Link: [**https://hahmed1020.github.io/Obesity-Project/**](https://hahmed1020.github.io/Obesity-Project/)

**Figure 1 – Box Plot:**

Figure 1 is a box plot displaying the distribution of weight, in kilograms, across various obesity levels: insufficient weight, normal weight, overweight (Level I and II), and obesity (Type I, Type II, and Type III). Since there was one categorical variable and one numerical variable, we decided to do a boxplot to understand the range and spread of weights within each category. Although the data is grouped, we still decided to show each level to determine if there was a trend in weights. We chose a sequential color scheme of blue to depict the progression of obesity level. We added a Tooltip interaction, where the user can hover over each box plot and view precise statistical values for each obesity level, including the minimum, first quartile (Q1), median, third quartile (Q3), and maximum weights. We prioritized this feature because we found it important that the user can obtain accurate values rather than relying on visual estimates. Nonetheless, the marks in this plot are the individual box plots, whiskers, and outliers for each obesity level. The channels include position along the axes (weight on the y-axis and obesity level on the x-axis), as well as color, which encodes the progression of obesity levels from light to dark blue.

**Figure 2: Interactive Scatter Plot — Height vs. Weight with Obesity Levels**

This scatter plot visualizes the relationship between height and weight, categorized by obesity level. Each point represents an individual, with color indicating their obesity classification. A sequential blue color palette was applied to maintain color-blind accessibility, ranging from light blue for Insufficient Weight to dark blue for Obesity. The categories are grouped conceptually into broader classes—Insufficient Weight, Normal Weight, Overweight, and Obesity—with color shades offering a smooth visual gradient while still providing clear differentiation. Since this figure was created using Altair, it supports multiple interactive features. First, users can zoom and pan across the scatterplot to explore dense regions of data. Second, an interactive tooltip allows users to hover over any point and view detailed information, including the individual's age, gender, height, and weight—encouraging a more personalized understanding of the dataset. Finally, users can filter by obesity category using radio buttons below the chart; when a category is selected, all other points are grayed out, enabling a focused view of the group of interest while maintaining overall context. We chose to do a scatterplot with these interaction features to understand the relationship between various obesity factors of individuals, especially numerical ones, such as weight and height. In this visualization, the marks are points representing individuals, while the channels include position (x-axis for height and y-axis for weight) and color (used to indicate obesity level).

**Figure 3: Gender-Based Breakdown of Obesity Levels**

This treemap displays the distribution of individuals across different obesity levels, separated by gender. Each rectangle represents a unique gender–obesity level combination, and its size corresponds to the number of individuals in that category. A sequential blue color palette is used again in this figure to support color-blind accessibility while also visually representing obesity severity. Lighter shades denote Insufficient and Normal Weight, while progressively darker shades represent higher obesity classifications. This use of color maintains visual clarity while subtly reinforcing the progression of obesity levels. Since this figure was created in Tableau, it incorporates an interactive tooltip feature: when users hover over a section, they can view detailed information including gender, obesity level, and the exact count of individuals in that category. Additionally, users can click on a specific box to highlight it, causing the rest of the chart to grey out. This feature enhances comparative analysis by allowing users to focus on a specific group without distraction from other categories. Originally, we had displayed this information as a bar chart; however, to introduce diversity into our visualizations, we decided to do a treemap as it is another way to show the two categorical features. This form of visualization also enables viewers to understand the hierarchy of categories. In this treemap, the marks are rectangles, and the channels used include area (to represent the number of individuals), color (to show obesity severity), and categorical grouping (gender and obesity level).

**Figure 4: Interactive Panels**

This two-part visualization shows how age and weight relate to meal frequency across different obesity levels. The upper panel features an interactive scatterplot where each point represents an individual, plotted by their age and weight, and colored by obesity level. To ensure accessibility and aesthetic consistency, we used a sequential blue palette that progresses from light to dark, corresponding with increasing obesity severity. This palette is colorblind-friendly and aligns with the visual language used throughout the site. In the scatterplot, the marks are points representing individuals, and the channels include position (age on the x-axis and weight on the y-axis) and color (indicating obesity level). The lower panel is a dynamic bar chart that updates in real time based on the user's selection in the scatterplot, showing how individuals within the selected group are distributed by obesity level and number of meals consumed. In the bar chart, the marks are bars representing the count of individuals, and the channels include length (to show frequency), position (categorical axes for obesity level and meal count), and color (again encoding obesity level). This dual-view design allows users to visually explore and filter complex relationships in the data, enabling a deeper understanding of how obesity intersects with age, weight, and dietary habits. The interactivity encourages personalized exploration, making it easier to identify patterns such as clustering of obesity levels in certain age-weight ranges or common meal frequencies within specific groups.

**Figure 5: Stacked Bar Plot**

For the D3-based visualization, we designed a stacked bar chart to explore the relationship between snacking frequency (CAEC) and obesity levels. The goal was to reveal patterns in how frequently individuals consume food between meals and how that relates to their obesity classification. A stacked bar chart was chosen because it clearly shows how the total number of individuals is distributed across obesity categories within each CAEC group (e.g., "Sometimes", "Frequently"). To enhance accessibility and consistency across visualizations, we applied a sequential blue color palette ranging from light to dark blue to represent increasing obesity severity, from Insufficient Weight to Obesity Type III. This palette ensures color-blind friendliness while visually reinforcing progression in obesity levels. Interactivity was embedded through tooltips, which allow users to hover over segments to view exact counts and category breakdowns. Additionally, hovering over a bar dims the rest of the chart, helping users isolate and interpret patterns more clearly. The marks in this visualization are the rectangular segments of each stacked bar, and the channels used include position (stacked vertically to indicate counts), length (to represent magnitude within each category), and color (to encode obesity levels). This design prioritizes both accessibility and interpretability, aligning with the overall theme of health behavior analysis.