

BIOL 300 Assignment 8, Spring 2012

Chapter 12

15. (a) The difference in white blood cell count is 1.87, with the more promiscuous species having the higher count.
(b) $0.10 < \mu_d < 3.62$.
(c) The null hypothesis that there is no difference means that $\mu_0 = 0$, so $t = 1.87 / 0.52 = 3.56 > \alpha(2)_{0.01, 8 \text{ df}}$, so $P < 0.01$. We reject the null hypothesis: promiscuous primates have higher white blood cell counts.
16. (a) We need to use Welch's t -test as the variances appear to differ with the diet.
(b) For Welch's t , we need the difference in the means ($2.05 - 1.54 = 0.51$), with standard error of the difference = 0.0604. The null difference in means is zero. $t = 8.3$. The calculated degrees of freedom are 26. We can reject the null hypothesis that the diets do not lead to a difference in eye stalk length, $P < 0.0002$.
21. (a) two-sample t -test: The difference is $(1.51 - 0.87) = 0.64$, the null hypothesis is that the difference is zero, and the SE of the difference is 0.16. $t = 0.64 / 0.16 = 4.0$, so we reject the null hypothesis that there is not a difference ($P < 0.01$).
(b) The estimated difference is 0.64. The standard error is 0.16.
22. (a) The standard error is the standard deviation divided by the square-root of the sample size. To calculate the standard deviation from the standard error, multiply by the square root of the sample size: SD baby = 1.69; SD adult = 2.91.
(b) two-sample t -test: the difference in mean conductivity is 2.0, SE = 1.34. The null hypothesis is that there is no difference, so $(\mu_1 - \mu_2)_0 = 0$. $t = 2.0 / 1.34 = 1.50$, with 12 df . We cannot reject the null hypothesis that the conductivity does not differ between adult and baby dolphin blubber. ($P > 0.05$).
25. No, this is not a valid statement. Drug X had some effect on chilblains and drug Y did not have a statistically significant effect. However, this did not mean that drug Y had no effect, which is the implication of concluding that drug X is better than drug Y based strictly on the two independent tests. To conclude that drug X is more effective, it is necessary to compare the mean effect of drug X and the mean effect of drug Y in a two-sample t -test (assuming that the assumptions are met).