PDF SOLUTIONS

Simple Visualizations of Paired Comparisons

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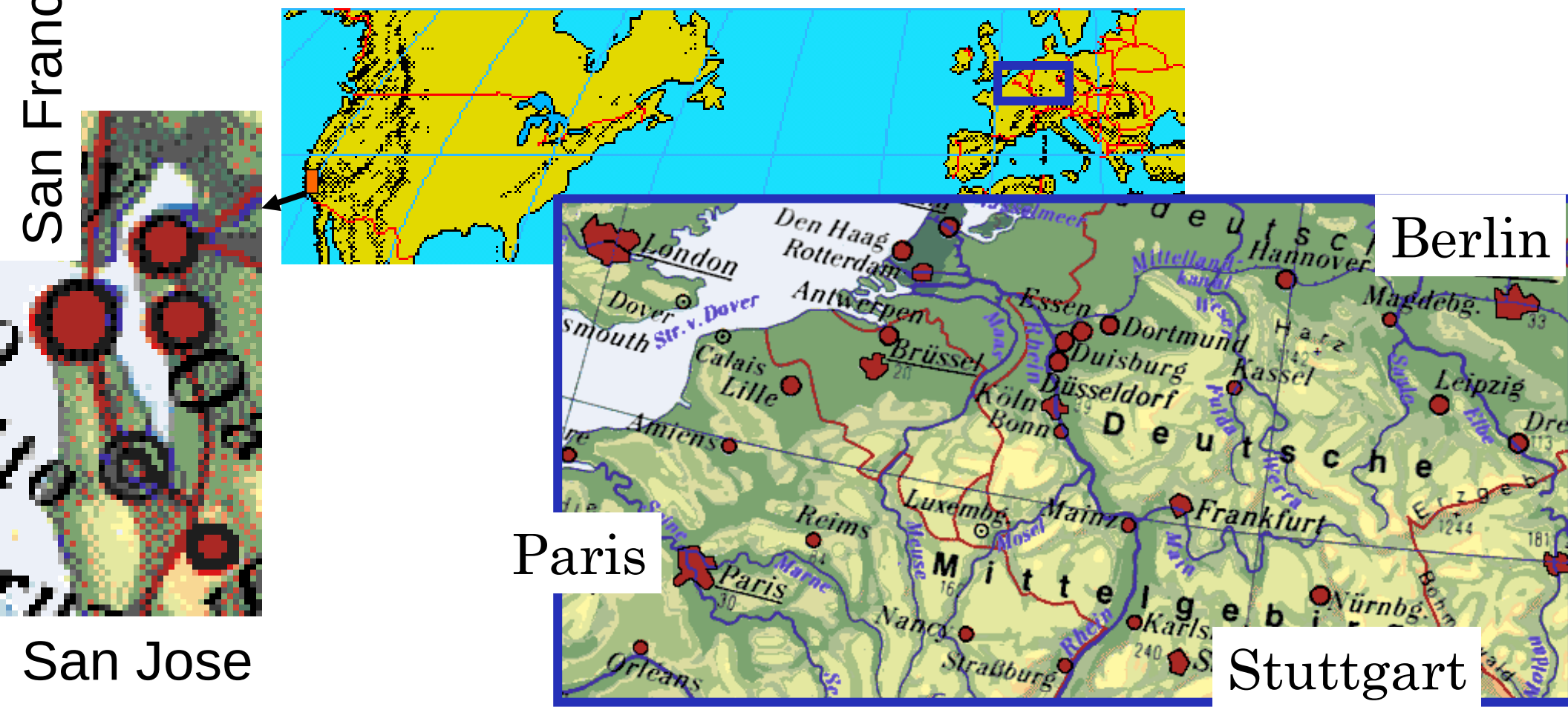


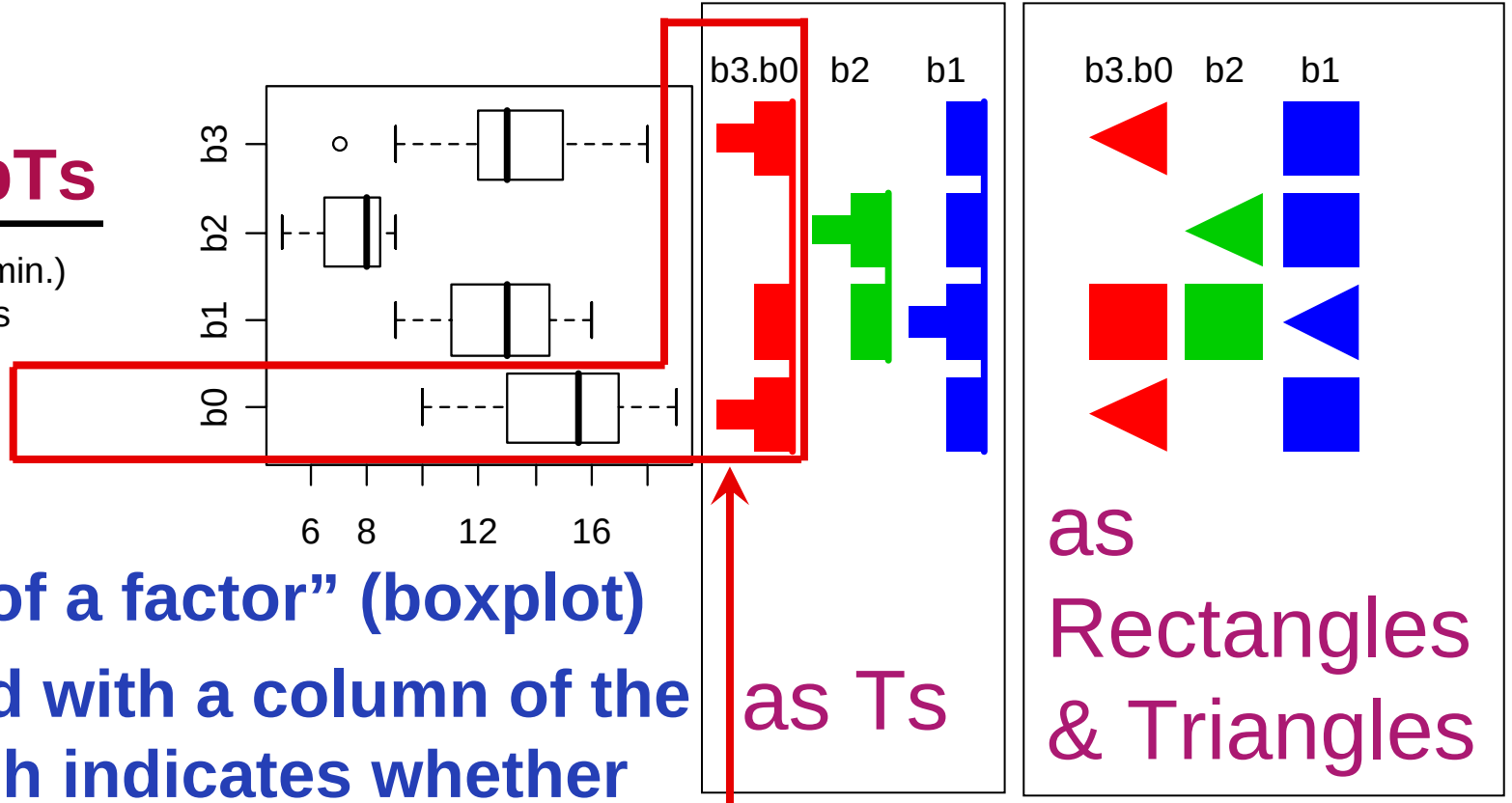
Two Methods

- **Convert a table of logicals (TRUE or FALSE) indicating which pairs of *k* objects are *l* are not distinct**
  - p-value or distance exceeding a threshold (or correlation less than a threshold)
  - Into an easily decoded visual
- **Two alternatives**
  - Letter-based representation (Piepho 2004, JCGS 13: 456-466)
  - “Neighbor” or “Indistinct Ts” (similar to “undifferentiated classes”; Donague 2004)
- **R Package “multcompView” (www.r-project.org)**

* John R. Donaghue (2004) “Implementing Shaffer’s multiple comparison procedure for a large number of groups”, pp. 1-23 in Benjamini, Bretz and Sarkar (eds) *Recent Developments in Multiple Comparison Procedures* (Institute of Mathematical Statistics Lecture Notes-Monograph Series vol. 47)

multcompTs

Post-surgery recovery time (min.) with different heating blankets (b1, b2, b3) vs. a standard blanket (b0).

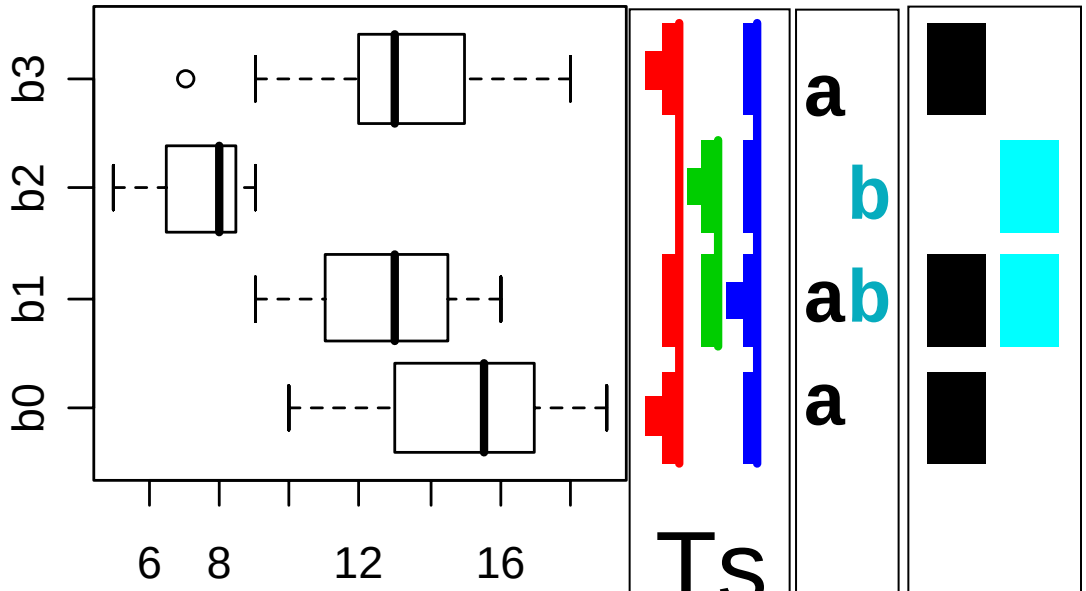


- Each “level of a factor” (boxplot)
- is associated with a column of the display which indicates whether each other level is or is not distinct
- Example:
  - b0 is distinct from b2 but not b1 or b3
  - b3 has the same “undifferentiated pattern” as b0

- Each “T” or triangle points to the level(s) that column represents

library(multcomp)
(minutes~blanket, recovery)

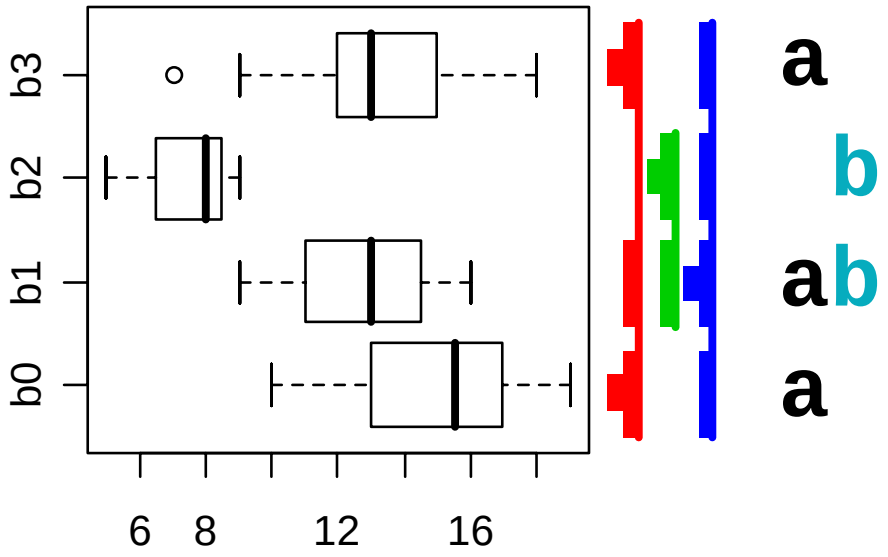
multcompLetters



- **Rows that share "Letters" are NOT distinct**
- **Example:**
  - b1 is not distinct from any of the other levels, because
    - it shares "a" with b0 and b3, and
    - it shares "b" with b2
  - b0 is not distinct from b1 or b3 but is from b2

"Letters" displayed as rectangles

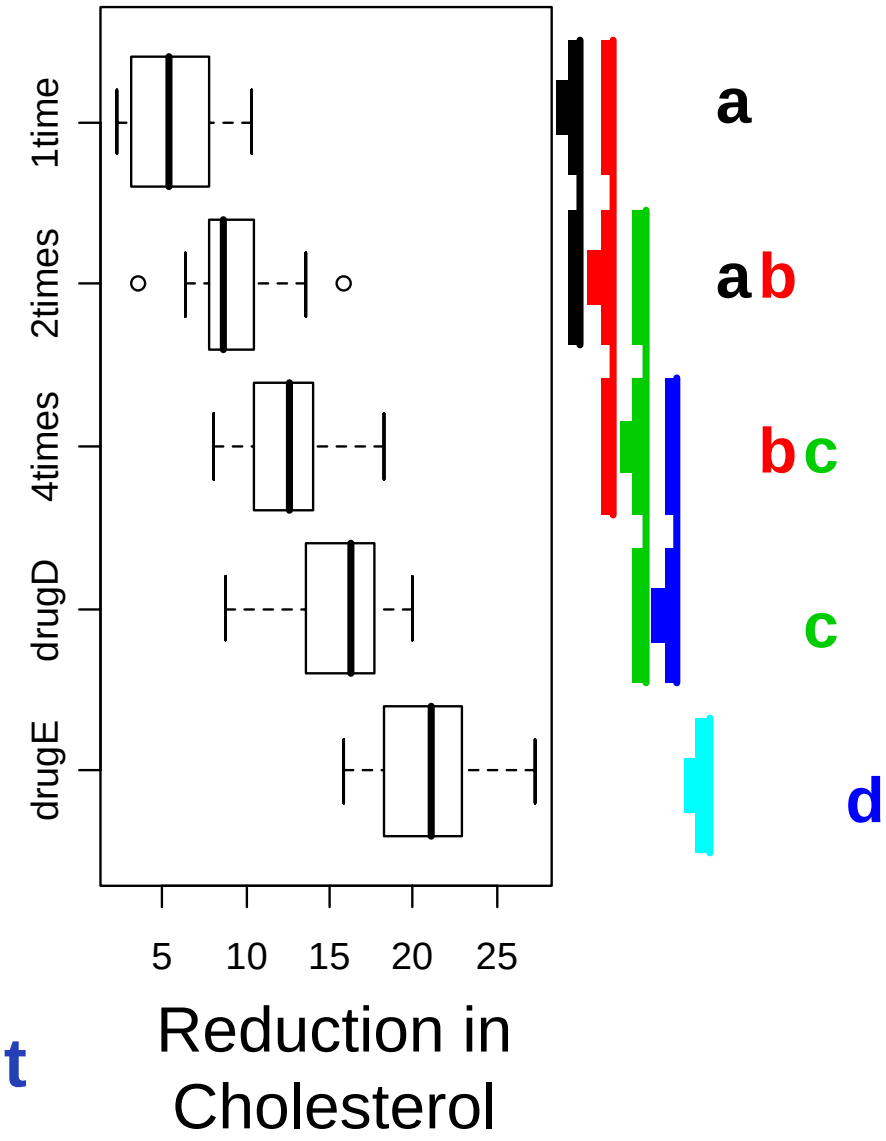
Ts vs. Letters



	Ts	Letters
Pro	Simple, Easily decoded visually	* Easily added to a text table * Less space than “Ts”?
Con	Can’t add to a simple text table without graphics	Requires more cognitive processing

Cholesterol Study

- **5 different treatments**
  - 1time = 20 mg once/day
  - 2times=10 mg twice/day
  - 4times = 5mg 4 times/day
  - drugD, drugE = 2 other drugs
- **drugE produced the greatest reduction, and is the only treatment distinct from all others**
- **For "2times" and "4times", we must read 2 different "letters" but only one "T" each.**



See the "multcomp" package in R or
Peter H. Westfall, Randall D. Tobias, Dror Rom, Russell D. Wolfinger, and Yosef Hochberg (1999) *Multiple Comparisons and Multiple Tests* (SAS Institute)

R Foundation for Statistical Computing

- **www.r-project.org**
- **R is the platform of choice for an increasing number of the leading experts in statistical computing**
  - 723 contributed packages downloadable from 'CRAN' (2006.04.30)
  - 58 mirrors in 24 countries (2006.04.30)
- **The availability of downloadable R code substantially reduces the time to learn, apply, modify and extend existing statistical techniques.**
- **You can increase your chances that people like me will read and cite your work if you publish**
  - in journals with articles, data and R scripts freely downloadable or
  - books with companion R packages

multcompView package in R

Data

Paired Comparison Summary

function

multcompTs

multcompLetters

multcompBoxplot

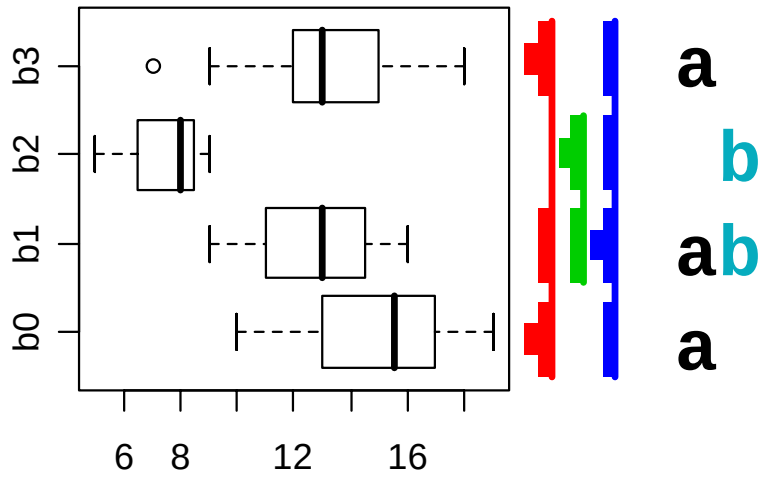
object of class

multcompTs

multcompLetters

Plot

Print



Summary: R package "multcompView"

- Two visual summaries of paired comparisons relative to a threshold:

- multcompTs: Easily decoded visual
- multcompLetters: Parsimonious, letter-based summary that does not require graphics

- multcompBoxplots: General function for producing variations of either or both with boxplots.