

A guide to robust statistical methods in neuroscience: outlier examples

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Contents

Dependencies	1
Effect of outliers (section 2)	1
Sample without outliers	1
Sample with one outlier	2
Effect of outliers (section 3)	2
Example 1	2
Example 2	3

Outlier examples presented in sections 2.1 and 3.2 of the article.

This is an R Markdown Notebook. When you execute code within the notebook, the results appear beneath the code. Try executing this chunk by clicking the *Run* button within the chunk or by placing your cursor inside it and pressing *Cmd+Shift+Enter*.

Dependencies

```
source("../code/Rallfun-v40.txt")
```

Effect of outliers (section 2)

Sample without outliers

```
mu <- 1 # hypothesis
obs <- c(1, 1.5, 1.6, 1.8, 2, 2.2, 2.4, 2.7)
tres <- t.test(obs, mu = mu)
```

sd = 0.54;
 $T = 4.69$;
 $p = 0.002228$;
CI = [1.45, 2.35].

Sample with one outlier

```
mu <- 1 # hypothesis
obs <- c(1, 1.5, 1.6, 1.8, 2, 2.2, 2.4, 2.7, 8)
tres <- t.test(obs, mu = mu)
```

```
sd = 2.1;
T = 2.26;
p = 0.0538402;
CI = [0.97, 4.19].
```

Effect of outliers (section 3)

Example 1

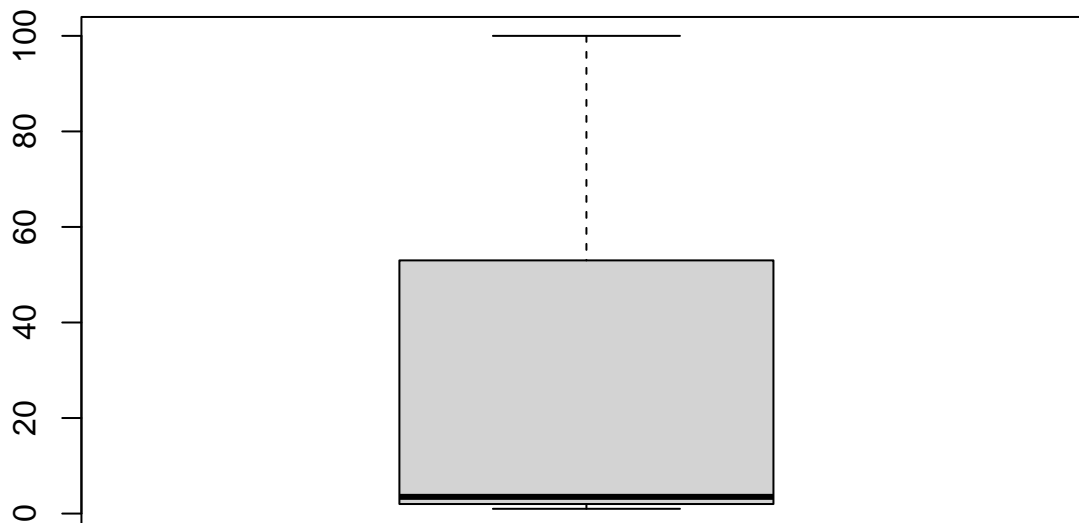
2 SD rule

```
a <- c(1, 2, 2, 3, 4, 6, 100, 100)
((a - mean(a)) / sd(a)) > 2
```

```
## [1] FALSE FALSE FALSE FALSE FALSE FALSE FALSE
```

Boxplot rule

```
out <- boxplot(a)
```



```
out$out
```

```
## numeric(0)
```

MAD-median rule

```
((a - median(a)) / mad(a)) > 2.24
```

```
## [1] FALSE FALSE FALSE FALSE FALSE FALSE TRUE TRUE
```

Example 2

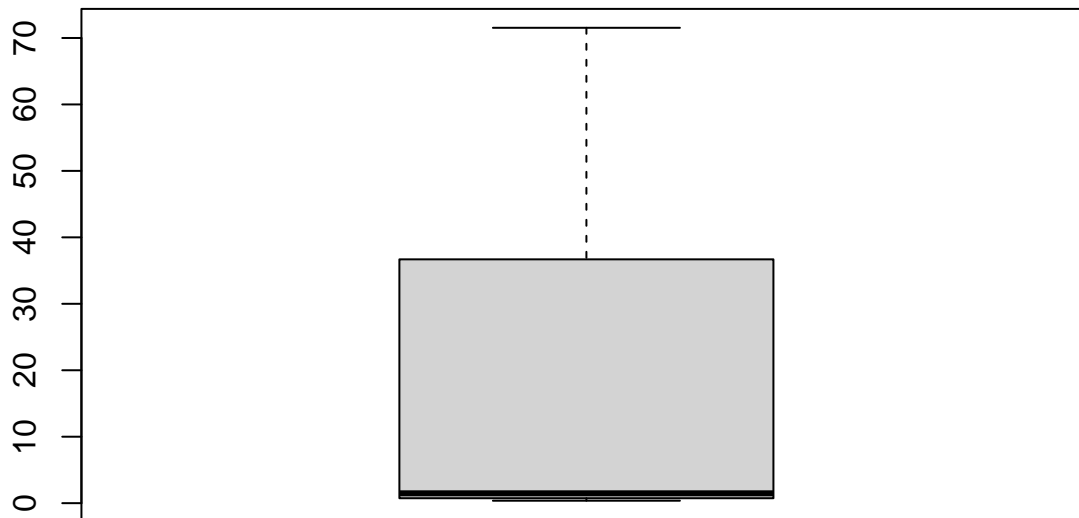
2 SD rule

```
a <- c(1.85, 1.11, 1.11, 0.37, 0.37, 1.85, 71.53, 71.53)
((a - mean(a)) / sd(a)) > 2
```

```
## [1] FALSE FALSE FALSE FALSE FALSE FALSE FALSE
```

Boxplot rule

```
out <- boxplot(a)
```



```
out$out
```

```
## numeric(0)
```

MAD-median rule

```
((a - median(a)) / mad(a)) > 2.24
```

```
## [1] FALSE FALSE FALSE FALSE FALSE FALSE TRUE TRUE
```