

5b.TS2 What are some statistical methods for indicating whether an activity made an important contribution to change?

While it is clear that long-term, large-scale change in racial disparities and injustice will happen only as a result of sustained efforts on many fronts, a community group working on these issues and its supporters will want to know whether what it is doing is making a contribution toward change.

There are three questions that need to be considered when assessing an activity's contribution toward change:

- Did a change occur? Is the observed change large enough, broadly spread enough and long-lasting enough to be important?
- Is the pattern of change associated with the activities? Are they associated in time, in direction and in magnitude?
- Can the contribution of other factors that might affect the observed change be separated from the contribution of the activity?

There are both statistical and non-statistical ways to look for answers to these questions. This tip sheet focuses on statistical approaches; Tip Sheet 6b.TS3 focuses on non-statistical methods.

The question about whether change occurred can be addressed statistically with quantitative data.

- The underlying question is, "how confident can we be that the observed change did not occur by chance" or "how confident can we be that the observed change is different from zero or no change"?
- Tests of differences in mean values are one way to answer this question.
 - There are specific tests that apply under different circumstances, but all report the probability that the observation is "real" - that is, it did not happen by chance alone and it is different from no change (in a statistical sense).
 - (See 6b.TS1 for discussion of statistical tests of significance.)

There are also tests to see whether an activity or intervention (independent variable) is associated with differences in an outcome such as change (dependent variable).

- There are sometimes called patterns of association.

5b.TS2 What are some statistical methods for indicating whether an activity made an important contribution to change?

- Patterns of association can be examined statistically using various correlation, cross-tabulation, and comparison of means (analysis of variance) techniques.
- The level of statistical significance can be computed for these statistics.

To the extent that other important factors that might contribute to the observed change or might strengthen or weaken the effects of the activity can be quantified, it is possible to conduct statistical tests of the separate (independent) effects of the activity, taking the other factors into account.

- Such tests include multiple regression and analysis of covariance.
- Coefficients of statistical significance can be used to indicate the probability that the observed relationships are not due to chance.

It is important to remember that statistical analysis does not take the place of a rigorous evaluation design (see Tip Sheet 3a.TS1). In particular, statistical tests can not control for things other than the activity or intervention that might have caused the change, unless this is specifically covered in the way the evaluation is designed.

Thus, you should always do a few things when you, or someone else, is using statistical analysis:

- Understand as fully as possible where the statistics came from - the evaluation or research design, the questions asked, who responded, how answers are grouped and any limitations or biases in available data that can influence how you might interpret the results
- Understood as fully as possible what the particular statistics can and cannot tell you
- Use common sense in understanding statistical results - if they don't seem to fit what you understand the reality to be - dig deep until you can make the link between your understanding of things and what the numbers are telling you - where might your understanding need to be changed and where might the statistics be misleading.