Random & Probability Sampling

by Sophia

1. Random Sample

The term "random" is used a lot in everyday speech, but what does it mean when it comes to statistics? In statistics, random refers to something that is unpredictable and does not have a recognizable pattern.

With a **random sample**, every member of the population has the same chance of getting selected. This is the best way to get a representative sample. Recall that a representative sample is when the population and the sample have the same set of relevant characters.

If you want a random sample, you would need to select participants in such a way that every member of that population has an equal chance of being selected for the sample. This is also known as **random selection**.

You need to come up with a method to achieve a random sample, and you can do that with a **probability sampling plan**. This plan must be made first before a random sample can be taken. You can also "weight" certain people so that they might be more likely to be selected for the sample, too.

IN CONTEXT

What does a random sample look like in context? Suppose there are 15 billiard balls from a pool table:

You place them all in a hat, and you shake the hat, and voila, here's a sample of five.

Shake #1

We got ball numbers 1, 5, 7, 10, and 14.

Suppose you place the billiard balls back in the hat and shake the hat for a second time.

Shake #2

This is another sample of five and is not that different than the previous example. If you conducted the same hat trick over and over again, they would all have an equal chance of being pulled.

Let's shake the hat for a third time.

Shake #3

What happened here was we got balls 9, 11, 12, 13, and 14--all of which happened to be striped billiard balls. No solids. If you only had access to this information, you might be led to believe that all the balls in the hat were striped, which wouldn't be the case.

This may seem odd, but it can certainly happen even though you selected these randomly--you did a probability sampling plan. The reason being, this sample of five is just as likely as any other sample of five to be chosen.

Might you get something that's unrepresentative? Yes. But the vast majority of the time, it will be representative.

📄 TERMS TO KNOW

Random Sample
A sample that has been selected in a manner where every member of the population has some predetermined chance of being selected for the sample.

Random Selection
The method of obtaining a random sample.

Probability Sampling Plan
The way to collect a random sample that guarantees a certain likelihood for each member of the population to be selected.

📋 SUMMARY

The best method for selecting a sample that's representative is a random sample and a probability sampling plan. Now, this won't always get you a representative sample. But often, you will get one when you do random samples.

Good luck!

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The method of obtaining a random sample