What is the definition of Neyman Bias and what are some examples of it?

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Neyman Bias, also known as selection bias or self-selection bias, is a statistical phenomenon that occurs when the selection process of a study or experiment is not random, leading to a skewed representation of the population being studied. This bias can occur in various types of research, such as surveys, clinical trials, and observational studies. It can distort the results and conclusions of the study, making them less accurate and reliable.

One example of Neyman Bias is in a survey aimed at determining the satisfaction level of a certain product. If the survey is conducted only among customers who have voluntarily filled out a feedback form, the results may not accurately reflect the opinions of the entire customer base. This is because those who are highly satisfied or dissatisfied with the product are more likely to take the time to fill out the form, leading to an overrepresentation of extreme opinions.

Another example is in a clinical trial for a new medication. If the participants are self-selected, such as those who volunteer to participate in the trial, the results may not be generalizable to the larger population. This is because those who volunteer may have different characteristics or health conditions compared to the general population, leading to biased results.

In summary, Neyman Bias is a type of bias that occurs when the selection process of a study is not random, leading to inaccurate and unreliable results. It is important for researchers to be aware of this bias and take steps to mitigate it in order to ensure the validity of their findings.

Neyman Bias: Definition & Examples

Neyman bias (also known as *prevalence-incidence bias*) is a type of bias that can occur in research studies in which extremely sick individuals or extremely healthy individuals are excluded from the final results of the study which may lead to biased results.

There are two ways in which this bias can affect the results of a study:

1. If extremely sick individuals are excluded from the

study because they've died, then the disease will appear less severe.

2. If extremely healthy individuals are excluded from the study because they have recovered and been sent home, then the disease will appear more severe.

Examples of Neyman Bias

Here are two examples of Neyman Bias occurring in different scenarios:

Example 1: Sick individuals being excluded from a study.

Suppose a group of researchers at a hospital want to study the severity of a certain strain of flu. They randomly select a sample of 40 individuals in the area who contract that strain of flu and monitor their outcomes.

In this scenario, the individuals who contract a particularly severe case of the flu and happen to die from it will be excluded from the study. This means only individuals with mild cases will be included in the study, which will make the flu appear less severe.

Example 2: Healthy individuals being excluded from a study.

Suppose a group of researchers at a hospital want to study the severity of a certain seasonal cold. They randomly select a sample of 30 individuals in the area who contract the cold and monitor their outcomes.

In this scenario, the individuals who already contracted the cold and recovered will not be included in the study, which means only individuals with more severe cases who have not recovered will be included in the study. This could cause the cold to appear more severe.

In What Types of Studies Does Neyman Bias Occur?

Neyman bias occurs most often in studies in which there is a long time period between individuals contracting a certain disease and then being included in a study simply because this gives them more time to either (1) recover and not be included in the study or (2) die and not be included in the study.

Case-control studies are most susceptible to this type of bias, but it can also occur in cohort studies and cross-sectional studies.

How to Prevent Neyman Bias

There are two ways to avoid the pitfalls of Neyman bias:

An incident case is a newly diagnosed case of a disease. A prevalent case is an existing case of a disease, in which an individual has typically had it for a longer period of time and thus have a more progressed and serious version of the disease. By using incident cases, it's less likely that individuals will be excluded from the study at some point since they're a new case.

2. Use follow-up studies.

Another way to avoid Neyman bias is by using a follow-up study in which researchers follow up with individuals and examine their situation after the study is over. This can be particularly useful for monitoring individuals who left a study because they recovered from the disease, which allows researchers to gain a better understanding of the long-term effects of a disease.

What is Undercoverage Bias?

What is Referral Bias?

What is Nonresponse Bias?

What is Treatment Diffusion?