Assignment 5

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2018-11-25

Problem A- Chi Square Test for Differences in Probabilities

```
men <- c(32, 68)
women <- c(26, 74)

taste <- data.frame(men, women, row.names = c("no likey",
    "likey"))
taste_test <- chisq.test(x = taste, correct = FALSE) %>%
    tidy()
```

Hypotheses:

H_0: $p_{men} = p_{women}$
H_1: $p_{men} \neq p_{women}$

Test Statistic

The test statistic of this Chi-Square test is 1

Critical Region

We are looking for a $\chi^2_{0.975,1,1}$ and $\chi^2_{0.025,1,1}$, which is equal to 8.7652.

Conclusion

With the test statistic not greater than or less than the critical region, we cannot reject the Null hypothesis that the probabilities are the same. There is not enough evidence to suggest that the two probabilities are different.

Problem B- Fisher's Exact Test

Hypotheses:

H_0: All c populations have the same median.
H_1: At least two of the populations have different medians.

Test Statistic

The test statistic of this Median test is 0.8269.

Critical Region

We are looking for a $\chi^2_{0.95,2}$, which is equal to 5.9941.

Conclusion

With the test statistic greater than the critical region, we can reject the Null hypothesis that the medians are the same. There is evidence to suggest that at least two medians are different.

Problem C- Chi Square Test for Differences in Probabilities

```
ase <- c(11, 11, 1)
nyse <- c(24, 11, 0)

stocks <- data.frame(ase, nyse, row.names = c("A",
    "B", "C")) %>% t()

stock_test <- chisq.test(x = stocks, correct = FALSE)
```

Hypotheses:

H_0: $p_{ASE} = p_{NYSE}$
H_1: At least two of the populations have different populations.

Test Statistic

The test statistic of this Median test is 0.8269.

Critical Region

We are looking for a $\chi^2_{0.95,2}$, which is equal to 5.9941.

Conclusion

With the test statistic greater than the critical region, we can reject the Null hypothesis that the medians are the same. There is evidence to suggest that at least two medians are different.

Problem D- Chi-Square Test

Hypotheses:

H_0: All c populations have the same median.
H_1: At least two of the populations have different medians.

Test Statistic

The test statistic of this Median test is 0.8269.

Critical Region

We are looking for a $\chi^2_{0.95,2}$, which is equal to 5.9941.

Conclusion

With the test statistic greater than the critical region, we can reject the Null hypothesis that the medians are the same. There is evidence to suggest that at least two medians are different.

Problem E- Median Test

```
# packages needed
library(agricolae)

sampl_1 <- c(35, 42, 42, 30, 15, 31, 29, 29, 17)
sampl_2 <- c(34, 38, 26, 17, 42, 28, 35, 33, 16)
sampl_3 <- c(17, 29, 30, 36, 41, 30, 31, 23, 38)

sample_col <- c(rep("samp_1", length(sampl_1)),
    rep("samp_2", length(sampl_2)), rep("samp_3",
        length(sampl_3)))

medians <- c(sampl_1, sampl_2, sampl_3)

med_frame <- data.frame(sample_col = as.factor(sample_col),
    medians = medians) %>% as.tibble()

med_test <- Median.test(trt = med_frame$sample_col,
    y = med_frame$medians)
```

Hypotheses:

H_0: All c populations have the same median.
H_1: At least two of the populations have different medians.

Test Statistic

The test statistic of this Median test is 0.8269.

Critical Region

We are looking for a $\chi^2_{0.95,2}$, which is equal to 5.9941.

Conclusion

With the test statistic greater than the critical region, we can reject the Null hypothesis that the medians are the same. There is evidence to suggest that at least two medians are different.