# 1. Glossary of Research Terms[1,2]

## What does the jargon mean?

This glossary describes different types of study designs and defines some key concepts and terms you will come across when reading research. It is arranged alphabetically. Words in italics are explained in other sections of the glossary.

## Action research

Action research is an iterative approach which normally takes place within a practice setting. Unlike models of research where data is collected, analysed and published when the project is complete, researchers in an action research model will interact with staff and users, feedback the results in stages and enable changes in direction, based on the findings, to be made while the project is still underway.

## Analysis of covariance (ANCOVA)

Analysis of covariance (ANCOVA) is designed to assess group differences on a single outcome variable while controlling for a removing the effects of other variables (covariates).

## Analysis of variance (ANOVA)

Analysis of variance (ANOVA) is used to compare two or more means to see if there is any statistically significant differences between them.

## Bias

The deviation from the truth or *reliability* of results due to the way(s) in which the study is conducted.

## Blinding

Refers to measures taken to disguise allocation to groups to avoid *bias*. In a *single-blind* study, participants are unaware of which group they have been assigned to, but the researcher does know (or vice versa). A *double-blind study* means that neither the researchers nor the participants are aware of the allocation to groups.

## Case-control studies

Individuals with a particular problem are 'matched' with similar people (*control group*) without the problem. Case-control studies typically use patients who already have a particular medical condition (e.g. lung cancer) and examine these individuals' characteristics to see if they differ from those who do not have the condition.

## Case study

A case study refers to the in-depth investigation of a single subject or event. The most useful case studies highlight important issues that, while being from the perspective of only one person, can represent a commonly experienced problem.

## Chi-square test

Chi-square is a family of distributions commonly used to test for statistically significant relationships in a data set.

## Cohort studies

Cohort studies collect information about the same individuals at regular intervals over a period of time, which may vary from months to decades.

[1]This glossary is adapted from Frost, S. et al. (2006) The Evidence Guide: Module 1. Barnardo's: Barkingside
[2]A useful on-line glossary of research terms is available at: http://www.resmind.swap.ac.uk/content/00_other/glossary.htm

## Confidence interval (CI)

Confidence intervals are often used to describe how reliable survey results are. They are the plus-or-minus figures reported in opinion polls results and on other data sets. The most common interval reported is the 95% confidence interval. For example, 44% ± 2% of people would vote for Party X, this means we are 95% confident or fairly sure that the proportion of people who would vote for Party X lies somewhere in the range of 42% to 46%.

## Confounding variable

A confounding variable is a variable that for some reason has been left uncontrolled and therefore can have an effect on the outcome of a study. For example, a study is trying to test out a new drug for hypertension (high blood pressure), two groups are compared, one group with the drug, another with a placebo. The researcher reviews that the group receiving the drug have lower blood pressure than the control group. However, for some reason the average age of the group receiving the drug is significantly lower than that of the control group. As hypertension is age related, the difference in blood pressure between the two groups might be a factor of age differences rather than the effect of the drug. Age differences have therefore confounded the findings.

A **measure of effect** tells us something about what the *intervention* does for a particular *sample*. For example, we find that a family and parenting programme decreased the time spent by delinquent young people in institutions by an average of 51.34 days. The 95% confidence interval was '30.16 to 72.52 days'. This means that we can be 95% certain that, when delivered to other similar *sample*s, these types of family and parenting programmes will reduce the time spent in institutions by between 30.16 and 72.52 days.

## Content analysis

A research method or type of analysis which involves an examination of material (e.g. interview transcripts) with the aim of classifying into themes or concepts. Content analysis can be conducted either quantitatively, for instance by counting the number of times a word or phrase occurs, or qualitatively, which involves coding and organising data into emerging themes and issues.

## Control group

A control group is used to try to establish whether any effect found in the *intervention group* is due to the intervention or would have occurred anyway. The control group is the comparison group that gets a different service/ *intervention* (or no service/ *intervention*) to the *intervention group*.

## Critical appraisal

A systematic way of assessing a research study, and considering it in terms of *validity*, *bias*, results and relevance to your own work.

## Cross-sectional surveys

A representative *sample* of people surveyed at one point in time. These may be repeated on a regular basis to establish trends. Unlike *cohort studies*, the same respondents are not re-sampled.

## Data saturation

Data collection in *qualitative research* is carried out until no new themes or ideas are emerging.

## Discourse Analysis

Discourse Analysis typically involves analysis of text and speech. Aims to gain a greater understanding behind the text and words we use.

## Document analysis

The researcher reads systematically through documents to look for answers to a research question. In social research these can be all sorts of documents such as meeting minutes, regulations, letters or media coverage. Some researchers will ask their respondents (children or adults) to record a diary related to certain activities.

## Effectiveness

Describes the extent to which an *intervention* improves the *outcome*(s) (i.e. changes that happen as a result of the *intervention*) for those receiving it and may also describe the extent to which these benefits outweigh the harm (if any) caused by the *intervention*.

## Ethnography

A *qualitative research* methodology that entails collecting and analysing data in a manner that considers the social and cultural settings of those involved.

## Focus groups

The researcher facilitates and leads a group of individuals through a discussion on a specific topic. Focus groups can be more or less structured and the researcher may choose to be directive or take on a more observing role, depending on the objective of the research. A key feature is that participants are able to interact with each other.

## Grounded theory

An approach to qualitative data in which the researcher will look for issues that emerge repeatedly from the data. Theories are then generated, tested against emerging evidence and, if necessary, amended and re-tested. This data may have been gathered from interviews, *observation* or *focus groups*.

## Hawthorne effect

When those involved in research change their behaviour – consciously or unconsciously – because they know they are being studied.

## Homogeneity

This term is used in *systematic reviews* to describe the extent to which results from research were similar to each other. If many studies show similar results, we can be more confident about the findings. Studies are said to be 'homogeneous' if their results do not vary more than would be expected by chance. The opposite of homogeneity is heterogeneity, a measure of how study results differ.

## Hypothesis

A statement to be tested through investigation or research. A hypothesis should be stated in a way that renders it capable of being proved true or false by the investigation methods proposed.

## Intention to treat analysis

A method of analysis for *randomised controlled trials* in which all participants are followed up to the end, regardless of whether or not they actually received or completed the *intervention*. This ensures that the groups included in the trial retain their equivalence.

## Inter-rater reliability

A measure of consensus. Two or more researchers independently examine data and compare the similarity of their conclusions. The extent to which the researchers agree is usually measured by the kappa statistic, where 0 indicates no consensus at all and 1.0 perfect agreement. A score of 0.7 and above is usually thought to indicate substantial agreement.

## Intervention

A service, programme or policy intended to affect the welfare of individuals, families or communities.

## Intervention group

The group that receives an *intervention* (service, medicine, treatment). See also *case-control studies* and *randomised controlled trial*.

## Longitudinal study

The same data are collected at different time points over a period of time. Longitudinal studies may be *cross-sectional* (different respondents) or *cohort* (same respondents). Used to measure long-term effects or changes.

## Mean

An average obtained by taking the sum of all values and dividing it by the number of values.

## Median

After placing all measures in numerical value (from the smallest to the largest), the median is the value that comes in the middle of the distribution.

## Meta-analysis

A statistical technique that pools the results from several studies into one overall estimate of the effect of an *intervention*. *(See also Systematic review)*

## Mode

The value occurring most frequently in a series of numbers.

## Narrative reviews

In contrast to *systematic reviews*, narrative reviews tend to be less methodically executed, often focusing on easily accessible research, such as that published in major journals. A potential problem with this approach is that authors may consciously or unconsciously refer to those studies that reflect their own biases.

## Null hypothesis

Null hypothesis states that the results observed in a study are no different to what might have occurred by chance. Within a study the null hypothesis is set up to be reflected by statistical evidence.

## Observation

In *qualitative research*, observation may be used as a method to record behaviour and interaction within groups or individuals. The observations may be audio or video taped or put down in words. The researcher may actively take part in the interaction, known as *participant observation*, depending on the research objective.

## Odds

Odds give a ratio of probability (the chances or likelihood) of occurrence to non-occurrence of an event. Odds are a way of expressing the likelihood of an event such as reconviction after an *intervention*.

## Odds Ratio (OR)

The odds ratio looks at the relationship between the effect in the control versus the *intervention group*. It is the ratio of the odds of the event occurring in the experimental group relative to the odds of the event occurring in the *control group*. This is sometimes used as a measure of the *effectiveness* of an *intervention*. The OR is calculated by dividing the odds of the event occurring in the intervention group with the odds of it occurring in the control group.

## Outcome

Changes or effects that happen as a result of an *intervention*. Outcomes may be for individuals, families, communities or organisations.

## P-value (*statistical significance*)

This refers to the probability that the results found by a study have occurred by chance rather than as a result of the intervention. A p-value of 5% (0.05) indicates that there is a 5% probability that the results occurred by chance. A p-value of less than 5% is generally regarded as *statistically significant*.

## Participant observation

A type of qualitative research in which the researchers participate in the social setting they are observing. Observation can be covert or non-covert. However, ethical issues arise with the use of covert observation.

## Power

Sometimes referred to as 'statistical power'. The likelihood that a *sample* is large enough to detect a *statistically significant* difference between a *control* and an *intervention group*, if such a difference actually exists. Power analysis can be used to calculate the required *sample* size.

## 'Pre-post' studies

Sometimes referred to as 'before and after' studies, this type of research design involves taking measurements at the beginning and end of an *intervention* (and sometimes at 'follow-up'). The same measurements are taken at time 1 (pre) and time 2 (post), to see if any changes have occurred after the period of *intervention*. Typically, standardised *outcome* measures are used. Pre-post studies do not contain *control groups*. Those with *control groups* would be classified as *quasi-experimental* or experimental studies.

## Purposeful (purposive) sampling

Purposeful sampling is choosing specific participants with particular characteristics, rather than being based on random selection. Methodologically, it is the least robust form of sampling.

## Qualitative research

Qualitative research is concerned with the meanings people give to their experiences and how they make sense of the world. It often studies people in their natural settings, and includes a range of methods, such as *participant observation* and non-participant observation, talking with people (interviews, *focus groups*) and reading what they have written. Can be used to find out about social processes and what matters to people, how these vary in different circumstances, and why.

## Quantitative research

Quantitative research is used to measure and determine the relationship between one thing (independent variable) and another (dependent variable). It is about quantifying relationships between variables. Quantitative research designs can be either descriptive – where individuals are measured once – or experimental – where individuals are measured before and after a treatment or particular time interval. A descriptive study can only tell you associations between variables; whereas an experimental can claim causality.

## Quasi-experimental studies

These measure the difference between two groups, which are usually pre-existing populations, matched for similarity. One group receives a particular service; the other does not, or receives another type of service.

## Randomised controlled trial (RCT)

An experiment in which individuals are randomly allocated either to receive an *intervention* (*intervention group*) or to receive no *intervention* or a different one, such as the standard service (*control group*). Both groups are measured at baseline and at the end of the *intervention* period and are often followed up later. The *outcomes* of the two groups are then compared to determine the *effectiveness* of the *intervention* under investigation.

## Regression analysis

Regression analysis is a statistical tool for investigating the relationship between an outcome variable and one or more explanatory variables.

## Reliability

Refers to the likelihood that the same results would be found if the study was repeated in the same way if carried out at different times by the same researcher or by different researchers.

## Replicability

Researchers should provide sufficient information about a study so it can be replicated by others. The notion of replicability implies that research should be transparent to its readers.

## Sample

A subset of people selected from the population to be studied.

## Sample size and power

Sample size is a crucial determinant of whether a difference will be detected if it really exists. Sometimes the number of participants in a study is chosen because the number 'seems appropriate', or because that is how many participants the study can afford to test or interview. However, the appropriate size for a particular study depends on the likely size of the effect you are trying to detect – for example, the likely size of the *odds ratio* (OR), or the magnitude of the difference between two *means*. Where the effect is likely to be small, then larger study numbers are required.

## Semi-structured interview

An interview where the researcher has a set of themes they want to discuss with a respondent, but they are not bound by these themes, and can investigate emerging issues arising during the course of the interview *(see also Structured interview; Unstructured interview).*

## Standard deviation (SD)

Measures how widely spread the values in a data set are from the *mean*. If many data points are close to the mean, then the standard deviation is small; if many data points are far from the mean, then the standard deviaiton is large.

## Statistical significance *(see also P-value)*

A result is called statistically significant if it is unlikely to have occured by chance. Typically studies report 0.05 level as a cut off for determining statistical significance.

## Structured interview

An interview in which the same predetermined questions are asked to each participant *(see also Semi-structured interview; Unstructured interview).*

## Survey

Surveys gather information via a questionnaire or *structured interview* at one time point to obtain responses from more than one person, which can then be quantified and subjected to statistical analysis.

## Systematic review (SR)

A systematic review is a critical assessment and evaluation of existing research that addresses a specific question. SRs are transparent and explicit about the search terms used and range of sources searched. They aim to be exhaustive and comprehensive in the range of sources searched. When a systematic review pools data across studies to provide an estimate of the overall treatment/ intervention effect, it is referred to as a *meta-analysis.*

## T-test

A statistical test used to determine whether there is a *statistically significant* difference between the mean of two groups or data sets.

## Theoretical sampling

Theoretical sampling happens when researchers may have a particular theory in mind that they want to explore and would therefore choose their *sample* to reflect this.

## Triangulation

Triangulation is the use of more than one theory, method, data source or researcher in a research study to reinforce the trustworthiness of its findings.

## Type I error

Type I error exists when a null *hypothesis* is rejected when it is really true.

## Type II error

Type II error exists when a null *hypothesis* is accepted when it is really false.

## Unstructured interview

An unstructured interview in which a researcher asks participants very general questions, enabling them to shape the interview in whichever way they see fit, without a predetermined plan for the flow of the conversation *(see also Semi-structured interview; Structured interview).*

## Validity

Validity refers to the extent a study can be regarded as accurate and reliable. If the internal validity is high, the study has been designed and carried out in such a way as to avoid systematic *bias* – which means that it will give a good estimate, for example, of the *effectiveness* of an *intervention*. External validity is also sometimes called transferability or generalisability, and refers to the extent to which you can generalise the findings from one study and apply them to other populations, settings and arrangements.

## Variable

A principle factor of experimental studies is that one element is manipulated on purpose by the researcher to see whether it has any impact upon another measure. The element or factor that is being manipulated by researchers is known as the independent variable, whereas the change (or *outcome*) resulting from the implementation of the independent variable is the dependent variable.

## Variance

Variance refers to how values in a data set are distributed around the *mean*.