

Assignment 3: Persuasion & Deception

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Description

In this assignment we will explore how we can use visualization for persuasion and deception. You will create three visualizations: two to show how we can create visualizations of opposing perspectives from the same dataset, and one to explore how we can actively deceive readers through various manipulations.

Submission Requirements

Provided Template

In the GitHub repository, you will find six files: `index.html`, `USgap.js`, `d3.v7.min.js`, `simplestatistics.js`, `README.md`, and `spec.pdf`. The `index.html` provides a minimal HTML outline to set up your webpage and structure your responses. The `USgap.js` file contains the data for your plots and is described below. `d3.v7.min.js` is a copy of the d3 library. `simplestatistics.js` is a copy of the simplestatistics library (discussed below). You will need to load these before any other scripts that use d3 or simplestatistics. `README.md` provides a template to use for documenting your repository as described below. Finally, `spec.pdf` contains a copy of the assignment specification (this document).

Over the course of this assignment, you may want to perform additional analyses when designing some of your plots, such as calculating a trend line using linear regression. For any extra analysis, you may use whatever library you feel is appropriate or calculate it by hand. For convenience, I have provided a library called `simplestatistics.js` that supports statistics such as [linear regression](#). If using external libraries or functions designed by anyone but yourself, be sure to cite them in your `README.md`.

Submitted Files

You will create your visualizations in `index.html`, it should be the only HTML file in your submission. You may add any additional JavaScript and CSS files as you see fit. At this point, I would like us to move away from writing JavaScript code in HTML files. As such, the vast majority of your JavaScript should be written in an external `.js` file (or files) and loaded into your HTML page. You must add appropriate documentation via commenting to all JavaScript code, whether it's in a separate `.js` file or written directly in your `index.html` file. Finally, you should include a `README.md` file (using the given template) that provides a text description of what is in your repository, how to run your program and any parameters that you used. Also, document any idiosyncrasies, behaviors, or bugs of note that you want us to be aware of. When you have completed your assignment, please submit the link to your GitHub repository on Canvas to indicate that you have completed work on your assignment.

For two of the visualizations, you must use `d3.js` to create your plots. However, you may also use any other external libraries that you see fit. For the third visualization, you are free to use any tools you want to design it. If you opt to use additional libraries or external tools, please document what you used and how you used them in your `README.md` file.

Part 1: Creating Persuasive & Deceptive Visualizations (70 pts)

In this part, you will create three plots using the same dataset. The first two plots are designed to provide two opposing perspectives using the same dataset, to illustrate how we can design and manipulate visualizations to persuade people towards a specific viewpoint. I will guide you towards what data to use to show each perspective but will leave it up to you to decide how best to encode that data. For the third visualization, you will design a "black-hat" visualization. Specifically, you will design a visualization that intentionally misleads, stretches the truth or flat out lies.

The dataset we will use is the [The World Bank's Overall Global Gender Gap Index](#). This dataset examines the gap between men and women in four fundamental categories: Economic Participation and Opportunity, Educational Attainment, Health and Survival and Political Empowerment using 14 indicators from 2006 to 2022. The original dataset contains a Global Gender Gap Index, 4 sub-indexes and 14 indicators for 146 countries. For simplicity, I have provided a simplified version that contains only the Global Gender Gap Index and the 4 sub-indexes for just the U.S, from 2006-2022. For each index and sub-index, you will find an attribute containing the index value for the U.S. (from 0-1) and an attribute containing the rank of the US relative to the other 145 countries in the dataset. For example, for the Health and Survival sub-index, you will find the attributes "Health_and_Survival_index" and "Health_and_Survival_rank". The index values range from 0 to 1, where 1 indicates gender equality for the given index.

1a. Amongst its peers, the US has seen a sharp decline in health and survival gender equity in recent years. (25 pts)

First, you will create a visualization that aims to persuade the reader that health and survival gender equity is declining in the US. To do this, you will create a plot of the **rank** of the US over time for the Health and Survival indicator. How you design this plot is up to you. There are a few constraints in this part: (1) your math should be sound - any mappings of the data to visual encodings should correctly quantify the underlying value; (2) you should follow the design principles from class such as choosing the most effective channels for the most important data, using proper scales and labeling, etc.; and (3) you must use `d3.js`.

1b. The US gender equality in health and survival has remained steady at near equality over the last decade. (25 pts)

Now, you will create a visualization that aims to persuade the reader that the gender gap in health and equality has remained largely unchanged in recent years and that the US is very nearly at equality. To do this, you will create a plot of the **index** of the US over time for the Health and Survival indicator. Again, how

you design this plot is up to you but the encoding should not be identical to the previous plot and the same constraints apply as specified above.

1c. Black-Hat Visualization (20 pts)

Finally, you will design an intentionally deceptive visualization. You are not constrained to using the Heath and Survival indicator, you may use any indicators in the provide dataset. You are also welcome to use the more of the dataset that contains these indicators for 146 countries (found [here](#)) if you desire.

You do not need to strictly adhere to visualization principles or correct mathematical mappings of data to visual encodings. You may manipulate the data and visualization in any way you see fit, e.g. perform transformations/aggregations, remove unfavorable/selectively sample data points, manipulate the scales, add chartjunk etc but, ideally, your deception should be subtle enough that it could genuinely mislead someone. It may be helpful to start by picking a viewpoint you want to show, and then finding the manipulations to show it. For this plot (and only this plot) you are free to use whatever you want to design your visualization. You can draw it by hand, design it in an illustrator app, use other visualization tools to create it, or, of course, use `D3.js`. Be creative! If you opt not to create it in JavaScript, you will still need to add a sufficiently high-quality image of your plot to the HTML file in the div tag with the id `plot3_div`.

Part 2: Design Rationale (30 pts)

In this part, you will describe your design for each of your plots using the terminology and principles from class (e.g. describe your chosen marks & channels). Additionally, for plots 1a. and 1b., you should justify your design choices based on the design principles from the lectures 4-8. This should include things like effectiveness, expressiveness, integrity (e.g. scale choice), etc.

For 1c., you should discuss your design rationale (why you made the choices you did), but don't necessarily need to justify each choice using the principles from class (since the goal is to deceive!). Additionally, you should state the message you are trying to convey, identify the type of deceptive visualization you created, and discuss the tools you used to create your deception. What manipulations did you perform to the data? To the visual encoding? Did you break any conventions for how people read plots? Did you perform "bad" math to map your data to the visual channels?

Grading

For plots a and b in Part 1, you will be graded on the soundness of your design - how well you followed the principles of visualization. Your plots should also be well labeled. For your "black-hat" plot in c, you will be graded on how well your deceptive visualization illustrates the intended message indicated in Part 2.

Your answers in Part 2 will be graded on how well they describe and justify your design rationale. You will not lose points for your design choices here but rather for how clear and detailed your descriptions are.