

Week 5 Statistics Half of the Tutorial Questions

Part A

Dextroamphetamine is a drug that has been commonly used to treat hyperkinetic children. A paper in the *Journal of Nervous and Mental Disorders* (1968, vol. 146, pp. 136–146) reported the following data on the amount of dextroamphetamine (%) excreted in a trial over 7 hours by a sample of children having organically related disorders and a sample of children with non-organic disorders:

Organic	17.53	20.60	17.62	28.93	27.10
NonOrganic	15.59	14.76	13.32	12.45	12.79

The mean amount excreted for the organic group is 22.36 % with a standard deviation of 5.35 %, while for the non-organic group the mean is 13.78 % with a standard deviation of 1.34 %. Does this give evidence of a difference in mean dextroamphetamine excretion between the two groups?

- State the null and alternative hypotheses of interest in terms of μ_1 and μ_2 , the underlying mean dextroamphetamine excretion for the two populations.
- Does a pooled two-sample t -test seem appropriate here? Why or why not?
- Calculate the t statistic to test this null hypothesis.
- Considering the concept of using the minimum of two sample sizes, what is the corresponding P -value? What do you conclude?

- e) Calculate the 90% confidence interval for the difference in the mean dextroamphetamine excretion between two groups. (Hint: use the degrees of freedom for t-distribution from part d)).
- f) Create a “csv” file using the data and perform Welch t-test in RStudio to test the hypothesis in part a).
- g) Using the Welch t-test results from part f), what is the margin of error in a 95% confidence interval for the difference in the mean dextroamphetamine excretion between two groups?

Part B

A study reported on the survival rate among patients suffering cardiac arrest both when resuscitation was started by (trained) lay people and when it was delayed until the arrival of an ambulance crew. A total of 27 patients survived out of the 75 attended by lay people, while 130 survived out of the 556 attended by an ambulance crew.

- Give a 95% confidence interval for the difference between p_1 and p_2 , where p_1 denotes the proportion of successful resuscitations in the lay-trained class and p_2 the proportion of delayed successful resuscitations by ambulance crews.
- Is there any evidence of a difference in the proportion of successful resuscitations in the lay-trained class compared to the proportion of delayed successful resuscitations by ambulance crews?
- How would the analysis need to change if the researchers were aiming to show that a program to train lay people to perform resuscitation would be beneficial?
- What is the conclusion from the analysis in part c)?

PART C

About Paper Review which is due on 11 Jan 2023 at 3:00 pm.