

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.

Intrinsic Difficulties

1-10 (2.5 pts each). These questions ask for the intrinsic difficulty illustrated by the given statement. Do not assume any more than what is explicitly given in the question – address only the difficulties or phenomena specifically mentioned. Also, a paragraph may describe NO intrinsic difficulty (option E)

(A)	(B)	(C)	(D)	(E)
Intrinsically limited replication	Time lags	Interactions	Humans are difficult subjects	None

1 The standard approach used by prosecutors has been to identify a prime suspect and then selectively gather evidence against that person. As a consequence, if the prime suspect was not the perpetrator, the evidence that would lead to solving the crime was often neglected, and the perpetrator was never prosecuted. What intrinsic difficulty underlies this flaw in prosecutorial procedure?

1. (A) (B) (C) (D) (E)

2. Joe's math class has 3 exams during the semester. He has heard that the exams are particularly challenging, so he intends to use the scientific method to progressively improve his scores during the semester. His plan is to adopt his usual model for studying for exam 1. Then, based on his score, modify his study plan for exam 2. Finally, he will learn from his mistakes on exam 2 to further modify his study plan for exam 3. However, the professor is lazy and grades exam 1 only after exam 2 is given, and does not grade exam 2 until exam 3 is given. Consequently, Joe is only able to revise his study model once during the semester. What intrinsic difficulty underlies Joe's inability to carry out his plan to make two changes to his study plan?

2. (A) (B) (C) (D) (E)

3. There have been several instances in the US of diseases and outbreaks being recognized in recent times. Surprisingly, when epidemiologists went back through previous records, they realized that the same diseases and similar outbreaks had occurred many times in the past, merely having gone unnoticed. The failure to discover the disease or outbreak in the past was merely due to the lack of enough cases in the same region and at the same time for anyone to realize there was a common cause. What intrinsic difficulty underlies this difficulty in disease detection?

3. (A) (B) (C) (D) (E)

4. The FAA is a US government agency that oversees airline safety. One of its standard approaches is to identify the causes of airline crashes to understand how to avoid them. However, airline crashes are uncommon – the US often goes many years without any crashes. To overcome this problem, the FAA began gathering data on near misses – cases in which accidents almost happened – because near misses happen more often than crashes and should be a useful model of causes of crashes. What intrinsic difficulty underlies the FAA's difficulty in studying the causes of actual airline crashes?

4. (A) (B) (C) (D) (E)

5. Seldane is a drug that was approved by the FDA in 1985. It passed clinical trials with no complication. However, drug approval was withdrawn in 1997 after discovering that Seldane is toxic when taken with certain other drugs. The people in the clinical trials had not been allowed to take other drugs while taking Seldane. What intrinsic difficulty underlies the reason that Seldane was not found to be toxic in clinical trials but was toxic when used more typically?

5. (A) (B) (C) (D) (E)

6. The effects of diet on health are difficult to study with the scientific method. The main problem appears to be that the effect of different nutrients depends on what else is in the diet. That is, a particular nutrient is good for health when eaten along with some foods but has little effect with others. As a consequence, advice for what nutrients to include in a healthy diet changes over the years. What difficulty explains why it is so difficult to identify the health effects of different nutrients?

6. (A) (B) (C) (D) (E)

(A)	(B)	(C)	(D)	(E)
Intrinsically limited replication	Time lags	Interactions	Humans are difficult subjects	None

7. Some scientists become vested in particular hypotheses. When testing those hypotheses, they are reluctant to reject them and will re-interpret contrary data to fit the hypothesis. They may even fail to test the hypothesis at all and instead use selectively chosen, anecdotal data to claim support for the hypothesis. What intrinsic difficulty underlies this behavior of some scientists to selectively reinforce hypotheses?

7. (A) (B) (C) (D) (E)

8. A recent 'buzz word' in science is something called an emergent property. Emergent properties occur in systems with multiple components, and a property is 'emergent' when it arises as something atypical of any of the individual components of the system. For example, an emergent property of a food dish would be a flavor that is unlike the flavor of any of the ingredients. Emergent properties are difficult to analyze scientifically precisely because they do not follow from the separate properties of the system components. What intrinsic difficulty underlies the basis of emergent properties?

8. (A) (B) (C) (D) (E)

9. Science often advances merely by improved technology – an improved ability to measure some quantity. For example, advances in physics have often been enabled merely by improved technology in measuring time. Improvements in biology have been enabled by improved visualization. In hindsight, we can say that progress was held up by the inability to make accurate measurements. What intrinsic difficulty underlies the lack of progress in science from the inability to make accurate measurements?

9. (A) (B) (C) (D) (E)

10. Which intrinsic difficulty underlies the difficulty in studying unique historical events? 10. (A) (B) (C) (D) (E)

Biological Determinism

11-17. (14 pts) Which of the following are true about Biological Determinism, as covered in class? **A=true, B = false**

11. (A)(B) In broad terms, biological determinism is the view that behaviors are socially 'forced' on people instead of voluntarily chosen.
12. (A)(B) In the early to mid 1900s, scientists and scientific organizations in the US almost universally took a cautious view to biological determinism and hesitated to argue in favor of improving society through heredity.
13. (A)(B) In the US during the 1900s, arguments to use the foundations of biological determinism as a basis for improving society were confined to scientists and were not implemented into legislation.
14. (A)(B) The Bio301D themes used to motivate the topic of biological determinism were conflict and bias.
15. (A)(B) Anatomical, physiological and other correlates of same-sex (gay) preference have been reported that appear to suggest sexual preference is not merely a choice of the individual but is set down early in life. At least one of those correlates is difficult to reconcile with the view that same-sex preference is inherited.
16. (A)(B) A modern context for the question of biological determinism is whether the raping behavior of rapists can be corrected by castration.
17. (A)(B) Studies of sexual preference among brothers have compared preference similarity between identical twins to preference similarity between full siblings to infer there is a partially inherited basis for sexual preference.

Conflict and Bias

Videos (6 pts) (A) = TRUE (B) = FALSE

18.(A)(B) The 'Lie to Me' clip was used primarily to illustrate conflict (between a scientist and a government organization).

19.(A)(B) The clip on Fox News reporters illustrated conflict and a resolution in which the public interest won out over corporate interests.

20.(A)(B) In one video it was revealed that the US media has no legal obligation to report the truth.

21.(A)(B) The Facilitated Communication video illustrated several cases of bias. In all cases that we discussed (or are covered in the book), the bias aligns with the person's vested interest in wanting FC to be valid or not.

22-25 (10 pts) Which of the following paragraphs describe a tragedy of the commons conflict or outcome? **A = is a ToC conflict, B = is not**

22. (A)(B) A game for money is played in class of 30 students. All students are made the same offer: everyone gets \$10 if everyone cooperates and accepts the \$10 offer. But each individual is also given the choice of \$500 – the selfish choice. If only one person chooses \$500, then he/she gets the \$500 but the others get only \$5 each. If two or more people choose the \$500 option, no one gets any money at all. The choices are made secretly, so no one knows what the others have chosen. Year after year, there are always 10 or more students requesting the \$500, and no one receives any money. Indicate whether this class failure to collect money stems from a ToC.

23. (A)(B) All students – past and present – attending Texas Methodist University (TMU) benefit by the scholastic reputation of TMU. High standards and rigorous grading translate into a high social regard for degrees from TMU, which helps graduates find jobs – all students benefit. However, professor salaries at TMU are tied to student evaluations, and students give evaluations in proportion to their grades – because they think that their grade reflects how much they learned and thus how good the professor is. Professors inflate grades to get better evaluations (and higher salaries), and over the years, the grade inflation has led to deterioration of the reputation of a TMU degree. Indicate whether this deterioration of degree reputation stems from a ToC.

24. (A)(B) The 120 farmers of Absaroka County can grow either of two crops, cotton and sorghum. Cotton is the more profitable unless too much cotton is grown in the county, in which case pests of cotton become abundant and wipe out everyone's crop. Thus the per-acre value of a cotton crop is highest when county is planted mostly with sorghum. Yet if most of the county will be planted in sorghum, an individual farmer benefits by growing mostly cotton – a farmer's cotton directly determines their profit, but the size of their crop has essentially no influence on how abundant pests are. In the absence of legislation to control crop sizes, the profit incentive usually results in a cotton crop so large that the pests destroy most of the cotton throughout the county. Indicate whether this collapse of the cotton crop stems from a ToC.

25. (A)(B) Ten students each put \$1000 into an investment account with the goal of making a profit; the profits will be shared equally. The account is managed by a paid professional who is not one of the ten students. Due to poor management and a tumultuous market, the account loses money, and each student recovers only \$950 in the end. Indicate whether this loss of money stems from a ToC.

26-29. (4 pts) Each of the following options describes a property of a vaccine, disease, or population. Indicate which of them works in favor of (allows or enables) a tragedy of the commons (ToC) conflict.

A = enables a ToC, B = does not

26. (A)(B) Herd immunity exists for the disease

27. (A)(B) Individuals get vaccinated for selfish reasons

28. (A)(B) The infectious agent cannot spread from person to person

29. (A)(B) The vaccine does not prevent an individual from getting infected but does prevent transmission by the infected individual. Thus, the vaccine can create herd immunity.

30-36 (16 pts). Identify the bias in the following questions using options (A)-(I). Only one answer per question, but an answer may be used once, never, or used on several questions. Options (A)-(G) are arguments/statements indicative of bias. H is confirmation bias. (I) is none of the others.

(A) character assassination of opponent	(D) build causation from correlation	(G) refusal to admit error
(B) use 'either-or' arguments	(E) require refutation of all alternatives	(H) confirmation bias
(C) appeal to authority	(F) use anecdotes as evidence of generality	(I) None of A-H

- 30.** In attempting to justify a city-wide effort to improve oral hygiene through fluoridation, a politician argues that fluoridation is beneficial because tooth decay rates are low in West Texas towns where natural fluoride is abundant in the drinking water
(A) (B) (C) (D) (E) (F) (G) (H) (I)
- 31.** People are given a sequence of numbers and asked to guess at the number rule. When asked to propose sequences of numbers to test their guess, they invariably propose sequences of numbers compatible with their rule.
(A) (B) (C) (D) (E) (F) (G) (H) (I)
- 32.** In ridiculing climate change scientists, a politician notes that one of the scientists is a member of an unpopular motorcycle club.
(A) (B) (C) (D) (E) (F) (G) (H) (I)
- 33.** A student writing a term paper attempts to build a strong case for their controversial position by looking only at several references that share a similar view as they do.
(A) (B) (C) (D) (E) (F) (G) (H) (I)
- 34.** In defending the validity of facilitated communication, Doug Biklen argued that FC should not be judged on how many times it fails.
(A) (B) (C) (D) (E) (F) (G) (H) (I)
- 35.** In assessing whether a psychic's predictions are accurate, a scientist tests those predictions against a null model.
(A) (B) (C) (D) (E) (F) (G) (H) (I)
- 36.** The video of Facilitated Communication part II interviewed two parents who defended the legitimacy of FC for their child. Which method in the above list did they use to support FC?
(A) (B) (C) (D) (E) (F) (G) (H) (I)

Trustworthy sources

- 37-41. (10 pts)** Which of the following correctly describes properties given in book or lecture as indicative of trustworthiness?
A = true B = false
- 37. (A)(B)** The more sensational the claim, the more trustworthy it is, because sensational claims must survive greater scrutiny than modest claims.
- 38. (A)(B)** The more that uncertainty is acknowledged, the less trustworthy the claim.
- 39. (A)(B)** Reports giving lots of details about the data are less trustworthy than reports with few details, because the details are commonly used to distract attention from the actual result.
- 40. (A)(B)** Reports from 3rd parties who have no specific interest in the work/claim are less trustworthy than reports from 'interested' parties because 3rd parties have no reason to get the facts right.
- 41. (A)(B)** Work from reputable investigators and reputable institutions are more trustworthy than work from private and unknown researchers and institutions.

42-48. (16 pts) Identify the appropriate type (or stage) of bias in the following questions. If the question gives a way to reduce bias, choose (E). If a question does not satisfy any of (A)-(E), choose 'None' (option F).

(A) Before the design and conduct	(B) In the design and/or conduct	(C) In evaluation and description of results	(D) Arguments indicative of bias, instead of ways to bias	(E) Ways to reduce deliberate bias	(F) None
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42. (A)(B)(C)(D)(E)(F) Terminate studies prematurely when results are unfavorable so that the study is never completed

43. (A)(B)(C)(D)(E)(F) Influence government regulatory agencies in your favor

44. (A)(B)(C)(D)(E)(F) Control the null model

45. (A)(B)(C)(D)(E)(F) Provide alternative interpretations of the results

46. (A)(B)(C)(D)(E)(F) Claim that all alternatives have not been disproved

47. (A)(B)(C)(D)(E)(F) Make non-random assignments to control versus treatment groups

48. (A)(B)(C)(D)(E)(F) Publish protocols in advance of the study

49. (3 pts) (A) Fill in **bubble A** on 49 to indicate your key. **Likewise make sure your name and EID are correctly bubbled in.**