606 HW4(Part 1)

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Load Library

```
library(IS606)
```

```
##
## Welcome to CUNY IS606 Statistics and Probability for Data Analytics
## This package is designed to support this course. The text book used
## is OpenIntro Statistics, 3rd Edition. You can read this by typing
## vignette('os3') or visit www.OpenIntro.org.
##
## The getLabs() function will return a list of the labs available.
##
## The demo(package='IS606') will list the demos that are available.

##
## Attaching package: 'IS606'

## The following object is masked from 'package:utils':
##
##     demo
```

4.4 Heights of adults. Researchers studying anthropometry collected body girth measurements and skeletal diameter measurements, as well as age, weight, height and gender, for 507 physically active individuals. The histogram below shows the sample distribution of heights in centimeters.

(a) What is the point estimate for the average height of active individuals? What about the median?

-The point estimate for the average height of active individuals is 171.1.

-Median 170.3

(b) What is the point estimate for the standard deviation of the heights of active individuals? What about the IQR?

-The point estimate for the standard deviation is 9.4

-IQR = Q3 - Q1 = 14

(c) Is a person who is 1m 80cm (180 cm) tall considered unusually tall? And is a person who is 1m 55cm (155cm) considered unusually short? Explain your reasoning.

-It will depend on how we define "unusual", if we go by IQR than they are both unsually tall and unsually short, 180 cm is over the Q3 of 177.8 and 155 cm is below the Q1 of 163.8 cm. But if we go by standard deviation 180 cm is 0.95 sd of the mean and 155 cm is 1.71 of mean which are both 2 sd above and below of mean and can not call them unusual.

(d) The researchers take another random sample of physically active individuals. Would you expect the mean and the standard deviation of this new sample to be the ones given above? Explain your reasoning.

-No I do not expect the mean and the standsrd deviation of the new sample to be the ones given above because the variable population of active individual will be diffrent but it will be some what similar.

(e) The sample means obtained are point estimates for the mean height of all active individuals,if the sample of individuals is equivalent to a simple random sample. What measure do we use to quantify the variability of such an estimate (Hint: recall that $SD_{\bar{x}} = p!n$)? Compute this quantity using the data from the original sample under the condition that the data are a simple random sample.

-The variability of this estimate is the standard error.

```
9.4/sqrt(507)
```

```
## [1] 0.4174687
```

4.14 Thanksgiving spending, Part I. The 2009 holiday retail season, which kicked off on November 27, 2009 (the day after Thanksgiving), had been marked by somewhat lower self-reported consumer spending than was seen during the comparable period in 2008. To get an estimate of consumer spending, 436 randomly sampled American adults were surveyed. Daily consumer spending for the six-day period after Thanksgiving, spanning the Black Friday weekend and Cyber Monday, averaged $84.71. A 95% confidence interval based on this sample is ($80.31, $89.11). Determine whether the following statements are true or false, and explain your reasoning.

(a) We are 95% confident that the average spending of these 436 American adults is between $80.31 and $89.11.

-False, we are 100% confident about theaverage spending of these 436 American adults, 95% confidence represent the population in gerneral.

(b) This confidence interval is not valid since the distribution of spending in the sample is right skewed.

-Not conclusive, more testing required to reach such conclusion.

(c) 95% of random samples have a sample mean between $80.31 and $89.11.

-False, 95% confidence interval repesents the population mean not random sample mean.

(d) We are 95% confident that the average spending of all American adults is between $80.31 and $89.11.

-True.

(e) A 90% confidence interval would be narrower than the 95% confidence interval since we don't need to be as sure about our estimate.

-True, the interval gets narrower as the confidence interval gets smaller.

(f) In order to decrease the margin of error of a 95% confidence interval to a third of what it is now, we would need to use a sample 3 times larger.

-In order to decrease the margin of error of a 95% confidence interval to a third we will need 9 times the sample size we have.

(g) The margin of error is 4.4.

-True, 1.96 * SE.