

Probability and Statistics Investigation

Does swimming for an hour each week amount to different calories burnt across different gendered age groups?

Swimming is one of the many exercises that can help a person burn calories and stay fit. But, as men and women get older, does the number of calories we burn change?

The following data, placed in a bar graph, has been collected from the [Culinary Schools](#) website. Based on the average weight and height of a male and female, it has determined the average of calories burned during a one-hour duration of 'swimming laps, freestyle, fast with vigorous effort.'

	Female	Male
18-23	840, 840, 852, 852, 858, 858. Mean: 850	960, 960, 960, 966, 966, 978. Mean: 965
24-29	858, 864, 864, 864, 870, 870. Mean: 865	978, 978, 984, 984, 984, 996. Mean: 984
30-35	870, 882, 882, 888, 888, 888. Mean: 883	996, 1002, 1002, 1002, 1014, 1014. Mean: 1005
36-41	894, 894, 894, 900, 900, 912. Mean: 899	1020, 1020, 1020, 1032, 1032, 1038. Mean: 1027
42-47	912, 912, 918, 918, 924, 924. Mean: 918	1038, 1038, 1050, 1050, 1056, 1056. Mean: 1048

The idea of this investigation is to compare the calories between a male and a female. The data above is the information being used for the graphs throughout the investigation, these graphs include a histogram and polygon as well as a box-and-whisker plot.

The following key was a controlled variable during the Investigation.

Average Weight of a male: 86 kg Average Height of a male: 176cm
Average Weight of a female: 71 kg Average Height of a female: 162cm

The following graph demonstrates the mean, median and range for all calorie scores.

	Female	Male	Total
Mean	883	975.8	1758.8
Median	885	1002	1887
Range	84	96	180

The results provided in the graphs below have been calculated by finding the mean calories for each age group.

Probability and Statistics Investigation

BAR GRAPH

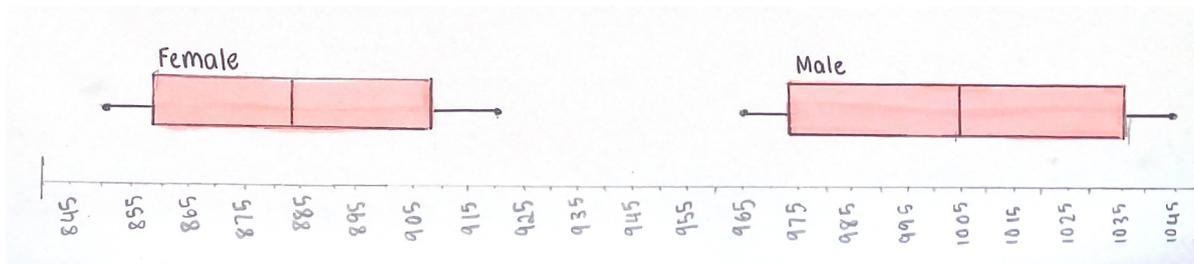
Calories Burnt Amongst different age groups when swimming for an hour



The means of calories burnt per age group is presented above in a bar graph. As you can see, as a person ages, the calories burnt within an hour of swimming increases both for females and males. The bar graph above shows that females do not lose as many calories compared to males in the one-hour duration of swimming.

BOX PLOT

The box plot below shows the comparison between males and females. The five number table below the plot gives evidence as to the difference between the genders.



FEMALE
 Lower extreme: 850
 Lower quartile: 857.5
 Median: 883
 Upper quartile: 908.5
 Upper extreme: 918

MALE
 Lower extreme: 965
 Lower quartile: 974.5
 Median: 1005
 Upper quartile: 1037.5
 Upper extreme: 1048

The five number graph above demonstrates the quartiles that were used to create the box plot. You can see how the upper extreme differs from the male and female columns.

Probability and Statistics Investigation

FREQUENCY TABLE

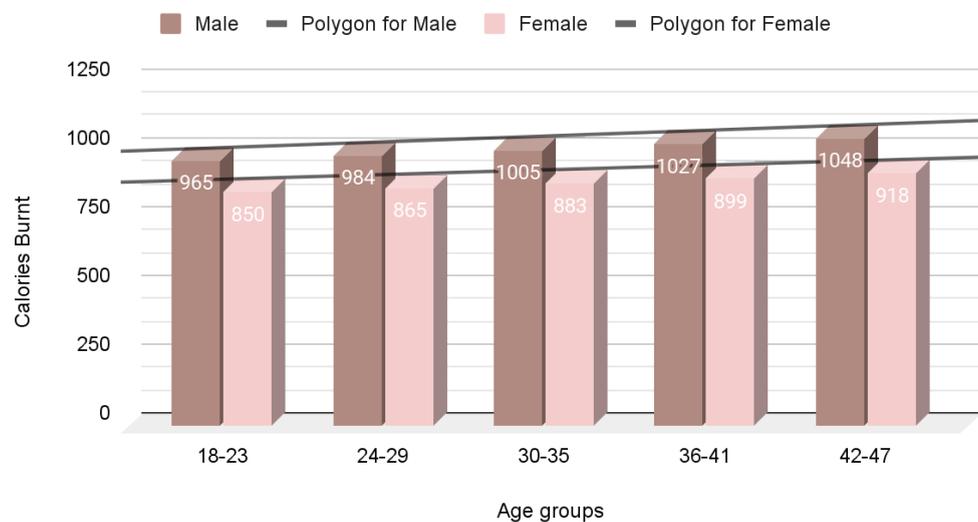
FEMALE	
Calories Burnt	Frequency
840	2
852	2
858	3
864	3
870	3
882	2
888	3
894	3
900	2
912	3
918	2
924	2
TOTAL	29

MALE	
Calories Burnt	Frequency
960	3
966	2
978	3
984	3
996	2
1002	3
1014	2
1020	3
1032	2
1038	3
1050	2
1056	2
TOTAL	29

HISTOGRAM AND FREQUENCY LINE

The Histogram demonstrates the comparison between the calories burnt between males and females. The frequency line allows readers to interpret the frequency which is again demonstrated in the table above.

Calories Burnt over 1 hour of swimming



Probability and Statistics Investigation

COLLABORATION

During my investigation, I collaborated with Zara Harrison's investigation, "Does swimming for an hour each week amount to different calories burnt across different gendered age groups?" to compare calories burnt in a one hour duration in different sports.

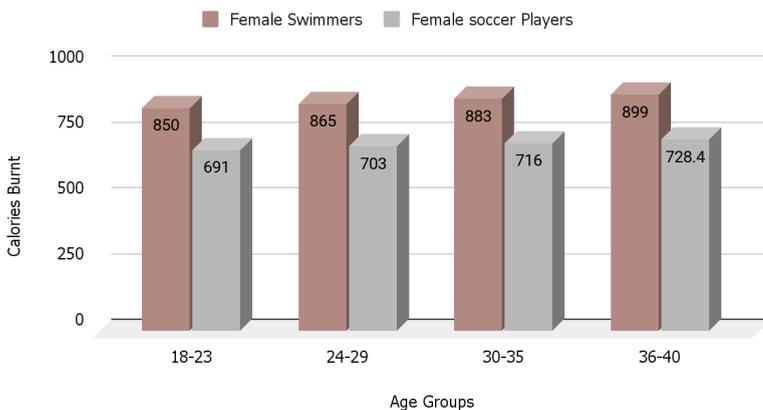
After we had both gathered our data separately and situated the data into graphs, we were able to compare the results between swimming and soccer, regarding what sport burns more calories in a one hour duration.

Ultimately, the comparison below concluded that swimming for one hour does amount to more calories being burnt than soccer for both males and females.

FEMALE		
Age Group	Mean calories burnt (swimming)	Mean calories burnt (soccer)
18-23	850	691
24-29	865	703
30-35	883	716
36-40	899	728.4

MALE		
Age Group	Mean calories burnt (swimming)	Mean calories burnt (soccer)
18-23	965	828
24-29	984	844
30-35	1005	867
36-40	1027	883.2

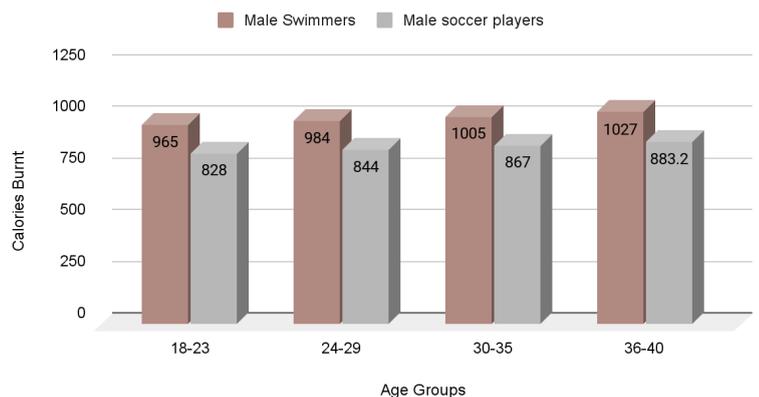
Female; Swimming VS Soccer



As you can see, throughout both female and male graphs comparing the calories burnt between swimming and soccer, swimming always results in more calories being burnt in the one hour duration.

The two column graphs compare the calories burnt between swimming and soccer. Females have a lower range of scores compared to males in both sports but we still see that swimming allows the person to burn more calories in a one hour duration for both male and female.

Male; Swimming VS Soccer



Probability and Statistics Investigation

ANALYSIS

In the Investigation, multiple graphs were presented to demonstrate as well as compare the differences between males and females burning calories when swimming for a one hour duration.

The table on the first page demonstrates the age groups being used in the investigation as well as the individual calories burnt per age as well as the mean for each age group.

The bar graph was a basic representation of the data collected to highlight the basic idea that males burn more calories than females as they get older. The number of calories burnt was found by finding the mean number of each age group.

The Box plot allowed us to visually compare the data. Below the box plot is the lower and upper extreme, the lower and upper quartiles and the median for both male and females which was used to create the box plot. The box highlights the difference between calories burnt between males and females throughout the distance.

The frequency and histogram that follows depicts the frequency of each score, the histogram further presents this information in a column graph.

Further into my investigation I collaborated with Zara Harrison's data, her investigation focussed on calories burnt while playing soccer for one hour for both females and males. I compared her results with mine to look further into the idea of *calories burnt in different sports*. The data gathered from both mine and Zara's investigation concluded that for both genders, swimming allows the person to burn more calories in a one hour duration.

CONCLUSION

Throughout my investigation, I researched how swimming for an hour each week can amount to different calories burnt across different gendered age groups. The information and statistics was put into different types of graphs and tables to support the question and to come up with an answer.

Ultimately, yes, swimming for an hour each week does amount to different calories burnt across different genders. With the gathered data from the [Culinary Schools website](#) calculator, we can see that across a total of 29 ages separated into five age groups, males burn more calories than females in a one hour duration of swimming when using the controlled average height and weight for each gender.

FUTURE RESEARCH

With the end of my investigation, further questions arise, these included:

- *Is this the same if we research different styles of swimming?*

With the use of the [Culinary Schools website](#) calculator, there are different options of effort of swimming such as low or moderate (the one used in the investigation was *vigorous effort*), there are also other styles such as breaststroke and butterfly other than freestyle.

- *What if we increased the time to 2 hours?*

If we set the duration of swimming from one hour to 2 hours, will the calories double?

- *Do height and weight essentially affect the calories burnt in an hour?*

In most sports, the weight and height of a person would affect the amount of calories burnt. If a person weighed more than the average used in my investigation, would it affect the calories burnt? This goes for height as well.