Inference For Single Proportions

- Means and proportions have different distributions, standard errors and hypothesis tests.
- For proportions, we'll use `prop.test()` rather than `t.test()`.
- Example: Does the proportion of respondents whose number of children is equal to their ideal number of children differ from .33?

Inference For Single Proportions

- First step, create binary variable capturing respondents whose number of children is equal to their ideal number of children. Call it `has_ideal`.

```
gss_week7 <- gss_week7 |>
  mutate(has_ideal = ifelse(childs == chldidel, 1, 0))
```

Inference For Single Proportions

- For the test, we will need the frequency with a 1 and the total in the sample.

```
addmargins(table(gss_week7$has_ideal))
```

```
   0    1  Sum 
2034  889 2923 
```

Inference For Single Proportions

- Enter those two values in `prop.test()` along with the null hypothesis value you want to test. The function calculates the proportion and compares it to the null hypothesis value.

```
1 prop.test(889, 2923, p = .33)
```

```
    1-sample proportions test with continuity correction

data:  889 out of 2923, null probability 0.33
X-squared = 8.7246, df = 1, p-value = 0.003139
alternative hypothesis: true p is not equal to 0.33
95 percent confidence interval:
 0.2875599 0.3212387
sample estimates:
        p
0.3041396
```

Another Example

Does the proportion of respondents with less children than their ideal number differ from .53 at the 99% confidence level?

```
gss_week7 <- gss_week7 |>
  mutate(less_ideal = ifelse(childs < chldidel, 1, 0))
```

```
addmargins(table(gss_week7$less_ideal))
```

```
   0    1  Sum 
1437 1486 2923 
```

Another Example

```r
prop.test(1486, 2923, p = .53, conf.level = .99)
```

```
    1-sample proportions test with continuity correction

data:  1486 out of 2923, null probability 0.53
X-squared = 5.3975, df = 1, p-value = 0.02017
alternative hypothesis: true p is not equal to 0.53
99 percent confidence interval:
 0.4844006 0.5323247
sample estimates:
        p
0.5083818
```