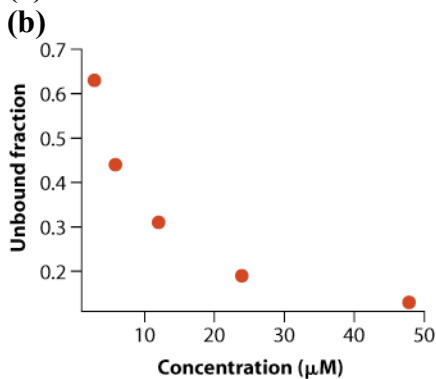


BIOL 300 Assignment 11 (not due), Spring 2012

Chapter 16

12. (a) There is a negative linear relationship between telomere length and chronicity, but it is not strong. (b) -0.43 . (c) $-0.66 < \rho < -0.13$.
14. (a) butterfly: $r = 0.35$ $SE_r = 0.26$; bird: $r = 0.61$ $SE_r = 0.22$; plants: $r = 0.41$ $SE_r = 0.25$
16. (a) $r = -0.86$.



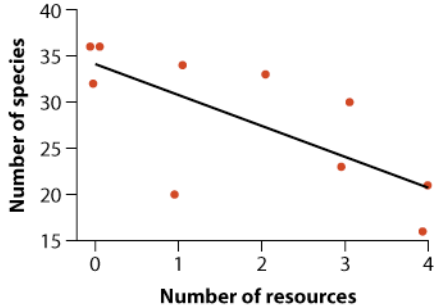
- (c) The relationship is non-linear.
- (d) A transformation of one or both variables (e.g., the log transformation) to make the relationship linear is the first step. If transformations fail to remedy the problem, a nonparametric correlation is the next option.
17. (a) $r = 0.86$
- (b) $SE = 0.18$
- (c) The standard error is the standard deviation of the sampling distribution of r .
- (d) H_0 : There is no correlation between increase in slow-wave sleep and increase in performance ($\rho = 0$).
- H_A : There is a correlation between increase in slow-wave sleep and increase in performance ($\rho \neq 0$).
- n , df :
- $t = 4.84$, $df = 8$, $P = 0.0013$.
- $t_{0.05(2), 8} = 2.31$. Since t is greater than $t_{0.05(2), 8}$, $P > 0.05$. Reject H_0 .
- Conclude that there is a positive correlation between increase in slow-wave sleep and increase in performance.
- (e) This is an observational study [note: the original study also included an experiment]. The researchers did not assign subjects to different values of slow wave sleep increase

Chapter 17

13. (a) The variance in Y is not equal for all X , but increases with increasing X .
- (b) The relationship between X and Y is not linear.
- (c) The residuals are not normally distributed.

(d) The residuals are not normally distributed, and the variance in Y is not the same for all X , because of the outlier.

14. (a) The number of added nutrients should be the explanatory variable (X), as this was controlled by the experimenters. The response variable of interest (Y) is the number of plant species supported.



(b) $b = -3.34$ (3.34 species are lost for each nutrient added), $SE = 1.10$.

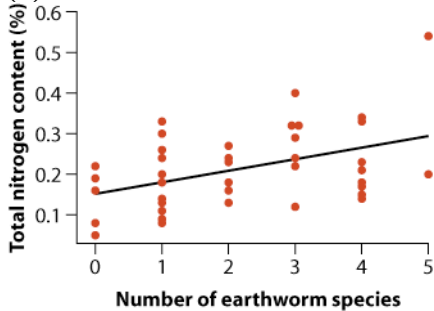
(c) $R^2 = 0.54$

(d) H_0 : There is no treatment effect ($\beta = 0$)

H_A : There is a treatment effect ($\beta \neq 0$)

$t = -3.04$, $df = 8$, $P = 0.016$, $t_{0.05(2),8} = 2.31$. Since $t > 2.31$, $P < 0.05$. Reject H_0 . Conclude that adding more nutrients reduces the number of plant species supported.

15. (a)



(b) $Y = 0.152 + 0.028X$

(c) %Nitrogen per earthworm species.

(d) $\hat{Y} = 0.294$.

(e) $SE = 0.0096$.

(f) $0.009 < \beta < 0.048$

18. (a) $b = 0.798$

(b) $b = 0.771$

(c) Regression toward the mean.