

Uni-variate comparison

Question

Are the newborn boy babies heavier than the newborn girl babies?

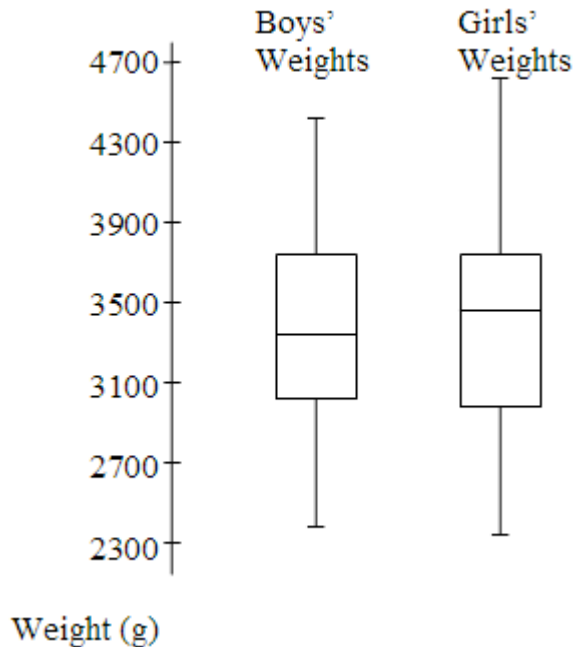
Data organized

Stem and leaf plot of newborn babies' weights (kg used for ease of recording).

Baby girls' weights (kg)		Baby boys' weights (kg)
33	2.3	
	2.4	0
	2.5	9
	2.6	
7	2.7	01
5	2.8	1
50	2.9	59
1	3.0	35
	3.1	055
1	3.2	25
6211	3.3	34
5	3.4	088
5200	3.5	07
10	3.6	05
6	3.7	
	3.8	5
5	3.9	5
2	4.0	
976	4.1	
	4.2	02
	4.3	
	4.4	002
	4.5	
1	4.6	

Summary statistics

Weights of babies	Boys	Girls
Number	30	26
Mean	3395	3432
Median	3335	3475
Lower quartile	3030	3010
Upper quartile	3650	3760
Interquartile range	620	750
Range	2020	2280

Box and Whisker comparison graph**Answer**

The boys are not heavier than the girls.

The median for the girls is 140 grams heavier than the boys and the upper quartile value (covering 75% of the data) for the girls is 110 grams heavier than the boys, suggesting if anything that the girls are heavier than the boys. The mean weight for the girls is 37grams heavier than the boys, which is not a significant amount, but certainly this data does not support the claim that the boys are heavier.

The lower quartile statistic (representing the bottom 25%) of the boys is at a higher level than the girls, which does support the boys being heavier, but the 20 grams difference here is so small that it would not be enough to confirm the claim that the boys were heavier.

The heaviest baby was also a girl, but the second heaviest girl at 4180grams is lighter than the weight of the 5 heaviest boys. So there are some heavy boys but we cannot conclude the boys are heavier than the girls from just these few data items.

The range and interquartile range for the girls is greater than the boys showing a greater variability in the weight of the girl babies, while the boys tend to be clumped more around the median (50% between 3030g and 3650g). 25% of the girls are above 3760g compared with only 23% of the boys. Thus we cannot conclude that the boys are heavier than the girls.

Comment

There are girls at both extreme ends of the data: the smallest baby is a girl at 2330 grams and the heaviest baby is also a girl weighing 4610 grams, 190 grams heavier than the heaviest boy.

Limitations and Improvements

Because the babies have been born after different length pregnancies perhaps it would have been better to just compare the boy and girl babies whose term length was the same e.g. all the 40 week term boys with the 40 week term girls etc. This would have meant splitting the data up into a lot of groups and then it would be a much longer process.

There are no really premature babies here with the smallest term being 34 weeks so this may not represent the full range of babies that survive now. Perhaps this data only represents babies who don't need any special care (e.g. incubator) at birth. A bigger, more varied data set would give a better picture of the weight of the different genders at birth.

This is a small data set so the conclusions I have drawn may not be valid in general.

What I have learnt

Although males as a group are heavier than females as adults they are not necessarily heavier as babies. It appears from this data that there is not a great difference in the weights of the newborn girls and boys. If anything the girls are slightly heavier based on this data.

That the mode is not always a useful statistic to compare data sets as in this case the mode or modal groups fall in a variety of places not directly linked to the center of the distribution.

That two extreme values at either end can mean you get a big value for your range, which may not be very meaningful. If you take away the two maximum and minimum values and recalculate the range the range for the girls is 1420 grams, which is a lot less than that for the boys. So extreme values can have quite an impact on the range.