Design Brief

Project Title: Data Project

Client(s):
- **Wesley Chan**
- **Diego Santiago**

Designer(s):
- **Jumhelle Viduya**
- **Janelle Viste**

Problem Statement:

In the NFL, the concussion rate of the football players have been steadily increasing within the past few years. This is due to the head to head contact while playing the game. The linemen are especially susceptible due to making head contact every play rather than other positions. Another factor to take into consideration for this increased concussion rate is the fact that players have been getting stronger and more physical over the years. Not only does this problem affect players during their time in the NFL, but also the years after their career. Dr. Frank Conidi, the director of the Florida Center for Headache and Sports Neurology, reported that more than 40% of retired NFL players show evidence of abnormal brain structures years after playing football. Ryan Bort, a reporter from Newsweek, wrote an article about former Steelers wide receiver, Antwaan Randle El. He wrote that Randle El "has trouble walking down stairs, and his memory is failing" at only 36 years old due to his NFL experience.

40% of Former NFL Players Had Brain Injuries. (n.d.). Retrieved February 01, 2017, from http://time.com/4289745/nfl-concussion-symptoms-treatment/

Bort, R. (2016, May 16). Former NFL star Antwaan Randle El's post-retirement health problems are heartbreaking. Retrieved February 01, 2017, from http://www.newsweek.com/are-417835

Design Statement:

The Ayala Designers, Jumhelle Viduya and Janelle Viste, will provide the clients, Wesley Chan and Diego Santiago, with nine visualizations to match the multiple causes of concussion they had provided.The visualizations will consist of a scatterplot comparing the height and weight of all 2016 NFL players, a histogram of the entire NFL rosters' BMI and the number of head concussion per group, a box plot of the average BMI of NFL players, two pie charts comparing the injured and uninjured of NFL players with average and high BMI, and three line graphs of the amounts of concussions in relation to football player positions. The scatterplot is to display the height and weight of each football player whilst showcasing the normal BMI of the NFL. A scatterplot will best show the BMI between NFL players since due to the large amount of NFL players, there will be a lot of variations of each individual player's BMI. The box plot will show the average BMI percentile, and the histogram will display a distribution among the NFL roster. The pie chart will separate the players into groups based on injury status to organize the players to give an idea of the amount injures yielded. The pie chart is the most effective to compare the two because the two groups can be compared based on 2 sets of questions. The line graphs will display the amount of concussions over time by positions to view if there is a correlation between the two.

Constraints:
- Deadline
  - One Week for Construction of Visualization
- Anthropometric Data
  - Body Mass Index (BMI) of NFL Players
- Sample Size
  - 2016 NFL Player Roster
- Allegedly Skewed Raw Data
  - "4,500 ex-players..claiming the NFL hid known concussion" (http://www.si.com/nfl/2016/08/31/nfl-concussion-lawsuit-appeal-dropped)

Conclusion Statement:

The Clients were partially unclear in their problem statement. Mr. Chan and Mr. Santiago addressed the steadily increasing number of concussions, however, they did not give a direct cause of the increasing rates, but rather suggested multiple causes that may impact the concussion rates. An interpretation of the question was to address each of their suggestions in relations to concussions. Thus, the original interpreted question, "Why NFL concussion rates are increasing?" was reevaluated to "How does player's position/BMI affect NFL players' susceptibility to concussions?" The results were shocking. The pie graphs, used to identify the difference in proportions showed low measures of standard deviation. In the line graphs, offense players showed large dips in numbers, defense players with small periodic dips and large increases at the year's end. These data visualizations, although they aid in displaying the deviation of concussion data periodically, a correlation cannot be made due to lack of variation. Amongst the two, the pie graphs yielded the most error. The two distinct bmi groups yielded roughly the same percentages of injuries, differences by a small margin (1% or lower), possibly due to how the data was separated, and despite the large number of players with an above average BMI in the histograms, its sheer size revealing little impact on the percentages, possibly undermining the idea of BMI's negative effect on concussion rates. However, the addition of discrete medical info on each NFL player (health history) and NFL rule change history could alter the results.