

# Warpbreaks

## Data

The `warpbreaks` data set (from the `datasets` library which should be automatically loaded) contains as *response* variable the number of warp **breaks** for two types of wool (A and B) and three levels of tension (L, M and H). We treat both of these variables as unordered factors.

## Questions

*What is the influence of the wool type and the tension on the mean number of warp-breaks?*

1. Check the `str` of the data set to get a first impression.
2. Compute means and standard deviations of the number of **breaks** for each combination of tension and wool. Comment on the results.
3. Visualize the raw data. Do you see evidence for interactions between the tension and the wool?
4. Try a parametric model to answer the research question. Do we need interaction effects?
5. Check the model assumptions.
6. There will be problems; fix them first by choosing a heteroskedastic model, ...
7. ... and then by transforming (Box-Cox).
8. Give the fitted number of warp breaks for each combination of wool and tension from the Box-Cox transformed model *on the scale of the data* (you need to back-transform) and compare them with the sample means.
9. Give confidence intervals for the mean number of warp breaks for each combination of wool and tension on the scale of the data. If you manage to, plot the confidence intervals.
10. For each wool, compare the tension levels (H vs. M) and (M vs. L). Perform these four comparisons with `glht` to answer whether the differences between adjacent tension levels are significant within each wool, at a familywise error rate of 0.05.