SPSS 3 Practice – Interpretation questions

A researcher is interested in the effects of music on stress levels, and how stress levels might be related to anxiety and life satisfaction.

1. Below is the output of a 2 (gender) x 3(music type) completely between subjects factorial ANOVA on stress ratings

Descriptive Statistics

Dependent Variable: Stress Level

Gender	Music	Mean	Std. Deviation	N
Male	No music	2.71	.951	7
	Hardcore Gangster Rap	7.40	.548	5
	Mozart	4.33	.516	6
	Total	4.56	2.064	18
Female	No music	2.20	1.095	5
	Hardcore Gangster Rap	7.29	1.254	7
	Mozart	3.83	.753	6
	Total	4.72	2.421	18
Total	No music	2.50	1.000	12
	Hardcore Gangster Rap	7.33	.985	12
	Mozart	4.08	.669	12
	Total	4.64	2.219	36

Tests of Between-Subjects Effects

Dependent Variable:Stress Level

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	147.282[a]	5	29.456	35.314	.000	.855
Intercept	756.577	1	756.577	907.028	.000	.968
Gender	1.250	1	1.250	1.498	.230	.048
Music	144.528	2	72.264	86.634	.000	.852
Gender * Music	.302	2	.151	.181	.835	.012
Error	25.024	30	.834			
Total	947.000	36				
Corrected Total	172.306	35				

a. R Squared = .855 (Adjusted R Squared = .831)

Report the results of this analysis in apa format, including means and standard deviations along with reporting effect sizes for gender, music type, and the gender by music type interaction.

A 2 (gender: male/female) x 3 (music type: control/rap/classical) completely between subjects factorial ANOVA was conducted on stress levels. The results revealed no significant main effect for gender, $F(1, 30) = 1.50$, $p > .05$, $\eta^2 = .05$. There was a significant main effect for music type, $F(2, 30) = 86.63$, $p < .05$, $\eta^2 = .85$. The highest stress levels were reported by the participants in the rap condition ($M = 7.33$, $SD = .96$) and the lowest stress levels were reported by participants in the control condition ($M = 2.50$, $SD = 1.00$). The classical music condition produced stress levels relatively midway between the rap and control groups ($M = 4.08$, $SD = .67$). The gender by music type interaction was not significant, $F(2, 30) = .18$, $p > .05$, $\eta^2 = .01$.

Interpret the effect size for the main effect for music type.

The partial eta-squared value of .85 indicates that music type accounts for 85% of the total variability in stress ratings after statistically controlling for both gender and the gender by music type interaction.

Should there have been a post-hoc analysis for the main effect for music type? Why or why not?

Yes, there should have been a post-hoc analysis on music type because: (1) the main effect for music type was significant and the variable has three levels, so a post-hoc would help determine where the significant differences lie, and (2) the interaction was not significant so there is no need to perform simple effects analyses.

2. Below is the output of a Oneway ANOVA on life satisfaction using music conditions as the independent factor along with a Tukey post-hoc test.

Descriptives

Life Satisfaction

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
No music	12	4.67	1.775	.512	3.54	5.79	2	9
Hardcore Gangster Rap	12	5.25	2.301	.664	3.79	6.71	2	9
Mozart	12	7.50	1.168	.337	6.76	8.24	5	9
Total	36	5.81	2.149	.358	5.08	6.53	2	9

ANOVA

Life Satisfaction

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	53.722	2	26.861	8.214	.001
Within Groups	107.917	33	3.270		
Total	161.639	35			

Multiple Comparisons

Life Satisfaction
Tukey HSD

(I) Music	(J) Music	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
No music	Hardcore Gangster Rap	-.583	.738	.712	-2.39	1.23
	Mozart	-2.833*	.738	.002	-4.64	-1.02
Hardcore Gangster Rap	No music	.583	.738	.712	-1.23	2.39
	Mozart	-2.250*	.738	.012	-4.06	-.44
Mozart	No music	2.833*	.738	.002	1.02	4.64
	Hardcore Gangster Rap	2.250*	.738	.012	.44	4.06

*. The mean difference is significant at the 0.05 level.

Write the results of the analysis in a paragraph in APA format, and include the means and standard deviations, the effect size, and the results of the post-hoc test.

A Oneway ANOVA was conducted on life satisfaction scores for the between subjects factor Music Type. The results revealed significant differences in life satisfaction ratings, F (2, 33) = 8.21, $p < .05$, $\eta^2 = .33$. Post-hoc analyses (Tukey's HSD) revealed that the group that listed to Mozart reported significantly higher life satisfaction (M = 7.50, SD = 1.17) than either the group that listed to Rap (M = 5.25, SD = 2.30) or the group that heard no music (M = 4.67, SD = 1.78). The latter two groups did not significantly differ from one another.

3. Below is the output from a Chi-Square Test of Independence on the relationship between gender and whether or not subjects exercise.

Gender * Exercise Crosstabulation

			Exercise		
			no exercise	exercise	Total
Gender	Male	Count	11	7	18
		Expected Count	9.0	9.0	18.0
	Female	Count	7	11	18
		Expected Count	9.0	9.0	18.0
	Total	Count	18	18	36
		Expected Count	18.0	18.0	36.0

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1.778[a]	1	.182		
Continuity Correction[b]	1.000	1	.317		
Likelihood Ratio	1.793	1	.181		
Fisher's Exact Test				.318	.159
Linear-by-Linear Association	1.728	1	.189		
N of Valid Cases	36				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 9.00.

b. Computed only for a 2x2 table

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.222	.182
	Cramer's V	.222	.182
	N of Valid Cases	36	

Write the results of the analysis in APA format including the measure of effect size. In addition, report the probability of exercising, given you are a male and the probability of exercising, given you are a female.

A Chi-Square Test of Independence was conducted on gender (male/female) and exercise (yes/no) to determine if these two dichotomous variables were significantly related. The results revealed no significant relation between these two variables, $\underline{X}^2$ (1, N = 36) = 1.78, $\underline{p} > .05$, $\phi = .22$. The probability that one exercises, given they are male is $\underline{p}$ (exercise/male) = .39, whereas the probability that one exercises, given they are female is $\underline{p}$ (exercise/female) = .61.

4. Below is the correlation matrix for correlations between stress, anxiety, and life satisfaction.

Correlations

		Stress Level	Anxiety	Life Satisfaction
Stress Level	Pearson Correlation	1.000	-.261	-.003
	Sig. (2-tailed)		.125	.985
	N	36.000	36	36
Anxiety	Pearson Correlation	-.261	1.000	-.253
	Sig. (2-tailed)	.125		.136
	N	36	36.000	36
Life Satisfaction	Pearson Correlation	-.003	-.253	1.000
	Sig. (2-tailed)	.985	.136	
	N	36	36	36.000

Write the results of these analyses in APA format.

Three separate Pearson Product-Moment Correlation Coefficients were computed in order to determine the degree to which anxiety ratings, stress ratings, and life satisfaction ratings were related. The results revealed that stress levels were not significantly correlated with either anxiety, $r(34) = -.26$, $p > .05$, nor was stress significantly correlated with life satisfaction, $r(34) = -.003$, $p > .05$. Anxiety was not significantly correlated with life satisfaction, $r(34) = -.25$, $p > .05$.

4. Below is the output of a point-biserial correlation between exercise and anxiety ratings.

Correlations

		Exercise	Anxiety
Exercise	Pearson Correlation	1.000	-.818**
	Sig. (2-tailed)		.000
	N	36.000	36
Anxiety	Pearson Correlation	-.818**	1.000
	Sig. (2-tailed)	.000	
	N	36	36.000

**. Correlation is significant at the 0.01 level (2-tailed).

Report this analysis in APA format. In your writeup, include and interpret the effect size.

A Point-Biserial correlation was computed between anxiety ratings and whether or not participants exercise. The results revealed that people who exercise are significantly less anxious than those who do not exercise, $r(34) = -.82$, $p < .05$. This correlation is very strong as 67% of the total variation in anxiety can be explained by exercise.