Multiple Comparison Procedures To A Control

For AN(C)OVA Models

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Contents

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Basic Information

Automatic statistics for the file:

File
recovery.csv

Your selection for the encoding: UTF-8
Your selection for the decimal character: .
Observations (rows with at least one non-missing value): 41
Variables (columns with at least one non-missing value): 2
Variables considered continuous: 1

Variables considered continuous
minutes

Variables considered categorical: 1

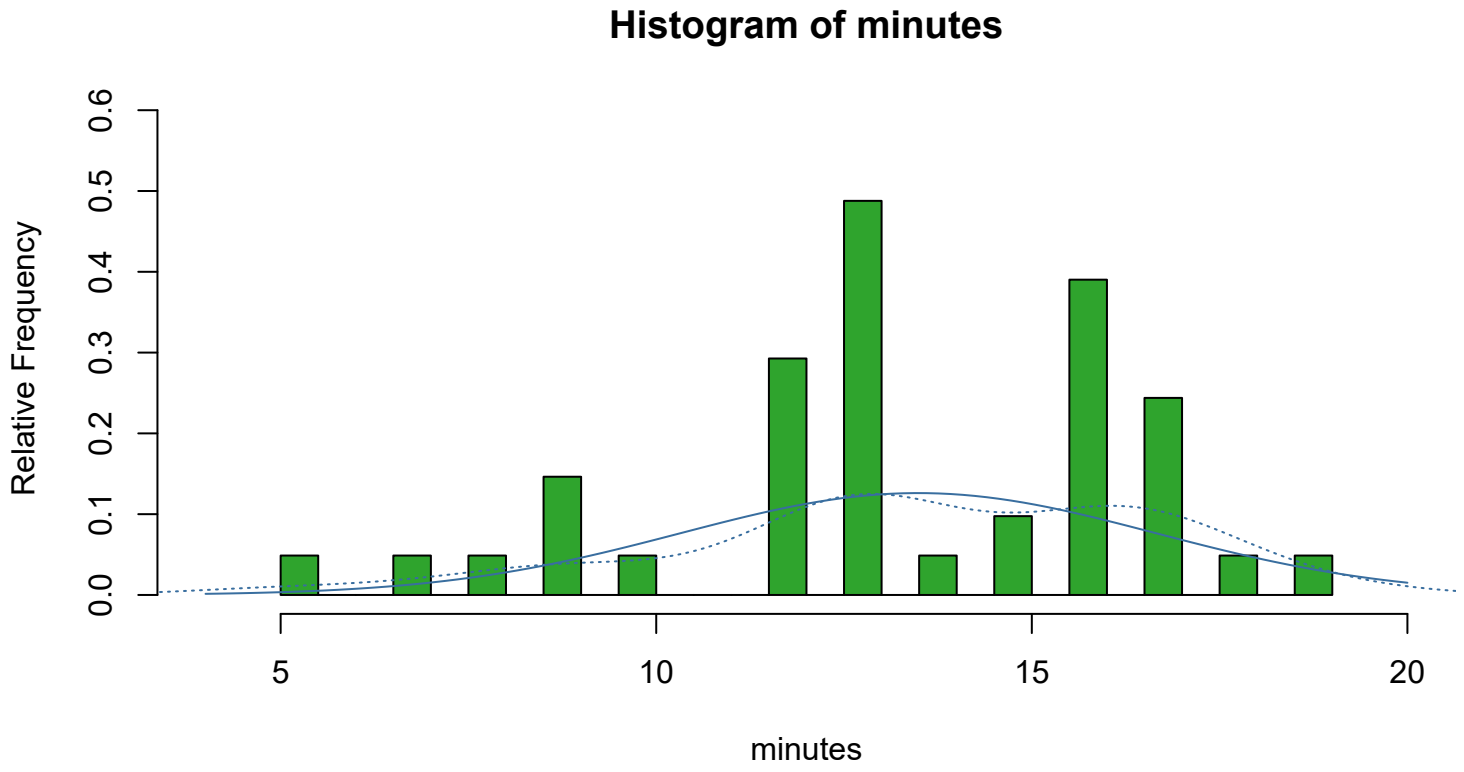
Variables considered categorical
blanket

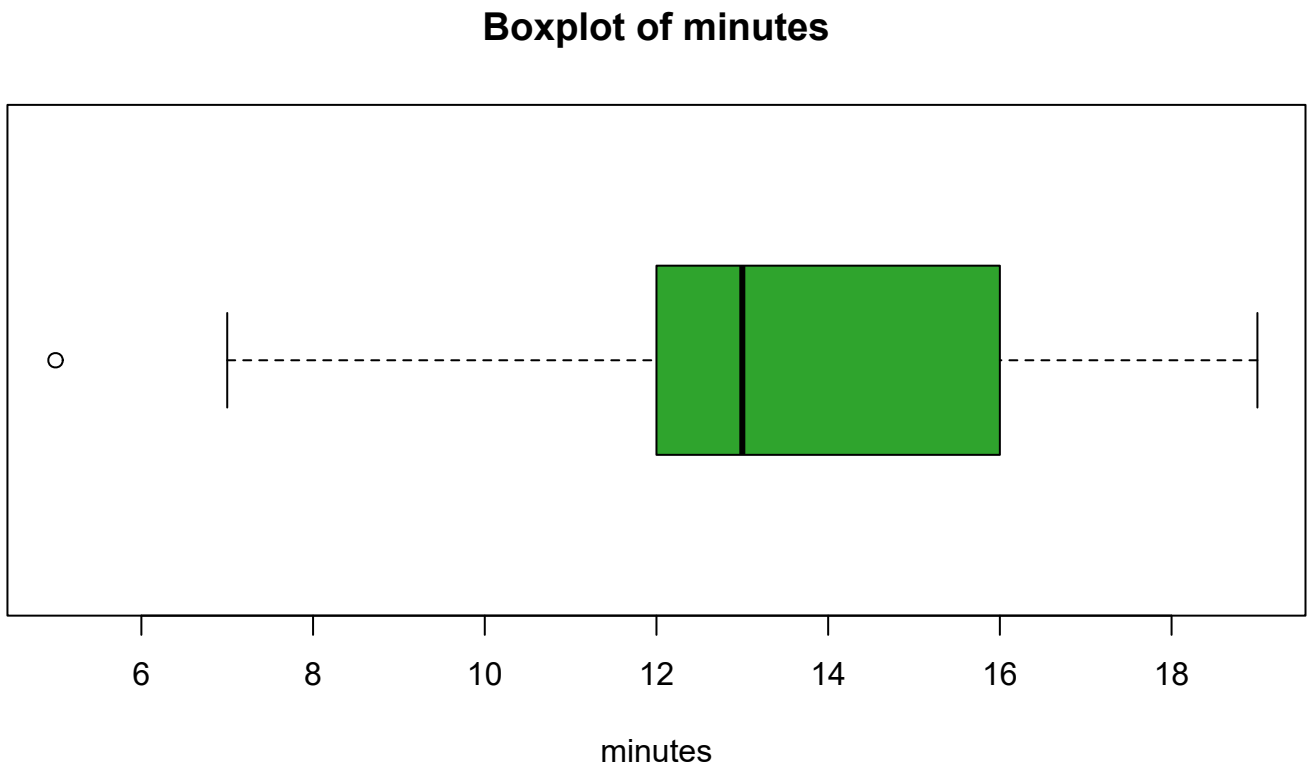
Model Information

You defined the following linear model: minutes~blanket
You are interested in the factor: blanket
You are interested in pairwise comparisons to the control factor level: b0

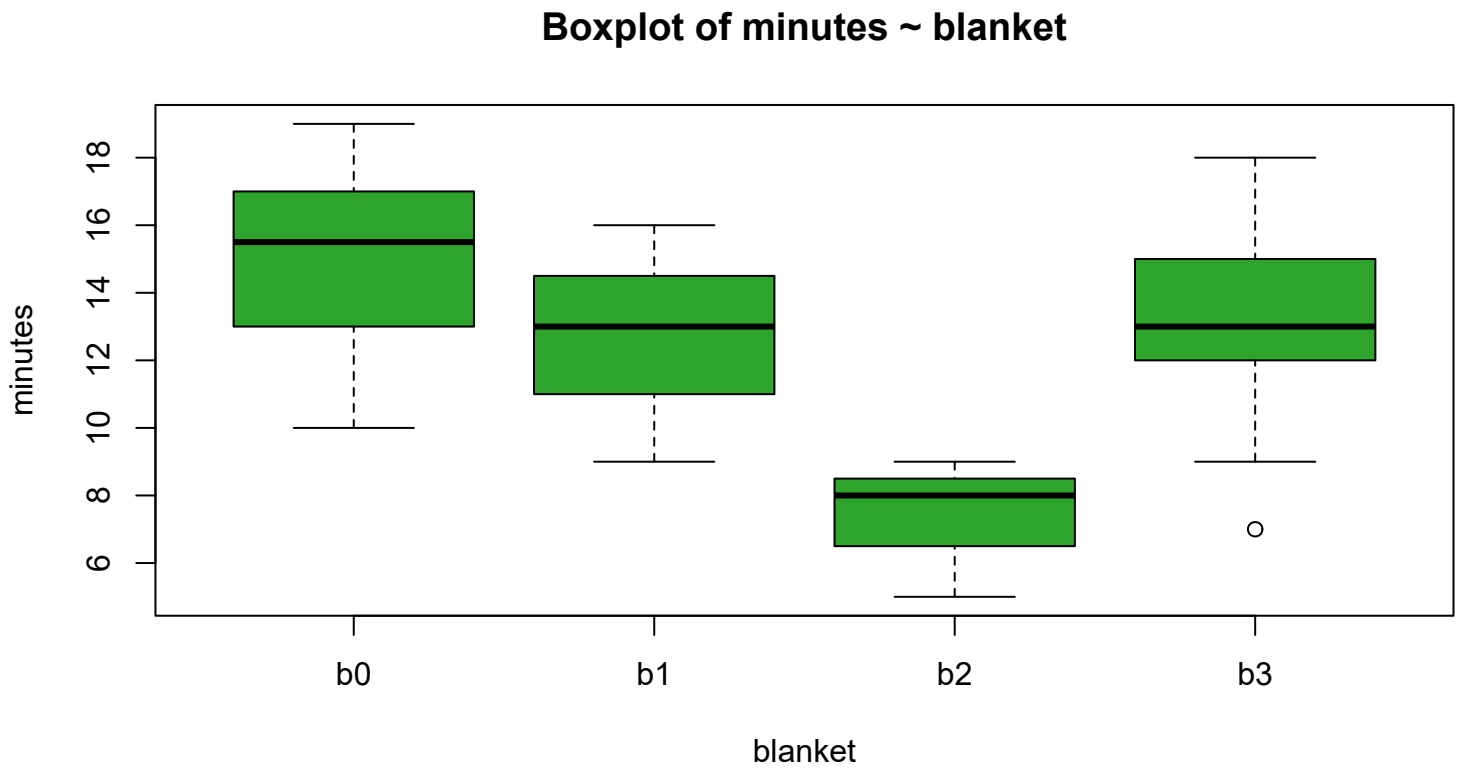
Descriptive Plots

Dependent Variable




Boxplot of minutes
6
8
10
12
14
16
18
minutes

Dependent Against Categorical Factors



Analysis of variance

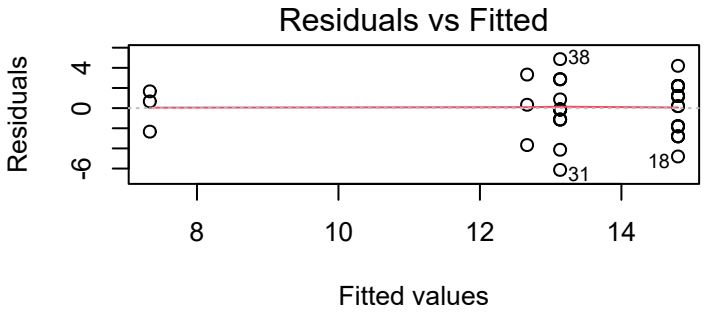
Effect of the separate expressions of the given variables (Parameter Estimates)

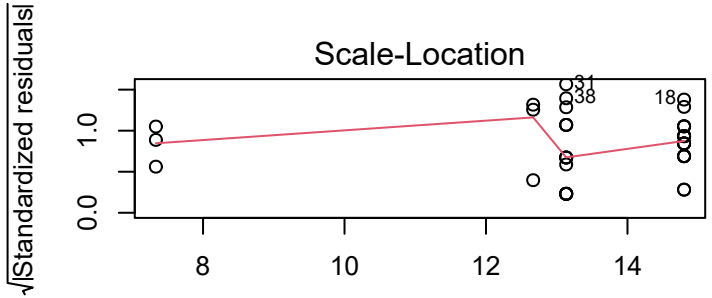
Variable	Value	Std.Error	T.value	P.value	sign. level[1]	Significance at 5 percent error
(Intercept)	11.98	0.57	20.91	<0.001	***	Intercept Significant.
blanket1	2.82	0.70	4.00	<0.001	***	Significant. A Difference between the effect of blanket1 and its reference.
blanket2	0.68	1.20	0.57	0.573		Not Significant. No difference between the effect of blanket2 and its reference.
blanket3	-4.65	1.20	-3.87	<0.001	***	Significant. A Difference between the effect of blanket3 and its reference.

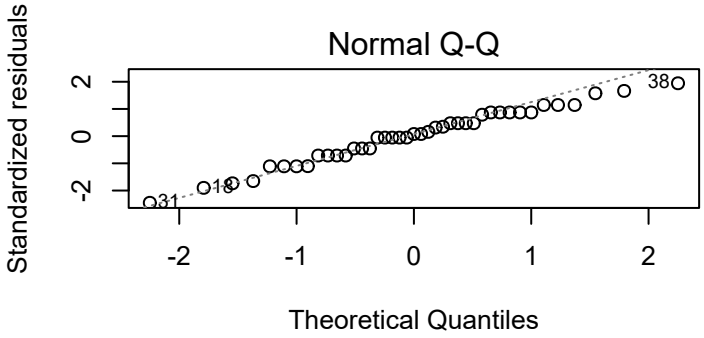
[1] '***': sign. to 0.1% error. '**': sign. to 1% error. '*': sign. to 5% error. ' . ': sign. to 10% error. ' ': not sign. ' - ': no statement.

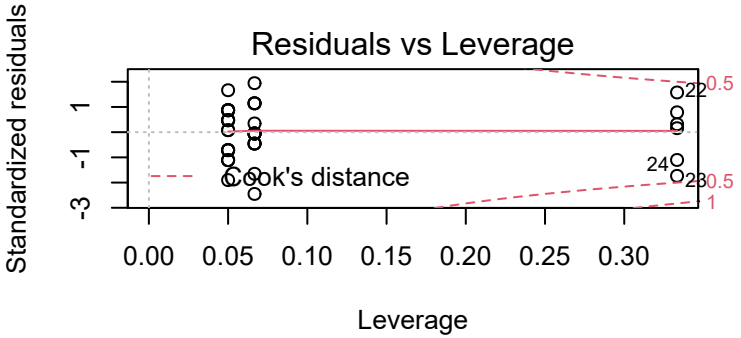
```
Anova Table (Type III tests)

Response: minutes
             Sum Sq Df  F value    Pr(>F)
(Intercept) 2933.11  1 437.1314 < 2.2e-16 ***
blanket      151.98  3   7.5499 0.0004619 ***
Residuals    248.27 37
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```










```
     Simultaneous Tests for General Linear Hypotheses

Multiple Comparisons of Means: Dunnett Contrasts


Fit: lm(formula = modelfunction, data = df_factorized)

Linear Hypotheses:
             Estimate Std. Error t value Pr(<t)
b1 - b0 >= 0  -2.1333     1.6038  -1.330 0.2412
b2 - b0 >= 0  -7.4667     1.6038  -4.656 <0.001 ***
```

```
b3 - b0 >= 0  -1.6667     0.8848  -1.884 0.0924 .
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
(Adjusted p values reported -- single-step method)


     Simultaneous Confidence Intervals

Multiple Comparisons of Means: Dunnett Contrasts


Fit: lm(formula = modelfunction, data = df_factorized)

Quantile = 2.1837
95% family-wise confidence level


Linear Hypotheses:
             Estimate lwr     upr
b1 - b0 >= 0 -2.1333     -Inf  1.3688
b2 - b0 >= 0 -7.4667     -Inf -3.9645
b3 - b0 >= 0 -1.6667     -Inf  0.2654
```

Control Dunnet

Pairwise Comparisons Of Expression Levels

Null Hypothesis	Value	Std.Error[2]	T.value	P.value	sign. level[1]	Significance at 5 percent Type I error
b1 - b0 >= 0	-2.13	1.73	-1.23	0.279		Not Significant. Level b0 of factor blanket is less than b1[3]
b2 - b0 >= 0	-7.47	1.11	-6.73	<0.001	***	Significant. Level b2 of factor blanket is significantly less than b0[4]
b3 - b0 >= 0	-1.67	0.86	-1.93	0.085	.	Not Significant. Level b0 of factor blanket is less than b3[3]

[1] Note: The sandwich tester was used to calculate this column.

[2] '***': sign. to 0.1% error. '**': sign. to 1% error. '*': sign. to 5% error. ' . ': sign. to 10% error. ' ': not sign. ' - ': no statement.

[3] H1 does not hold significantly.

[4] H1 holds significantly.

Null Hypothesis	Value	Lower bound	Upper bound	Interpretation
b1 - b0 >= 0	-2.13	-Inf	1.65	The interval (-Inf, 1.65) traps the true difference b1-b0 with probability 95 percent.[2]
b2 - b0 >= 0	-7.47	-Inf	-5.05	The interval (-Inf, -5.05) traps the true difference b2-b0 with probability 95 percent.[1]
b3 - b0 >= 0	-1.67	-Inf	0.22	The interval (-Inf, 0.22) traps the true difference b3-b0 with probability 95 percent.[2]

[1] Remark: Zero is not in the conidence interval.

[2] Remark: Zero is in the confidence interval.

References

Fox, John, and Sanford Weisberg. 2019. *An R Companion to Applied Regression*. Third. Thousand Oaks CA: Sage. https://socialsciences.mcmaster.ca/jfox/Books/Companion/.

Gross, Juergen, and Uwe Ligges. 2015. *Nortest: Tests for Normality*. https://CRAN.R-project.org/package=nortest.

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Zeileis, Achim, and Torsten Hothorn. 2002. "Diagnostic Checking in Regression Relationships." *R News* 2 (3): 7–10. https://CRAN.R-project.org/doc/Rnews/.