

STAT 217 Project 2 - χ^2 Tests

Due Monday 10/20 - beginning of class

The sinking of the Titanic in 1912 was one of the worst maritime disasters of all time. The Naval Safety Committee has hired you to investigate the survivalship of passengers on the Titanic. Though there have been numerous advances in technology leading to safer boat travel, one concern of the Naval Safety Committee is whether all passengers safety is equally ensured. Though first class passengers may be treated to extravagances not afforded to lower class passengers, modern cruise ships must ensure the safety of all passengers equally. It is your job to analyze the passenger data for the sinking of the Titanic in 1912. We are interested in the relationship between survival status of passengers aboard the Titanic and their ticket status. These data are in the **effects** package. Your task will be to perform the appropriate χ^2 test. Your write-up should be word processed and read like a report. Remember to include all plots and code in the appendix, not in the body of the report. Follow the same “Project Writing Guidelines” posted on D2L. Some requirements (to refresh your memory) are listed below:

Code for this analysis is on the back of this page, but you must decide where to include the output from each command.

Discuss each of the following in the order provided below when writing up your report:

- *Introduction*

Use the `help(Titanic)` command to find out how the data were collected. Give a brief background on the study (try to rephrase the description rather than just copying word for word). State the appropriate statistical test (homogeneity or independence) to answer the research question. Clearly state the question of interest.

- *Statistical Procedures Used*

Describe the two variables of interest. Provide a table of counts and a either a mosaic plot or stacked bar chart depending on the type of test you will perform. Describe any interesting features that you see. State the null and alternative hypotheses and address the validity conditions. State whether assumptions and conditions were (or were not) met **and why**.

- *Results & Conclusions*

In the first sentence, write your decision. In the second sentence, communicate an appropriate conclusion/answer to the research question. Follow class examples. Make sure to include your p-value, test statistic, and the distribution it follows under the null hypothesis.

- *Further Analysis* Examine the standardized residuals and note where you see observed counts that are noticeably different than what we would expect under the null hypothesis. Include a visual aid for your discussion.

- *Scope of Inference*

Follow the examples in the *Project Writing Guidelines*.

- *Extra Credit*

There were two other variables collected in this data set: age and sex. Use the `tableplot()` function in the `tabplot` package to discuss how they could be related to survival.

```
install.packages("effects")
require(effects)
require(mosaic)
data(TitanicSurvival)
ship<-tally(~survived+passengerClass,data=TitanicSurvival)
ship
mosaicplot(t(ship))
```

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

```
chisq.test(ship)$residuals
mosaicplot(t(ship),shade=T)
```

```
install.packages("tabplot")
require(tabplot)
tableplot(TitanicSurvival[,c(1,4,2,3)])
```