

1. Model selection criteria like the AIC test heavily penalize the number of parameters in a model because additional parameters increase the complexity of the model and increase the chance that the multiple parameters will be collinear, which violates the first group 1 model assumption: independent observations.
2. In considering the regression equation for a simple linear regression (typed here as $y=a+bx+e$), the slope parameter b describes the magnitude and direction of change in y , the response variable, as x , the predictor variable, changes. In non-technical language, b can be understood as the amount that y changes when x increases by 1.

Consider, for example, an experiment observing the number of birds that frequent a particular study site in relation to the number of outdoor domestic cats in that same area. In this case y would describe the number of birds present, and x would describe the number of cats. If, when 0 cats are present, we observe an average of 20 birds during a sampling period, but that number drops to an average of 15 when 1 cat is present, and 10 when 2 are present, then the slope parameter b can be estimated as -5 for the model. In other words, we can predict that for every additional cat present, there will be 5 fewer birds.

3. In this table, the base case (or intercept) is the low level of water treatment.
4. The average plant biomass for low water treatment in this case is 2.4 g, with a standard deviation of 2.19. Calculation was not needed in this case, as the base case mean is reported directly.
5. The average plant biomass for medium water treatment is 3.7 g, with a standard deviation of 5.12. I calculated this by adding the waterMed estimate to the base case estimate. This is because, in a Coefficient table, each level other than the base case is considered to be a +1 to the predictor variable, and the estimate is the slope parameter. Therefore, the mean of medWater = intercept + medWaterEstimate * 1, or $2.4 + 1.3$.
6. B: Model coefficient tables characterize the strength and significance of individual intercept and slope coefficients, but do not tell us about the overall significance of the categorical predictor.