Student A
Math 45X
Instructor Lum
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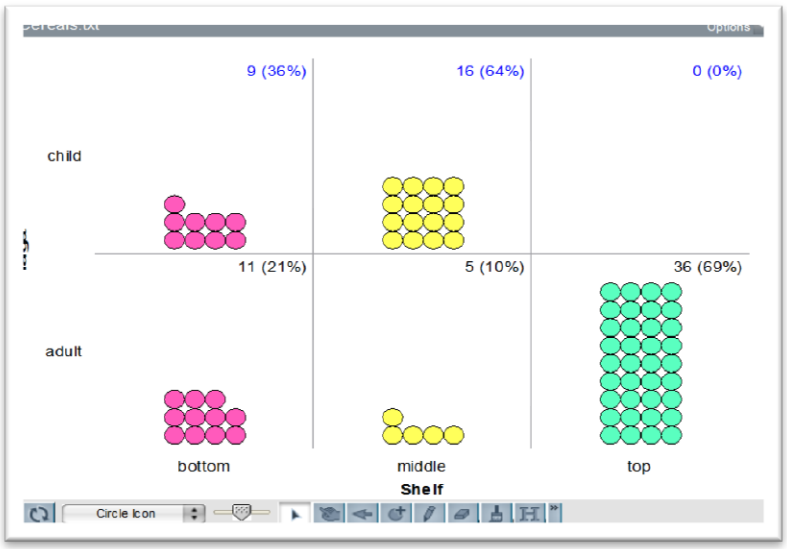
Breakfast is known as the most important meal of the day. It is important because it is supposed to make up for what you didn't eat while you slept the night before, it "Breaks the fast". Also, Breakfast is very essential because it will affect the way you feel throughout your day. Most people are living in a fast paste, busy life and may not have time to make themselves a nice whole nutritious meal. What they believe is the next best thing is a cereal. According to the article, *Better Cereal Choices for Kids? Some child-focused products are 50 percent sugar*, by the consumer report website; "Sugary cereals are heavily marketed to children, to the tune of about $229 million advertising dollars per year." And going on to say that 58% of those cereals are also consumed by adults. Throughout my data, I have found that children cereals have a higher amount of sugar, sodium and lower amount of fiber and vitamins. This may be because their cereals have a lot of colors, shapes and so the prettier they look, the more they will sell. Therefore, big cereal companies spend more money on advertising. According to my graph, children cereals appear to be deliberately located on grocery store shelves to attract children's attention.

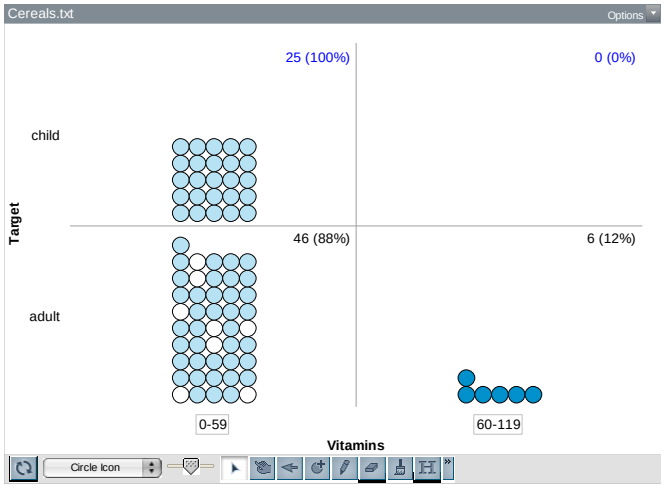


The 77 cereal TinkerPlots data set contains the data on 77 cereals, 52 targeted to adults and 25 to children. The contingency table above shows the shelf placement of the cereal (top, middle, bottom), and the type of cereal in each (adult or child). To prove my claim that children cereals are deliberately placed in middle and lower shelves, I will use the row percent to figure out the amount of cereals placed in each shelf for each type. Out of the 25 children cereals, 64% (16 out of 25) of the cereals are located

on the middle shelf. There are 0% of children cereals in the top shelf. Out of 52 adult cereals, 69% (36 out of 52) are located on the top shelf. For the Children cereals, more than half of them are on the middle shelf and the rest on the bottom. This could be because of their height, and so many of the kids are going to straight to what is at their eye level. Most of the adult cereals are on the top shelve, where they can also reach to and pick their favorite.

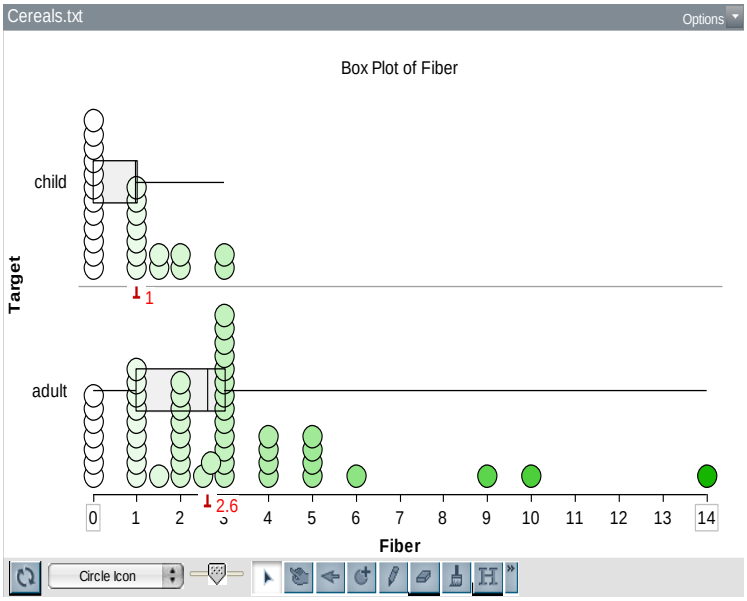
In most of the commercials with a child actor, you will hear that the cereal is only, "part of a nutritious breakfast". What kids don't know is that they have to make up what they don't get from the cereal in other foods. Most kids are too young to really look into the nutrition facts; therefore parents read the labels of the cereals to check if they are healthy and sometimes they will be tricked into believing the amount of sugar in the cereal. Data shows cereals marketed to children are less healthy than the cereals marketed to adults. Most times cereals are high in sugar and lack vitamins and fiber. This is bad for the children because they are not getting the vitamins they need to help them have energy, but also they are not getting as much fiber to help their digestive system.

Vitamins are a key ingredient in most children cereals, According to the Breakfast Cereal Information website, "One bowl of cereal provides at least 25% of daily requirements for many essential vitamins and 17% for iron." This means that cereals are a good way to start off the day because you can get children to eat their vitamins in a tasty bowl of cereal than other foods they might not like. Although they will get their vitamin intake, they don't have a variety of choices to choose from. In this graph we have the explanatory variable which is the target, and the response variable which is a high amount of vitamins and a low amount. These variables can help explain what type is richer in vitamins. The row percents will help me figure out what percent of the cereal have a high amount of vitamins. From a quick observation you can see that there aren't even any children cereals in the higher percentage area. Out of the 25 cereals, 100% (25 out of 25) have low amount of vitamins.



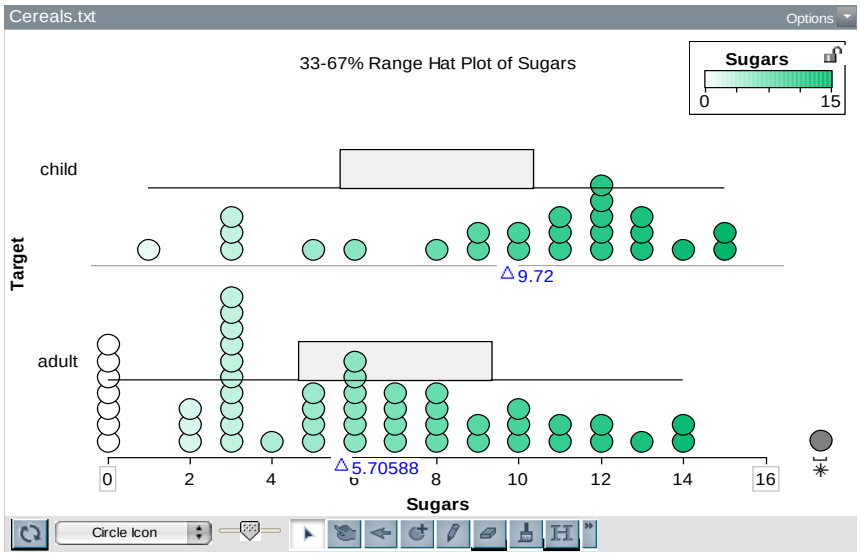
For the adult cereals, out of the 52, at least 12% (6 out of 52) have a high amount of sugar. This proves that the majority of children cereals will consist of a low amount of vitamins; there are not that many cereals that will have a high percent of vitamins per serving. For adults, although most are also in the lower amount, there are at least 6 with a higher vitamin intake.

Another reason why children cereals are less healthy than adult cereals is because they are very low in fiber. This graph at the bottom shows which cereals have the least amount of fiber. The explanatory variable is the target and the response variable is the amount of fiber per serving. The reason why I chose fiber is because it is an important nutrient for the children's digestive system, and the difference between the two targets is very significant. As you can see the children cereals has a median of 1 as oppose to the adult cereals which has a median of 2.6 grams per serving. Also the box plot for the children shows that IQR is very small and the median is very close to Q3, which means that the fiber amount is very consistent among children cereals; there isn't much variation. The adult cereals however have a bigger spread; it is also skewed to the right. This means that there are more options for adults to find cereals with fiber. The reason why it's also skewed is because there is an outlier which shows that a cereal has 14 grams of fiber per serving. For the children's cereal, the greatest amount of fiber was about 3 grams. The box plot helps me figure out the median for the fiber especially since I had an outlier in the adult cereals. According to the Kellogg Company website, "Studies show that fiber plays a positive role in… heart health, improved mood and decreased risk for certain diseases" Because

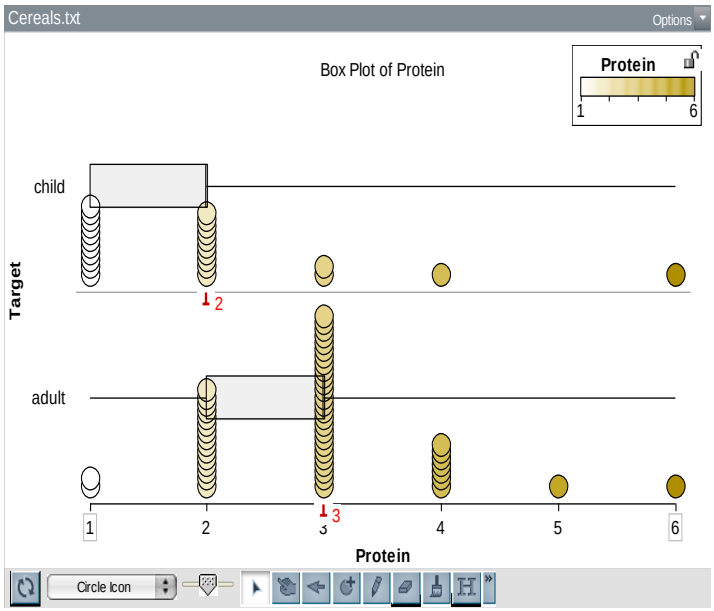


fiber is a very helpful and healthy ingredient it should be presentable in children cereals as well.

The amount of sugar intake is another attribute for healthy cereals. According to The Consumer International Member report, India conducted research in 2009 that found that all children cereals have high sugar. They stated, "Though [Kellogg's cereals] carried nutritional information on their boxes, most of them made some dubious claims. Kellogg's claims on the pack of most of its product contain iron up to 23.3mg per 100gm… Kellogg's Corn Flakes …and Kellogg's Frosties - contained only 8.7mg to 12.3mg of iron per 100gm. These products of Kellogg's were not high in iron and were loaded with sugar." This is just one example of how the big cereal companies will lie about the cereal's nutrition to try to gain the costumer's trust. In this graph the explanatory variable is the target, and the response variable is the amount of sugar per serving. The mean for children cereals is 9.72, for adults the mean in 5.70. Although the intervals overlap, there is a significant difference between the two means. In the key chart you can see that the darker the dots are the higher the amount of sugar the cereal has. For the children cereals there are more dark dots than in the adult graphs. We can figure out the ADM by adding up all the deviations and dividing them by the number of data points, this will help us figure out the average distance from the mean. The hat plot helps us determine where the majority of grams of sugar are in the graphs (should use an ADM hat instead of the range hat. We have not studied what a range hat is.). For children it is from 33 to 67%, whereas the adult cereals the hat is more to the left, making their average lesser than the children.



Protein is also a key ingredient for healthy cereals. In this graph we have the explanatory variable as the target, and the response variable being the amount of protein per serving in each cereal. I chose these variables because not that many cereals have protein as a main ingredient, and it will be another way to determine that children cereals are healthier. I chose to use the box plot because of the series of outliers on both histograms. The median for the children cereals determine the average amount of protein, which is 2 grams per serving. For adults, the median is 3. This proves that the adult cereals are higher in protein. Although both of the graphs are skewed to the right, the adult cereals have higher number of intervals. In terms of my analysis, protein is an ingredient that children cereals lack in. This helps me determine which target has healthier cereals. Cereals targeted to children are less healthy than adult cereals.



My data has proved that children cereals are deliberately placed in grocery shelves to attract the kid's attention. This was proved because from the contingency table, I figured out what percents of cereal types were in each shelf. For the second question I also found that my hypothesis for that question was correct. The different graphs proved that the children cereals were full of sugar and lacked vitamins and fiber. I proved this by comparing the average of each target. Also the box plot and hat plots helped me measure the variation within the graphs, and this gave me the answer to the second question. My data proved that cereals targeted to children are less healthy than cereals targeted to adults.