**Narrative Visualization project report**
**CS 416**
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The URL of my narrative visualization is https://yulinggao.github.io/.

1. **Messaging**

The project highlights and explores the patterns and disparities in suicide cases across different genders, years, and age groups. It emphasizes the significant imbalance in suicide rates between males and females, with males consistently showing higher numbers of cases. Additionally, it brings attention to the age group of 35 to 54 years, which consistently experiences the highest number of suicide cases.

Furthermore, the project visually demonstrates the relationship between suicide cases and average GDP per capita, showing how suicide rates vary with the economic status of different countries.

Overall, the narrative visualization conveys the importance of understanding and addressing the complex factors contributing to suicide rates. It encourages viewers to recognize the impact of gender, age, and economic factors on suicide trends and advocates for thoughtful policy measures and interventions to reduce suicide rates and provide support for vulnerable populations.

2. **Narrative Structure**

The narrative visualization was designed to follow the "interactive slide show" structure.

The interactive slide show structure allows users to progress through the visualization in a linear manner, presenting information in a sequence with a clear narrative flow. In this narrative visualization, the users are guided through a series of interconnected visualizations, starting with the main bar chart that presents an overview of suicide cases across genders and year.

When users click on any bar, which represents a specific year, it will redirect users to drill-down and explore the detailed chart "Female Detail Chart for Year Selected" (second slide) that displays the distribution of suicide cases of that selected year among different age groups for females, providing a broad perspective. The chart immediately catches the users' attention, highlighting the significant difference in suicide rates between total cases and female cases. Users can then click on the "Go to Male Chart"

button on the second slide to see the detailed chart for male suicide cases for the selected year. They can also click on “Go Back to Main Chart” to select a new year.

The narrative then provides focused insights through "Male Detail Chart for Year Selected" (third slide). Similarly, users can click on the "Go Back to Female Chart" button on the male detailed chart to explore the detailed chart for female suicide cases. Alternatively, they can click on “Go to Scatterplot” to access the final chart.

The narrative visualization concludes with a "scatterplot" (fourth slide), illustrating the relationship between suicide cases and average GDP per capita. All data points are blue while the one representing the user selected year will be marked red. Additionally, specific years of interest (1988, 2003, and 2015) are highlighted in the scatterplot with circles and corresponding custom descriptions to provide more context and insights. Users are allowed to hover over any bar or data points in any charts in this visualization to see detailed information on popup tooltips.

Throughout the interactive slide show, users have the opportunity to "drill-down" and explore specific aspects of the data in more detail, providing an engaging and informative experience. The structure allows for a seamless flow of information, guiding users through the story while offering interactivity for deeper exploration at key points in the narrative.

3. **Visual Structure**

The visualization mainly uses bar charts for three scenes. The fourth scene includes a scatterplot to give users a better understanding of the relationship of year they selected with the overall situation. The visual structures used in each scene ensure the viewer can understand the data presented, navigate between scenes seamlessly, and recognize the important parts of the data. The consistent use of colors, labels, tooltips, and clear call-to-action buttons enhance the user experience and enable a coherent narrative flow throughout the visualization.

For the main bar chart scene(first slide), it presents a grouped bar chart with year on the X-axis and the number of suicide cases on the Y-axis. The bars are grouped by gender and are color-coded (black for female cases and steelblue for total cases). The chart uses clear labels and axes, making it easy for viewers to understand the data and identify different years and genders. Hovering over the bars displays tooltips with exact values, allowing viewers to get specific information for each bar. The chart's title and description provide context for better comprehension. The chart uses contrasting colors for total and female bars, highlighting the significant difference in suicide rates between genders. The ability to click on bars to see detailed information for each year provides

clear calls-to-action, enabling viewers to transition to more detailed bar charts for male and female data.

In the "Female Detail Chart for Year Selected" (second slide) and "Male Detail Chart for Year Selected" (third slide), the detailed bar charts follow the same grouped bar chart format as the main chart, but with age groups on the X-axis and the number of suicide cases on the Y-axis. The bars are grouped by gender and are color-coded (black for female and steelblue for total on the second slide, black for male and steelblue for total on the third slide). Similar to the main chart, the detailed charts provide clear labels, axes, and tooltips for easy data comprehension. Users can hover over the bars to view exact values. The contrasting colors for male and female bars continue to highlight the difference in suicide rates between genders. The title and description draw attention to the specific year selected, providing a clear focus for the data presented. The emphasis on the highest bar (age group 35 to 54) also draws attention to the most critical data point. Buttons enable users to easily transition back to the main chart or switch between male and female detailed charts. The consistent visual format maintains continuity and connection between scenes.

In the last slide, the scatterplot plots suicide cases (total suicides) on the Y-axis and average GDP per capita on the X-axis. Each data point represents a year, and specific years of interest (1988, 2003, and 2015) are highlighted with circles and labeled custom descriptions. The scatterplot utilizes labeled axes, providing clear information about the variables being compared. Hovering over data points displays tooltips with detailed information about each year's suicide cases and GDP per capita. The circles and custom descriptions highlight specific years that are important for the data analysis. This draws the viewer's attention to key data points and emphasizes their significance. Buttons facilitate smooth transitions back to the main chart or detailed male chart. This allows viewers to connect the information presented in the scatterplot with the previous scenes.

4. **Scenes**

The narrative visualization consists of the following scenes:

First, the “Number of Suicides Between 1985 and 2015” bar chart. The first scene presents the main bar chart. The scene provides an overview of the data and highlights the differences in suicide rates between genders and years. The second scene is the “Female Detail Chart for Year Selected” bar chart. The second scene is a more focused view of the main chart, zooming in on the data for female populations. This scene

provides deeper insights into the suicide patterns among males across different age groups. The third scene is the “Male Detail Chart for Year Selected” bar chart. It is similar to the previous one, but it focuses on the male population. The last scene is the “Scatterplot of Suicide Cases vs. Average GDP”. It introduces a scatterplot that compares the total number of suicide cases with the average GDP per capita for each year. This scene enables viewers to understand the relationship between suicide cases and GDP per capita and identifies significant years in terms of suicide rates. Users can also see the year they selected on a large scale to understand how suicide rates changed over the year.

The scenes are ordered in a logical linear sequence to tell a coherent and insightful data story. The visualization starts with the main bar chart scene to provide an overview. It sets the foundation for understanding the general distribution of suicides and the disparity between males and females. The narrative then dives deeper into the data by presenting separate detailed bar chart scenes for males and females. This allows viewers to explore and compare the suicide patterns within each gender group, focusing their attention on the specific age groups that are most affected. Finally, the scatterplot scene introduces another dimension by showing the correlation between suicide cases and average GDP per capita over the years. The highlighted years with custom descriptions draw attention to critical points in the data, providing context for potential connections between economic factors and suicide rates. The order of scenes is carefully structured to guide the viewer through a step-by-step analysis, starting from the general overview and gradually zooming into specific aspects of the data.

5. **Annotations**

The narrative visualization follows a template of textual annotations placed within each scene to provide contextual information and support the messaging. The annotations are designed to enhance the viewer's understanding of the data and highlight key insights.

One essential feature of the visualization is the implementation of tooltips, which are accessible in every chart. When users hover over a bar or data point, a standardized tooltip template appears, presenting pertinent information in a clear and concise manner. The tooltip, presented as a dark box with white text, provides details like "Total Suicide Cases" and "Average GDP Per Capita" specific to the data point. This not only enhances the user experience but also supports the messaging by offering specific data points for users to understand the chart effortlessly.

To further facilitate user engagement and emphasize essential data points, certain bars and data points are enclosed within circles, accompanied by descriptive annotations

adjacent to the circles. This intentional highlighting urges users to concentrate on these critical data elements, enhancing their understanding of the overall data trends.

While the templates of the annotations remain consistent throughout the visualization, the annotations themselves are contextually relevant and specific to each scene. When transitioning to a new scene, the annotations from the previous scene disappear, ensuring a clean slate for the next set of data to take center stage. This approach is imperative as it allows users to focus solely on the information pertinent to the current scene, preventing any clutter or confusion.

6. **Parameters**

In this visualization, the primary parameter is the "selectedYear," which allows users to interactively choose a specific year to explore the data visually. Other parameters are buttons to switch between male and female detail charts, the button to see the scatterplot, and buttons to go back to the main chart. As users interact with the visualization, selecting different years through clicks, the selectedYear parameter updates, triggering a transition to the corresponding state.

Most scenes within this narrative visualization are designed around a specific selectedYear, and the parameters play a vital role in defining the state of each scene. When users select a particular year through clicks in the visualization, the selectedYear parameter captures this input and communicates it to the underlying data processing and visualization scripts. As a result, the visualization adapts dynamically to present the data relevant to the chosen year, providing users with a focused view of the data for that specific timeframe.

Throughout the narrative visualization, the selectedYear parameter acts as a bridge between the user's interactions and the visual representation of the data, defining the state of each scene and ensuring that the user's focus remains on the relevant information corresponding to their chosen year.

7. **Triggers**

The triggers in this visualization are mostly buttons. In the first chart, the trigger is clicking on bars to go to the second chart for the selected years.

In the second chart(female bar chart), one trigger is clicking on the "Go to Male Chart" button to redirect the user to the third page, passing the selected year as a parameter in the URL. Another trigger is clicking on the "Go Back to Main Chart" button to redirect the user to the first chart.

In the third chart(male bar chart), one trigger is clicking on the "Go to Scatterplot" button to redirect the user to the fourth page, passing the selected year as a parameter in the URL. Another trigger is clicking on the "Go Back to Female Chart" button to redirect the user to the second chart with the selected year.

In the fourth chart(scatterplot), one trigger is clicking on the "Go Back to Male Chart" button to redirect the user to the third page, passing the selected year as a parameter in the URL. Another trigger is clicking on the "Go Back to Main Chart" button to redirect the user to the first chart.

The narrative visualization provides several affordances to communicate available options to the users. Each button is labeled descriptively, indicating its function and destination. For example, "Go to Male Chart" and "Go to Scatterplot" buttons explicitly convey their respective actions. There are also descriptive texts showing the users what each button does. Also, throughout the visualization, tooltips are available to provide contextual information when users hover over bars or data points. These tooltips guide users on how to interact with the visualization and understand the data better. The visualization uses visual cues like color (e.g., highlighting the selected year in red) to draw attention to specific data points and convey the current state to the users.