male participants as a decimal?

What is the mean recall for males to three significant figures?

11.2.2 Be able to understand and use, including calculations:

a. mean, and finding arithmetic means
b. median
c. mode
d. ratios
e. fractions
f. percentages
g. range as a measure of dispersion
h. know the characteristics of normal distributions

Candidates need to be able to understand, calculate, and use **averages** (mean, median, mode) (11.2.2a, b, c), **ratios** (11.2.2d), **fractions** (11.2.2e), **percentages** (11.2.2f), the **range** (11.2.2g), and the **characteristics of normal distributions** (11.2.2h).

Candidates may be asked to consider the following issues when evaluating studies:

- validity
- reliability
- generalisability
- ethics
- objectivity
- subjectivity.

Therefore, centres may want to consider the data that studies have used and to evaluate them in terms of the **quantitative analysis** (11.2.2). For example, Peterson and Peterson (1959) (2.2.2) used quantitative data in terms of the **mean** number of seconds to begin their recall (11.2.2a) and calculated **percentage** of recall after different time intervals (11.2.2f). This type of data is more objective so could therefore be considered a strength of the study.

Jacob is carrying out psychological research into the role of rehearsal in memory. His results for participants who were allowed to rehearse were:

15, 11, 10, 13, 18, 19, 14

What is the median recall for the participants who were allowed to rehearse?

The total amount of words recalled for those allowed to rehearse was 100 whereas the total amount of words recalled for those not allowed to rehearse was 50.

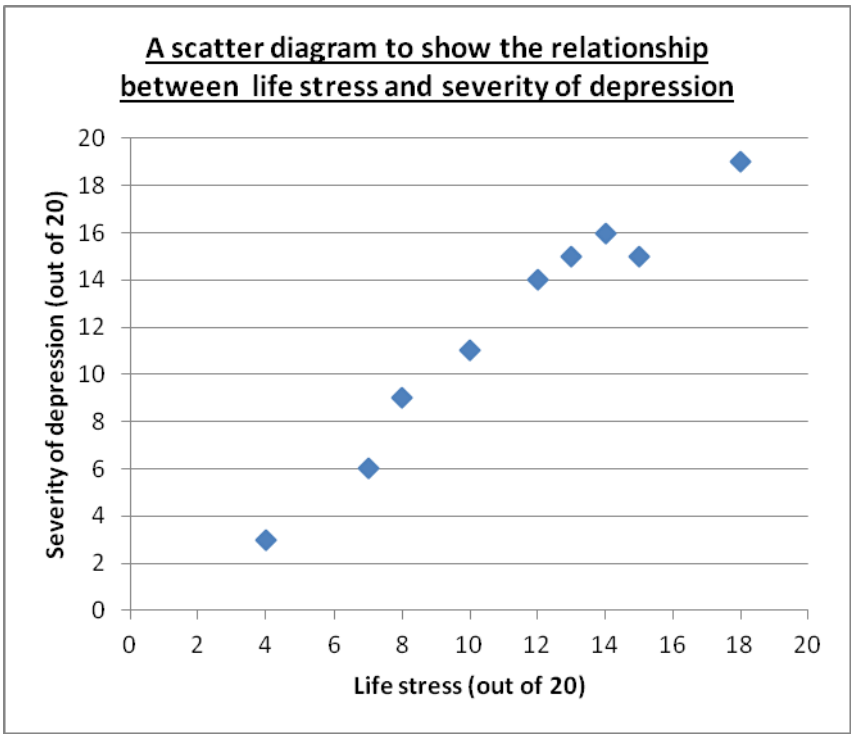
What is the ratio of those allowed to rehearse to those not allowed to rehearse in its lowest possible form?

11.2.3 Be able to:

a. construct and interpret frequency tables and diagrams
b. construct and interpret bar charts
c. construct and interpret histograms
d. construct a scatter diagram
e. use a scatter diagram to identify a correlation between two variables
f. translate information between graphical and numerical forms
g. plot two variables from experimental or other data and interpret graphs

Candidates need to be able to **construct and interpret frequency tables and diagrams** (11.2.3a), **bar charts** (11.2.3b), **histograms** (11.2.3c) and **scatter diagrams** (11.2.3d). They should also be able to identify a **correlation on a scatter diagram** (11.2.3e) including positive, negative and no correlations. Also, candidates need to be able to **interpret graphs** to extract data and **plot data** on the different diagrams or graphs (11.2.3f, g).

For example, a scatter diagram like the one below could be given to candidates and they are then asked to interpret it in the examination.



Jacob is carrying out psychological research into the role of rehearsal in memory. The mean recall for those who were allowed to rehearse was 15 words. The mean recall for those who were not allowed to rehearse was 10 words.

Draw a bar chart to show the mean recall for the two conditions in Jacob's study.

11.2.4 Understand, and know the difference between:
a. primary data
b. secondary data

Candidates need to understand what **primary** and **secondary data** (11.2.4) are and know the difference between them. Candidates may benefit from using studies from their compulsory or optional topics to show the difference between primary and secondary data; for example, primary data collected from Bartlett (1932) when studying memory (Topic 2, 2.2.1) and the use of secondary data in Damasio et al. (1994) when studying the brain and neuropsychology (Topic 4, 4.2.1).

Candidates may be asked to consider the following issues when evaluating studies:
- validity
- reliability
- generalisability
- ethics
- objectivity
- subjectivity.

Jacob is carrying out psychological research into the role of rehearsal in memory. He collected the mean recall of a word list.

Is the data collected in Jacob's study primary or secondary?

What is one difference between primary and secondary data?

11.2.5 Understand, and know the difference between:
a. qualitative data
b. quantitative data

Candidates need to understand what **qualitative** and **quantitative data** (11.2.5) are and know the difference between them. Candidates may benefit from using studies from their compulsory or optional topics to show the difference between qualitative and quantitative data; for example, qualitative data collected in Damasio et al. (1994) when studying the brain and neuropsychology (Topic 4, 4.2.1) and the use of quantitative data in Peterson and Peterson (1959) when studying memory (Topic 2, 2.2.2).

Jacob is carrying out psychological research into the role of rehearsal in memory. He collected the mean recall of a word list.

Is the data collected in Jacob's study qualitative or quantitative?

What is one difference between qualitative and quantitative data?

11.3 Issues and debates

11.3.1 Understand ethical issues in psychological research, including:
a. know the term 'ethical issue(s)'
b. use content, theories and research drawn from the compulsory topics (Topics 1, 2, 3, 4, 5) to explain ethical issues in psychological research

The issues and debates content in each compulsory topic, including research methods, is designed to enable candidates to understand the wider issues in psychology that underpin psychological knowledge and research. These are delivered within specific topic content.

Issues and debates will be specifically assessed in Paper 1 through an extended open-response question.

Ethical issues (11.3.1) have been included in the research methods topic (Topic 11). Candidates need to understand ethical issues in psychological research, which is directly underpinned by the earlier requirement to understand ethical issues in psychological research and how to deal with **ethical issues** (11.1.8).

In addition to the earlier understanding of **ethical issues** (11.1.8), candidates need to know the term ethical issue(s) and be able to use content, theories and research drawn from the compulsory topics to explain ethical issues in psychological research.

Teachers may wish to deliver all of the ethics content at the same time (11.1.8, 11.3.1) or may prefer to deliver a basic understanding of ethics earlier in the course (11.1.8) with the wider focus towards the end (11.3.1).

Candidates should be able to offer ethical issues from the studies taught throughout the compulsory and optional topics. For example, the **protection of participants** (11.1.8e) could be a relevant ethical issue for both Piliavin et al. (1969) (5.2.1) and Haney, Banks and Zimbardo (1973) (5.2.2) when studying social influence (Topic 5). Further considerations of ethical issues could be explored in more detail, such as the issue of deception (11.1.8b) in terms of whether this guideline would affect the validity and usefulness of psychological research.

Candidates should be able to offer ethical issues from the content taught throughout the compulsory and optional topics; for example, whether **informed consent** (11.1.8a) can be gained in studies of people with brain damage when studying the **impact of neurological damage on cognitions and behaviour** (4.1.4) in the brain and neuropsychology (Topic 4), or when studying those with different forms of **amnesia** (2.1.3) in memory (Topic 2).

Candidates would benefit from being able to offer ethical issues from the theories taught throughout the compulsory and optional topics; for example, the possible issue of **protection of participants** (11.1.8e) when testing theories such as social learning theory for criminal behaviour (6.1.1) when studying criminal psychology (Topic 6), or **informed consent** (11.1.8a) when testing theories such as Carol Dweck's Mindset Theory (1.1.3) with children when studying development (Topic 1).

David is arguing with his friend about how ethical psychological research has been. David says that lots of research has been unethical and gives the example of Piliavin et al. (1969) and research into amnesia. His friend says that the research has made an important contribution to understanding of human behaviour, regardless of ethics.

What are the ethical issues in psychological research?
What are the strengths and weaknesses of using ethics in research?

Resources and references

Research methods

Sources suggested here are additional guidance for centres to aid with teaching resources and ideas. These are not compulsory components and centres should select delivery content as appropriate to their candidates. Centres can draw upon any research evidence to support evaluations and explanations of topic areas. This list is not exhaustive.

Ethical issues

British Psychological Society (BPS) page on ethics
http://www.bps.org.uk/what-we-do/bps/ethics-standards/ethics-standards

BPS code of Ethics and Conduct (2009)
http://www.bps.org.uk/system/files/Public%20files/aa%20Standard%20Docs/inf94_code_web_ethics_conduct.pdf

BPS code of Human Research Ethics (2014)
http://www.bps.org.uk/system/files/Public%20files/code_of_human_research_ethics_dec_2014_inf180_web.pdf

DfE GCSE subject content

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/513599/gcse-subject-level-conditions-and-requirements-for-psychology.pdf

Teacher resource sharing

Further suggested resources can be found in the 'Getting Started' publication, where a scheme of work has been provided.

http://www.psychlotron.org.uk
http://www.psychteacher.co.uk
http://www.resourcd.com

Teacher and student resource sites

http://www.simplypsychology.org/ – this website gives an overview of many of the key areas.

https://www.psychologytoday.com/ – this is an online magazine (with an option to subscribe) that brings psychological theories into modern, contemporary issues.

https://play.google.com/store/search?q=psychology%20free%20books&c=books&hl=en – this site has a number of free short books about key areas of psychology.

http://www.open.edu/openlearn/body-mind/psychology – The 'OpenLearn' programme offers freely accessible resources provided by the Open University.

http://allpsych.com/ –a useful site with books, articles and summaries of some of the key concepts.

https://www.youtube.com/playlist?list=PL8dPuuaLjXtOPRKzVLY0jJY-uHOH9KVU6 – Psychology 'Crash Course' is a YouTube channel that provides 40 short overviews of psychological issues.

http://www.bbc.co.uk/programmes/b008cy1j – 'BBC Mind Changers' is a series of radio episodes (that can also be downloaded) about key psychologists, their work and the development of psychology over time.

http://www.bbc.co.uk/programmes/b006qxx9 – 'BBC In the Mind' is a series of radio episodes that focus on the human mind using the application of psychological concepts and theories.

**All weblinks included here have been checked as active at publication, however the nature of online resources is that they can be removed or replaced by webhosting services and so it cannot be guaranteed that these sites will remain available throughout the life of the qualification.*