Lab 7 Report

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Section 1: Hypothesis

The goal of this research paper is to determine whether there is statistically significant regarding age of regular prayers from 2007 to 2017. To that end, the null and research hypothesis are as follows:

> Null: There is no significant difference in age of those who pray regularly between 2007 and 2017.
> Research: Those who are praying regularly will be significantly older on average in 2017 than in 2007.

> H_0: $\text{Age}_{2007} = \text{Age}_{2017}$
> H_1: $\text{Age}_{2007} < \text{Age}_{2017}$

Section 2: Data

The data used for this report is from two different years of the Baylor Surveys of Religious Life, 2007 and 2017. In this data, respondents who said they prayed one or more times a day were asked to report their age. The range of ages falls within 17 and 95 for '07 and 18 and 96 for '17.

Section 3: Method

Using RStudio, the data set was packaged into two variables, ***data_2007*** and ***data_2017***. From there, the following code was ran:

```
# Stat sig of differences in age of consistent prayer

t.test(data_2007, data_2017, alternative = c("less"),
       conf.level = 0.95)
```

A left-handed test was performed to determine if the older population observed in 2017 versus 2007 was significant.

In the previous report, the level of prayer of two select age groups was evaluated. To analyze this data, the following code was applied to subset the data.

```
# Tests for significance between data sets

# Create a data frame of 21>=
lessthan22_07 <- subset(data_2007, data_2007 < 22)
lessthan22_17 <- subset(data_2017, data_2017 < 22)
```

```r
# Create a data frame of 69=<
greaterthan68_07 <- subset(data_2007, data_2007 > 68)
greaterthan68_17 <- subset(data_2017, data_2017 > 68)

# Stat sig for 21-
t.test(lessthan22_07, lessthan22_17, alternative = c("less"),
       conf.levels = 0.95)

# Stat sig for 69+
t.test(greaterthan68_07, greaterthan68_17, alternative = c("greater"),
       conf.levels = 0.95)
```

A left-handed analysis was performed on 21 and under, while a right-handed analysis was performed on 69 and over.

I experimented with concatenating the results using a C function to create a more readable report. This entire document is written as a R markdown document. Much of the C code was borrowed from stack overflow, at least with how to pull the values into the code.

```r
format_ttest <- function(test) {
  sprintf("t = %.2f, df = %.2f, p-value = %.4f, 95%% CI = (%.2f, %.2f)",
          test$statistic, test$parameter, test$p.value,
          test$conf.int[1], test$conf.int[2])
}
```

"`%.if`" is the primary argument called, where "`%`" calls the literal value and "`.if`" formats it to as a precise decimal, with "`i`" determining to which decimal place. Passing the results of "`t.test()`" through the function results in a concatenated string with the format seen below in results.

Section 4: Results

The results of each test is as follows:

Results of 2007 versus 2017:

```
## t = -6.18, df = 1327.72, p-value = 0.0000*, 95% CI = (-Inf, -3.95)
```

Results of 2007 versus 2017 with respects to 21 and younger (left-tailed):

```
## t = 0.50, df = 1.06, p-value = 0.6499*, 95% CI = (-Inf, 9.53)
```

Results of 2007 versus 2017 with respects to 69 and older (right-tailed):

```
## t = 0.12, df = 298.76, p-value = 0.4542*, 95% CI = (-1.07, Inf)
```

* Note that p-value depicts a zero value if below <0.0001.

Section 5: Discussion and Conclusion

From these results, the idea that those who are praying regularly in 2017 are older than those in 2007 is statistically significant. Because this, we can reject the null hypothesis and accept the research hypothesis.

What didn't fair so well was my previous analyses of the prayer habits of ages 21 and 69. According to the results, there was no significant difference in observed ages between samples in each age group. Accordingly, in relation to this group, we can accept the null, even if the research hypothesis isn't quite applicable, as there is no significant changes within the average age in each group. This means that any increase or decrease in chance may be caused by sampling error or chance.