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## Between Subjects Design

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A between subjects design is a way of avoiding the carryover effects that can plague within subjects designs, and they are one of the most common experiment types in some scientific disciplines, especially psychology.

The basic idea behind this type of study is that participants can be part of the treatment group or the control group, but cannot be part of both. If more than one treatment is tested, a completely new group is required for each.

The banner features the Explorable logo and the text "Quiz Time!". Below this are three quiz cards:

- Quiz: Psychology 101 Part 2** (Image: Red roller skates on a wooden deck)
- Quiz: Psychology 101 Part 2** (Image: A fan of colorful pencils)
- Quiz: Flags in Europe** (Image: A Ferris wheel at sunset)

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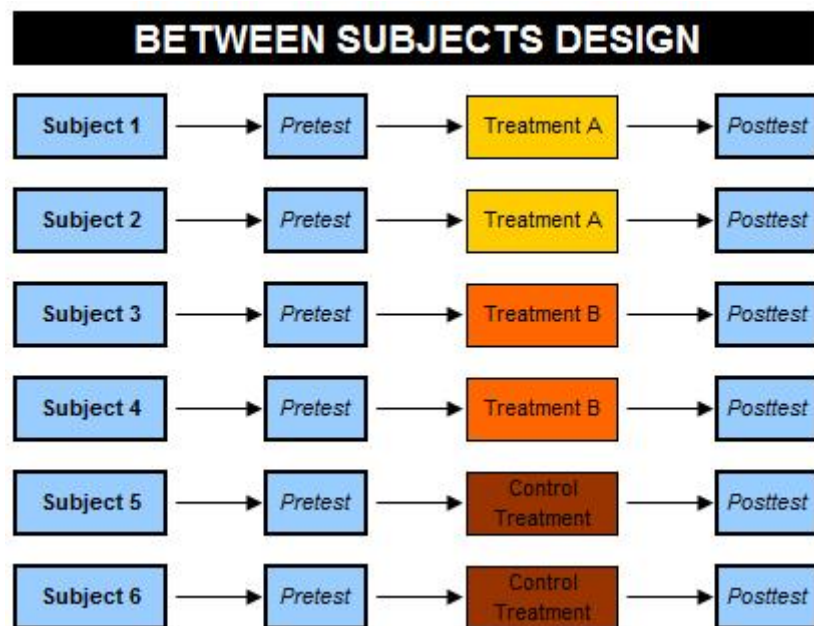
## What is a Between Subjects Design?

A group of researchers wants to test some modifications to the educational program and decide upon three different modifications.

They pick a school and decide to use the four existing classes within an age group, assuming that the spread of abilities is similar. Each group of children is given a different educational program, along with a control group sticking with the original. All of the groups are tested, at the end, to determine which program delivered the most improvement.

If the researchers want to be a little more accurate and reduce the chances of differences between the groups having an effect, they use modifications of the design.

For example, maybe one class had a great teacher and has always been much more motivated than the others, a factor that would undermine the validity [1] of the experiment. To avoid this, randomization [2] and matched pairs are often used to smooth out the differences between the groups.



## Advantages of Between Subjects Design

Between subjects designs are invaluable in certain situations, and give researchers the opportunity to conduct an experiment [3] with very little contamination by extraneous factors.

This type of design is often called an independent measures design because every participant is only subjected to a single treatment. This lowers the chances of participants suffering boredom after a long series of tests or, alternatively, becoming more accomplished through practice and experience, skewing the results.

## Disadvantages of Between Subjects Design

The main disadvantage with between subjects designs is that they can be complex and often require a large number of participants to generate any useful and analyzable data. Because each participant is only measured once, researchers need to add a new group for every treatment and manipulation [4].

- **Practicality:**

Researchers testing educational programs, for example, might need two groups of twenty children for a control [5] and test group. If they wanted to add a third program to the mix, they would need another group of twenty children.

For many research programs, the sheer scale of the experiment and the resources required can make between subjects designs impractical. If the condition tested is rare, then finding enough subjects becomes even more difficult.

- **Individual Variability:**

The other problem is that it is impossible to maintain homogeneity across the groups; this method uses individuals, with all of their subtle differences, and this can skew data.

Age, gender and social class are just some of the obvious factors but intelligence, emotive quotient and every other personality construct can influence the data. If, for example, you were using a between subjects design to measure intelligence, how do you guarantee that emotion does not play a role? Some people may be very intelligent but are nervous when completing tests, so achieve lower scores than they should. These individual differences can create a lot of background noise, reducing the effects of the statistics [6] and obscuring genuine patterns and trends.

- **Assignment Bias:**

Imagine researchers comparing educational programs, and they decide to use two schools as their participants. They find that there is a difference between the two groups and conclude that treatment A is better than treatment B.

However, they neglected to take into account the fact that the schools contain children from different socio-economic backgrounds, and this created assignment bias. A better idea would have been to use children from a single school or use random assignment [7], but this is not always possible.

- **Generalization:**

Whilst it is easy to try to select subjects of the same age, gender and background, this then opens the door for generalization [8] issues, as you cannot then extrapolate the results to encompass wider groups. Striking the best balance is one of the keys to conducting a between subjects design. Failure to do this can lead to assignment bias [9], the ogre that threatens to destroy this type of research.

- **Environmental Factors:**

Environmental variables are another major issue and usually arise from poor research design. In the example above, imagine that the researchers did, in fact, use participants from a single school and randomly [2] assigned them. Due to time restrictions, they tested one group in the morning and one in the afternoon. Many studies show that most people are at their mental peak in the morning, so this will certainly have created an environmental bias.

These factors could very easily become confounding variables [10] and weaken the results, so researchers have to be extremely careful to eliminate as many of these as possible during the research design. These disadvantages are certainly not fatal, but ensure that any researcher planning to use a between subjects design must be very thorough in their experimental design [11].

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**Source URL:** <https://explorable.com/between-subjects-design?gid=1580>

#### Links

- [1] <https://explorable.com/types-of-validity>
- [2] <https://explorable.com/randomization>
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