Introductory Statistics Project

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Introduction

Whether one likes to admit it or not, there is a definite stereotype between athletes and non-athletes at Northland College. It is apparent in the cafeteria, residential halls, and at social events. For example, McMillan is stereotyped as the "athlete" dorm, whereas Fenenga is stereotypically the "hippie" dorm. Last year NCSA tried to rearrange the cafeteria seating to promote "intermingling" between the students because it is obvious that the athletes tend to sit with other athletes and the non-athletes tend to sit with the other non-athletes. Residential Life has also made efforts to diversify the residential halls, by characteristics such as class, interests, etc. In lieu of this, as athletes and as students that are aware of the athlete to non-athlete stereotype, we are curious to see that if this diversification attempt has distributed athletes to non-athletes equally between the three residential halls. We chose to test these three dorms (Fenenga, MELLC, and McMillan) because Mead is too small of a sample size, the MELLC apartments, townhouses and theme houses are by special request only, and Memorial is all women so there wouldn't be as heterogeneous of a mixture.

Methods

The three dorms that were being observed in this study were the McLean Environmental Living and Learning Center (MELLC), McMillan, and Fenenga residential halls. For randomization purposes, all residential hall room numbers were placed in a hat, one residential hall at a time. Forty-five rooms were then randomly selected from the hat. After each res hall had its forty-five rooms picked out we went around the res halls asking the students who resided in the chosen rooms whether or not they were a part of a varsity athletic organization at Northland College. For the rooms with two people residing in them, each person was randomly assigned either heads or tails, and a coin was flipped to determine which person's data would be recorded. Results were then tallied and plugged into a table.

Results

1) Chi Squared Test i) Categorical variable
ii) >2 populations

2) H_O: $P_{FEN} = P_{MCM} = P_{MELLC}$
H_A: "At least one pair of proportions differs."
- Where p is the proportion with varsity athletes residing.
- Subscripts correspond to residential hall names.

3) $\alpha = 0.05$

4) observational, randomized

5)

Table 1.1: Summary of the expected athletes to non-athletes residing in the residential halls

	Athlete	Non Athlete	Total
Fenenga	15	30	45
McMillan	15	30	45
MELLC	15	30	45
Total	45	90	135

5 in each cell

6) Observed Table

Table 2.1: Summary of the observed athletes to non-athletes residing in the residential halls

	Athlete	Non Athlete	Total
Fenenga	10	35	45
McMillan	18	27	45
MELLC	17	28	45
Total	45	90	135

Table 3.1: Summary of the Chi-Square results

Pearson's Chi-squared test
data: freq.tbl
X-squared = 3.8, df = 2, p-value = 0.1496

7) $\chi^2 = 3.8$ (Table 3.1)

8) p-value = 0.1496 (Table 3.1)

9) p-value > α therefore DNR H_O.

10) It appears that the proportion of athletes to non-athletes between the three residential halls (Fenenga, MELLC, and McMillan) do not differ.

R Commands:

```
Pro.data <- read.table("ProjectData.txt", head = T)
attach(Pro.data)
freq.tbl <- table(Dorm, Status)
freq.tbl
Pro.data.chi <- chisq.test(freq.tbl, correct = F)
Pro.data.chi
Pro.data.chi$expected
```

Discussion

We found that there is really no difference in the proportion of athletes to non-athletes between the three residential halls. Ultimately, this shows that Residential Life's attempt at making the residential halls more diverse worked. Ideally, in doing a chi-square test, a greater sample size would have been preferred. However, because Northland College is such a small population, we could not have made the sample size any larger.