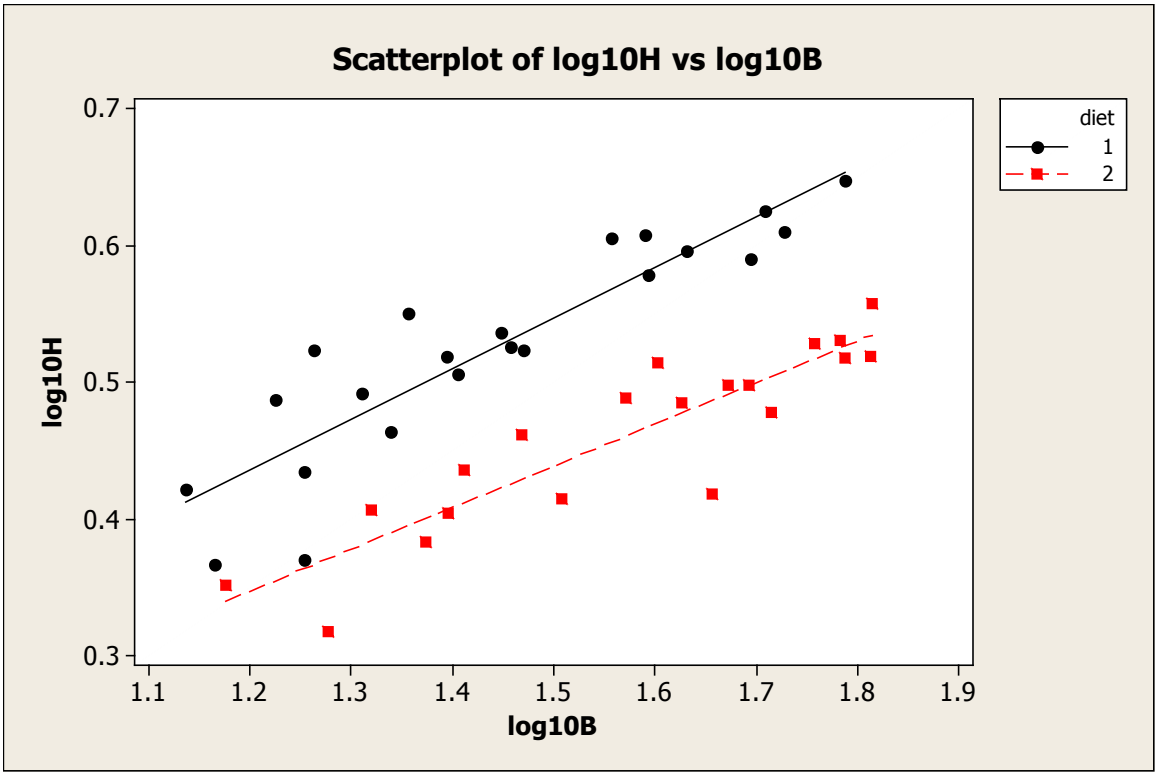
Class Notes – Tuesday 22 January 2008

- Section 2.4: Let's demonstrate the **Full-and-Reduced F test** on p.8, where we wish to ***simultaneously*** drop several X's (and in other cases too) – ***this test is very important***!
- Section 2.5: return to dummy variables again with Example 2.4 on p.9. Dummy variables are also needed to perform an analysis of covariance (ANOCOV) as in Example 2.5 on p.10: Y = $\log_{10}$(head size) and wish to compare two treatments; covariate is X = $\log_{10}$(body size)
- This graph illustrates the parallelism detected on p.12;



- We really have no business performing an ANOCOV analysis if we cannot accept parallelism; parallelism means that ***the covariate affects the response variable in a similar manner for the two drugs or groups***;

- Homework 1 ex. 1 demonstrates the importance of first removing covariate(s) (i.e., doing ANOCOV) before comparing means of Y, as opposed to just doing a simple 2-sample t-test (and ignoring the covariate);
- In the presence of an interaction term, main-effects terms cannot be interpreted and are meaningless.

New Section 2.6 Material

- Sometimes the Wald procedure on a transformed scale yields reliable CI's, and sometimes we have to go to the trouble to find the more reliable likelihood-based CI's;
- Examples include the CC (correlation coefficient) even when normality is assumed, and also π, OR, and RR (latter 3 are in the Appendix);
- Fisher showed a good transformed scale for the CC (r) is the inverse hyperbolic tangent, $k = \frac{1}{2}\log\{(1+r)/(1-r)\}$, from which we get the CI given in equation (2.8);
- For the CC, the likelihood-based CI is given in (2.10);
- For the original Efron GPA data graphed on p.14 (***n=15***), these two intervals are close (top of p.15) for both 95% and 99%, and graphs in mid-p.15 are close;
- This breaks down for small samples: note the big difference between the two 95% CI's for data graphed on p.16 (n=6) – graphs and intervals differ a lot on p.16;
- When do Wald methods break down? This is a function of the model/data *'**curvature**'*;
- Bottom line: likelihood methods are usually preferred, but finding them is computationally more work.

Examples in the Appendix

Again, there exist modified Wald-type intervals which – for large sample sizes – approximate the likelihood intervals.