



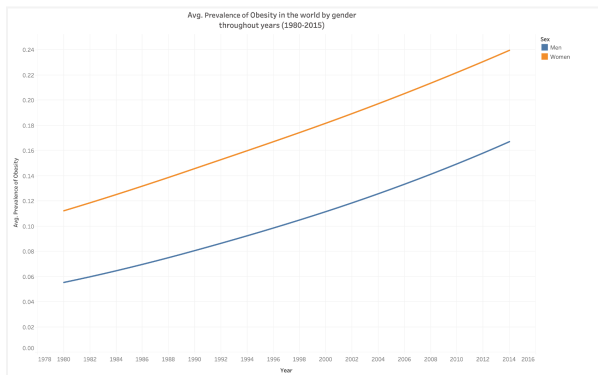
Middlesex University London
CST4060 Visual Data Analysis
Dr. Clifford De Raffaele

Assignment 1 - Data Visualization using Tableau
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Analysis 1



Findings: This visualization shows the average prevalence of obesity segregated by gender from 1980 to 2015, both men's and women's obesity were increasing but women's was always higher than men's.

What:

Dataset Types: Table

Data Types: Items and attributes

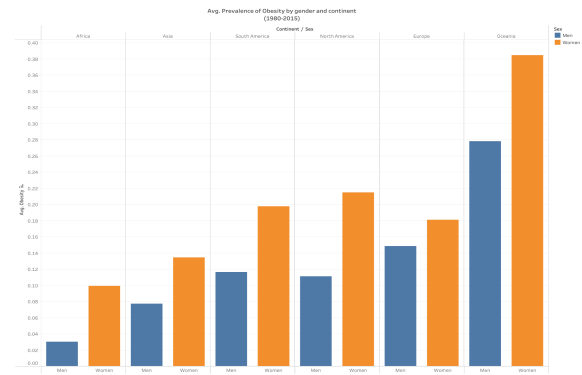
Attribute Types: Country (Categorical), Prevalence of BMI>=30 kg/m² (obesity) (Quantitative), Year (Categorical), Sex (Categorical)

Why:

- The analysis used is to plot the average obesity of countries across years and discover the increase in average obesity throughout the years from 1980 to 2015, the target is to identify the trend of average prevalence of obesity over years.
- Actions: analyze (discover), search (explore), query (compare)
- Target: data (trends), attribute (many– similarity)

How:

- Encoding:
 - Marks: line
 - Channels: position (average prevalence of obesity and year are mapped to position), color (sex is mapped to the color)
- Why are such visual mapping and design effective: A line chart is useful to explore the trend throughout the years for the average prevalence of obesity, continuous value.



Findings: This visualization shows the average prevalence of obesity across all continents by sex from 1980 to 2015, there was a trend that women's obesity was always higher than men's across all continents.

What:

Dataset Types: Table

Data Types: Items and Attributes

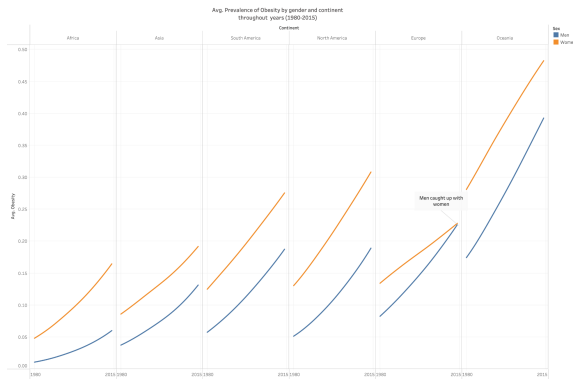
Attribute Types: Continent (Categorical), Obesity (Quantitative), Sex (Categorical)

Why:

- The graph is to plot the average obesity and compare between women and men across all continents.
- Actions: analyze (discover), search (explore), query (compare)
- Target: data (trends), attribute (many– similarity)

How:

- Encoding:
 - Marks: line
 - Channels: position vertical (average prevalence of obesity is mapped to position), color (sex is mapped to the color)
- Why are such visual mapping and design effective: Bar chart is useful to compare between 2 categorical variables (men and women). All continents are placed in the ascending order of average prevalence of obesity and put next to each other to compare easily.



Findings: Throughout the years, the women's value was always higher than men's except for Europe, for the first time, the men caught up with women.

What:

Dataset Types: Table

Data Types: Items and Attributes

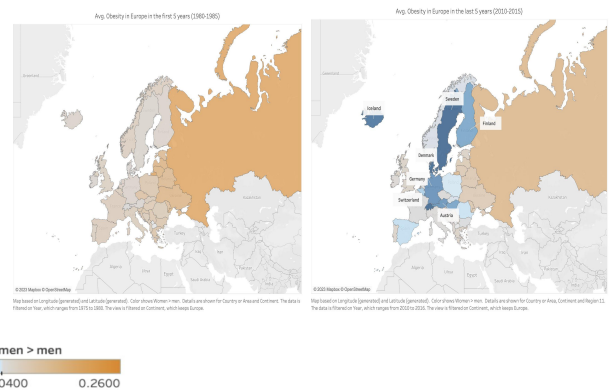
Attribute Types: Continent (Categorical), Obesity (Quantitative), Year (Categorical), Sex (Categorical)

Why:

- The graph is to explore the trend of the average obesity to find any abnormalities. happen throughout the years in each continent.
- Actions: analyze (discover), search (explore), query (compare)
- Target: data (outliers), attribute (many– similarity)

How:

- Encoding:
 - Marks: line
 - Channels: position both (average prevalence of obesity and year is mapped to position), color (sex is mapped to the color)
- Why are such visual mapping and design effective: The line chart is useful to explore the trend of obesity prevalence between 2 categorical variables (men and women) throughout the year. All continents are placed in the ascending order of average prevalence of obesity and put next to each other to compare easily.



Findings: In Europe, for the first 5 years, all the countries had women's average obesity higher than men's. However, for the last 5 years, the trend changed as there were some countries (Sweden, Denmark, Germany, Switzerland, Iceland, Austria, Finland) having men's values higher than women's.

What:

Dataset Types: Table

Data Types: Items and Attributes

Attribute Types: Continent (Categorical), Country (Categorical), Obesity (Quantitative), Year (Categorical), Sex (Categorical)

Why:

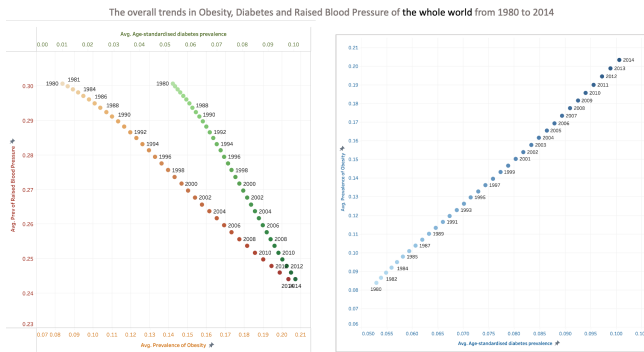
- This analysis is divided into two charts, the first chart shows the difference of the average obesity between women and men in each European country for the first 5 years (left chart) and the last 5 years (right chart).
- Actions: analyze (derive), search (browse), query (compare)
- Target: data (outliers), attribute (many– similarity)

How:

- Encoding:
 - Marks: area
 - Channels: position (position for each country), color (difference of the average obesity between women and men is mapped to the color: orange means women's value higher than men's, and blue is the opposite)
- Why are such visual mapping and design effective: A Map is useful to see the overview of the whole continent. By using the color scale, it is easy to point out the countries having the opposite trend with the others. The 2 maps show the changes in Europe between the beginning and the end of the observation time.

Conclusion: Almost all countries have avg. percentage of obesity of women higher than men. In Europe, the male's value increased rapidly and caught up with women's at the end, because of some countries (Sweden, Denmark, Germany, etc.), recently, having men's values higher than women's.

Analysis 2



Findings: The visualization shows the prevalence of obesity and diabetes had a strong positive correlation over the years, while the prevalence of raised blood pressure had a notable negative correlation with both. This relationship shows a diverging trend in obesity, diabetes, and raised blood pressure, which suggests that while there were concerning health trends related to obesity and diabetes, there may be some positive sights on blood pressure trends.

What:

Dataset Types: Table

Data Types: Items and attributes

Attribute Types: Year(Categorical), Obesity (Quantitative), Prevalence of raised blood pressure (Quantitative), Age-standardized diabetes prevalence (Quantitative)

Why:

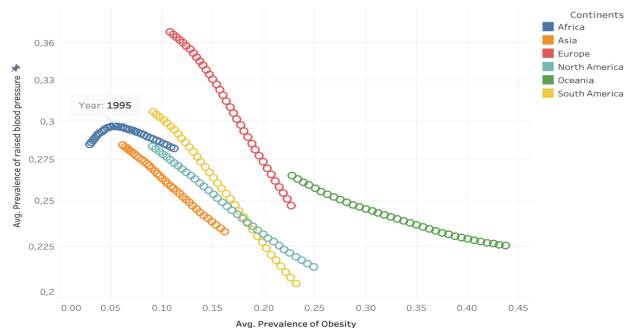
- The analysis used is to plot the relationship between average blood pressure, diabetes, and obesity throughout the years from 1980 to 2014.
- Actions: analyze (discover), search (lookup), query (compare)
- Target: data (trends), attribute (many– correlation)

How:

- Encoding:
 - Marks: points
 - Channels: position (Avg. BP, Avg. Obesity, and Avg. diabetes are mapped to position), color (the relationship between Avg. BP and Obesity; Avg. BP and diabetes; Avg. Obesity and Diabetes are mapped to color)
- Why are such visual mapping and design effective: A scatter chart is useful to explore the relationship throughout the years for all three categories, distinct colors represent different relationships, making it easy to spot fluctuations and trends

Because the prevalence of obesity and diabetes has a nearly linear relationship, the next part will focus more only on the relationship between the raised blood pressure and obesity. It would be the same for the relationship between the raised blood pressure and diabetes.

The overall trends in Obesity and Raised Blood Pressure of every continent from 1980 to 2014



Findings: The visualization shows that most continents have the same negative correlation between the prevalence of raised blood pressure and obesity, **except for Africa**. The correlation changed from positive to negative. For Africa, the prevalence of raised blood pressure increased until 1995 and then decreased, while the prevalence of obesity kept increasing.

What:

Dataset Types: Table

Data Types: Items and Attributes

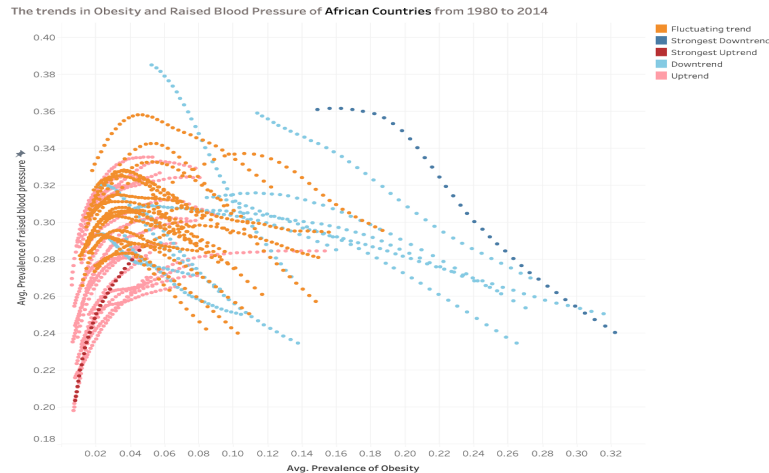
Attribute Types: Continent (Categorical), Year (Categorical), Blood Pressure (Quantitative), Obesity (Quantitative)

Why:

- The purpose is to see the trend and correlation between obesity and raised blood pressure prevalence based on each continent over the years from 1980 and 2014.
- Actions: analyze (discover), search (explore), query (compare)
- Target: data (outlier), attribute (many– correlation and similarity)

How:

- Encoding:
 - Marks: Points
 - Channels: position (the yearly average prevalence of obesity and raised blood pressure are mapped to position), color (continents are mapped to the colors)
- Why are such visual mapping and design effective: the scatter plot is useful to easily explore relationships between variables throughout the years across all continents.



Findings: The scatter plot illustrates a shared upward trend in obesity prevalence across all African countries under consideration, while different trends emerging on the prevalence of raised blood pressure. Among these nations, some exhibited a rising trend in raised blood pressure, some others showed a declining pattern, and most of them demonstrated a fluctuating trend over the observed period.

What:

Dataset Types: Table

Data Types: Items and Attributes

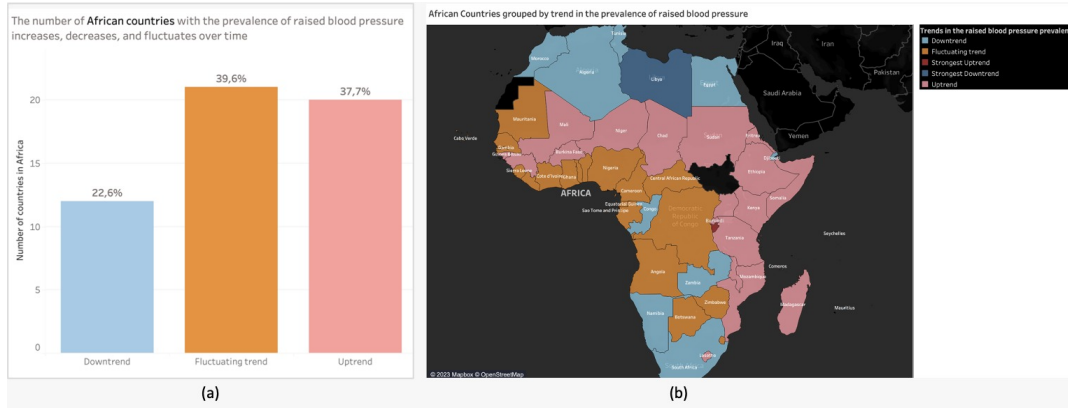
Attribute Types: Quantitative (Categorical), Diabetes (Quantitative), Year (Categorical), Obesity (Quantitative), Blood Pressure (Quantitative)

Why:

- The purpose of this analysis is to discover the relationship between obesity and raised blood pressure prevalence of every African country over the observed period.
- Actions: analyze (derive), search (explore), query (compare)
- Target: data (features), attribute (many– correlation and similarity)

How:

- Encoding:
 - Marks: Points
 - Channels: position (yearly average prevalence of obesity and raised blood pressure are mapped to position), color (different trends: up, down, fluctuated trends in the prevalence of raised blood pressure are mapped to the colors)
- Why are such visual mapping and design effective: the scatter plot is useful to easily explore relationships between variables throughout the years across all countries and discover the different groups based on the different trends. There are three main groups discovered here, which are countries with uptrend, downtrend and fluctuating trend in the prevalence of raised blood pressure (considered as X).
 - These groups are defined by taking the year of 1995 as the milestone
 - Countries with X increased from 1980 to 1995 and also 1995 to 2014 would be in the uptrend group,
 - Countries with X decreased from 1980 to 1995 and also 1995 to 2014 would be in the downtrend group
 - Countries with X increased from 1980 to 1995 and then decreased from 1995 to 2014 would be in the fluctuating group.



Findings: Most African countries experienced an upward and then downward trend in the prevalence of raised blood pressure over the observed period, leading to the observed different trend compared to the rest continents.

What:

Dataset Types: Table

Data Types: Items and Attributes

Attribute Types: Country (Categorical), Diabetes (Quantitative), Year (Categorical), Obesity (Quantitative), Blood Pressure (Quantitative), Continent (Categorical)

Why:

(a) The bar chart

- The bar chart compares the number of countries with the uptrend, downtrend and fluctuations in raised blood pressure prevalence over time in Africa, aiding the analysis of health trends and facilitating cross-country comparisons.
- Actions: analyze (discover), search (explore), query (compare)
- Target: data (features), attribute (one – distribution)

(b) The map

- The map shows the trends of each country and spatial relationships of African countries in three groups of trends and also highlights the countries with the strongest uptrend and downtrend in the prevalence of raised blood pressure.
- Actions: analyze (discover), search (explore), query (identify)
- Target: data (features), attribute (one – distribution)

How:

(a) The bar chart

- Encoding:
 - Marks: lines
 - Channels: position (countries are mapped to the position) and color (countries with the same trend are mapped to the same color)
- Why are such visual mapping and design effective: the bar chart is useful to easily compare the number of countries in three categories.

(b) The map

- Encoding:
 - Marks: area
 - Channels: position (position for each country), color (difference groups are mapped to the color)
- Why are such visual mapping and design effective: Map is useful to see the overview of the whole continent. By using the different colors, it is easy to determine the countries in different group.