

Vulnerability of Wildebeest

In the African country of Tanzania, wildebeest of varying ages and physical states of health fall prey to lions. We will rate the vulnerability of various wildebeest by placing them into specific categories as follows:

Level 1 MOST VULNERABLE: under 6 months, over 12 years, ill.

Level 2 MODERATELY VULNERABLE: under 1 year or mildly ill.

Level 3 LESS VULNERABLE: 1 to 2 years, in good health.

Level 4 LEAST VULNERABLE: 2 to 12 years, excellent health.

If the lions feed on wildebeest from each category randomly, then the number of wildebeest eaten would be nearly equal. If, however, the data does not support this hypothesis, then SELECTION of certain wildebeest must have occurred. A NULL HYPOTHESIS is usually proposed for these circumstances, something to the effect that the vulnerability category of the wildebeest will have NO effect on the numbers of each category eaten. If you can show that this is not the case through a statistical process, then selection must be occurring.

Data Analysis (for Vulnerability of Wildebeest)

1. Use the Chi-square test to test this null hypothesis by comparing the expected number of wildebeest of each vulnerability category to be eaten against the observed numbers actually eaten. Use the data given below to complete calculation. (Enter expected numbers first) All data should be entered in Table. 1.

Table 1

	Observed	Expected
Vulnerability Level 1	148	
Vulnerability Level 2	82	
Vulnerability Level 3	51	
Vulnerability Level 4	19	
Total	300	

2. Interpreting the Chi-square value: With the calculation table completed, determine the degrees of freedom to be used and the probability that the Chi-square you obtained is caused by chance factors or by selection.

df = _____ p = _____

3. Discussion: Answer the following:
 - a. Was the null hypothesis acceptable or unacceptable? What factors influenced your decision?
 - b. Which vulnerability level was selected for? Which vulnerability level was selected against? Explain. How does this relate to the concept of natural selection?
 - c. What factors determine which wildebeest most often fell prey to lions?