AS2: Choosing the Appropriate Hypothesis Test

SECTION I:

SCENARIO #1

A researcher hypothesizes that background music will have an effect on classroom performance. He selects a sample of n=50 students and randomly assigns the sample to either a non-music condition or a meditative music condition. He measures performance and is ready to analyze the data to conclude whether or not the data support his hypothesis.

What is the appropriate test? 2 independent samples t-test

Why did you choose this test? I chose the 2 independent samples t-test because there are two samples which are students in non-music conditions and students in music conditions are independent of each other.

SCENARIO #2

Childhood participation in sports, cultural groups, and youth groups appears to be related to improved self-esteem for adolescents. In a representative study, a sample of n= 100 adolescents with a history of group participation is given a standardized self-esteem questionnaire. For the general population of adolescents, scores on this questionnaire form a normal distribution with a mean of $\mu = 50$ and a standard deviation of $\sigma = 15$. The sample of group-participation adolescents had a mean of M= 54.

What is the appropriate test? 1 sample t-test

Why did you choose this test? I chose the 1 sample t-test because there is one sample in this scenario which is scores of group participation adolescents which are compared with population score.

SCENARIO #3

Researchers have noted a decline in cognitive functioning as people age. However, the results from other research suggest that the antioxidants in foods such as blueberries may reduce and even reverse these age-related declines. To examine this phenomenon, suppose that a researcher obtains a sample of n=16 adults who are between the ages of 65 and 75. The researcher uses a standardized test to measure cognitive performance for each individual. The participants then begin a 2 month program in which they receive daily doses of a blueberry supplement. At the end of the 2-month period, the researcher gain measures cognitive performance for each participant.

What is the appropriate test? Dependent sample t-test

Why did you choose this test? I chose this test because n=16 adults who are between the ages of 65 and 75 are measured 2 times which are before and after standardized testing.

SCENARIO #4

When people learn a new task, their performance usually improves when they are tested the next day, but only if they get at least 6 hours of sleep. A researcher has a set of data that demonstrates this phenomenon. He had participants learn a visual discrimination task on one day, and then tested them on the task the following day. Half of his participants were allowed to have at least 6 hours of sleep and the other half of his participants were kept awake all night.

What hypothesis test did the researcher likely use to analyze the data?

Answer: 2 Independent samples t-test

Why did you choose this hypothesis test? I chose this test because in the two samples, half of participants were allowed to have at least 6 hours of sleep and the other half of participants kept awake all night were independent of each other.

SCENARIO #5
Researchers wanted to investigate whether soccer players (who can sometimes get hit in the head with the ball) suffered any neurological deficits. These researchers measured neurological deficits in soccer players and compared the soccer player data to the data of non-soccer players believed to not engage in any other activity that could deliver blows to the head. The researchers did find significant differences between the soccer players and the non-soccer players.

What hypothesis test did the researchers most likely use to analyze the data?
Answer: Independent samples t-test

Why did you choose this hypothesis test? I chose this test because there are two independent samples and we tested for the significance of difference between them. The samples are soccer players and non-soccer players.

SCENARIO #6
A researcher was interested in studying whether watching television, especially medical shows such as Grey's Anatomy and House, can result in increased concern about personal health. She randomized a sample of n=75 to three conditions: little or none medical show television watching, moderate medical show television watching, and substantial medical television watching for six months. After six months, all participants were measured on a hypochondriac scale.
What hypothesis test should the researcher use to analyze her data?
Answer: Dependent samples t-test

Why did you choose this hypothesis test? I chose this test because there are two dependent samples and they tested for the significance of difference between those two dependent samples. The two dependent samples are a randomized sample of 75 people before 6 months and 75 people after 6 months.

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SECTION II:

This section requires that you choose the appropriate hypothesis test for each data set, run the test on SPSS, and write up your conclusions in APA format.

1. Analyze the following data from a randomized two group experiment, using the appropriate hypothesis test:

Control	Experimental
2, 3, 5, 7, 4, 3, 2, 1, 5, 3,	4, 6, 5, 7, 8, 9, 7, 6, 8, 7

Cut and paste your SPSS results here:

Group Statistics

	VAR00002	N	Mean	Std. Deviation	Std. Error Mean
VAR00001	1.00	10	3.5000	1.77951	.56273
	2.00	10	6.7000	1.49443	.47258

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means							
						Significance				95% Confidence Interval of the Difference	
		F	Sig.	t	df	One-Sided p	Two-Sided p	Mean Difference	Std. Error Difference	Lower	Upper
VAR00001	Equal variances assumed	.334	.571	-4.355	18	<.001	<.001	-3.20000	.73485	-4.74386	-1.65614
	Equal variances not assumed			-4.355	17.478	<.001	<.001	-3.20000	.73485	-4.74717	-1.65283

Write up your research results here:

The mean for the control group was M=3.50 with a SD=1.77. The mean for the experimental group was M=6.70 with a SD=1.49. The data showed a significant difference between the control group and the experimental group. t(18)=-4.355, p<.05

2. Analyze the following data from a within-subjects design measuring heart rate before and after watching a horror film:

Before	After
60	70
72	74
75	78
80	85
71	78
62	65
64	72

Cut and Paste your SPSS results here:

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	VAR00001	74.5714	7	6.47707	2.44810
	VAR00002	69.1429	7	7.35818	2.78113

Paired Samples Test

		Paired Differences					t	df	Significance	
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			One-Sided p	Two-Sided p
Pair 1	VAR00001 - VAR00002	5.42857	2.99205	1.13089	2.66138	8.19576	4.800	6	.001	.003

Write up your research results here:

The mean for the before group was M=69.14 with a SD=7.35. The mean for the after group was M=74.57 with a SD=6.47. There was a significant difference between the groups. t(6)=4.800, p<.05

3. Analyze the following data from a randomized experiment that examined the effect of hours of sleep on happiness.

6 hours	8 hours	10 hours
18	6	4
13	11	9
19	7	5
12	9	6
16	8	5
12	13	7

Cut and paste your SPSS results here:

Descriptives

VAR00001

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean Lower Bound	Upper Bound	Minimum	Maximum
1.00	6	15.0000	3.09839	1.26491	11.7484	18.2516	12.00	19.00
2.00	6	9.0000	2.60768	1.06458	6.2634	11.7366	6.00	13.00
3.00	6	6.0000	1.78885	.73030	4.1227	7.8773	4.00	9.00
Total	18	10.0000	4.53743	1.06948	7.7436	12.2564	4.00	19.00

ANOVA

VAR00001

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	252.000	2	126.000	19.286	<.001
Within Groups	98.000	15	6.533		
Total	350.000	17			

Post Hoc Tests

Multiple Comparisons

Dependent Variable: VAR00001

Scheffe

(I) VAR00002	(J) VAR00002	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1.00	2.00	6.00000*	1.47573	.004	1.9952	10.0048
	3.00	9.00000*	1.47573	<.001	4.9952	13.0048
2.00	1.00	-6.00000*	1.47573	.004	-10.0048	-1.9952
	3.00	3.00000	1.47573	.161	-1.0048	7.0048
3.00	1.00	-9.00000*	1.47573	<.001	-13.0048	-4.9952
	2.00	-3.00000	1.47573	.161	-7.0048	1.0048

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

Write up your research results here:

The data indicate a significant difference between variable 1 and variable 2, and also between variable 1 and variable 3. However, there is no statistically difference between variable 2 and variable 3.

$F(2, 15)=19.286$, $p=<.001$