What is a double-blind study?

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In experimental research, subjects are randomly assigned to either a treatment or control group. A **double-blind study** withholds each subject's group assignment from both the participant and the researcher performing the experiment.

If participants know which group they are assigned to, there is a risk that they might change their behavior in a way that would influence the results. If researchers know which group a participant is assigned to, they might act in a way that reveals the assignment or directly influences the results.

Double blinding guards against these risks, ensuring that any difference between the groups can be attributed to the treatment.

Different types of blinding

Blinding means withholding which group each participant has been assigned to. Studies may use single-, double- or triple-blinding.

Single-blinding occurs in many different kinds of studies, but double- and triple-blinding are mainly used in medical research.

Single blinding

If participants know whether they were assigned to the treatment or control group, they might modify their behavior as a result, potentially changing their eventual outcome.

In a **single-blind** experiment, participants do not know which group they have been placed

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Example: Single-blind vaccine study

You have developed a new flu vaccine. In order to test the effectiveness of your new treatment, you run an experiment, giving half of your participants the flu vaccine and the other half a fake vaccine that will have no effect.

If participants in the control group realize they have received a fake vaccine and are not protected against the flu, they might modify their behavior in ways that lower their chances of becoming sick – frequently washing their hands, avoiding crowded areas, etc. This behavior could narrow the gap in sickness rates between the control group and the treatment group, thus making the vaccine seem less effective than it really is.

To prevent such an outcome, in a **single-blind** study, you hide from the participants which vaccine – real or fake – each of them received.

Double-blinding

When the researchers administering the experimental treatment are aware of each participant's group assignment, they may inadvertently treat those in the control group differently from those in the treatment group. This could reveal to participants their group assignment, or even directly influence the outcome itself.

In **double-blind** experiments, the group assignment is hidden from both the participant and the person administering the experiment.

Example: Double-blind vaccine study

In the flu vaccine study that you are running, you have recruited several experimenters to administer your vaccine and measure the outcomes of your participants.

If these experimenters knew which vaccines were real and which were fake, they might accidentally reveal this information to the participants, thus influencing their behavior and indirectly the results.

They could even directly influence the results. For instance, if experimenters expect

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measure symptoms incorrectly, thus making the vaccine appear more effective than it really is.

To avoid this, you hide group assignments from both the participants and the experimenters giving the vaccines – a **double-blind** study.

Triple-blinding

Although rarely implemented, **triple-blind studies** occur when group assignment is hidden not only from participants and administrators, but also from those tasked with analyzing the data after the experiment has concluded.

Researchers may expect a certain outcome and analyze the data in different ways until they arrive at the outcome they expected, even if it is merely a result of chance.

Example: Triple-blind vaccine study

In your vaccine study, you have also recruited assistants to analyze the data you gathered on flu infection rates. You decide to hide the group assignments from the participants, the people administering the experiment, and the people analyzing the data – a **triple-blind** study.

To achieve triple blinding, you assign each participant to group 1 or group 2, but do not inform the data analysts which number represents which group.

Importance of blinding

Blinding helps ensure a study's internal validity, or the extent to which you can be confident any link you find in your study is a true cause-and-effect relationship.

Since non-blinded studies can result in participants modifying their behavior or researchers finding effects that do not really exist, blinding is an important tool to avoid bias in all types of scientific research.

Risk of unblinding

Unblinding occurs when researchers have blinded participants or experimenters, but they become aware of who received which treatment before the experiment has ended.

This may result in the same outcomes as would have occurred without any blinding.

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Example of unblinding

You are studying the impact of a new school instruction program aimed at improving students' reading comprehension skills.

You randomly assign some students to the new program (the treatment group), while others are instructed with a standard program (the control group). You use single blinding: you do not inform students whether they are receiving the new instruction program or the standard one.

If students become aware of which program they have been assigned to – for example, by talking to previous students about the content of the program – they may change their behavior. Students in the control group might work harder on their reading skills to make up for not receiving the new program, or conversely to put in less effort instead since they might believe the other students will do better than them anyway.

Thus, the results of your study could be invalid unless you prevent any unblinding.

Inability to blind

Double or triple blinding is often not possible. While medical experiments can usually use a placebo or fake treatment for blinding, in other types of research, the treatment sometimes cannot be disguised from either the participant or the experimenter. For example, many treatments that physical therapists perform cannot be faked.

In such cases, you must rely on other methods to reduce bias.

- Running a **single** rather than double- or triple-blind study. Sometimes, although you might not be able to hide what each subject receives, you can still prevent them from knowing whether they are in the treatment or control group. Single blinding is particularly useful in non-medical studies where you cannot use a placebo in the control group.
- Relying on **objective** measures that participants and experimenters have less control over rather than **subjective** ones, like measuring fever rather than self-reported pain. This should reduce the possibility that participants or experimenters could influence the results.

✔ **Pre-registering** data analysis techniques. This will prevent researchers from trying g.

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Lauren has a bachelor's degree in Economics and Political Science and is currently finishing up a master's in Economics. She is always on the move, having lived in five cities in both the US and France, and is happy to have a job that will follow her wherever she goes.

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