

**Statistical Analysis completed by the**

**Burkardt Consulting Center**

**by**

**Joseph Nolan, PhD**

**Brooke Turner, Consultant**

**for**

**Dr. Andy Long (and class)**

**on 11/23/2015**

bcc.nku.edu bcc@nku.edu 859-572-1325

**Response Variables:**

* Provide
* Safe
* Health
* Someone
* Community
* Hope

For the entire analysis, we converted all of the responses to binary data (i.e. agree/disagree). That allows for the relevant statistical analysis below.

As a side note, if you want to play with some graphs with your class, some bar graphs would be appropriate for the original data

**Potential Predictor Variables:**

* Age
* Gender
* Newport

**One Proportion Test for Agree/Strongly Agree**

These confidence intervals estimate the percentage of people in your population who would agree or strongly agree on each statement. Two example interpretations are given below, the rest would be interpreted similarly (I generally prefer to convert the decimals to percents).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Variable** | **X** | **N** | **Sample Proportion** | **Confidence Interval** |
| Provide | 44 | 53 | 0.830189 | (0.701978, 0.919291) |
| Safe | 43 | 53 | 0.811321 | (0.680276, 0.905630) |
| Health | 40 | 53 | 0.754717 | (0.617175, 0.862449) |
| Someone | 47 | 53 | 0.886792 | (0.769710, 0.957304) |
| Community | 34 | 52 | 0.653846 | (0.509144, 0.780342) |
| Hope | 48 | 52 | 0.923077 | (0.814603, 0.978643) |

* With 95% confidence, we estimate that between 70.2 and 91.9% of people in Newport agree or strongly agree with “provide”. (You’ll need to modify this to reflect the statement).
* With 95% confidence, we estimate that between 68.0 and 90.6% of people in Newport agree or strongly agree with “safe”.

**Two Proportion Tests for the Difference in Proportions that Agree/Strongly Agree (East vs. West)**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Variable** | **Newport** | **X** | **N** | **Sample Proportion** | **Estimated Difference** | **Confidence Interval for Difference** | **Z** | **P-value** |
| Provide | East | 18 | 22 | 0.81812 | -0.0279720 | (-0.240596, 0.184652) | -0.26 | 0.797 |
|  | West | 22 | 26 | 0.846154 |  |  |  |  |
| Safe | East | 18 | 22 | 0.81812 | 0.0489510 | (-0.179528, 0.277430) | -0.42 | 0.675 |
|  | West | 20 | 26 | 0.769231 |  |  |  |  |
| Health | East | 18 | 22 | 0.81812 | 0.164336 | (-0.079417, 0.408088) | 1.32 | 0.186 |
|  | West | 17 | 26 | 0.653846 |  |  |  |  |
| Someone | East | 20 | 22 | 0.909091 | -0.0139860 | (-0.171852, 0.143880) | -0.17 | 0.862 |
|  | West | 24 | 26 | 0.923077 |  |  |  |  |
| Community | East | 15 | 22 | 0.681818 | 0.0664336 | (-0.203475, 0.336342) | 0.48 | 0.630 |
|  | West | 16 | 26 | 0.615385 |  |  |  |  |
| Hope | East | 20 | 21 | 0.952381 | 0.0677656 | (-0.085129, 0.220660) | 0.87 | 0.385 |
|  | West | 23 | 26 | 0.884615 |  |  |  |  |

This table looks at potential differences in proportions (or percentages) between east and west. High p-values (>0.05) indicate no evidence of any differences for any of the variables in the percentage of people who agree or strongly agree with each individual question. However, this lack of evidence (relate to jury trial) doesn’t mean there is no difference. It could be that our sample sizes are just too small to see a diference. The confidence intervals actually suggest that some pretty large differences (up to about 40%) could exist that were not found in the analysis.

We ran a similar analysis for gender; likewise no evidence of differences was found. But it was “close” in a couple of cases, for “someone” and “community”:

* “someone”: It is quite possible that women are more likely to agree with this statement. (In your sample, female agreement was 96%, male agreement was 81%)
* “community”: It is quite possible that men are more likely to agree with this statement. (In your sample, female agreement was 54%, male agreement was 76%)

**Binary Logistic Regression: community versus age**

Deviance Table

Source DF Adj Dev Adj Mean Chi-Square P-Value

Regression 1 4.398 4.398 4.40 0.036

 age 1 4.398 4.398 4.40 0.036

Error 49 61.825 1.262

Total 50 66.223

Since age is continuous, it requires a more complex procedure to explore. The procedure is called logistic regression. Statistically significant effect for age was found only for the “community” response. In the table below you can see the estimated % agreement (and the trend) related to a variety of ages. Estimates have fairly wide ranges, again due to the small sample size.

**Prediction Intervals for Community based on Age**

|  |  |
| --- | --- |
| **Age** | **Estimated % Agreement** |
| 15 | 28-68% |
| 25 | 46-74% |
| 35 | 56-85% |
| 45 | 59-93% |
| 55 | 60-97% |

Each confidence interval can be interpreted in a similar manner.

We estimate that between 28 and 68% of Newport 15 year olds agree with “community”.

To interpret the other prediction intervals, substitute the appropriate age and limits.