

Homework 2**1 Reporting a Binomial Test**

Researchers tracked how often speakers used the prepositional dative in spontaneous phone conversations, as opposed to the double object construction, finding 501 occurrences of the prepositional dative and a total of 2,360 constructions. Using a test statistic of 0.5, the 95% confidence intervals were found to be 0.1959431 and 0.2293504, and compared to an  $\alpha = 0.05$ , the results we obtained are significant.

*R script:*

```
>x <- 501
>n <- 501 + 1859
>binom.test(x, n, p = 0.5)
```

*Results:*

```
Exact binomial test

data:  x and n
number of successes = 501, number of trials = 2360, p-value < 2.2e-16
alternative hypothesis: true probability of success is not equal to 0.5
95 percent confidence interval:
 0.1959431 0.2293504
sample estimates:
probability of success
      0.2122881
```

**2 McNemar's Test**

*R Script:*

```
>setwd('/Users/brynn/Downloads')
>c <- read.table(file = 'PTB.tsv', header = TRUE)
>Stanford.correct <- c$gold.tag == c$Stanford.tag
>NLP4J.correct <- c$gold.tag == c$NLP4J.tag
>x1 <- sum(Stanford.correct & !NLP4J.correct)
>x1
>x2 <- sum(NLP4J.correct & !Stanford.correct)
>x2
>x <- x1
>n <- x1 + x2
>binom.test(x, n, p = 0.5)
>x <- x2
>binom.test(x, n, p = 0.5)
```

*Results:*

```
x1 <- [1] 943  
x2 <- [1] 1016
```

Exact binomial test

```
data: x and n  
number of successes = 943, number of trials = 1959, p-value =  
0.1038  
alternative hypothesis: true probability of success is not equal to 0.5  
95 percent confidence interval:  
 0.459029 0.503763  
sample estimates:  
probability of success  
      0.481368
```

Exact binomial test

```
data: x and n  
number of successes = 1016, number of trials = 1959, p-value =  
0.1038  
alternative hypothesis: true probability of success is not equal to 0.5  
95 percent confidence interval:  
 0.496237 0.540971  
sample estimates:  
probability of success  
      0.518632
```

Based on the binomial tests and compared to an  $\alpha = 0.05$ , neither tagger performed significantly better than the other.