

Chapter 13 Class Notes – Summary of Inference Methods

Connections between the statistical methods considered in the text are given in the flowchart on p.551, and 12 illustrations (first 5 in-depth) are given in § 13.2 on pp.552-562. For each example, we must consider the following:

1. What question(s) were the researchers attempting to answer when they collected their data?
2. What is the response variable that was measured?
3. What predictor variable(s) was/were measured?

Example 13.1. Gibberellic acid. Here, the NPP's (Normal Probability Plots) indicated non-normality, so the data are log-transformed. Since there are 2 treatment groups and the response is continuous, the data are then analyzed using a two-sample t-test. These data suggest a difference in the population means.

Example 13.2. Whale swimming speed. Here, two continuous measurements are made on each subject (whale), so SLR is used. The researcher's Q was: "Does tail-beat velocity [y] depend on velocity [x]?" The NPP and residual plot look okay. Here, we conclude that the slope is not zero. Since the slope estimate is $\hat{\beta}_1 = 1.44$, we say that as the velocity increases by one unit (one L/s), tail frequency increases by 1.44 Hz on average.

Example 13.3. Tamoxifen. The data for this randomized, double blind study are given in the 2x2 CT on p.557, and can thus be analyzed in a number of ways: one could perform a χ^2 test or obtain a CI for the RR, OR, or $(p_1 - p_2)$. Here, the latter CI does not contain 0.

Example 13.4. Chromosome Puffs. We analyzed these data at the end of Chapter 12 using SLR modelling. The conclusion for the ANOVA (and MCP) is that the three treatment means differ.

Example 13.5. Therapeutic Touch. These data are used by fitting the Binomial distribution to data, and then seeing how closely the Binomial distribution approximate the data using the χ^2 GOF (goodness of fit) test. For these data, the Binomial distribution provides a good approximation.

Example 13.6 Seastars: two independent sample t-test

Example 13.7 Twins: McNemar's test

Example 13.8 Soil Samples: paired t-test, or sign or WSR test

Example 13.9 Vaccinations: chi-square test for 2x2 CT or logistic regression

Example 13.10 Estrogen and Steroids: ANOVA or quadratic regression

Example 13.11 Damselflies: 2x3 CT and χ^2 test

Example 13.12 Tobacco Use Prevention: sign test