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? _____independent-measures t-test
_____

Why did you choose this test? __The researcher selected a random sample and randomly assigned the sample to two groups. The researcher uses between-subject design and compares the control group mean with the experimental group mean.
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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? _____z-test_____

Why did you choose this test? __We know the σ and μ and it's possible to calculate the difference between the sample mean and the population mean and then compare the difference to the difference due to error.
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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-measures t-test

Why did you choose this test?

____The sample is not assigned to any groups. The entire sample is measured twice. The researcher analyzes the "before-treatment" group mean to the "after-treatment" same group mean

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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: ____independent-measures t-test_____

Why did you choose this hypothesis test?

_____The sample is assigned to two groups. The researcher is using between-subject research design. The researcher compares the control group mean to the experimental group mean

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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-measures t-test _____

Why did you choose this hypothesis test? ___Two groups where one represents non-players that we compare to the group of players. The researcher is using between-subject design and compares two means : experimental (players) and control (non-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: _____one way independent measures ANOVA_____

Why did you choose this hypothesis test? ____The sample is assigned to more than two groups. One IV (medical show TV watching) that has 3 levels. More than two means are compared._____

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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						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
VAR00001	Equal variances assumed	.334	.571	-4.355	18	.000	-3.20000	.73485	-4.74386	-1.65614
	Equal variances not assumed			-4.355	17.478	.000	-3.20000	.73485	-4.74717	-1.65283

Write up your research results here:

__The mean for control group was M=3.5 with SD=_1.77951. The mean for experimental group was M=6.7 with SD=1.49443. The data were significant. t(18) = - 4.335, p<0.05.

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	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	VAR00001 - VAR00002	5.42857	2.99205	1.13089	2.66138	8.19576	4.800	6	.003

Write up your research results here:
_The mean for heart rate before watching the horror film was M=69.1429 with SD=7.35818. The mean for heart rate after watching the horror film was M=74.5714 with SD=6.47707. The data were significant. Our data support that horror film did have an effect on heart rate. t(6)=4.8, p<0.05.

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		Minimum	Maximum
					Lower Bound	Upper Bound		
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	.000
Within Groups	98.000	15	6.533		
Total	350.000	17			

Multiple Comparisons

Dependent Variable: VAR00001

Scheffe

(I) VAR00002	(J) VAR00002	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
1.00	2.00	6.00000*	1.47573	.004	1.9952	10.0048
	3.00	9.00000*	1.47573	.000	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	.000	-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 6 hours sleep and 8 hours. The data also indicate a significant difference between 6 hours of sleep and 10 hours of sleep. However, there is no statistically significant difference between 8 hours of sleep and 10 hours of sleep. F(2,15)=19.286, p=0.000.

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