STAT 217: Chi-Squared Assumptions and Standardized Residuals 10-12

1. A random sample of Brazilians aged 18 and older was taken, and each subjects Age - (Under 30, 30-49, 50 and over) and Political Ideology-(Liberal, Moderate, Conservative) were noted.

```
PolAge <- as.table(rbind(c(83,140,73), c(119,280,161), c(88,284,214)))
dimnames(PolAge) <- list(age=c("underthirty","thirtytofortynine","fiftyandOver"),
party=c("Liberal","Moderate", "Conservative"))
PolAge
```

```
##                     party
## age               Liberal Moderate Conservative
##   underthirty           83      140           73
##   thirtytofortynine    119      280          161
##   fiftyandOver          88      284          214
```

(a) Below is the table of expected counts generated by R. Are all of the assumptions and conditions met for the chi squared test?

```
chisq.test(PolAge)$expected
```

```
##                     party
## age                    Liberal Moderate Conservative
##   underthirty         59.52843 144.5104     91.96117
##   thirtytofortynine  112.62136 273.3981    173.98058
##   fiftyandOver       117.85021 286.0915    182.05825
```

A. Yes.

B. No, age is not categorical.

C. No, the table of expected counts is too similar to the table of observed counts.

D. No, the normality assumption is not met.

(b) Do you expect the Chi-Square test statistic to be large or small? Explain how you know.

Below is a table and a plot of standardized residuals.

```
chisq.test(PolAge)$residuals

##                      party
## age                    Liberal    Moderate  Conservative
##   underthirty        3.0421447 -0.3752025    -1.9772555
##   thirtytofortynine  0.6010599  0.3992767    -0.9841103
##   fiftyandOver      -2.7496802 -0.1236555     2.3673010

mosaicplot(PolAge,shade=T)
```
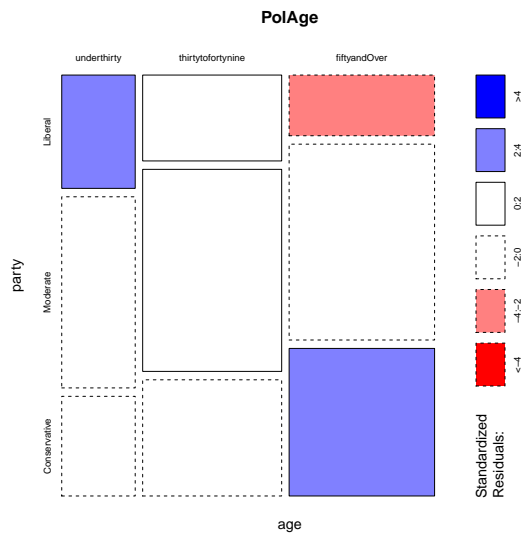

(c) The top left segment on the plot is blue. What does this tell us about the Liberal underthirty group? Use the appropriate value from the table of standardized residuals to support your answer.(*Hint: You can also compare the table of expected and observed counts on the previous page*)

(d) The top right segment on the plot is red. What does this tell us about the Liberal fifty and Over group? Use the table to support your answer

(e) The bottom middle segment is white with dashed borders. What does this tell us about the Conservative thirty to fortynine group? Use the table to support your answer.

2