

4. for the following data, please complete the ANOVA table

A General Social Survey asked 1465 respondents how much they liked rap music. Liking of rap music was measured on a five-point scale ranging from 1 (like it very much) to 5 (dislike it very much). These are the mean rap scores and Ns for type of community in which respondent lives:

Type of Community	Mean	N
Big City	3.773	256
Suburbs	3.909	395
Small City	3.930	572
Village	4.400	55
Country	4.011	187

Sum of square	Sum of square	df	MSS	F	E ²
Between					
Within	1811.960				
total					

First, you need to calculate total mean (\bar{X}_T)

$$\bar{X}_T = \frac{3.773 \times 256 + 3.909 \times 395 + 3.930 \times 572 + 4.4 \times 55 + 4.011 \times 187}{1465} = 3.92$$

With the total mean, you can go ahead calculating $SS_{Between}$

$$(SS_{Between}) = \sum (\bar{X}_G - \bar{X}_T)^2 \times N_G$$

$$(SS_{Between}) = (3.773 - 3.92)^2 \times 256 + (3.909 - 3.92)^2 \times 395 + (3.930 - 3.92)^2 \times 572 + (4.4 - 3.92)^2 \times 55 + (4.011 - 3.92)^2 \times 187 =$$

Once you have $SS_{Between}$, you should be able to calculate

$$SS_{Total} = SS_{Between} + SS_{within} \Rightarrow SS_{total} = 19.86 + 1811.96 = 1831.82$$

Then follow the ANOVA table to calculate the rest

	Sum of square	df	MSS	f	p	Eta-square
Between	19.86	4	4.965	4.00	P < .01	1.1%
Within	1811.96	1,460	1.24			
total	1831.82					

P < .01, meaning you should reject the null hypothesis, committing type I error

calculating eta-square (E^2)

$$E^2 = \frac{SS_{between}}{SS_{total}} = \frac{19.86}{1831.82} = 1.1\%$$

interpret eta-square

Eta-square is PRE: knowing independent variable reduces errors in estimating the value of dependent variable by X%,

knowing communities reduces errors in estimating the liking of rap music by 1.1%.