Plots Used for STAT 892 Experiment

Ryan Lalicker

Introduction

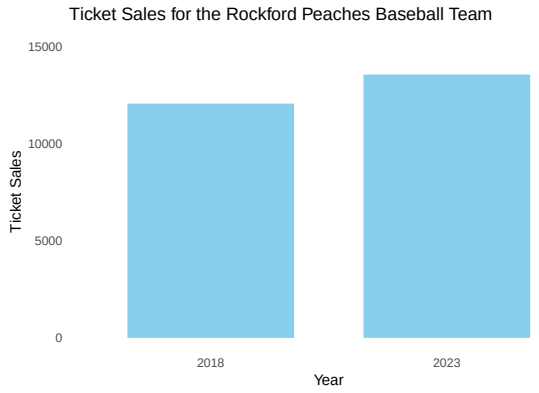
This document is contains the plots that will (or could) be used in the experiment for the STAT 892 final paper. For more information on this experiment see the project's GitHub page.

Note, the data for the noncontroversial plots is made up, but the data for the controversial plots is sourced. The *References* section will lead you to the original data. Also, the *R Code Used* section shows how each plot was created.

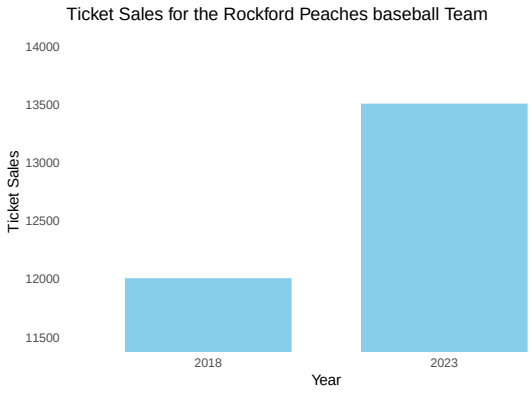
I want to mention some of the controversial were thrown together quickly and may use some flawed logic in terms of identifying the *More Likely to Overestimate* side of the political spectrum. These would need to be refined before proceeding with the experiment. All answers to the listed questions will be on a numbered scale where small number small increase and large numbers imply a large increase.

Noncontroversial Plots

Bar Graphs

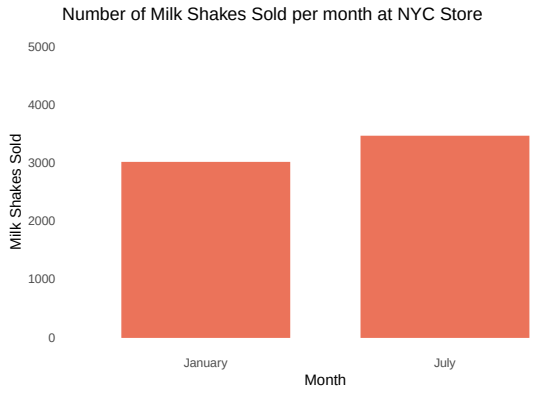


(a) Control

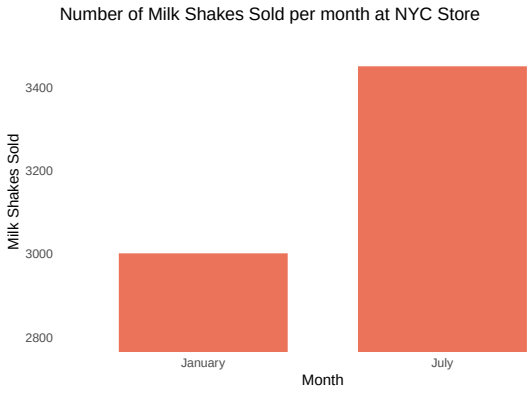


(b) Deceptive

Question: How large was the increase in ticket sales from 2018 to 2023?



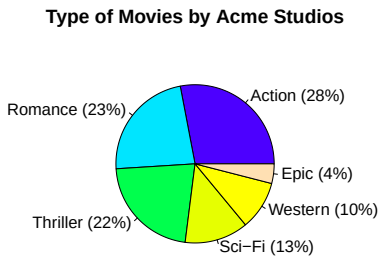
(a) Control



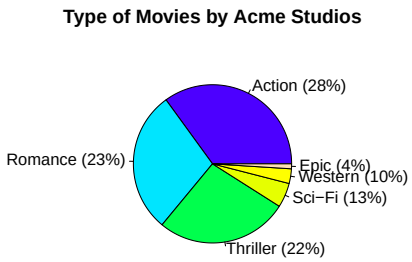
(b) Deceptive

Question: How much did milk shake sales increase from January to July?

Pie Charts

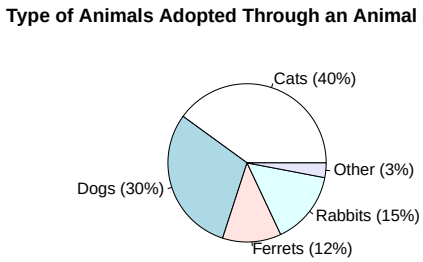


(a) Control

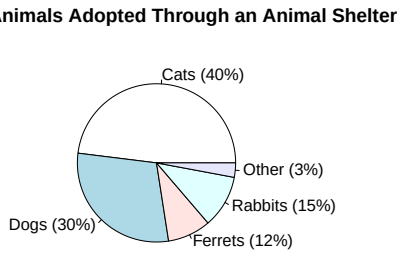


(b) Deceptive

Question: How many more romance movies were made than westerns?



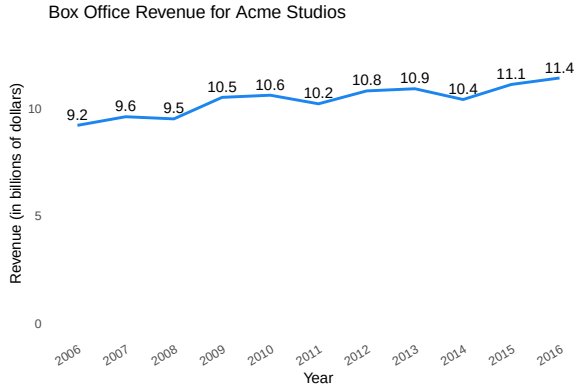
(a) Control



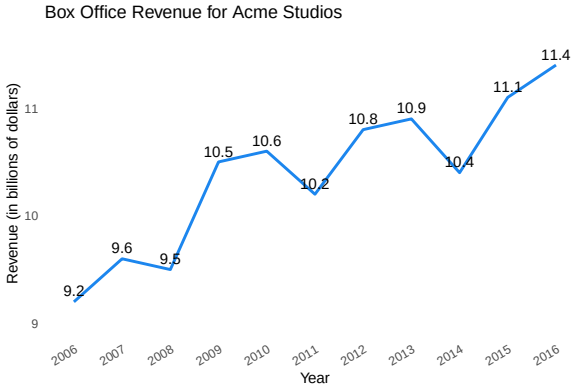
(b) Deceptive

Question: How many more cats were adopted than dogs?

Line Graphs

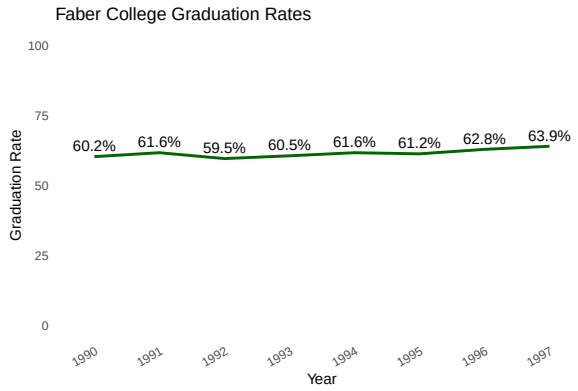


(a) Control

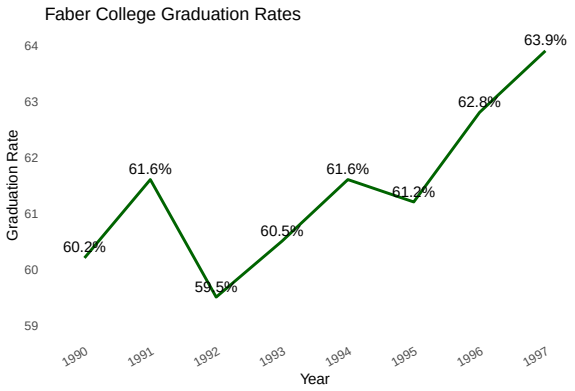


(b) Deceptive

Question:



(a) Control

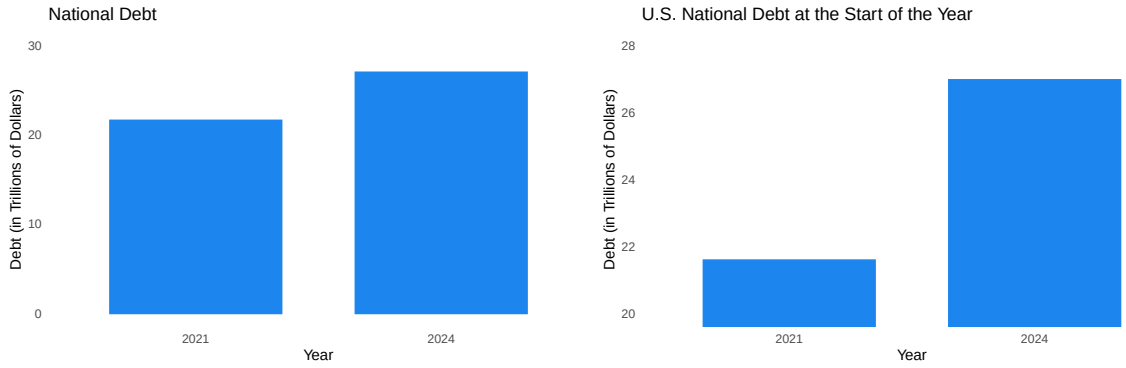


(b) Deceptive

Question: What was the increase in graduation rates from 1990 to 1997?

Controversial Plots

Bar Graphs

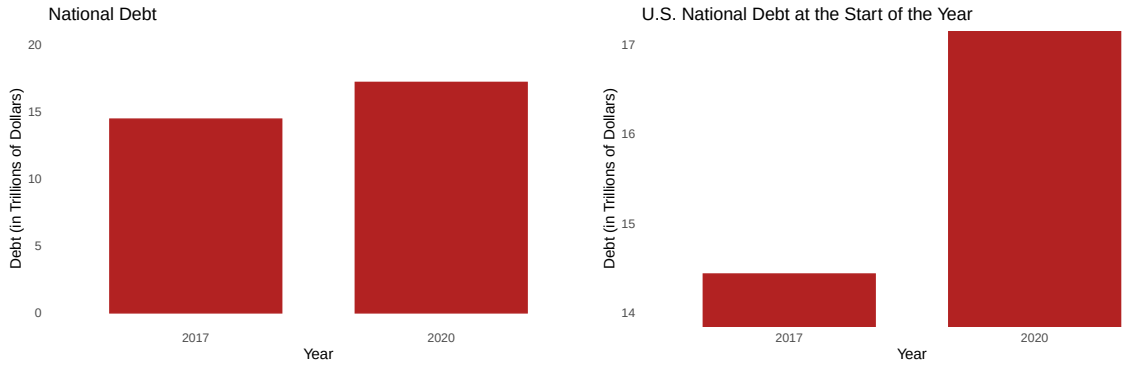


(a) Control (b) Deceptive

Figure 7: Data from FiscalData (2024a)

Question: How much did the U.S. national debt increase from 2021 to 2024?

More Likely to Overestimate: Right - Rising debt during Joe Biden's term is more likely to be overstated by right-leaning individuals.



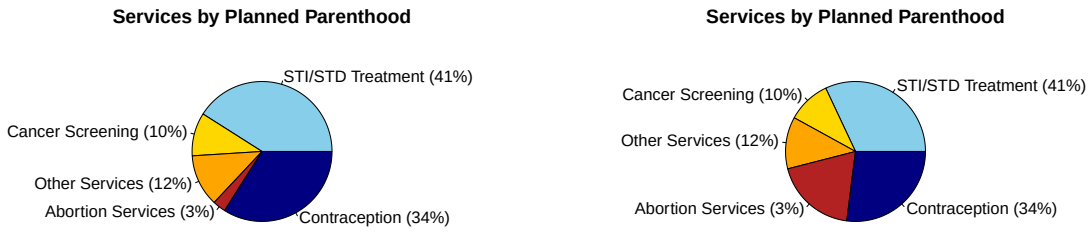
(a) Control (b) Deceptive

Figure 8: Data from FiscalData (2024a)

Question: How much did the U.S. national debt increase from 2017 to 2020?

More Likely to Overestimate: Left - Rising debt during Donald Trump's first term is more likely to be overstated by left-leaning individuals.

Pie Charts

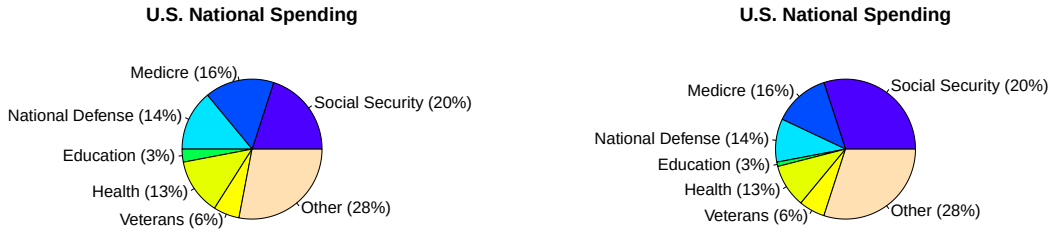


(a) Control (b) Deceptive

Figure 9: Data from Robertson (2011)

Question: How much more cancer screening does Planned Parenthood perform than abortion services?

More Likely to Overestimate: Left - Left-leaning individuals are more likely to give a larger answer. Right-leaning individuals are more likely to overstate the amount of abortion services, thereby giving smaller answers.



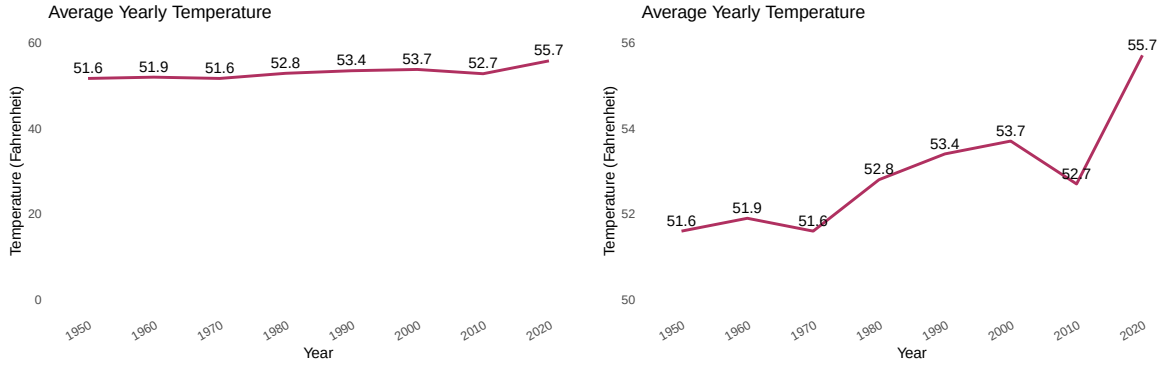
(a) Control (b) Deceptive

Figure 10: Data from FiscalData (2024b)

Question: How much more did the U.S. spend on social security than national defense?

More Likely to Overestimate: Right - Individuals on the left side of the political spectrum are likely to underestimate this, making it more likely right-leaning individuals overestimate.

Line Graphs

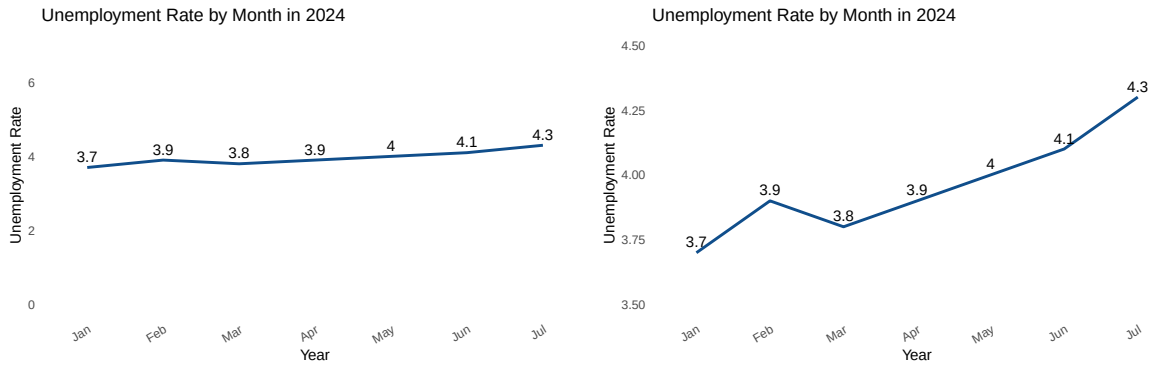


(a) Control (b) Deceptive

Figure 11: Data from NOAA (2023)

Question: How much did the global temperature rise from 1950 to 2020?

More Likely to Overestimate: Left - Expect left-leaning individuals to possibly overstate the rise in their answers.



(a) Control (b) Deceptive

Figure 12: Data from U.S. Bureau of Labor Statistics (2024)

Question: How much did the employment rate rise in the first seven months of 2023?

More Likely to Overestimate: Right - Expect right leaning individuals to overstate rising unemployment rate during Joe Biden's presidency.

References

FiscalData. 2024a. "Debt to the Penny." Treasury.gov. 2024. https://fiscaldata.treasury.gov/datasets/debt-to-the-penny/debt-to-the-penny.

———. 2024b. "How Much Has the u.s. Government Spent This Year?" Treasury.gov. 2024. https://fiscaldata.treasury.gov/americas-finance-guide/federal-spending/.

NOAA. 2023. "Average Annual Temperature by Year." National Weather Service. https://www.weather.gov/media/slc/ClimateBook/Annual%20Average%20Temperature%20By%20Year.pdf.

Robertson, Lori. 2011. "Planned Parenthood." FactCheck.org. https://www.factcheck.org/2011/04/planned-parenthood/.

U.S. Bureau of Labor Statistics. 2024. "Unemployment Rate [UNRATE]."

R Code Used

Libraries Used

```
library(ggplot2)
```

Noncontroversial Plots

Bar Graphs

```
RubberDucks <- data.frame(
  Year = c("2018", "2023"),
  Sales = c(12000, 13500)
)

ggplot(RubberDucks, aes(x = Year, y = Sales)) +
  geom_bar(stat = "identity", color = "skyblue", fill = "skyblue", width = 0.7)
+ coord_cartesian(ylim = c(0, 15000)) +
  labs(title = "Ticket Sales for the Rockford Peaches baseball Team",
       x = "Year",
       y = "Ticket Sales") +
  theme_minimal() + theme(panel.grid = element_blank())

ggplot(RubberDucks, aes(x = Year, y = Sales)) +
  geom_bar(stat = "identity", color = "skyblue", fill = "skyblue", width=0.7)
+ coord_cartesian(ylim = c(11500, 14000)) +
  labs(title = "Ticket Sales for the Rockford Peaches baseball Team",
       x = "Year",
       y = "Ticket Sales") +
  theme_minimal() + theme(panel.grid = element_blank())
```

Pie Charts

```r
control_movies <- data.frame(
  Genre = c("Action",
            "Romance",
            "Thriller",
            "Sci-Fi",
            "Western",
            "Epic"),
  Percentage = c(28, 23, 22,
                 13, 10, 4)
)

deceptive_movies <- data.frame(
  Genre = c("Action",
            "Romance",
            "Thriller",
            "Sci-Fi",
            "Western",
            "Epic"),
  Percentage = c(35, 29, 27,
                 5, 3, 1)
)

pie(control_movies$Percentage,
    labels = paste(control_movies$Genre,
                   " (", control_movies$Percentage, "%)", sep = ""),
    main = "Type of Movies by Acme Studios",
    col = topo.colors(nrow(control_movies)))

pie(deceptive_movies$Percentage,
    labels = paste(deceptive_movies$Genre,
                   " (", control_movies$Percentage, "%)", sep = ""),
    main = "Type of Movies by Acme Studios",
    col = topo.colors(nrow(deceptive_movies)))
```

Line Graphs

```r
box_office <- data.frame(
  Year = c("2006", "2007",
           "2008", "2009",
           "2010", "2011",
           "2012", "2013",
           "2014", "2015", "2016"),
  Dollars = c(9.2, 9.6,
              9.5, 10.5,
              10.6, 10.2,
              10.8, 10.9,
              10.4, 11.1,
              11.4)
)

ggplot(box_office, aes(x = Year, y = Dollars, group = 1)) +
  geom_line(color = "dodgerblue2", size = 1) +
  geom_text(aes(label = Dollars),
            vjust = -0.5, size = 4, color = "black") +
  labs(title = "Box Office Revenue for Acme Studios",
       x = "Year",
       y = "Revenue (in billions of dollars)") +
  theme_minimal() +
  theme(axis.text.x = element_text(angle = 30, hjust = 1)) +
  ylim(0, 13) +
  theme(panel.grid = element_blank())

ggplot(box_office, aes(x = Year, y = Dollars, group = 1)) +
  geom_line(color = "dodgerblue2", size = 1) +
  geom_text(aes(label = Dollars),
            vjust = -0.5, size = 4, color = "black") +
  labs(title = "Box Office Revenue for Acme Studios",
       x = "Year",
       y = "Revenue (in billions of dollars)") +
  theme_minimal() +
  theme(axis.text.x = element_text(angle = 30, hjust = 1)) +
  ylim(9, 11.6) +
  theme(panel.grid = element_blank())
```

Controversial Plots

Bar Graphs

```
debt <- data.frame(
  Year = c("2021", "2024"),
  debt = c(21.593, 26.966)
)

ggplot(debt, aes(x = Year, y = debt)) +
  geom_bar(stat = "identity", color = "dodgerblue2", fill = "dodgerblue2",
           width = 0.7) + coord_cartesian(ylim = c(0, 30)) +
  labs(title = "National Debt",
       x = "Year",
       y = "Debt (in Trillions of Dollars)") +
  theme_minimal() + theme(panel.grid = element_blank())

ggplot(debt, aes(x = Year, y = debt)) +
  geom_bar(stat = "identity", color = "dodgerblue2", fill = "dodgerblue2",
           width = 0.7) + coord_cartesian(ylim = c(20, 28)) +
  labs(title = "U.S. National Debt at the Start of the Year",
       x = "Year",
       y = "Debt (in Trillions of Dollars)") +
  theme_minimal() + theme(panel.grid = element_blank())
```

```
debt <- data.frame(
  Year = c("2017", "2020"),
  debt = c(14.434, 17.170)
)

ggplot(debt, aes(x = Year, y = debt)) +
  geom_bar(stat = "identity", color = "firebrick",
           fill = "firebrick", width = 0.7) + coord_cartesian(ylim = c(0, 20)) +
  labs(title = "National Debt",
       x = "Year",
       y = "Debt (in Trillions of Dollars)") +
  theme_minimal() + theme(panel.grid = element_blank())

ggplot(debt, aes(x = Year, y = debt)) +
```

```
  geom_bar(stat = "identity", color = "firebrick",
           fill = "firebrick", width = 0.7) + coord_cartesian(ylim = c(14, 17)) +
  labs(title = "U.S. National Debt at the Start of the Year",
       x = "Year",
       y = "Debt (in Trillions of Dollars)") +
  theme_minimal() + theme(panel.grid = element_blank())
```

Pie Charts

```
plannedpar <- data.frame(
  Cat = c(
    "STI/STD Treatment",
    "Cancer Screening",
    "Other Services",
    "Abortion Services",
    "Contraception"
  ),
  Percentage = c(41, 10, 12, 3, 34)
)

cols <- c("skyblue","gold", "orange", "firebrick", "navy")

pie(plannedpar$Percentage,
    labels = paste(plannedpar$Cat,
                   " (", plannedpar$Percentage, "%)", sep = ""),
    main = "Services by Planned Parenthood",
    col = cols)

deceptive_planned <- c(32, 10, 12, 19, 27)

pie(deceptive_planned,
    labels = paste(plannedpar$Cat,
                   " (", plannedpar$Percentage, "%)", sep = ""),
    main = "Services by Planned Parenthood",
    col = cols)
```

```r
spend <- data.frame(
  cat = c("Social Security", "Medicre", "National Defense", "Education",
          "Health", "Veterans", "Other"),
  perc = c(20, 16, 14, 3, 13, 6, 28)
)

pie(spend$perc,
    labels = paste(spend$cat,
                   " (", spend$perc, "%)", sep = ""),
    main = "U.S. National Spending",
    col = topo.colors(nrow(spend)))

dec_perc <- c(30, 13, 10, 1, 10, 6, 30)

pie(dec_perc,
    labels = paste(spend$cat,
                   " (", spend$perc, "%)", sep = ""),
    main = "U.S. National Spending",
    col = topo.colors(nrow(spend)))
```

Line Graphs

```r
temp <- data.frame(
  year = c("1950", "1960",
           "1970", "1980",
           "1990", "2000",
           "2010", "2020"),
  temp = c(51.6, 51.9,
           51.6, 52.8,
           53.4, 53.7,
           52.7, 55.7)
)


ggplot(temp, aes(x = year, y = temp, group = 1)) +
  geom_line(color = "maroon", size = 1) +
  geom_text(aes(label = temp),
            vjust = -0.5, size = 4, color = "black") +
```

```
  labs(title = "Average Yearly Temperature",
       x = "Year",
       y = "Temperature (Fahrenheit)") +
  theme_minimal() +
  theme(axis.text.x = element_text(angle = 30, hjust = 1)) +
  ylim(0, 60) +
  theme(panel.grid = element_blank())


ggplot(temp, aes(x = year, y = temp, group = 1)) +
  geom_line(color = "maroon", size = 1) +
  geom_text(aes(label = temp),
            vjust = -0.5, size = 4, color = "black") +
  labs(title = "Average Yearly Temperature",
       x = "Year",
       y = "Temperature (Fahrenheit)") +
  theme_minimal() +
  theme(axis.text.x = element_text(angle = 30, hjust = 1)) +
  ylim(50, 56) +
  theme(panel.grid = element_blank())
```

```
unemp <- data.frame(
  Month = c("Jan", "Feb", "Mar",
            "Apr", "May", "Jun",
            "Jul"),
  rate = c(3.7, 3.9, 3.8, 3.9,
           4, 4.1, 4.3)
)

unemp$Month <- factor(unemp$Month, levels = c("Jan", "Feb", "Mar",
                                              "Apr", "May", "Jun", "Jul"))


ggplot(unemp, aes(x = Month, y = rate, group = 1)) +
  geom_line(color = "dodgerblue4", size = 1) +
  geom_text(aes(label = rate),
            vjust = -0.5, size = 4, color = "black") +
  labs(title = "Unemployment Rate by Month in 2024",
       x = "Year",
       y = "Unemployment Rate") +
```

```
  theme_minimal() +
  theme(axis.text.x = element_text(angle = 30, hjust = 1)) +
  ylim(0, 7) +
  theme(panel.grid = element_blank())

ggplot(unemp, aes(x = Month, y = rate, group = 1)) +
  geom_line(color = "dodgerblue4", size = 1) +
  geom_text(aes(label = rate),
            vjust = -0.5, size = 4, color = "black") +
  labs(title = "Unemployment Rate by Month in 2024",
       x = "Year",
       y = "Unemployment Rate") +
  theme_minimal() +
  theme(axis.text.x = element_text(angle = 30, hjust = 1)) +
  ylim(3.5, 4.5) +
  theme(panel.grid = element_blank())
```