Using Percentages in Statistics

by Sophia

WHAT'S COVERED

This tutorial will discuss how to use percentages wisely in statistics by focusing on:

1. Percentage Point vs. Percent

People tend to use percentages without really thinking about what type of percentages they're talking about. Results and statistics are often expressed as percents but it's important to distinguish between percentage points and percents.

Percents are used to describe the relative change. **Percentage points** are used to measure absolute change.

TERMS TO KNOW

Percentage Points

An absolute increase or decrease in a percent value.

Percent Change

A relative increase or decrease in a percent value.

2. Examples

2a. Retaking a Test

Suppose a teacher gives a particularly difficult exam and these six students all failed it. The teacher graciously offered a retake to the students and they all passed.

The table below shows their original score and their retake score. On the retake, Jonathan scored an 88, Ryan scored a 78, Katherine scored an 84, etc.

Student	Original Score	Retake Score
Johnathan	52%	88%
Ryan	38%	78%
Katherine	61%	84%
Isaiah	44%	89%
Teri	50%	82%
Kelly	48%	95%

These changes can be expressed as either percentage points or percent increase. First, which student had the highest increase in percentage points?

Student	Original Score	Retake Score	Change in Percentage Points
Johnathan	52%	88%	36%
Ryan	38%	78%	40%
Katherine	61%	84%	23%
Isaiah	44%	89%	45%
Teri	50%	82%	32%
Kelly	48%	95%	47%

Jonathan went from 52% to 88%, that's an increase of 36 percentage points. Ryan went from 38% to 78%, that's an increase of 40 percentage points. We can calculate that for all of them and see that it was Kelly who increased 47 percentage points.

Now, who had the highest percent increase? Now you need to look at the raw increased numbers and determine who had the highest percent increase over their old score.

Begin with Jonathan's scores. We need to determine how much of an increase 36 percentage points was over that original score of 52.

Student	Original Score	Retake Score	Change in Percentage Points	Percent Increase
Johnathan	52%	88%	36%	69%

Ryan	38%	78%	40%	105%
Katherine	61%	84%	23%	38%
Isaiah	44%	89%	45%	102%
Teri	50%	82%	32%	64%
Kelly	48%	95%	47%	98%

Jonathan's score increased by 69%. Katherine's only increased by 38% because she had a fairly high score to begin with.

But it was Ryan who had the highest percent increase. He started with a 38 and finished with a 78, a 40 percentage point increase. A 40 percentage point increase over a score of 38, is over 100%, meaning he more than doubled his old score.

2b. A Politician's Approval Rating

WATCH

Suppose Patrick has found his way to class president at Memorial High School. But his approval rating has just hit the skids, dropping from 56% to 42%.

First, let's determine the absolute change in his approval rating. Take 42 and subtract 56 from it.

$$AbsoluteChange = New - Original = 42 - 56 = -14 percentage points$$

This gives you negative 14. So Patrick's approval rating dropped 14 percentage points. It's a drop, but looking at it that way, Patrick isn't too concerned.
However, how does that drop look when you calculate it in terms of relative change? Take the 14 percentage point drop and divide it by the original approval rating, 56.

$$RelativeChange = \frac{AbsoluteChange}{Original} = \frac{-14}{56} = -0.25 = -25\%$$

That will give you -0.25, or a 25% drop. Viewed in this context Patrick sees the drop is a significant one, which he might not have expected.

SUMMARY

When percentages are used in statistics it's important to know whether the focus is absolute change or relative change. Absolute change is the difference in percentage points and relative change is a percent increase or percent decrease.

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TERMS TO KNOW

Percent Change

A relative increase or decrease in a percent value

Percentage Points

An absolute increase or decrease in a percent value.