Presenting Data

Lecture 2

Graphing Distributions

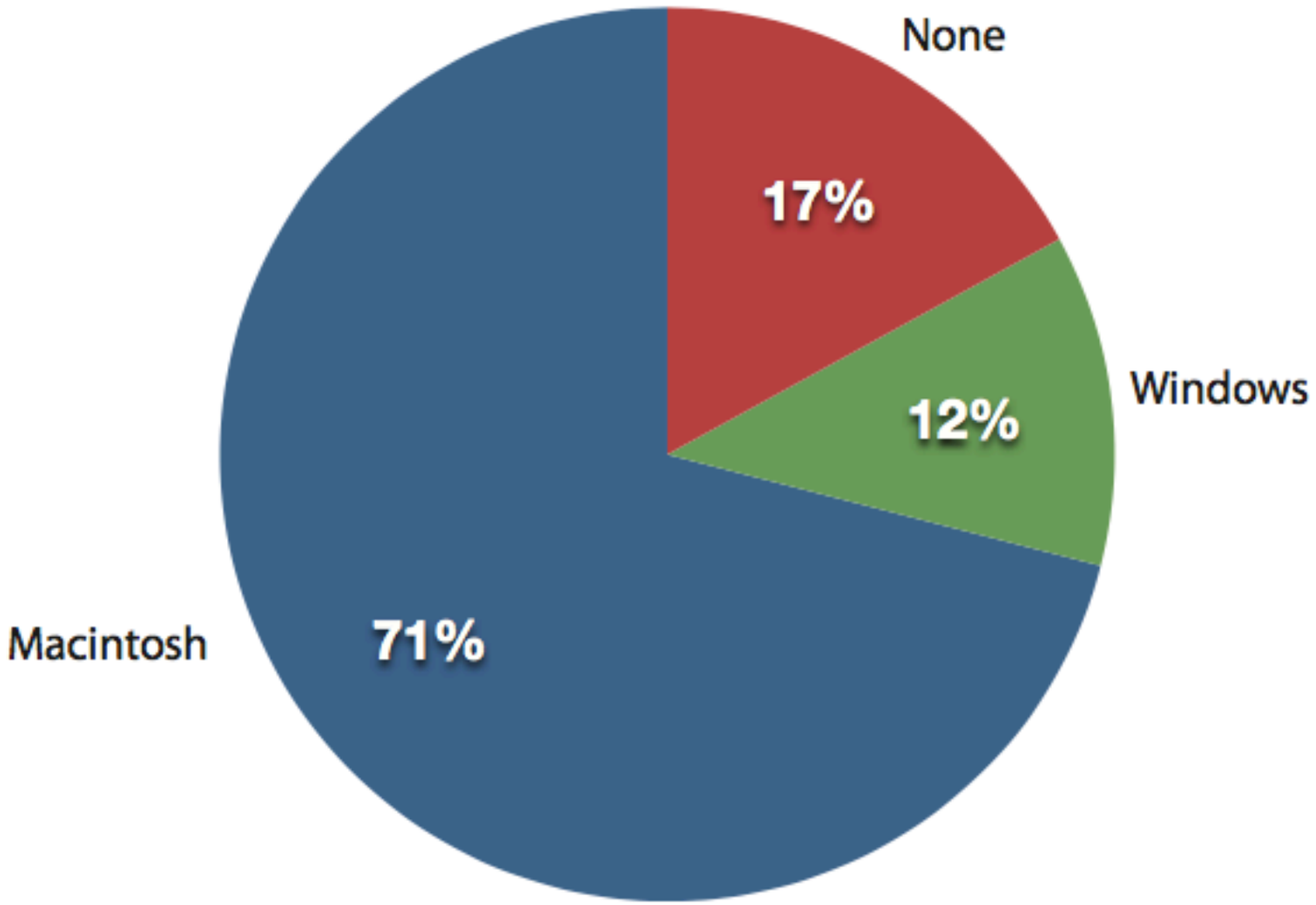
- Qualitative variables
- Quantitative variables
  - Stem and Leaf Displays
  - Histograms
  - Frequency Polygons
  - Box Plots
  - Bar Charts
  - Line Graphs
  - Dot Plots

Graphing Qualitative Variables

Frequency tables

Previous Ownership	Frequency	Relative Frequency
None	85	0.17
Windows	60	0.12
Macintosh	355	0.71
Total	500	1

Pie charts



Pie chart of iMac purchases illustrating frequencies of previous computer ownership.

If they are based on a small number of observations, it can be misleading to label the pie slices with percentages

Bar charts

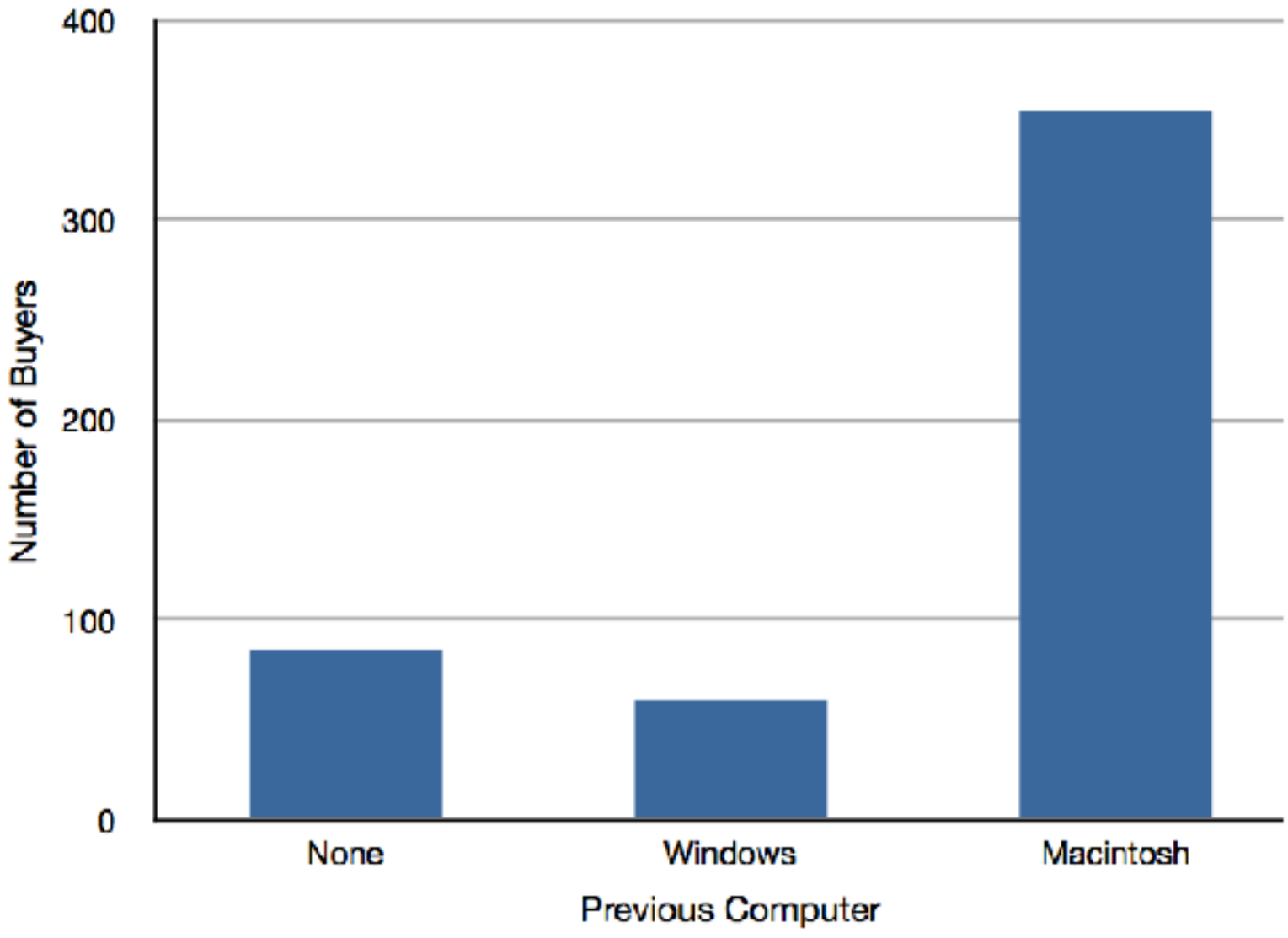
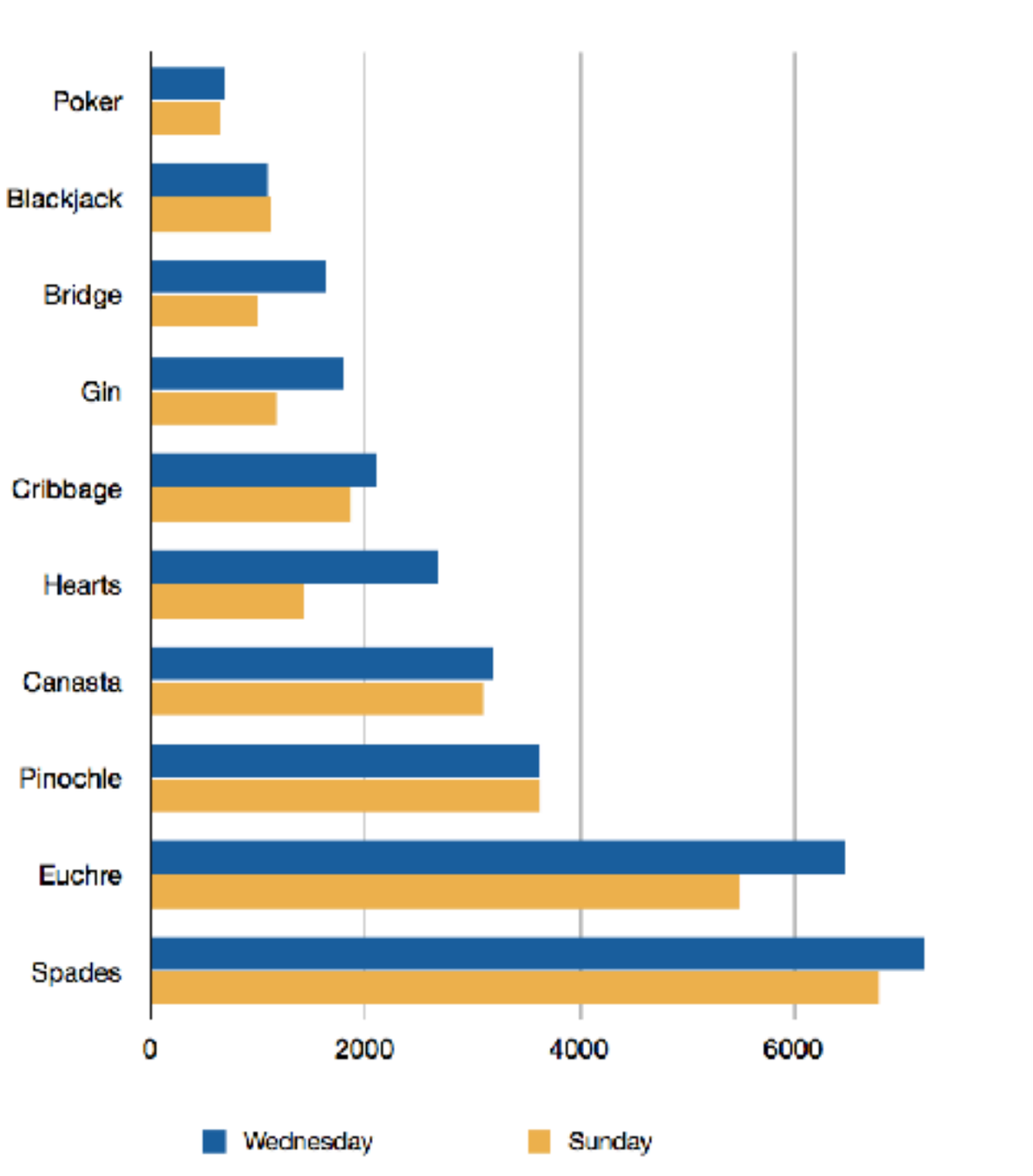


Figure 1: Bar chart of iMac purchases as a function of previous computer ownership.

Comparing distributions



A bar chart of the number of people playing different card games on Sunday and Wednesday

Graphical mistakes to avoid

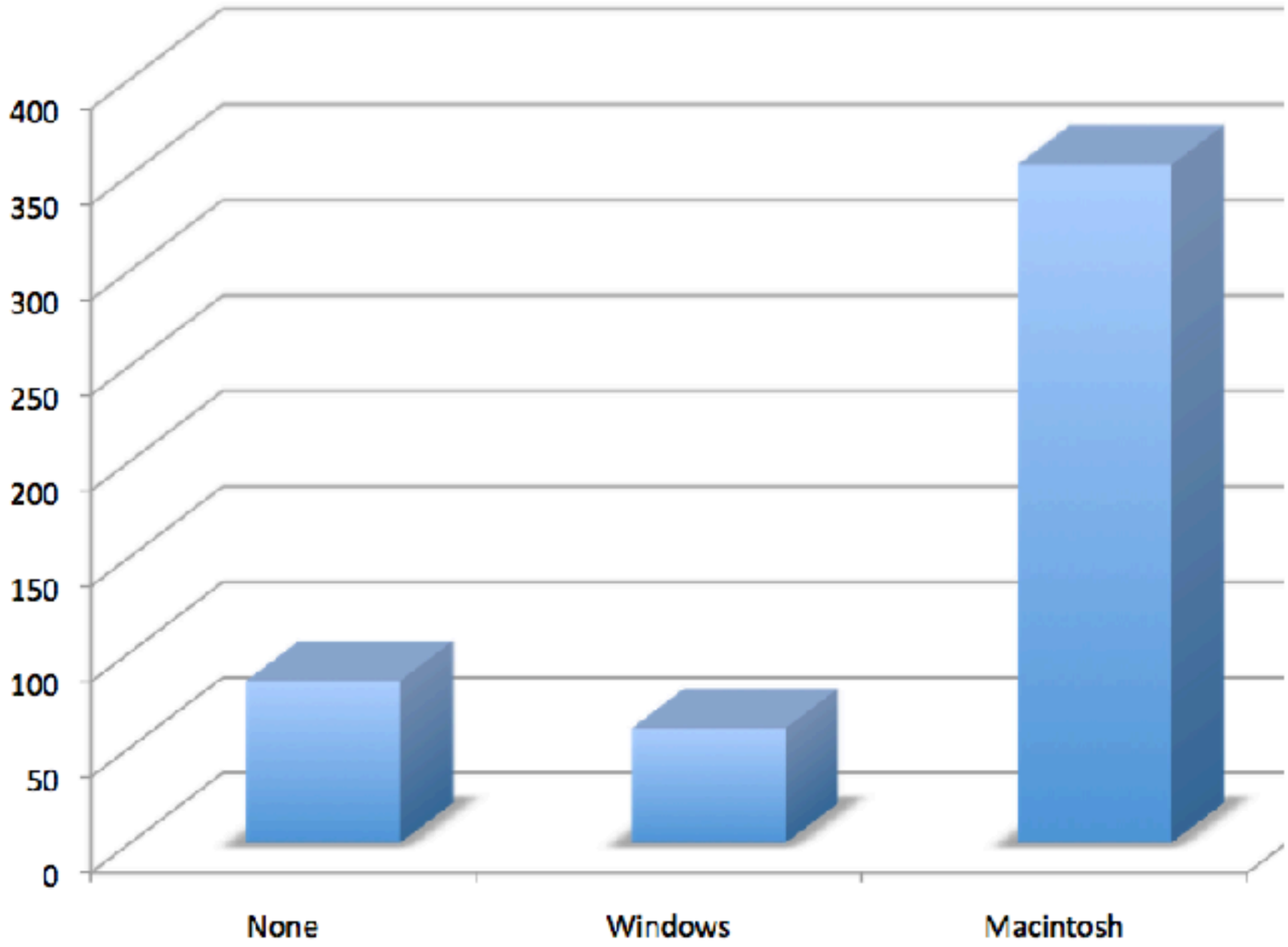


Figure 2: A three-dimensional version of Figure 1

Graphical mistakes to avoid

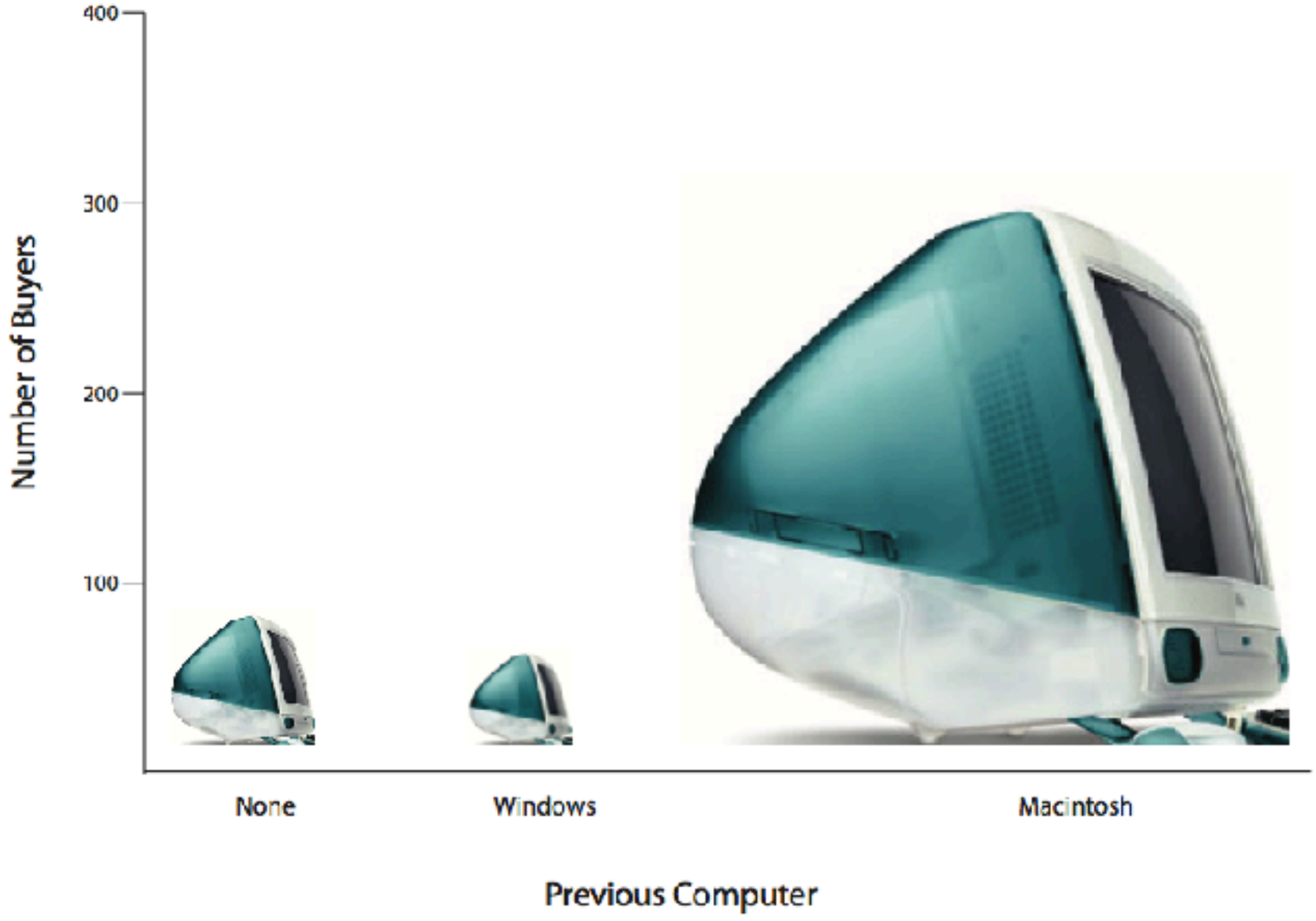


Figure 3: A redrawing of Figure 1 with a lie factor greater than 8

Graphical mistakes to avoid

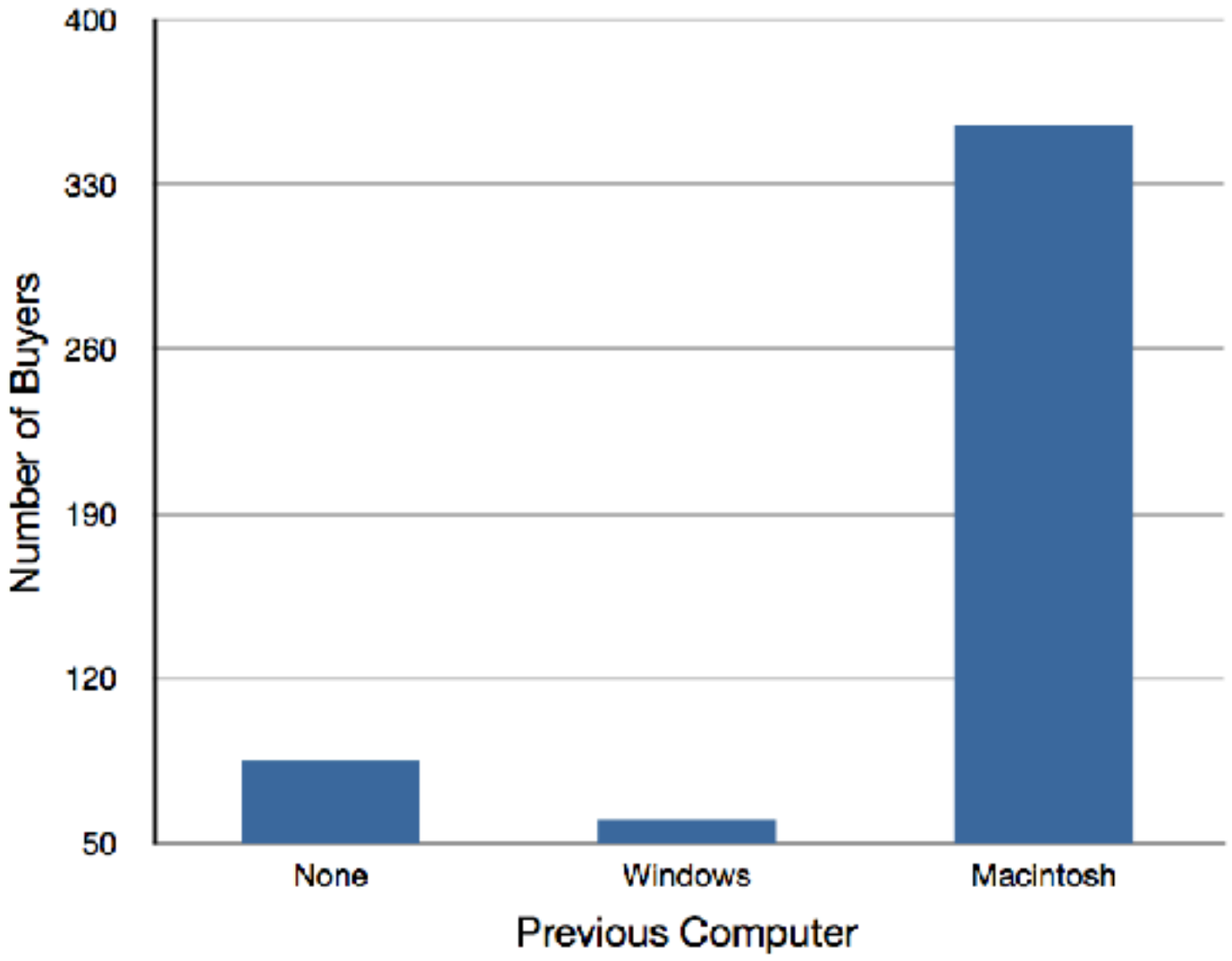


Figure 4: A redrawing of Figure 2 with a baseline of 50

Graphical mistakes to avoid

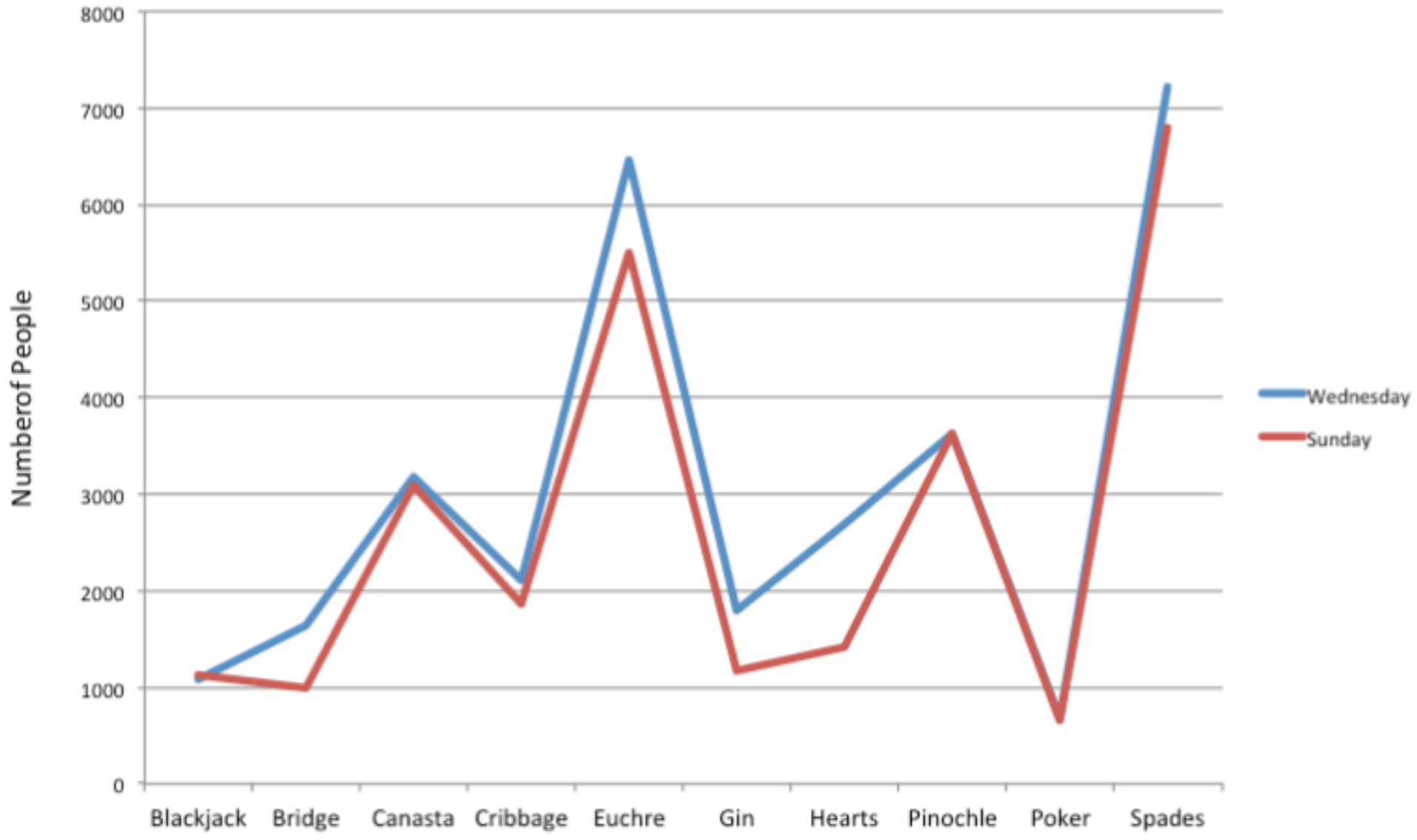
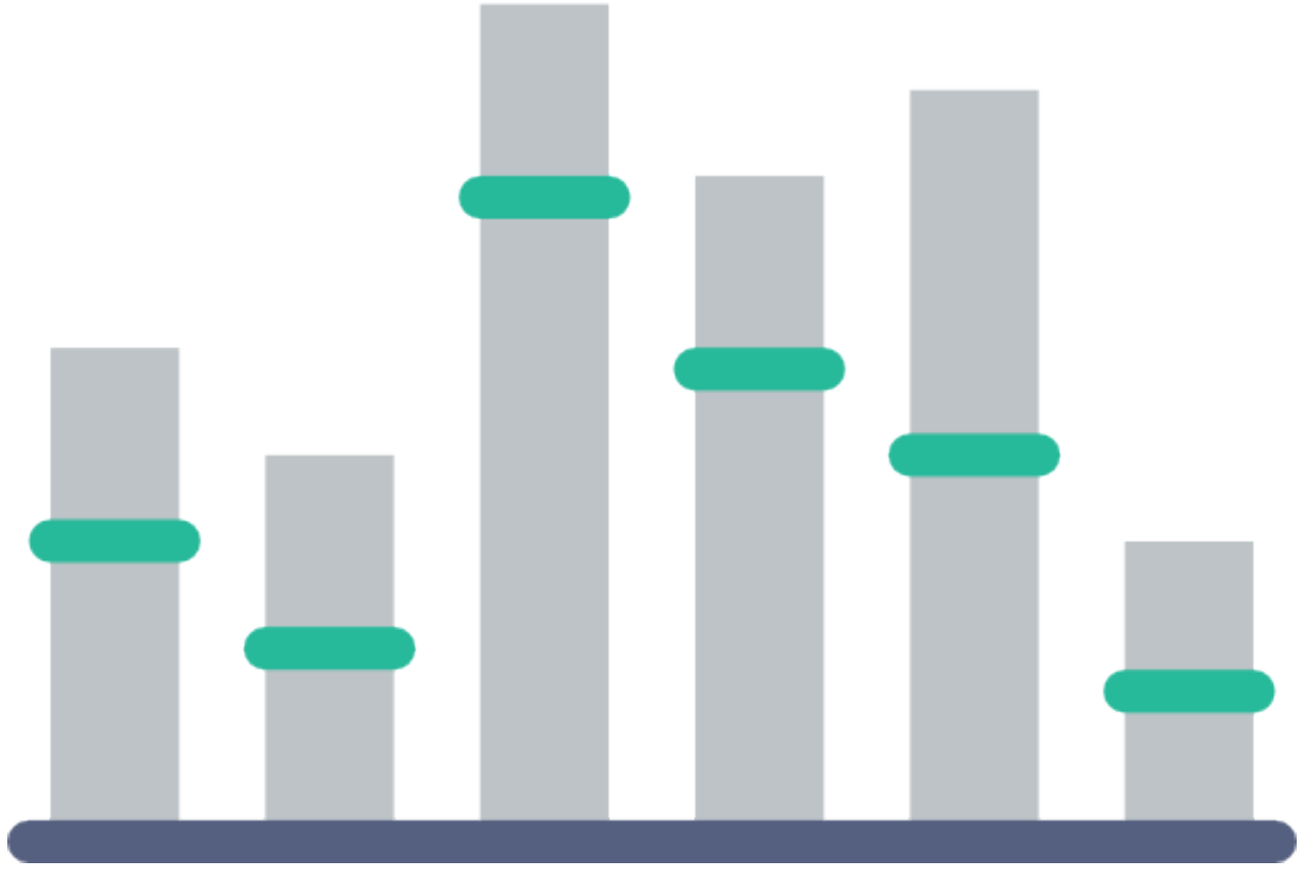


Figure 4: A redrawing of Figure 2 with a baseline of 50

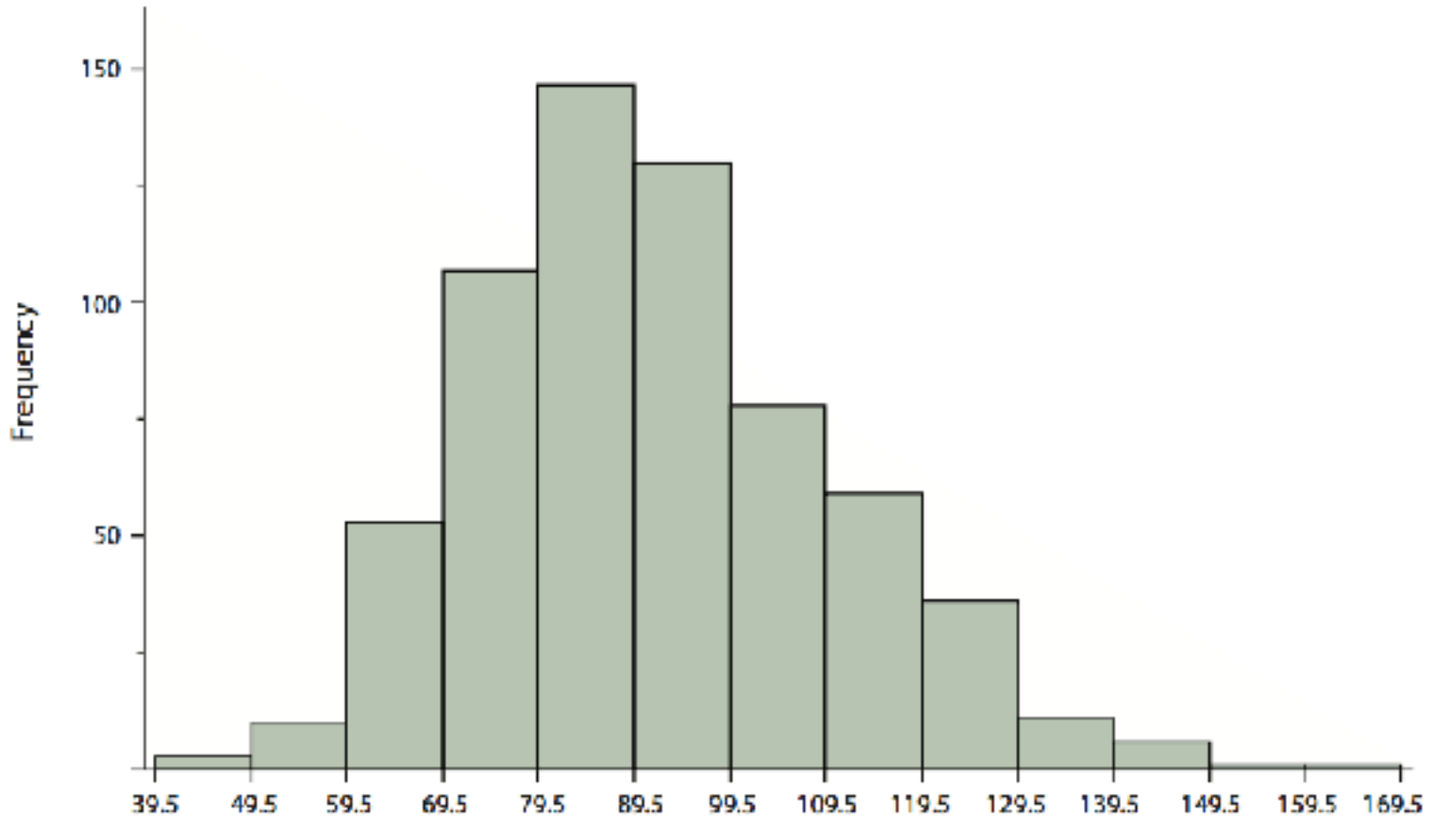
Graphing Quantitative Variables



Histograms

Grouped Frequency Distribution of Psychology Test Scores

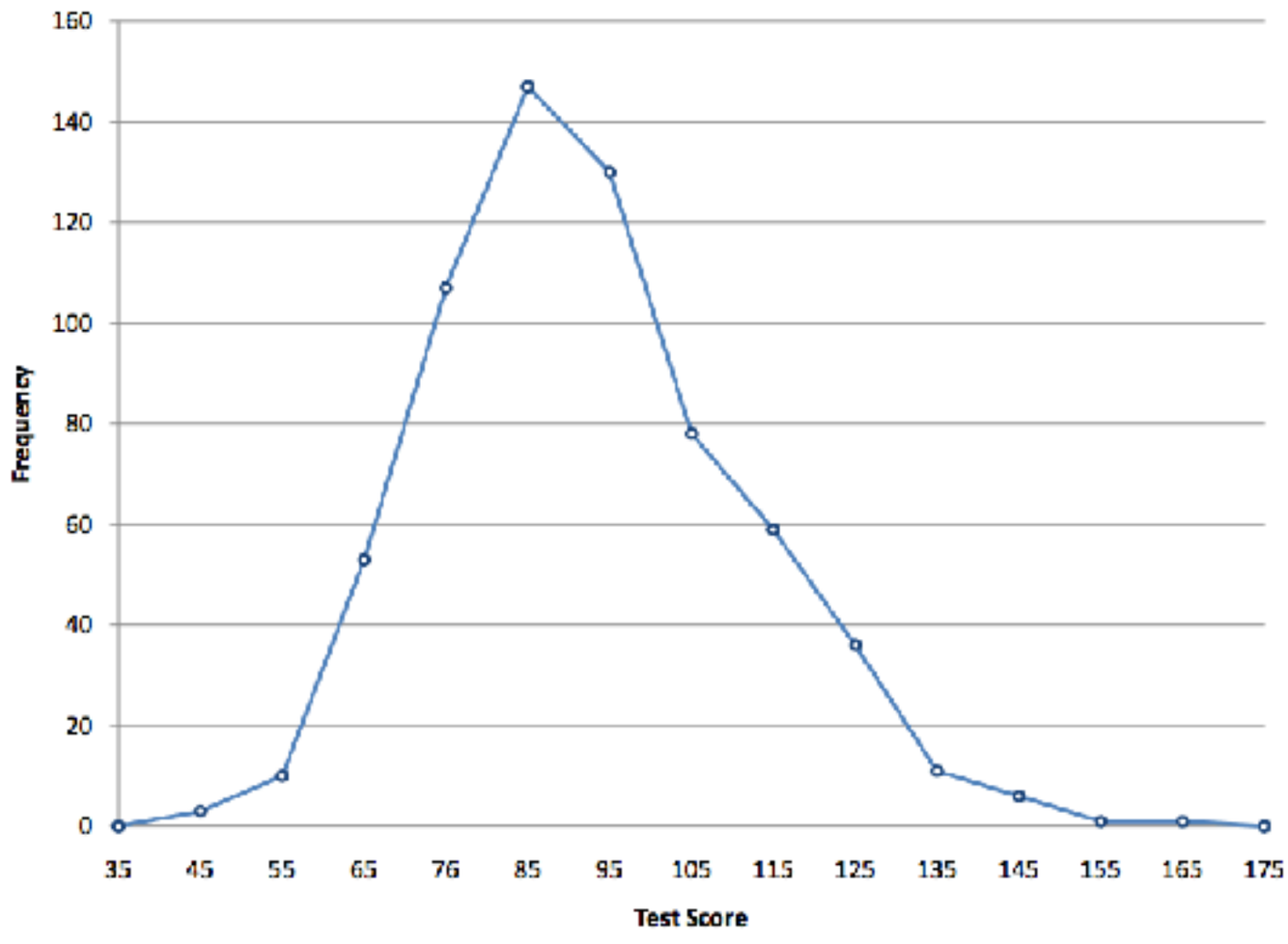
Interval's Lower Limit	Interval's Upper Limit	Class Frequency
39.5	49.5	3
49.5	59.5	10
59.5	69.5	53
69.5	79.5	107
79.5	89.5	147
89.5	99.5	130
99.5	109.5	78
109.5	119.5	59
119.5	129.5	36
129.5	139.5	11
139.5	149.5	6
149.5	159.5	1
159.5	169.5	1



Frequency Polygons

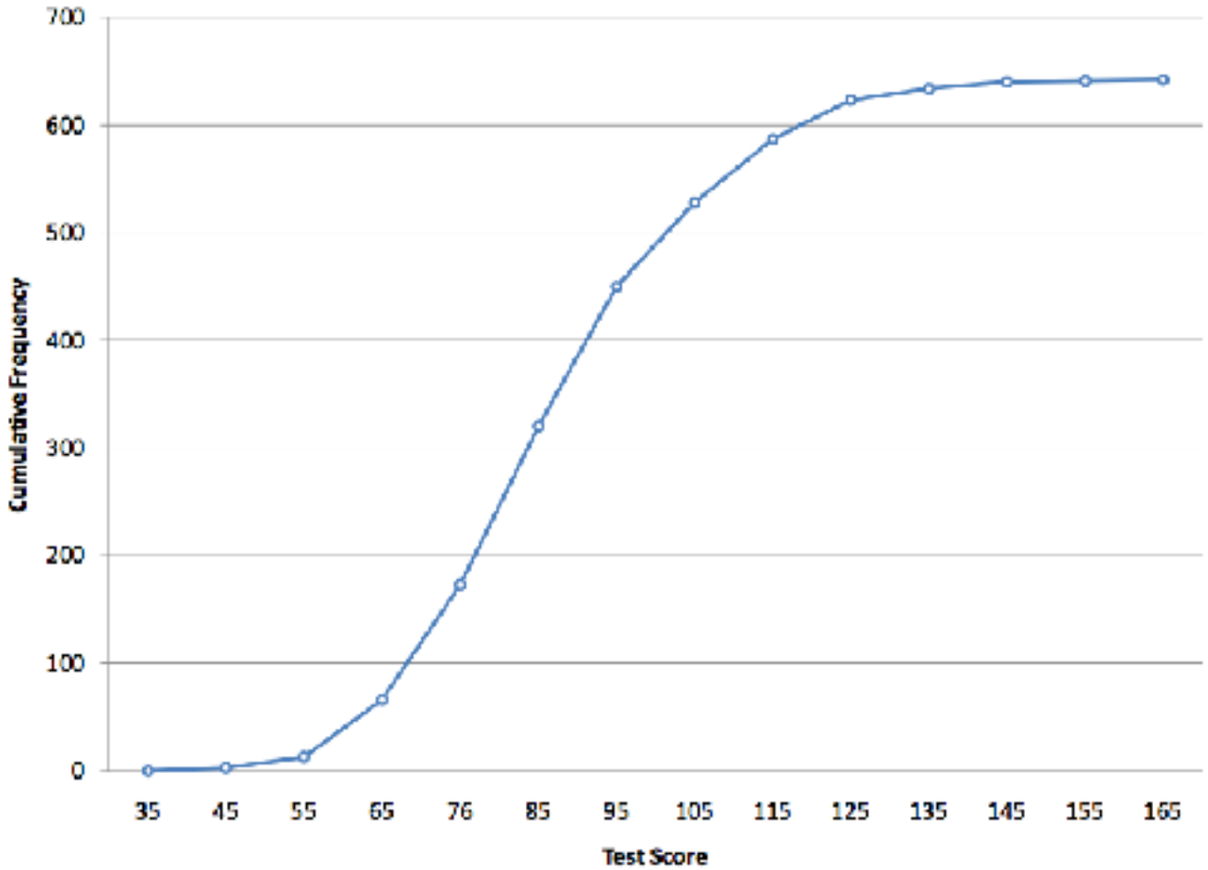
Frequency Distribution of Psychology Test Scores

Lower Limit	Upper Limit	Count	Cumulative Count
29.5	39.5	0	0
39.5	49.5	3	3
49.5	59.5	10	13
59.5	69.5	53	66
69.5	79.5	107	173
79.5	89.5	147	320
89.5	99.5	130	450
99.5	109.5	78	528
109.5	119.5	59	587
119.5	129.5	36	623
129.5	139.5	11	634
139.5	149.5	6	640
149.5	159.5	1	641
159.5	169.5	1	642
169.5	170.5	0	642

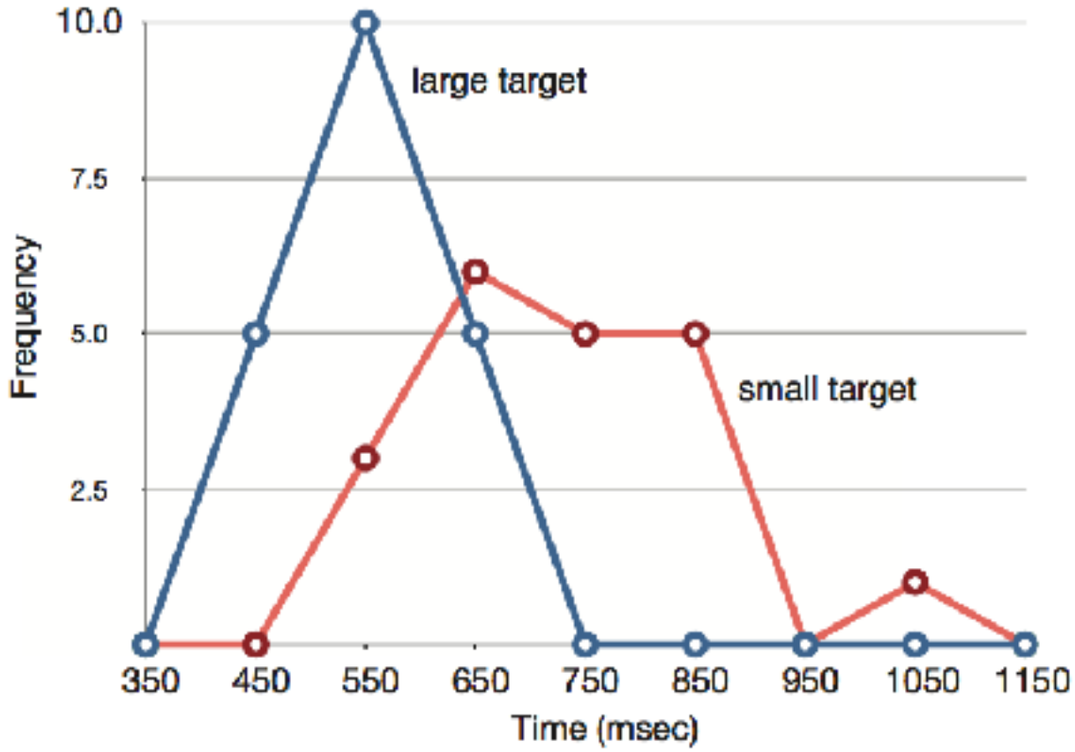


Frequency polygon for the psychology test scores

Frequency Polygons

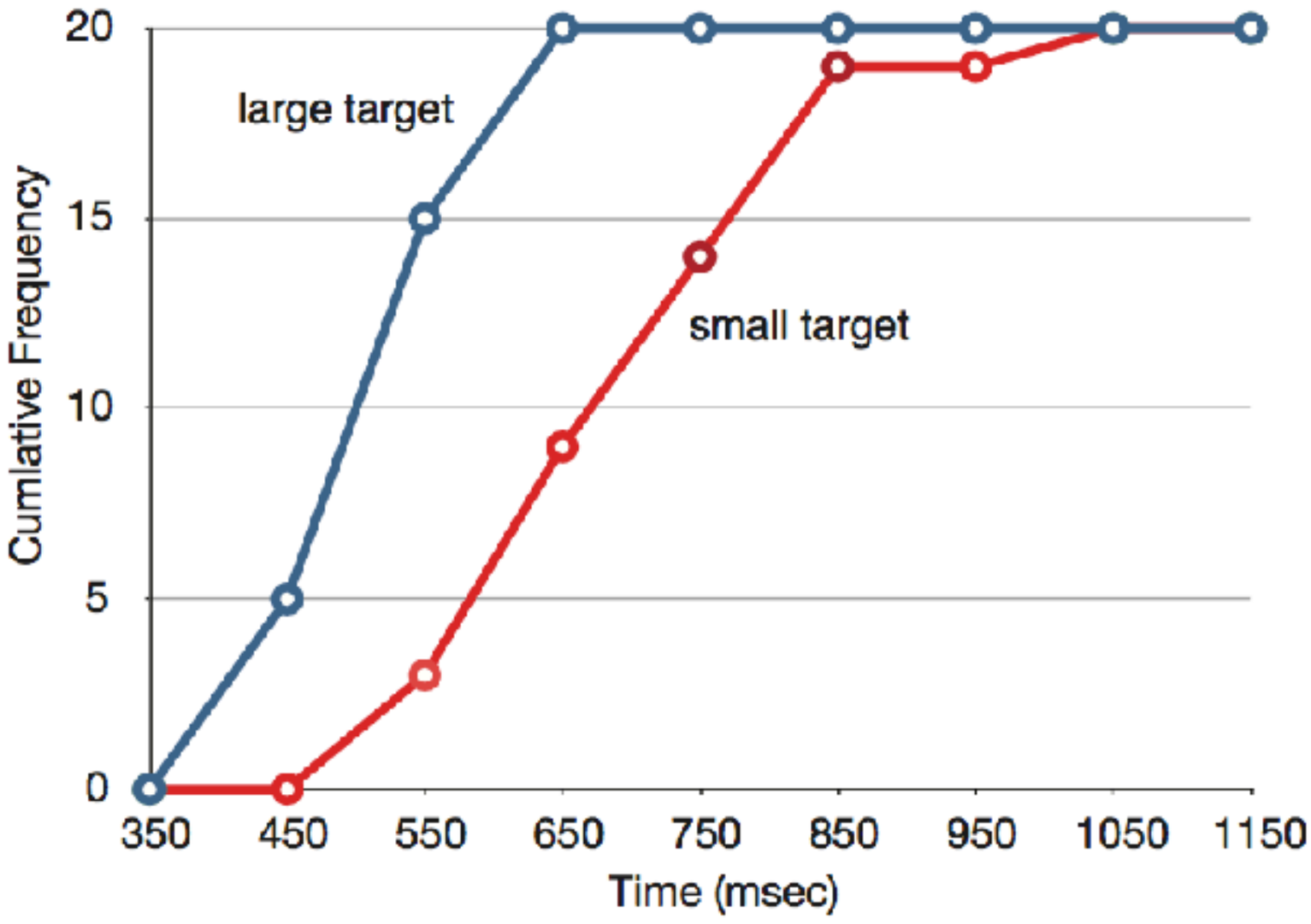


Cumulative frequency polygon for the psychology test scores



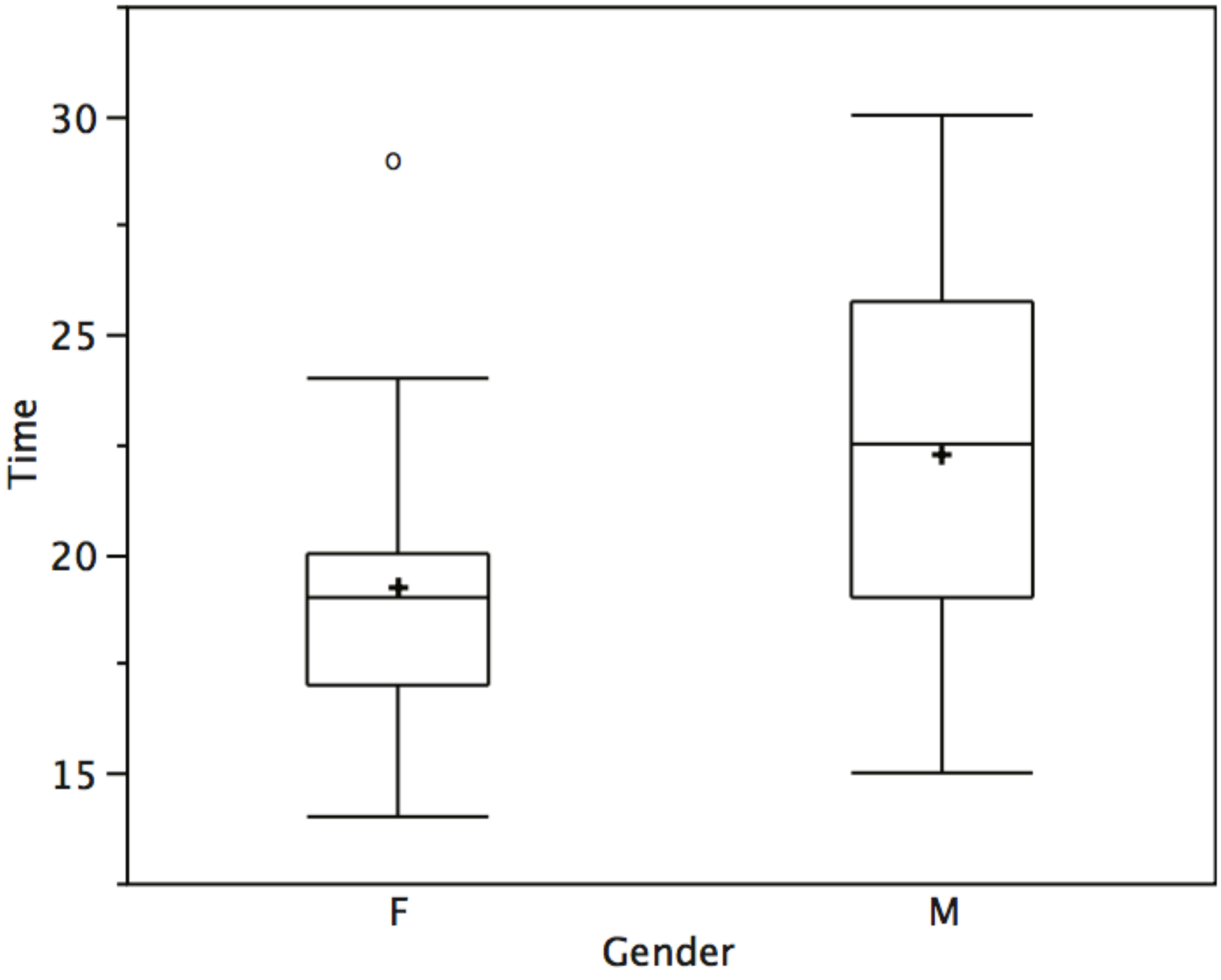
Overlaid frequency polygons

Frequency Polygons



Overlaid cumulative frequency polygons.

Box Plots

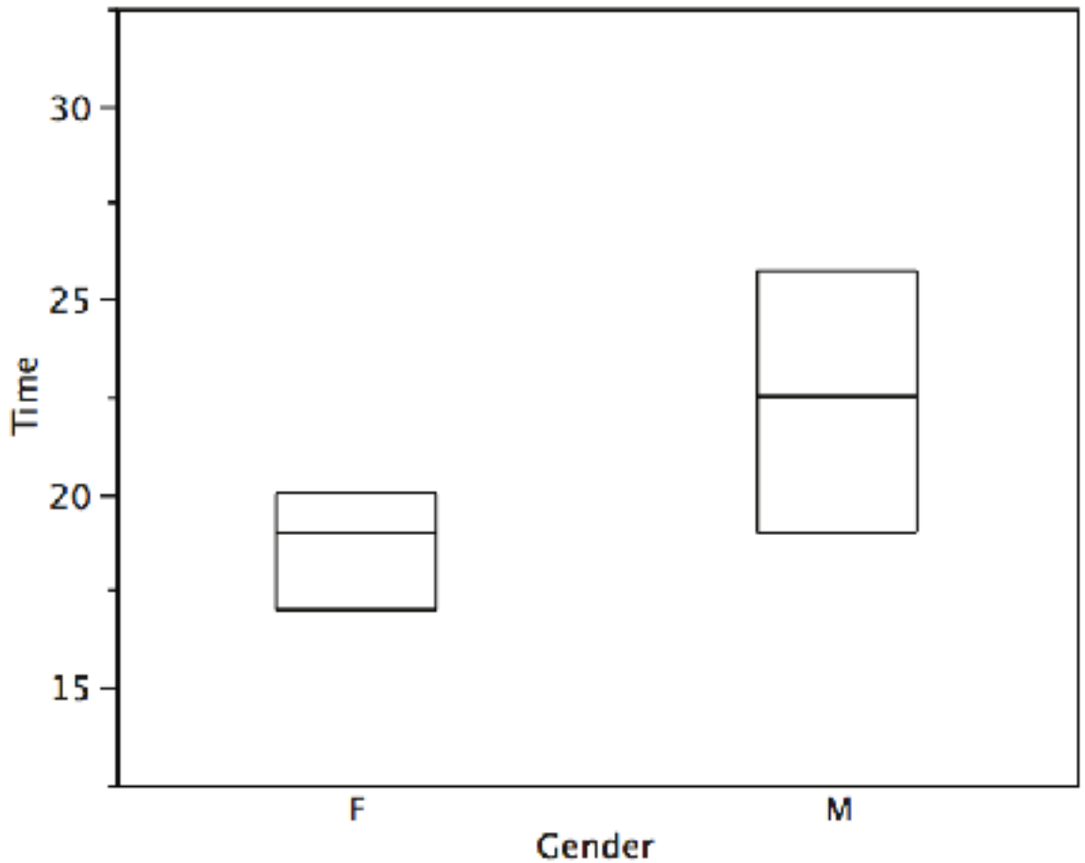


Box Plots

Women's times

14	17	18	19	20	21	29
15	17	18	19	20	22	
16	17	18	19	20	23	
16	17	18	20	20	24	
17	18	18	20	21	24	

The first step in creating box plots.

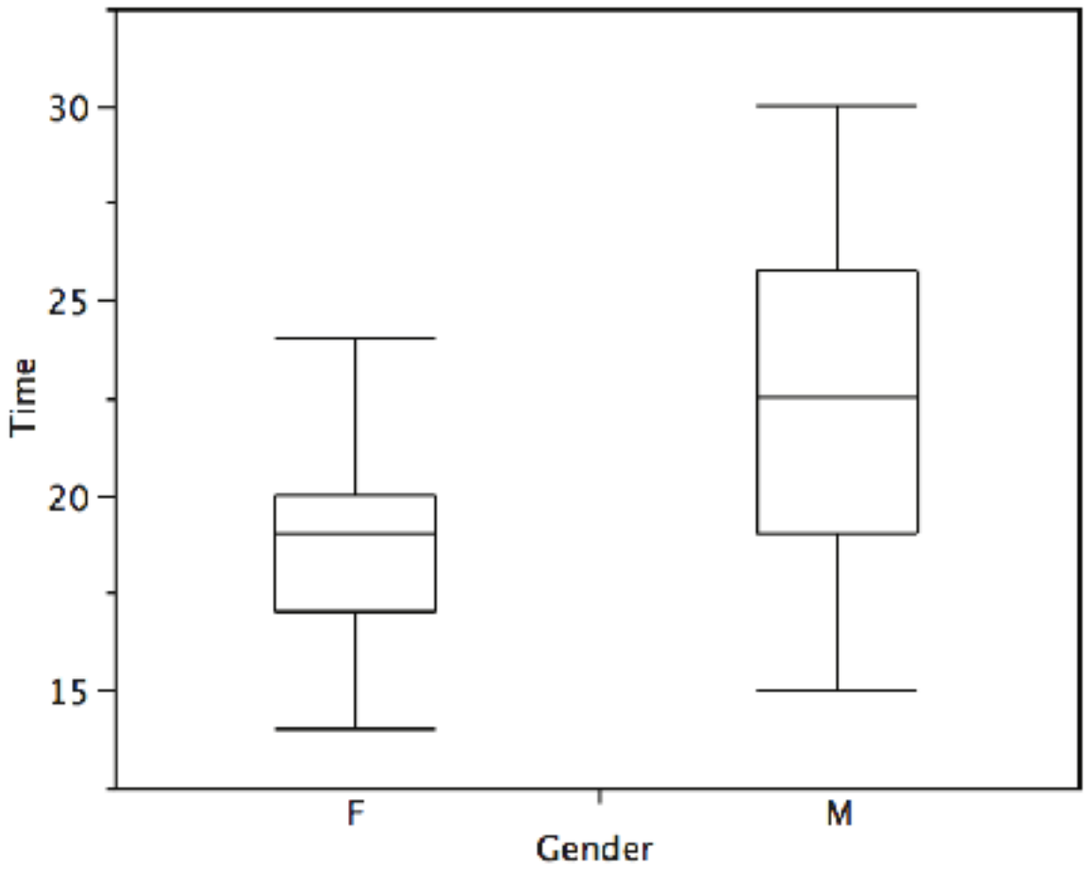


Box Plots

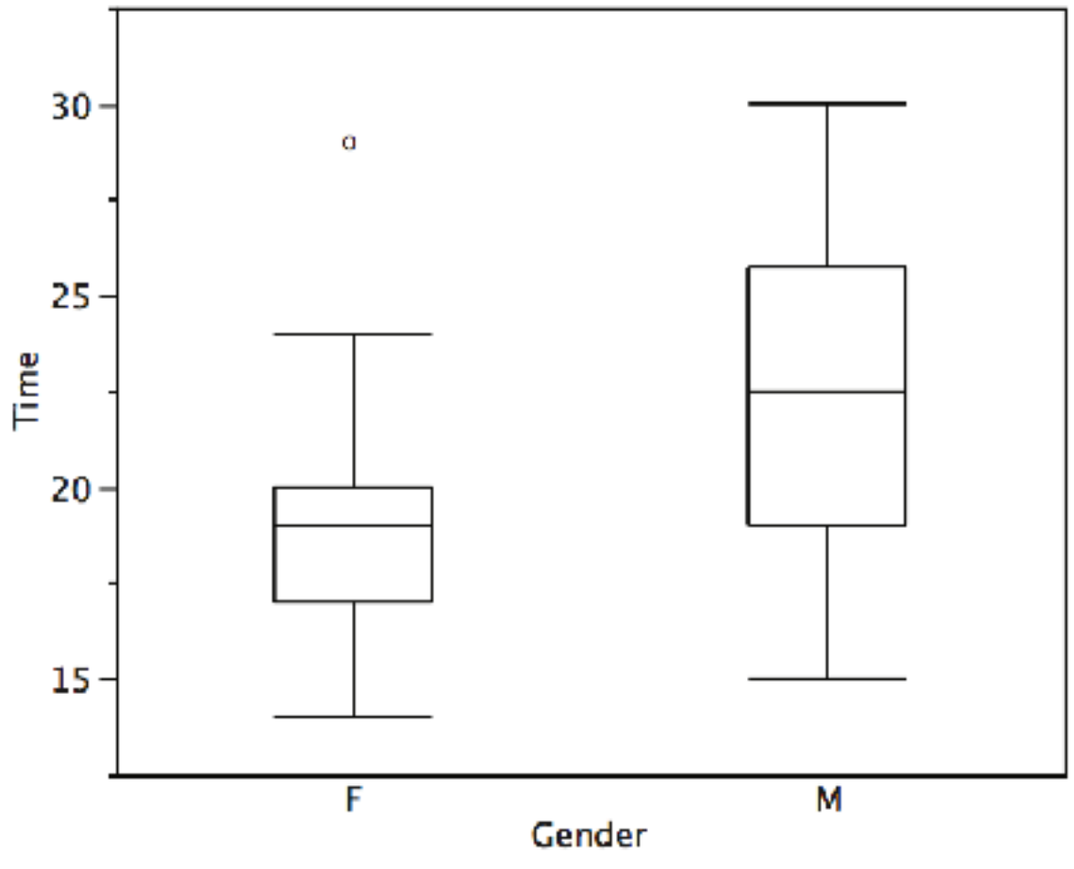
Box plot terms and values for women's times.

Name	Formula	Value
Upper Hinge	75th Percentile	20
Lower Hinge	25th Percentile	17
H-Spread	Upper Hinge - Lower Hinge	3
Step	1.5 x H-Spread	4.5
Upper Inner Fence	Upper Hinge + 1 Step	24.5
Lower Inner Fence	Lower Hinge - 1 Step	12.5
Upper Outer Fence	Upper Hinge + 2 Steps	29
Lower Outer Fence	Lower Hinge - 2 Steps	8
Upper Adjacent	Largest value below Upper Inner Fence	24
Lower Adjacent	Smallest value above Lower Inner Fence	14
Outside Value	A value beyond an Inner Fence but not beyond an Outer Fence	29
Far Out Value	A value beyond an Outer Fence	None

Box Plots

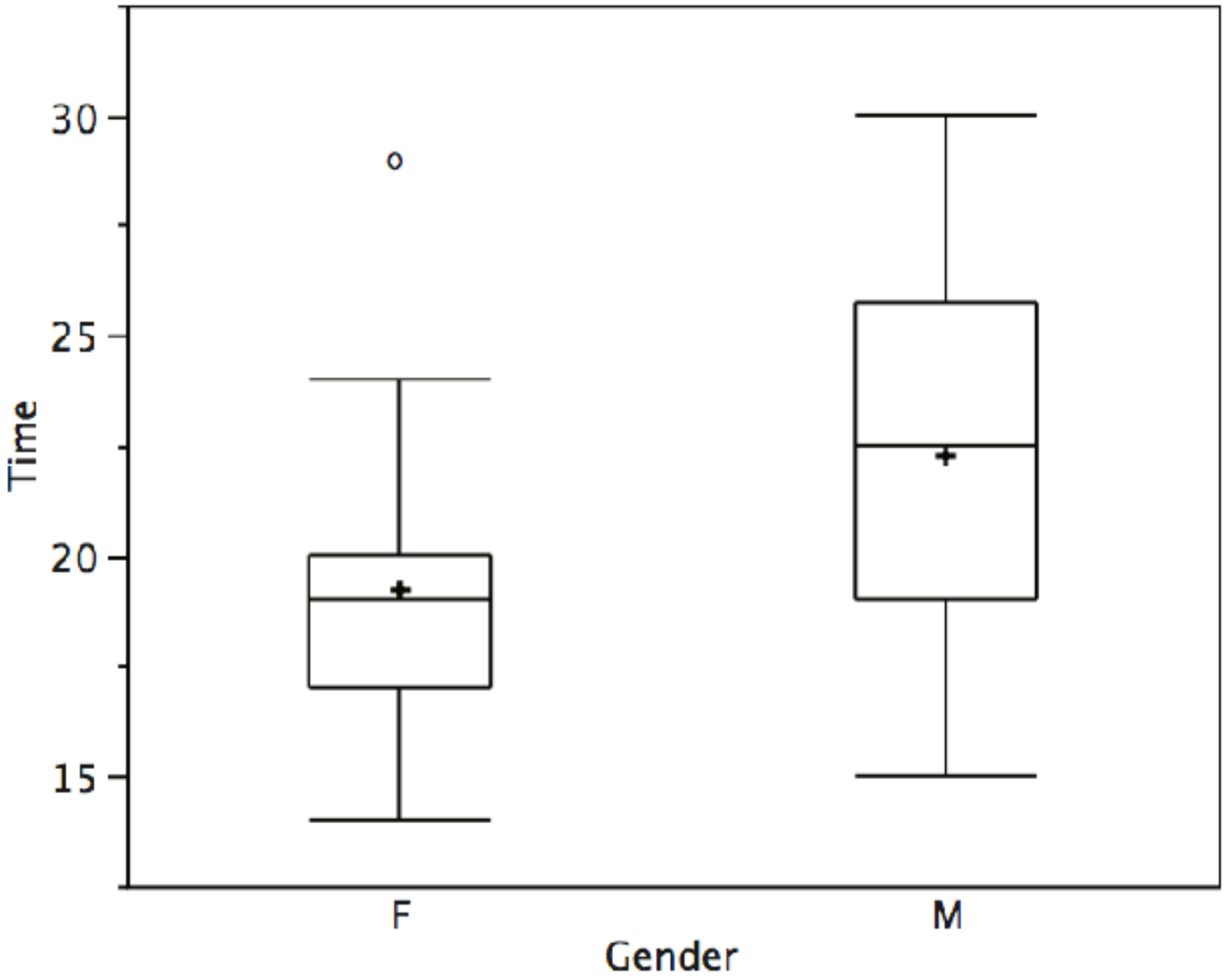


The box plots with the whiskers drawn.

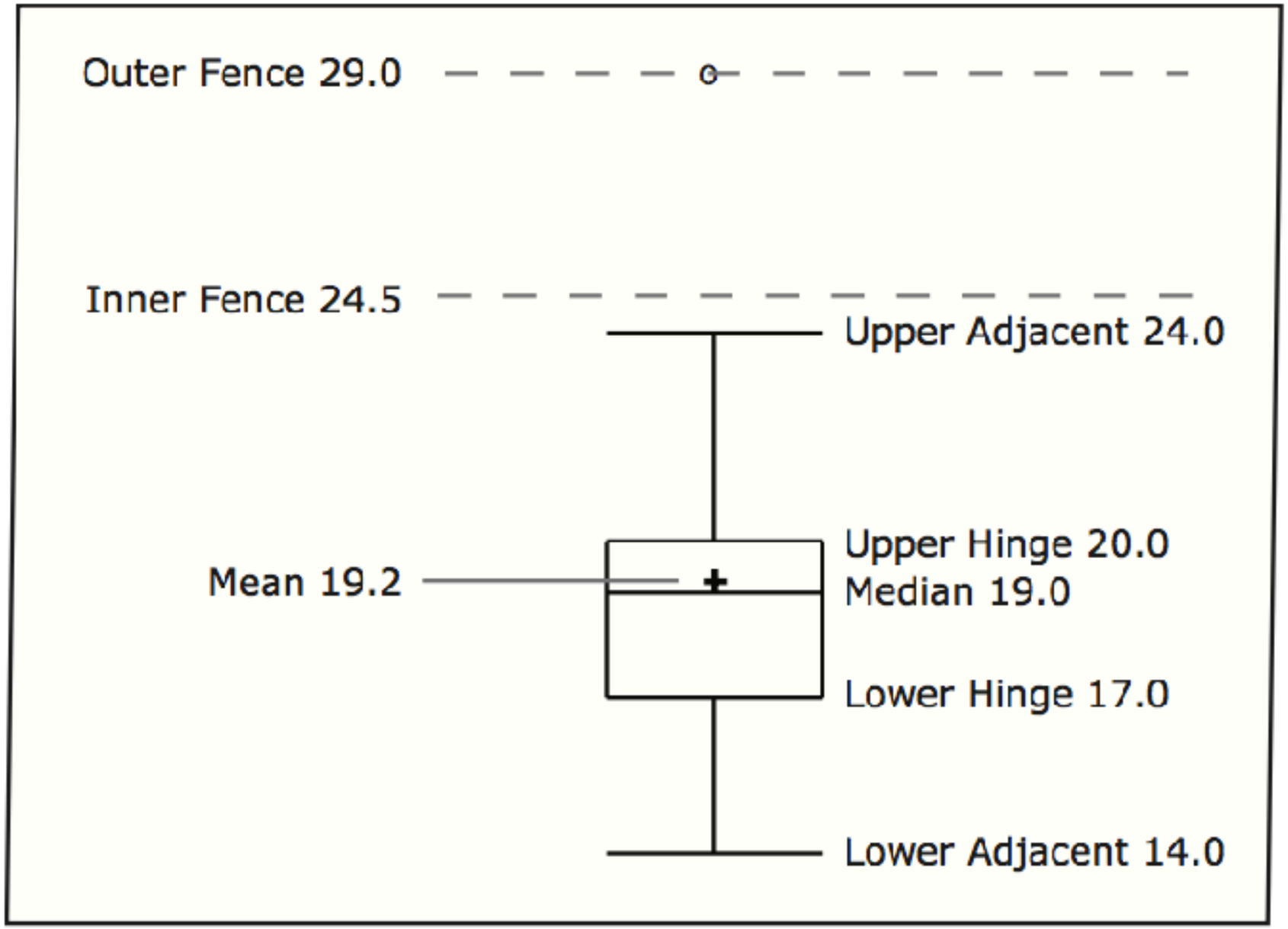


The box plots with the outside value shown

Box Plots

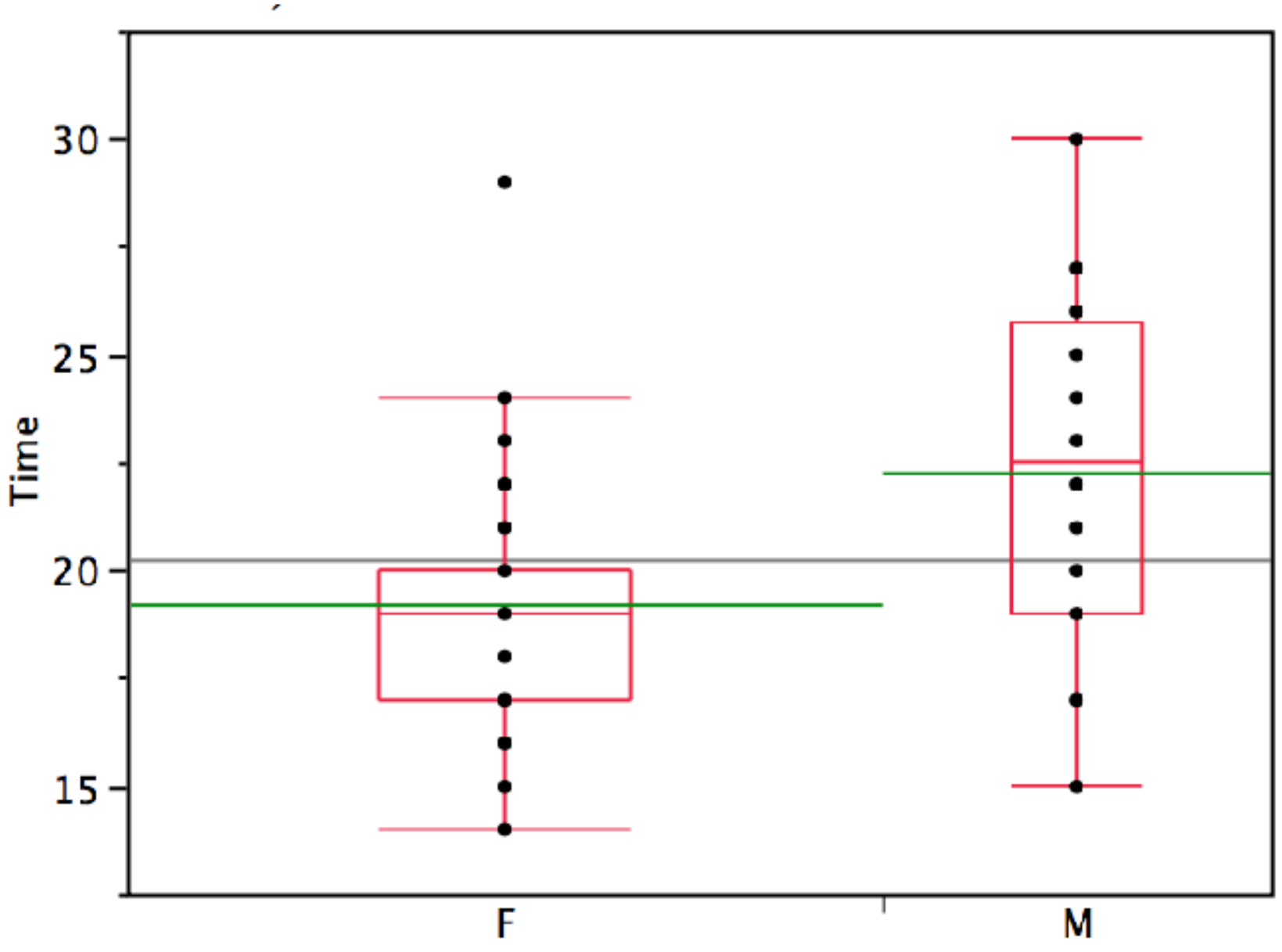


Box Plots



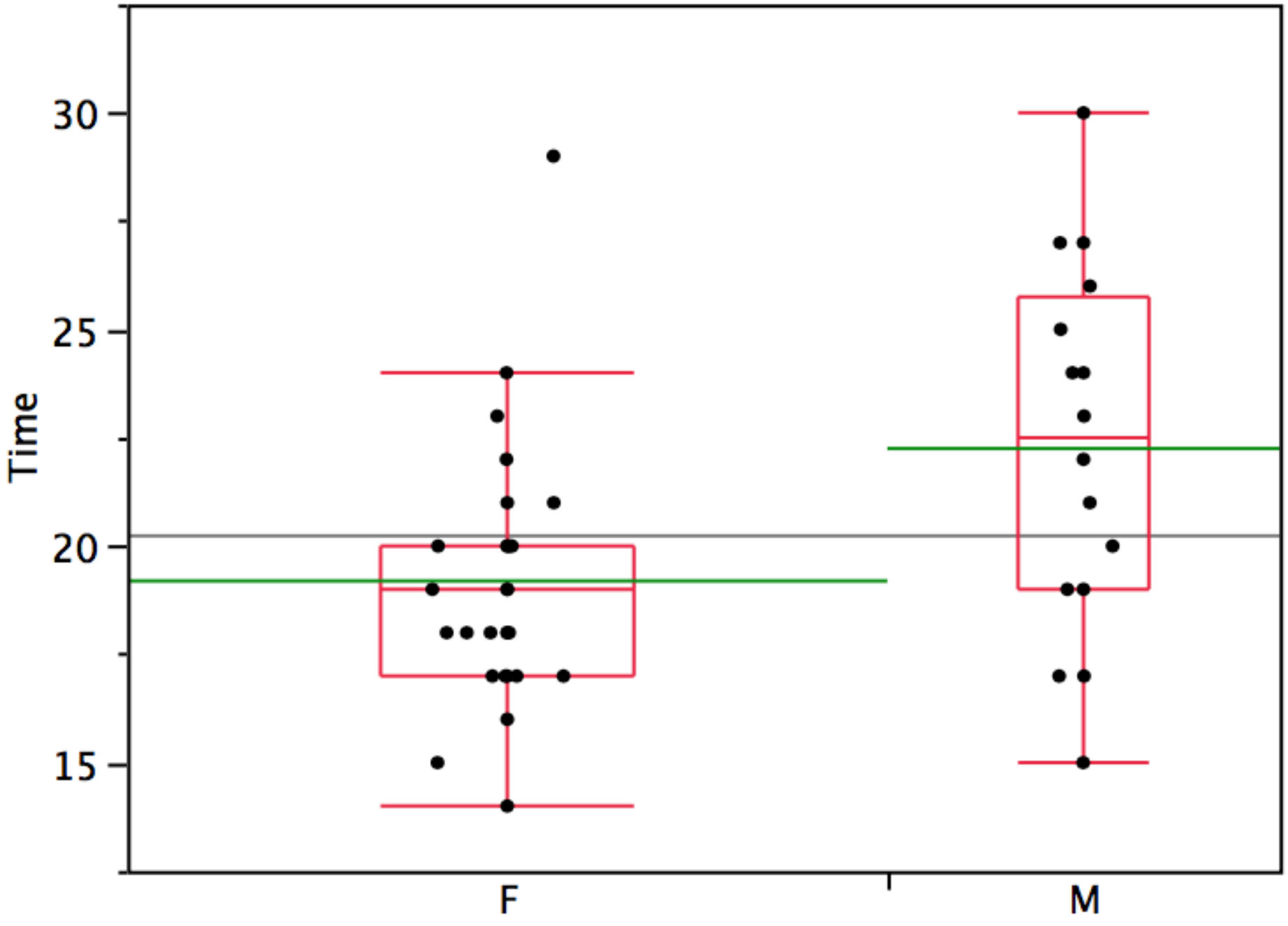
The box plots for the women's data with detailed labels.

Box Plots



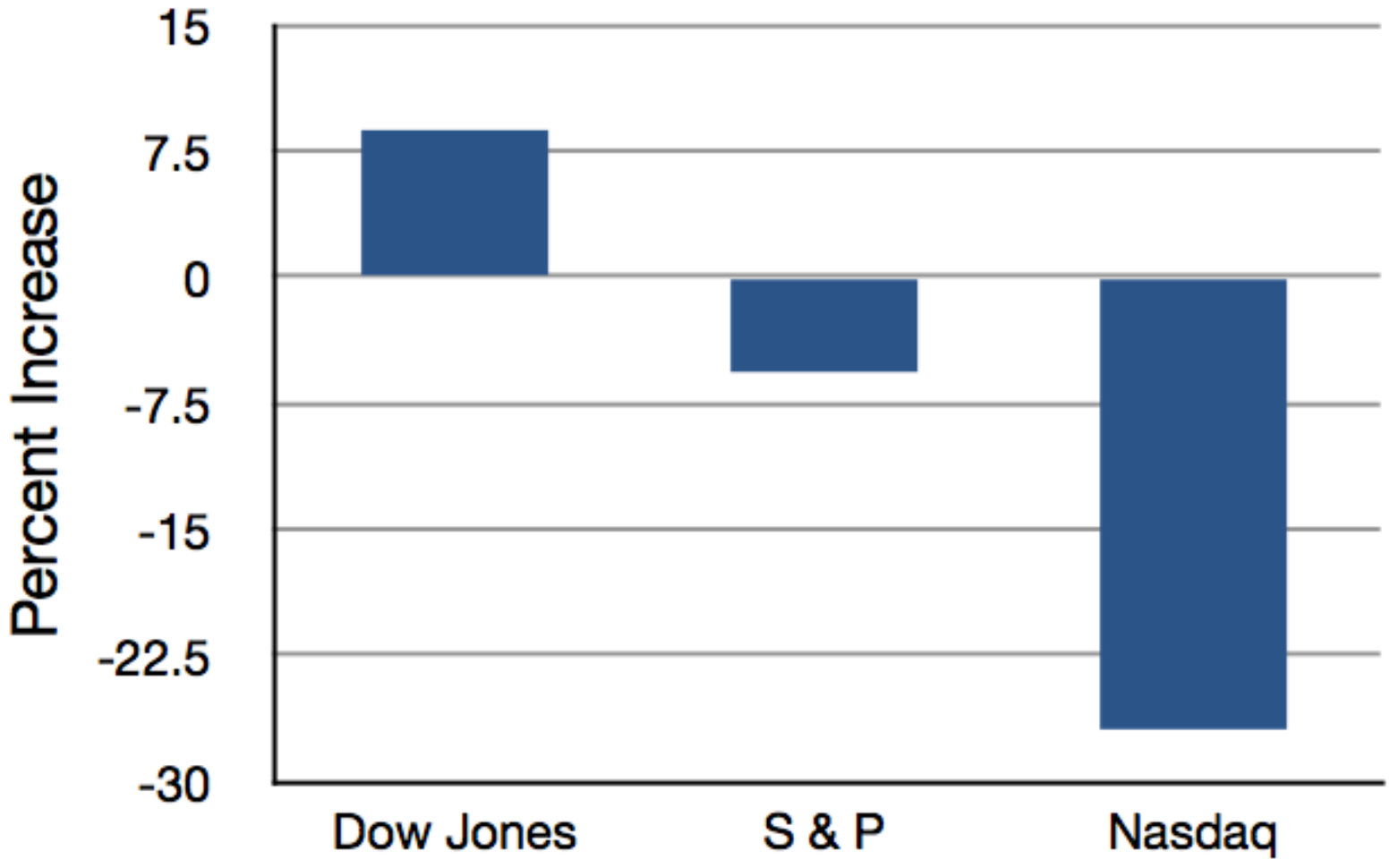
Box plots showing the individual scores and the means.

Box Plots

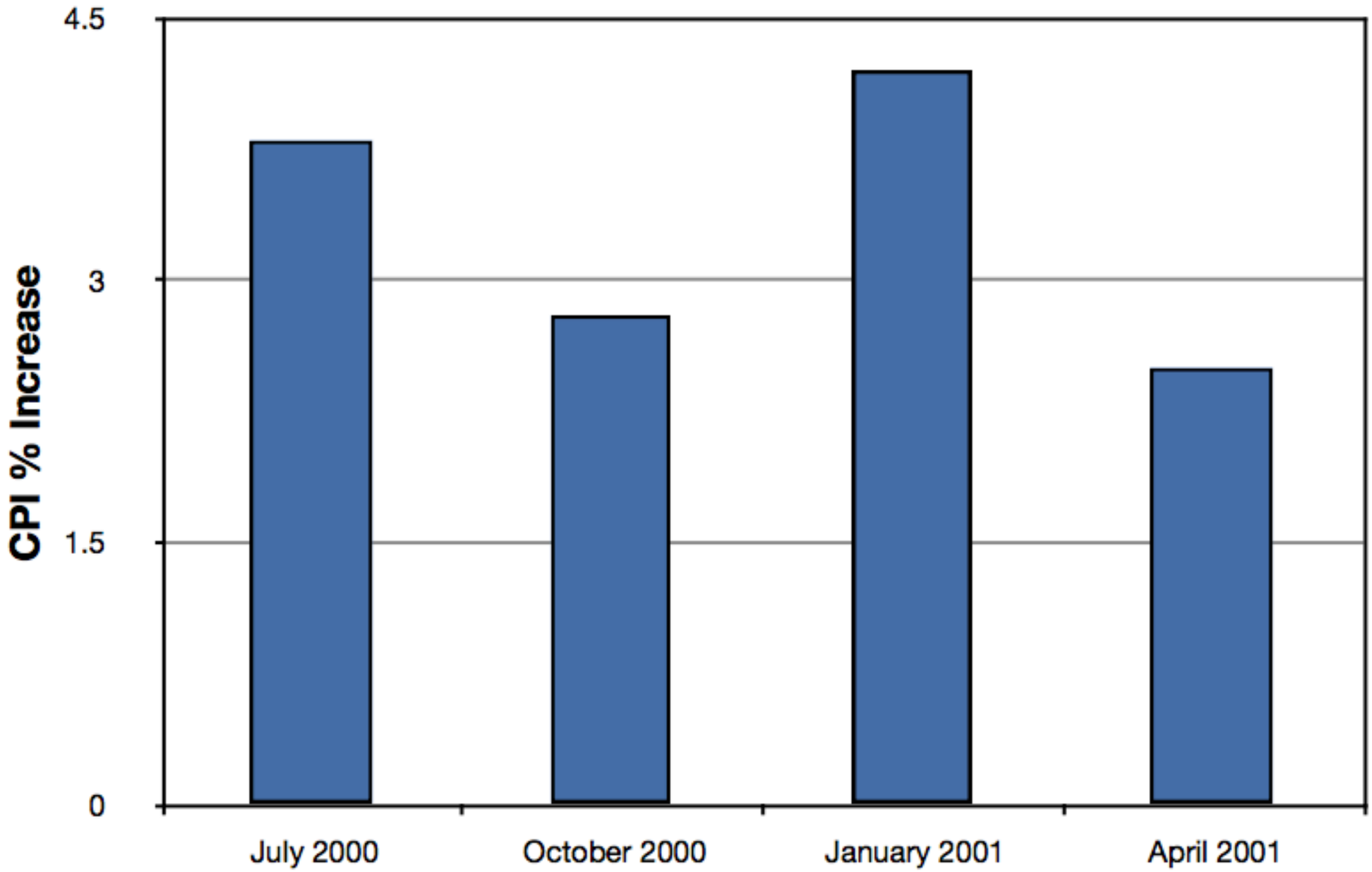


Box plots with the individual scores jittered.

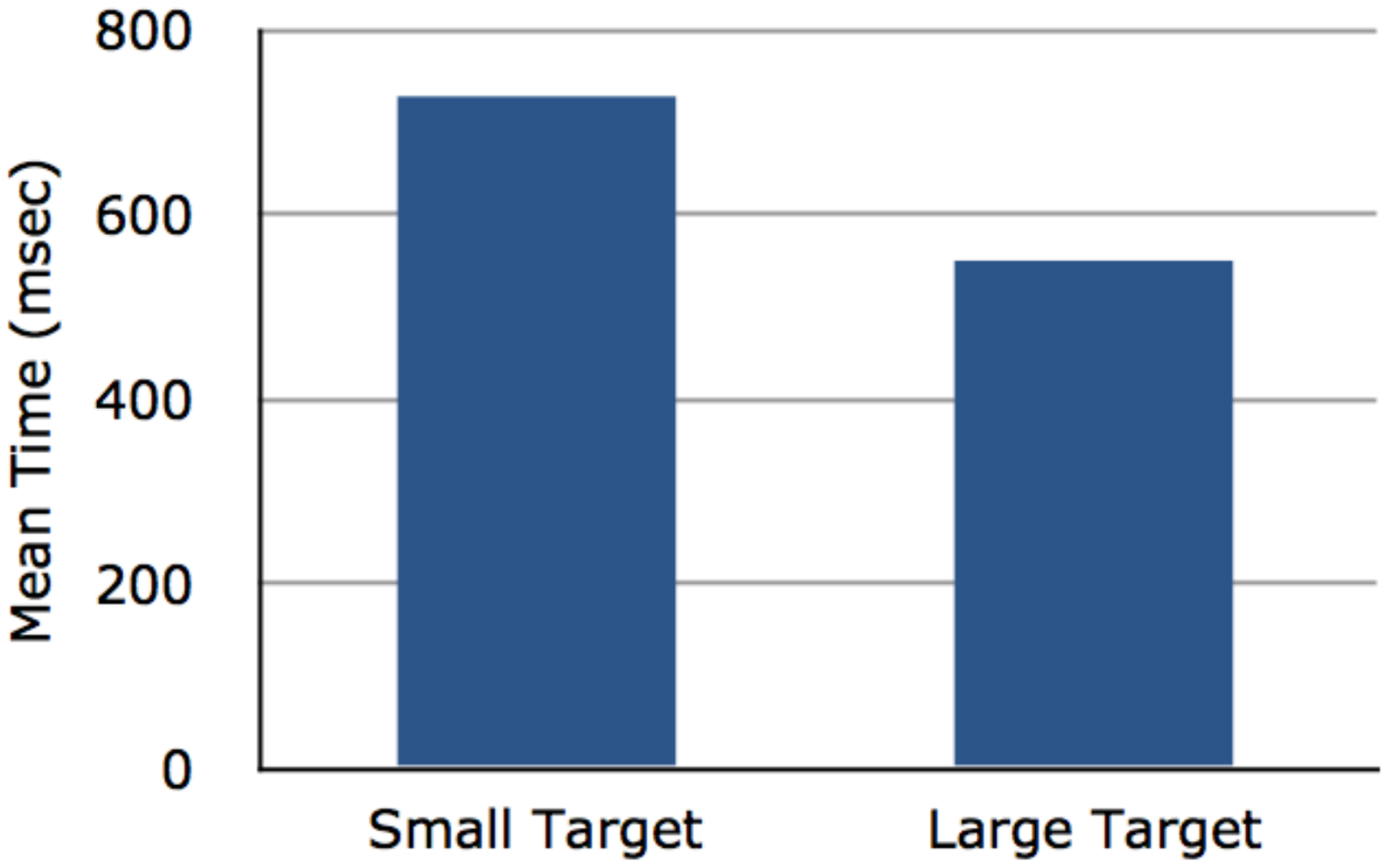
Bar charts



Bar charts

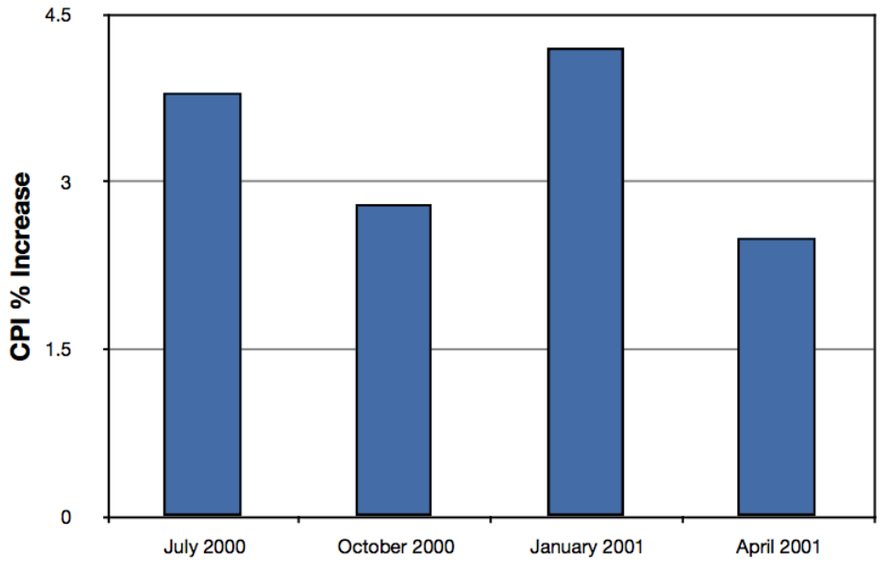

4.5
3
1.5
0
CPI % Increase
July 2000
October 2000
January 2001
April 2001

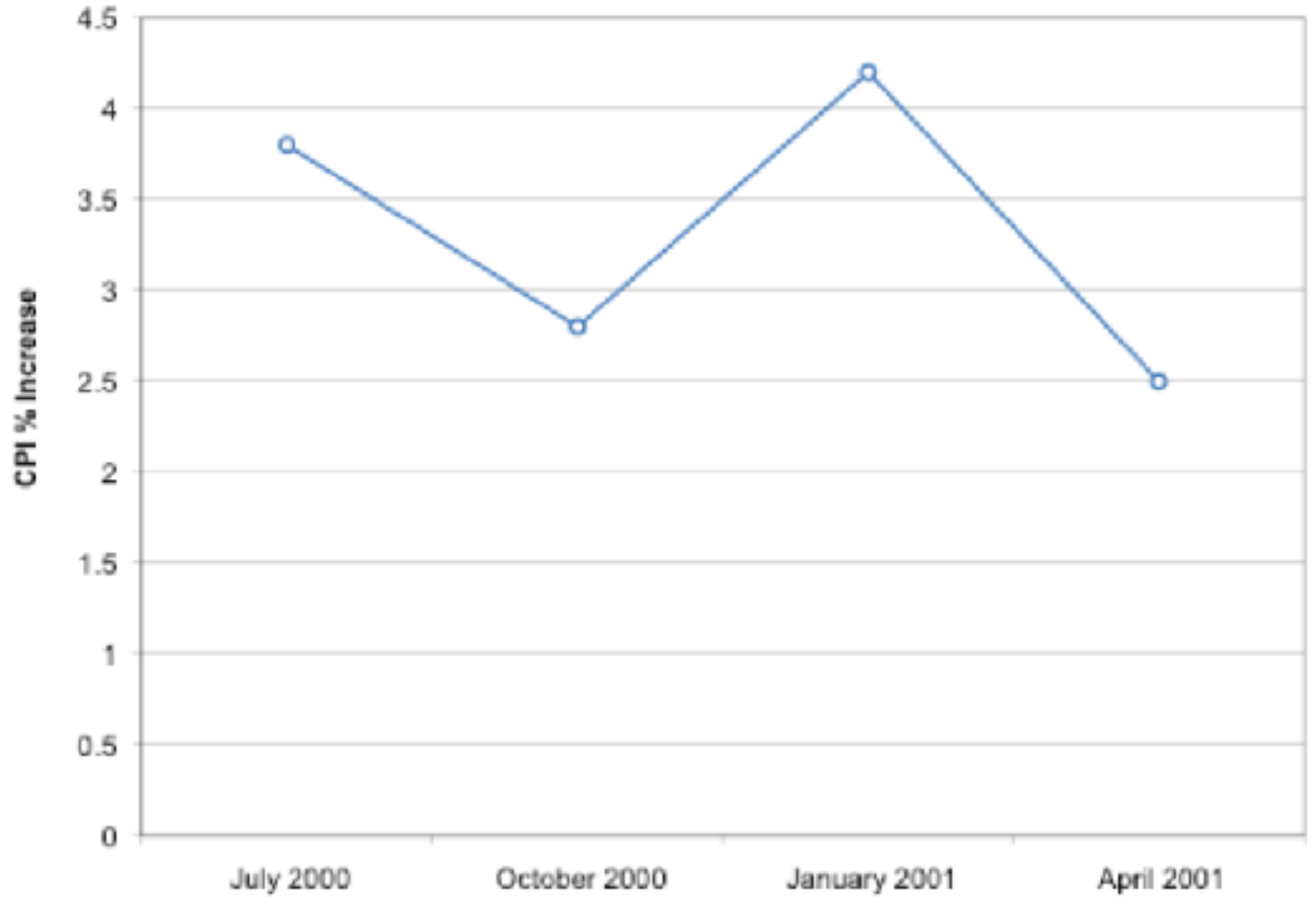
Bar charts



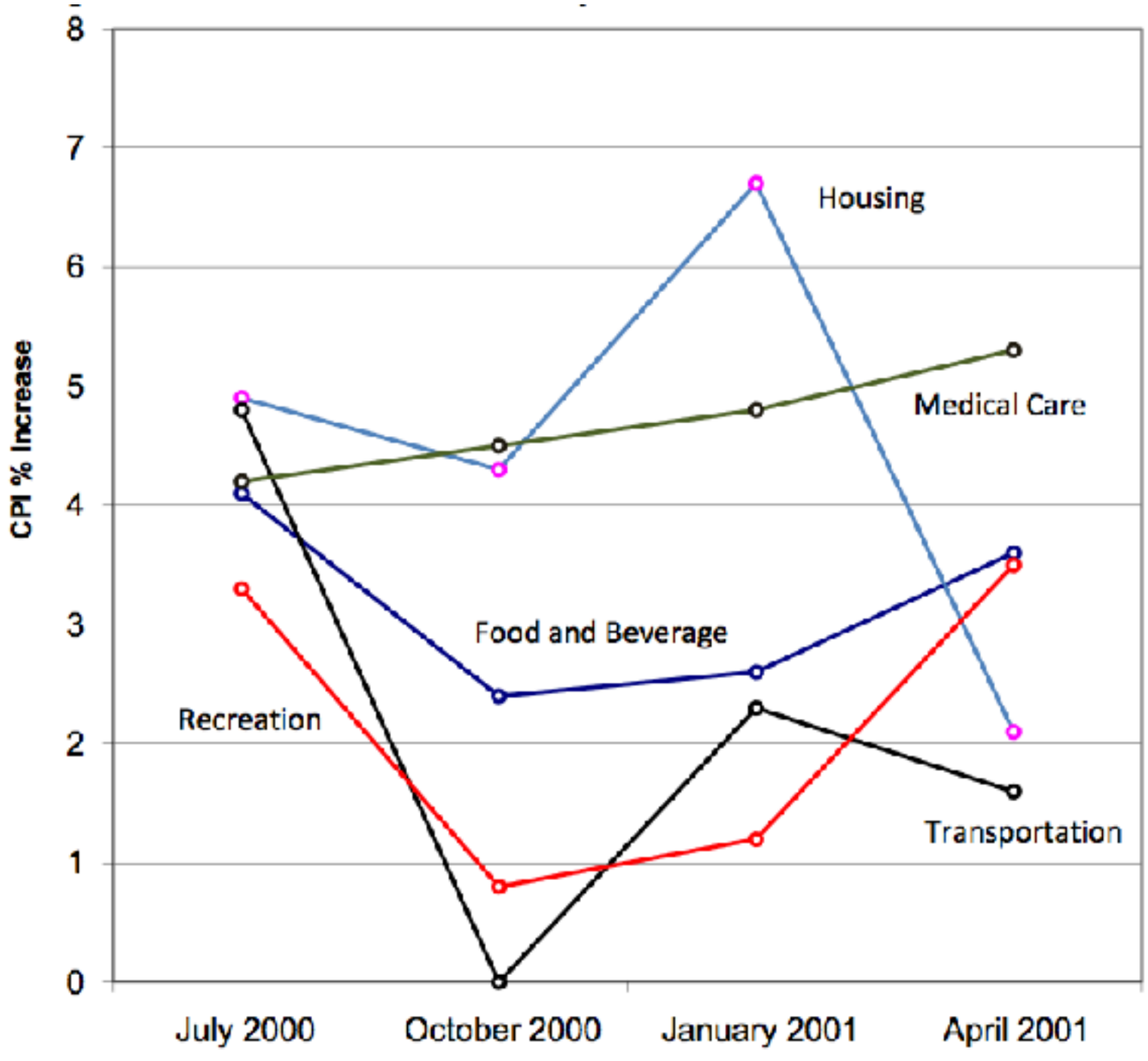
Bar chart showing the means for the two conditions

Line graphs

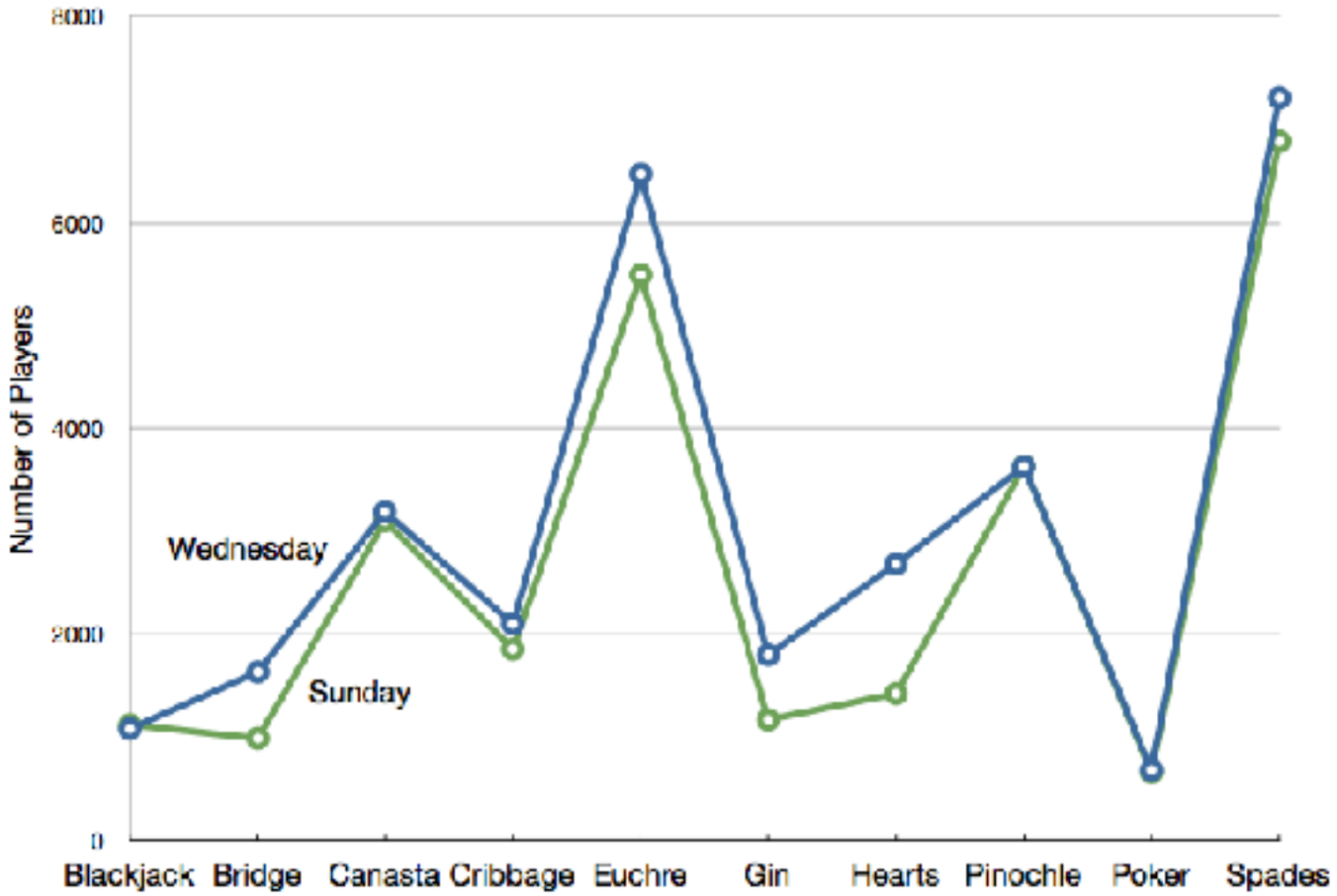

4.5
3
1.5
0
CPI % Increase
July 2000
October 2000
January 2001
April 2001


4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
CPI % Increase
July 2000
October 2000
January 2001
April 2001

Line graphs

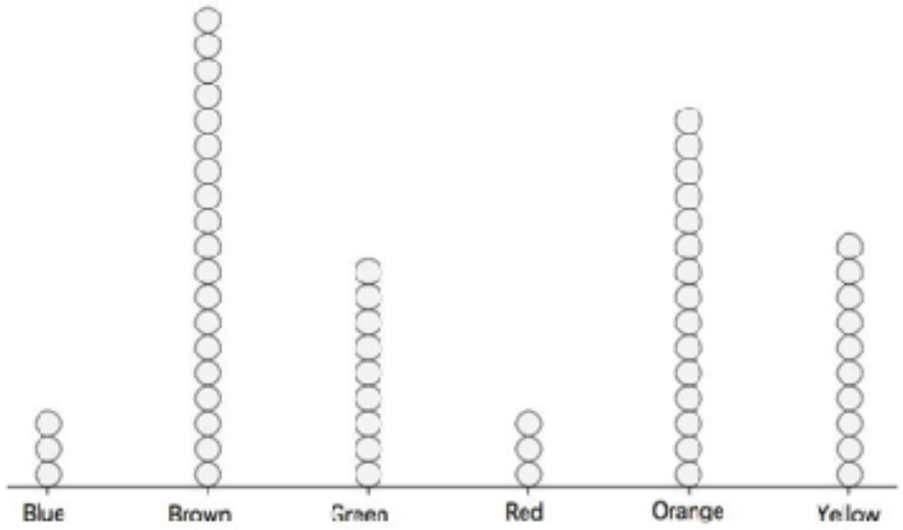

8
7
6
5
4
3
2
1
0
CPI % Increase
Housing
Medical Care
Food and Beverage
Recreation
Transportation
July 2000
October 2000
January 2001
April 2001

Line graphs

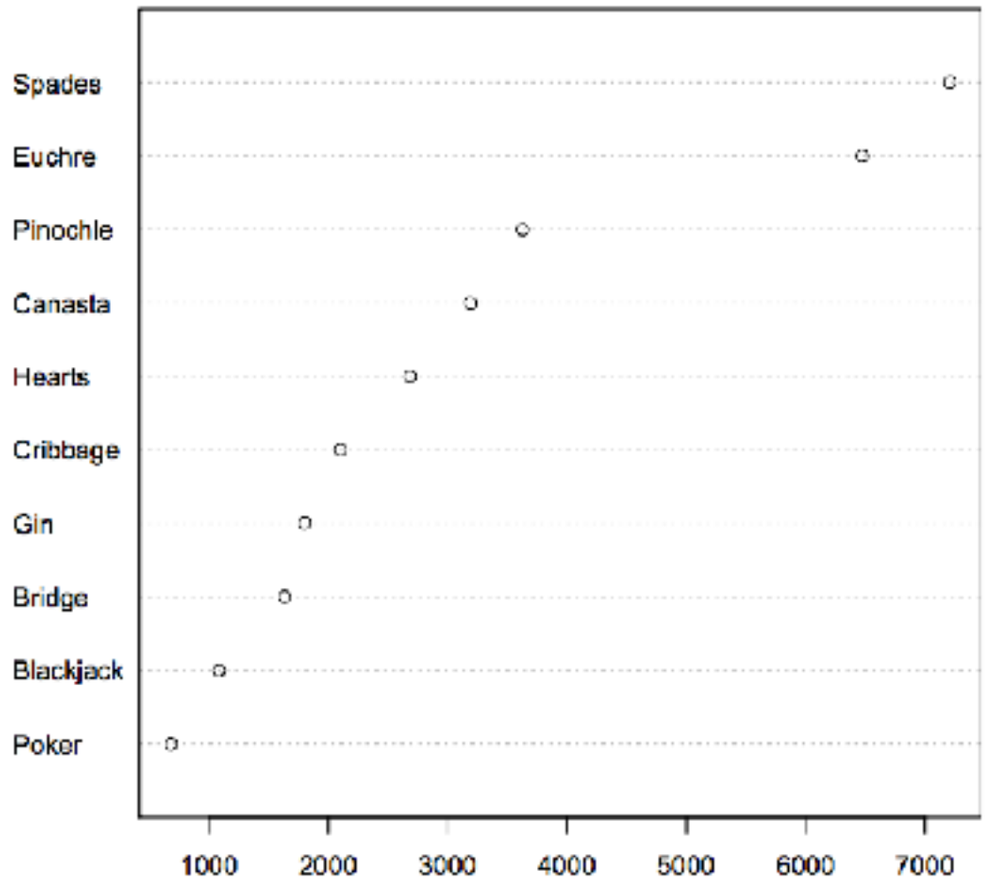


A line graph, inappropriately used, depicting the number of people playing different card games on Wednesday and Sunday.

Dot Plots

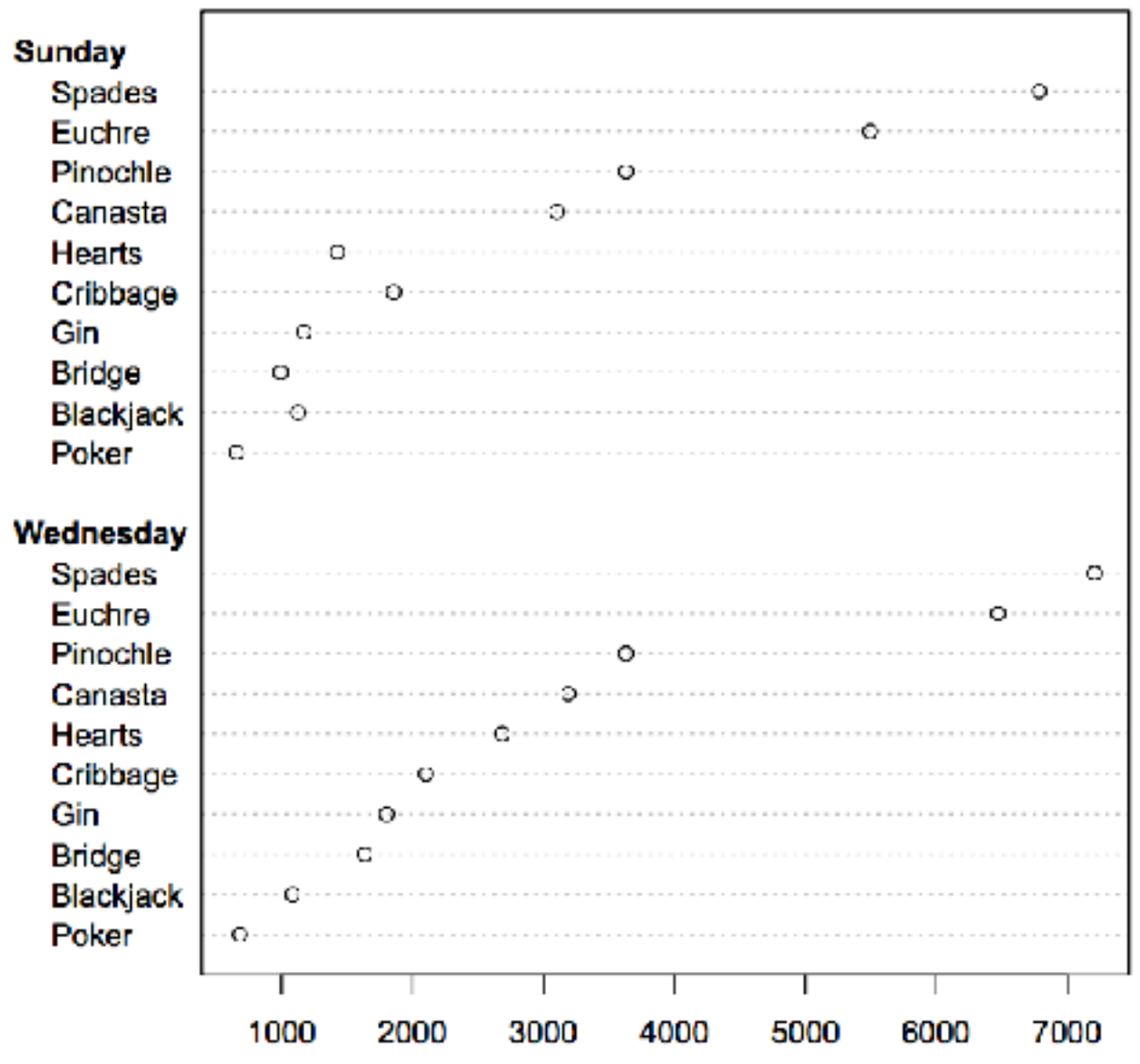


A dot plot showing the number of M & M's of various colors in a bag of M & M's.



A dot plot showing the number of people playing various card games on a Wednesday.

Dot Plots


Sunday
Spades
Euchre
Pinochle
Canasta
Hearts
Cribbage
Gin
Bridge
Blackjack
Poker
Wednesday
Spades
Euchre
Pinochle
Canasta
Hearts
Cribbage
Gin
Bridge
Blackjack
Poker
1000
2000
3000
4000
5000
6000
7000

The End