

Today's Agenda

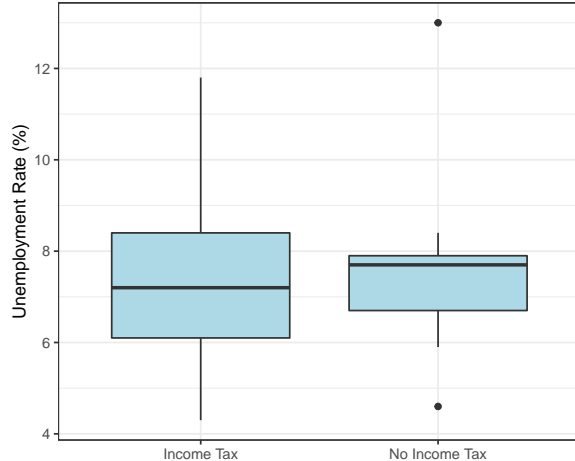
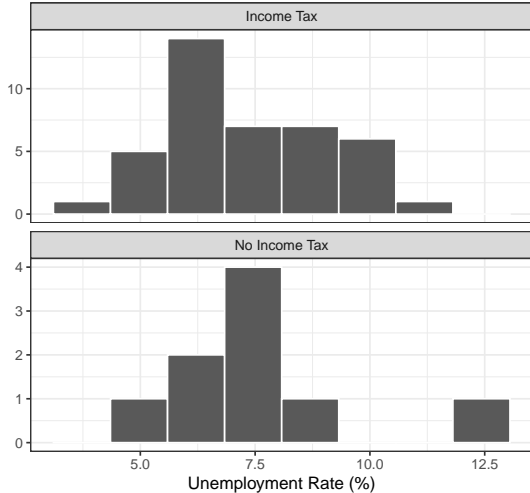
Practice building and polishing univariate, bivariate and multivariate visualizations

Justin Leinaweaver (Spring 2022)

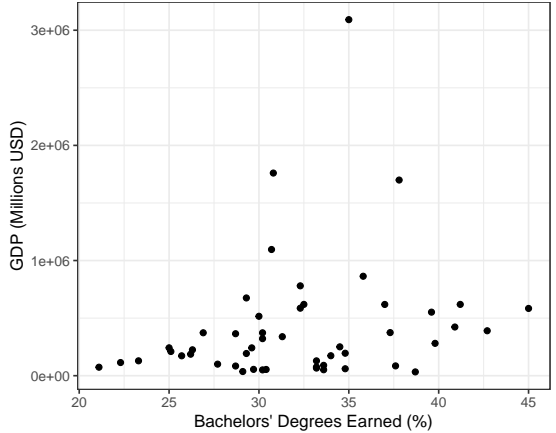
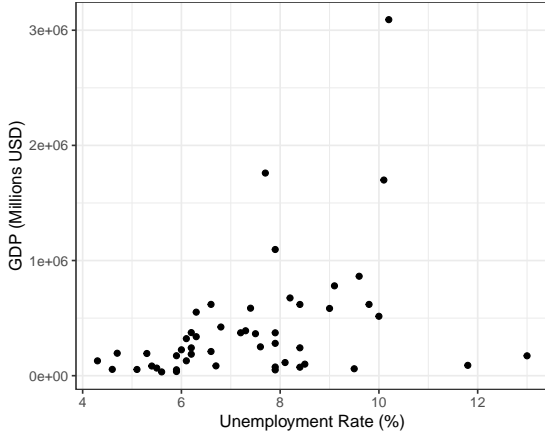
Practice from Tuesday

- 1 Make two histograms of unemployment, one for states with an income tax and one for states without.
- 2 Remake the above as a box plot
- 3 Make and analyze the following four scatter plots:
 - GDP (actual) x Unemployment
 - GDP (actual) x Bachelors' Degrees
 - GDP (rate) x Unemployment
 - GDP (rate) x Bachelors' Degrees

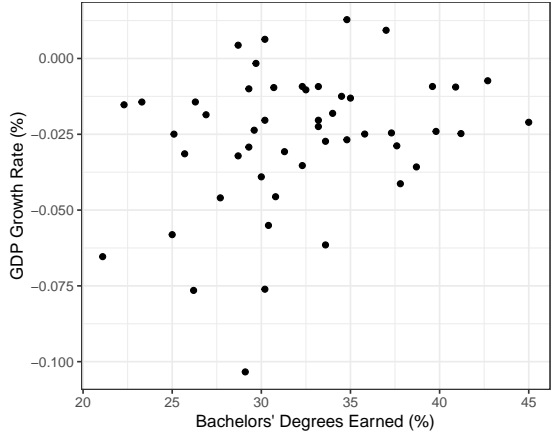
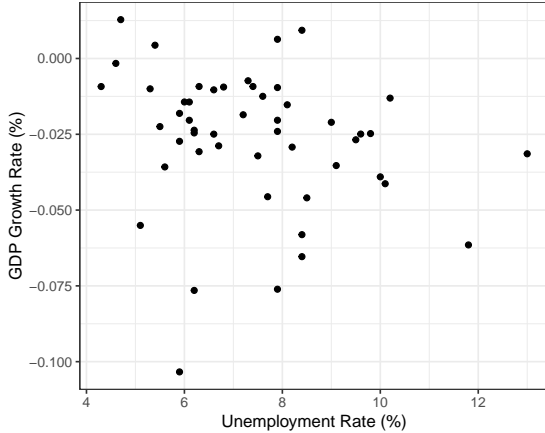
Unemployment x Income Taxes



Scatter plots of GDP (actual)



Scatter plots of GDP (rate)



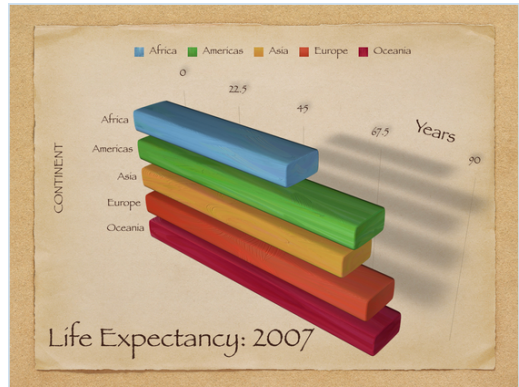
Knafllic, C. (2015). Choosing an Effective Visual. In *Storytelling with Data: A Data Visualization Guide for Business Professionals*. Wiley.

choosing an effective visual

There are many different graphs and other types of visual displays of information, but a handful will work for the majority of your needs. When I look back over the 150+ visuals that I created for workshops and consulting projects in the past year, there were only a dozen different types of visuals that I used (Figure 2.1). These are the visuals we'll focus on in this chapter.

Professional Visualizations

- 1 Informative titles
- 2 Figure labels
- 3 Clean axis labels
- 4 Source info
- 5 No chart junk



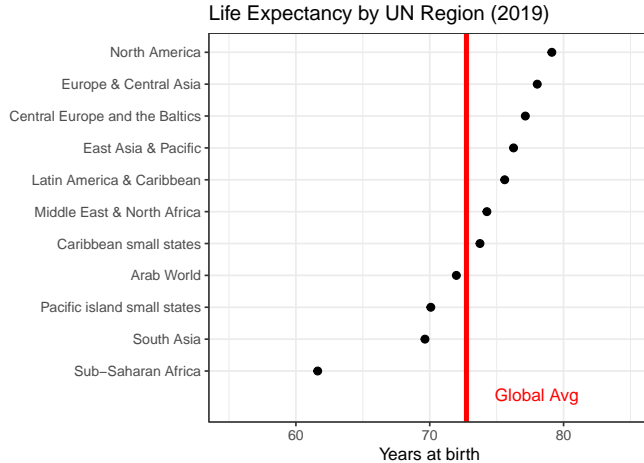


Figure 1: Global life expectancies for 2019 are taken from the World Bank's World Development Indicators (WDI) database and organized by UN region.

Work, Family, and Well-Being in the United States, 1990 (ICPSR 6666)

Version Date: Jun 10, 1996 [Cite this study](#) | [Share this page](#)

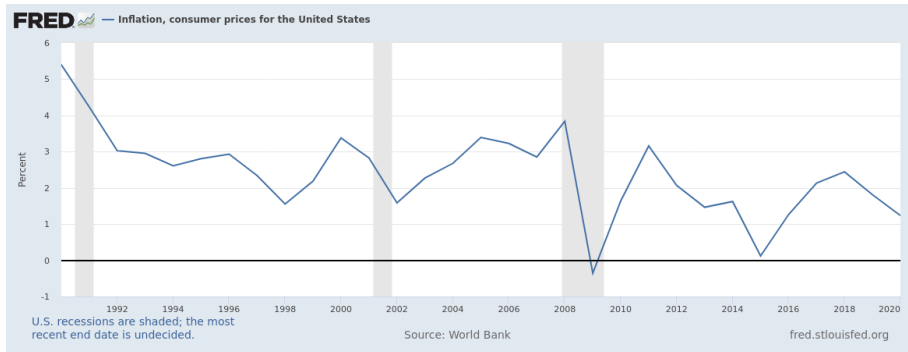
Principal Investigator(s): [Catherine E. Ross](#)

<https://doi.org/10.3886/ICPSR06666.v1>

Version V1

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	height	weight	male	earn	earnk	ethnicity	education	mother_education	father_education	walk	exercise	smokenow	tense	angry	age
2	74	210	1	50000	50	White	16	16	16	3	3	2	0	0	45
3	66	125	0	60000	60	White	16	16	16	6	5	1	0	0	58
4	64	126	0	30000	30	White	16	16	16	8	1	2	1	1	29
5	65	200	0	25000	25	White	17	17	NA	8	1	2	0	0	57
6	63	110	0	50000	50	Other	16	16	16	5	6	2	0	0	91
7	68	165	0	62000	62	Black	18	18	18	1	1	2	2	2	54
8	63	190	0	51000	51	White	17	17	17	3	1	2	4	4	39
9	64	125	0	9000	9	White	15	15	15	7	4	1	4	4	26
10	62	200	0	29000	29	White	12	12	12	2	2	2	0	0	49
11	73	230	1	32000	32	White	17	17	17	7	1	1	0	0	46
12	72	176	1	2000	2	Hispanic	15	15	15	8	1	2	0	0	21
13	72	265	1	35000	35	White	NA	NA	NA	1	1	2	0	0	53
14	72	160	1	27000	27	White	12	12	12	1	2	2	1	1	26
15	70	225	1	6530	6.53	White	16	16	NA	4	1	2	0	0	65
16	63	107	0	0	0	White	14	14	14	7	4	2	2	2	50

Inflation, consumer prices



- Since 1990 $\approx +102.66\%$
- **New Variable:** $\text{earnk}_{2021} = \text{earnk} \times 2.0266$

Univariate Analysis

Visualize the following variables:

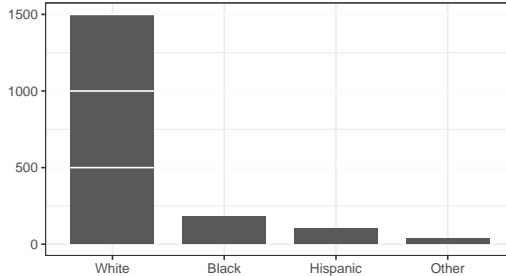
- 1 Ethnicity
- 2 Education
- 3 Yearly Income (earnk2021)

Univariate Analysis

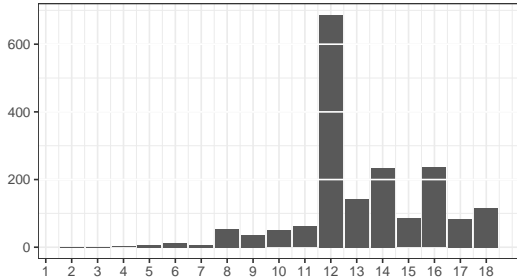
Visualize the following variables:

- 1 Ethnicity - **Bar plot**
- 2 Education - **Bar plot**
- 3 Yearly Income (earnk2021) - **Histogram**

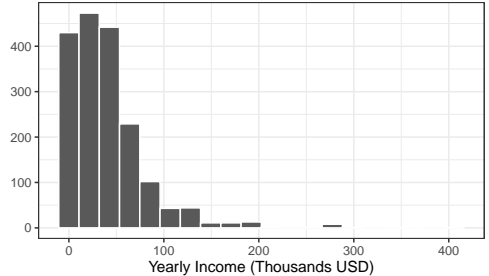
Survey Respondents by Ethnicity



Survey Respondents by Education



Survey Respondents by Income

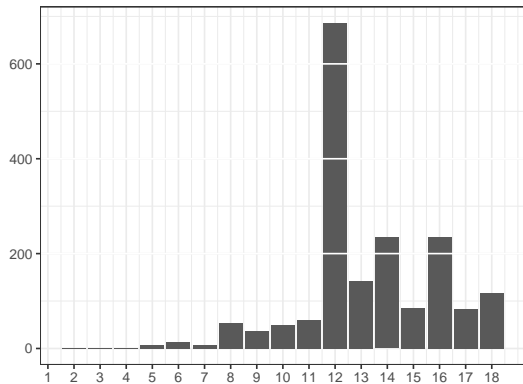


Univariate Analysis

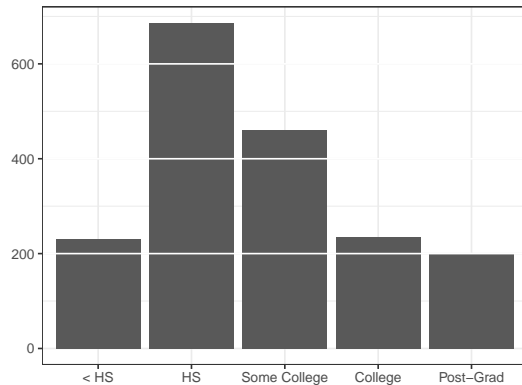
Recode education and remake the visualization:

- < HS (1-11)
- HS (12)
- Some college (13-15)
- College (16)
- Post-Grad (17-18)

Survey Respondents by Education



Survey Respondents by Education

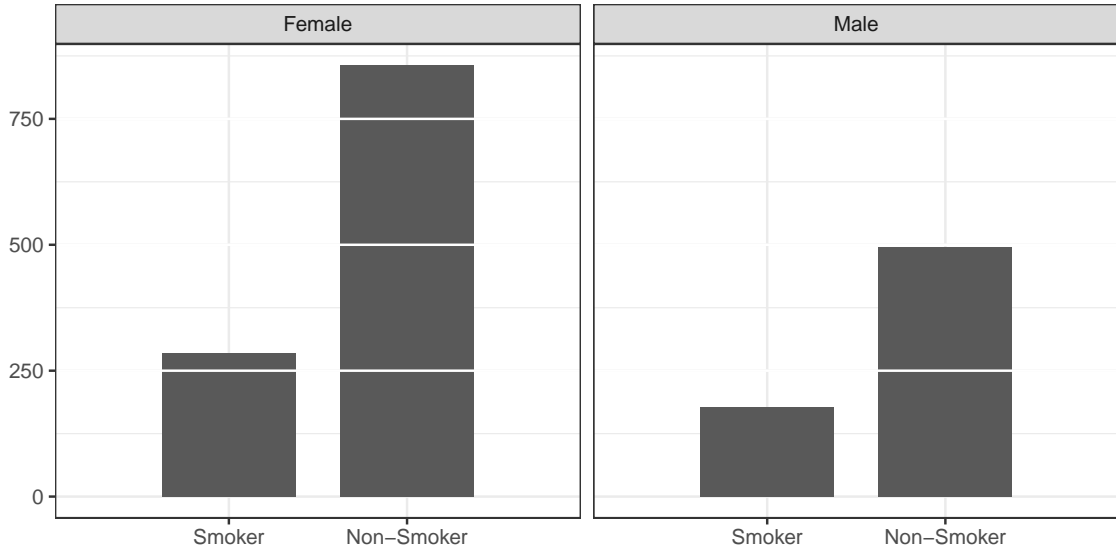


Bivariate Analyses

Visualize the following relationship:

- Gender x Smoker

Reported Smoking Rates by Gender

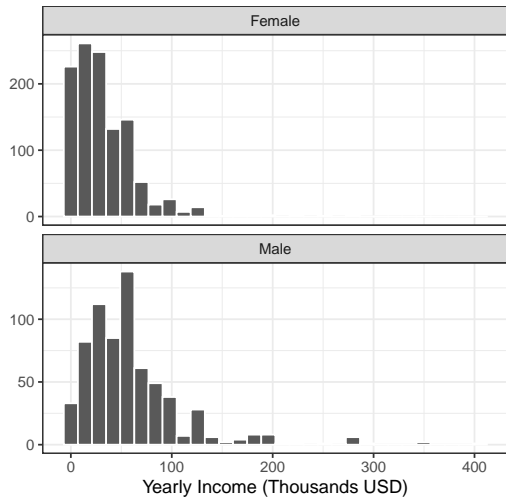


Bivariate Analyses

Visualize the following relationship:

- Income x Gender

Reported Yearly Earned Income by Gender



Reported Yearly Earned Income by Gender

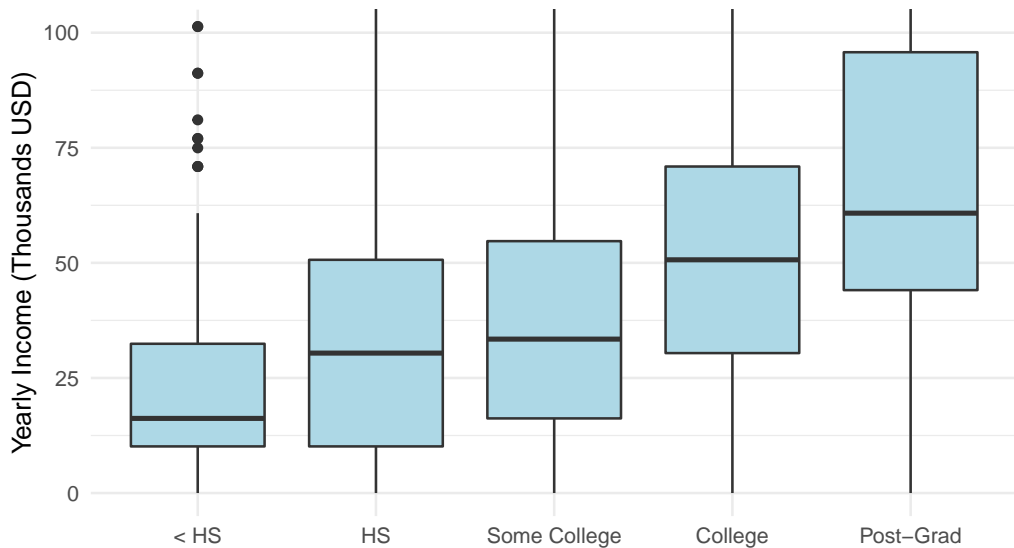


Bivariate Analyses

Visualize the following relationship:

- Income x Education (recoded)

Reported Yearly Earned Income by Education Level



Multivariate Analyses

Visualize the following relationship:

- Income x Education (original) x Gender

Multivariate Analyses

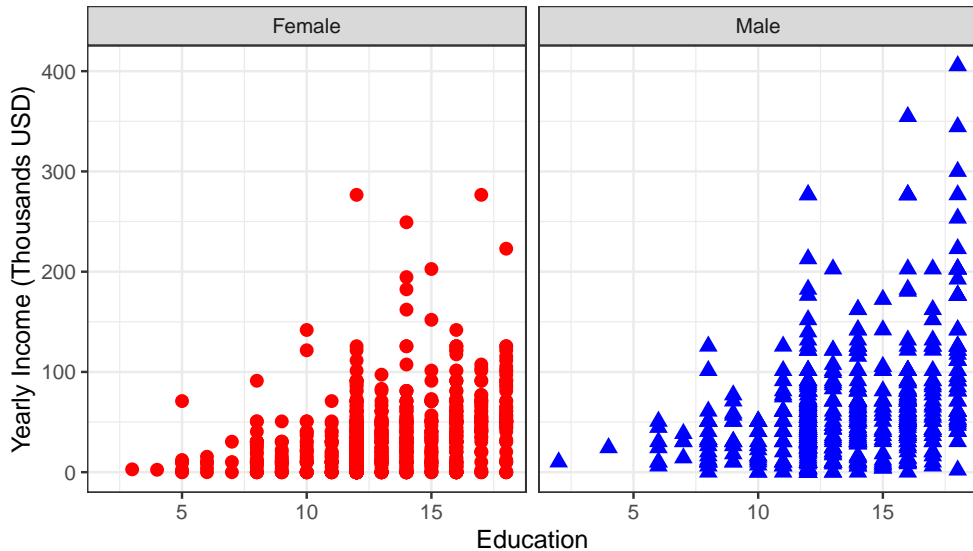
Visualize the following relationship:

- Income x Education (original) x Gender

Make two scatter plots

- 1 Income x Education for males
- 2 Income x Education for females

Does education correlate with income?



Multivariate Analyses

Visualize the following relationship:

- Height x Weight x Gender

Basic Demographics of the Survey Respondents

