

You must turn in both this hard copy (with your name on it) and your scantron to receive credit for this exam.

One answer and only one answer per question. Leaving a question blank or filling in 2+ answers will be incorrect no matter what.

Language of evaluation: falsifiability, irrelevant, consistent, support, null, ...

1-3. (5 pts) Use the 5 options listed below to answer the next four questions. An answer may be used more than once.

- | | | | | |
|---|-------------------------------|------------------------------|-------------------------------|-----------------------------|
| A) The data are irrelevant to the model | B) The model refutes the data | C) The data refute the model | D) The data support the model | E) The data prove the model |
|---|-------------------------------|------------------------------|-------------------------------|-----------------------------|

- Which option means that the data could not refute the model no matter how they turned out? A B C D E
- Which option means that the data could possibly have refuted the model but did not? A B C D E
- Of 100 models that the data might have refuted, the data refute all but one. What do we say about the relationship of the data to the one model that was not refuted? A B C D E

4-8 (6 pts) Which statements about 'language' are true? A = true, B = false

- (A)(B) In testing the model that **coffee** drinkers experience half the stroke rate of non-coffee drinkers, data showing that **smokers** experience 2 strokes per 10,000 and non-smokers experience 2 strokes per 10,000 would be consistent with the model. (Ignore the possibility of sampling error.)
- (A)(B) In testing the model that **smokers** have lung cancer rates at least 5-times (5X) that of non-smokers, data showing that **smokers** have 7 lung cancers per 1000 per year and non-smokers have 3 lung cancers per 1000 per year would be inconsistent with the model. (Ignore the possibility of sampling error.)
- (A)(B) A company wishing to obtain FDA approval to market a new drug must first show it is safe. This procedure thus assumes the null model that the drug is harmful until proven safe. In contrast, for marketing an herbal remedy, there is no null model.
- (A)(B) Classifying data as *irrelevant* to a model means that the data were not gathered according to the Ideal Data template.
- (A)(B) The reason we say you cannot prove a model is because you can never reject all alternative models

Correlations, Causation & Hidden variables

9-11 (6 pts) Consider the following data and answer the questions about whether a non-zero correlation is indicated.

25% of UT students use Mac computers (the other 75% do not use Macs)

30% of UT students bank at Wells Fargo (the other 70% use a different bank)

- (A)(B) The data can be interpreted as two variables measured on a single population of students
A = true B = false
- (A)(B) The problem provides enough information to decide if there is a correlation present.
A = true B = false
- (A)(B) A positive correlation is indicated by the data.
A = true B = false

12-17. (9 pts) Which of the following statements describes a (non-zero) correlation? Do not choose any option that describes a zero correlation, for which a correlation is undefined, or which describes causation but no correlation. If insufficient information is given to determine whether a correlation exists, treat it as if there is no correlation. If part of a group is described as having some attribute, assume that others in the group do not have it. **A = is a (non-zero) correlation, B = not a correlation**

- 12) (A)(B) The mean for exam 2 was lower than the mean for exam 1.
- 13) (A)(B) 98% of convicted felons eat bread
- 14) (A)(B) Influenza (*flu*) incidence is higher in December than in June.
- 15) (A)(B) People living in Ohio eat eggs for breakfast twice a week on average; people living in New Mexico play the lotto 3 times a week on average.
- 16) (A)(B) Some women have short hair, others have long hair.
- 17) (A)(B) Talking on cell phones while driving increases car accident rates.

18,19 (5 pts) Athletic teams with red uniforms have higher winning rates (per team) than teams with uniforms lacking red. Which of the following models invokes a third variable to explain the **cause** of this correlation? Recall that, for models that invoke a third variable, changing uniform color will not change winning rate. **A = 3rd variable present, B = no 3rd variable**

Choose (A) if third variable present	Causal model
18. (A)(B)	Wearing red inspires a player to perform better during a contest than wearing other colors. Winning rates go up as player inspiration goes up.
19. (A)(B)	The teams of older, established institutions tend to have red uniforms. Because of their established reputation, those institutions recruit better athletes than younger institutions. Better athletes increasing winning rates.

20,21 (5 pts) The following table gives percent of people subscribing to the Wall Street Journal (newspaper) according to whether they own a house and whether they belong to the Republican or Democratic party Answer the following options about the possible correlations that could result from this table.

		Political party	
		Republican	Democrat
Own house	yes	35% Subscribe	28% Subscribe
	no	25% Subscribe	19% Subscribe

A = true, B = false

- 20. (A)(B) The table shows that the combination of not owning a house and being Democrat has the lowest % of subscribing among the 4 cells.
- 21. (A)(B) If no other 3rd variables apply, the table shows that the % subscribing must always be higher for those owning a house than for those not owning a house no matter what numbers of people go in each of the 4 cells.

22-26. (7 pts) Across different cities, you observe a *negative* correlation between levels of tooth decay and the amount of fluoride in the city's water supply (more tooth decay with lower fluoride). Which of the following models are consistent with this observation (meaning which models are not refuted by the correlation)?

A = consistent, B = not consistent (is refuted)

22 (A)(B) High fluoride causes lower tooth decay rates.

23 (A)(B) High fluoride causes higher tooth decay rates.

24 (A)(B) Cities with low fluoride have poorer economies, such that fewer people are able to afford preventative dental care than in cities with high fluoride. The cause of difference in tooth decay rates is access to dental care.

25 (A)(B) Cities with high tooth decay rates tend to have high fluoride content in the water

26 (A)(B) Cities with high tooth decay rates tend to have low fluoride content in the water

27-30. (7 points) Which of the following constitutes an example of **inferring causation from correlation** (i.e., in which a correlation leads one or more people to infer the causal basis of the correlation)? Base your answer only on the information provided. Do not choose answers as true that merely describe a correlation, that argue correlation from causation, or that test the causal basis of a correlation. **A = infers causation from correlation; B = does not infer causation from correlation**

27 (A)(B) A friend tells you that people eating a Mediterranean diet live longer than people eating other diets. Wishing to live long, you adopt a Mediterranean diet.

28 (A)(B) Upon hearing that people with the highest longevity drink alcohol moderately, you resolve to drink moderately.

29 (A)(B) Drinking alcohol impairs a person's coordination. As a consequence, drunk drivers are involved in auto accidents more often than are sober drivers.

30 (A)(B) Quitting the smoking habit reduces a person's lung cancer rate. As a consequence, former smokers who have quit the habit have lower lung cancer rates than those who continue smoking.

Controls and controlled variables

31-35. (6 pts) A researcher decides to evaluate the effect of exam difficulty on teaching evaluations at UT. Two UT instructors are involved in the experiment. One instructor teaches two sections of a lower division course (same course number and content, one at 8:00 AM and the other at 11:00 AM, with different students). The other instructor teaches two sections of an upper division course, again at 8:00 AM and at 11:00 AM. For each instructor, the 8:00 section is given the harder exams. At the end of the semester, student evaluation scores are compared between the 8:00 and 11:00 sections taught by each instructor. What factors are explicitly controlled for (matched) in the design of this study? Do not infer more than is given. **A = controlled, B = not controlled**

31. (A)(B) Course number

32. (A)(B) University

33. (A)(B) time of lecture

34. (A)(B) Instructor

35. (A)(B) Exam difficulty

36-40. (6 pts) The Monty Python video on penguin intelligence compared the performance of humans and penguins on an IQ exam. Consider the last test shown in that video (with the immigrants at the zoo). Mark all of the following factors that were controlled for in that IQ test shown. **A = controlled, B = not controlled**

36. (A)(B) Inability to speak English

37. (A)(B) Ability to speak English

38. (A)(B) brain size

39. (A)(B) body size

40. (A)(B) testing environment

41-44. (6 pts) Researchers are attempting to identify the causes of high cow weight. The variables (factors) being considered are in columns: V, X, Y, Z and M. Each row (option) describes the factors present (+) and absent (-) for a select group of cows. Each row also has an associated average weight for the group (rightmost column). Which statements are correct about the factors being controlled? **Weight** is not a factor; the column is included merely to remind you what is being studied.

Option	factor					Weight
	V	X	Y	Z	M	
(A)	+	-	+	+	-	W_A
(B)	+	-	+	+	-	W_B
(C)	+	-	+	-	+	W_C
(D)	+	-	-	+	-	W_D
(E)	+	-	-	-	-	W_E
(F)	+	-	+	-	-	W_F
(G)	-	+	-	-	+	W_G
(H)	+	-	+	-	+	W_H

A = true, B = false

- 41. (A)(B) The pair of options A & B controls for all factors
- 42. (A) (B) Pair A & G controls for all factors
- 43. (A) (B) Excluding G, all possible option pairs control both for V and for X
- 44. (A)(B) Assuming that no factors other than V, X, Y, Z and M are important to weight, when comparing the weight of cows from row B with those from F, any difference in weights would be attributed to factor Z.

45-48. (6 pts) When investigating the possible cause of higher accident rates for red cars, which of the following would control for type of car (sports versus non-sports) as a variable affecting accident rate? **A = car type controlled B = car type not controlled**

- 45. (A)(B) Compare accident rates of red sports cars with non-red sports cars
- 46. (A)(B) Compare accident rates of red non-sports cars with non-red, non-sports cars
- 47. (A)(B) Compare accident rates of a sample of red cars chosen at random from all types red cars with accident rates of a sample of non-red cars chosen at random from all types of non-red cars..
- 48. (A)(B) For each car to be used in the study, you paint them a new color, choosing color at random. Then study the accident rates.

Experiments

49-53. (8 pts) **Prisoners of Silence video (FC = facilitated communication).** *The video showed tests of FC suggesting that the facilitator, not the child, was the author of the typed responses.* One criticism of the tests might be that the test environment was intimidating, so the children could not be expected to answer correctly. Other objections might be raised against the test design or interpretation of the results. Which of the following options are valid arguments either in favor of or against the tests and interpretations drawn? When choosing your answer, take account of the outcomes shown in the video and our discussion in class.

A = valid argument B = not valid

- 49. (A)(B) Use of a familiar facilitator would eliminate criticisms of the test environment, because the child would be comfortable.
- 50. (A)(B) The use of blind was unnecessary in assessing communication by the child, yet the blind feature of the study contributed the most to intimidation.
- 51. (A)(B) The null model for the experiment is that the child cannot communicate (i.e., the experiment is looking for positive responses); use of this null model biases interpretation of the test against communication by neglecting those examples in which valid communication was shown.
- 52. (A)(B) The controls for the study were the cases in which the child and facilitator were shown the same photo; the fact that the correct response was typed in these cases demonstrated that the FC setting was operating in the usual fashion.
- 53. (A)(B) Tests were conducted with multiple autistic children, multiple facilitators, and the type of test was even varied. The test outcomes were consistent across these replications. So the results did not depend on one particular test design or one particular facilitator.

54-57. (6pts) Which options about the in-class personality survey and/or the horoscope test shown in the video are true?

A = true, B = false

- 54. (A)(B) The personality descriptions in these experiments (our class and the video) were specific in many details about the person.
- 55. (A)(B) The study shown in the video (and used in class) would have been improved by including a group in which the personality description was assigned randomly to the student.
- 56. (A)(B) We suggested that it was ambiguous as to whether a control group was present in the video.
- 57. (A)(B) Blind was essential to the goal of the studies. Thus, if everyone had known the true purpose of the survey (and had known the design), it is likely that our class would not have rated the personality description so highly.

58-61. (6 pts) *Secrets of the Psychics* video. Several experimental tests of psychic practices were shown. Which options are correct?

A= correct B = false

- 58. (A)(B) The video illustrated three different psychic methods that were evaluated scientifically: tarot card readings, horoscopes, and palm reading.
- 59. (A)(B) The horoscope experiment consisted of creating individualized horoscopes based on astrological sign but then giving the horoscopes to students of a different astrological sign than it was designed for.
- 60. (A)(B) A null model approach to the interpretation of these experiments could not be used because psychic phenomena and predictions are so detailed and specific that there is no clear null model.
- 61. (A)(B) The ideal data features described in the palm reading test included blind, controls, replication and manipulation/experiment.

62-65 (5 pts) Based on what you observed in the video on Facilitated Communication and the lecture that followed, which of the following options would be experiments? These are some of the different ways we might try to find out if the words being typed were from the facilitator. The question is merely which are experiments; do not worry about how effective they might be.

A = experiment B = not an experiment

- 62. (A)(B) Watch closely and look for evidence that the Facilitator is controlling the typing.
- 63. (A)(B) Obscure the keyboard so that the Facilitator can see where the keyboard is but not see the individual letters; observe whether the typing makes sense
- 64. (A)(B) Show the child but not the Facilitator something and ask for a description of it.
- 65. (A)(B) Monitor brain waves of child and Facilitator to determine who is responding.

66. (4 pts) Key code, name, and ID number. Fill in (A) in scantron question 66 to indicate your key for this version of the exam.

Be sure your name and EID number are correctly bubbled in on the scantron.