

Analysis Report

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SAMPLE REPORT - Rafael Data Analysis Portfolio

Sample Characterization

The report starts by characterizing the sample studied. 12 individuals were measured and the following table shows the overall means and standard deviations of their ages, heights, weights, training experience years and BMI.

	Mean	Standard Deviation
Age	26.1	4.9
Height	181.4	4.9
Weight	82.5	4.8
Training Experience Years	3.3	1.1
BMI	90.9	4.3

Descriptive Statistics

Before testing the hypothesis that different types of music have an effect on each one of the performance indicators, descriptive statistics were generated. The table below shows the means, standard deviations, minimum and maximum values that were observed for the sample, on each of the five scales under study.

		HRMean	HRPeak	Total Distance (m)	Average Watts	RPE 1/10
No Music	Mean	169.083	184.500	1.031.500	225.917	9.333
	Standard Deviation	7.891	8.785	75.250	49.698	.492
	Minimum	157.000	169.000	927.000	162.000	9.000
	Maximum	182.000	198.000	1.165.000	320.000	10.000
Selected Music	Mean	170.417	185.583	1.056.417	243.917	8.542
	Standard Deviation	9.700	11.759	85.118	58.185	.582
	Minimum	154.000	162.000	948.000	177.000	8.000
	Maximum	185.000	202.000	1.187.000	339.000	9.500
Tempo Music	Mean	173.000	187.917	1.044.583	234.583	8.417
	Standard Deviation	5.560	8.670	76.838	51.655	.669
	Minimum	164.000	173.000	950.000	173.000	7.000
	Maximum	184.000	203.000	1.159.000	316.000	9.000

The table shows some interesting numerical differences. For instance, average Watts and Total Distance were higher on the Selected Music experiment compared to No Music or Tempo Music. The next section shows the results of statistical tests to check if these differences are statistically significant, which would indicate that different music types have significant effects on these measures.

Repeated-Measures Test

A repeated-measures ANOVA was used to evaluate the statistical effects. The repeated-measures ANOVA method is useful when the same participants are being measured under different conditions (or measured at different points in time). This is also referred to as a within-subjects design (Pallant, 2010).

An important assumption of this test is data sphericity. This test was performed for all indicators. HRMean ($\chi^2 = 19.081$, $p < 0.001$) and HRPeak ($\chi^2 = 7.283$, $p < 0.05$) have violated the sphericity assumption since the tests were significant ($p < 0.05$), while the other indicators have not. The coefficients for these measures will then need to be adjusted to accommodate this violation.

The table below shows the ANOVA results, testing the effect of music on the five indicators. The output shows results using the standard methodology (Sphericity assumed) and three corrections whenever the assumption of sphericity is violated. Thus, the results for HRMean and HRPeak should be extracted from either of these three additional lines (Greenhouse-Geisser, Huynh-Feldt or Lower-Bound). The table also shows effect sizes using Partial Eta Squared, which have the following thresholds:

- 0.01: small
- 0.06: medium
- 0.138: large

HRMean was not statistically different across different musics ($F = 2.484$, $p = 0.140$)

Univariate Tests

Source	Measure	Type III Sum of Squares	df	Mean Square	F	p	Partial Eta Squared	
Music	HRMean	Sphericity Assumed	95.167	2	47.583	2.484	.107	.184
		Greenhouse-Geisser	95.167	1.080	88.107	2.484	.140	.184
		Huynh-Feldt	95.167	1.105	86.123	2.484	.139	.184
		Lower-bound	95.167	1.000	95.167	2.484	.143	.184
		HRPeak	Sphericity Assumed	73.167	2	36.583	6.120	.008
	HRPeak	Greenhouse-Geisser	73.167	1.318	55.507	6.120	.020	.357
		Huynh-Feldt	73.167	1.427	51.266	6.120	.017	.357
		Lower-bound	73.167	1.000	73.167	6.120	.031	.357
		Distance	Sphericity Assumed	3728.167	2	1864.083	12.453	.000
	Greenhouse-Geisser		3728.167	1.517	2457.037	12.453	.001	.531
	Huynh-Feldt		3728.167	1.709	2181.188	12.453	.001	.531
	Lower-bound		3728.167	1.000	3728.167	12.453	.005	.531
	Watts	Sphericity Assumed	1944.889	2	972.444	11.804	.000	.518
		Greenhouse-Geisser	1944.889	1.386	1403.127	11.804	.002	.518
		Huynh-Feldt	1944.889	1.522	1277.765	11.804	.001	.518
		Lower-bound	1944.889	1.000	1944.889	11.804	.006	.518
RPE	Sphericity Assumed	5.931	2	2.965	14.277	.000	.565	
	Greenhouse-Geisser	5.931	1.934	3.067	14.277	.000	.565	
	Huynh-Feldt	5.931	2.000	2.965	14.277	.000	.565	
	Lower-bound	5.931	1.000	5.931	14.277	.003	.565	

Pairwise Comparisons

Measure	(I) Music	(J) Music	Mean Difference (I-J)	Std. Error	Sig. ^b	95% Confidence Interval for Difference ^b	
						Lower Bound	Upper Bound
HRPeak	Selected Music	No Music	1.083	.988	.889	-1.704	3.870
		Tempo Music	-2.333	1.275	.284	-5.930	1.263
	No Music	Selected Music	-1.083	.988	.889	-3.870	1.704
		Tempo Music	-3.417	.621	.001	-5.168	-1.665
	Tempo Music	Selected Music	2.333	1.275	.284	-1.263	5.930
		No Music	3.417	.621	.001	1.665	5.168
Distance	Selected Music	No Music	24.917	6.188	.006	7.466	42.368
		Tempo Music	11.833	4.705	.086	-1.434	25.101
	No Music	Selected Music	-24.917	6.188	.006	-42.368	-7.466
		Tempo Music	-13.083	3.797	.016	-23.791	-2.376
	Tempo Music	Selected Music	-11.833	4.705	.086	-25.101	1.434
		No Music	13.083	3.797	.016	2.376	23.791
Watts	Selected Music	No Music	18.000	4.711	.009	4.714	31.286
		Tempo Music	9.333	3.532	.069	-.627	19.294
	No Music	Selected Music	-18.000	4.711	.009	-31.286	-4.714
		Tempo Music	-8.667	2.553	.018	-15.868	-1.466
	Tempo Music	Selected Music	-9.333	3.532	.069	-19.294	.627
		No Music	8.667	2.553	.018	1.466	15.868
RPE	Selected Music	No Music	-.792	.168	.002	-1.266	-.318
		Tempo Music	.125	.196	1.000	-.427	.677
	No Music	Selected Music	.792	.168	.002	.318	1.266
		Tempo Music	.917	.193	.002	.372	1.461

Tempo	Selected					
Music	Music	-.125	.196	1.000	-.677	.427
	No Music	-.917	.193	.002	-1.461	-.372

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

b. Adjustment for multiple comparisons:Bonferroni.

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