Lesson 7 Hands-On

Directions

For this Hands On, you will be performing an ANCOVA in R to determine whether having an international cell phone plan increases the number of night minutes you use.

Requirements

This hands on uses a dataset on cell phone plans. It is located **here**.

Please answer the following question with this data:

Many folks with international relatives often find themselves calling at odd hours to fit typical schedules in other time zones. How does the presence or absence of an international phone plan (`International.Plan`) influence the use of nighttime minutes (`Night.Mins`), holding whether or not the client has a voicemail plan (`vMail.Plan`) constant?

In order to answer this question, you will need to do the following:

- Test for ANCOVA assumptions
- Run an ANCOVA
- Interpret the ANCOVA results and draw conclusions
- Conduct post hocs if necessary

Please submit your R studio file, with a one-sentence conclusion to answer the above question.

Lesson 7 Hands-On Solution

Below you will find the R code for the Lesson 7 Hands-On solution.

```
#This is to see if the Night.minutes differ by whether they have
an international phone plan, holding voice mail plans constant.
```

Testing Assumptions

Normality - Need to examine both GPA and TOEFL score

```r
library("rcompanion")
library("car")
library("effects")
library("multcomp")

plotNormalHistogram(cellPhone$Night.Mins)
```

Wow, that already looks normally distributed! No transformation necessary.

Homogeneity of Variance

```r
leveneTest(Night.Mins~International.Plan, data=cellPhone)

# Results were not significant, so the assumption is met!
```

Homogeneity of Regression Slopes

```r
Homogeneity_RegrSlp = lm(Night.Mins~vMail.Plan, data=cellPhone)
anova(Homogeneity_RegrSlp)

# This assumption was met as well!
```

Sample size is met - need 20 per IV or CV and I have 2, so need at least 40 and there are over 4,000 cases!

Running the Analysis

```r
ANCOVA = lm(Night.Mins~vMail.Plan +
International.Plan*vMail.Plan, data=cellPhone)
anova(ANCOVA)

# Whether a client has an international plan or not does not
influence the number of night minutes he or she uses, even
holding whether they have a voice mail plan constant.
```