

Psych 315, Winter 2021, Homework 10

Due Friday, March 12th by midnight (PST).

Name _____ ID _____

Section [AA] (Natalie), [AB] (Natalie), [AC] (Ryan), [AD] (Ryan), [AE] (Kelly), [AE] (Kelly)

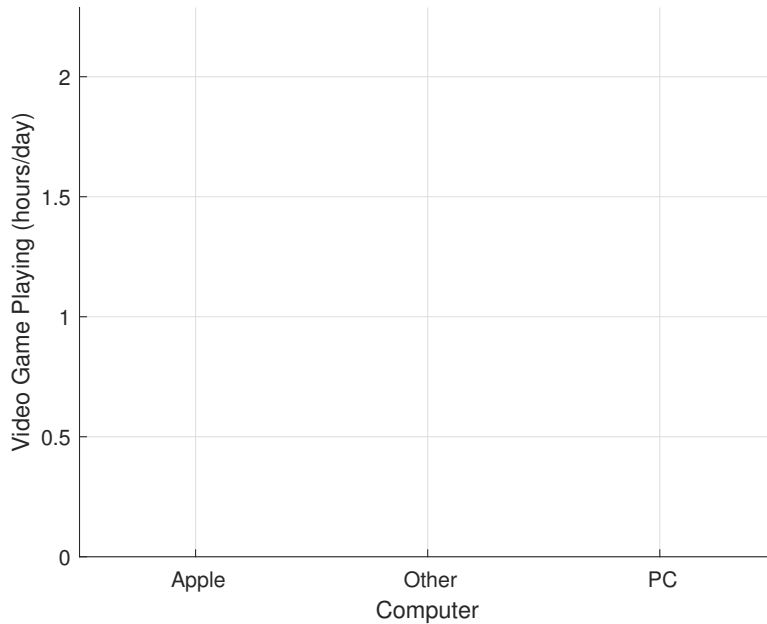
Problem 1 Does how much time you spend playing video games vary with what kind of computer you have?

	Apple	Other	PC
n	95	11	46
mean	0.76	0.36	1.74
SS	131.168	8.5456	184.3696

The grand mean (mean of video game playing for all 152 students) is 1.0276 hours per day.

a) Make a bar graph of these means with the error bars representing the standard error of the mean:

- (1) Calculate the standard deviation from SS: $s_x = \sqrt{\frac{SS}{n-1}}$
- (2) Calculate the standard error of the mean from s_x : $s_{\bar{x}} = \frac{s_x}{\sqrt{n}}$



You'll be filling in the following summary table in the remaining steps:

	SS	df	MS	F	F_{crit}	p-value
Between						
Within						
Total						

b) Calculate SS_{bet} by calculating the sums of squared deviations of each mean from the grand mean (1.0276), scaling each SS by its sample size.

$$SS_{bet} = \sum n(\bar{X} - \bar{\bar{X}})^2$$

Put the result in the table above.

c) Calculate the degrees of freedom for SS_{bet} , which is the number of groups - 1. Calculate MS_{bet} by dividing SS_{bet} by its degrees of freedom:

$$MS_{bet} = \frac{SS_{bet}}{df_{bet}}$$

Put the result in the table above

d) Calculate SS_w by adding up the SS for each of the 3 groups. Put the value in the table above.

e) Calculate the degrees of freedom df_w for SS_w , which is the total number of scores minus the number of groups ($n_{total} - k$). Calculate MS_w by dividing SS_w by df_w . Put the value in the table above.

f) Calculate the F statistic by dividing:

$$F = \frac{MS_{bet}}{MS_w}$$

Put the value in the table above.

g) Find the critical value of F from Table E, using a value of alpha $\alpha = 0.05$. Use the F-calculator to find the p-value for this test. Place the values in the table above.

h) State your conclusions using APA format

Problem 2 Conduct the hypothesis test in problem 1 using R. From the survey, the amount of video game playing can be found in the field 'games_hours' and their choice of computer is in 'computer'. Don't worry about plotting the results or calculating the effect size.

Hint: Start with the example in the R script from the one factor ANOVA tutorial: OneFactorANOVA.R