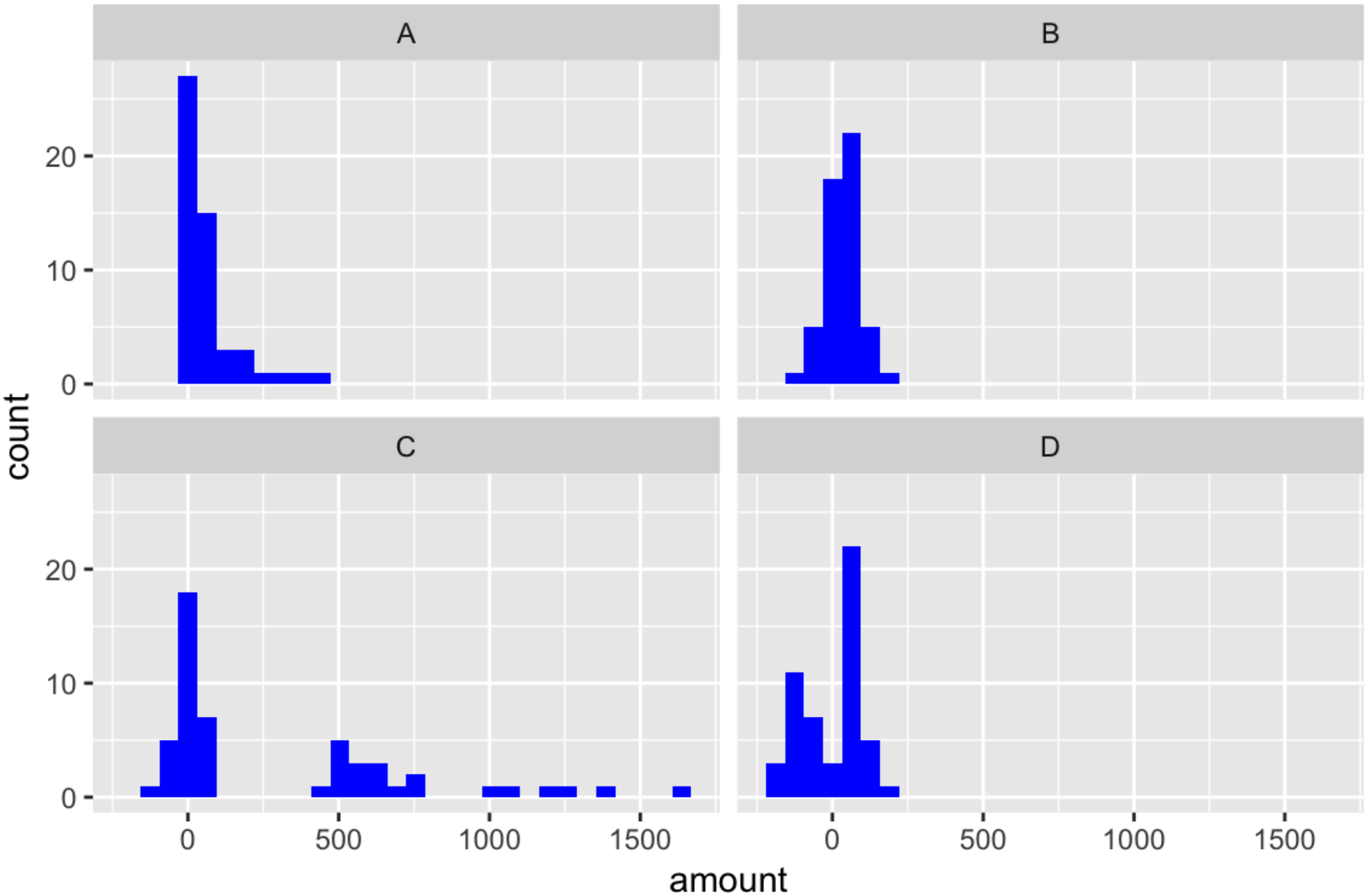
Continuous Variables:

BOXPLOTS

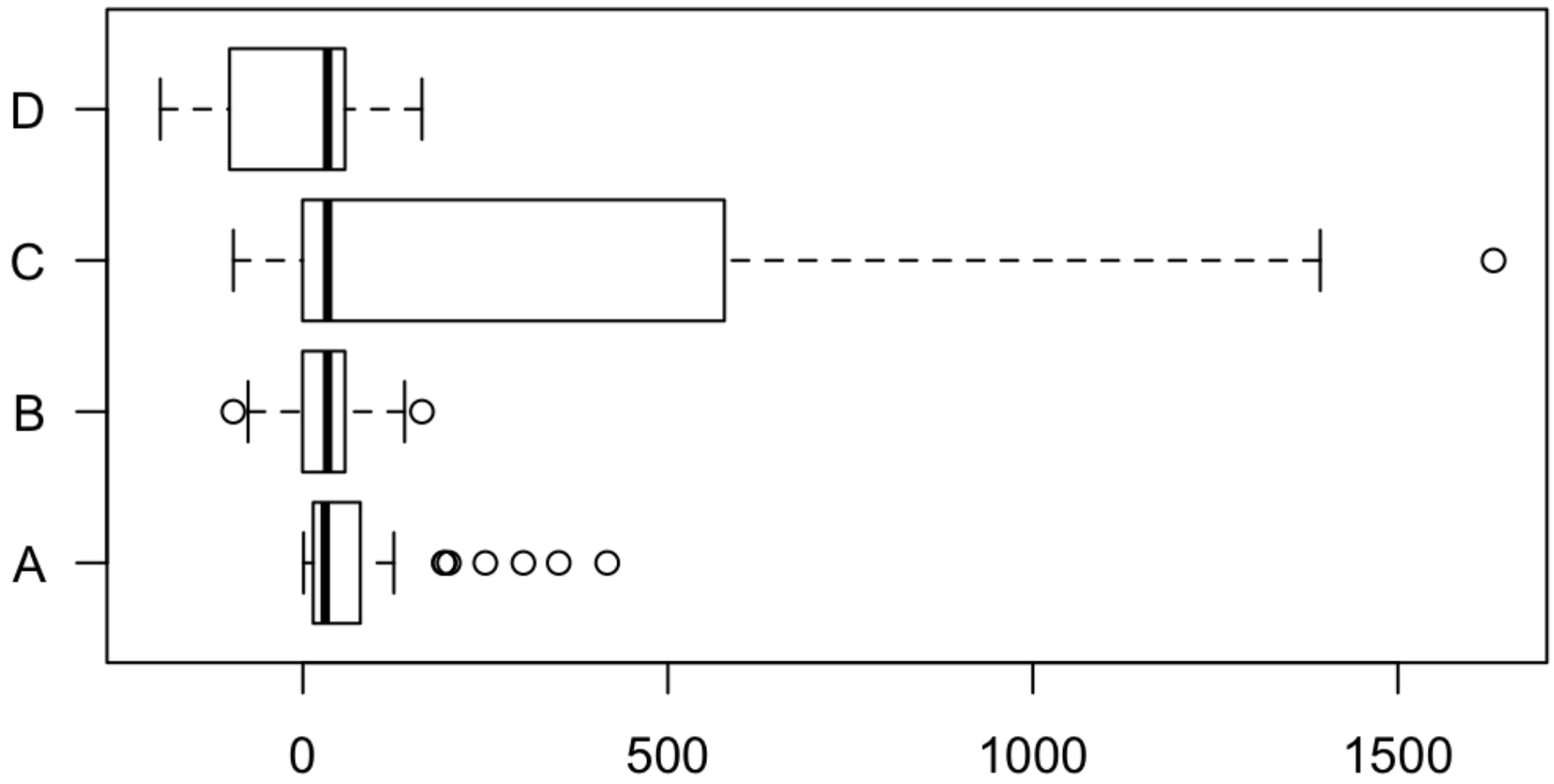
Multiple Histograms

Difficult to compare



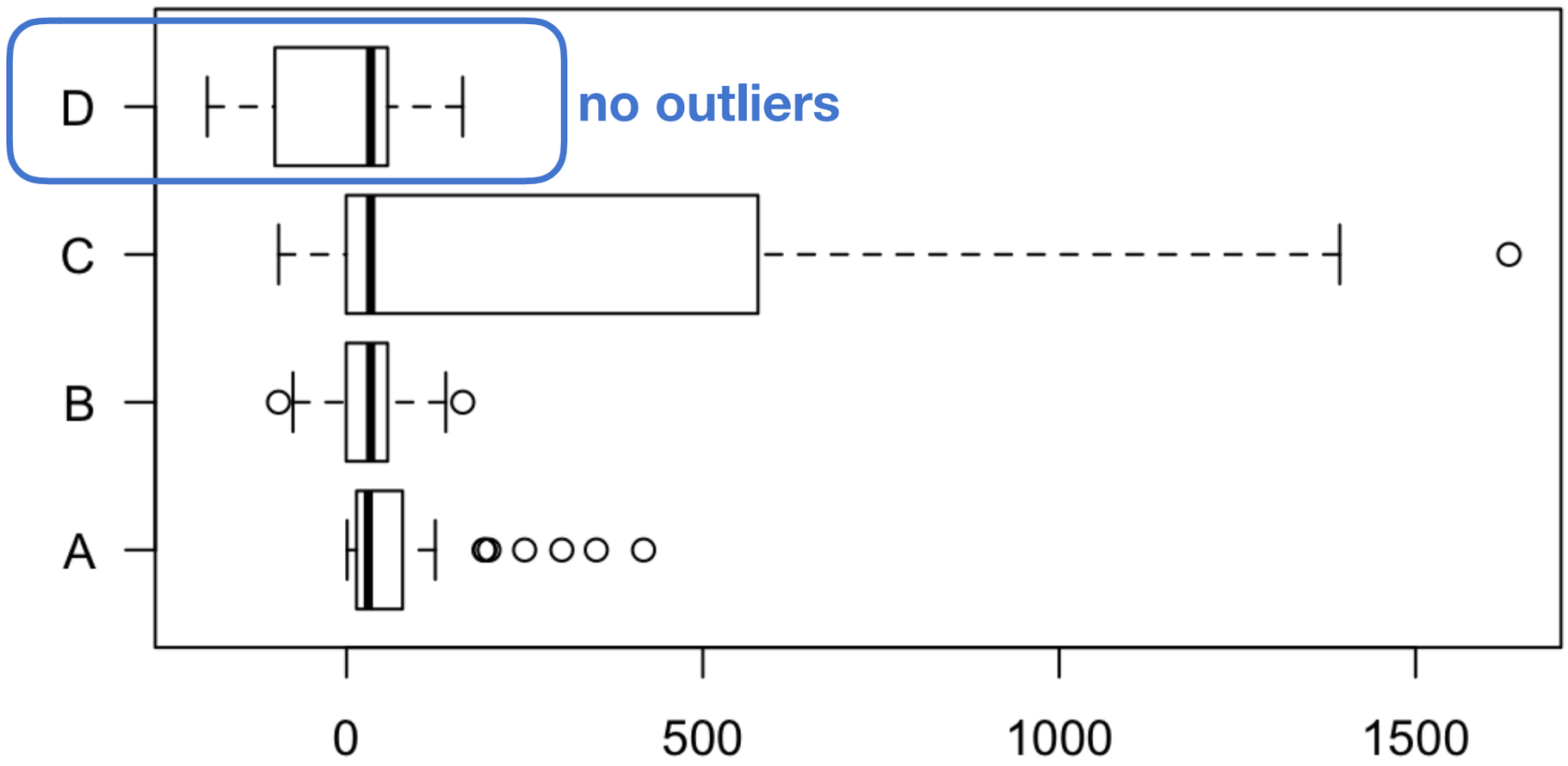
Boxplots

Allow us to compare summary statistics visually



Boxplots

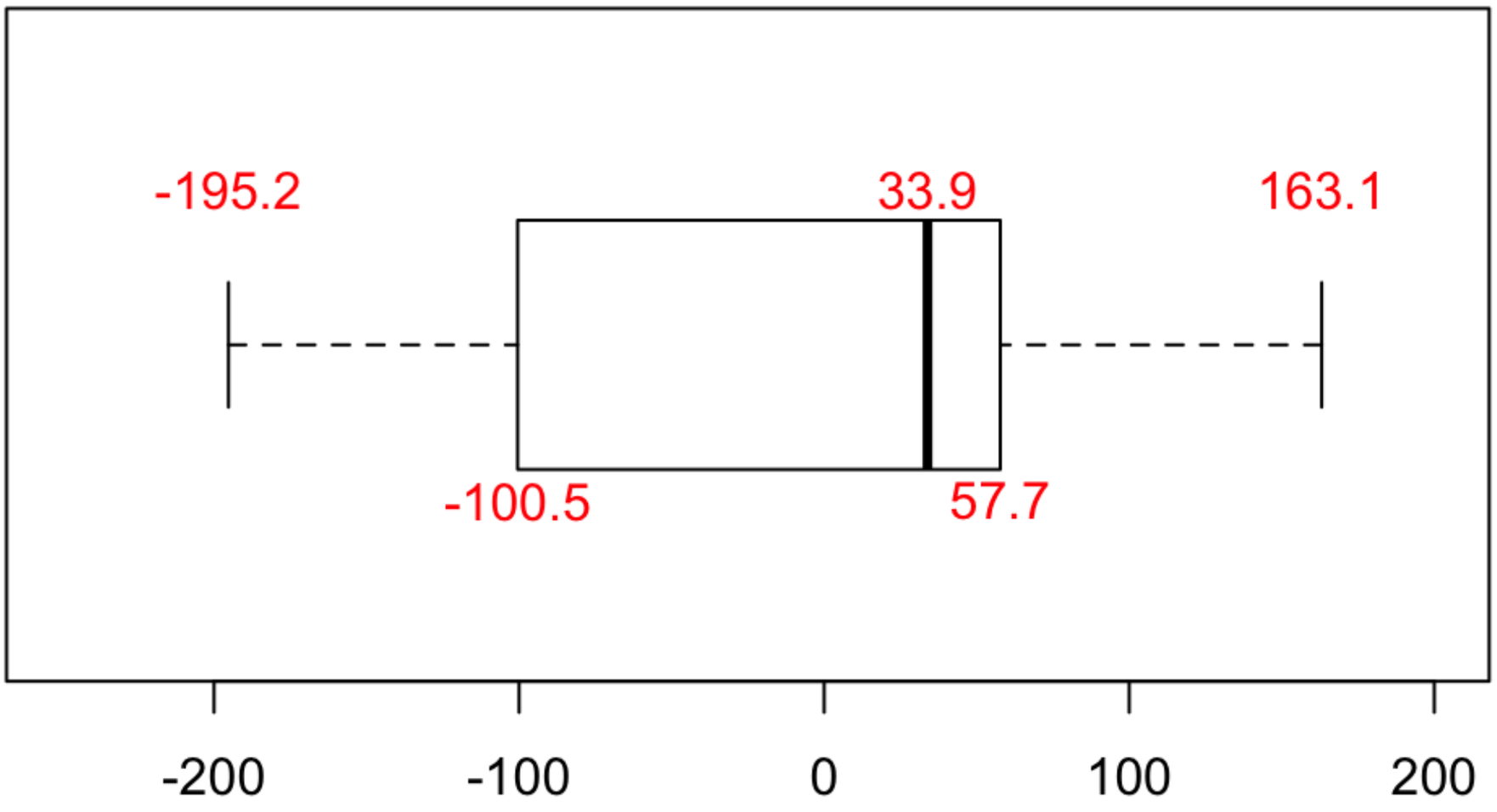
Allow us to compare summary statistics visually



Boxplot without outliers

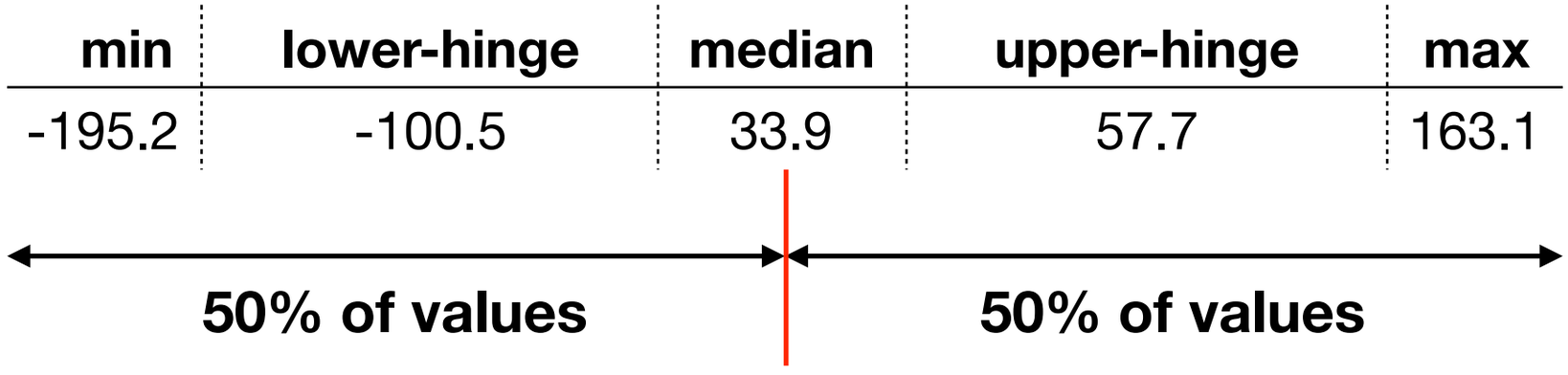
Five number summary

min	lower-hinge	median	upper-hinge	max
-195.2	-100.5	33.9	57.7	163.1

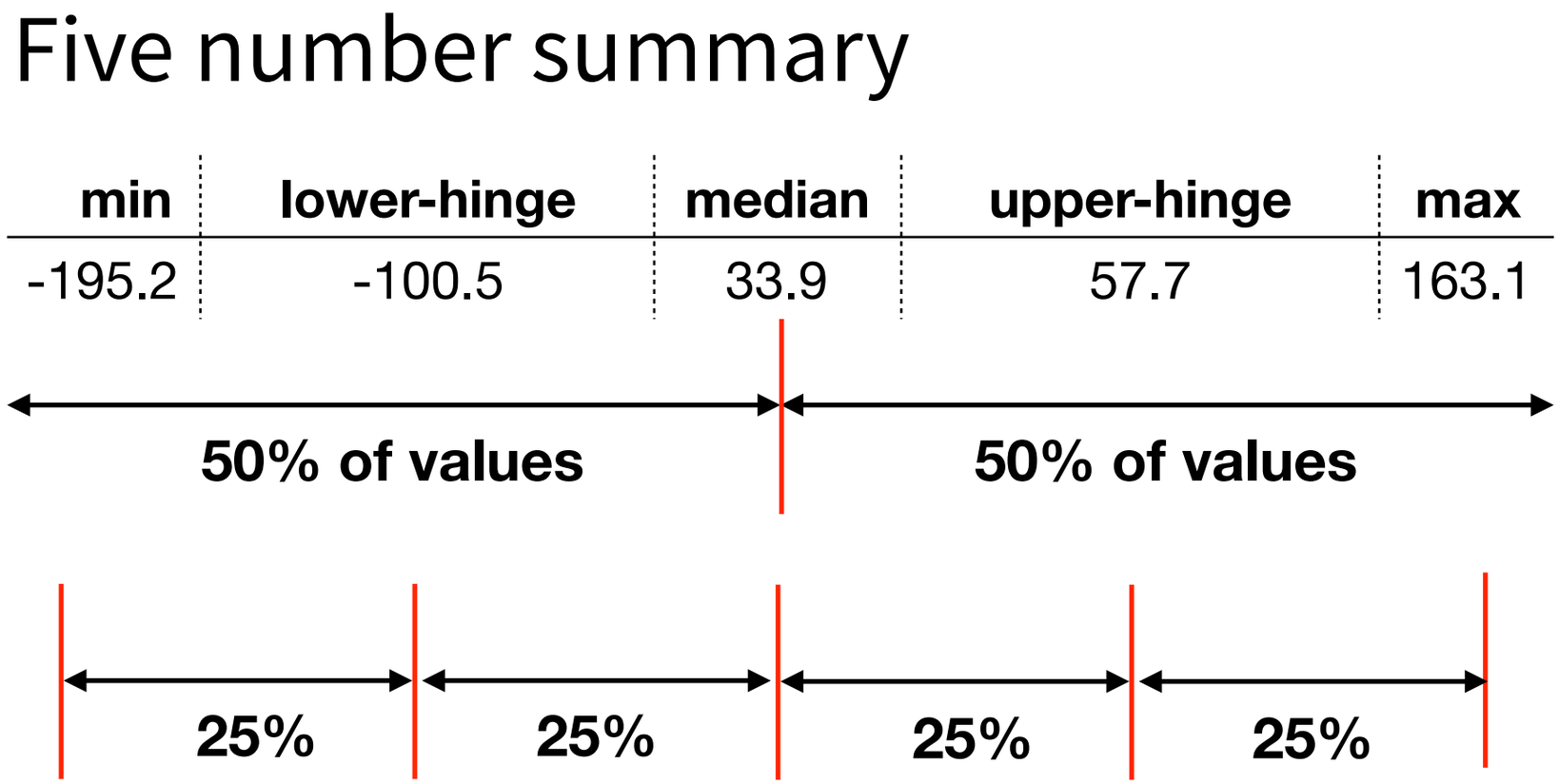


Boxplot without outliers

Five number summary



Boxplot without outliers



Boxplot without outliers

Five number summary

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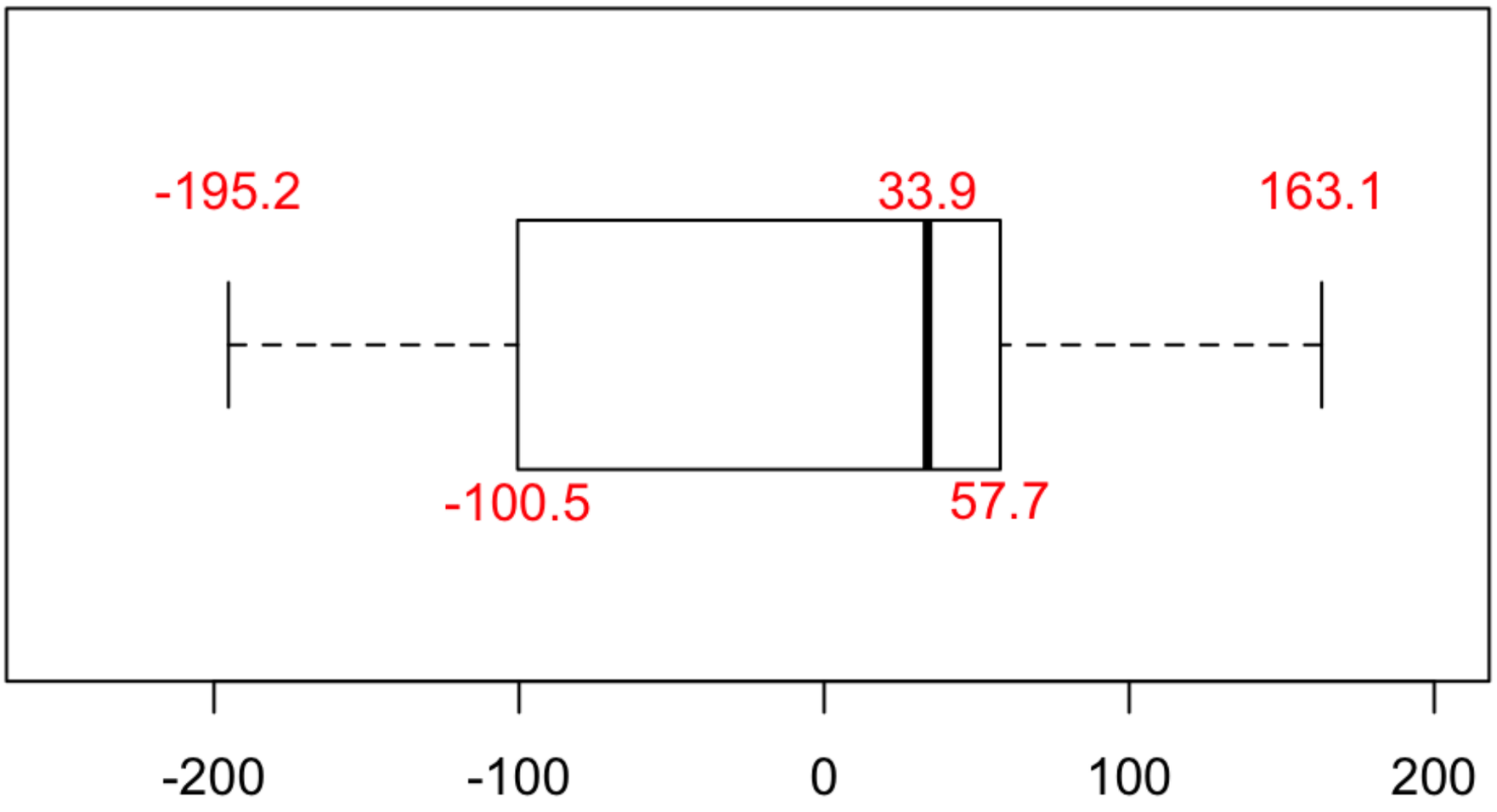
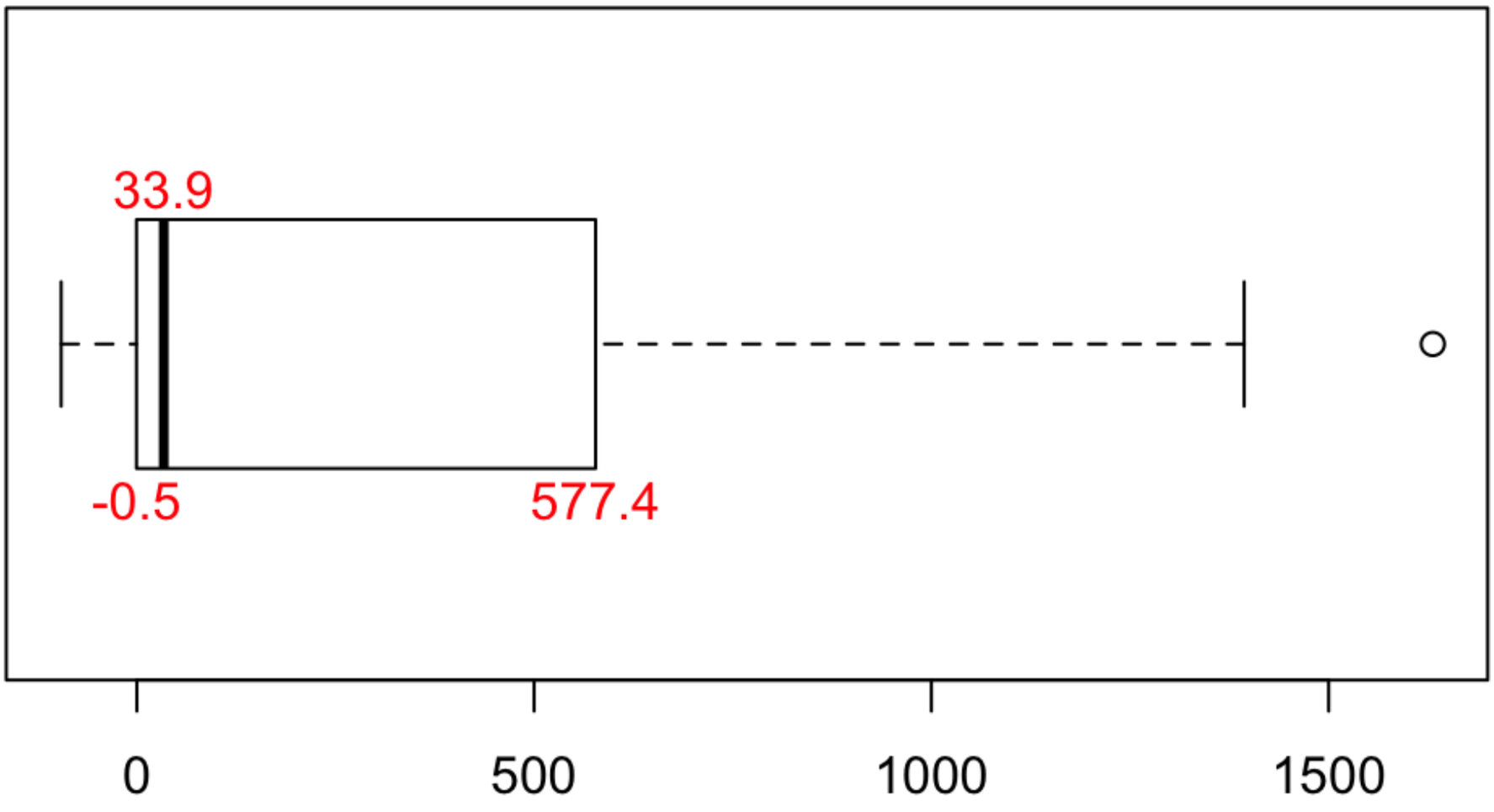


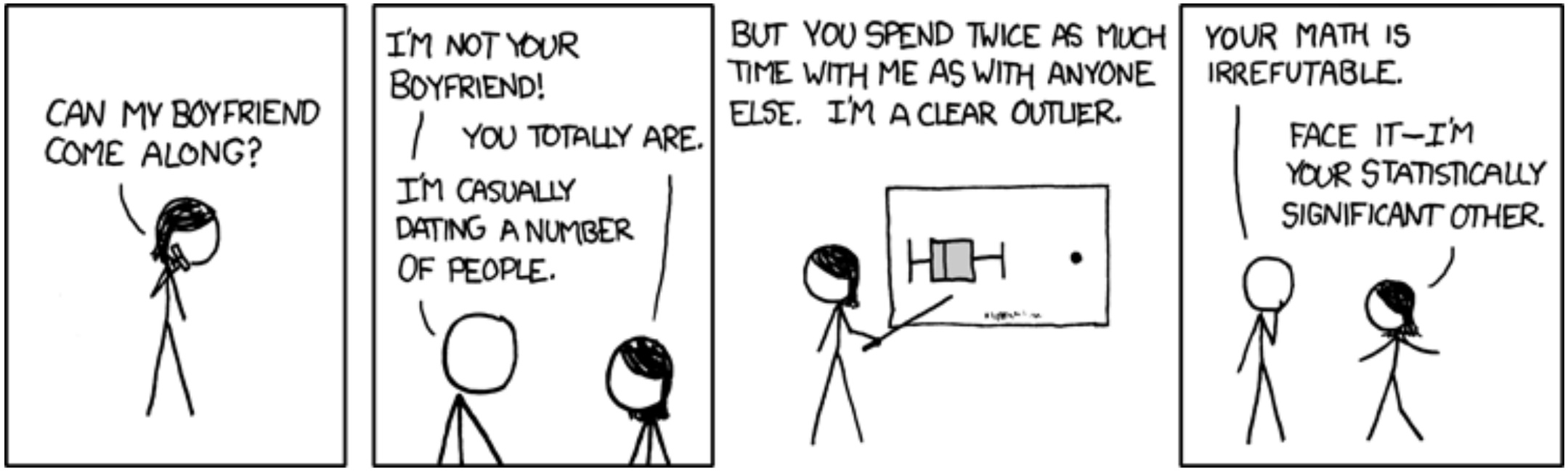
Boxplot with outliers

Five number summary

min	lower-hinge	median	upper-hinge	max
-95.2	-0.47	33.9	577.4	1631.1

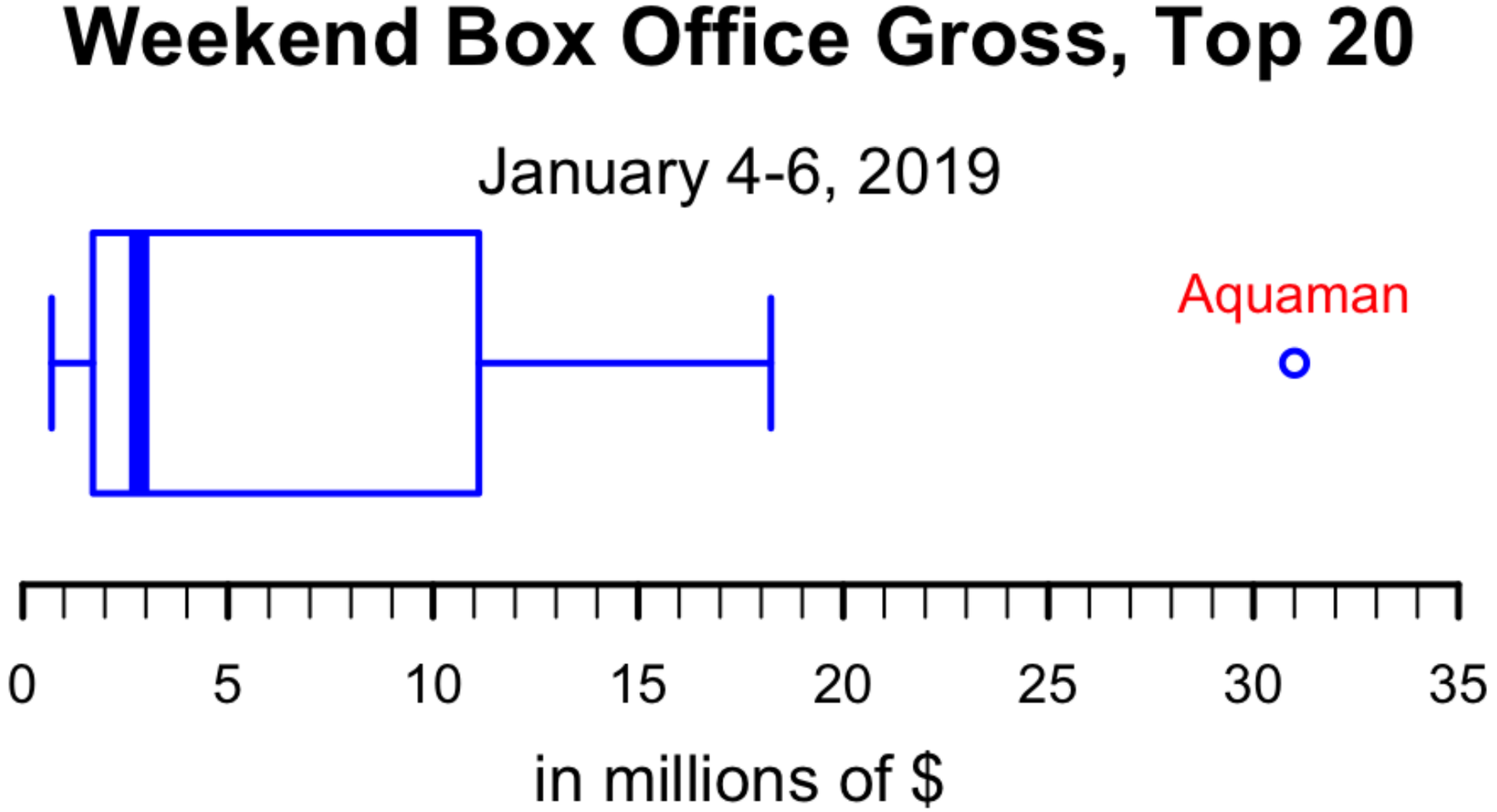


What does it take to be an outlier?



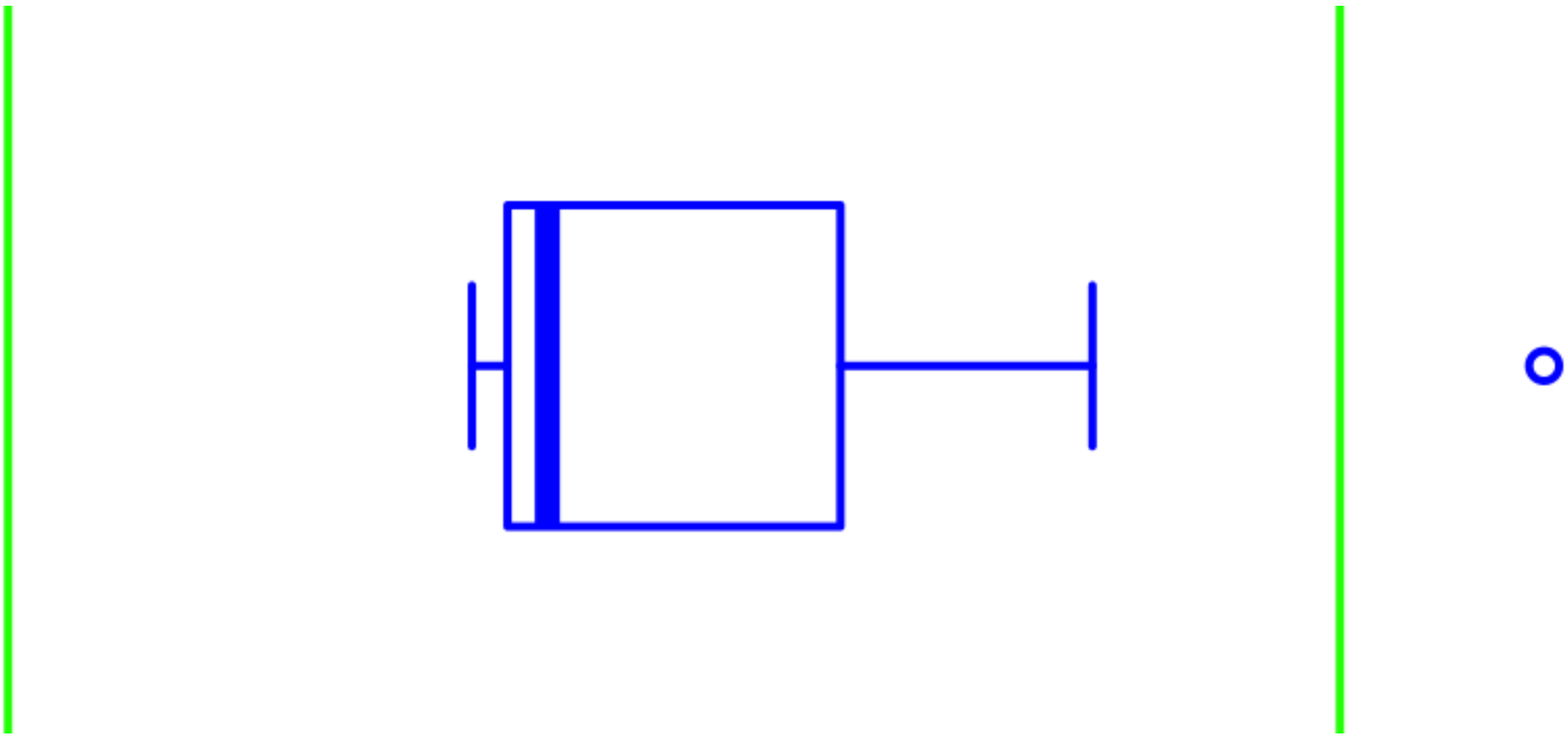
https://www.explainxkcd.com/wiki/index.php/539:_Boyfriend

What does it take to be an outlier?



Fences

divide outliers from non-outliers

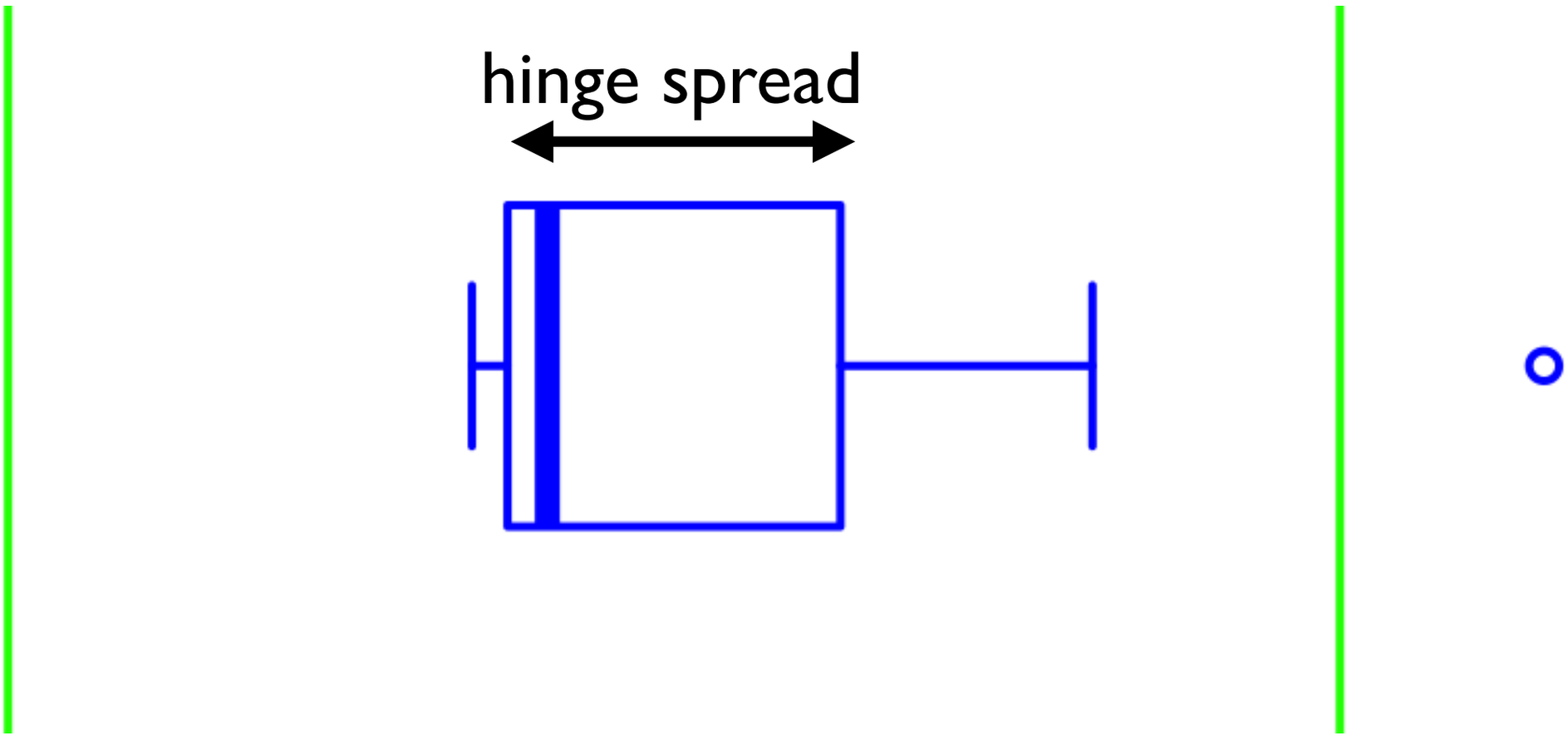


1.5 x hinge spread
below lower-hinge

1.5 x hinge spread
above upper-hinge

Fences

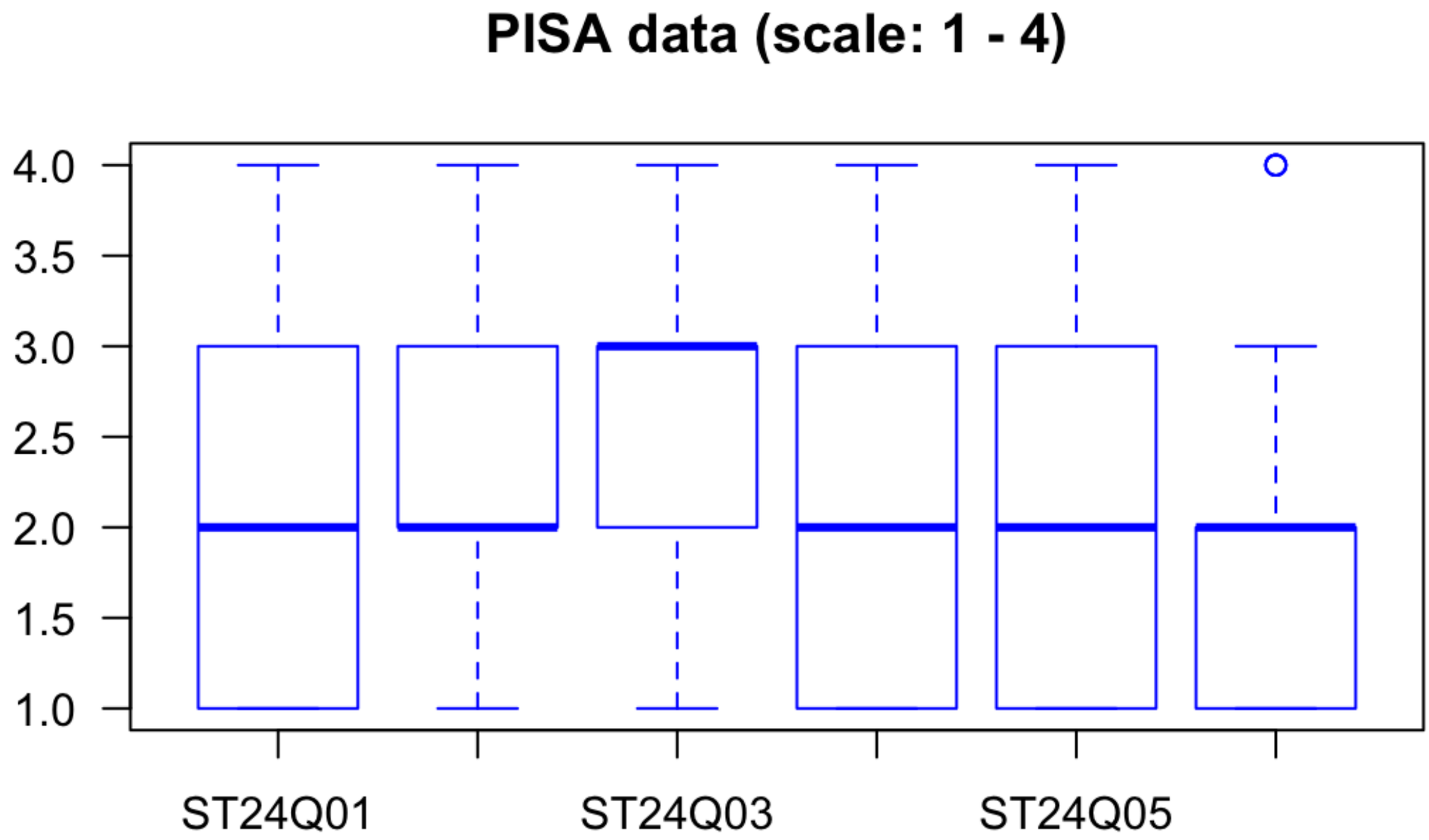
divide outliers from non-outliers



1.5 x hinge spread
below lower-hinge

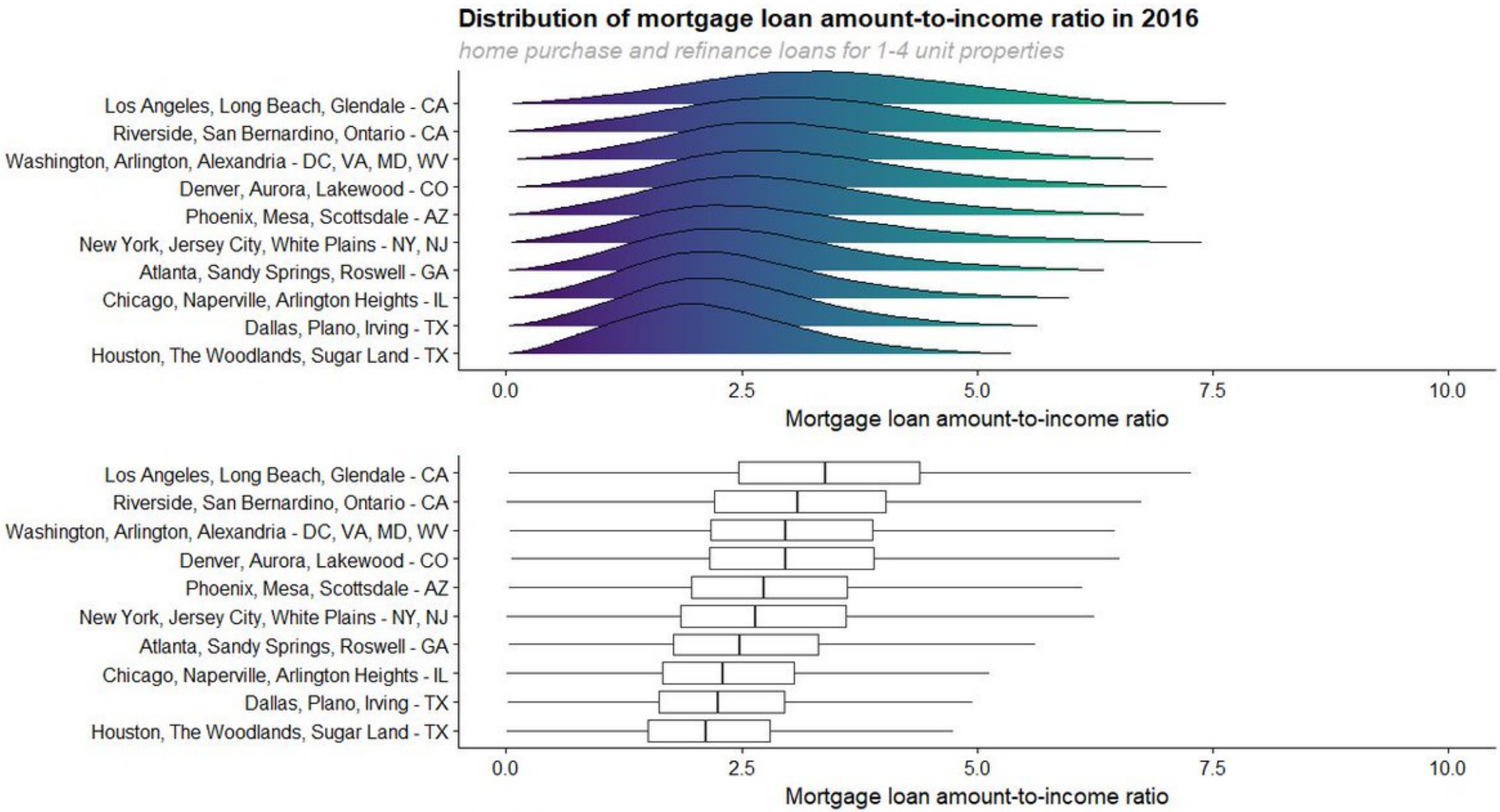
1.5 x hinge spread
above upper-hinge

Boxplots are not for discrete data



Source: R `likert::pisaitems` dataset

Ridgeline plots vs. boxplots



https://twitter.com/lenkiefer/status/916823350726610946

ggplot2

```
ggplot(data, aes(x = COUNTRY, y = TFR)) +
    geom_boxplot()
```

- geom_boxplot requires an x *and* y aesthetic:

  x is the group

  y is the continuous variable

ggplot2

- x must be factor or character type

  if group info is numeric, convert it:

```
ggplot(mtcars, aes(x = factor(cyl),
                   y = mpg)) +
    geom_boxplot()
```

4, 6, 8

ggplot2

```
ggplot(data, aes(x = COUNTRY, y = TFR)) +
    geom_boxplot() +
    coord_flip()
```

- for horizontal boxplots: use `coord_flip()` (don't switch x & y)

ggplot2

```
ggplot(data, aes(x = 1, y = TFR)) +
    geom_boxplot()
```

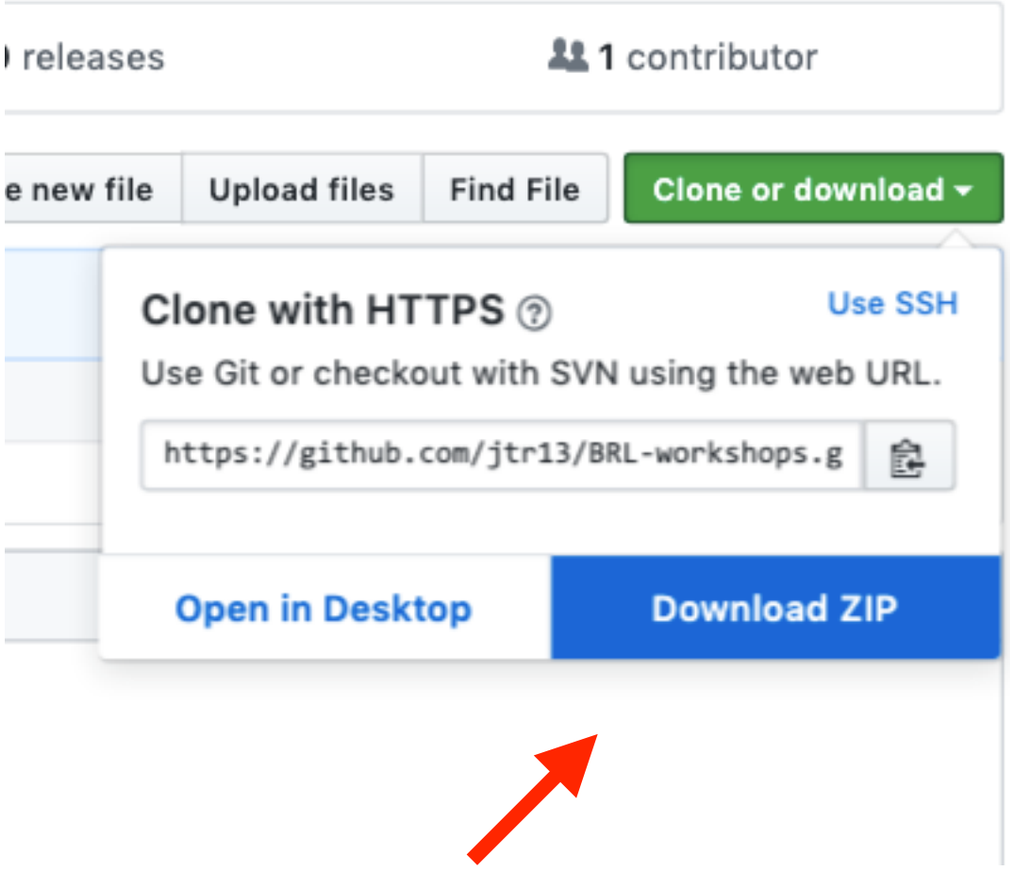
- for one group, use `x = 1`

Lab 3: Boxplots

1) Go to:

https://github.com/jtr13/BRL-workshops

2) Download ZIP



3) Open:

3-Boxplots.Rmd

in the

labs/ folder