

Probability and Statistics Investigation

Investigation Question: Does playing soccer for an hour each week amount to different calories burnt across different gendered age groups?

People play sports for a variety of reasons, whether that be to lose weight, gain muscle or just have fun. Sport and exercise is an integral part of our society, and something that males and females of all age groups can participate in. Many questions arise for people wanting to burn calories while exercising, particularly how much exercise equates to a certain number of burnt calories. Here, we will be exploring how your age and gender affects the amount of calories you burn after playing soccer for one hour.

I have gathered data from the [culinary schools organisation website](#), relating to the average height and weight of male and female soccer players in the category of *soccer, competitive*, to recognize how many calories different gendered age groups burn.

Data and statistical Analysis:

Average **weight** of male soccer players: 77.2kg

Average **height** of male soccer players: 182.4cm

Average **weight** of female soccer players: 61.4kg

Average **height** of female soccer players: 161.8cm

Age **range**: 16-40

Mean scores for each age group:

Age Groups	Male (Cal burnt)	Female (Cal burnt)
16-20	820.8	685.2
21-25	833.6	696
26-30	850	705.6
31-35	868.8	717.6
36-40	883.2	728.4

Overall measures of central tendency:

MCT	Male (overall)	Female (overall)	Total
Mean	851.28	706.56	714.92
Median	850	705.6	774.6
Range	62.4	43.2	135.6

Full Data Scores:

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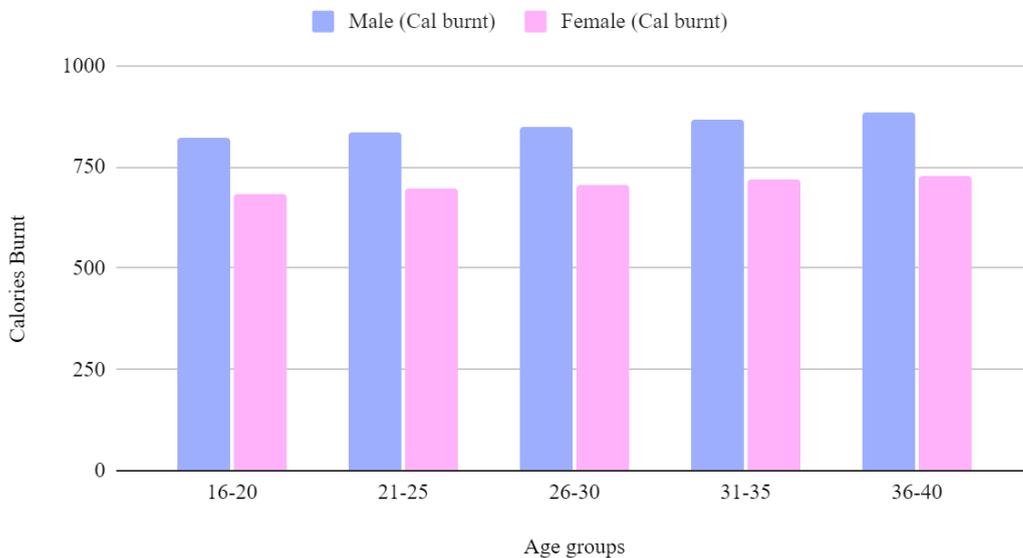
	A	B	C
1	Age	Male (Cal burnt)	Female (Cal burnt)
2	16	816	678
3	17	816	684
4	18	816	684
5	19	828	690
6	20	828	690
7	21	828	690
8	22	834	696
9	23	834	696
10	24	836	696
11	25	836	702
12	26	836	702
13	27	852	702
14	28	852	708
15	29	852	708
16	30	858	708
17	31	858	714
18	32	870	714
19	33	870	720
20	34	870	720
21	35	876	720
22	36	876	726
23	37	882	726
24	38	882	726
25	39	882	732
26	40	894	732

The spreadsheet on the left displays the amount of calories burnt after an hour of competitive soccer for different aged males and females.

The below graphs and plots display either the mean calories burnt for each age group and gender or the individual calories burnt for each age.

Column Graph:

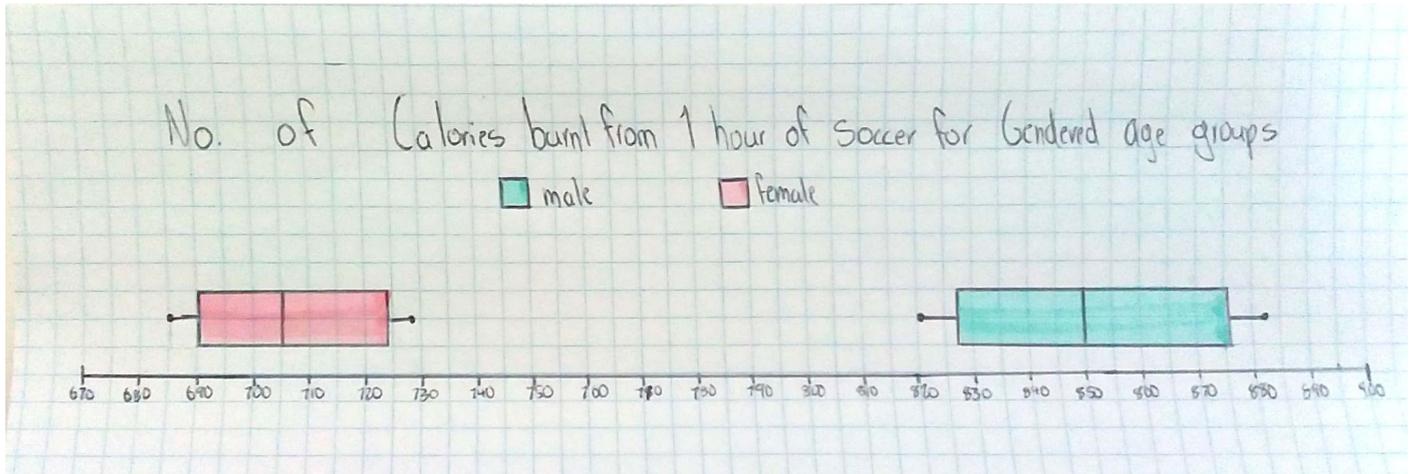
Calories burnt from 1 hour of soccer for gendered age groups



This graph displays the mean calories burnt for each gendered age group in a column graph. The information shown here highlights the gradual increase in the number of calories burnt as individuals get older, as well as the difference between males and females, as males burn more calories.

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Box Plots and 5 number summaries:



5 Number Summary	Male	Female
Lower extreme	820.8	685.2
Lower quartile	827.2	690.6
Median	850	705.6
Upper quartile	876	724.8
Upper extreme	883.2	728.4

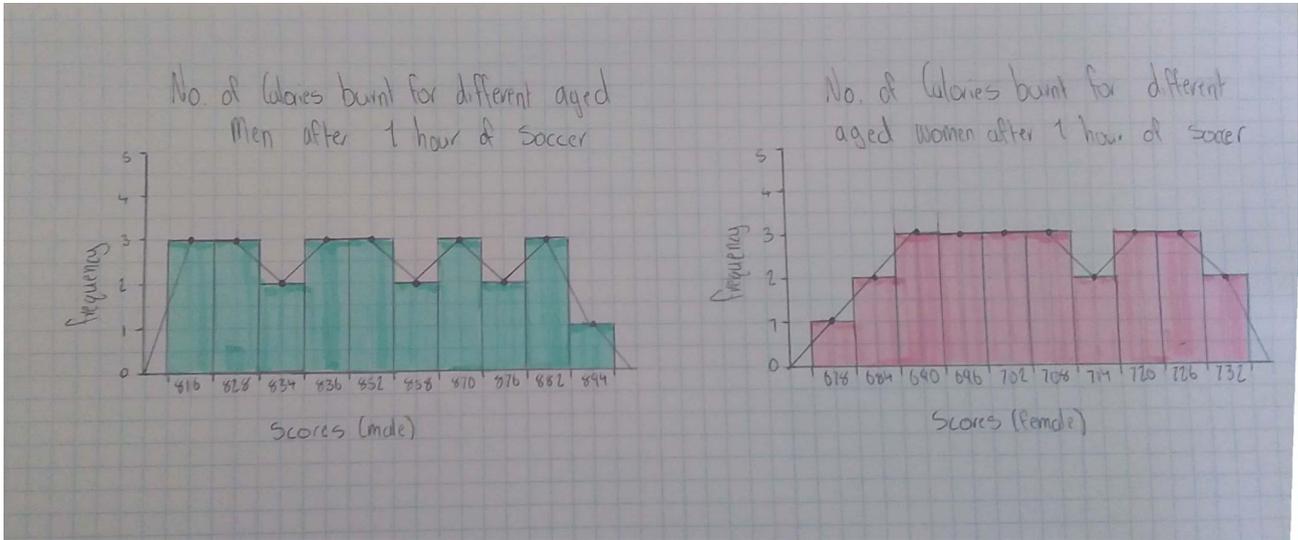
This graph is able to compare the differences between the amount of calories burnt for males and females using the information in a 5 number summary of the total scores for the gendered age groups. (seen above). The box plot is able to communicate the vast difference between the calories burnt for females and males, females of which burn less calories compared to males after 1 hour of soccer.

Frequency Tables, Histogram and Polygon:

Score (Male):	Frequency (Male):	Score (Female):	Frequency (Female):
816	3	678	1
828	3	684	2
834	2	690	3
836	3	696	3
852	3	702	3
858	2	708	3
870	3	714	2
876	2	720	3

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882	3	726	3
894	1	732	2
	Total: 25		Total: 25



This graph and table communicates the frequencies of each score for the different aged males and females through a histogram and polygon, using the data in the spreadsheet above. Displayed are two different graphs, one for the frequency of the number of calories burnt by a male and one for the frequency of the number of calories burnt by a female, both of which had similar frequencies of scores between 1-3.

Collaboration:

Throughout my investigation I collaborated with Kara Lau, as she was researching a similar topic to me. "Does swimming for an hour each week amount to different calories burnt across different gendered age groups?" Once we had both gathered and organised our data into various graphs and tables we were able to compare the differences and similarities in our findings. It would occur that **swimming** for an hour each week would amount to more calories burnt compared to **playing soccer** for an hour for both genders and all age groups.

Male Comparison Table:

Age groups	Male swimmers (cals. burnt)	Male soccer players (cals. burnt)
16-17	-	816
18-25	968.25	830
26-30	982.8	850
31-35	1006.8	868.8

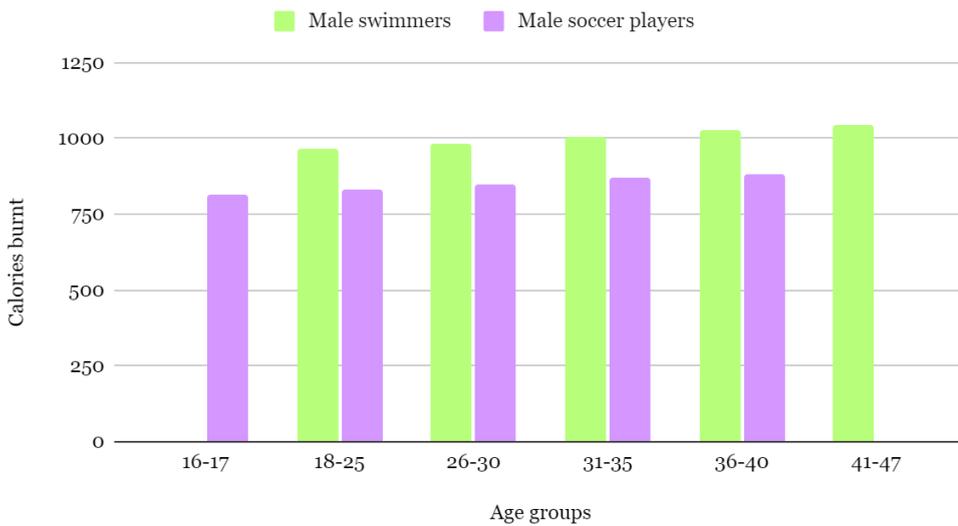
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36-40	1024.8	883.2
41-47	1046.57	-

Female Comparison Table:

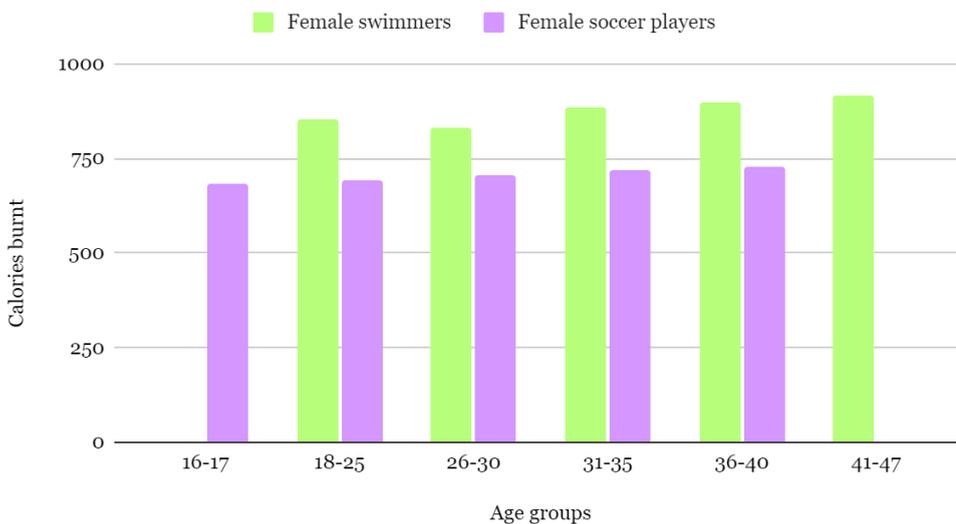
Age groups	Female swimmers (cals. burnt)	Female soccer players (cals, burnt)
16-17	-	681
18-25	852.75	693
26-30	831.6	705.6
31-35	885.6	717.6
36-40	896.4	728.4
41-47	917.14	-

Calories burnt for males after 1 hour of swimming or soccer



This column graph displays the calories burnt for males after playing soccer for an hour and swimming for an hour, among a variety of age groups. It is clear from this graph that swimming burns more calories across all male age groups compared to playing soccer.

Calories burnt for females after 1 hour of swimming or soccer



This graph highlights the difference between the amount of calories burnt for different aged female swimmers and soccer players. As seen, swimmers will burn more calories over a 1 hour period compared to soccer players.

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Conclusions and final thoughts:

Thus, after researching and collecting data surrounding the question, *Does playing soccer for an hour each week amount to different calories burnt across different gendered age groups?*, I have come to multiple conclusions. It is clear through the analysis of said data that males burn considerably more calories than females after playing soccer for a duration of an hour. For example in the 16-20 age group there is a difference of 135.6 calories between males and females, and a 154.8 difference in calories burnt between males and females in the 36-40 age group. This trend is confirmed to be the same for males and females after 1 hour of swimming, as both Kara Lau and I discovered that males burn more than females across both our sports when comparing our results. I also noticed that there was a gradual increase in the amount of calories burnt as both males and females grew older, through the analysis of graphs it can be concluded that the older a person is, the more calories they will burn after 1 hour of playing soccer. Due to the fact that there was an increase of 43.2 calories burnt between the youngest and oldest female age groups, and an increase of 62.4 calories burnt between the youngest and oldest male age groups. This, again, is continued through Kara Lau's findings, in her investigation the calories burnt for both males and females increases as the age of the individual increases.

Evidently, through extensive research the amount of calories burnt after an hour of playing soccer does in fact increase as individuals grow older for both males and females, but when comparing the two genders, males will burn more calories compared to females after one hour of soccer. These trends are also evident after a 1 hour duration of swimming.

Further questions of inquiry:

- If you were to play soccer for 2 hours, does the amount of calories double?

For this line of investigation you could change the settings on the calories calculator and compare the two results using graphs and tables.

- Are the calories burnt for soccer similar to those of other field sports?

Using the same calories calculator, collect data for all the gendered age groups for a range of sports such as AFL, NRL, cricket etc, and compare them using graphs and tables.

- Are Kara Lau's scores for swimming similar to other water sports?

Use the same calculator (that we both used), and collect the data for various water sports such as surfing, water polo, aqua aerobics etc, then compare and contrast the sets of data using tables and graphs.

- Why is there such a major difference between calories burnt for swimming and soccer? Is it because the athlete is moving through water?

Conduct health research and investigate as to why swimming for an hour burns more calories than playing soccer, you can use a variety of reliable websites to collect this data.