Lesson 2 Homework Ellen Chancey

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Question 1.5

People are surveyed with whether they think it should be possible for a pregnant woman to obtain a legal abortion if she is married and does not want any more children.

```
yes <- 587
no <- 636
n <- yes + no
pi <- yes/n
```

Find the p-value for $H_0: \pi = 0.50$ and construct 95% confidence interval

```
binom.test(yes,n, p=0.5, conf.level = .95, alternative = "two.sided")
```

```
##
##  Exact binomial test
##
## data:  yes and n
## number of successes = 587, number of trials = 1223, p-value =
## 0.1699
## alternative hypothesis: true probability of success is not equal to 0.5
## 95 percent confidence interval:
##  0.4516355 0.5083956
## sample estimates:
## probability of success
##              0.4799673
```

Interpret the results

The confidence interval includes 0.50 and the p value is large, therefore the null hypothesis that $\pi = 0.50$ cannot be rejected.

Additional Question

A sample of 100 women who suffer from dysmenorrhea participated in a study. A new analgesic is claimed to provide greater relief than a standard one. After using each analgesic in a crossover experiment, 40 of the participants reported greater relief with the standard analgesic and 60 reported greater relief with the new analgesic. Analyze these data.

```
total <- 100
standard <- 40
```

```
new <- 60
pi2 <- new/total
```

Null hypothesis test and confidence interval
$H_0: \pi = 0.50$
$H_1: \pi <> 0.50$

```
binom.test(new,total, p=0.5, conf.level = .95, alternative = "two.sided")
```

```
##
##  Exact binomial test
##
## data:  new and total
## number of successes = 60, number of trials = 100, p-value =
## 0.05689
## alternative hypothesis: true probability of success is not equal to 0.5
## 95 percent confidence interval:
##  0.4972092 0.6967052
## sample estimates:
## probability of success
##                    0.6
```

Interpret the results

This is a very border line result. A conservative approach would indicate that the null hypothesis cannot be rejected because the p value is more than 0.05 and because the confidence interval contains the value indicated in the null hyothesis.

Session Info

```
sessionInfo()
```

```
## R version 3.4.1 (2017-06-30)
## Platform: x86_64-w64-mingw32/x64 (64-bit)
## Running under: Windows 10 x64 (build 16299)
##
## Matrix products: default
##
## locale:
## [1] LC_COLLATE=English_United States.1252
## [2] LC_CTYPE=English_United States.1252
## [3] LC_MONETARY=English_United States.1252
## [4] LC_NUMERIC=C
## [5] LC_TIME=English_United States.1252
##
## attached base packages:
## [1] stats     graphics  grDevices utils     datasets  methods   base
##
## loaded via a namespace (and not attached):
##  [1] compiler_3.4.1  backports_1.1.0 magrittr_1.5    rprojroot_1.2
##  [5] tools_3.4.1     htmltools_0.3.6 yaml_2.1.14     Rcpp_0.12.13
```

```
##  [9] stringi_1.1.5   rmarkdown_1.6   knitr_1.16      stringr_1.2.0
## [13] digest_0.6.12   evaluate_0.10.1
```