

Earthquake Research

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Intro

Set up

The first step before beginning the investigation of the data is to set up our environment with the necessary packages and import the data. This is done in the code block below.

```
library(tidyverse)
library(janitor)
library(dplyr)
library(knitr)
earthquake <- read.csv("./data/earthquake_data.csv")
```

To make the data easier to use, it is also important to tidy the data. In this case, the data itself is tidy, but the column names could be shorter and more direct to make it easier to reference them within the code.

```
names(earthquake)[1] <- "general_worry"
names(earthquake)[2] <- "big_one_worry"
names(earthquake)[3] <- "big_one_occur"
names(earthquake)[4] <- "experienced_earthquake"
names(earthquake)[5] <- "taken_precautions"
names(earthquake)[6] <- "san_andreas_familiar"
names(earthquake)[7] <- "yellowstone_familiar"
names(earthquake)[8] <- "age"
names(earthquake)[9] <- "gender"
names(earthquake)[10] <- "household_income"
names(earthquake)[11] <- "region"

earthquake <- earthquake
```

Research Questions

In order to explore this data, we have selected 4 research questions to investigate.

Question 1

Does Knowledge affect how worried someone is?

Moving beyond how worried Americans are generally about earthquakes, we wanted to look specifically at how Americans feels about the “Big One”. One question we had in regard to the “Big One” is how knowledge about both the San Andreas fault line and the Yellowstone supervolcano (which are possible causes of the “Big One”) may affect how worried one is. On the one hand, more knowledge may result in a greater understanding of how earthquakes occur and their effects, so there would be less irrational worry. But on the other hand, learning of the existence of these possible causes may heighten one’s worry as they becoming more aware of a realistic cause of the “Big One”.

To investigate this question, we decided to visualize the data as two way tables containing the proportions of “Yes” and “No” responses to the question “Do you think the”Big One” will occur in your lifetime?” compared to their knowledge of the fault line and super volcano in @san-andreas-worry and @yellowstone-worry respectively.

```
san_andreas_table <- earthquake %>%
  tabyl(san_andreas_familiar, big_one_occur) %>%
  adorn_totals(where = c("row", "col") ) %>%
  adorn_percentages(denominator = "all") %>%
  adorn_pct_formatting(digits = 2) %>%
  adorn_title(
    placement = "combined",
    row_name = "Knowledge level",
    col_name = "Worry level")

san_andreas_formatNs <- attr(san_andreas_table, "core") %>%
  adorn_totals(where = c("row", "col")) %>%
  mutate(
    across(where(is.numeric), format, big.mark = ",")
  )
```

```
Warning: There was 1 warning in `mutate()`.
i In argument: `across(where(is.numeric), format, big.mark = ",")`.
Caused by warning:
! The `...` argument of `across()` is deprecated as of dplyr 1.1.0.
```

Supply arguments directly to ``fns`` through an anonymous function instead.

```
# Previously
across(a:b, mean, na.rm = TRUE)

# Now
across(a:b, \(x) mean(x, na.rm = TRUE))
```

```
san_andreas_FreqTab <- san_andreas_table %>%
  adorn_ns(position = "front", ns = san_andreas_formatNs)

san_andreas_FreqTab %>% kable(digits = c(0, 0, 2, 2, 2))
```

Table 1: Worry of ‘Big One’ occurring in one’s lifetime compared to knowledge of the San Andreas fault line

Knowledge level/Worry level	No	Yes	Total
	6 (0.59%)	6 (0.59%)	12 (1.18%)
Extremely familiar	55 (5.43%)	78 (7.70%)	133 (13.13%)
Not at all familiar	72 (7.11%)	34 (3.36%)	106 (10.46%)
Not so familiar	78 (7.70%)	36 (3.55%)	114 (11.25%)
Somewhat familiar	229 (22.61%)	168 (16.58%)	397 (39.19%)
Very familiar	137 (13.52%)	114 (11.25%)	251 (24.78%)
Total	577 (56.96%)	436 (43.04%)	1,013 (100.00%)

```
yellowstone_table <- earthquake %>%
  tabyl(yellowstone_familiar, big_one_occur) %>%
  adorn_totals(where = c("row", "col") ) %>%
  adorn_percentages(denominator = "all") %>%
  adorn_pct_formatting(digits = 2) %>%
  adorn_title(
    placement = "combined",
    row_name = "Knowledge level",
    col_name = "Worry level")

yellowstone_formatNs <- attr(yellowstone_table, "core") %>%
  adorn_totals(where = c("row", "col")) %>%
  mutate(
    across(where(is.numeric), format, big.mark = ",")
  )
yellowstone_FreqTab <- yellowstone_table %>%
```

```
adorn_ns(position = "front", ns = yellowstone_formatNs)

yellowstone_FreqTab %>% kable(digits = c(0, 0, 2, 2, 2))
```

Table 2: Worry of ‘Big One’ occurring in one’s lifetime compared to knowledge of the Yellowstone supervolcano

Knowledge level/Worry level	No	Yes	Total
	6 (0.59%)	6 (0.59%)	12 (1.18%)
Extremely familiar	40 (3.95%)	53 (5.23%)	93 (9.18%)
Not at all familiar	171 (16.88%)	99 (9.77%)	270 (26.65%)
Not so familiar	142 (14.02%)	77 (7.60%)	219 (21.62%)
Somewhat familiar	152 (15.00%)	128 (12.64%)	280 (27.64%)
Very familiar	66 (6.52%)	73 (7.21%)	139 (13.72%)
Total	577 (56.96%)	436 (43.04%)	1,013 (100.00%)

Based on both tables,

Question 3

Question 4

Conclusion