

# **OCR Psychology A-level**

Paper 1: Research Methods

Experiments

When conducting psychological research, different types of research methods can be used to scientifically investigate certain issues in order to gain an understanding. This revision sheet will cover how experiments work and the strengths and weaknesses of this method.

### **EXPERIMENT:**

a method of testing a hypothesis through manipulating an independent variable (the variable being changed) and measuring the outcome of the changes (dependent variable).

**When designing an experiment, these are the aspects to consider:**

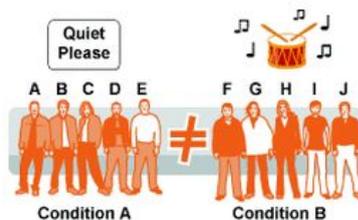
- Experimental design
- Laboratory, Field or Quasi
- Hypotheses
- Sample and sampling method
- Ethics
- Independent, dependent and control variables

**This document will go through each of these aspects in detail.**

You should know each of these for the core studies, and be familiar with each of them so you can answer questions in the exam. In paper 1, the 15 marker will require knowledge of at least 3 of these features and how you would conduct your own research!

### **Experimental Designs:**

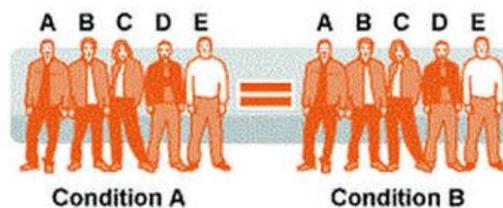
- **Independent Measures Design**
  - Different participants take part in each condition, which will vary according to the independent variable.



<u>Strengths of independent measures design</u>	<u>Weaknesses of independent measures design</u>
Participants are less likely to experience fatigue, practice or behavioural effects.	When using different participants in each group, it is impossible to control individual differences (an extraneous variable) which can cause inaccurate results.
If all other extraneous variables are controlled, it is easier to establish that the effect of the changes in groups are due to the variable being tested.	A larger sample of participants is required for independent measures which can be less time efficient.

- **Repeated Measures Design**

- An experimental design in which the same participants take part in each condition.



<u>Strengths of repeated measures design</u>	<u>Weaknesses of repeated measures design</u>
It is unlikely that the results will be distorted by individual differences as each condition will see these differences, thus allowing more accurate results.	Participants might guess the aim of the task as they repeat the experiment in different conditions. This can result in demand characteristics.
The sample required may be smaller as every participant can repeat conditions.	Order and fatigue effects can cause an inaccurate reflection of the behaviours caused by the varying conditions.

- **Matched Pairs Design**

- Different participants take part in each condition, however, is participant is matched according to certain characteristics with another participant in the other condition. Matched characteristics may include grades at school, age, religion, or any other relevant aspects that could potentially act as extraneous variables.

<u>Strengths of matched pairs design</u>	<u>Weaknesses of matched pairs design</u>
Order/practice/fatigue effects should not alter the results.	It is difficult and time consuming to try and match participants on all characteristics, and the complexity of our lifestyles means there may still be extraneous variables.
As participants only see a condition once, it is unlikely they'll guess the aim of the study.	Shared characteristics may be expressed of effect different people in different ways, meaning that despite a matching, these variables may alter behaviour differently.

### Types of Experiments: Laboratory, Field and Quasi

- **Laboratory Experiment**

- An experiment **carried out in a highly controlled environment, which will be an unnatural setting**. This may be an actual lab for more scientific based studies (e.g one involving fMRI) or a classroom in a university for example.
- Researchers will control for extraneous variables and ensure the procedure is fully standardised and replicable.
- It is easier to be confident that the IV truly affected the DV due to high control.
- The artificial setting may result in unrealistic behaviours, causing lab experiments to lack ecological validity.
- Furthermore, the researcher is often present which may lead to demand characteristics.

- **Field Experiment**

- The **setting of the experiment is natural** regarding the behaviours intended to be observed, but there is still a clear IV and DV.
- For example, researching how noise effects study behaviours in a sixth form library is a field experiment, as opposed to conducting the same research in an artificial environment set up by the experimenter (a laboratory experiment).
- The behaviours should reflect true responses as the situation is normal to the participants.
- This further lowers the effect of demand characteristics as participants may not even be aware they are being studied.

- **Quasi Experiment**

- In a Quasi experiment, the IV is not directly manipulated as it **naturally occurring or unethical to manipulate** within the participants
- Examples of naturally occurring variables include: age, gender, cognitive disorders such as tourettes or autism, disabilities ect.
- The participants with the independent variable being studied can be grouped according to severity of level of the variable, for example, high and low functioning autism. Alternatively, they may not be grouped and instead just individually studied.
- Quasi experiments can be very useful for conducting ethical, socially sensitive research or researching rare cases.
- However, they are difficult to replicate either due to the scarcity of the sample or due to unique individual cases.

## Understanding and Writing Hypotheses

### Research Aim:

- In a study, the research aim is what the researchers aim to find out about a particular phenomenon or topic. For example, a study investigating the effect that environment has on memory recall (always put the aim into the context of the investigation subject in exam questions!).

### Research Question:

- The research aim of the investigation phrased as a research question, for example, does learning environment affect memory recall ability?

### Hypothesis:

- A specific, testable prediction of how one variable in an experiment will affect another variable.

### Null Hypothesis:

- A hypothesis that predicts that the IV has no effect on the dependent variable. Any results or trends found are due to error or statistical chance. It is accepted if statistical tests show no significance.

### Alternate Hypothesis:

- A hypothesis that states there is a significant relationship between the two variables being studied and that the results were not due to chance, therefore supporting the theory being investigated.
- When conducting a study, researchers will formulate a null and alternate hypothesis relevant to the study, and only after statistical tests show either significance or not will one be accepted.

### **One tailed Hypothesis:**

- A hypothesis that predicts the exact direction of which the independent variable will affect the dependent/ measured variable.
- For example: The more time children spend watching television adverts will significantly increase their demand for the advertised toys at christmas.

### **Two tailed Hypothesis:**

- A hypothesis that predicts that an effect will occur between the independent and dependent variable, but not in a specified direction.
- For example: The amount of time spent sleeping at night will have a significant effect on response rates the following day.

### **Operationalizing a Hypothesis:**

- Ensuring that when writing a hypothesis, all details are included so that the statement is unambiguous and clearly predicts the effects of the study.
- For example: Eating their favourite food will have a positive effect on the participants' mood (measured on a scale of 1 - 10, 1 being extremely negative, 10 being extremely positive in response to "How do you feel?") compared to eating their least favourite food.
- If asked to write a hypothesis in the exam (a common question!), always write what is asked (alternate, null, one or two tailed) and clearly operationalise it.

### **Type 1 Error:**

- The rejection of a true null hypothesis (a false positive).
- In other words, the researchers accept the alternate hypothesis (saying the results DO show a significant relationship) when this was incorrect, and they should have accepted the null (there is no statistically significant relationship).

### **Type 2 Error:**

- Failing to reject a false null hypothesis (a false positive)
- In other words, the researchers accept the null hypothesis (thinking the results were insignificant) when in fact they were, and should have accepted the alternate hypothesis.

## **Samples and Sampling Methods**

In any psychological experiment, you will need to have a sample who represent the population you wish to research. To collect a sample, there are several different techniques you can use which all have their strengths and weaknesses.

### **A good sample should:**

- Represent the **target population** - the set of people that researchers intend to investigate and apply findings to.

- Be **unbiased** - they may not accurately represent the target population, eg. some groups in the population may be excluded accidentally.

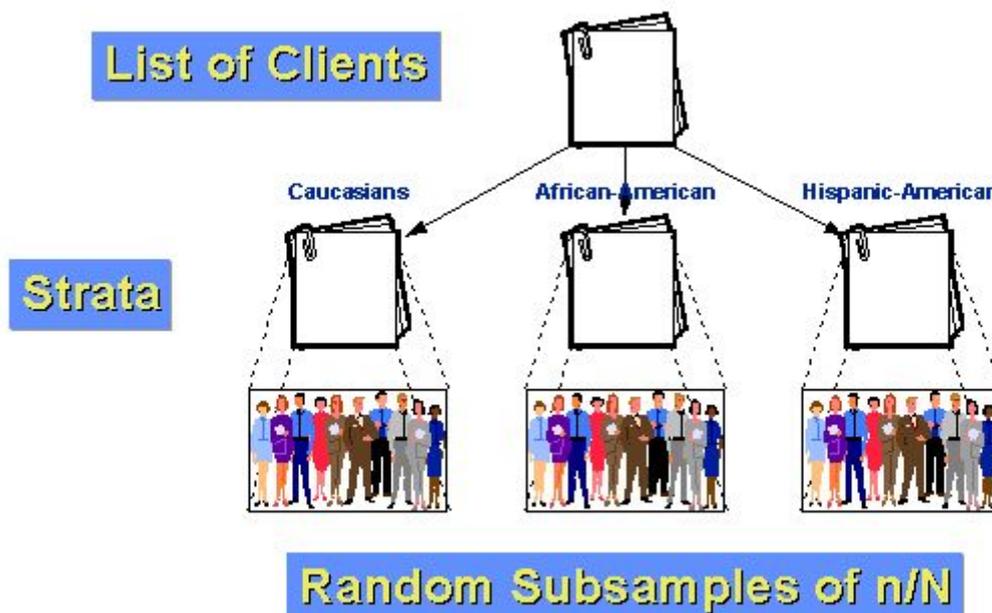
These are the types of sample bias you must know:

- **Gender Bias:** The sample only represents one gender despite the target population containing multiple/all genders.
- **Androcentric:** A sample that contains a disproportionate amount of males
- **Gynocentric:** A sample that contains a disproportionate amount of females (not representative of the actual gender proportions in the target population)
- **Cultural Bias:** Too focussed on one culture/ ignores other cultures
- **Ethnocentric:** Research results that are generalised to different cultures despite only being conducted on one culture, thus disregarding how different cultures may have different results.
- **Population Validity:** Being able to generalise results from the sample to the target population and still be true - this requires no biases!

### Sampling Techniques:

- **Opportunity Sampling**
  - Gathering a sample from the target population by asking people who are available and consenting at the time of the research.
  - For example, if the target population is college students, I could ask for the first 20 people that I see round campus if they'd like to participate.
  - Quick and time efficient
  - Not necessarily representative due to chance and is open to accidental researcher bias (only choosing certain people based on looks for example).
- **Self-Selecting**
  - Participants choose themselves to take part in the study through response to recruitment offers often through adverts or emails.
  - Volunteers are more likely to commit to the study and be fully involved in the study.
  - Less chance of participant attrition (participants dropping out of the study mid way) as they have chosen to be involved so are unlikely to change their minds.
  - Can gain a large sample quite quickly, that reaches a broad and representative audience.
  - There is a chance that not many people will see the advert or be interested enough to respond, leaving to a small sample, creating invalid results.
  - There may be inherent bias in the participants as similar types of people may sign up due to interest/need for money/ experience doing studies. This could lead to bias and unrepresentativeness.
- **Snowball Sampling**
  - Collecting a group of participants, and gaining the rest of the sample through recruitment from these participants themselves.
  - For example, 5 psychology research students could choose 10 friends each to create a sample of 50 people.

- Snowball sampling can allow you to access people that you may not otherwise be able to recruit. For example, people who take drugs or have addictions.
  - It can however have bias as people's friends or family are likely to share characteristics, meaning the sample is not representative of a wide enough group of people to be accurately representative.
- **Random Sampling**
    - Collecting a sample by ensuring each member of the target population has the same chance of being selected as any other member. This should in theory collect a representative sample with no bias with equally distributed characteristics.
    - Though in theory it should be random and fair, it could pull a sample all from the same area, same gender or of disproportionate age distribution.
    - It can be highly time consuming to gather details of every member of the target population if it is quite large.
    - An example of how a random sample can be done is drawing names from a hat.
    - Not everyone who is picked may consent to take part, meaning it can take a long time for the experiment to actually begin.
- **Stratified Sampling**
    - All types of members of the population are represented proportionally by selecting different numbers of participants from all strata. E.g, if the proportion of the target population included 60% people over 50, the sample would also include this distribution.
    - The sample will be representative and have no biases.
    - This method is difficult, costly and time inefficient. The target population must also be fully accessible.



## Ethics

Whenever psychological research is to take place, researchers must ensure that they meet all the ethical guidelines and requirements set by BPS's Code of Ethics and Conduct (British Psychological Society).

**Ethics:** a moral code that psychologists follow in order to protect both the participants and the experimenters.

There are four groups of ethical considerations that you must know for this specification: **respect, competence, responsibility and integrity.**

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### Respect

**Informed Consent:** The participant must give official and explicit consent to take part.

**Right to Withdraw:** The participant must have the right to withdraw from the experiment at any time, and should know of this right.

**Confidentiality:** The personal details or private results gained must be kept confidential and anonymous unless the participant consents to otherwise.

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### Competence

The psychologists must provide the services they may give, such as academic or training, to a high ability where specialist knowledge is concerned.

For example, psychologists should consider how the care for participants and any skills they must have, such as interview skills, whilst running the experiment.

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### Responsibility

**Protection from physical or psychological harm:** The experiment must not physically or psychologically damage the participant or cause long term changes.

**Debrief:** After an experiment where the aim has been unclear, the researchers and psychologists must make it very clear to the participants what the actual aim of the study is and answer any questions that participants may have or feel uncomfortable about.

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### Integrity

**Deception:** The researchers must be honest in their acts and the outcomes of the experiments itself. Whilst some information may need to be hidden, like the aim, for methodological reasons, participants should not be lied to or deceived for no reason.

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### Independent, dependent and control variables

Every experiment has variables to change, control and measure.

The **INDEPENDENT** measure is the one you change. It will result in varying conditions in the experiment to test the result of a change in that variable. Eg. different temperatures.

The **DEPENDENT** measure is one that the conclusion 'depends' on - it is the variable that you measure as a result of changes made in that condition.

The **CONTROL** variables are extraneous variables that are isolated and controlled, usually in laboratory experiments, in order to avoid them becoming confounding variables (and altering the results).

**INDIVIDUAL** variables (or individual differences) are variances in each person that can sometimes be categorised or identified but not fully controlled for. Eg. People with similar upbringings could be used in a matched pairs design, but not all their individual variables are controlled for through this method.

**CONFOUNDING** variables are outside influences that alter the dependent variable.