



Research Methods I

Variables, Samples and Quantitative / Qualitative Research

Stacey Coleman

Research Methods in Psychology

- Qualitative versus quantitative
- Basic versus applied research
- Experimental versus non-experimental

Qualitative and Quantitative

Qualitative



Focuses on obtaining data through open-ended and conversational communication

Data is
FREE TEXT / WORDS

Plus sometimes visual aids
and audio

- **Qualitative research:**

- We are interested in the specific experiences of our sample
- The 'life-world' of the participants we interview etc
- We **do not** attempt to generalise to larger populations

Qualitative and Quantitative

Quantitative



Systematic investigation of phenomena by gathering quantifiable data - performing statistical analysis

Data is NUMBERS

Categories or continuous
Nominal, ordinal, interval
and ratio

- **Quantitative research:**
 - We are not really interested in the sample that we study - we are interested in the **target population**
 - We want to be able to generalise our results to this target population



Qualitative Methods and Data		Quantitative Methods and Data
Rich	INFORMATION	Narrow
Subjective	INTERPRETATION	Objective
Realistic, natural	SETTING	Artificial
Loosely structured	DESIGN	Highly structured
High	REALISM	Low
Low	RELIABILITY	High
High	REFLEXIVITY	Low

Qualitative Research Methods



Ethnographic Research

The most in-depth observational method that studies people in their naturally occurring environment

Requires researcher to adapt to the population's environment

Relies on first-hand experience of natural settings over discussing participants experiences

Ethnographic Research

Advantages

- ✓ Can investigate complex issues
- ✓ Takes a holistic view of a phenomenon

Disadvantages

- × Time consuming and expensive
- × Requires a well-trained researcher
- × Ethical concerns

Focus Groups

One of the most common qualitative methods

Includes a small number of participants (6-10) who have something in common

Allows individuals to interact with each other in response to a particular topic

Make use of group dynamics to stimulate discussion, generate ideas and gain insights

Focus Groups

Advantages

- ✓ Less time-consuming than one-on-one interviews
- ✓ Useful for studying social processes
- ✓ Allows researcher to observe body language in addition to self-reports

Disadvantages

- ✗ More time consuming than survey research
- ✗ Some participants likely to dominate entire group / discussion

One-on-One Interview

One of the most common qualitative methods

Personal interview with one participant at a time

Can be carried out face-to-face or via telephone

Tend to last between 30 mins to 2 hours

Face-to-face gives a good opportunity to read body language

One-on-One Interview

Advantages

- ✓ Potential to gather rich and detailed information from each participants
- ✓ Conversational nature useful for discussing sensitive or complex issues
- ✓ Interviews can be used as part of a pilot study to gather information prior to conducting quantitative research

Disadvantages

- × Time and expense
 - × Interviewing and transcription
- × Social desirability bias can occur

Case Study Research

An in-depth analysis of an individual, group, or event

Seeks to identify how humans and other animals behave, particularly in their real-life context

Relies on multiples sources of evidence/research in most cases

Case Study Research

Advantages

- ✓ Provide rich (qualitative) information
- ✓ Provides insight for further research
- ✓ Can permit investigation of otherwise impractical/unethical areas

Disadvantages

- ✗ Lacking in scientific rigour
 - ✗ Cannot determine cause and effect
- ✗ Difficult to replicate or generalise findings
- ✗ Time-consuming and expensive
- ✗ Researcher bias - subjective

Observation

Researcher observes a behaviour as it occurs in a natural setting, and attempts to avoid influencing that behaviour

Nothing is manipulated in the observation

This method is used when there are variables that cannot be directly manipulated for ethical or practical reasons

Not 'true' experiments - quasi experiments because researcher cannot determine a true cause and effect

Observation (naturalistic)

Habituation: the process in which people typically adapt to and ignore the presence of an observer as time passes

Advantages

- ✓ Behaviour can be observed in natural settings with little or no influence
- ✓ No artificial labs, no uncomfortable or inaccurate behaviour

Disadvantages

- ✗ Cannot establish a causal relationship
- ✗ Very little control over other variables

Quantitative Research Methods



Correlational Research

Non-experimental method of research

Investigates variables that exist amongst people irrespective of any research intervention

Investigates existing group differences, or correlation (relationship)

Correlational Research

Three components to correlation research:

1. Research measures one variable (X)
2. Research measures a second variable (Y)
3. Researcher (statistically) determines whether (X) and (Y) are related

Correlational Research

Advantages

- ✓ Can establish generalisation outside of a lab setting
- ✓ Can generate ideas for further lab study
- ✓ Allows examination of variables that may not be practical or ethical to study in the lab

Disadvantages

- ✗ Cannot indicate causation
- ✗ Strong relationships between variables can be misleading

Survey Research

Information about a topic is obtained by administering questionnaires or interviews to many people



Types of surveys/questionnaires:

Cross-sectional

Longitudinal/ prospective

- Able to follow up over time
- Allows prediction about causality

Randomised controlled trials

- Gold-standard in psychological research

Survey research

Advantages

- ✓ Allows us to collect large amounts of data quickly and inexpensively
- ✓ We can ask about an almost limitless variety of attitudes, perceptions, experiences

Disadvantages

- × Unrepresentative samples can produce distorted results
- × Self-reports can be biased – people may not want to admit their attitudes or behaviours
- × Cannot indicate causation

Survey Research: Samples

POPULATION:

- All of the individuals that we are interested in drawing a conclusion about

SAMPLE:

- A subset of the individuals drawn from the larger population

Samples

SAMPLING FRAME:

- Specified range of people from whom a sample will be drawn. Those within a population who can be sampled.

TARGET POPULATION:

- Similar to sampling frame but more theoretical. The assumed population from which a sample is to be drawn. The aim is often to generalise sample results to this population.

Samples

BIASED SAMPLES:

- Where members of a sub-group of the target population are over- or under-represented

SAMPLING BIAS:

- Systematic tendency towards over- or under-representation of some categories in a sample

Sampling

Does it matter if not all individuals are the same?

- If all members of a population were identical, the population is considered to be ***homogenous***
 - That is, the characteristics of any one individual is the same as the characteristics as any other individual (little or no variation among individuals)
- Sampling is the process of selecting individuals (participants/ a sample) to provide an adequate description and robust inference of the population
- The sample we choose should be **representative** of the population

Representative Samples

How do we get a **representative sample**?

Say, for example, we are interested in exploring levels of depression in individuals who own dogs...

What would we need to do?



Representative samples

- A **representative sample** is one that reflects the important characteristics of the population

Dog owners and depression study

- Population of interest?

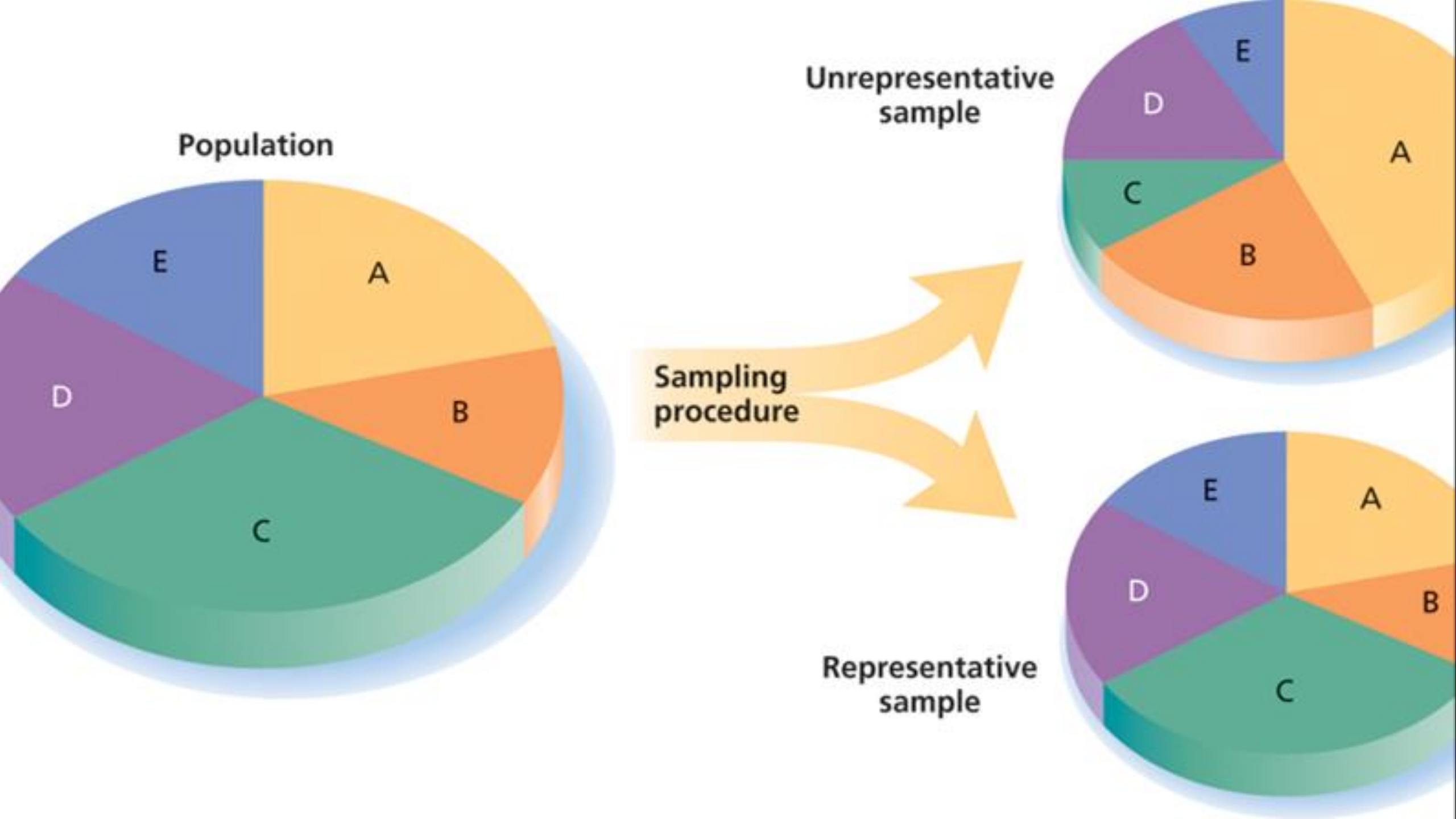


Every single dog owner!

- Sample?



We can't ask questions of EVERY dog owner, so we take a sample of this population



Samples



In psychological research,
we are interested in
people!



Who we include in our
research studies is hugely
important for the validity of
our research findings



Sample size is extremely
important in statistical
analyses

Types of Sampling

Probability-Based Sampling Methods

- **The simple random sample:** Every member of the target population has an equal chance of being selected and all possible combinations can be drawn
 - Computer selection, random number tables, manual selection, random allocation to groups, random trial order and sequencing of study materials

Types of Sampling

Probability-Based Sampling Methods

- The systematic random sample: Every n th case (where n is any number) from a list of the target population is selected. Every case has an equal chance of being in the sample

Types of Sampling

Probability-Based Sampling Methods

- Stratified sampling: Specified sub-groups will appear in numbers proportional to their size in the target population; within each group cases are randomly selected.

Types of Sampling

Probability-Based Sampling Methods

- Cluster samples: Groups in the population selected at random from among other similar groups and assumed to be representative of a population.

Types of Sampling

Non-Probability-Based Sampling Methods

- Quota: Samples selected so specified groups appear in numbers proportional to their size, BUT not randomly. Study stops capturing data once a quota is reached.
-
- Self-selecting sample: Selection based on who arrives at the sampling point

Types of Sampling

- What about if you just select participants from who is available at the time to complete your study?
 - This is called an **opportunity or convenience sample**
 - But what then about the people who aren't available?

✓ Easy in terms of time and therefore money

× Can produce biased samples

Types of Sampling

- Likewise, a sample of volunteers are a self-selected sample
 - May have their own reasons for volunteering
- Does not always include willing volunteers, though
 - And all participants come with their own biases and expectations!

Types of Sampling

Random sampling/selection

- Selection process with no pattern
- Every individual has an equal probability of being selected for a study
- Reduces the likelihood of research bias
- Names are usually selected from a computerised list

Why assign/choose participants randomly?

Samples that are assigned randomly are most likely to be truly **representative** of the population under consideration

Sample Size

- Must be considered before research begins
- Not all the population will be tested.
 - Thus, how many participants are required in order to find a significant effect.
- Links to
 - **Power**: the likelihood an effect will be demonstrated if there is one there
 - **Effect size**: the actual difference/effect that is found

Online Samples

In the current climate, the internet has become a very important source for participants

Advantages

- ✓ Easy and inexpensive way to collect data
- ✓ Not tied to taking part in a physical location or time
- ✓ Very large (diverse) sample
- ✓ Automatic scoring

Disadvantages

- ✗ Unrepresentative samples – access to PC/internet
- ✗ Less control – do not know who is taking part or level of concentration
- ✗ Researcher not available to deal with any issues

Experimental Research



When we are looking for differences between two or more groups, we will normally use an experimental design



Important when exploring cause and effect



Can identify whether one thing affects another

Experimental Research

- The experiment is generally assumed to be the most reliable and effective method for demonstrating that one *variable* has an effect on another *variable* to change
- The term **VARIABLE** is used to describe the empirical object or phenomenon that we are observing

Variables

- A variable is anything that varies - in psychology this usually refers to phenomenon for which an objective measure has been provided.



Measuring Variables

- The essence of studying anything is the observation of changes in variables.
- The essence of scientific research is to relate these changes in variables to changes in other variables.
- The first step is to **quantify** variables and find a way to measure them.
- In Psychology, if we are to work with variables such as attitudes or anxiety, we must be able to precisely specify them for accuracy and communication purposes.



Defining Variables

- **Two main types of variables used in experiments:**

1. Independent variables

2. Dependent variables

Plus – confounding or extraneous...

Independent Variable (IV)



The factor that is manipulated or controlled by the researcher in order to determine their effect on a given behaviour



A variable that influences a certain behaviour OR accounts for differences in a certain behaviour



The IV should **NOT** be influenced by anything else in your study!



Independent Variable (IV)

e.g., simple IV's:

Gender

Age



Researcher chooses what
manipulations to put in
place

e.g., psychological constructs:

Personality type

Dependent Variable (DV)



The factor that is measured by the researcher



The variable that may be influenced by the independent variable



The DV **depends upon** the IV!



EFFECT

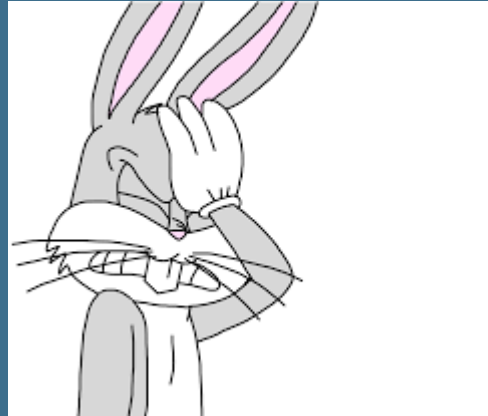
A large, multi-pointed starburst graphic in a light blue color, containing the word 'EFFECT' in a bold, sans-serif font.

But - also need to consider extraneous and confounding variables

1. Extraneous variables...

Other variables which are present during the study which shouldn't effect the study but could potentially become a confounding variables

e.g., noise level, temperature, lighting...



2. Confounding variables...

Other variables which we **should** have controlled for but didn't... and that could actually explain the outcome of your experiment or study

e.g., age, socio-economic status...

Summary

- There are many ways to explore research questions in psychology
- Have to weigh up the benefits and limitations of each approach, and each method used
- Must make sure the design you choose will enable you to answer your research question, and reject or accept your hypotheses (more on this soon!)