University of the People

MATH 1281 - Statistical Inference

Unit3 Written Assignment 3

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# Part 1: Barking Deer Foraging Preferences

## a. Hypotheses

• Null Hypothesis (H₀): Barking deer forage in different habitats in proportion to habitat availability.

• Alternative Hypothesis (Hₐ): Barking deer show a preference for certain habitats, i.e., the observed foraging is not proportional to habitat availability.

## b. Type of Test

A Chi-Square Goodness-of-Fit Test is appropriate because we are comparing the observed frequencies of foraging in each habitat to the expected frequencies based on land availability proportions.

## c. Assumptions and Conditions

1. Random Sample: We assume that the 530 sites were randomly selected or representative.  
2. Expected Count Condition: Each expected cell count must be ≥ 5.  
Expected counts (based on 530 sites):  
• Woods: 0.048 × 530 ≈ 25.44  
• Cultivated grassplot: 0.147 × 530 ≈ 77.91  
• Deciduous forests: 0.396 × 530 ≈ 209.88  
• Other: 0.409 × 530 ≈ 216.77

## d. Hypothesis Test

Observed counts:  
• Woods = 6, Cultivated = 18, Deciduous = 71, Other = 435  
  
Chi-square statistic ≈ 372.55  
Degrees of Freedom = 3  
P-value < 0.001  
  
Conclusion: Since p < 0.001 and is far below α = 0.05, we reject the null hypothesis.  
Interpretation: There is strong evidence that barking deer do not forage in habitats in proportion to their availability.

# Part 2: Link Placement Experiment

## a. Calculate actual visitor counts

Total visitors = 501  
• Position 1: Download = 80, No Download = 105  
• Position 2: Download = 74, No Download = 106  
• Position 3: Download = 60, No Download = 76

## b. Test for Equal Proportions Across Positions

Hypotheses:  
• Null Hypothesis (H₀): The proportions of download vs. no-download are the same across all three positions.  
• Alternative Hypothesis (Hₐ): At least one position has a different distribution of download rates.  
  
Test Type: Chi-Square Test for Homogeneity  
Given: p-value = 0.01215  
Conclusion: Since p = 0.01215 < α = 0.05, we reject the null hypothesis.  
Interpretation: There is statistically significant evidence that download behavior differs based on the position of the link.

# References

University of the People. (n.d.). Statistical Inference: Unit 3 – Testing for Goodness of Fit and Independence. UoPeople Learning Environment.  
OpenIntro. (n.d.). Statistics Textbook Resources. Retrieved from https://www.openintro.org