2006 Pike's Peak 10k Race

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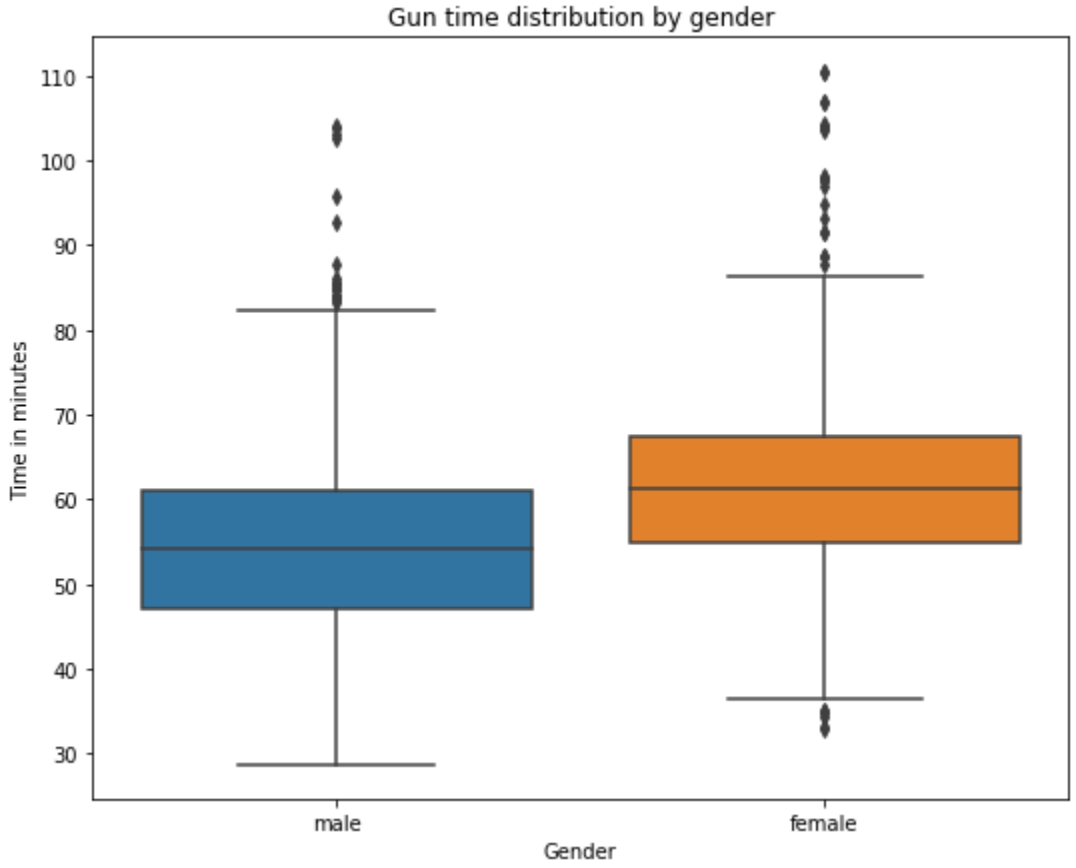
(https://github.com/fradmehr/2006-Pike-s-Peak-10k-Race)

Outlines

- Mean, Mode, Median and Data Range by Gender (and Division)
- Analyzing the Difference Between Gun Time and Run Time
- Chris Doe’s Performance Compared to 10 Percentile Runners
- Race Results of each Division

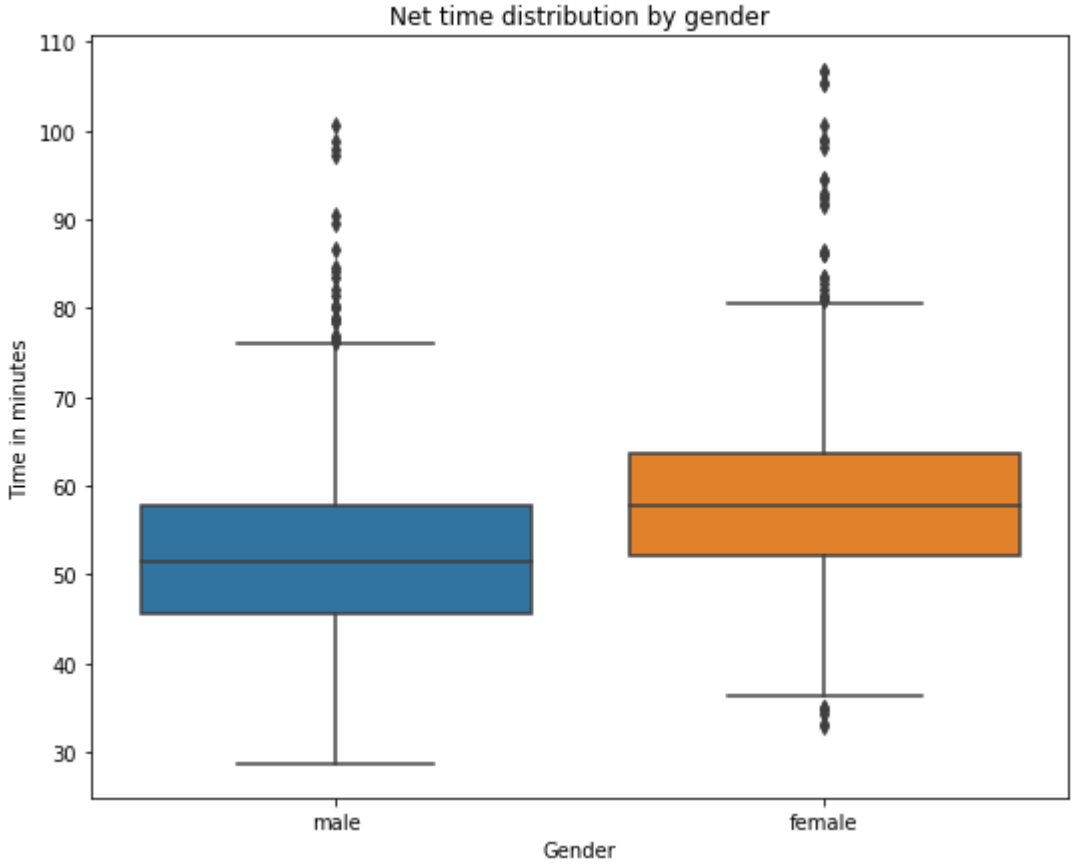
Box and whisker plot for Gun Time (by Gender)

	Male	Female
Min	28.8	32.98
25 Quantile	47	54.92
Median	54.3	61.33
75 Quantile	61.12	67.53
Max	104.12	110.52
Mean	54.62	61.7
Mode	55.22 64.93	62.67 61.78



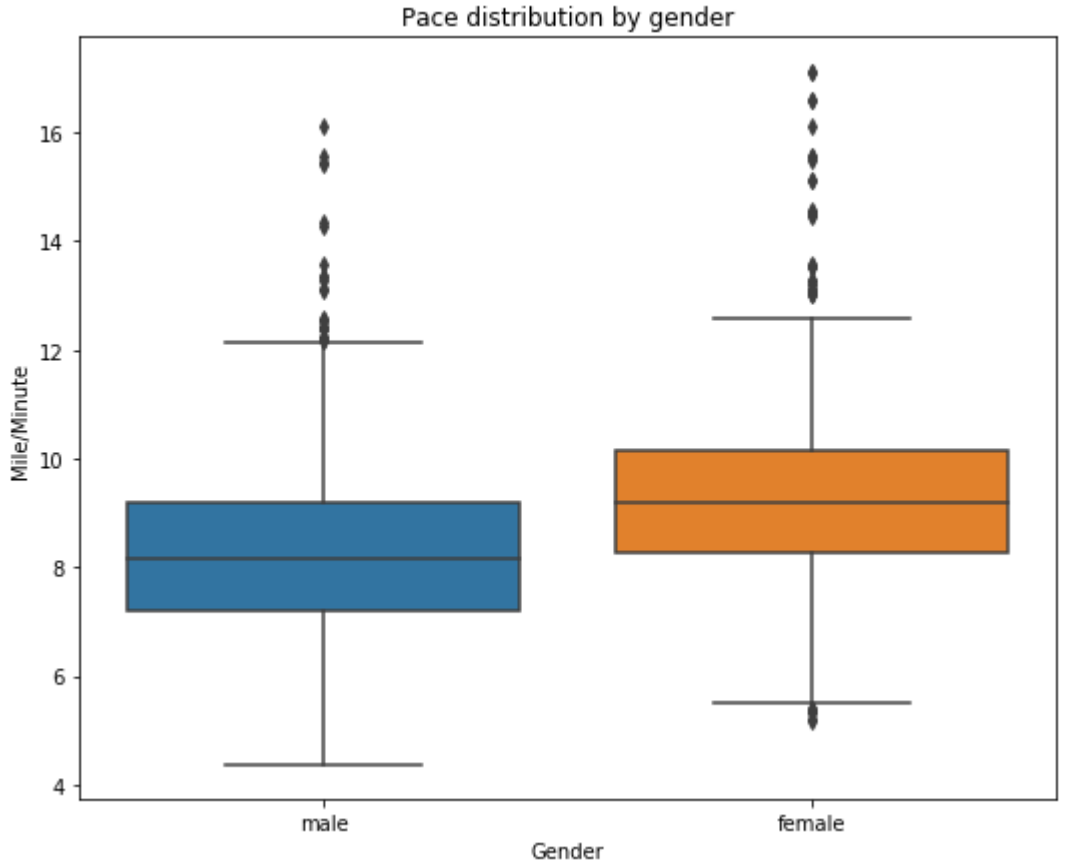
Box and whisker plot for Net Time (By Gender)

	Male	Female
Min	28.78	32.97
25 Quantile	45.68	52.22
Median	51.37	57.82
75 Quantile	57.82	63.6
Max	100.63	106.82
Mean	52.12	58.45
Mode	52.8 49.8	59 51.58



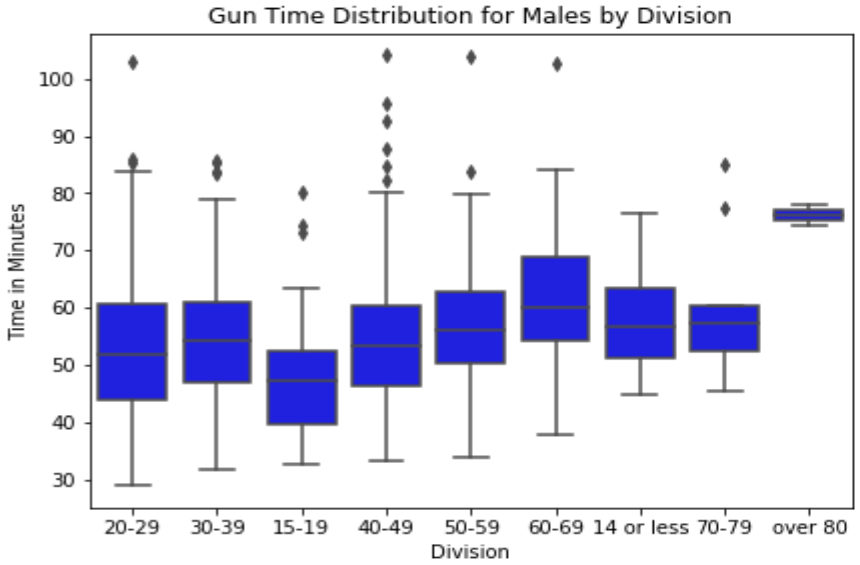
Box and whisker plot for Pace (by Gender)

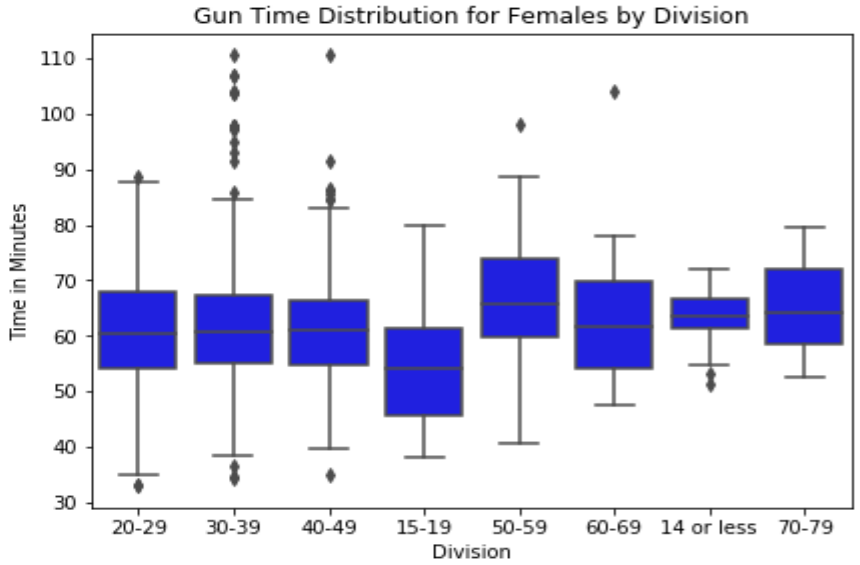
	Male	Female
Min	4.38	5.19
25 Quantile	7.21	8.25
Median	8.16	9.19
75 Quantile	9.19	10.15
Max	16.12	17.12
Mean	8.2	9.21
Mode	8.4 9.2	8.58 9.3

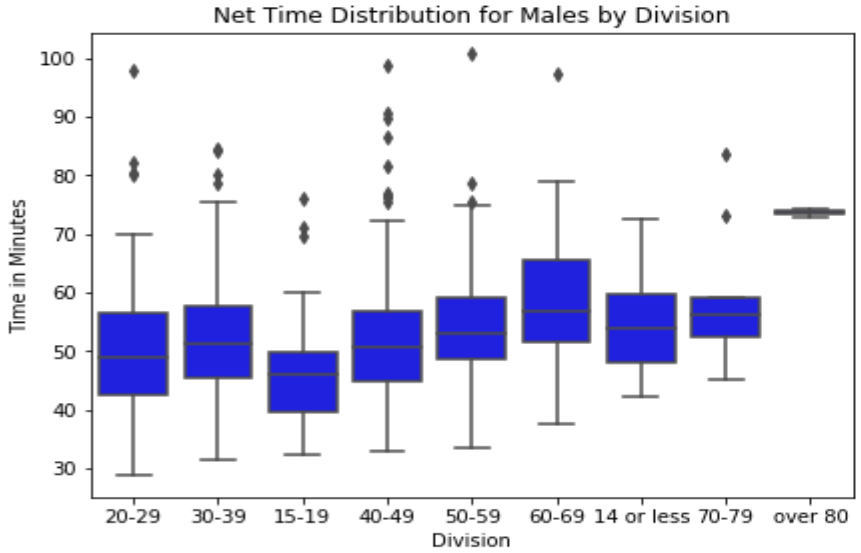


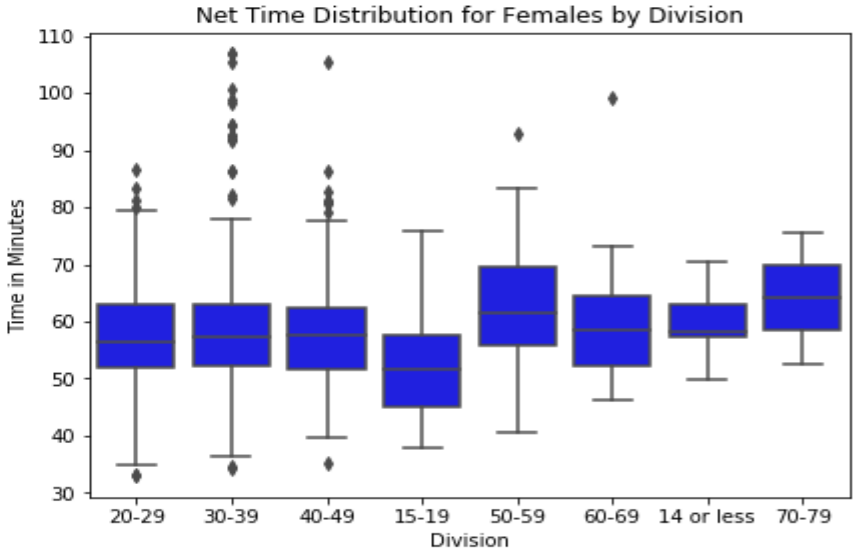
Females Gun/Net times are higher, but their Pace is only slightly higher than males.

Box and whisker plot (Gun/Net Times) (by Gender & Division)

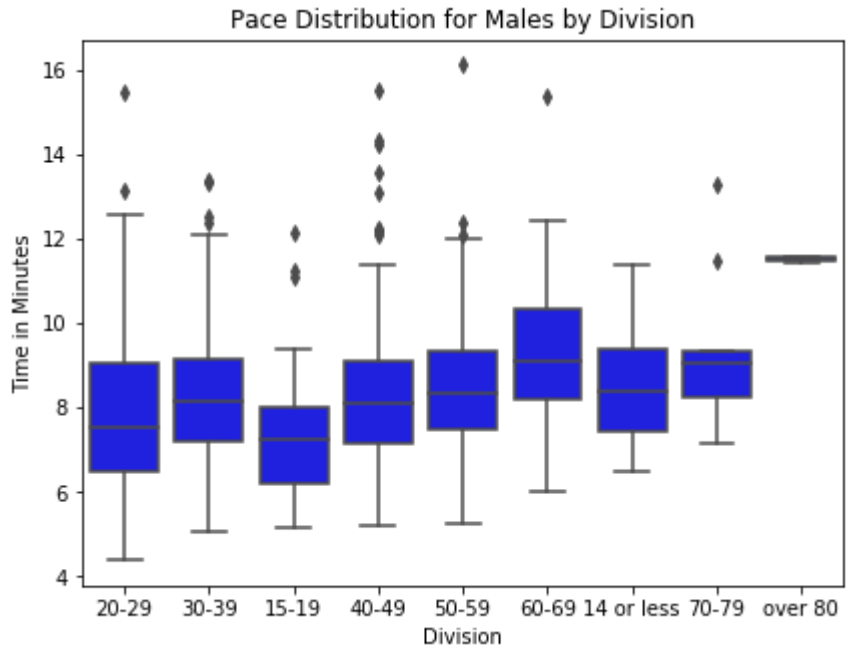


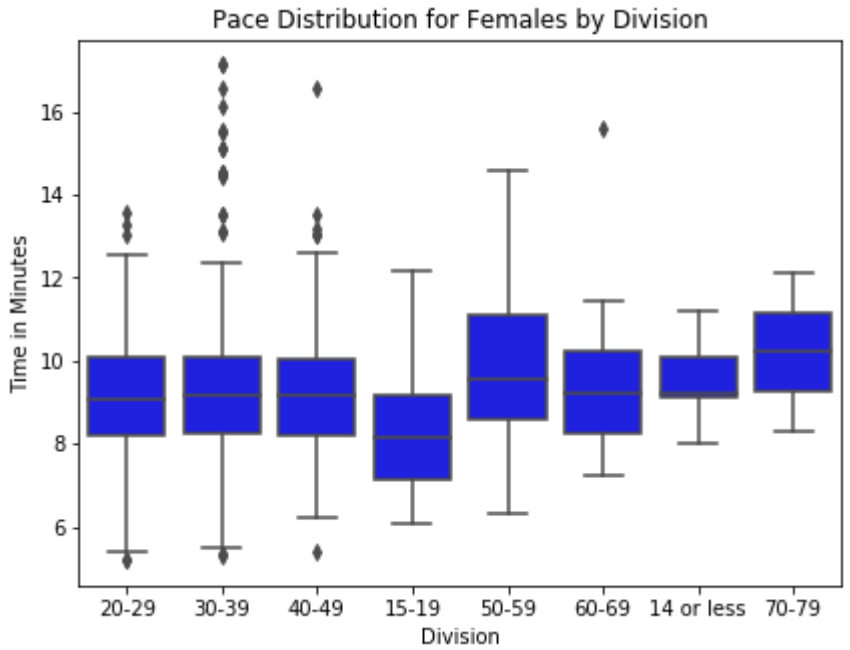






Box and whisker plot (Pace) (by Gender & Division)

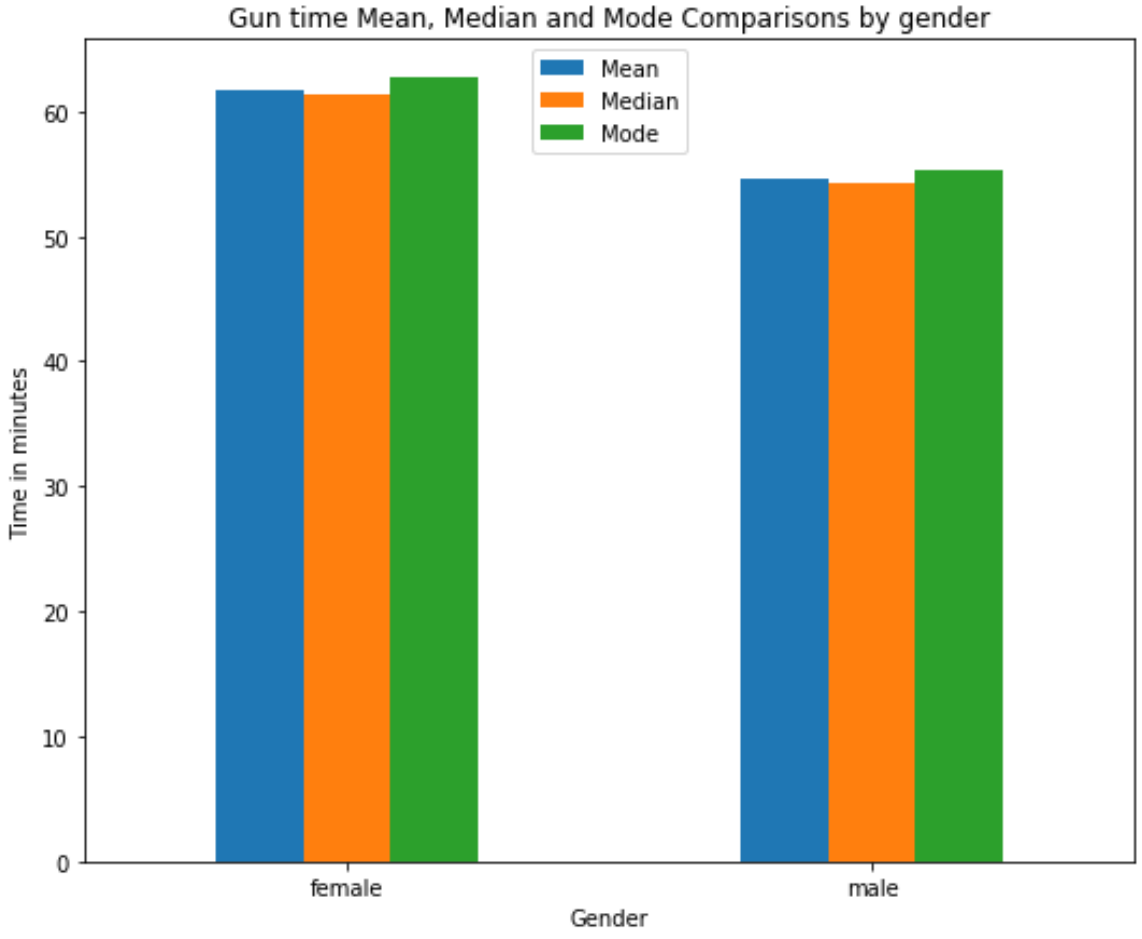


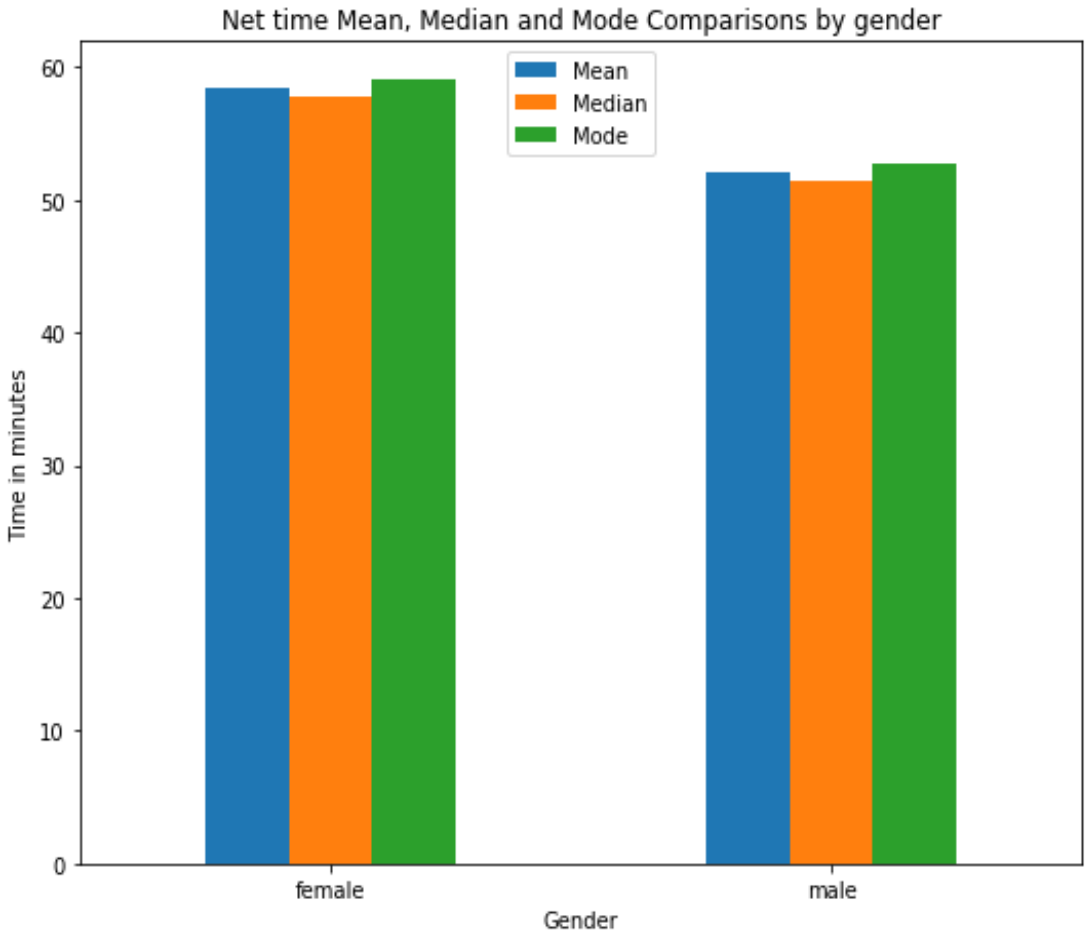


- Box plots and next table show that 15-19 years old runners have the best Gun time, Net time and Pace in both males and females.
- This conclusion is correct regarding all 3 Mean, Median and Mode.
- Next Group is 20-29 years old runners.

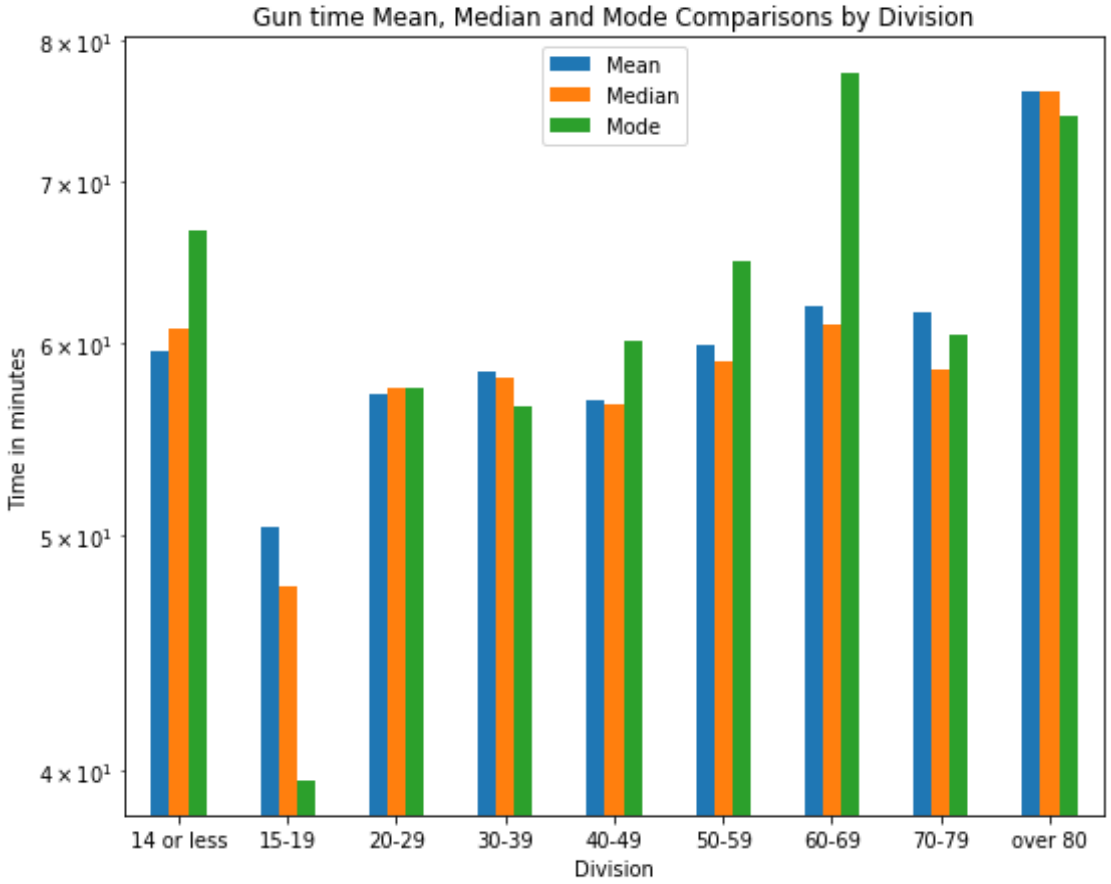
		Male			Female		
		Gun Time	Net Time	Pace	Gun Time	Net Time	Pace
14 or less	Mean	58.17	55.04	8.66	62.32	58.98	9.36
	Median	56.77	53.96	8.41	63.45	58.17	9.22
	Mode	-	-	9.36	-	-	9.22
15-19	Mean	48.09	46.65	7.34	54.42	52.13	8.21
	Median	47.1	45.97	7.24	54.28	51.55	8.18
	Mode	47.5	46.27	7.27	-	-	-
20-29	Mean	51.99	49.52	7.76	60.47	57.25	9.01
	Median	51.84	48.96	7.54	60.31	56.52	9.07
	Mode	-	-	-	57.53	46.37	9.36
30-39	Mean	54.13	56.67	8.13	61.96	58.7	9.24
	Median	54.32	51.29	8.16	60.8	57.38	9.15
	Mode	-	-	-	54.68	48.1	8.55
40-49	Mean	53.99	51.61	8.11	61.05	57.87	9.12
	Median	53.17	50.7	8.1	61.08	57.63	9.17
	Mode	-	-	-	57.45	46.02	9.08
50-59	Mean	56.65	53.93	8.5	66.42	62.61	9.87
	Median	56.05	53.08	8.33	65.6	61.64	9.56
	Mode	-	-	-	53.23	52.1	8.1
60-69	Mean	61.83	58.47	9.2	62.95	60.01	9.43
	Median	60.1	56.9	9.1	61.64	58.38	9.24
	Mode	58.02		9.25	-	-	10.15
70-79	Mean	60.56	59.26	9.42	65.46	64.11	10.2
	Median	57.32	56.27	9.04	64.32	64.22	10.21
	Mode	-	-	9.04	-	-	-
Over 80	Mean	76.24	73.66	11.52	-	-	-
	Median	76.24	73.66	11.52	-	-	-
	Mode	-	-	-	-	-	-

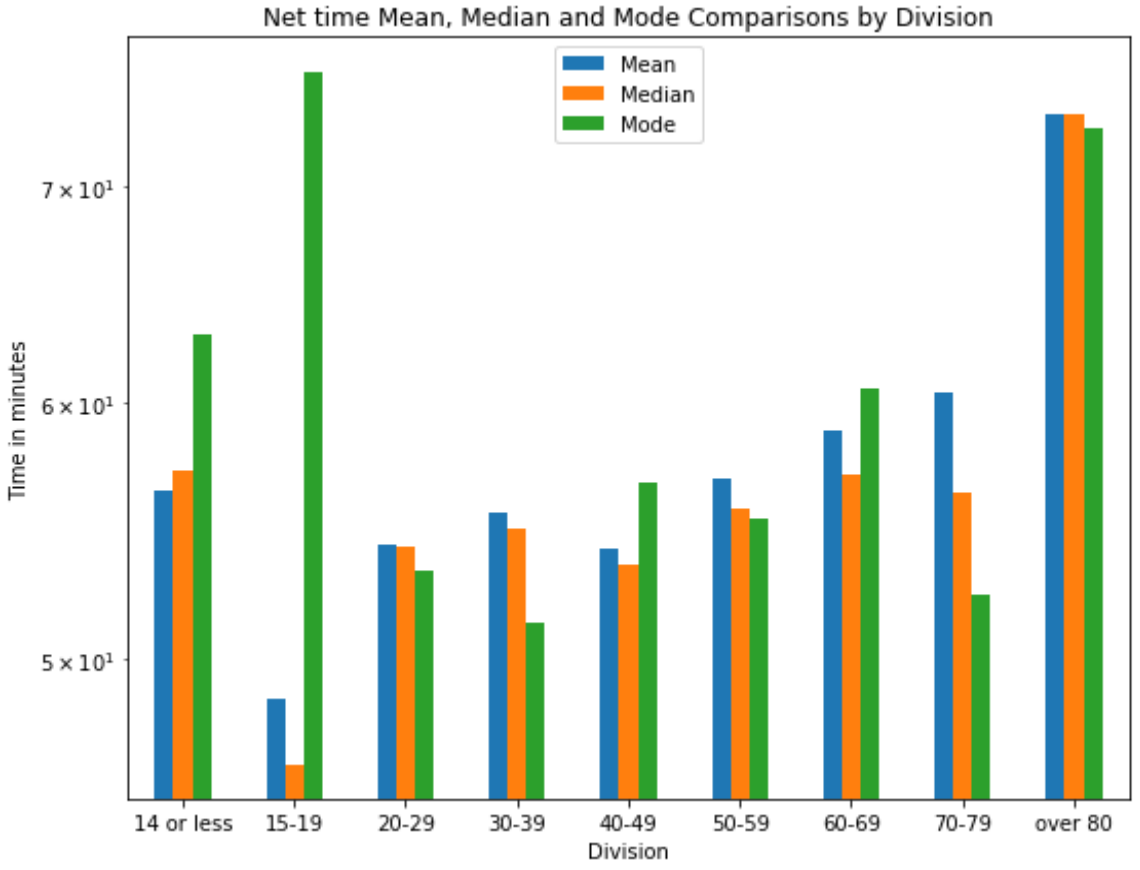
Mean, Median and Mode Comparison (by Gender)





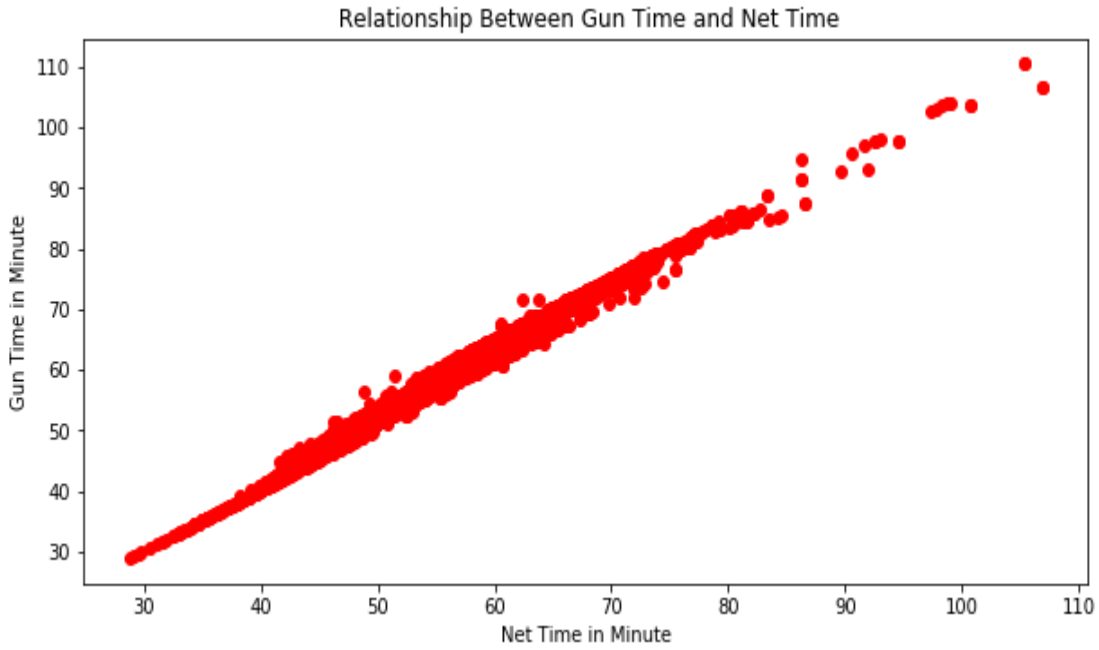
Mean, Median and Mode Comparison (by Division)





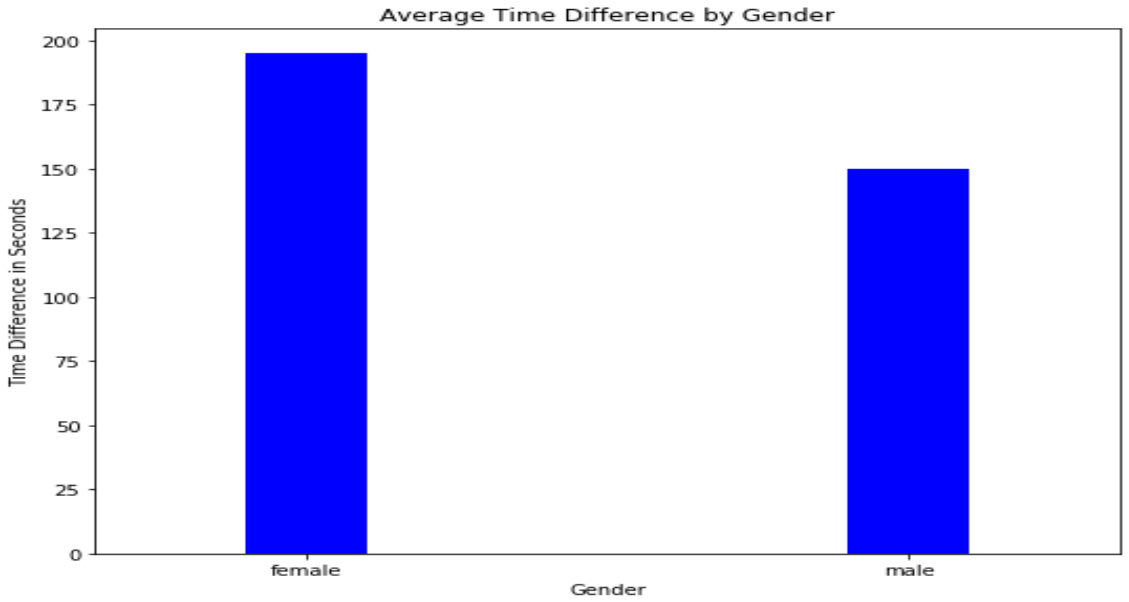
More clear representation that group 15-19 (and then 20-29) performs better in the race.

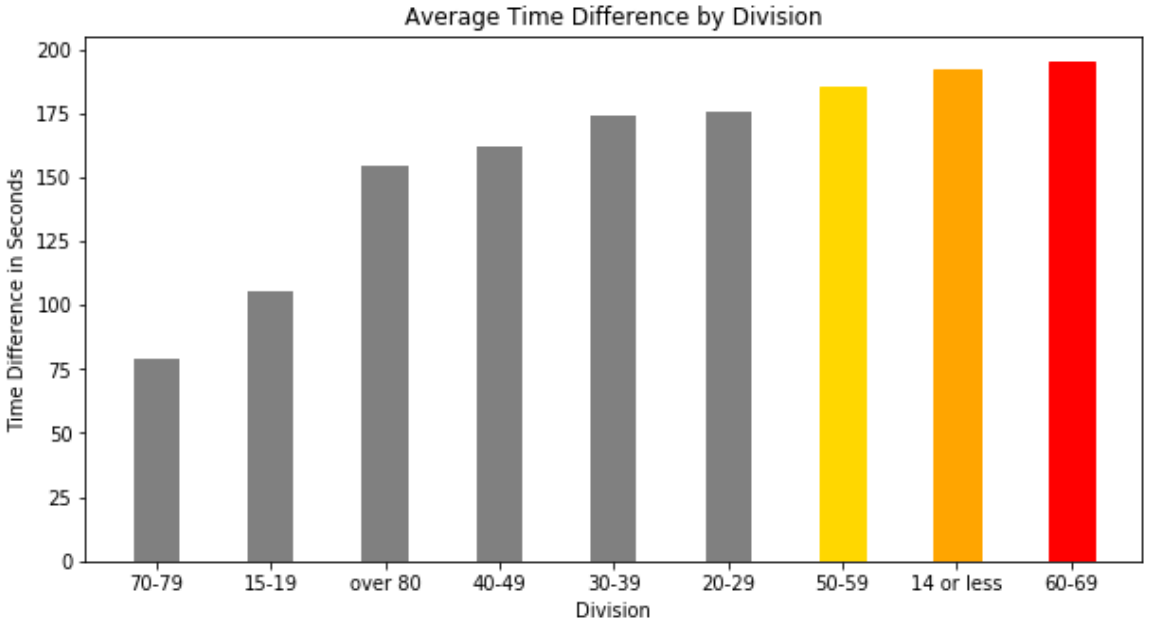
Gun-Net Times Difference and their Correlation



These 2 continues features are strongly correlated, so we don’t expect to have different results by analyzing using any of these two features.

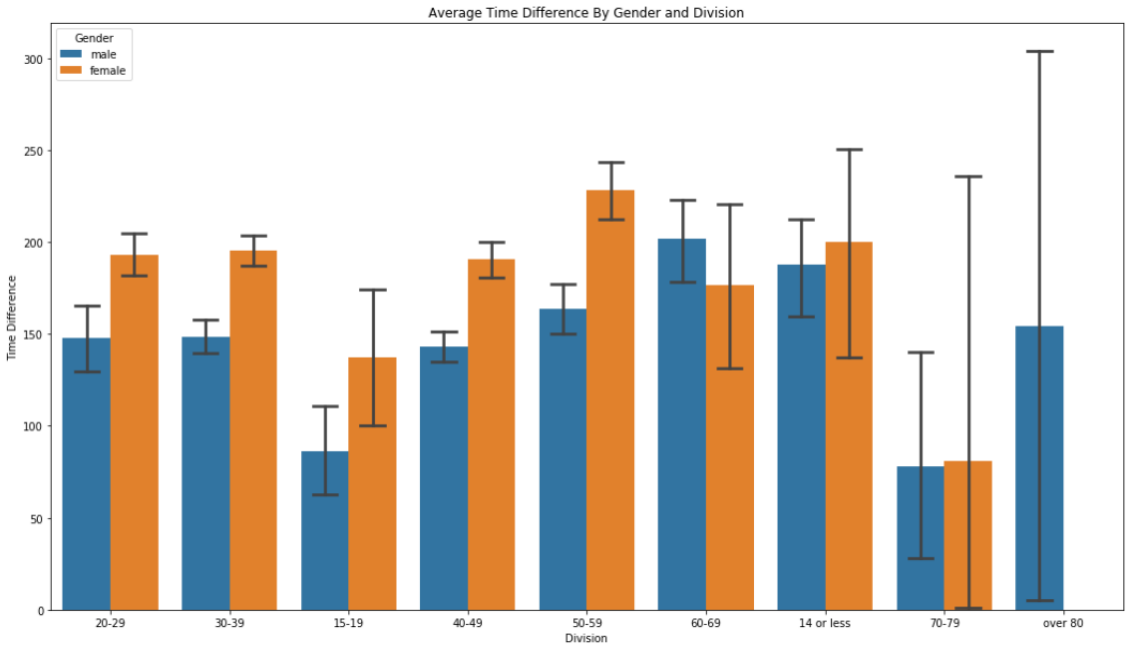
Time Difference by Gender and Division

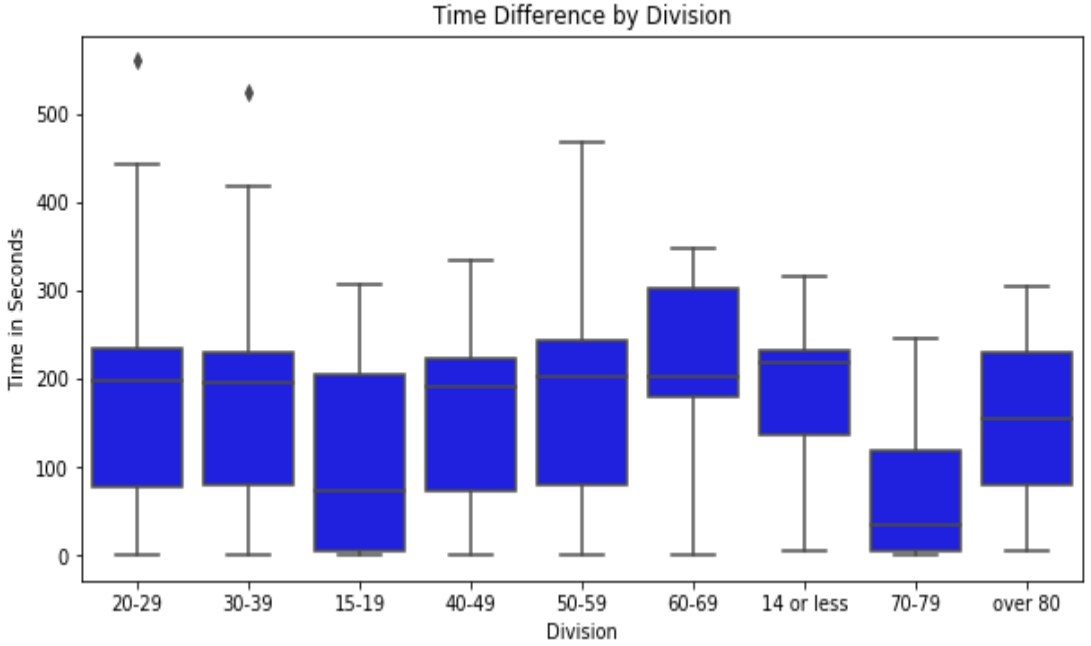




- Male group has the lower difference between Gun time and Net time
- Age group 70-79 has the lowest difference, on the other hand, age group 60-69 has the highest difference between Gun time and Net time.

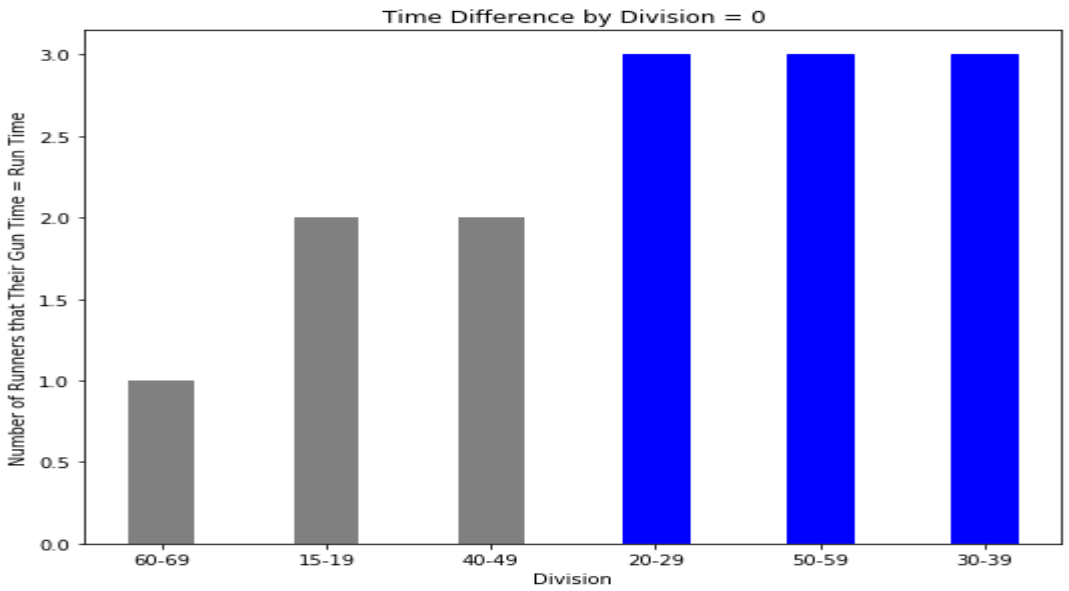
Time Difference by Gender-Division

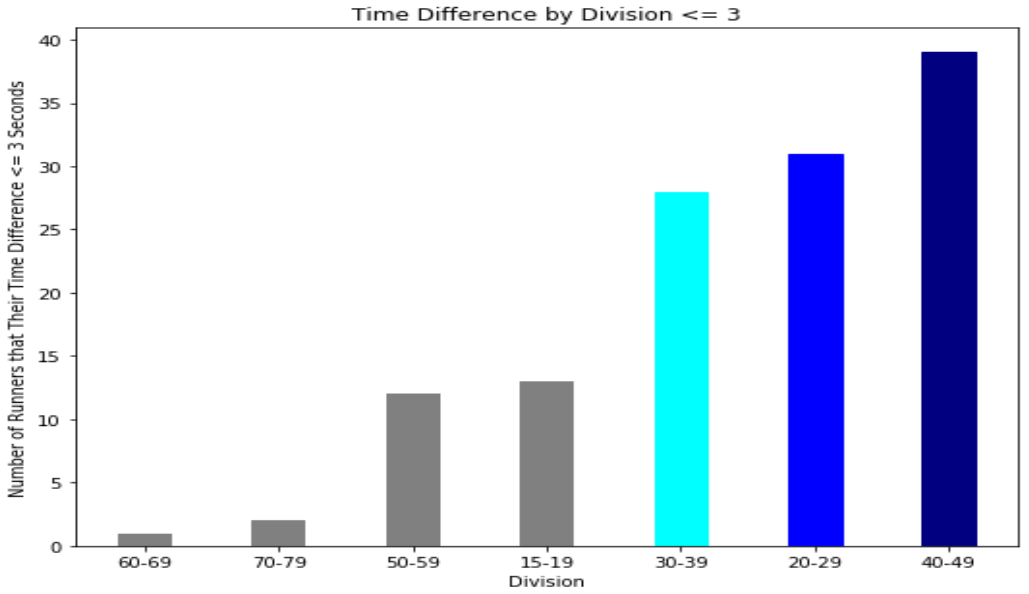




- These 2 graphs are better representation that group 70-79 and then group 15-19 have the lowest time difference.
- Left chart represents the error as well. So we can make the conclusions considering standard deviation.

Time Difference by Division





- Highest number of runners at age group 20-39 and 50-59 reacted immediately (Gun Time = Net Time).
- On the other hand, highest number runners at age group 20-40 reacted almost quickly compared to other groups (Gun Time – Net Time <= 3).
- Age group 60-69 has the least number of runners which their reaction time is zero or less than 3.

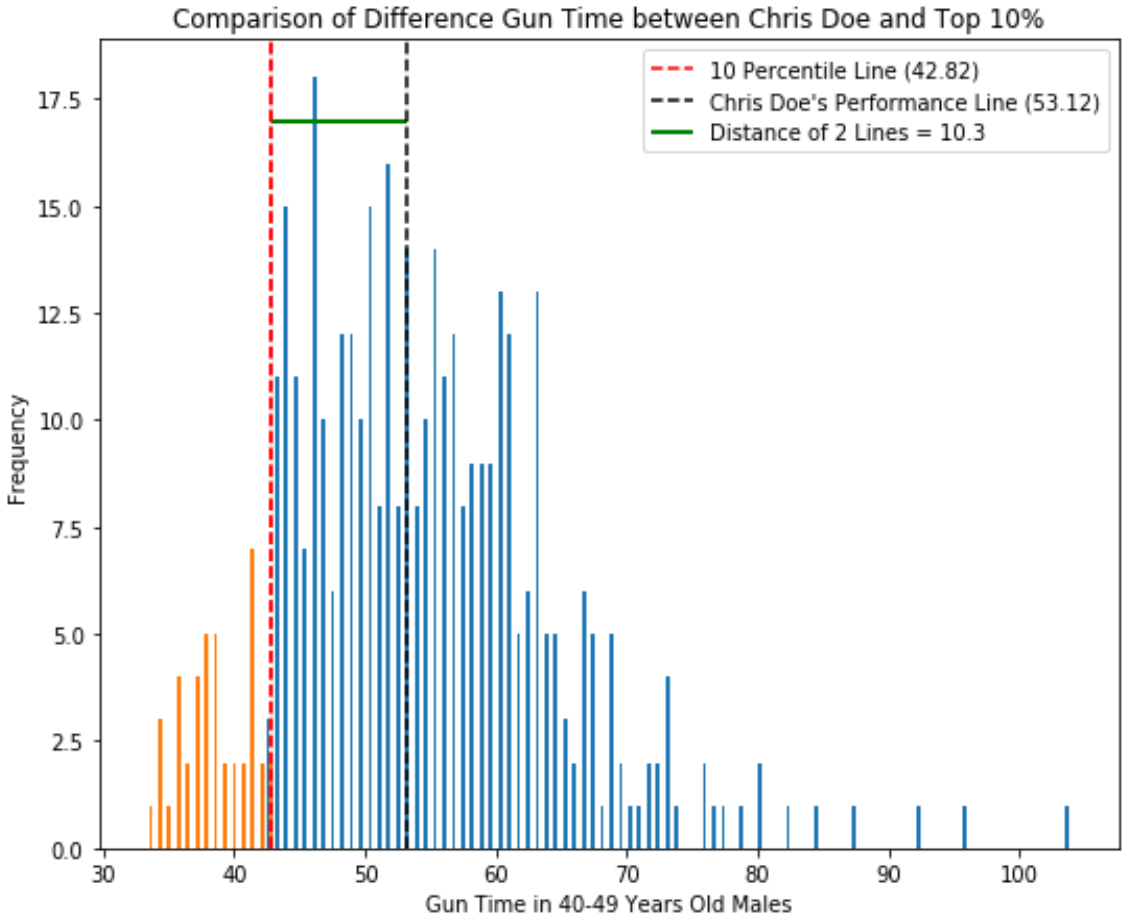
Chris Deo’s Stats

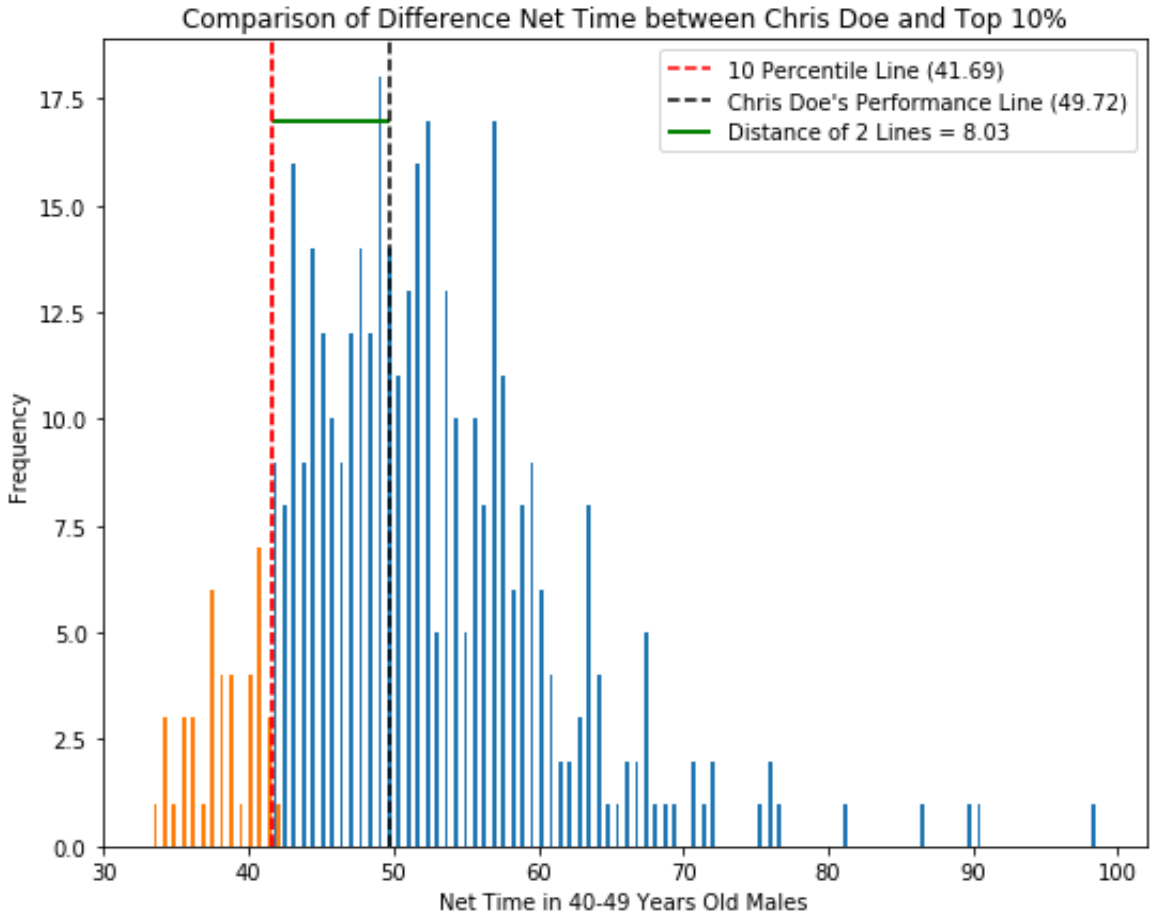
Compared to the 10 Percentile:

Gun Time: 53.12 (Slower by 10.3)

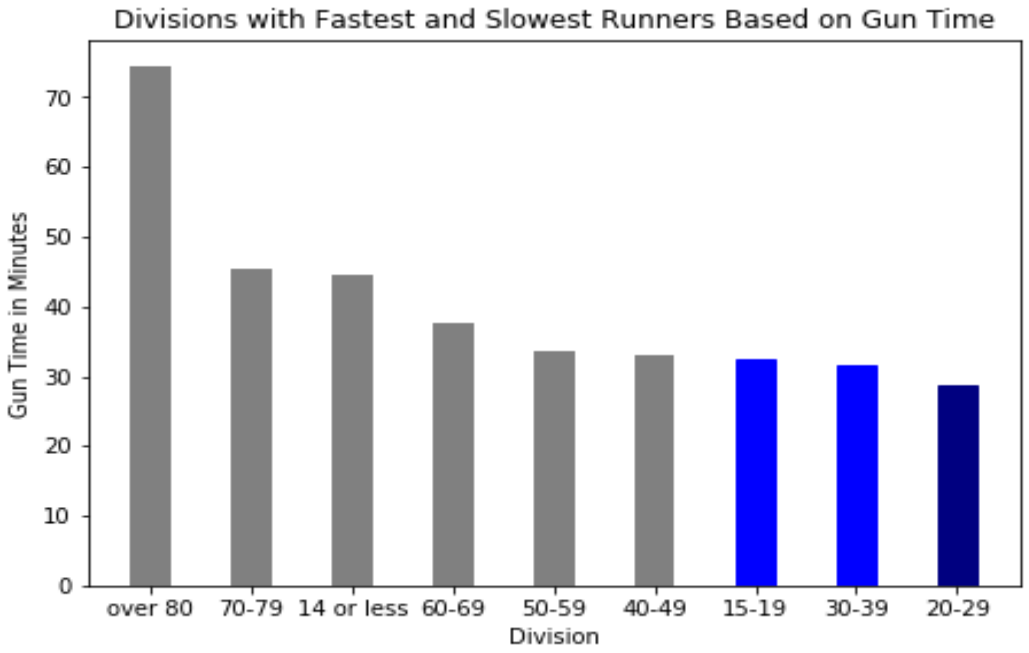
Net Time: 49.72 (Slower by 8.03)

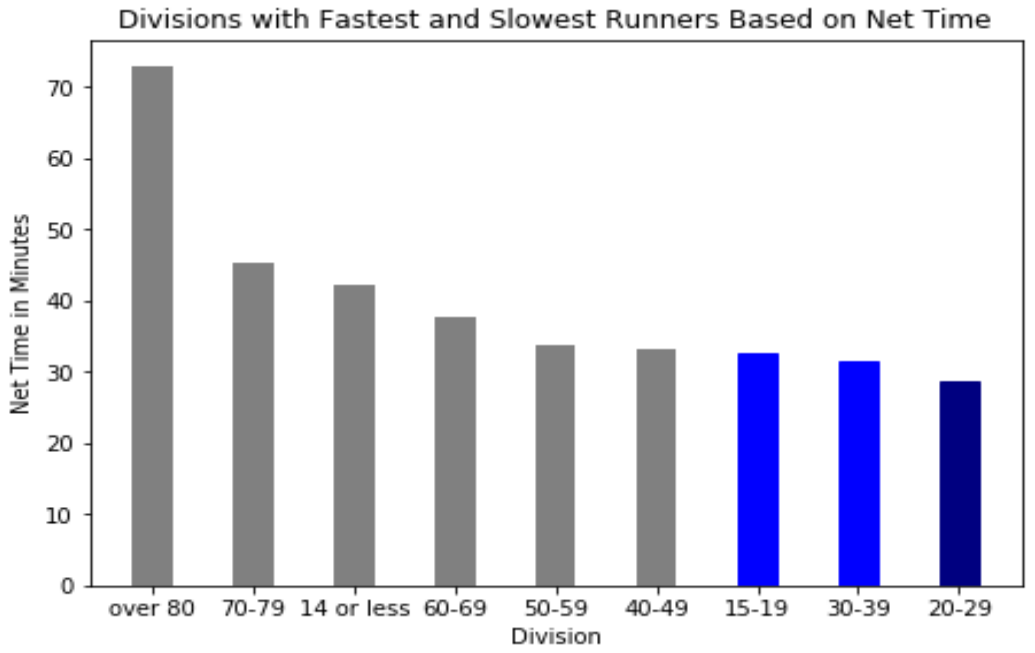
Chris Deo's Performance Visualization Compared to Top 10%





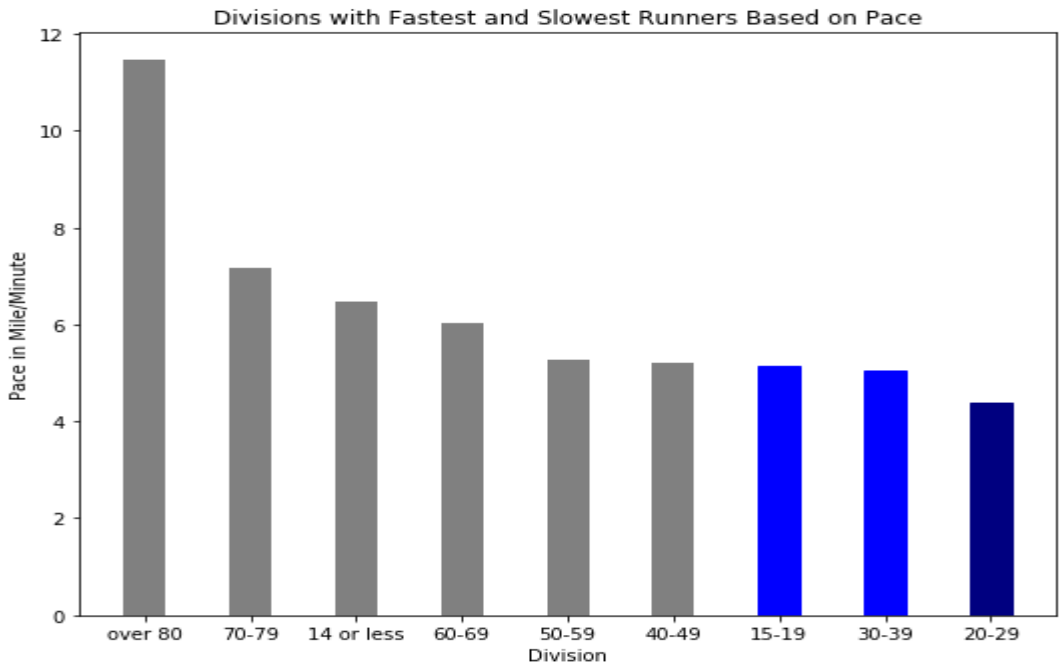
Division with Fastest and Slowest Runners Based on Gun/Net Times





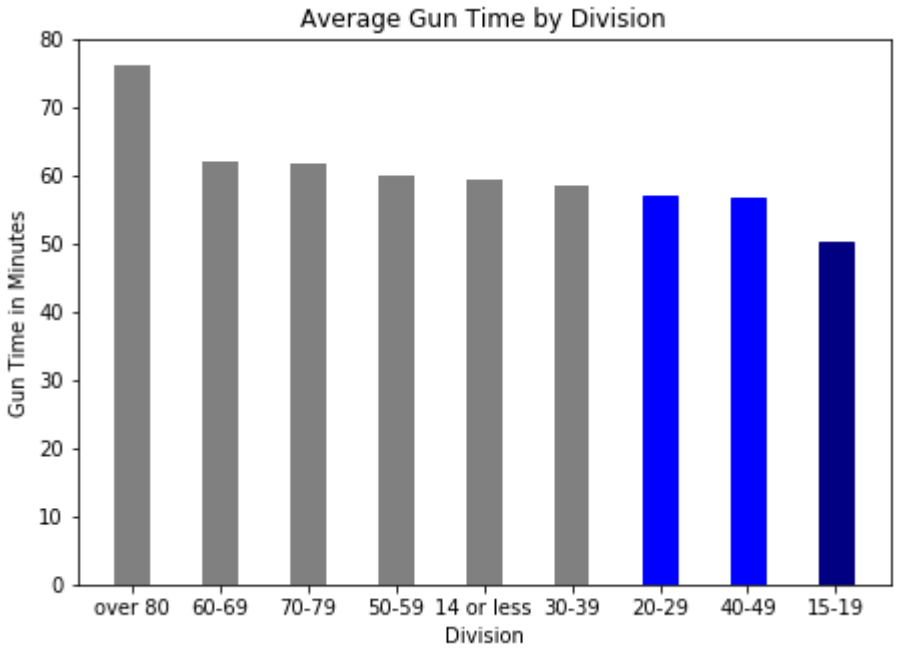
- We selected the min and max of gun time and net time in each group; and put them in the chart.
- Based on both features, Age groups 15-39 have the fastest runners and age 70 and above has the slowest runner.
- Middle ages are between these groups.

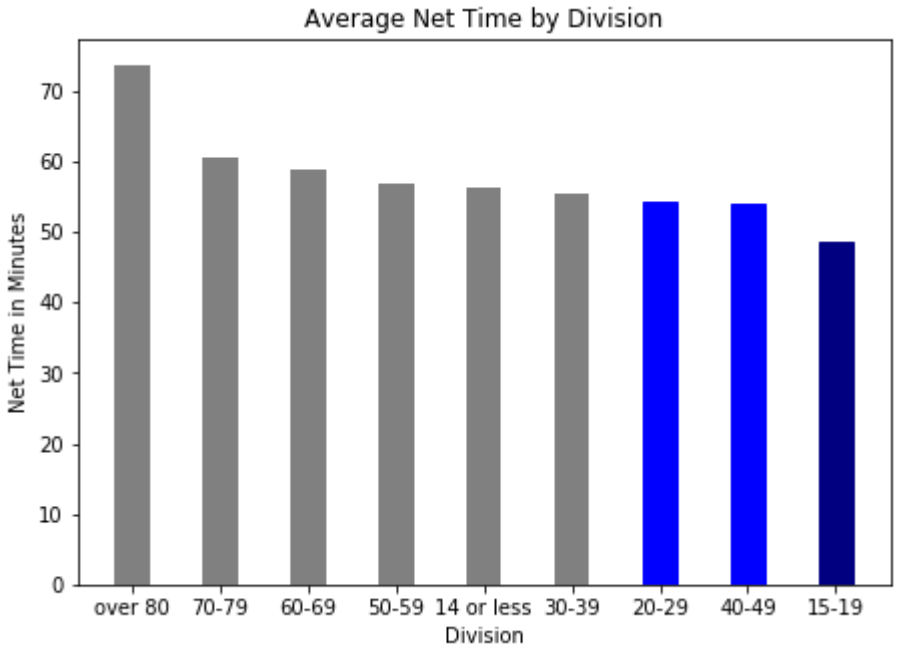
Division with Fastest and Slowest Runners Based on Pace



- Similarly, based on the Pace, Age groups 15-39 have the fastest runners and age 70 and above has the slowest runner.
- Middle ages are between these groups.

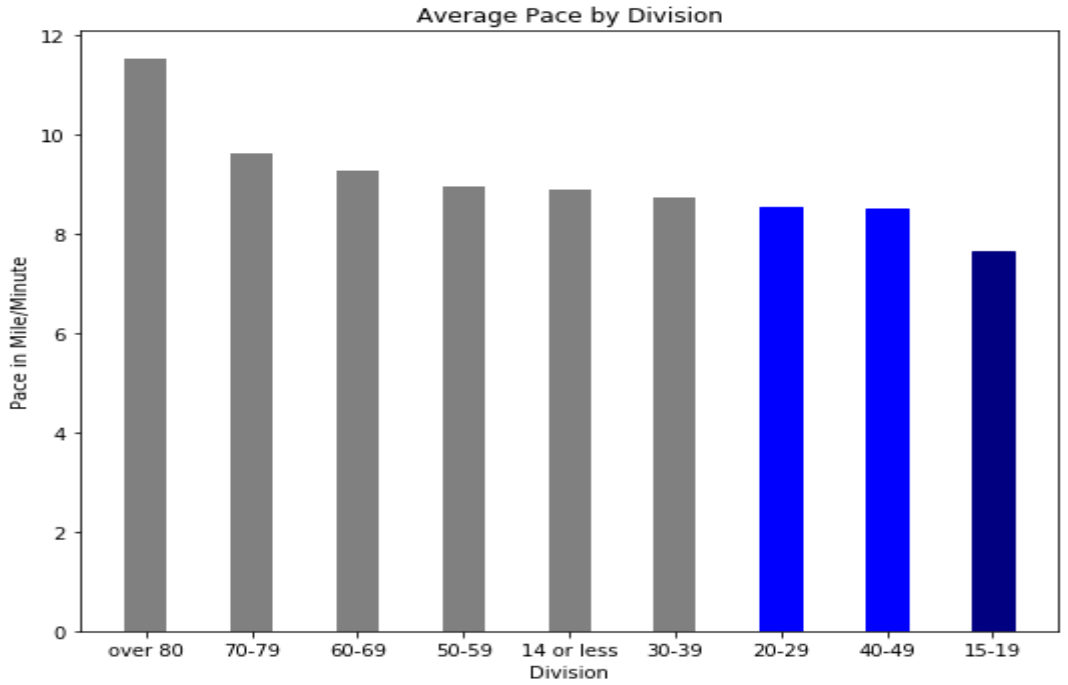
Average Times of Divisions





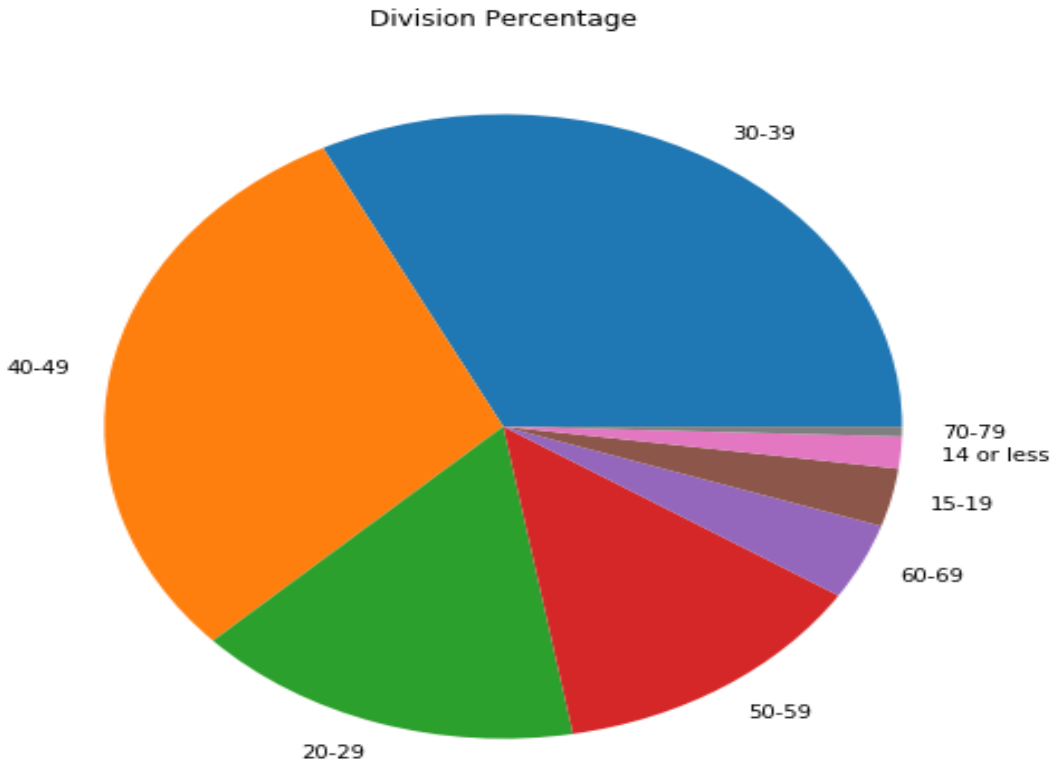
- We calculated the average of gun time and net time in each group; and put them in the chart.
- Based on both features, On Average, age groups 15-29 and 40-49 have the fastest runners and age 70 and above has the slowest runner.
- Middle ages are between these groups.

Average Pace of Divisions



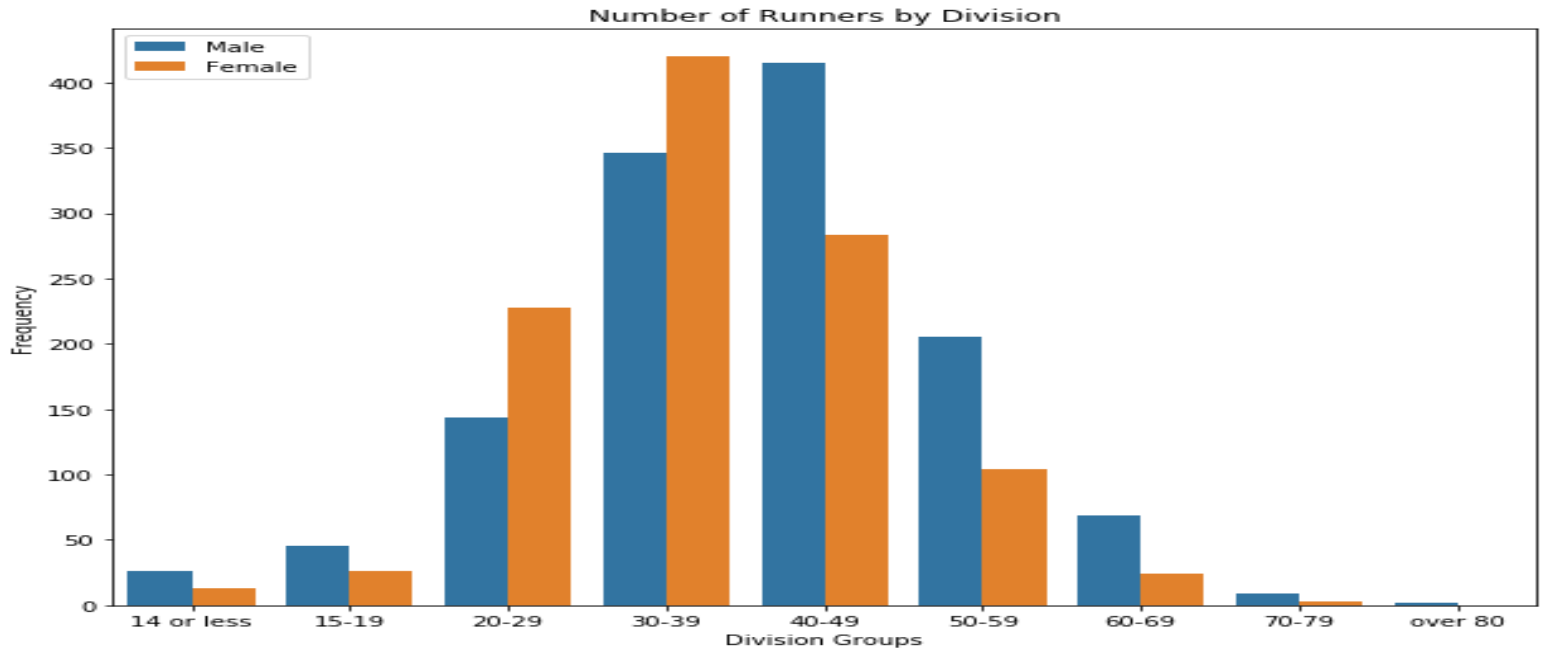
- Similarly, based on the Pace, On Average, age groups 15-29 and 40-49 have the fastest runners and age 70 and above has the slowest runner.
- Middle ages are between these groups.

Percentage of Participants based on their Age (Division)



- Participants of age Group 20-49 include around 80% of the total.
- We removed runners of 80 and older for more clarity of pie chart.
- Participants of age group 20-59 include most of the total.

Participant Distribution Based on Gender and Division



- Age groups are in the order to look for any pattern as well.
- As it's shown, a bell shape distribution appears. The middle ages have more participants, and less number appears on 2 ends.
- Male Participants are more than females in all divisions (Except 20-29 and 30-39).

Thank you!

Appendix (Additional Results)

		Male		Female	
		Gun Time	Net Time	Gun Time	Net Time
14 or less	Mean, Median	58.17, 56.77	55.04, 53.96	62.32, 63.45	58.98, 58.17
	Min, Max	44.67, 76.35	42.17, 72.43	51.27, 72.17	49.98, 70.6
	25 Percentile, 75 Percentile	51.19, 63.38	48.16, 59.71	61.47, 66.6	57.23, 63.02
15-19	Mean, Median, Mode	48.09, 47.1	46.65, 45.97	54.42, 54.28	52.13, 51.55
	Min, Max	32.50, 80	32.50, 75.98	38, 80	37.98, 75.98
	25 Percentile, 75 Percentile	39.65, 52.55	39.58, 49.77	45.61, 61.26	45.04, 57.74
20-29	Mean, Median	51.99, 51.84	49.52, 48.96	60.47, 60.31	57.25, 56.52
	Min, Max	28.80, 103	28.78, 97.83	32.98, 88.68	32.97, 86.5
	25 Percentile, 75 Percentile	44.02, 60.52	42.45, 56.67	54.11, 67.86	51.84, 63.08
30-39	Mean, Median	54.13, 54.32	51.66, 51.29	61.96, 60.8	58.7, 57.38
	Min, Max	31.67, 85.67	31.63, 84.52	34.43, 110.52	34.42, 106.82
	25 Percentile, 75 Percentile	47.02, 61	45.46, 57.63	55.18, 67.21	52.27, 63.05
40-49	Mean, Median	53.99, 53.17	51.61, 50.7	61.05, 61.08	57.87, 57.63
	Min, Max	33.12, 104.12	33.1, 98.77	35.08, 110.52	35.07, 105.37
	25 Percentile, 75 Percentile	46.39, 60.26	45.04, 56.93	54.79, 66.53	51.76, 62.41
50-59	Mean, Median	56.65, 56.05	53.93, 53.08	66.42, 65.6	62.61, 61.64
	Min, Max	33.70, 103.78	33.7, 100.63	40.73, 98.02	40.7, 92.95
	25 Percentile, 75 Percentile	50.15, 62.9	48.62, 59.2	59.8, 73.96	55.7, 69.51
60-69	Mean, Median	61.83, 60.1	58.47, 56.9	62.95, 61.64	60.01, 58.38
	Min, Max	37.65, 102.68	37.65, 97.33	47.42, 104.17	46.12, 99.05
	25 Percentile, 75 Percentile	54.25, 68.88	51.5, 65.45	54.11, 69.86	52.3, 64.52
70-79	Mean, Median	60.56, 57.32	59.26, 56.27	65.46, 64.32	64.11, 64.22
	Min, Max	45.35, 85	45.27, 83.52	52.58, 79.48	52.57, 75.55
	25 Percentile, 75 Percentile	52.45, 60.48	52.4, 59.22	58.45, 71.9	58.4, 69.88
Over 80	Mean, Median	76.24, 76.24	73.66, 73.66	-	-
	Min, Max	74.47, 78	72.93, 74.38	-	-
	25 Percentile, 75 Percentile	75.35, 77.12	73.29, 74.02	-	-