Appendix: Statistics for Those Who Hate Statistics

The Importance of Statistical Tests

When we analyze quantitative evidence (e.g., numbers) that describe a particular situation or phenomenon, we often need to generate coefficients based on specific statistical tests to reach reasonable conclusions. Visually inspecting a table full of numbers, for example, can be quite confusing, and the related conclusions may be deceiving. This is one of the reasons why statistical tests are important. The more quantitative evidence we have to analyze, the more difficult it is to inspect it visually, and so the more important those statistical tests become.

For example, we may want to know whether a particular variable, such as the degree of e-collaboration technology use by a business process improvement group, has any effect on the duration (or lifetime) of the group, measured in days. One way of testing that is to analyze the duration of several groups, some of them conducted using e-collaboration technology support, and others conducted without any e-collaboration technology support.

By simply comparing group duration averages (also known as “means” in statistics lingo) for each condition (i.e., with and without technology support), we may find that e-collaboration technology-supported groups have, on average, a duration in days that is, for instance, 13% higher than the groups conducted without any e-collaboration technology support.

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In the situation above, the following question arises. Is the 13% difference large enough to be significant? If the answer is yes, and other circumstances (e.g., group size, cultural background of the participants) were the same regarding the two group conditions (i.e., with and without technology support), then we can conclude that the use of e-collaboration technology had a significant impact on the duration of the business process improvement groups. The answer to this type of question, which is quite important in behavioral research in general, is one of the most important outcomes of statistical tests.

Statistical tests are widely used in areas other than behavioral research on the impact of technologies on people. For example, similar types of questions are whether a particular medical drug has any significant effect on individuals suffering from a certain disease, and whether a difference in the number of votes for two competing candidates in a pre-election poll is significant enough to warrant optimism in the camp of the candidate with the higher number of votes.

Three main types of statistical tests of significance used in previous chapters of this book are comparisons of means, correlation, and distribution trend tests. Comparison of means tests are aimed at establishing whether the differences between the means, or averages, of two or more conditions differ significantly from each other (as illustrated through the previous example). Correlation tests aim to establish whether two variables (e.g., degree of e-collaboration technology use and likelihood of success of a business process improvement group) vary in a significant way. Distribution trend tests aim to establish whether an observed distribution trend (e.g., the distribution of user perceptions about an e-collaboration tool’s impact on group outcome quality) is significant enough to allow for the conclusion that it is caused by a particular variable (e.g., e-collaboration tool support). Each of these tests is discussed in more detail below.

**Comparing Means from Different Conditions**

Let us assume that we facilitated 20 business process improvement groups. Half of those groups (10 groups) used an e-collaboration system to communicate, whereas the other half communicated face-to-face. Let us also assume that the outcomes of those business process improvement groups (i.e., the