Display multiple comparisons

Journal Club

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Types of Displays

- Table with n rows, one for each comparison (summary statistic or CI)
- Tiebreaker plot of the confidence intervals ([Bretz et al.(2010)Bretz, Hothorn, and Westfall])
- Compact letter display ([Piepho(2004)])
- Mean-mean multiple comparison plot ([Heiberger and Holland(2006), Heiberger and Holland(2010)])

Data set

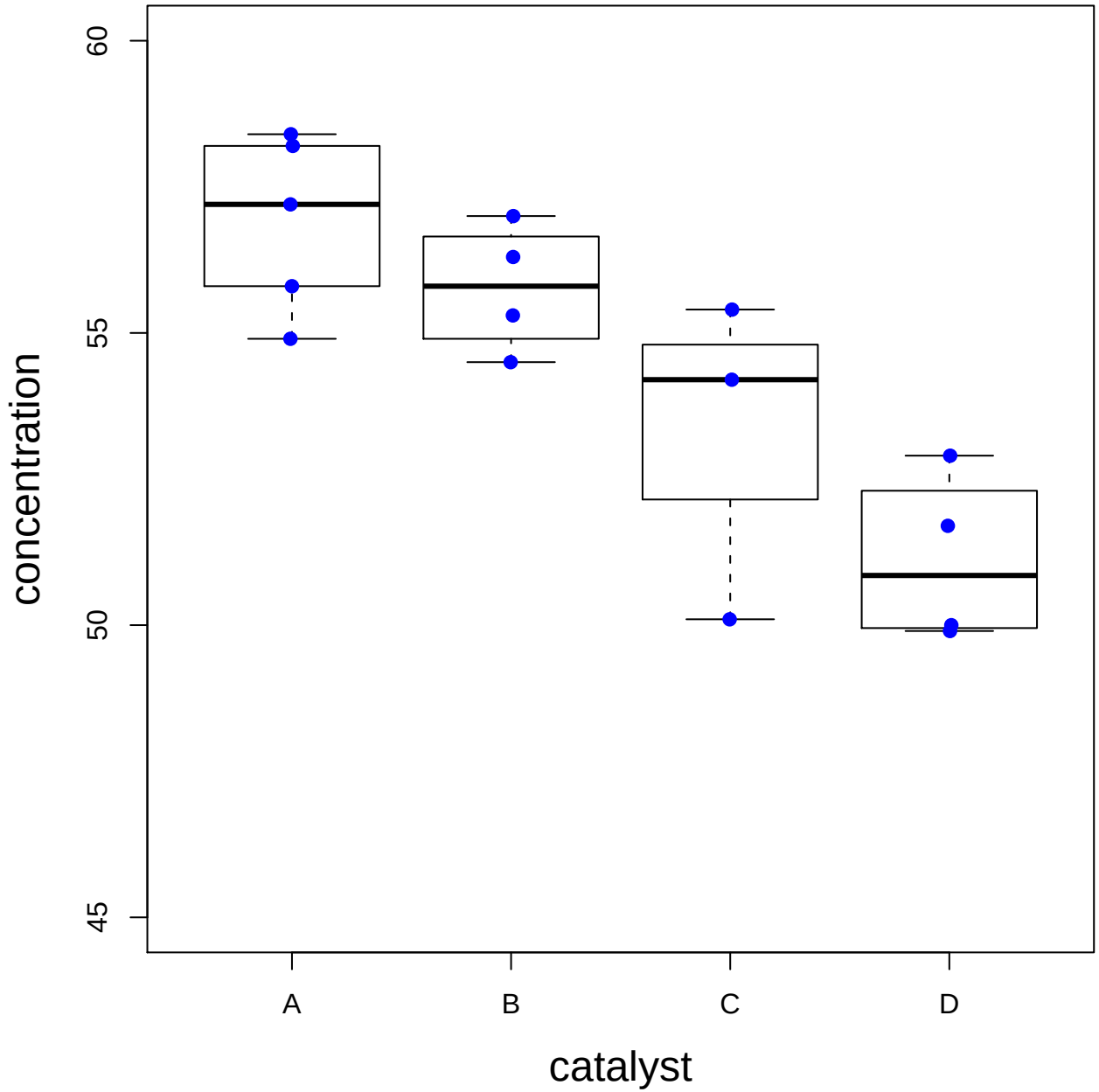


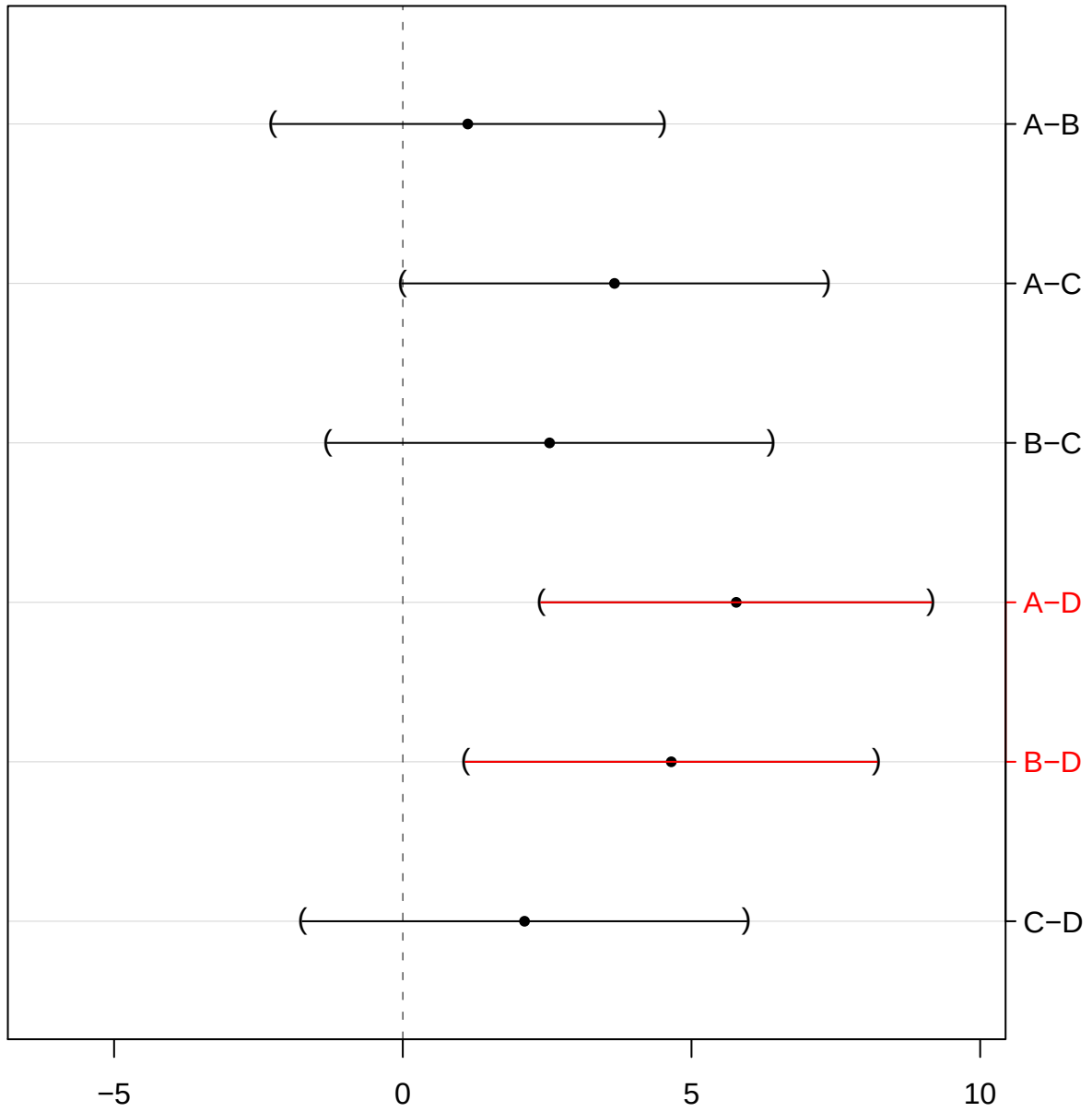
Table with n rows, one for each comparison (summary statistics)

	Estimate	Std. Error	t value	Pr(>|t|)	
B - A == 0	-1.125	1.138	-0.988	0.75812	
C - A == 0	-3.667	1.239	-2.958	0.05060	.
D - A == 0	-5.775	1.138	-5.073	0.00142	**
C - B == 0	-2.542	1.296	-1.961	0.25474	
D - B == 0	-4.650	1.200	-3.875	0.01021	*
D - C == 0	-2.108	1.296	-1.627	0.40012	

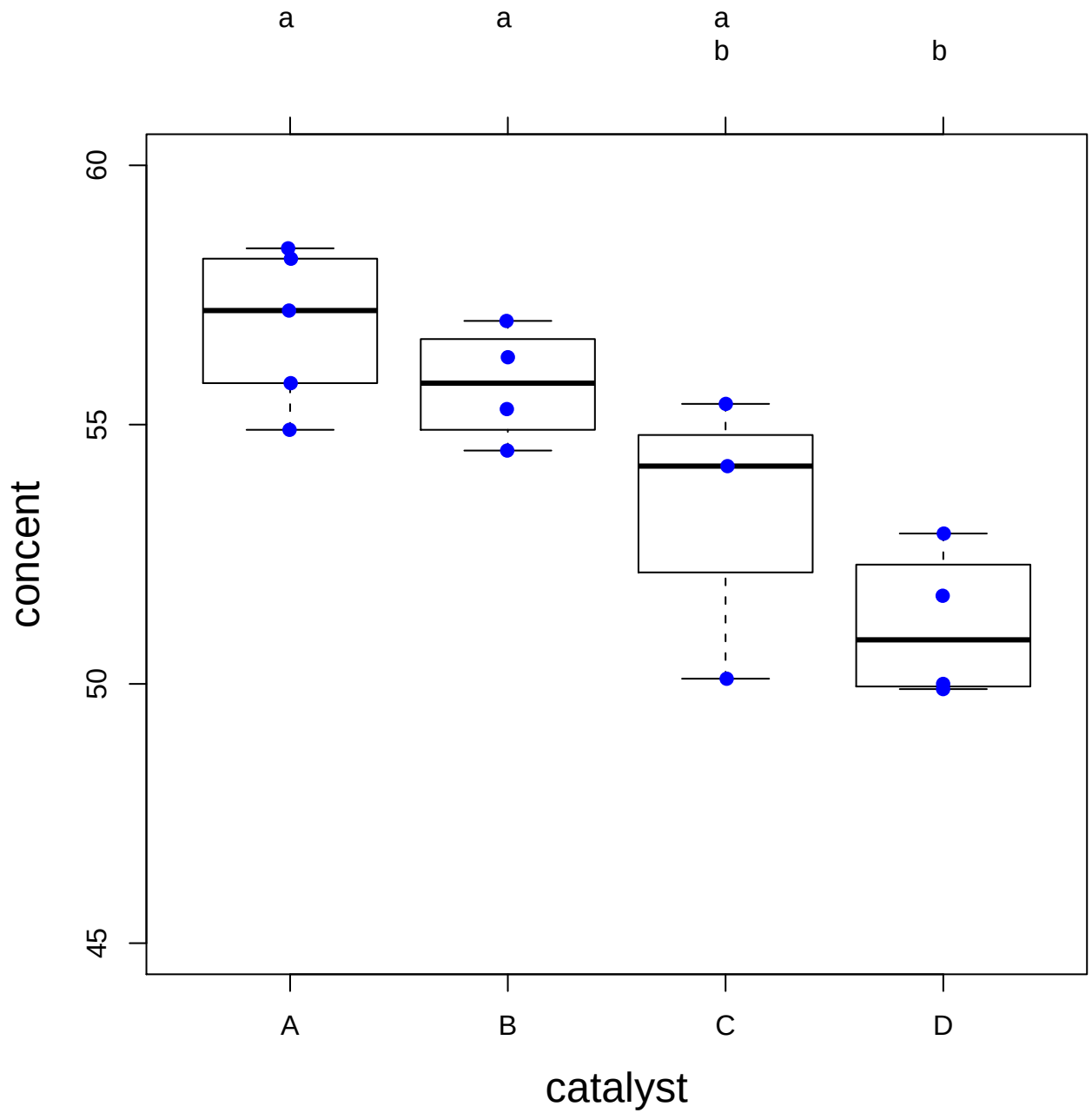
Table with n rows, one for each comparison (Confidence intervals)

	Estimate	lwr	upr
B - A == 0	-1.12500	-4.50306	2.25306
C - A == 0	-3.66667	-7.34423	0.01090
D - A == 0	-5.77500	-9.15306	-2.39694
C - B == 0	-2.54167	-6.38776	1.30442
D - B == 0	-4.65000	-8.21079	-1.08921
D - C == 0	-2.10833	-5.95442	1.73776

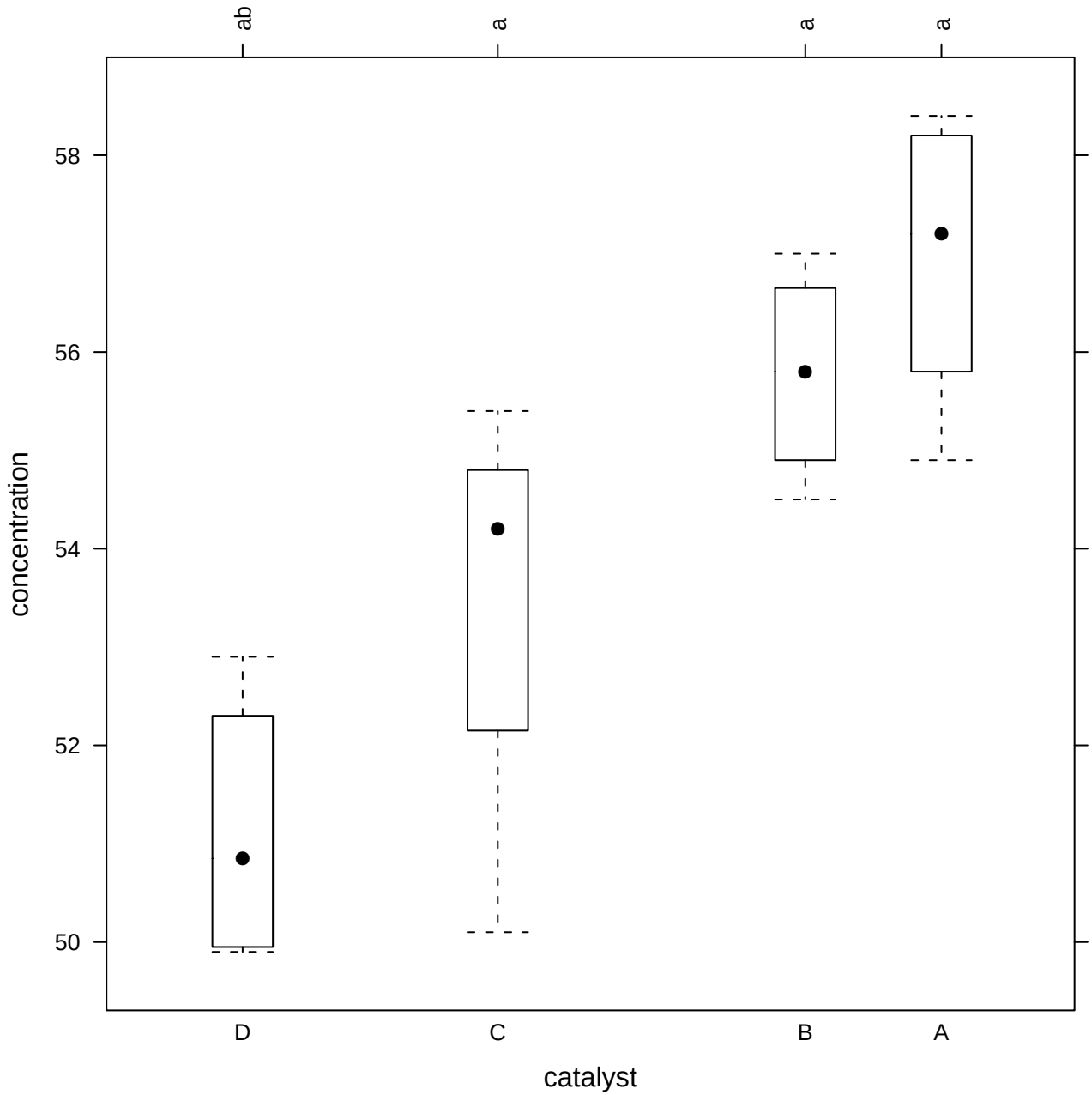
Tiebreaker plot of the confidence intervals



Compact letter display - 1



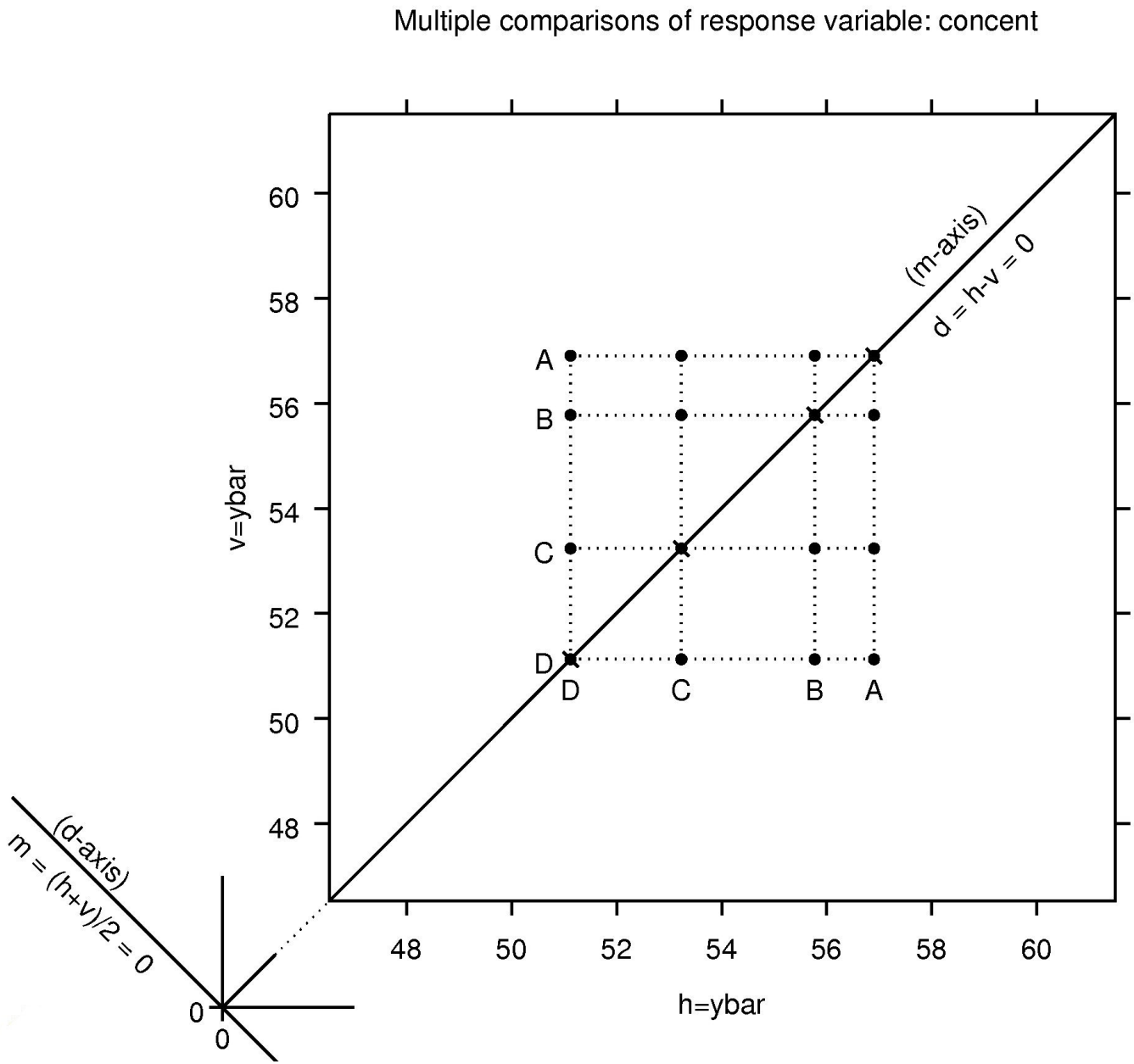
Compact letter display - 2



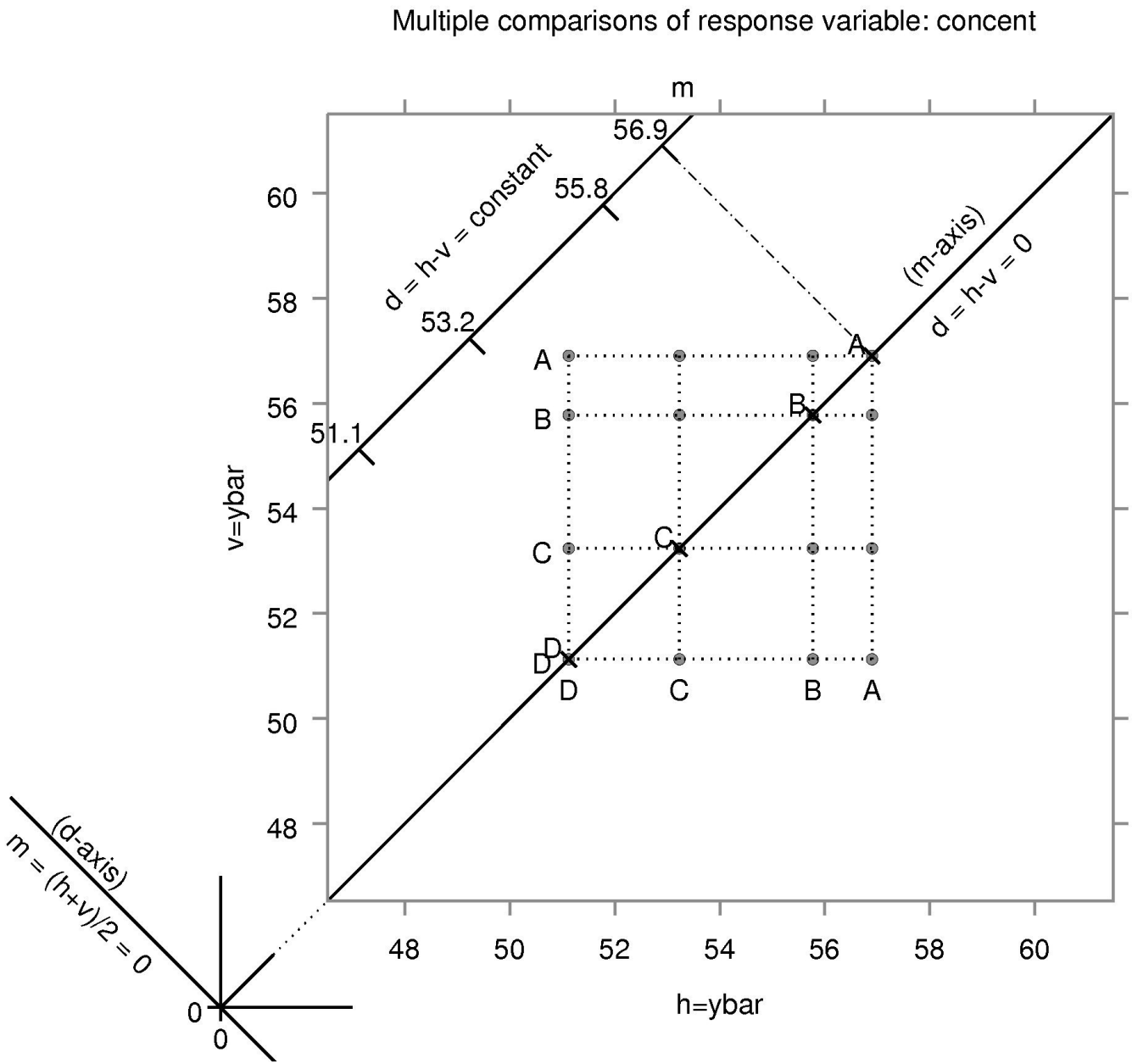
Existing procedures for graphically presenting the results of such procedures suffer from an inability to show all of the relevant information in the same plot:

- The sample means themselves, with correct relative distances
- The point and interval estimates of the pairwise differences
- The point and interval estimates for arbitrary contrasts of the level means
- Declarations of significance
- Confidence interval widths that are correct for unequal sample sizes

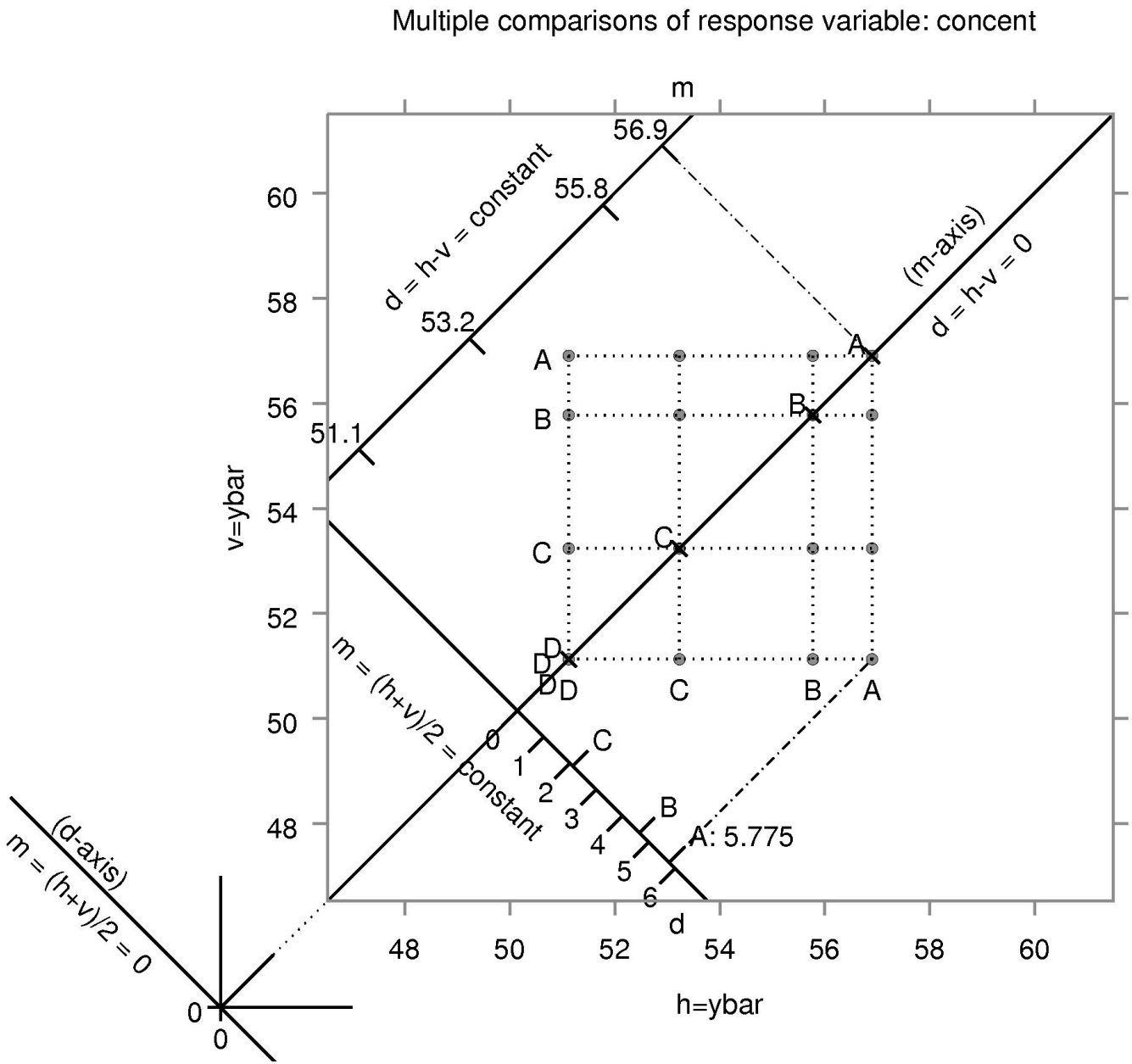
Construction of mean-mean multiple comparison plots - 1



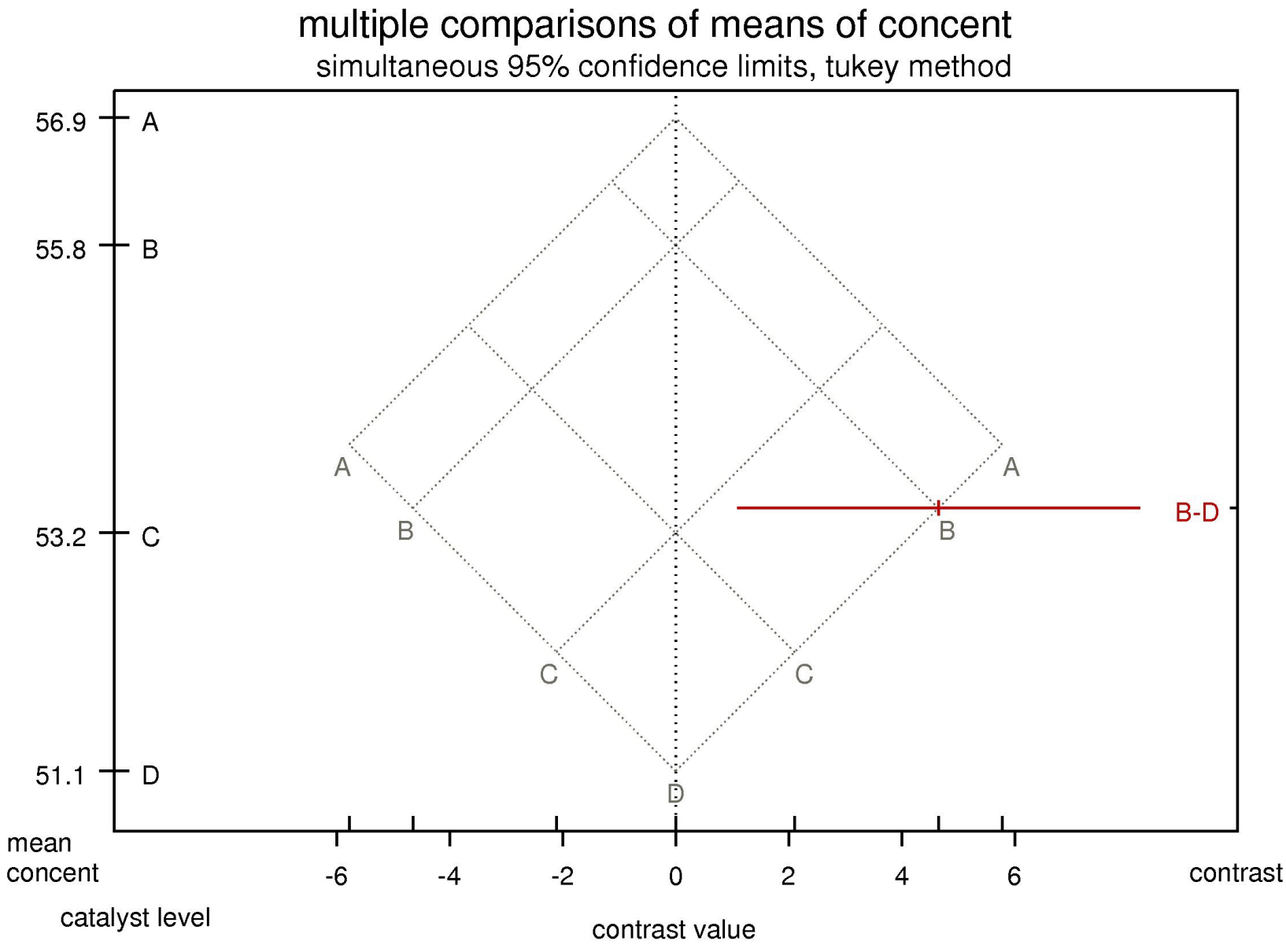
Construction of mean-mean multiple comparison plots - 2



Construction of mean-mean multiple comparison plots - 3

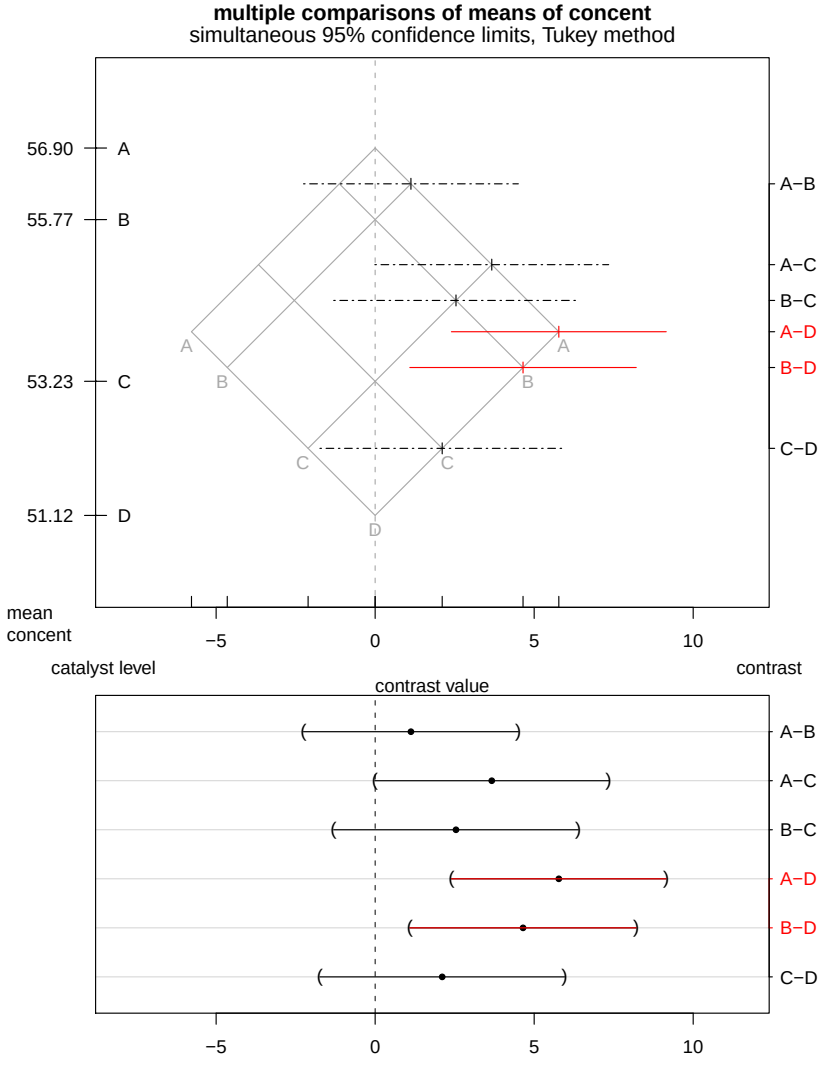


Applications of MMC plots



Applications of MMC plots

Applications of MMC plots



R implementation

function: `glht.mmc` with arguments:

- `model` - „aov“ object in „lm“ method
- `ylabel` - name of the response variable
- `lmat` - contrast matrix

Frank Bretz, Torsten Hothorn, and Peter Westfall.
Multiple Comparisons Using R.
Taylor &amp and Francis Ltd, 2010.
ISBN 1420010905.

R. M. Heiberger and B. Holland.
Mean-mean multiple comparison displays for families of linear contrasts.
JOURNAL OF COMPUTATIONAL AND GRAPHICAL STATISTICS, 15 (4):937–955, 2006.

Richard Heiberger and Burt Holland.
Statistical Analysis and Data Display: An Intermediate Course with Examples in S-Plus, R, and SAS.
Springer-Verlag New York Inc., 2010.
ISBN 1441923209.

H. P. Piepho.
An algorithm for a letter-based representation of all-pairwise comparisons.
JOURNAL OF COMPUTATIONAL AND GRAPHICAL STATISTICS, 13 (2):456–466, 2004.