

AS4 (Assignment 4, Unit 5)

SECTION I:

A randomized study on n=50 rats tested whether living in a crowded situation had an effect on stress levels. Based on this information, please answer questions 1-6

1. What is the researcher's hypothesis?

Living in a crowded situation had an effect on stress levels in rats.

2. What is the null hypothesis?

Living in a crowded situation will not have an effect on stress levels in rats.

3. What is the independent variable? Number of rats placed, Crowded/non crowded

4. What is the dependent variable? Stress levels

5. What research design appears apparent here? Observational

6. What is the appropriate hypothesis test? Z-test

A researcher wishes to know whether a newly developed teaching method has an effect on 5th grading reading scores. A sample of 5th graders are given a standardized test at the beginning of the school year and retested at the end of the school year. Based on this scenario, answers questions 7-12.

7. What is the researcher's hypothesis?

A newly developed teaching method has an effect on 5th grading reading scores.

8. What is the null hypothesis?

A newly developed teaching method will not have an effect on 5th grading reading scores.

9. What is the independent variable? Teaching method

10. What is the dependent variable? Reading scores

11. What is the name of the "research design? Experimental study design

12. What is the appropriate hypothesis test to analyze the data from this study? Independent two sample t-test.

SECTION II:

13. What is the definition of a random sample?

The definition of a random sample is that everyone in the population has an equal chance to be selected for the sample.

14. What is the definition of random assignment?

Random assignment is a cornerstone of experimental design which is a technique to assign participants into 2 groups randomly without any bias so that each participant has an equal chance of being selected in either treatment or control group.

15. Imagine that the researcher failed to use a random sample. How would this failure limit her study's conclusions?

If a researcher failed to use a random sample, then sampling bias would most likely occur. If this occurred then it would influence the final results as the results will alter.

16. Imagine that the researcher failed to use random assignment in her study. How would this limit her research conclusions?

If a researcher failed to use random assignment in their study then there is a high risk of grouping and this can give a wrong result about the data.

17. No matter what hypothesis test you are using, there are two basic "differences" that you are analyzing in ALL hypotheses tests. What are these two "differences"?

1. The first difference is between the null and alternative hypothesis given by the data.
2. The second difference is if there is any given level of significance do the hypothesis test hold good or if there is a variation in the results.

18. What is meant by the term "statistical significance"?

The "statistical significance" is when we are checking if the relationship between the variables found is other than random chance or due to some other reasons.

SECTION III:

A researcher tested whether drinking caffeine had an effect on anxiety. Below is an SPSS printout from an “independent measures t-test for the data he collected:

Group Statistics

Group	N	Mean	Std. Deviation	Std. Error
Drinking Caffeine	11	4.8333	1.16802	.3536
Not Drinking Caffeine	10	8.3333	.81620	.2882

Independent Samples Test

	Levene's Test for Equality of Variances	t-Test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference
Drinking Caffeine	1.841	.183	-6.012	10	.000	-3.5000	[-4.8184, -2.1816]	
Not Drinking Caffeine	1.841	.183	-6.012	10	.000	-3.5000	[-4.8184, -2.1816]	

19. Please write the “statistical statement” for the above SPSS results:

Answer: $t(10)=-6.012, p<.05$

20. What decision did you make at end of this test? **Reject the null hypothesis**

21. Are the data significant? **Yes**

22. Please write up the complete results for the above test:

The mean for drinking caffeine group was $M=4.83$ with a $SD=1.16$. The mean for not drinking caffeine was $M=8.33$ with a $SD=0.81$. There was a significant difference between the groups. $t(10)=-6.012, p<.05$.

A researcher tested whether a particular lecture would have an effect on motivation. Below is an SPSS printout of a Paired Samples Test she used to analyze her data:

Paired Samples Statistics

Pair	Variable	Mean	N	Std. Deviation	Std. Error
1	VAF00001	4.1200	8	1.4500	.4833
2	VAF00002	5.0000	8	2.0000	.6325

Paired Samples Test

Pair	Variable	Paired Differences			t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error			
1	VAF00001 - VAF00002	-.8800	1.4000	.4833	-1.178	.272	

22. Please write the “statistical statement” for the above SPSS results:

Answer: $t(7) = -1.178, p > .05$

23. Did you reject or fail to reject the null hypothesis? **Fail to reject the null hypothesis**

24. Is this a within or between subject design? **Within subject design**

25. Are the data significant? **No**

26. Is there a probability of Type I Error? **Yes**

27. Please write up the research results for the above:

The mean of the first lecture group was $M=4.12$ with a $SD=1.45$. The mean of the second lecture group was $M=5.0$ with a $SD=2.0$. The data failed to reach significance. $t(7) = -1.178, p > .05$.