Quantitative Data Graphical Summary: Boxplots

Brenda Gunderson

What is a Boxplot?

Five Number Summary

Min	Q1	Median	Q3	Max

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Min	Q1	Median	Q3	Max
		Center		

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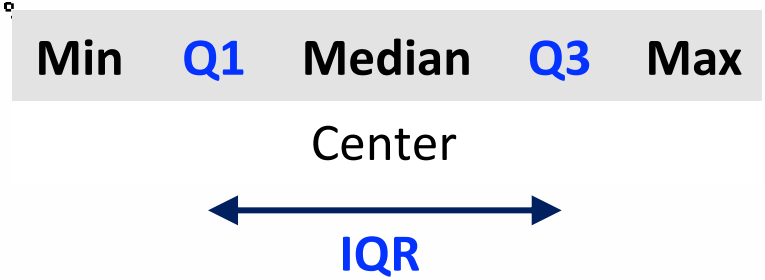
Five Number Summary



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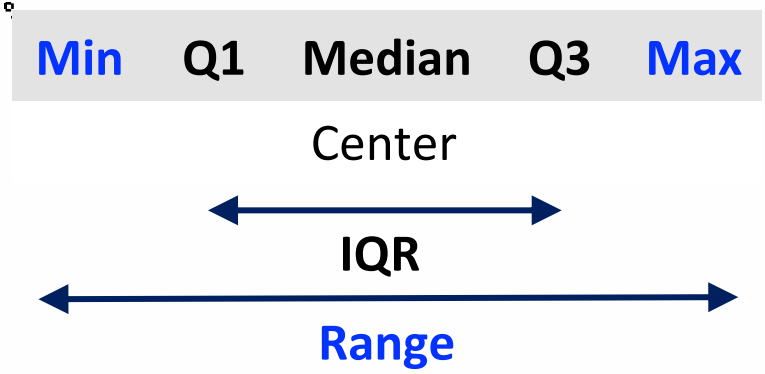

What is a Boxplot?

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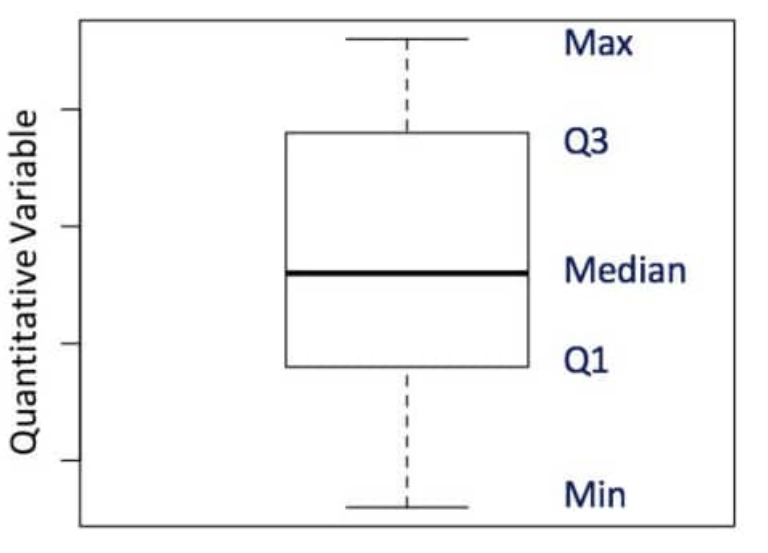
Center

IQR

Range



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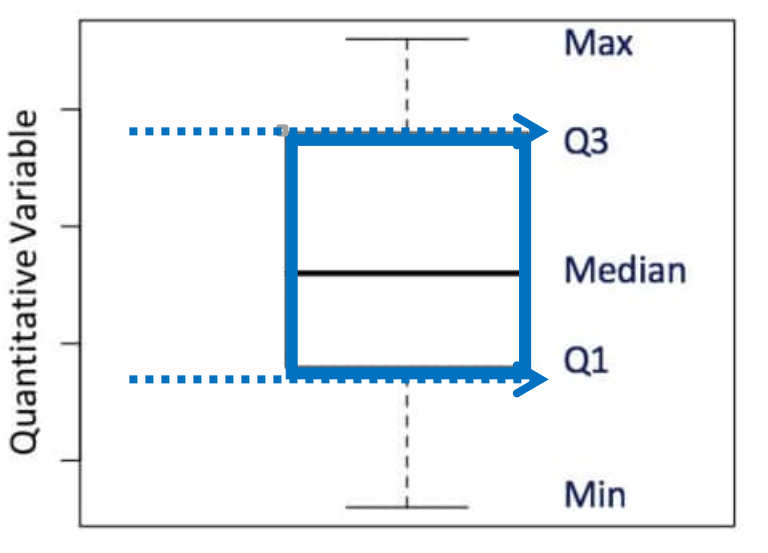

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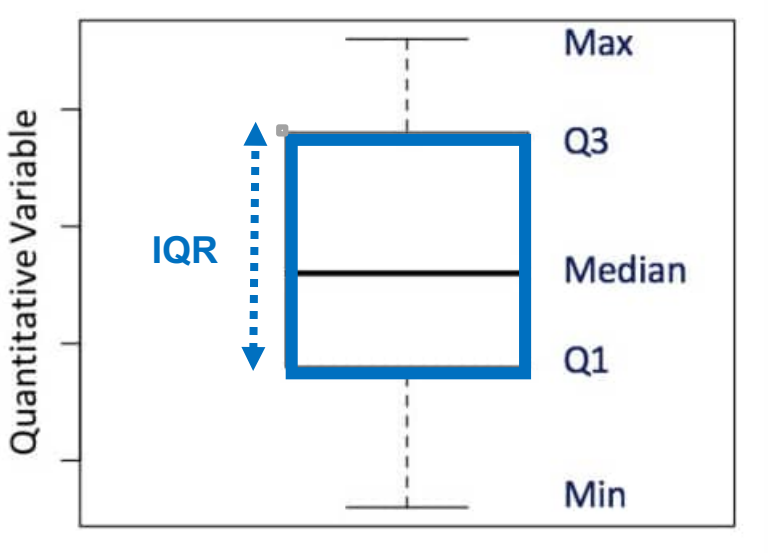

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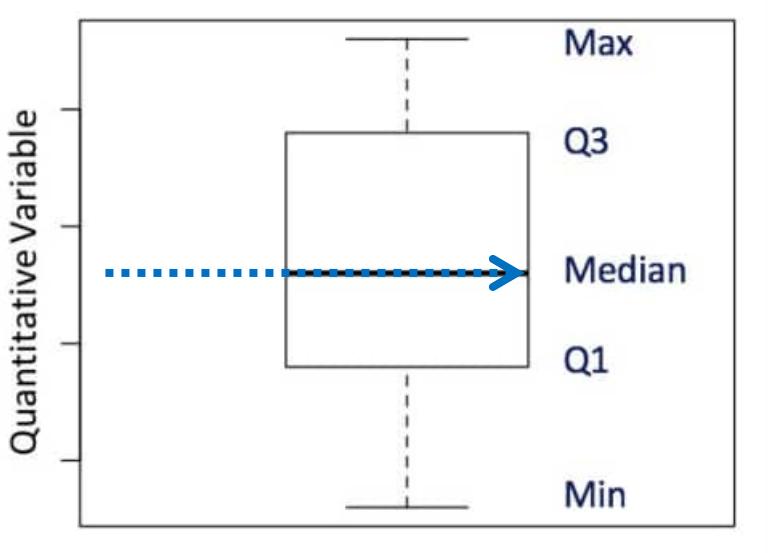

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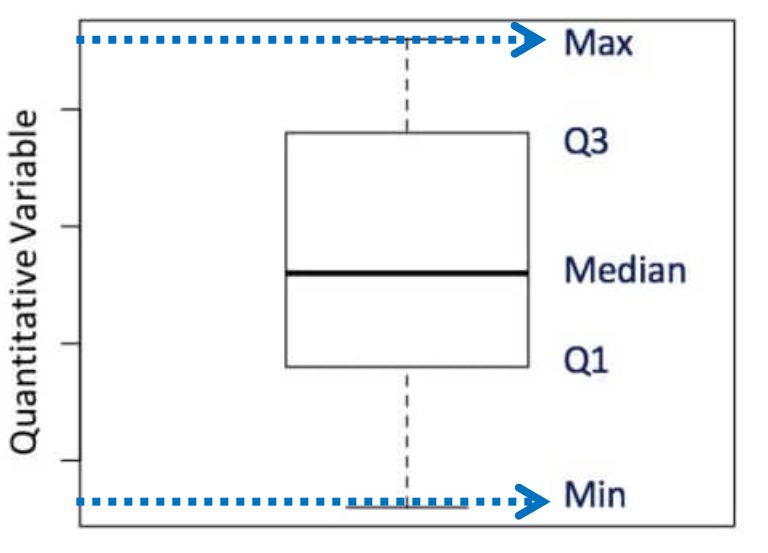

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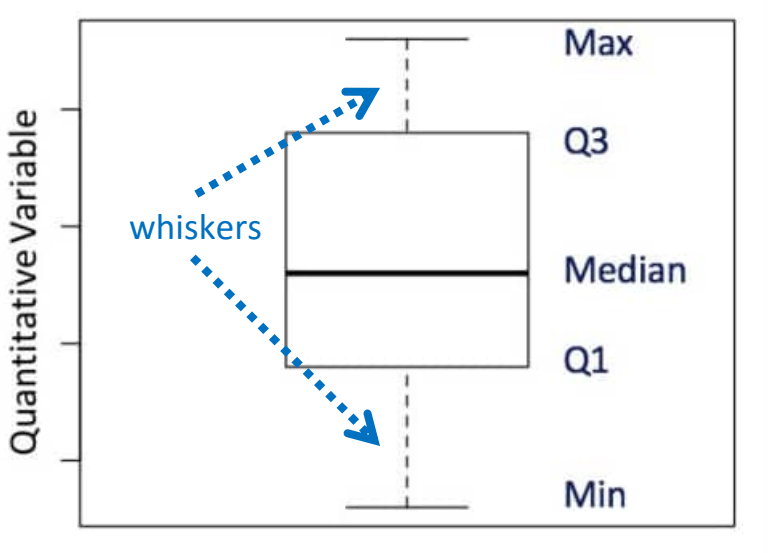
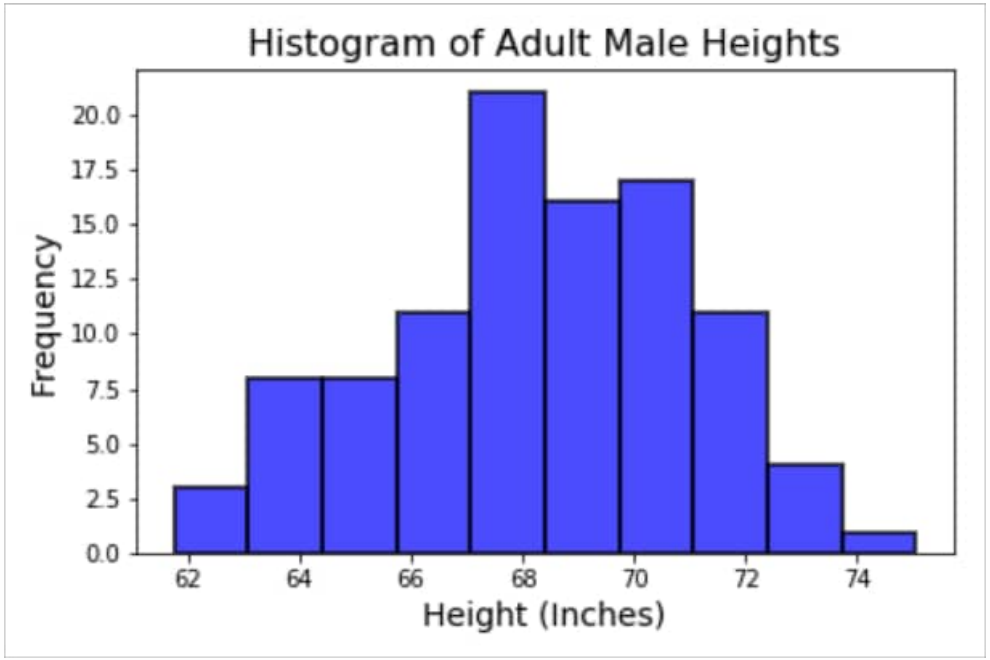


Example 1: Heights of Adult Males



	Height
Min.	:61.7
1st Qu.	:66.5
Median	:68.3
Mean	:68.3
3rd Qu.	:70.1
Max.	:75.1

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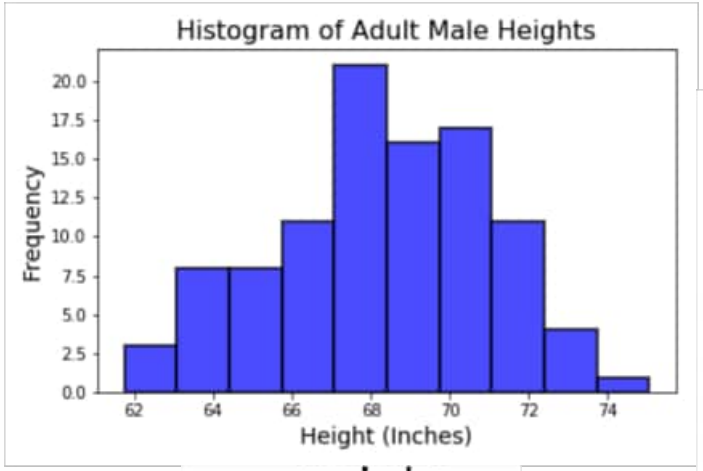

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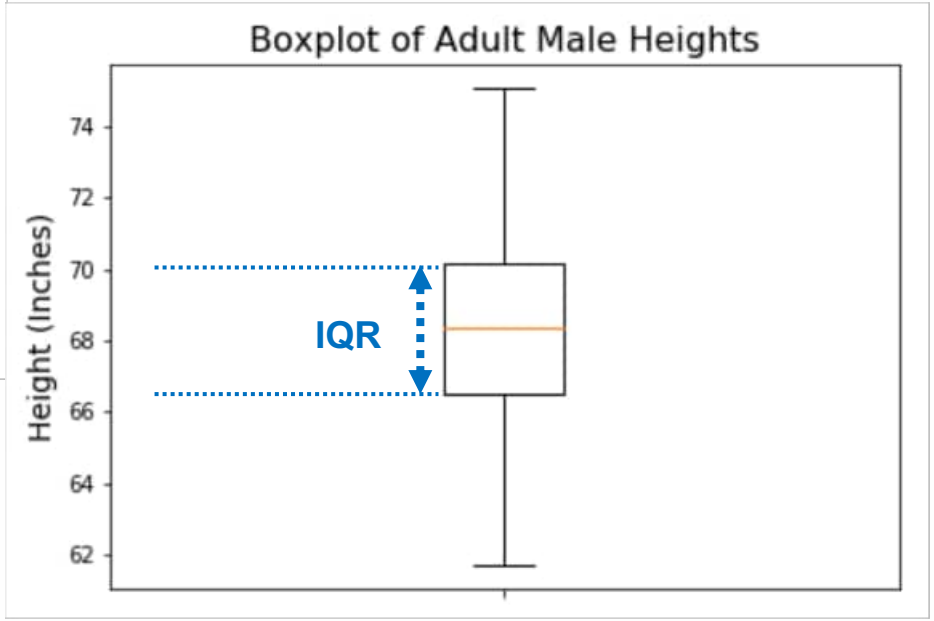

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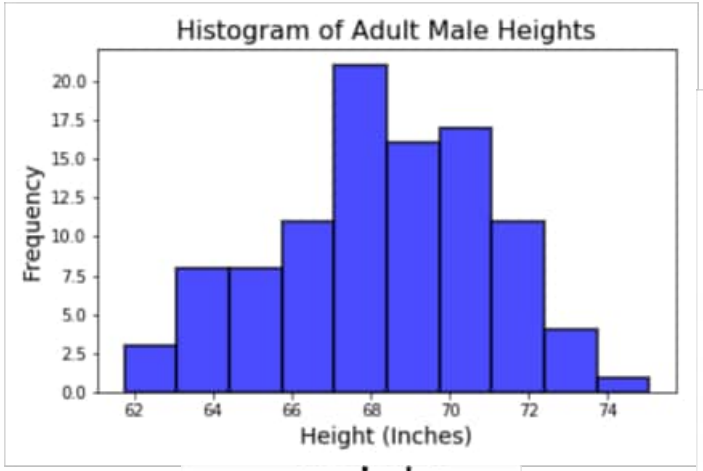


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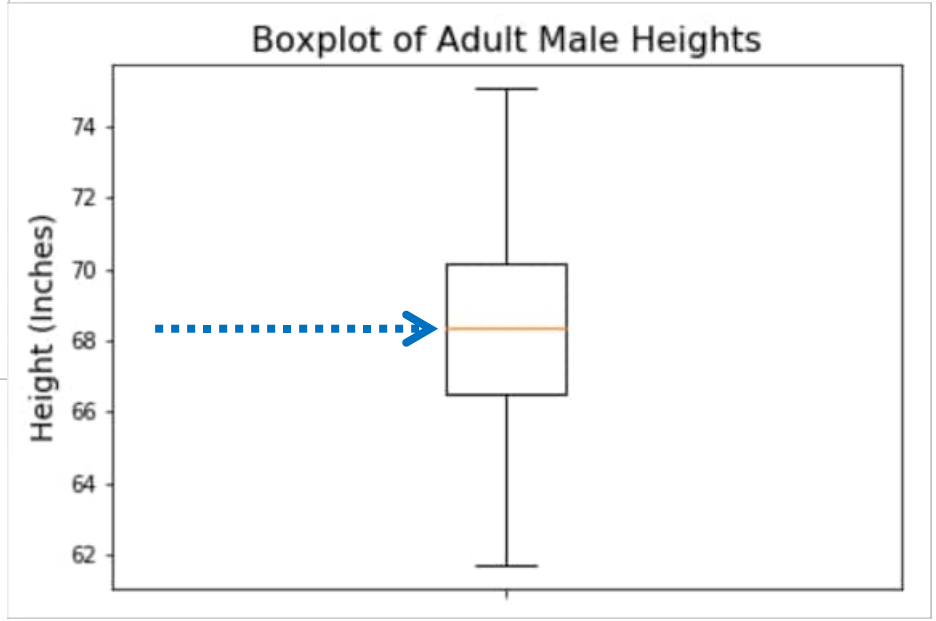

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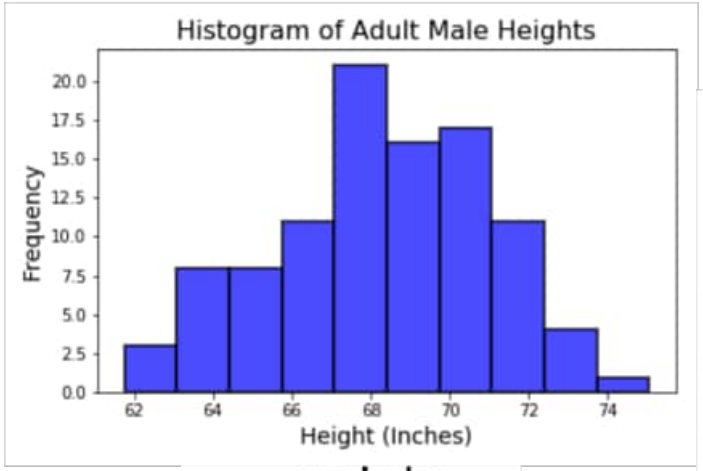


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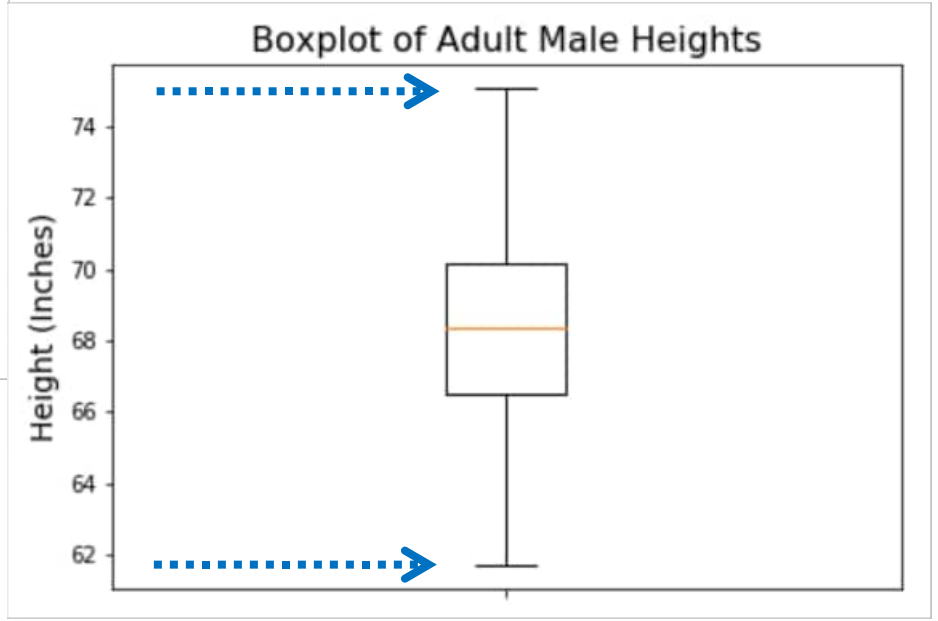
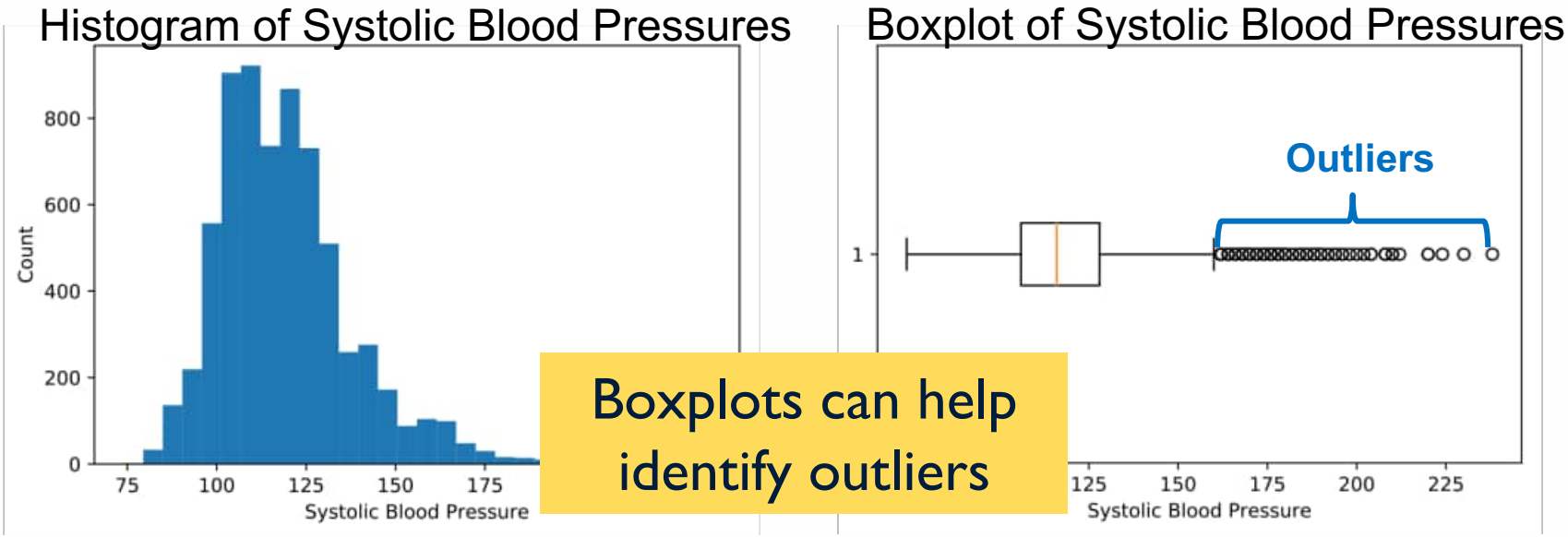


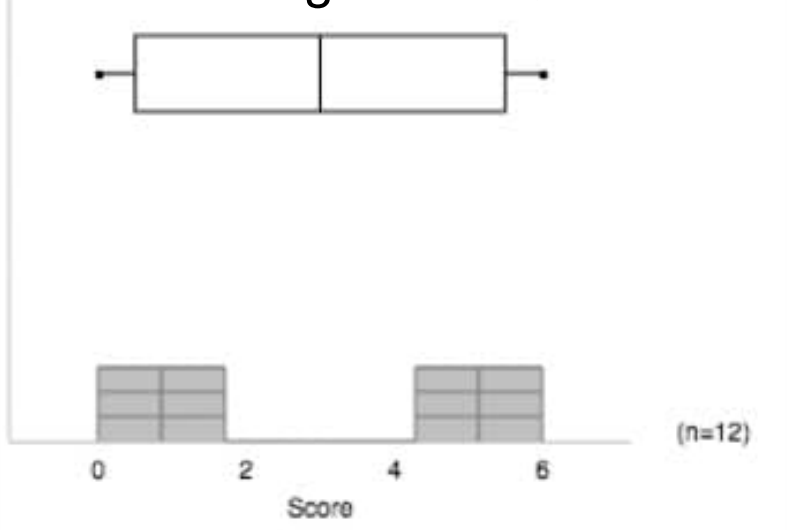
Example 2: Systolic Blood Pressures



Boxplots can help identify outliers

Example 3: Quiz Scores

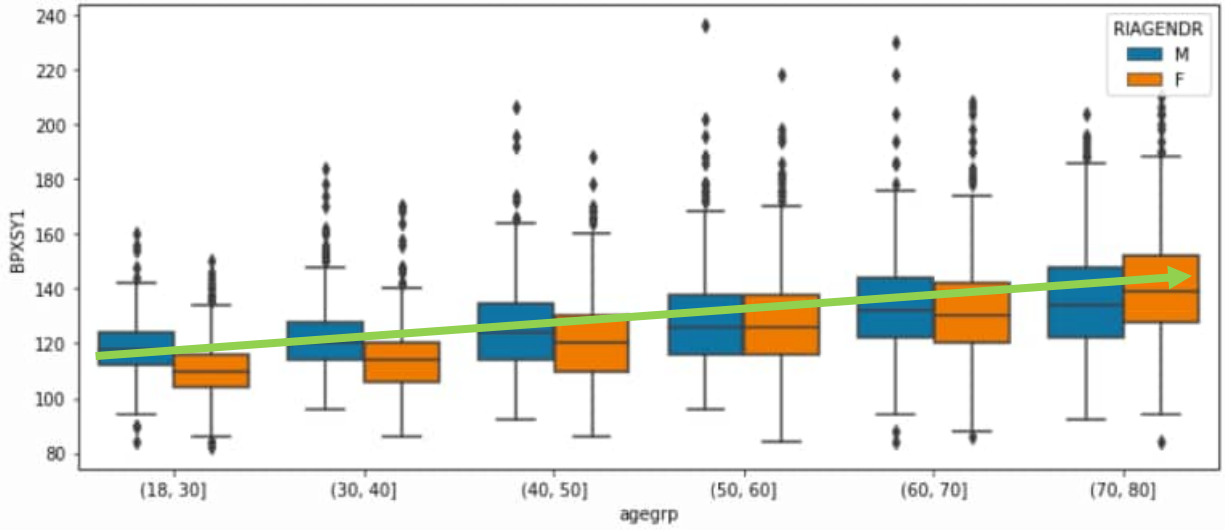
Boxplot and Histogram of Quiz Scores



Boxplots can hide gaps and clusters

Example 4: Side by Side Boxplots

Boxplots of Systolic Blood Pressure by Age and Gender



What do you see?
Old vs Young:
BP **higher**

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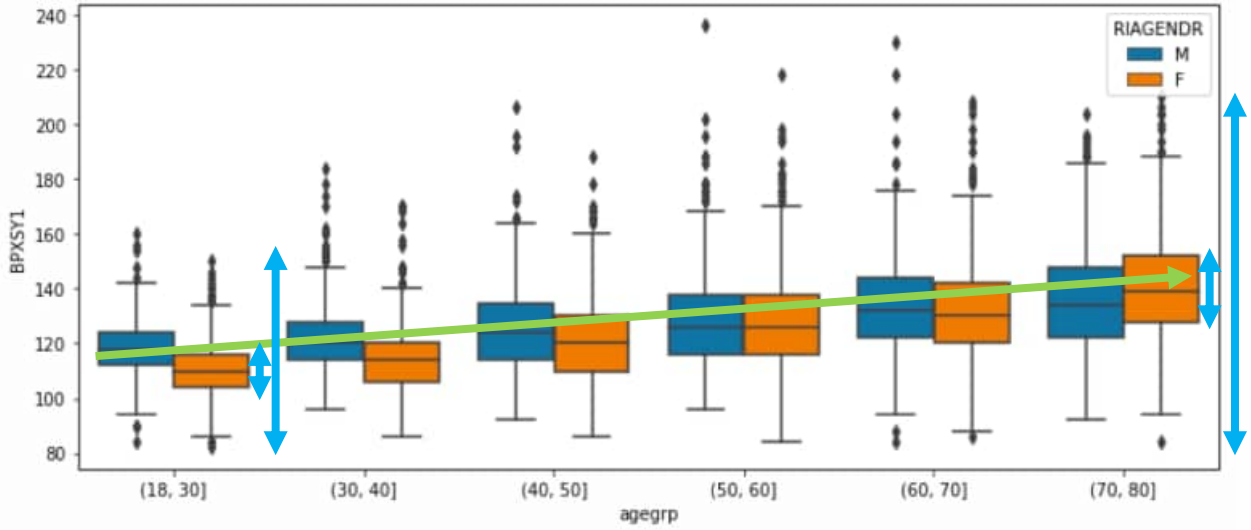

What do you see?

Old vs Young:

BP **higher, more disperse**

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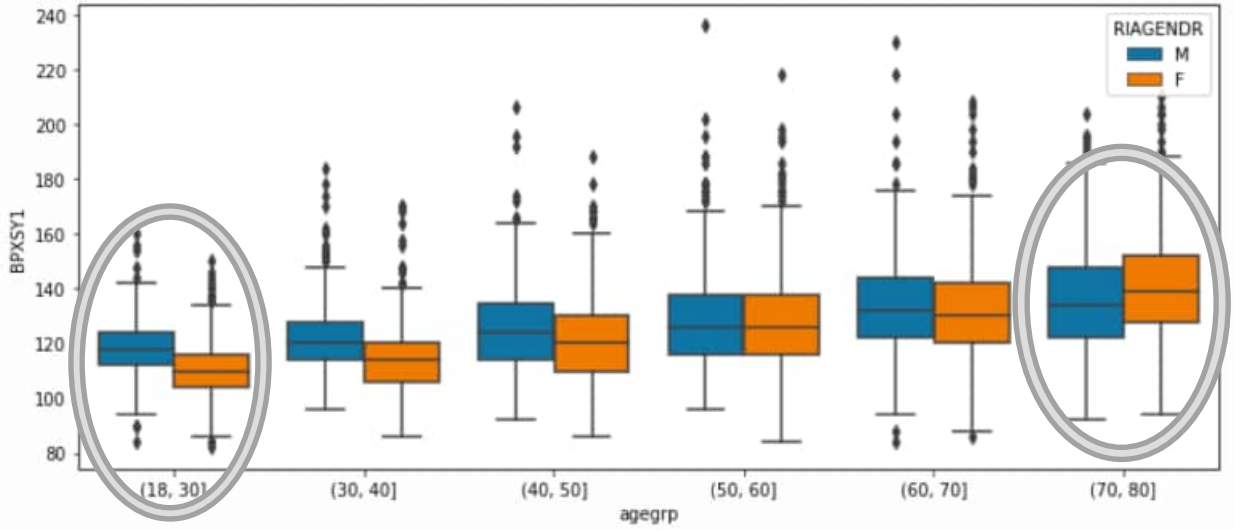

What do you see?

- Old vs Young: BP higher, more disperse
- BP ***higher*** for **young men** vs young women
- BP ***lower*** for **old men** vs old women

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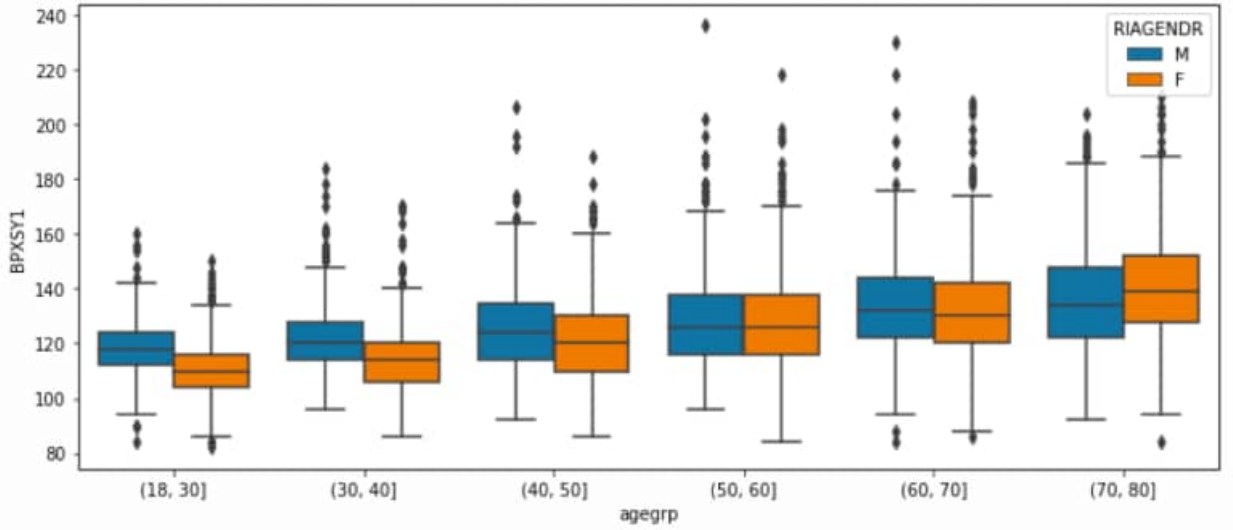
Boxplots of Systolic Blood Pressure by Age and Gender



Boxplots are useful for comparing sets of observations

Notes about Boxplots

- **Boxplots provide a graphical picture of the five-number summary: showing center (median), spread (IQR and range), and identifies potential outliers.**
- **Boxplots can hide some shape aspects** *(histograms do better job at displaying shape)*
- **Side-by-Side Boxplots are useful for comparing two or more sets of observations.**