A plot tells a thousand words

DATA VISUALIZATION FOR EVERYONE

Richie Cotton
Curriculum Architect at DataCamp

What you'll learn

- How do you choose an appropriate plot?
- How do you interpret common types of plots?
- What are best practices for drawing plots?

Three ways of getting insights

Calculating summary statistics

mean, median, standard deviation

Running models

linear and logistic regression

Drawing plots

scatter, bar, histogram

The Datasaurus Dozen

away_x	away_y	bullseye_x	bullseye_y	...	x_shape_x	x_shape_y
32.33	61.41	51.20	83.34	...	38.34	92.47
53.42	26.19	58.97	85.50	...	35.75	94.12
63.92	30.83	51.87	85.83	...	32.77	88.52
70.29	82.53	48.18	85.05	...	33.73	88.62
34.12	45.73	41.68	84.02	...	37.24	83.72
67.67	37.11	37.89	82.57	...	36.03	82.04

[1] Matejka, J., & Fitzmaurice, G. (2017) https://www.autodeskresearch.com/publications/samestats

Mean of x for each dataset

dataset	mean(x)
away	54.27
bullseye	54.27
circle	54.27
dino	54.26
dots	54.26
h_lines	54.26
high_lines	54.27

dataset	mean(x)
slant_down	54.27
slant_up	54.27
star	54.27
v_lines	54.27
wide_lines	54.27
x_shape	54.26

Mean of x and y for each dataset

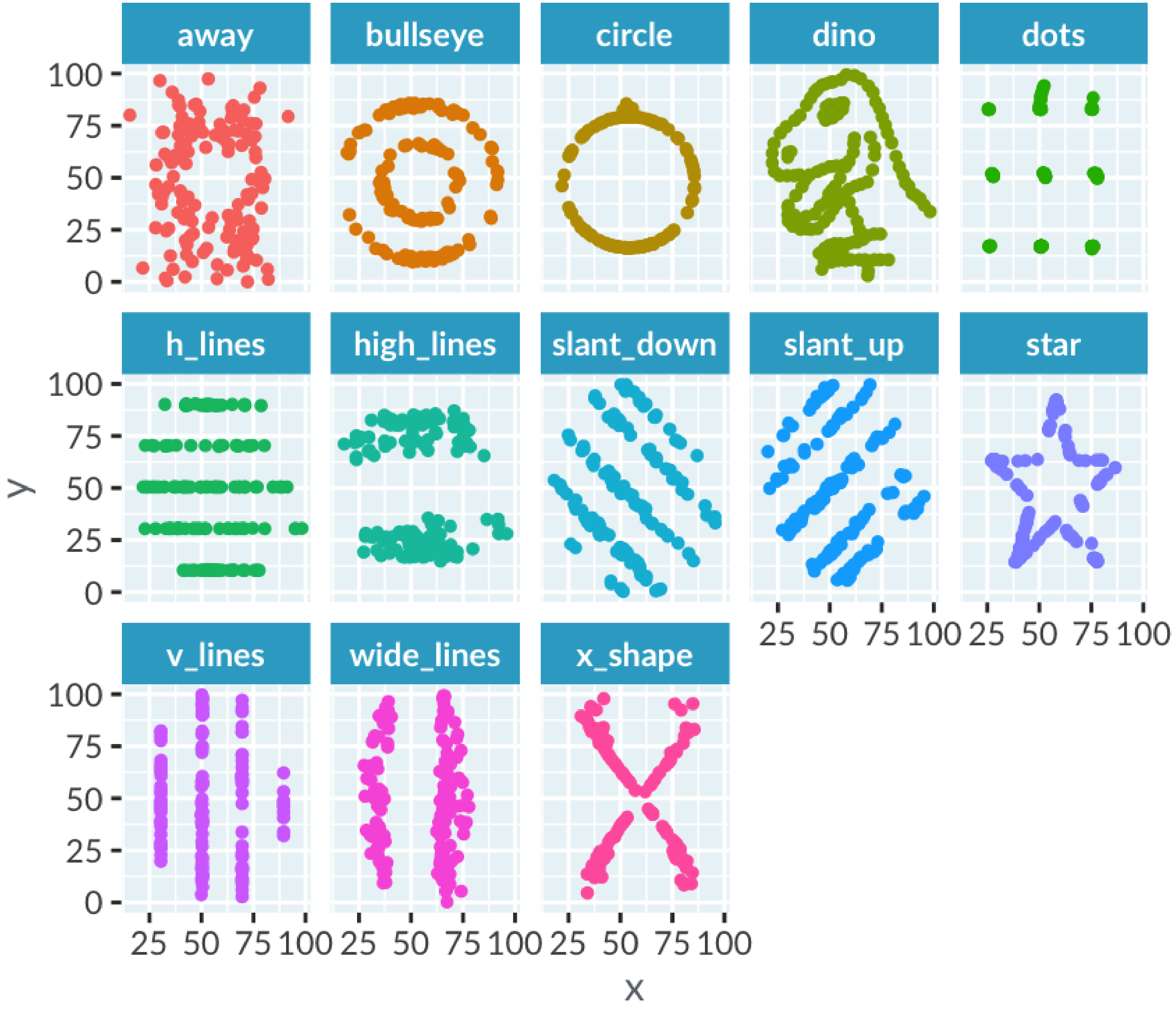
dataset	mean(x)	mean(y)
away	54.27	47.83
bullseye	54.27	47.83
circle	54.27	47.84
dino	54.26	47.83
dots	54.26	47.84
h_lines	54.26	47.83
high_lines	54.27	47.84

dataset	mean(x)	mean(y)
slant_down	54.27	47.84
slant_up	54.27	47.83
star	54.27	47.84
v_lines	54.27	47.84
wide_lines	54.27	47.83
x_shape	54.26	47.84

Standard deviations for each dataset

dataset	std_dev(x)	std_dev(y)
away	16.77	26.94
bullseye	16.77	26.94
circle	16.76	26.93
dino	16.77	26.94
dots	16.77	26.93
h_lines	16.77	26.94
high_lines	16.77	26.94

dataset	std_dev(x)	std_dev(y)
slant_down	16.77	26.94
slant_up	16.77	26.94
star	16.77	26.93
v_lines	16.77	26.94
wide_lines	16.77	26.94
x_shape	16.77	26.93


away
bullseye
circle
dino
dots
h_lines
high_lines
slant_down
slant_up
star
v_lines
wide_lines
x_shape
100
75
50
25
0
y
25
50
75
100
x

Continuous and categorical variables

Continuous: usually numbers

- heights, temperatures, revenues

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Categorical: usually text

- eye colors, countries, industry

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Can be either

- age is continuous, but age group is categorical
- time is continuous, month of year is categorical

Let's practice!

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Histograms

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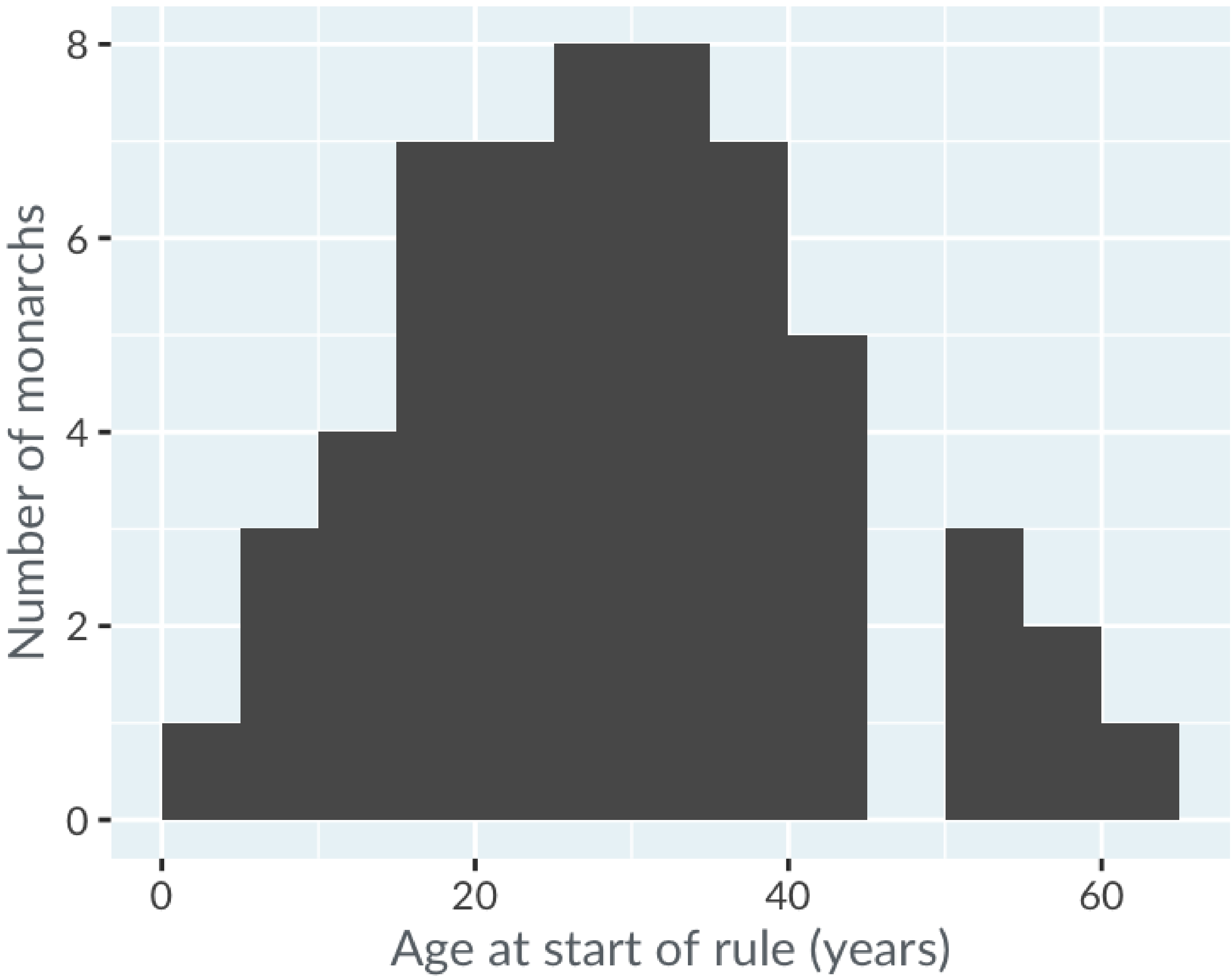
When should you use a histogram?

1. If you have a single continuous variable.
2. You want to ask questions about the shape of its distribution.

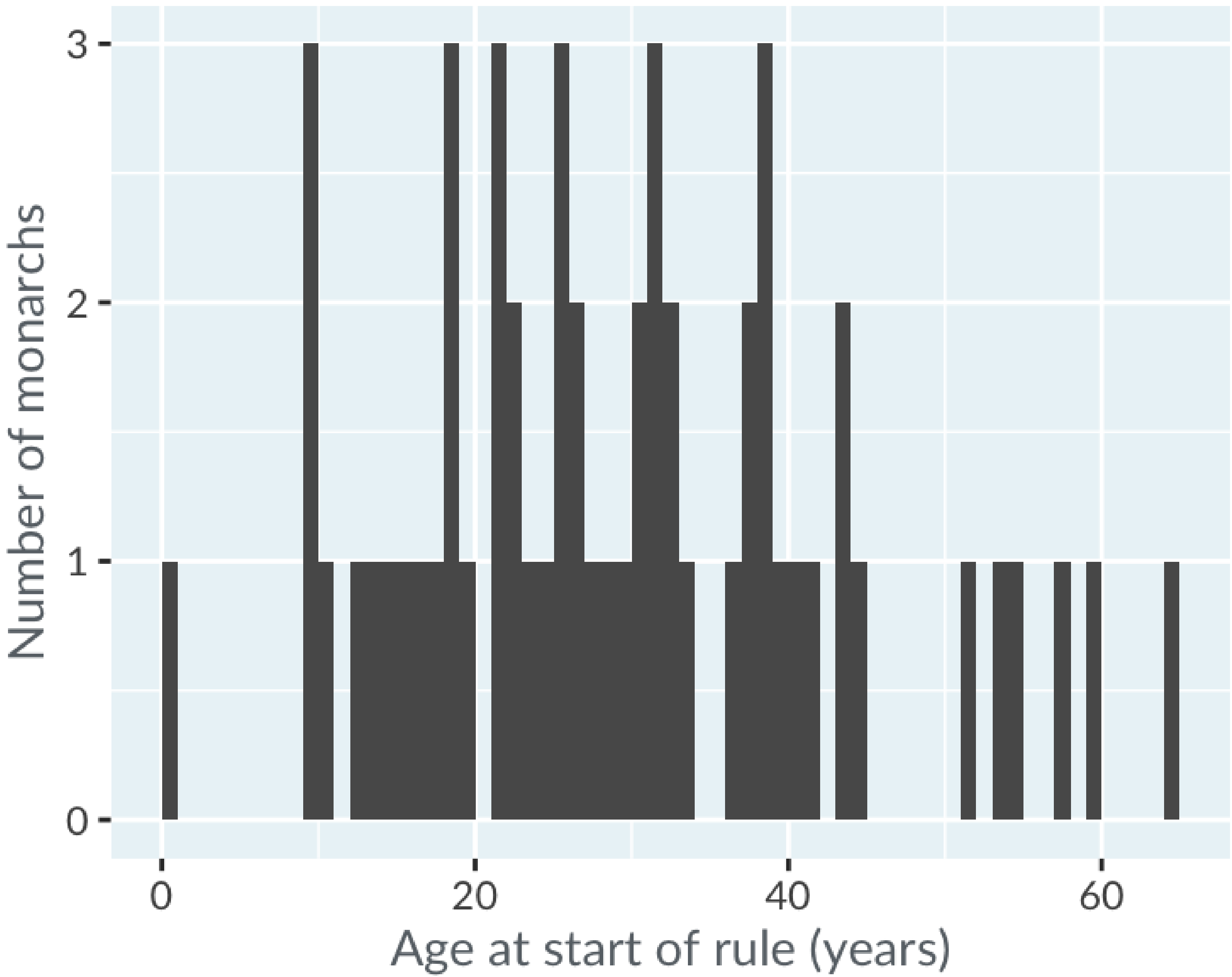
Kings and Queens of England & Britain

official_name	house	birth_date	start_of_rule	age_at_start_of_rule
Elizabeth II	Windsor	1926-04-21	1952-02-06	25.79603
George VI	Windsor	1895-12-14	1936-12-11	40.99110
Edward VIII	Windsor	1894-06-23	1936-01-20	41.57426
...	...	...	...	...
Eadred	Wessex	0923-07-01	0946-05-26	22.90212
Edmund I	Wessex	0921-07-01	0939-10-27	18.32170
Aethelstan	Wessex	0894-07-01	0924-07-01	29.99863

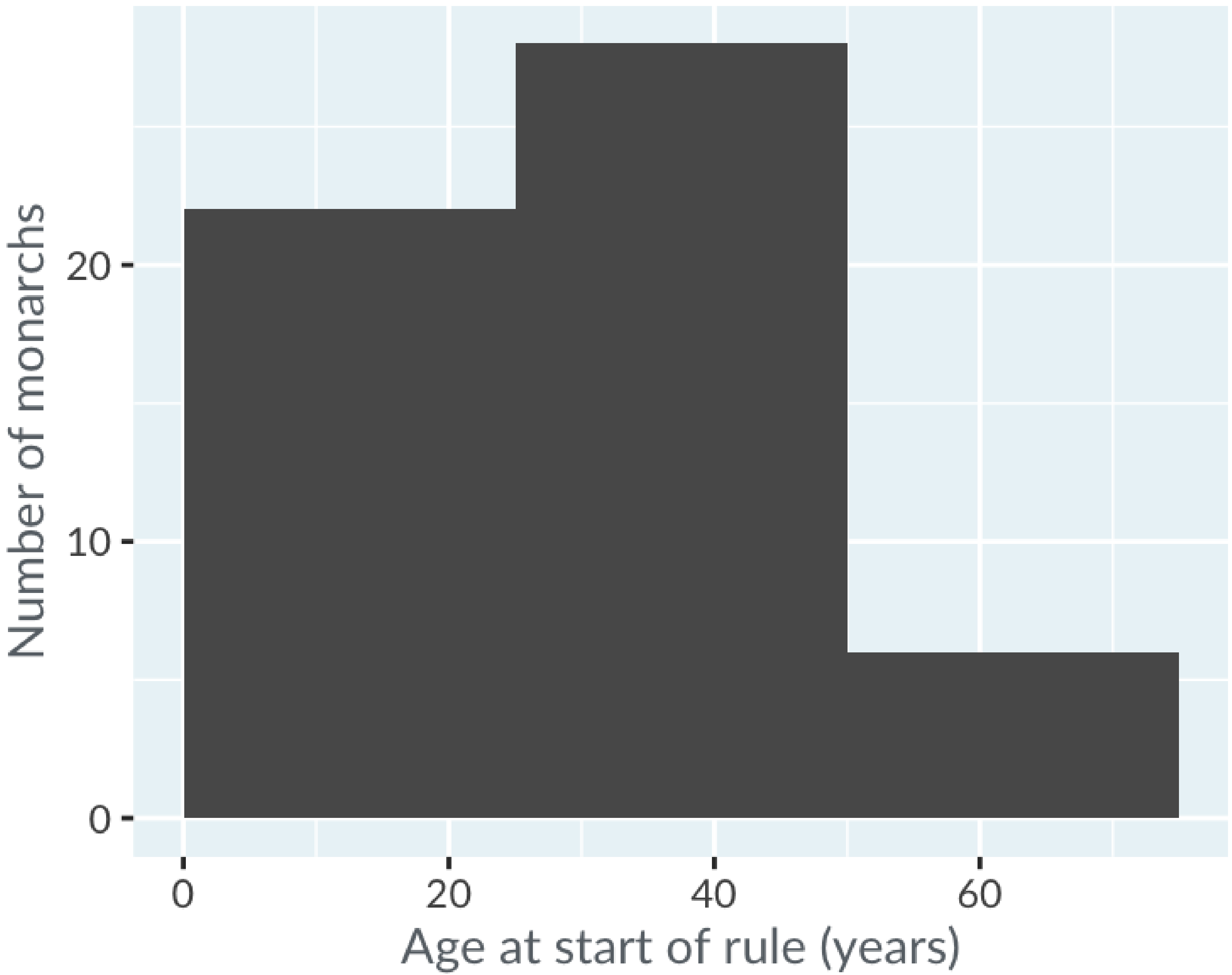
Histogram of age at start of rule



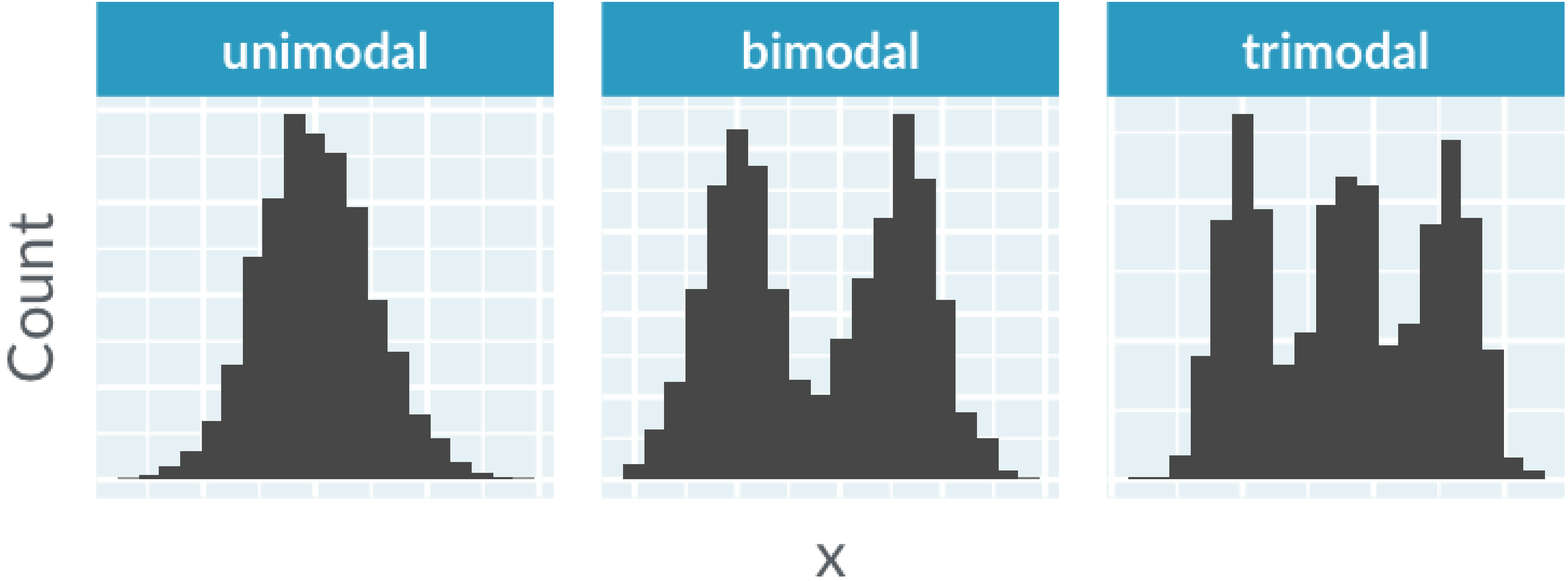
Choosing binwidth: 1 year



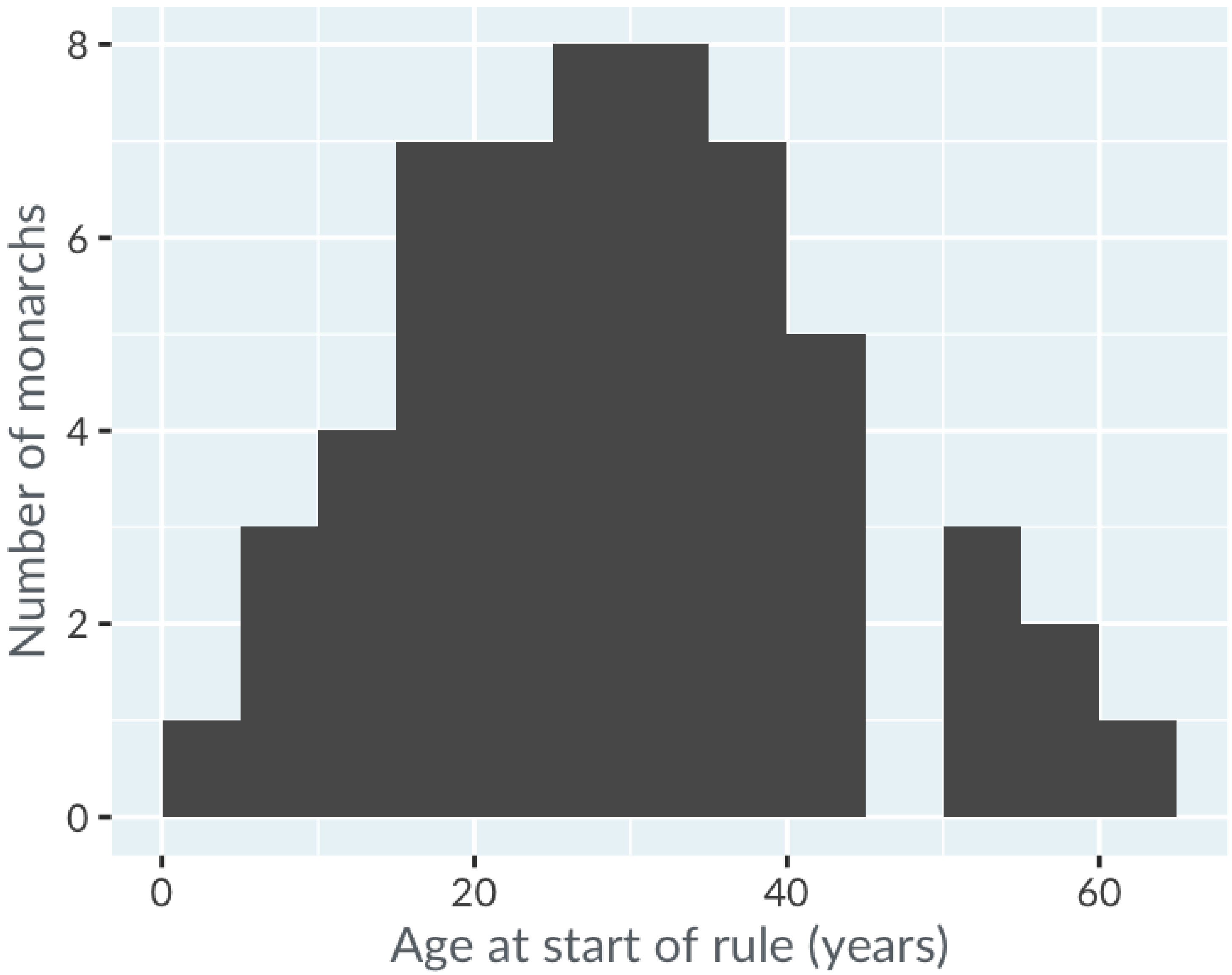
Choosing binwidth: 25 years

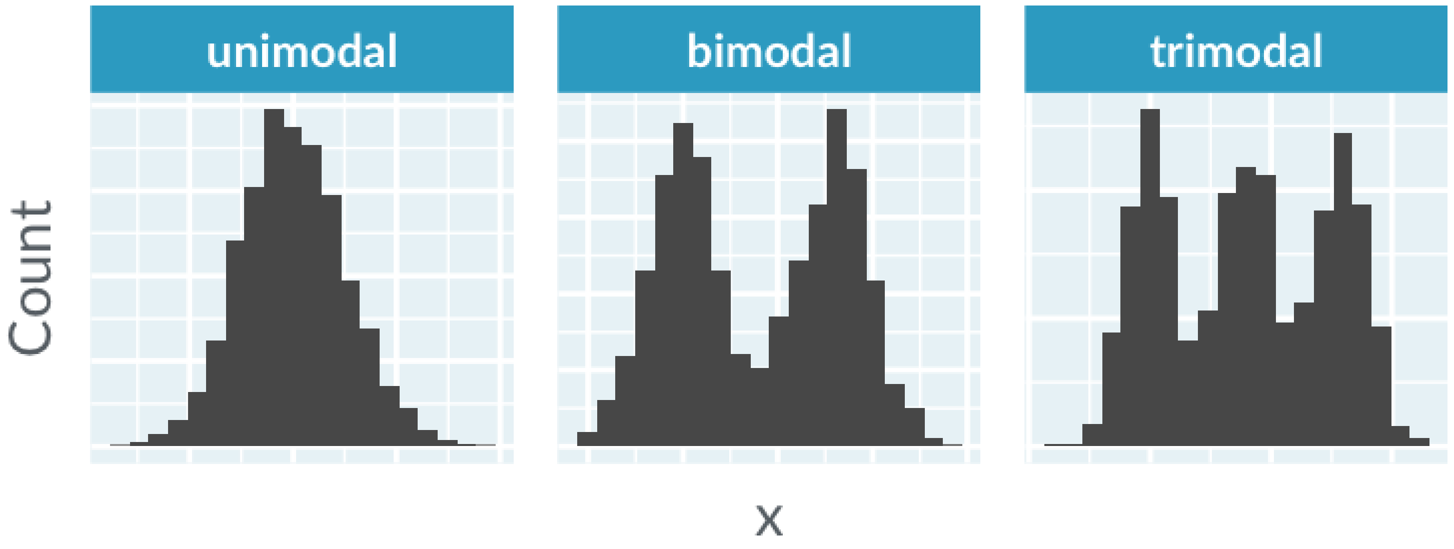


Modality: how many peaks?

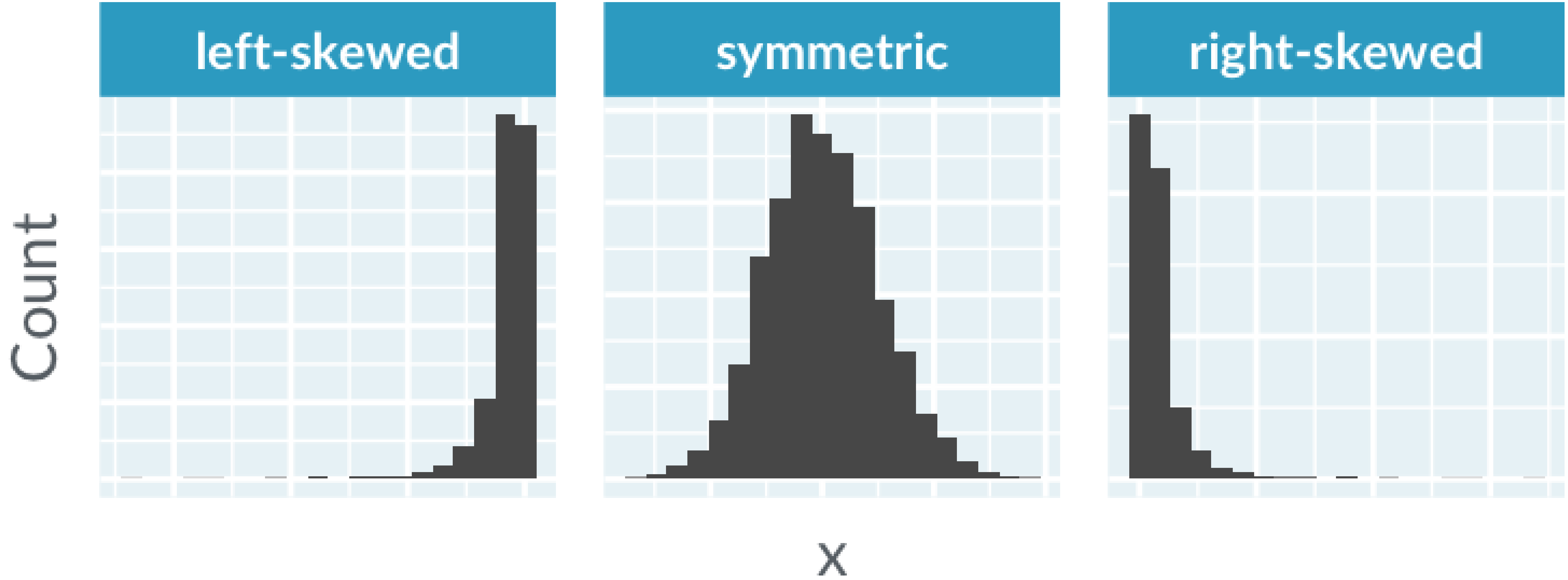


Modality: how many peaks?

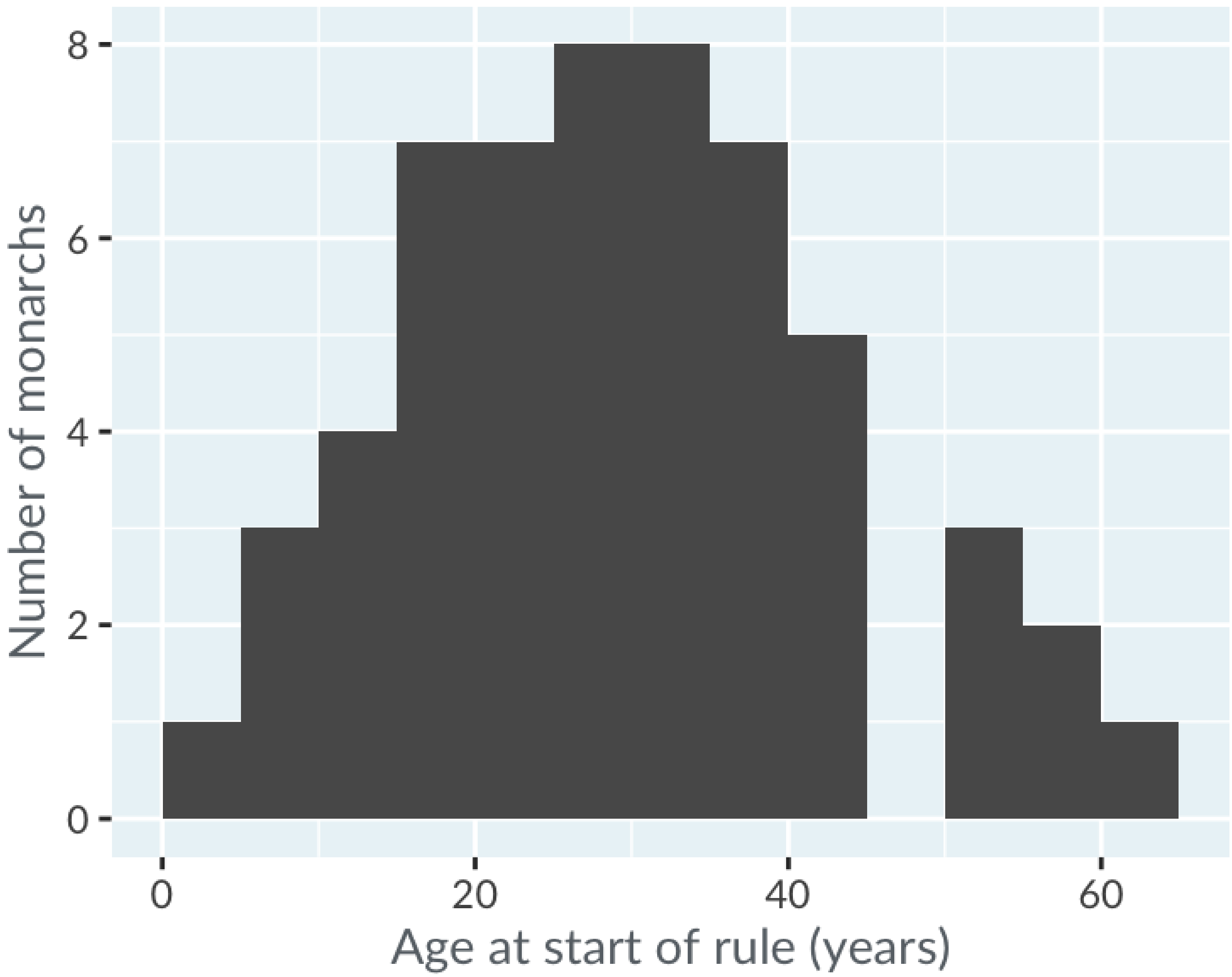


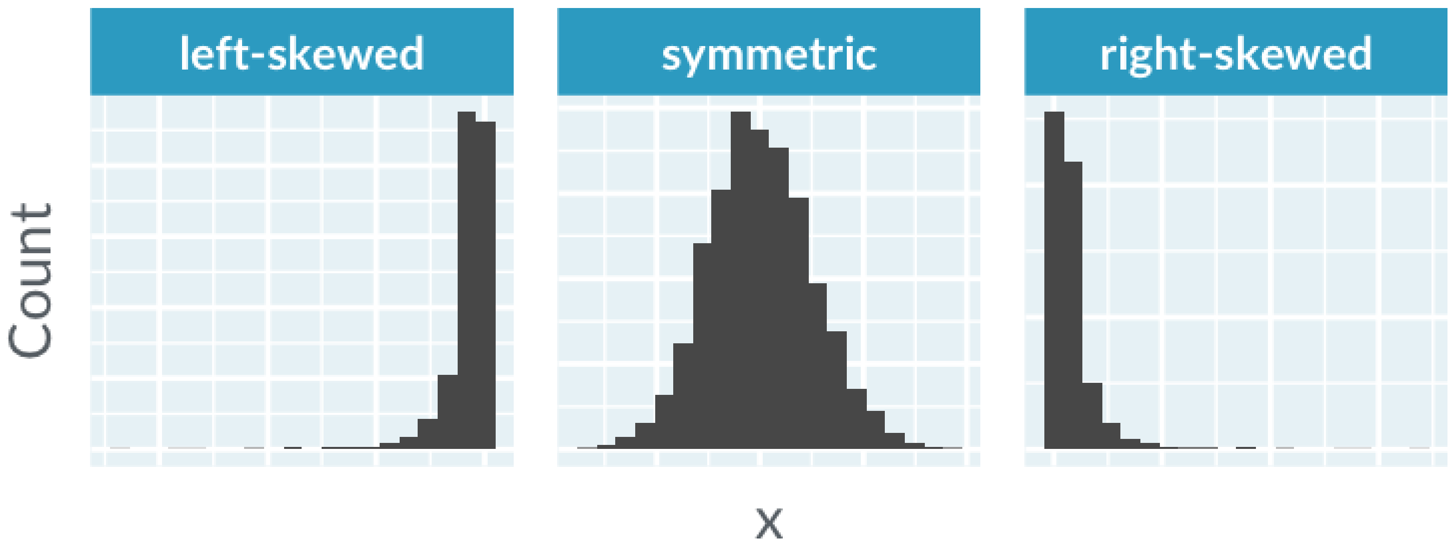


Skewness: is it symmetric?

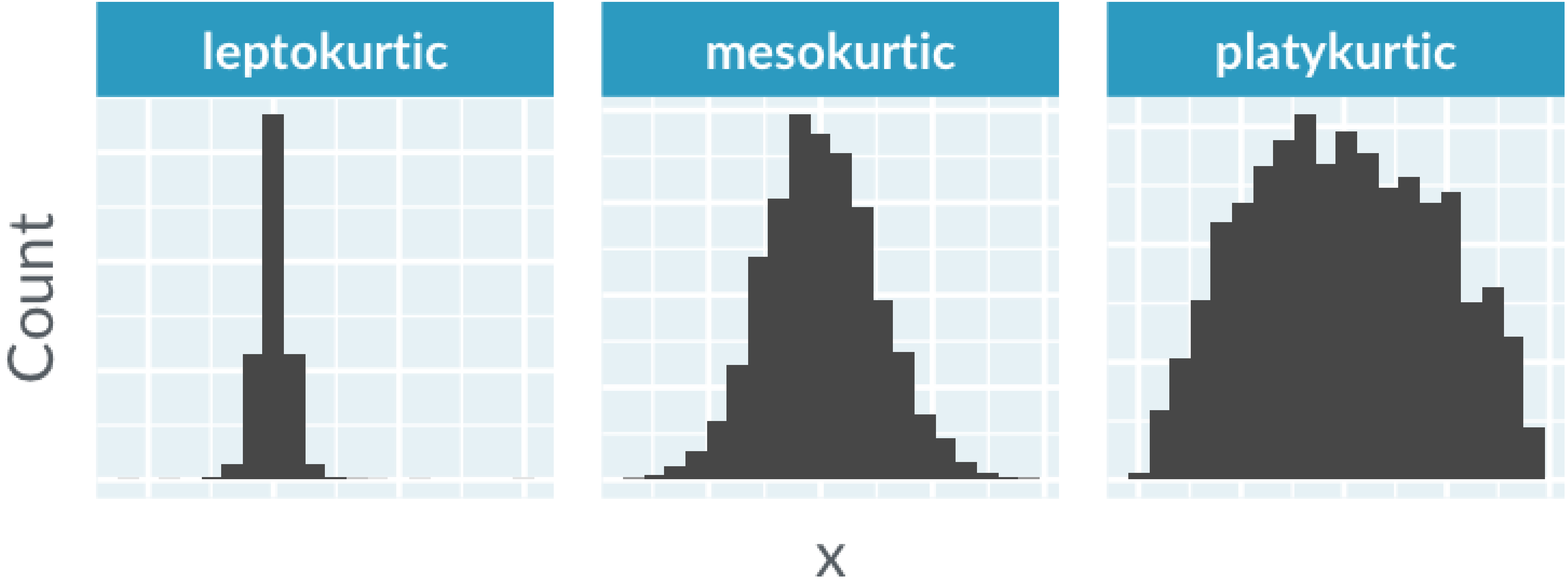


Skewness: is it symmetric?

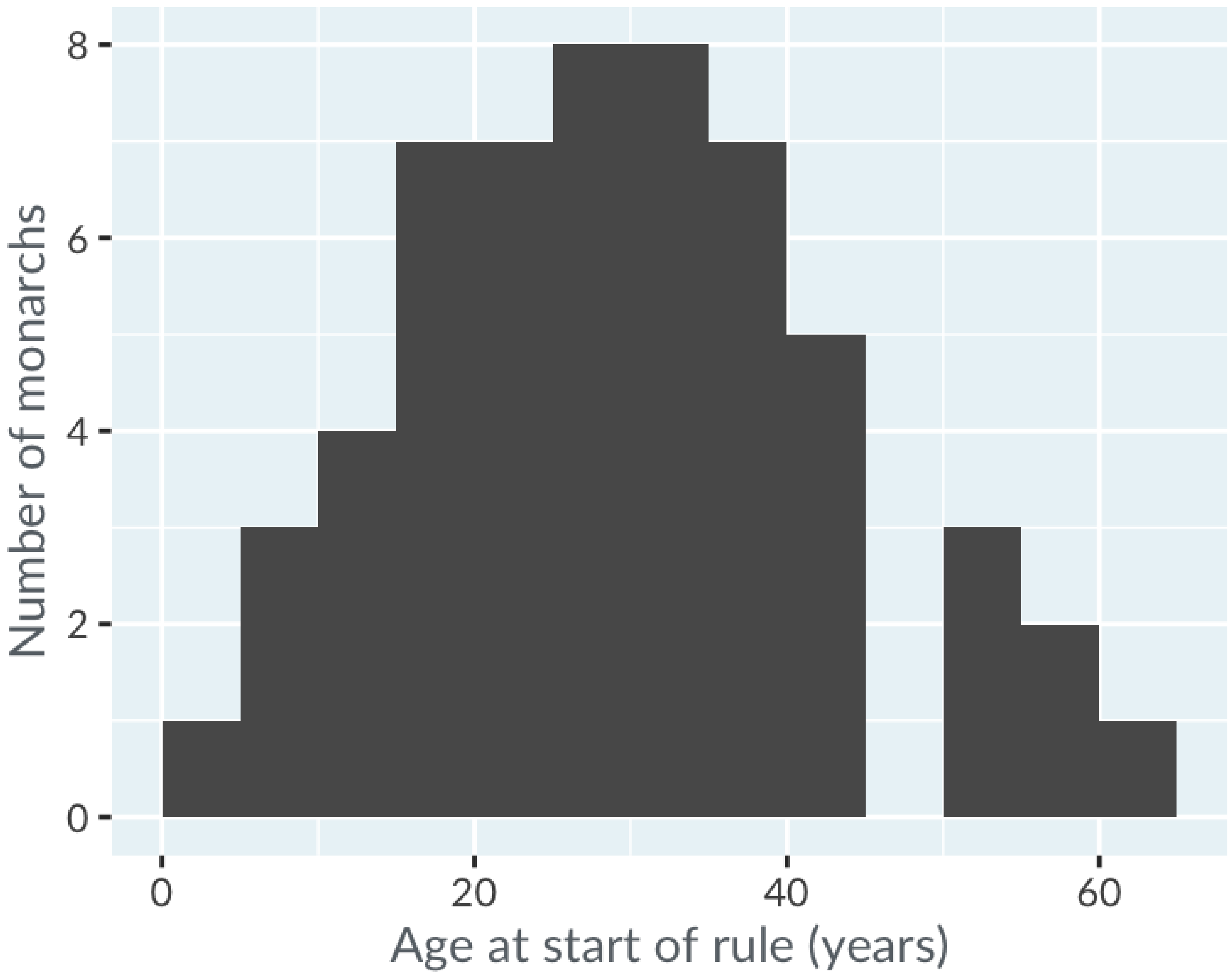


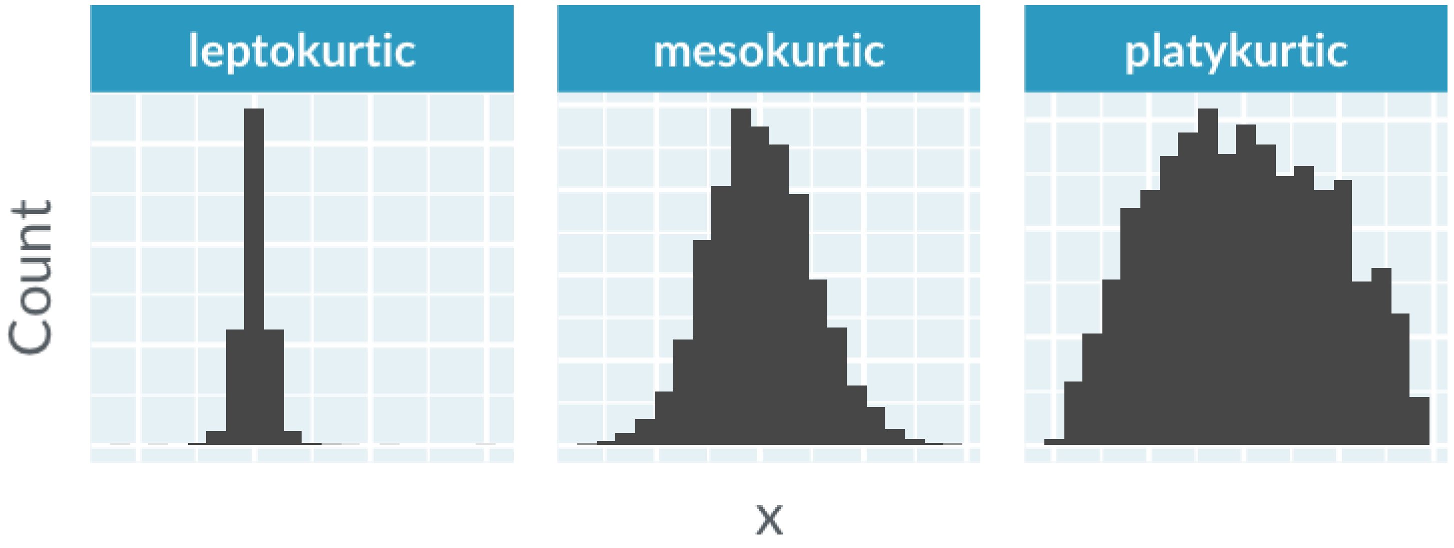


Kurtosis: how many extreme values?



Kurtosis: how many extreme values?





Let's practice!

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Box plots

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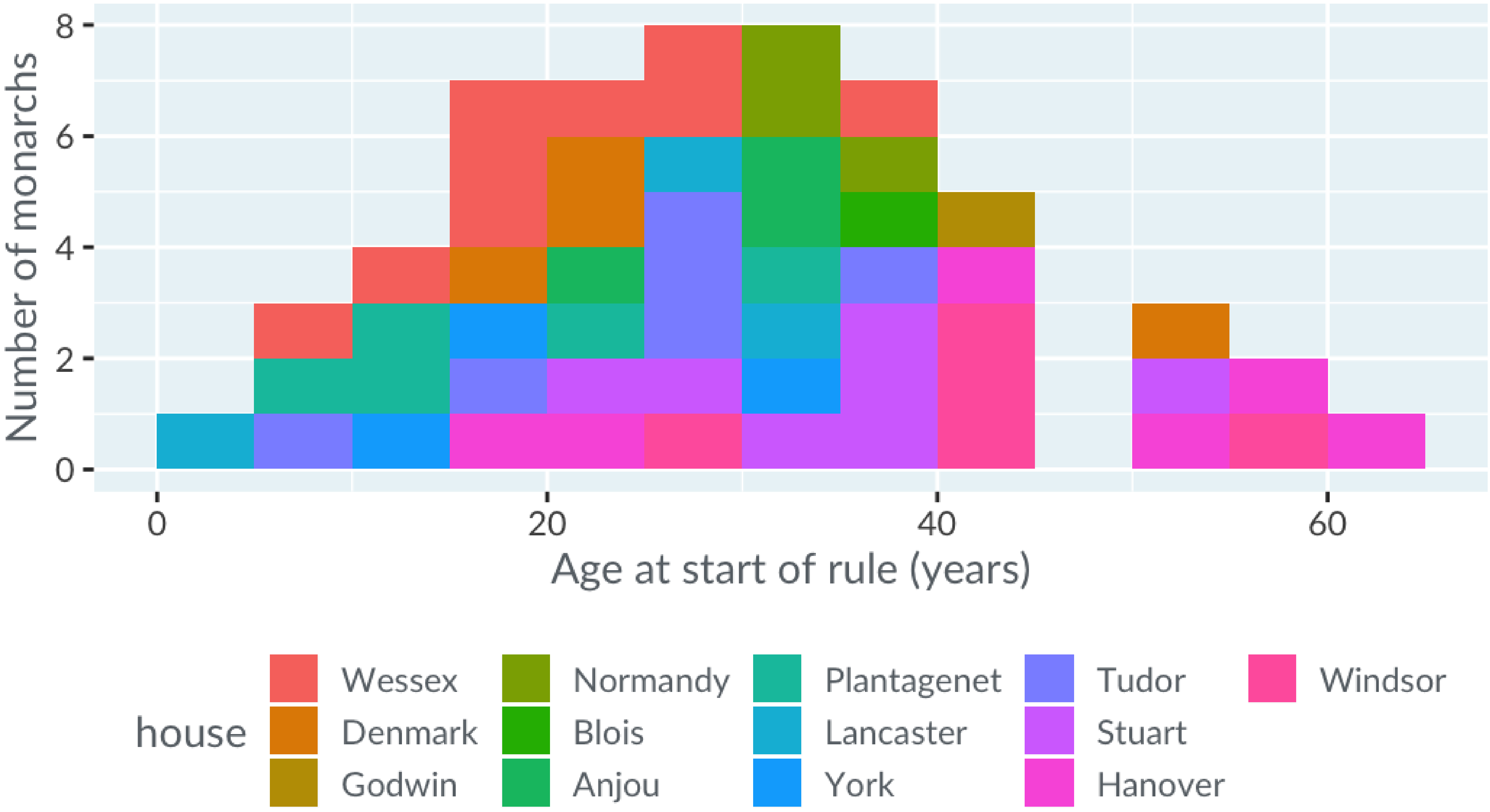
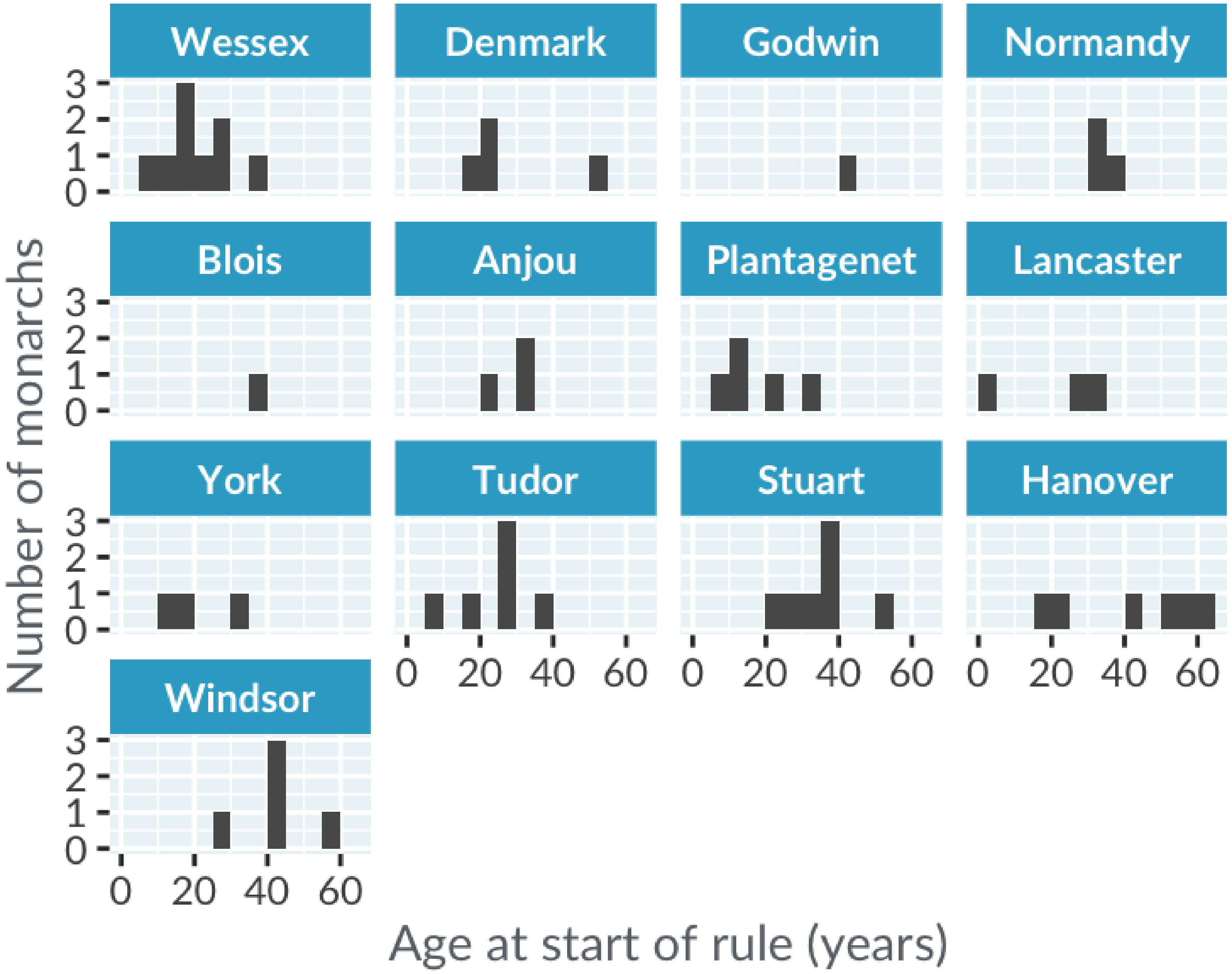
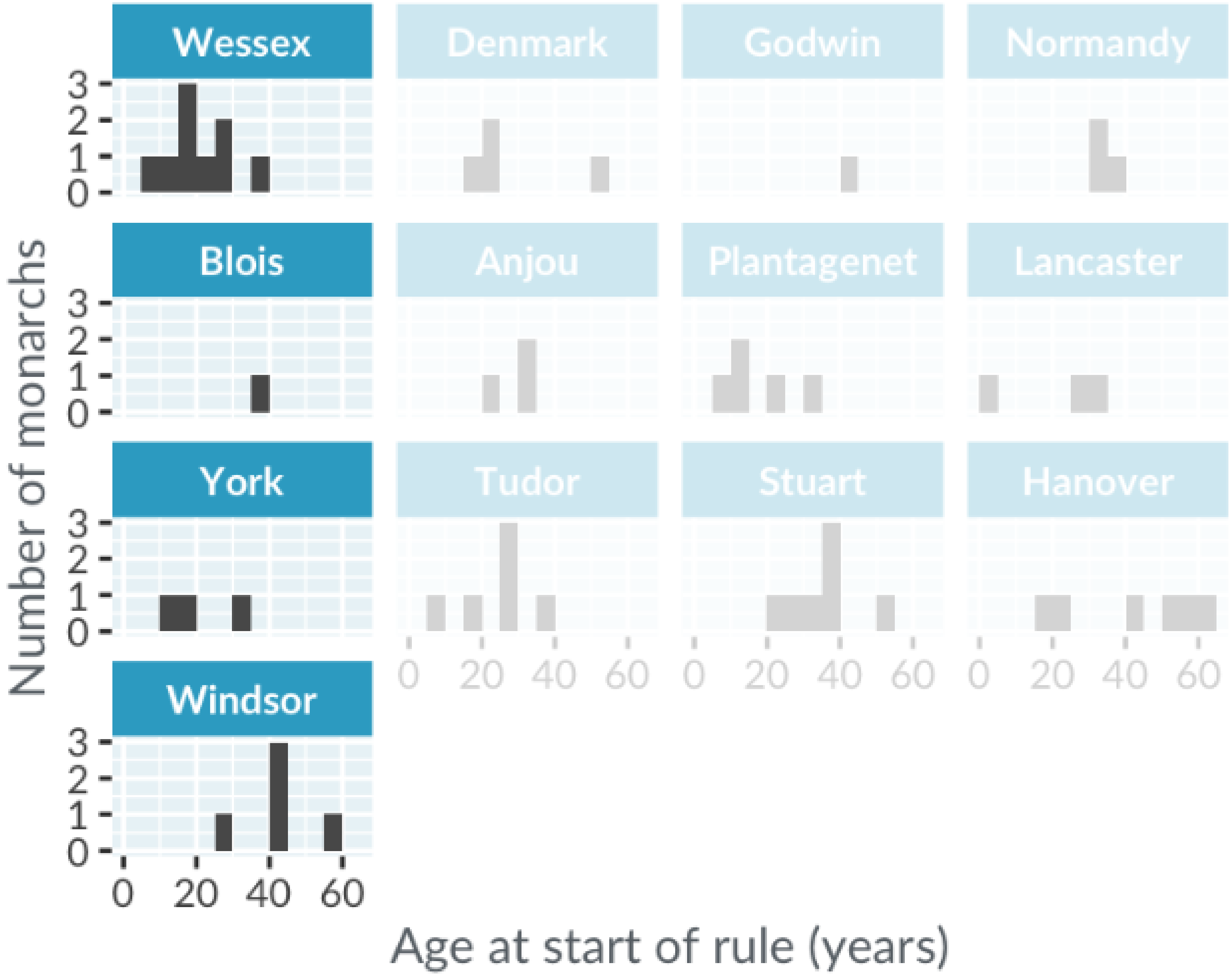
You can't just color in histograms



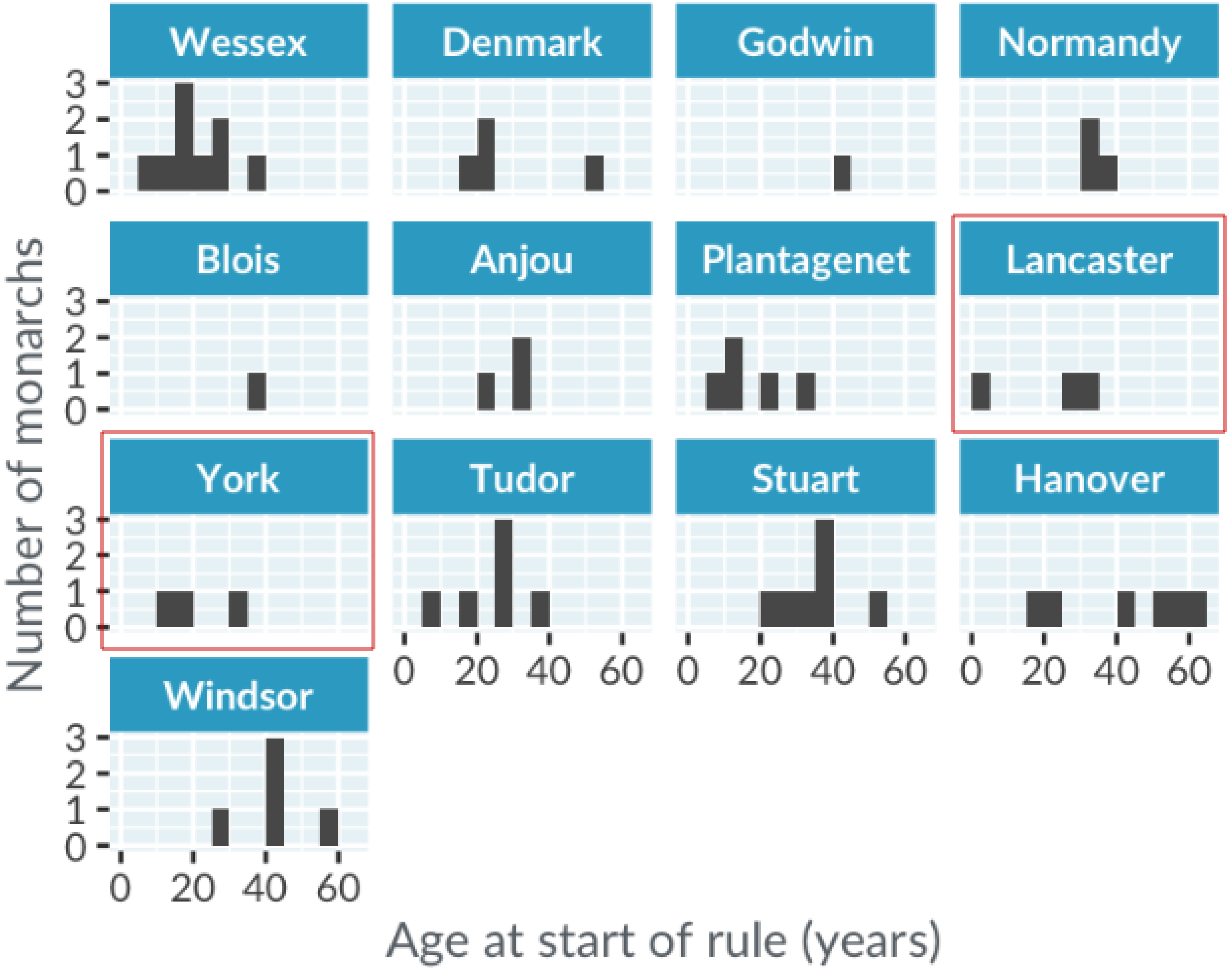
Draw each histogram in its own panel

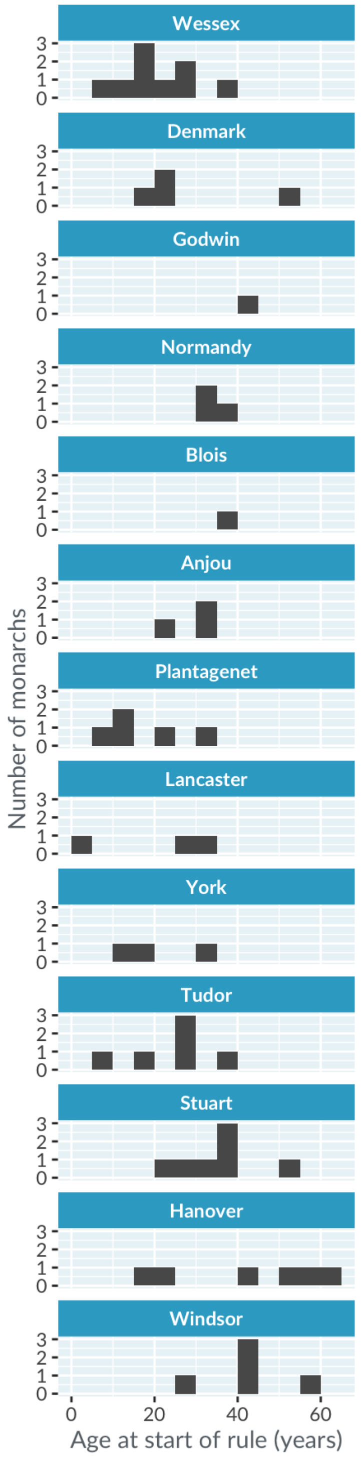


Draw each histogram in its own panel



Draw each histogram in its own panel

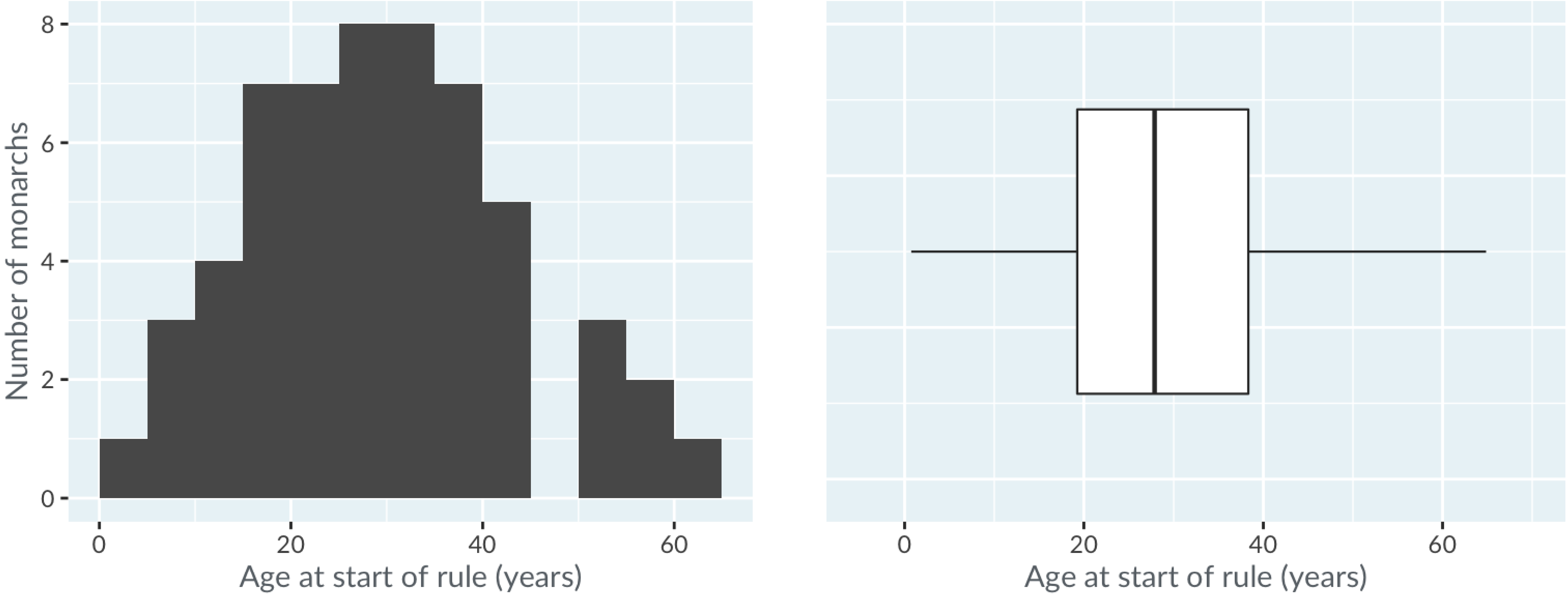



Wessex
Denmark
Godwin
Normandy
Blois
Anjou
Plantagenet
Lancaster
York
Tudor
Stuart
Hanover
Windsor
Number of monarchs
0
1
2
3
0
20
40
60
Age at start of rule (years)

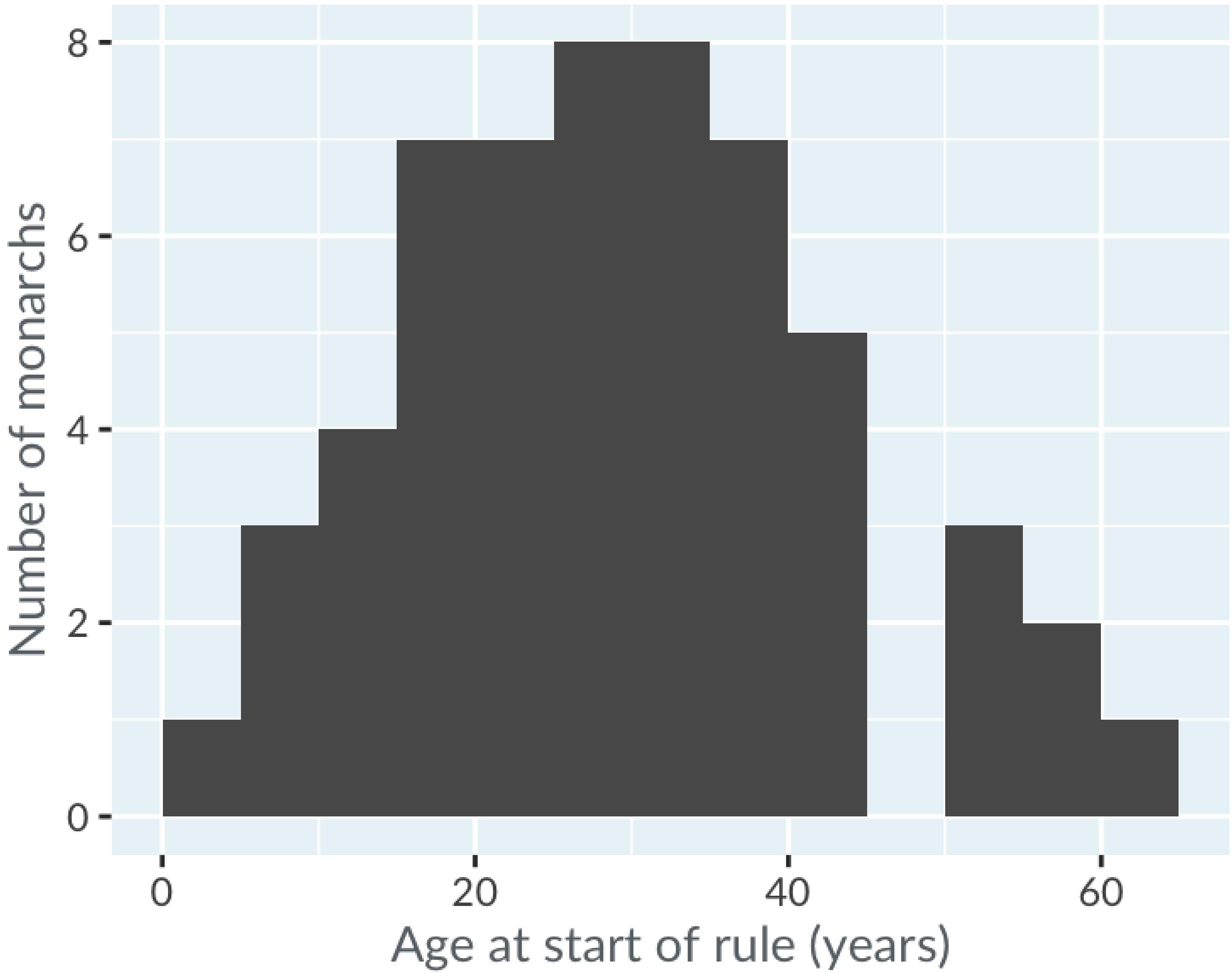
When should you use a box plot?

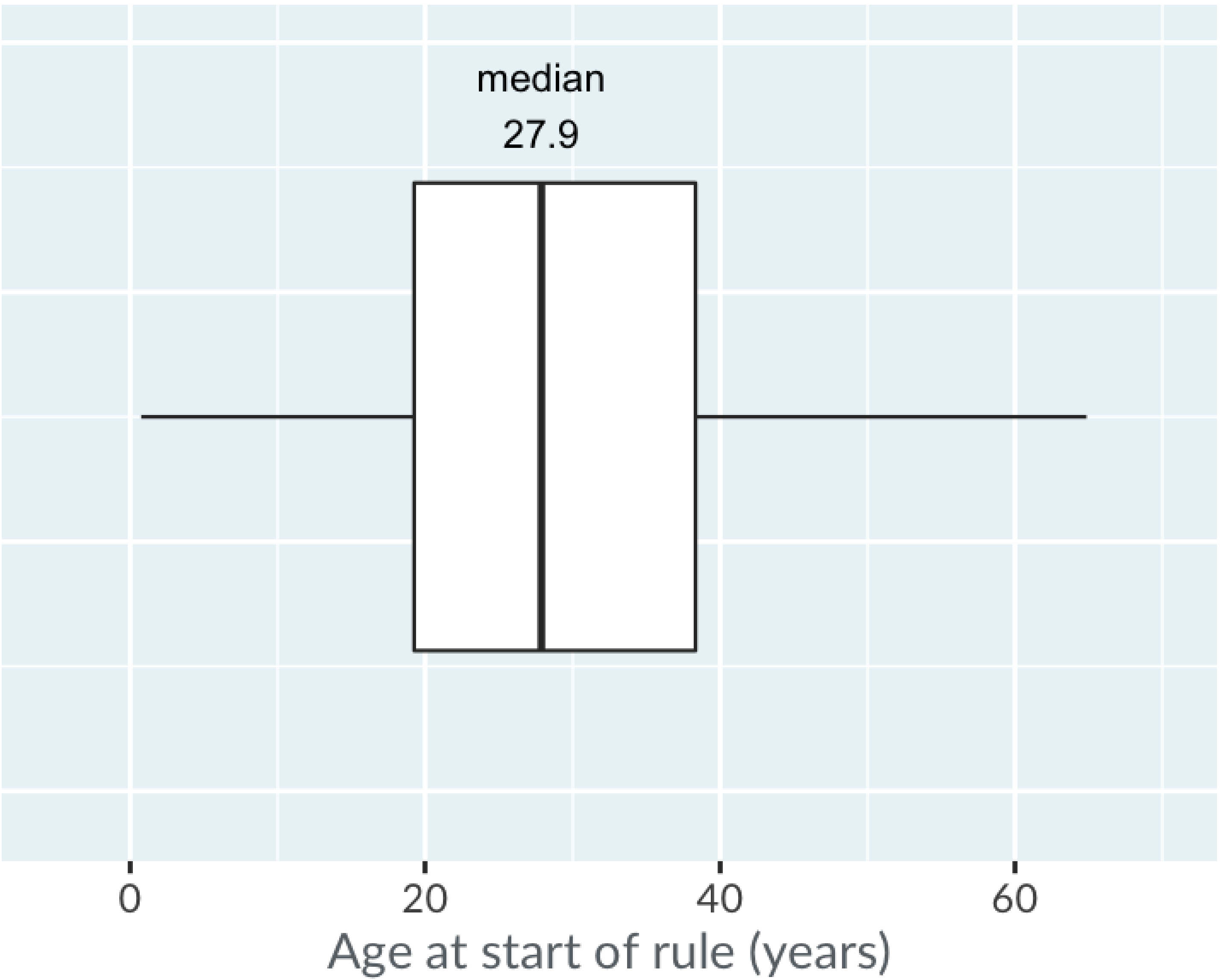
1. When you have a continuous variable, split by a categorical variable.
2. When you want to compare the distributions of the continuous variable for each category.

Histogram vs. box plot

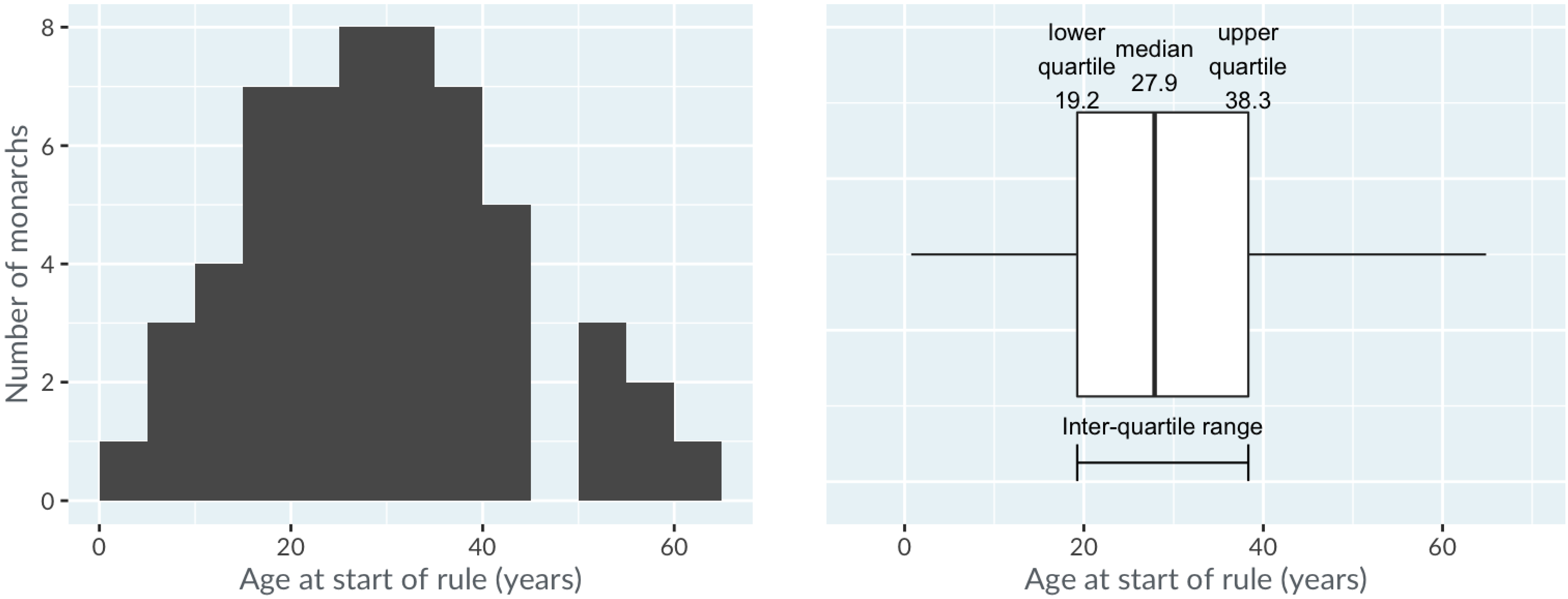


Histogram vs. box plot: mid-line

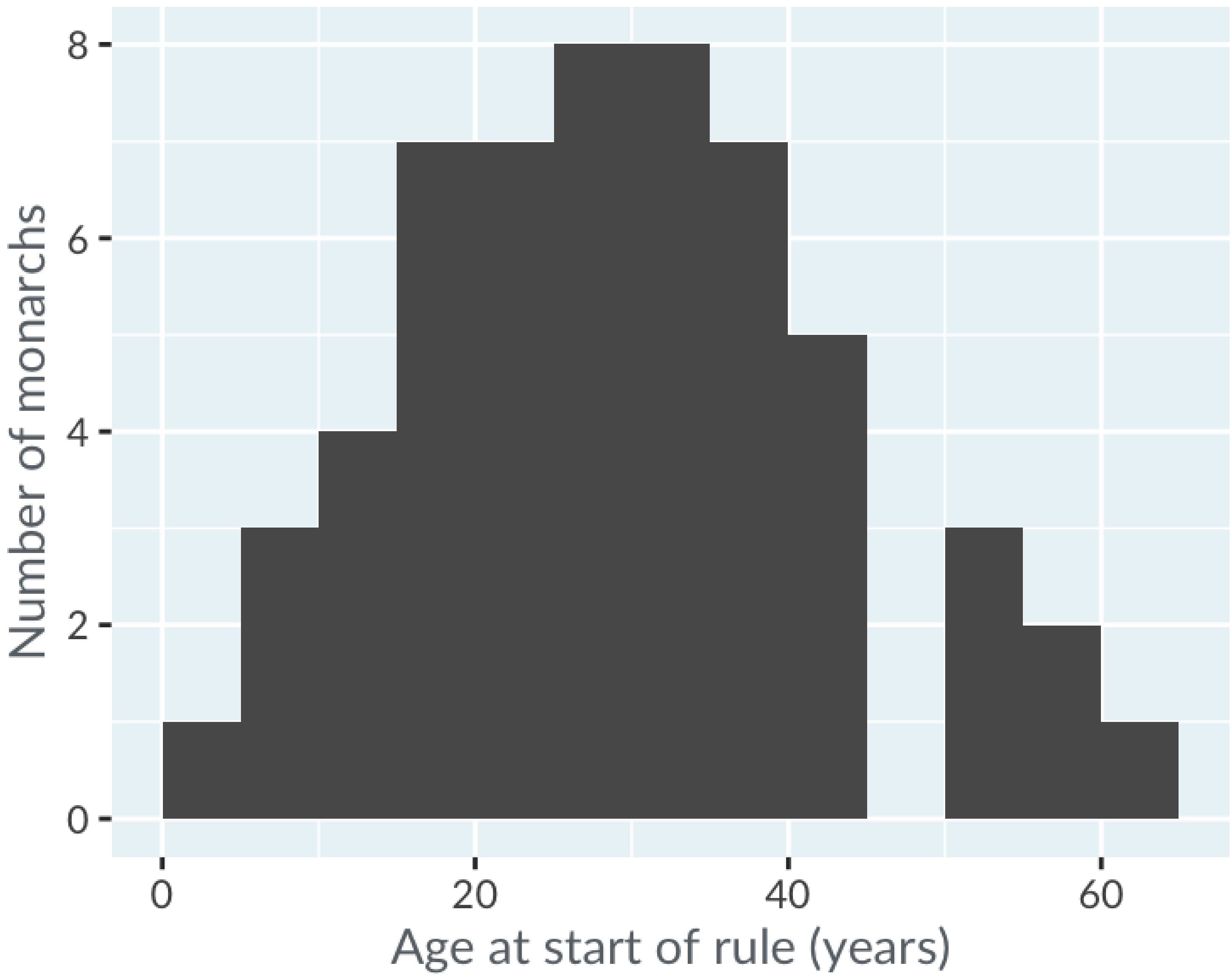


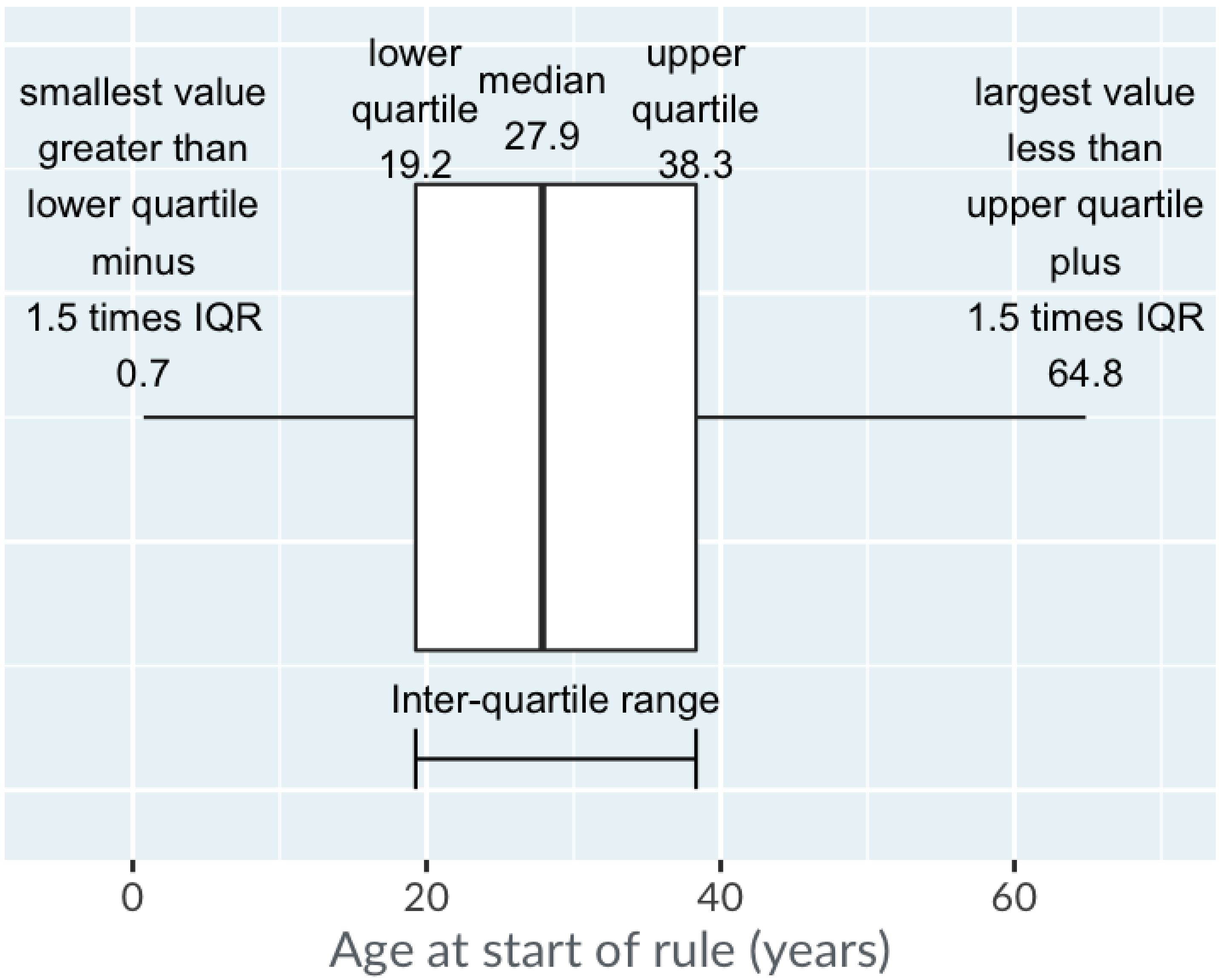


Histograms vs. box plot: the box

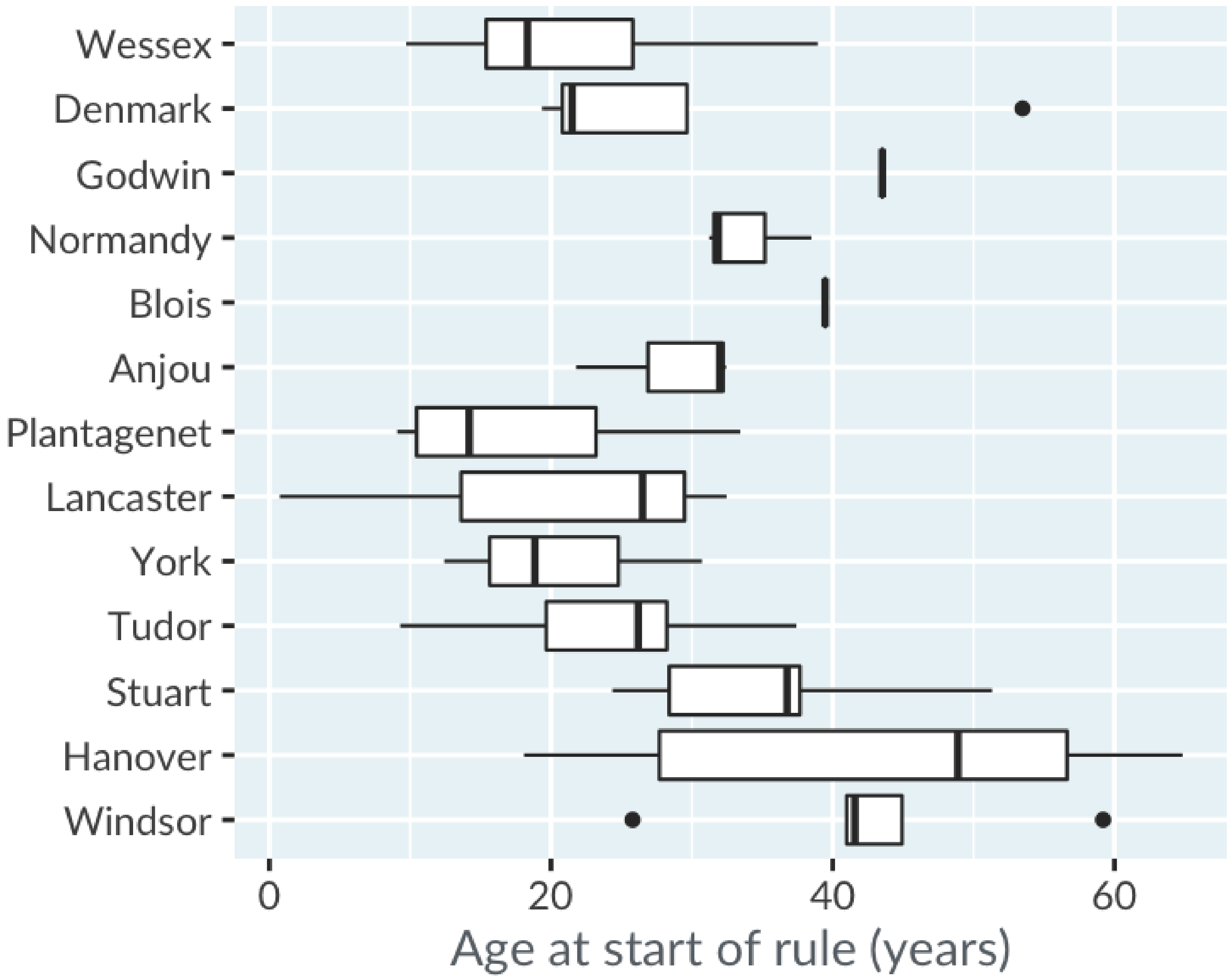


Histograms vs. box plots: the whiskers





Monarchs by house



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