A Simple Explanation of Internal Consistency

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Internal consistency refers to how well a survey, questionnaire, or test actually measures what you want it to measure. The higher the internal consistency, the more confident you can be that your survey is reliable.

The most common way to measure internal consistency is by using a statistic known as **Cronbach's Alpha**, which calculates the pairwise correlations between items in a survey.

The value for Cronbach's Alpha can range between negative infinity and one.

The following table describes how various values of Cronbach's Alpha are typically interpreted:

Cronbach's Alpha	Internal consistency
$0.9 \leq \alpha$	Excellent
$0.8 \leq \alpha < 0.9$	Good
$0.7 \leq \alpha < 0.8$	Acceptable
$0.6 \leq \alpha < 0.7$	Questionable
$0.5 \leq \alpha < 0.6$	Poor
$\alpha < 0.5$	Unacceptable

Next, we'll walk through an example to provide an intuitive understanding of internal consistency.

Related: How to Report Cronbach's Alpha (With Examples)

An Example

Suppose a restaurant manager wants to measure overall satisfaction among customers, so she sends out a survey with the following questions to which customers can respond s*trongly disagree, disagree, neutral, agree*, or *strongly agree*.

1. I was satisfied with my experience.

2. I would recommend your restaurant to family and friends.

3. I would visit this restaurant again at some point in the future.

Each of these questions measures customer satisfaction in slightly different ways, but a given customer should response to each survey question with roughly the same response.

For example, a customer that was highly satisfied with their experience should also be highly likely to recommend the restaurant to family and

friends and also be highly likely to visit the restaurant again at some point in the future.

For this survey, the internal consistency (as measured by Cronbach's Alpha) should be fairly high, which would indicate that the items in the survey actually measure what we want them to measure.

But consider if the following question was added to the survey:

4. I am a fan of baseball.

Since this question is completely unrelated to overall customer satisfaction, it would likely lower the internal consistency of the survey.

Or consider instead if question 3 was re-worded as follows:

3. I would probably (not definitely, but maybe most likely) visit this restaurant at some point in the near future, given the right circumstances if I was in the right mood.

Since the wording of this question is so confusing and obscure, it's possible that different customers will interpret it differently, and thus provide differing responses. This would likely result in a lower internal consistency.

What to Do if Internal Consistency is Low

If the internal consistency (as measured by Cronbach's Alpha) is low for a given survey, there are two ways that you can potentially increase it:

1. Remove items from the survey that have a low correlation with other items on the survey (e.g. removing the item that says "I am a fan of baseball.")

2. Add items to the survey that are likely to correlate with other items on the survey (e.g. adding an item that says "I often feel that money spent at this restaurant is money well spent"). If you choose this option, be careful not to add items that are redundant to the items already on the survey.

Additional Resources

The following tutorials explain how to Calculate Cronbach's Alpha using different statistical software:

How to Calculate Cronbach's Alpha in Excel
How to Calculate Cronbach's Alpha in R

How to Calculate Cronbach's Alpha in Python
How to Calculate Cronbach's Alpha in SAS

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