

ABSORBENCY OF PAPER TOWELS

13. Summary

The goal of the experiment is to compare the absorbency of three brands of paper towels. The factors are brand of paper towel and time it takes a sheet from the brand to absorb a specific amount of water. The response variable is the weight of water absorbed by the sheet. Observe that including time as a factor allows you to measure not only how much water a sheet holds (absorbency) but also how fast it absorbs water.

In this experiment, three paper towel brands and three time levels are used, so it is a 3x3 factorial experiment, meaning two factors at three levels each. There are nine combinations of the levels of the factors, and because there are five observations in each combination, there are five replications and overall 45 measurements. To avoid bias, the 45 absorbency measurements are taken according to a random allocation of combinations.

The experiment is an example of a factorial experiment. The GLM General Factorial Model in SPSS was used to analyze the data. The main effects of brand and time were found to be statistically significant. However, the comparison of the magnitudes of the F-statistic for the two models indicates that the main effects due to brand are much stronger than the effects due to time.

The analysis showed very weak interaction between brand and time. Indeed, the brands 2 and 3 absorbed almost all its water during the first few seconds after the sheets from these two brands were immersed in water. On the other hand, the relationship between the weight of water absorbed and time was much stronger for the brand 1. In this case, water is absorbed much slower compared to the other brands.

The profile plots and numerical summaries show that the highest mean weight of water absorbed is achieved by the brand 3 at every time level. The analysis also showed that the brand absorbed water much faster than the other brands.