

**ISU 580 Midterm Exam**  
**Closed Book, Closed Notes, 100 mins max**

Name \_\_\_\_\_

**When asked to specify a "Study Design" please refer to the following list:**

Ethnographic, Descriptive, Correlational, Demonstrative,  
Between-Subjects Experimental, Within-Subjects Experimental

**You may modify these with the following prefixes:**

Univariate, multivariate, N-factor, N-level (for integer N).

**When asked what statistics you would use, be as specific as possible, e.g., "Mean and standard deviation of nose-picking frequency" or "t-test for independent means on scream intensity with torture method as the independent variable."**

**When asked "What kind of test is this?", choose from the following list:**

t-test for independent means, Chi-square goodness-of-fit, Chi-square test for independence, Pearson correlation

**When asked for a "Research Model", draw a boxes and arrows diagram depicting variables and their relationships. Label the boxes with the role of the variable(s) contained (IV, DV, etc.) as well as the name(s) of the variable(s).**

**When asked to "Interpret the results" of a test, you should write the results in both English and publication format.**

**Example: "There were no significant differences in performance between the Jacuzzi and Sauna groups,  $t(42)=5.67$ , n.s."**

1. On the following page is an excerpt from a study questionnaire. For each numbered question, indicate: a) the type of question format (e.g., semantic differential, etc.) and b) the type of the measure (using the four categories from Bordens & Abbott).

Q1a: \_\_\_\_\_ Q1b \_\_\_\_\_

Q2a: \_\_\_\_\_ Q2b \_\_\_\_\_

Q3a: \_\_\_\_\_ Q3b \_\_\_\_\_

Q4a: \_\_\_\_\_ Q4b \_\_\_\_\_

Q5a: \_\_\_\_\_ Q5b \_\_\_\_\_

Q6a: \_\_\_\_\_ Q6b \_\_\_\_\_

Q7a: \_\_\_\_\_ Q7b \_\_\_\_\_

Q8a: \_\_\_\_\_ Q8b \_\_\_\_\_

Q9a: \_\_\_\_\_ Q9b \_\_\_\_\_

2a. What measure of central tendency should you use for Q5?

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2b. Assume results from Q9 have outliers. What measure of spread should you use?

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Please take a moment and answer a few questions about yourself:

**Q1. Age:** \_\_\_\_\_ **Q2. Sex:** M , F, Other \_\_\_\_\_ **Q3. Weight:** \_\_\_\_\_

**Q4. Do you smoke:** Y / N

**Q5. Ethnic Background (check one):**

American Indian or Alaskan Native \_\_\_\_\_

Asian or Pacific Islander \_\_\_\_\_

Black, Not of Hispanic Origin \_\_\_\_\_

White, Not of Hispanic Origin \_\_\_\_\_

Hispanic \_\_\_\_\_

**Q6. Occupation:** \_\_\_\_\_

**Q7. How much experience do you have with virtual chickens (check one):**

I've never used one. \_\_\_\_\_

I've tried one a few times. \_\_\_\_\_

I use one regularly. \_\_\_\_\_

I'm an expert. \_\_\_\_\_

**Q8. When your housemate has handcuffed you to the sofa, how confident are you that you would still be able to exercise? Circle one:**

- a. Not at all confident
- b. Somewhat confident
- c. Moderately confident
- d. Very confident
- e. Completely confident

**Q9. Composite measure of credibility of information. Write an 'X' on each line:**

How **trustworthy** was the information?

not at all      •      •      •      •      •      •      •      very trustworthy

How **competent** was the information?

not at all      •      •      •      •      •      •      •      very competent

How **credible** was the information?

not at all      •      •      •      •      •      •      •      very credible

3. You have just been hired by PriceFisher Toys to lead the development of their newest product, "Serenity", an electronic tantrum control collar for toddlers.

3a. Your first task is to determine how parents currently control their toddlers' tantrums. Design a questionnaire to assess: a) which method parents currently use (ignoring, spanking, duct tape, or other); and b) degree of satisfaction with their current method, assessed via a three-Likert-item, one-factor composite scale.

3c. You decide to test the satisfaction part of your questionnaire by comparing against the widely accepted, "gold standard", "satisfaction with toddler muzzling battery" questionnaire. What kind of measure quality assessment is this?

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3d. You show the satisfaction part of your questionnaire to your boss, and she says it looks ok to her. What kind of measure quality assessment is this?

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3e. Fill out your questionnaire (pretend you have a toddler). What is your level of satisfaction?

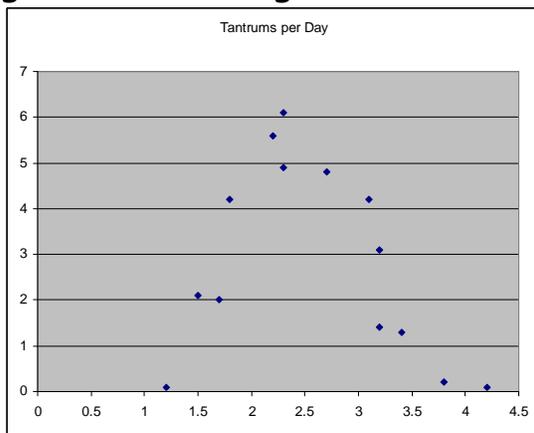
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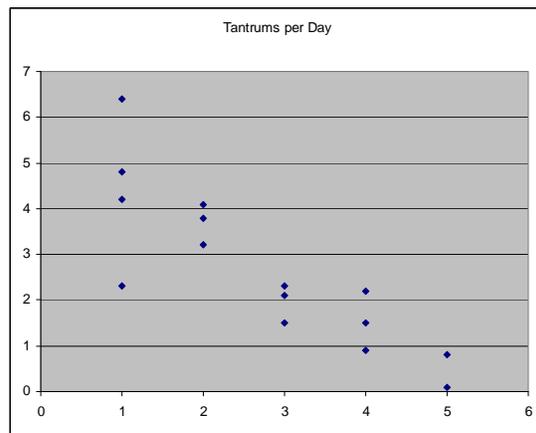
3f. You send the survey to 100 parents and get 72 responses. Assume you are doing a purely descriptive study. What kinds of statistical analyses can/should you do on the results (of the ones discussed in class)? Provide a complete and detailed analysis plan, including how you would represent the data in SPSS and the details of each analysis you would run.

3f, continued

4. You conduct a new study to understand the relationship of tantrum frequency (tantrums per day) to toddler age and birth order, assessing these three measures from a new survey. You get the following data.



Age vs. TTD



Birth Order vs. TTD

4a. What kind of study is this?

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4b. Draw the research model.

4c. What are these diagrams (Age vs. TTD, BO vs. TTD) called?

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4d. What kinds of statistical analyses can/should you do on the results (of the ones discussed in class)?

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4e. Guesstimate the results of the statistical analyses from the diagrams.

Diagram A:

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Diagram B:

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5. You finally finish your "Serenity" prototype and your boss tells you to prove that it is effective. Design a study to show this. Include all relevant details, including a research model, description of variables, a list of the statistics you would use to analyze your data, and all procedures related to your use of study participants.

5. continued

6. For each of the following, indicate the type of the study (descriptive, demonstration, correlational or experimental).

6a. You want to test the "100 monkeys on 100 typewriters" theory with toddlers, so you have 100 toddlers (systematic sampling from a Toys'R Us) sit at computers for an hour each and you count the number of valid words they type.

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6b. You repeat the previous study, but this time randomly assign half the toddlers to sit in front of Macs the other half in front of PCs.

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6c. You camp out in front of Toys'R Us again, but this time count the number of toys each toddler comes out of the store with, after which you ask their parent how many tantrums per day they have to see if there is a relationship between these measures.

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6d. You talk some of the parents into letting you go home with them so that you can objectively measure tantrums per day for yourself.

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7a. In which of the above studies can you infer causality?

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7b. Why (say more than just the type of study)?

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## 9. SPSS

9a. What kind of test is this? What kind of study design would you normally use this for? Interpret the results.

Group Statistics

Condition		N	Mean	Std. Deviation	Std. Error Mean
Outcome	Intervention	11	4.3991	1.27774	.38525
	Control	8	2.4375	1.00027	.35365

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	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Outcome	Equal variances assumed	1.073	.315	3.604		.002	1.96159	.54434	.81314	3.11004
	Equal variances not assumed			3.751		.002	1.96159	.52296	.85752	3.06566

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9b. Describe this result and its implications.

Symmetric Measures

		Value	Asymp. Std. Error <sup>a</sup>	Approx. T <sup>b</sup>	Approx. Sig.
Measure of Agreement	Kappa	.600	.242	2.400	.016
N of Valid Cases		8			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

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10. Concepts

10a. Why worry about extraneous variables?

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10b. How can you control extraneous variables?

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10c. What does a power analysis tell you?

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10d. Why should you care about the results of a power analysis?

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10e. What are the inputs to a power analysis for a t-test for independent means?

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10f. Why is random sampling important?

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10g. Define "empirical research method".

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