

HPS201/771

Week 8 - Seminar

Seminar Outline

- ANOVA
- jamovi Assignment – Task 5
- Practice Questions









	Ice Cream	Chocolate	Pizza in a Cone
Happiness Score	1	5	9
	2	6	10
	3	7	11
	4	8	12
	2.5	6.5	10.5
Average			



$$F = \frac{\text{Between Treatment Variance}}{\text{Within Treatment Variance}}$$

Error



jamovi

Stats.
Open.
Now.

Q1

Has the assumption of homogeneity of variance been violated? Use statistical information to support your answer.

No, the assumption of homogeneity of variance has been met, $F(3, 24) = 0.25, p = .860$.

Q2

Report the results of the analysis in APA format.

A one-way ANOVA was conducted to examine whether there was a significant difference in reaction time between the control, decaf, coffee and water groups. The analysis revealed a statistically significant difference between the groups, $F(3, 24) = 6.59, p = .002, \eta_p^2 = 0.45$.

There are four common antidepressants that are used to treat depression (Anti-depressant A, B, C, & D). As a geriatric clinical psychologist, you are interested in comparing the effects of these four drugs on elderly individuals suffering from depression.

You take a sample of $N = 40$ elderly individuals suffering from depression and randomly allocate each person to one of four groups (each will contain $n = 10$ participants). Each group will be given one of the antidepressants.

After administering the antidepressants, you measure each participants' depression levels using a depression rating scale (0-50- higher scores indicate higher levels of depression) and conduct a one-way between groups ANOVA comparing the mean depression levels of your four groups.

Source	SS	df	MS	F
Treat			10	
Error				
Total	174			

N =

n =

k =

Source	SS	df	MS	F
Treat			10	
Error				
Total	174			

$$MS = \frac{SS}{df} \quad F = \frac{MS_{Treat}}{MS_{Error}}$$

$$N = 40$$

$$n = 10$$

$$k = 4$$

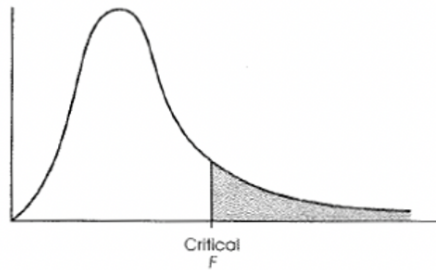
$$df_{Treat} = k - 1 =$$

$$df_{Error} = k \times (n - 1) =$$

$$df_{Total} = N - 1 =$$

TABLE B.4 THE F DISTRIBUTION*

*Table entries in lightface type are critical values for the .05 level of significance. Boldface type values are for the .01 level of significance.



Degrees of Freedom: Denominator	Degrees of Freedom: Numerator									
	1	2	3	4	5	6	7	8	9	10
30	4.17 7.56	3.32 5.39	2.92 4.51	2.69 4.02	2.53 3.70	2.42 3.47	2.34 3.30	2.27 3.17	2.21 3.06	2.16 2.98
32	4.15 7.50	3.30 5.34	2.90 4.46	2.67 3.97	2.51 3.66	2.40 3.42	2.32 3.25	2.25 3.12	2.19 3.01	2.14 2.94
34	4.13 7.44	3.28 5.29	2.88 4.42	2.65 3.93	2.49 3.61	2.38 3.38	2.30 3.21	2.23 3.08	2.17 2.97	2.12 2.89
36	4.11 7.39	3.26 5.25	2.86 4.38	2.63 3.89	2.48 3.58	2.36 3.35	2.28 3.18	2.21 3.04	2.15 2.94	2.10 2.86

Source	SS	df	MS	F
Treat	30	3	10	2.50
Error	144	36	4	
Total	174	39		

- The obtained F-statistic of 2.50 is less than the critical F-value of 2.86.
- We don't have evidence for a significant difference between our groups.



Q1

Calculate the
effect size partial
eta squared

Source	SS	df	MS	F
Treat	30	3	10	2.50
Error	144	36	4	
Total	174	39		

$$\eta_p^2 = \frac{SS_{treatment}}{SS_{treatment} + SS_{error}}$$

$$\eta_p^2 = \frac{30}{30 + 144} = \frac{30}{174} = 0.17$$

Q2

Report the results of the analysis in APA format.

A one-way ANOVA was conducted to investigate whether there was a significant difference in mean depression ratings between elderly sufferers of depression who were either given Anti-depressant A, B, C, or D. This analysis failed to show a significant difference between the groups, $F(3, 36) = 2.50, p > .05, \eta_p^2 = .17$.

AT1 - Task 5

Exam Practice

Q1

Why could we expect to see differences between our group (or treatment) means?

A

Chance only

B

Treatment effect only

C

Treatment effect + Chance

D

None of the above

Q2

Why would we expect to see differences within our groups (or treatments)?

A

Chance only

B

Treatment effect only

C

Treatment effect + Chance

D

None of the above

Q3

If your treatment effect increased, how would you expect the F statistic to change?

A

You would not

B

Increase

C

Decrease

D

Stay constant

Q4

The value of SS_{Between} would be:

A

14

B

90

C

27

D

33

Source	SS	df	MS	F
Between treatments		3	30	
Within treatments				
Total	110	10		

Q5

The value of SS_{within} would be:

A

200

B

20

C

30

D

40

Source	SS	df	MS	F
Between treatments	90	3	30	
Within treatments				
Total	110	10		

Q6

The value of df_{within} would be:

A

7

B

8

C

9

D

10

Source	SS	df	MS	F
Between treatments	90	3	30	
Within treatments	20			
Total	110	10		

Q7

What would the F-value for this data set be?

A

10.5

B

8.76

C

2.19

D

4.29

Source	SS	df	MS	F
Between treatments	90	3	30	
Within treatments	20	7		
Total	110	10		

Q8

In the previous example, the $df = 3, 7$ and you set your α at .05. Accordingly, you would:

A

Reject the null hypothesis because the obtained F-value was greater than the critical F-value

B

Accept the null hypothesis because the obtained F-value was greater than the critical F-value

C

Reject the null hypothesis because the obtained F-value was less than the critical F-value

D

Accept the null hypothesis because the obtained F-value was less than the critical F-value

See you next week!