Week 6 – Lecture notes

Anova – Analysis of Variance. Generalization of t-test, that allows us to examine differences among 2 or more groups. Independent variable – Categorical variable, often referred as Factors/levels.

P – value of 0.0104 if alpha is 0.05, then reject the null hypothesis. There is a difference among the means.

F-statistic – Square of the t-distribution.

If HDI no overlap with 0, very confident we have a credible difference in our value. Confidence interval, from our width of the interval, over the long run – at least 100 - we know that 95% of the confidence interval will overlap with the true population value. We don’t know if the particular confidence interval is one of the good ones or not.

Null hypothesis test – Critical values of the test, marked off with quartiles. If it falls in the tails, we reject the null hypothesis.

Within group variance – variance within each group.

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PrecipGrp – is the factor. Between groups. Variation among means. The variance between each group mean and the population mean. The between groups can be defined as the population mean variance.

Residulas – is the error term. Within groups. Estimate of the true variance of the raw population. Sample mean variance.

Degrees of freedom – 3 factors so 2 DF. 60 data sets – 1, and -2 for the factor. When we calculate a statistic like mean, we are borrowing the data, so df will be n-1. Standard deviation of population is divided by n, but for a sample is divided by n-1, because we calculate the mean and that takes away 1 degrees of freedom.

Mean sq – Variance. Sum sq/ DF.

F-value – Ratio of the mean squares. Ratio of between groups and within groups. The ratio should be close to 1, if the groups were all sampled from the same population. If value is above 1, it is due to sampling error, that would mean the value is way out in the tail, which means the probability of finding that value would be very low, which would reject the null hypothesis.

P-value: The null hypothesis states that when data is sampled from the same population, we expect that the between groups variance and the within groups variance will be roughly equal. This means that the F value should be close to 1. The alternative hypothesis suggests that there’s a difference between the groups and one of the groups was sampled from a population with a different mean. We get an F value of 7.21. The F value is significant according to the logic of the null hypothesis because the probability of F being larger is 0.00175. 0.00175 is less than alpha (0.05) so we reject the null hypothesis.When we reject, we have no evidence the group are different.

If the p-value is less than or equal to the alpha (p< . 05), then we reject the null hypothesis, and we say the result is statistically significant. If the p-value is greater than alpha (p > . 05), then we fail to reject the null hypothesis, and we say that the result is statistically nonsignificant (n.s.).

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Bayesfactor – By default, in odds in favor of the alternative hypothesis. The HDI’s for the 3 groups do not overlap, which is evidence that the groups do have different means.

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F-value is high, 15.37, with small p-value. The value is way out in the tail, we reject the null hypothesis, there is some difference in the group means. The bayes factor, is in favor of the alternative hypothesis.

No overlap of HDI between horsebean and sunflower/casein. So Sunflower and Casein are much better.

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