

CHAPTER 7: EVALUATING ARGUMENTS

Pseudo Arguments: FALLACIES¹

The word ‘fallacy’ derives from two Latin words, fallax (“deceptive”) and fallere (“to deceive”). A **fallacy** is an error or defect in reasoning that can deceive us into believing things that these fallacies actually do not warrant. A fallacy is an attempted argument which fails to provide any support whatever for its conclusion, regardless of the truth of the premises, but nonetheless tends to be rhetorically effective and persuasive. Such failed or pseudo reasoning should never persuade us. We covered a number of formal fallacies in Chapters 5 and 6. Examples are:

If P then Q	All A are B
<u>Q</u>	<u>All C are B</u>
P	All A are C

Those are fallacies because of the form or structure of the arguments.

This chapter is on **Informal fallacies**. These fallacies can be detected only by examining the content of the arguments. Logicians have identified over a hundred types of common fallacies. This chapter covers just a few. Though labels are useful, the important thing is to be able to show why the reasoning fails. It is also important to remember that when an argument is fallacious, this does **not** mean the conclusion of the argument is false, only that the conclusion remains totally unsupported and unworthy of belief.

I. FALLACIES OF ACCEPTABILITY (Questionable Premise)

1. Equivocation
2. Begging the Question
3. Inconsistency
4. False Alternative
5. Suppressed Evidence
6. Lack of Proportion
7. Complex Question
8. Composition and Division

1. Equivocation

In Chapter 4 we examined various ways in which language can be ambiguous, and we indicated the

importance of ensuring that the meaning of what we say is clear and unambiguous. We now consider some ways in which ambiguities can destroy or weaken an argument. The fallacy of **equivocation** arises when a premise has two interpretations, one acceptable and one unacceptable, and when it is the unacceptable interpretation that is required by the conclusion. Any of the types of ambiguity we discussed in Chapter 4 can give rise to the fallacy of equivocation.

Example a: There's a lot of talk these days about how we shouldn't discriminate. Well, I don't agree at all. Everybody discriminates all the time. It is unavoidable. We discriminate when selecting a wine or buying a car or choosing new wallpaper. We discriminate when deciding which friends to invite to a party or which candidate to vote for. We discriminate when we hire someone, or admit someone to a college. We always make such decisions on the basis of the qualities we admire, i. e., we discriminate. So there is nothing wrong with discrimination.

The equivocation here is with the term discrimination. In the premises the speaker uses the term to mean making decisions on the basis of relevant qualities. This is an accepted sense of the term, which is reflected in sentences like He is very discriminating in his choice of clothes. But the conclusion uses the term to mean making decisions on the basis of irrelevant qualities such as race, religion, or gender. This is the sense of the term that is obviously used by those who believe we should not discriminate. The sense in which the premises are true is not the sense required by the conclusion, so the argument commits the fallacy of equivocation.

Example b: It never ceases to amaze me that so many scientists deny that the miracles reported in the Bible actually took place. After all, science itself has presented us with many miracles, such as lasers, antibiotics, computers, and space flight. Since scientists accept that these modern miracles actually exist, they should accept that biblical miracles also actually occurred.

Example c: The Country Club cannot build an indoor swimming pool unless the membership

¹Some material in this chapter is from Howard Kahane, *Logic and Contemporary Rhetoric*, 7th ed., Belmont, CA: Wadsworth, 1995., John Mullen, *Hard Thinking*, Lanham, Maryland: Rowman & Littlefield, 1995, and David Kelley, *The Art of Reasoning*, 2nd ed., New York: Norton, 1994.

agrees. Well, I am a member and I most certainly do not agree. Therefore, the Club cannot build its new pool.

2. Begging the question (also called circular reasoning): trying to support a proposition with an argument in which that proposition is a premise. Assuming without proof the question, or a significant part of the question, at issue.

Example: The federal government should save New York City from default, for New York deserves such aid.

Examples:

- a. You ought not tell lies, because you should avoid being mendacious.
- b. California is the best state to live in since no other state is as good as a place to reside.
- c. Why hasn't the prize committee considered Galbraith's work good enough for a Nobel Prize? Because they judged it not sufficiently original to merit a laureateship.
- d. Only short poems, not long ones, can be good. Of course, many so-called poems, such as *Paradise Lost*, take up a large number of pages. But if they are any good, they must really be collections of short poems, because a long poem as such cannot be of any great value.
- e. As a determinist, I believe that none of our actions results from free choice and that all of them are determined by the strongest motive acting upon us. To be sure, it sometimes does seem that we choose to act on the weaker of two motives. But if we do that, it only shows that the motive that seemed weaker was really the stronger of the two, since it determined our action.

3. Inconsistency: Using or accepting contradictory statements to support a conclusion or conclusions.

Examples:

- a) An MIT ROTC colonel, explaining the military's ban on gays: "We don't discriminate. We simply exclude certain types of people."
- b) Notice from the Hyatt Regency Hotel in New Orleans (quoted in the *Quarterly Review of Doublespeak*, July 1988): We are pleased to confirm your reservation. It will be held on a space available basis.
- c) President Lyndon Johnson: "I believe in the right to dissent, but I do not believe it should be exercised."

4. False alternative (False dilemma): excluding relevant possibilities without justification. Reasoning from the premise that there are just two plausible solutions to a problem or issue when, in fact, there are at least three.

Examples:

- a. Either you vote for Senator Rogers or you don't care about the environment. The choice is yours.
- b. If she loved me, she would have called me back tonight, and she didn't. So she must hate me.
- c. Opinion poll question: Do you favor more money for welfare programs, or do you feel we should let people starve in the streets?
- d. Congressman Jones denies that he's a liberal, so he must be a conservative.

5. Suppressed evidence (fallacy of omission): Failing to bring relevant evidence to bear on an argument.

Examples:

- a) Marijuana should be illegal because it leads to more addiction, more crime, and health problems. [Those opposed to legalization of marijuana suppress evidence that marijuana use is rarely followed by addiction to heroin, evidence that marijuana addiction is not linked to theft, robbery, and violence as is the case with hard drugs, and though there may be health risks, there is evidence that studies showing health hazards from marijuana use are flawed.]
- b) American football is a more brutal sport than bullfighting because more young men get killed and maimed every year playing American football than in the bullring. [Suppressed: A vastly greater number of people play football than enter a bull ring]
- c) Global warming has never been a big problem in the past. Therefore, it won't be a big problem in the future.

6. Lack of proportion: The failure to see things in proper perspective or proportion..

Example: Last year, we had two days of 100+ degree weather. This year, we had three. See? Global warming is totally changing the planet's ecosystem.

A variation of the fallacy of lack of proportion is that of *tokenism*, in which a token gesture is taken for the genuine article. *Example:* During the 1992 Presidential and congressional campaigns, virtually all candidates shouted

about campaign reform, because the electorate was fed up with abuses. But the campaign reform that followed was insignificant. A bill was passed that did little good but allowed the politicians to say they had done something.

7. Complex question: trying to get someone to accept a proposition by posing a question that presupposes it.

Examples:

- Have you stopped beating your wife yet?
- When are you going to admit that you are wrong?
- Salesman to customer who is deciding whether to buy a pair of shoes: "Should I wrap these shoes up or are you going to wear them?"

8. Fallacies of Composition & Division (See Ch. 4)

To think that what holds true of a group of things individually holds true of the same things as a *group* automatically and necessarily is to commit a mistake in reasoning known as the **fallacy of composition**. Here are two examples of this fallacy:

Examples:

- An instant has no duration. But an hour is composed of instants. Therefore, an hour has no duration.
- We don't spend *that* much on military salaries. After all, whoever heard of anyone getting rich in the Army? (We don't spend that much on service personnel *individually*, therefore we don't spend much on them *as a group*.)

Conversely, to think that what holds true of a group of things as a group automatically holds true of the same things individually is to commit the error known as the **fallacy of division**.

Example:

- Salt is a non poisonous compound. Therefore, its component elements, sodium and chlorine, are nonpoisonous.
- Congress is incompetent. Therefore, Congressman Benton is incompetent.
- The Eastman School of Music has an outstanding international reputation; therefore, Vladimir Peronepky, who is on the faculty of Eastman, must have a good reputation.

II. FALLACIES OF RELEVANCE

1. Subjectivism

2. Popularity/majority

3. Authority

4. Emotion (e.g. pity)

5. Force/consequence

6. Ad hominem/tu quoque

7. Diversion/straw man/red herring

1. Subjectivism: using the fact that one believes or wants a proposition to be true as evidence of its truth. Notice that this fallacy is related to the issue of argument stoppers and reason substitutes.

Structure: I (don't) believe/want x to be true, therefore x is (is not) true

Examples:

- You can argue all you want that democracy gives us only the illusion of control over the government, but I don't buy it. I was brought up to believe in the democratic system.
- Olie North is such a clean-cut fine American. I just can't believe he committed illegal acts involving drugs, weapons and hostages.

2. Appeal to Majority (*ad populum*) or Traditional Wisdom: using the fact that large numbers of people believe a proposition to be true as evidence of its truth. To spot this fallacy check to see if you are asked to believe something because of the beliefs of many people, or a long-standing tradition.

Structure: Everyone or most in some group believe (have always believed/accepted) x, therefore x is true.

Examples:

- Of course Jane is going to be successful. Everyone says so.
- The Golden Rule is a sound moral principle, for it is basic to every system of ethics in every culture.
- The most effective way to increase government revenues would be to raise the corporate income tax, since opinion polls show widespread support for this approach.
- You still believe in relativism? That's a postmodernist idea; no one believes that stuff anymore. (Reverse appeal to numbers/majority.)
- "How can you give me a D in this course? I've been getting B's and C's from all my other teachers. Maybe your grading standards are too high."

3. Appeal to authority or experts: using testimonial evidence for a proposition when the conditions for credibility are not satisfied or the use of such evidence is inappropriate. Check to see if you are asked to believe something because of someone else's word? *Inadequate*

expert— Is the person an expert in the right area? Are there other experts who disagree?

Examples:

- a. I think America should be more careful about the international organizations we join and the treaties we sign. After all, wasn't it George Washington himself who warned against "foreign entanglements"?
- b. This must be an important event—the *Times* gave it four columns on the front page.

4. Appeal to emotion: trying to get someone to accept a proposition on the basis of an emotion one induces.

Structure: I feel pity, anger, etc. about x, therefore x is true.

Examples:

- a. Poor Scooter Libby should never have been sent to jail for lying to a grand jury. Scooter is an honorable man. He devoted his whole life to working for his country. One administration after another asked for his help. And Scooter was always there, ready to serve. Scooter deserved a medal—not jail time.
- b.. Foreign imports are wrecking our economy and savaging our workers, the backbone of this country. Buy American before you put your money on that Honda, think of the guy in Detroit whose kids may not eat tomorrow. Before you buy those Italian pumps, ask yourself whether a little glamour is worth the job of the shoemaker in Boston who's worked all his life to make an honest living.
- c.. "Fine. Go ahead and marry him. Why should you care about breaking your mother's heart? I guess you love him more than me but why should I care? Who am I to complain? I'm only your mother. I only spent twenty years trying to make a good match for you, a nice boy, and now you run off...."

5. Appeal to force or consequence (*argumentum ad baculum*) trying to get someone to accept a proposition on the basis of a threat. This must involve a change in belief, not mere acquiescence to a threat. (For example, legislators who vote so as to satisfy lobbyists are *not* usually guilty of the fallacy of appeal to force; they become convinced by the implied threats of the lobbyists to vote a certain way because of self-interest, not because they change their minds about the merits of the legislation.)

Structure: I am afraid to not believe/accept that x is true, therefore x is true.

Examples:

a. How can you believe that John is innocent? I don't see how we can go on being friends if you believe that.

b. Teacher to student: ". . . and finally, in reconsidering your position, you might remember who gives the grades in this course."

6. Ad hominem: using a negative trait of a speaker as evidence that his statement is false or his argument weak. Check to see if the arguer talks about his or her opponent instead of the issues they raise.

6a. Ad hominem—circumstantial (*also called Poisoning the well*): trying to refute a statement or argument by showing that the speaker has a motive for adopting it. Is the arguer explaining the motives of the opponent instead of the issue?

Example:

- a. A: "Jack's proposal to upgrade the zoning was impressively argued."
B: Hey, of course he's going to argue that. He's got land there."
- b. Why should Congress consult the joint chiefs of staff about military funding? They are military men, so obviously they will want as much money as they can get.
- c. A: "The poor nations of the world will have to learn to produce their own food if they are to solve the problem of hunger in the long run."
B: "That's a heartless position. You wouldn't say that if you had ever really been hungry."

6b. Ad hominem—abusive: Is the arguer saying abusive things about the opponent instead of dealing with the issue?

- Examples:**
- a. Don't go to that dentist, Dr. Jones. Did you know he's a nudist?
 - b. You can't believe anything he says. What good are the ideas of an avowed communist?

6c. Tu quoque (*two wrongs don't make a right*): trying to refute an accusation by showing that the speaker is guilty of it.

Example:

- a) TV commentators are always attacking big business for making "obscene profits," but the companies they work for have higher profits than almost any other industry.
- b) Iraqi citizen on August 26, 1990, while Iraq was holding more than a thousand American citizens hostage: The mentality is different here. We are justified in holding Americans here

because the Americans forced Japanese into U.S. internment camps in World War II.

7. Diversion/Distortion: trying to support a proposition by changing the subject or distorting your opponent's view.

7a. Straw Person: Misrepresenting an opponent's position in order to make it easier to attack and make one's own position appear superior. Trying to refute one proposition by arguing against another proposition. Attacking a weaker opponent while ignoring a stronger one. Check to see if the arguer describes, rewords, or implies a different argument or position the real one of the opponent. Is the arguer distorting the opponent's position?

Examples:

- a. A: "It's time we started to do something about the homeless in America."
B: "It's not government's job to care for us from cradle to grave."
- b. "The union wants us to consult with them when we intend to change any of the workers' conditions of employment, but I say that once management begins to turn its decision-making prerogatives over to the unions, American capitalism is dead in the water."
- c. "I don't see how you can support distribution requirements. Don't you want students to have any choice about their courses?" [and false dilemma]

7b. Red Herring: Fallacy committed when in danger of losing an argument by raising an irrelevant issue in an effort to change the topic. Does the arguer change the topic of the argument or discussion? Has the prior topic been settled?

Examples:

- a. Senator Jackson argues in favor of legalizing gay marriage. But did you know that the senator has been married three times? And his last divorce was a real doozie. His wife went on and on about their sex life. Apparently the Senator is no good in bed. Enough about that issue.... Shall we move on?
- b. We're all familiar with the complaint that over 40 million Americans are without health insurance. But America's doctors, nurses, and hospitals are among the best in the world. Thousands of people come from abroad every year to be treated here. Clearly there is nothing wrong with our health care system.
- c. Sure, I read in the paper that my candidate was with some prostitute last night, but tell me, do you think it's proper for reporters to be hiding in the

front bushes of politicians just to get a story?

Don't people have a right to privacy?

- d. Senator, what should we do about the homeless in America? Well, I think we must start by providing incentives to the lending industry to make loans more accessible to everyone and incentives to the construction industry to build more affordable housing.

III. FALLACIES OF INADEQUACY

1. Ignorance

2. Slippery slope

3. Problems in analogical reasoning

1. Appeal to ignorance (*argumentum ad ignorantiam*) using the **absence** of proof for a proposition as evidence for the truth of the opposite proposition. Absence of evidence is never evidence of absence.

Examples:

- a. No one has proved that global warming is actually occurring, so I'm sure it isn't.
- b. Nobody has ever proved that the universe wasn't created in six days. Therefore, we must conclude that the universe was indeed created in six days, just like it says in *Genesis*.
- c. No one has proved that crystals don't cure disease. So I'm entitled to believe they do.
- d. There is no evidence that he is guilty. Therefore, he is innocent of the crime.

When there is no evidence or reliable system of knowledge for something (for which there *could be* evidence), it is most reasonable to suspend belief. On the other hand, things for which in principle there could be no evidence such as an eternal God (eternal means outside time and space), then no evidence could support or refute any claims about it, thus one could never appeal to evidence one way or the other.

2 Slippery slope: Objecting to an action on the grounds that once it is taken, it will lead to similar but less desirable actions until some horror is reached down the road. We commit this fallacy when we accept the slipperiness of the slope in the absence of sufficient supporting evidence or reasons.

Examples:

- a) You should never buy your child a goldfish, because next it will be a hamster and then a rabbit. After that the kid will scream for a cat, and then a dog. Next it will be a horse, then a water buffalo, and finally an elephant. The cost of pet food will drive you to the poor house.

b) Roger Magyar, "Rebuttal to Argument in Favor of Proposition 79," 1988 California Ballot Pamphlet: Overcrowding prevents learning, incites classroom misbehavior that culminates in discourteous spectacles at graduation ceremonies, and creates an inviting atmosphere for gang violence that makes the mind numbing consumption of drugs an understandable—though deplorable—habit. [Overcrowding does interfere with learning, but occurs frequently without leading to gang violence and drug use]

3. Questionable analogy: Drawing an analogical conclusion when the cases compared are not relevantly alike. Analogies can fail in at least two ways: 1) the analogy itself fails (the two things are not alike, a question of truth) 2) the analogy is irrelevant or insufficient (a matter of logic).

In the following examples 1) find the two things being compared 2) find the analogy 3) find the generalization being used to support the move from the specific case to the conclusion 4) find the conclusion. 5) State why the analogy fails to support the conclusion.

Examples:

- a) Human knowledge is like a building, and it must therefore rest on foundations. (Chapter 2)
- b) Jim is an intellectual, like Fred, and Fred doesn't like sports. So Jim probably doesn't like them either.
- c) During the cold war, Congressman Charles Rose (Democrat, North Carolina) answered (in part) the arguments of those opposed to government-sponsored research to develop "remote viewing—the ability to see a distant place telepathically" by stating that "It seems to me that it would be a hell of a cheap radar system, and if the Russians have it and we don't, we are in serious trouble. This country wasn't afraid to look into the strange physics behind lasers and semiconductors, and I don't think we should be afraid to look into this."

[Rose's analogy was between the successful development of lasers and semiconductors and the creation of a long-range telepathic system. This analogy was fallacious because the items compared were not relevantly alike: The "strange physics" behind lasers and semiconductors grew out of the well confirmed theories of physical science; there is no similar body of evidence or theory that lends the slightest support to telepathy. (One suspects that Rose had no idea about what

science is. He seemed to see science as some kind of magic box from which objects can be removed on demand.)]

- d) "We can follow the path taken by physics and biology by turning directly to the relation between behavior and the environment and neglecting supposed mediating states of mind. Physics did not advance by looking more closely at the jubilation of a falling body, or biology by looking at the nature of vital spirits, and we do not need to try to discover what personalities, states of mind, feelings, traits of character, plans, purposes, intentions, or the other perquisites of autonomous man really are in order to get on with a scientific analysis of behavior." [B. F. Skinner, *Beyond Freedom and Dignity*]
- e) "If a Russian is caught spying against the United States, wouldn't America try him for a crime? That the culprit might be of Soviet citizenship is of no consequence. Mr. [Salman] Rushdie has committed a crime against Islam. Let Mr. Rushdie be handed over for trial in an Islamic court...." [Letter to the editor, *New York Times*, April 1, 1989]

IV. FALLACIES OF GENERALIZING

1. Confusing possibilities and probabilities

2. Fallacy of Small sample or Hasty Conclusion:

3. Fallacy of Biased or Unrepresentative sample

4. Fallacy of Invalid measure

Fallacies in Generalizing: Our beliefs vary in the degree of conviction about their truth. We often appeal to some level of probability. The probability of a belief being true or of some event occurring is the measure of the degree of certainty or conviction that a belief deserves to be given based on available information. Generalizations based on probabilities are extremely valuable in human affairs, but they should be made on the basis of a fair sampling and a sizable enough sampling to warrant the generalization (and not mere possibilities). Check to see if an argument concludes that a population has a characteristic based upon an improper sample from that population. Improper stereotyping can be the result. However, stereotypes are only wrong if they are unreasonable.

Following are some fallacies to be avoided when thinking in terms of probabilities.

1. Confusing possibilities and probabilities:

This fallacy occurs when we appeal to possibility in an irrational manner, instead of rational probabilities. The **probability** of a belief being true or of some event occurring is the measure of the degree of certainty or conviction that a belief deserves to be given *based on available information*. **Possibility** simply means that something is not logically impossible. The claim "Anything is possible" should not convince us of anything. First it is false, since logical contradictions, such as "square circles" are impossible. And secondly, the claim that anything is possible tells us nothing about the believability of a claim.

Example 1: "We shouldn't give up hope that the soldiers missing in action in Viet Nam are still alive. Anything is possible. Miracles do happen." (i.e., we shouldn't stop believing that they may still be alive). Whether or not we believe this should be based on evidence and background information, not mere possibilities. Yes it is "*possible*" that they are still alive, because it is not logically self-contradictory. But the *probabilities* based on evidence do not support such a belief.

Example 2: To believe that a 15 foot tall cat just walked into your room, (instead of thinking, for example, that it is an hallucination caused by the medicine your doctor gave you), because "anything is possible," is not reasonable.

Example 3: To play the lottery because you enjoy it is one thing. But to play because an advertisement says "Ya never know!" and you conclude therefore that you should play, is poor reasoning. If you play *realizing* that your chances of winning (your probability, not the possibility) is about 1 in 14 million, for example, then it is not unreasonable. In that case you realize that your chances of winning are extremely remote and that you should only be using money that you can afford to spend on entertainment, such as the lottery or going to the movies. On the other hand, if you really believe you are going to win or have a good chance of winning, you are confusing possibility with probability. When deciding what to believe, *probabilities* are relevant, *possibilities* are not.

Example 4: To argue against someone in terrible pain who has no statistical chance of surviving some disease for which there is no known cure, that they should nonetheless be given heroic life support because "what if they find a cure?" Is to be arguing possibilities, not probabilities. Probabilities are always based on the best

information we have. Mere possibilities are *not believable*. They are merely *thinkable*. Since they have *no support*, we should not use them as a basis for any belief.

When arguing probabilities, there are guidelines we must follow if our judgments about the likelihood of something are to be believable. The following fallacies occur when we do not properly follow these guidelines.

Directions: In the next three sections, to properly understand the examples 1) find the population 2) find the sample 3) find the characterization being tested 4) find the conclusion/generalization (sometimes implicit).

Fallacies Based on Problems with the Sample:

2. Fallacy of Small sample or Hasty

Conclusion: Accepting an argument on the basis of relevant but insufficient information or evidence. Drawing a conclusion about a population based upon a sample that is too small. Drawing conclusions about a population on the basis of a sample that is too small to be a reliable measure of that population. Is the sample large enough for the desired accuracy? How heterogeneous was the population?

Examples:

- a) "Some people say that American products are not well-made, but I'll tell you that I've had this here Westinghouse refrigerator for going on 12 years now, and I fully expect to have her ten years from now. I don't know what they're complaining about."
- b) "In an effort to find out in depth what the American people think of the latest scandal hearings in Congress, I'm here with the Phelps family in Waukegan, Ohio. There are fully three generations represented here, so let's see first whether the President still has the kind of credibility problem that polls have indicated he has."
- c) From Bob Schwabach, "On Computers," newspaper column: "There aren't just a couple of brands of IBM-compatible computers for those very low prices; there are dozens. Do they work? Someone I know has been running one continuously for five months, and it's never missed a beat."
- d) Conclusions drawn in a study about primate mating habits based on a sample of three human couplings, a gibbon mating, and those of one troop of baboons.

3. Fallacy of Biased or Unrepresentative sample—*Drawing a conclusion about a population based upon a sample that is not chosen according to a legitimate random procedure.* Reasoning from a sample that is not representative (typical) of the population from which it was drawn. Did the selection of the sample insure that every member of the population had an equal chance to be in the sample?

Examples:

- a) A: "Here we are, folks, at old Dowling College in Oakdale, New York, a school of over 4,000 students. We came to determine what today's college students think about skiing. Surprisingly, we've found that skiing has significantly decreased in popularity since our last survey three years ago at the University of Denver, in Colorado."
- b) The electric company wanted to find out what the people of the county thought about the safety of nuclear power. It reassigned the duties of 24 day-shift linemen to do in-depth phone interviews during the times that they would normally be on the lines from a very large and randomly selected number of Long Island homes. Since 99.8 percent of all Long Island homes have a phone, it was not concerned with a biased sample.
- c) "*Jaws III* was in 3-D, and so was *Friday the Thirteenth III*. So every time they do the third version of a movie, they make it in 3-D." [and small sample as well]
- d) A company sent out 7,000 questionnaires to the buyers of a new product to gauge customer satisfaction. One thousand people responded of whom 70 percent said they were dissatisfied. The company concluded that 70 percent of its customers are dissatisfied with the product.

Fallacies Based on Problems with the Characteristic Being Generalized

4. Fallacy of Invalid measure—*Drawing a conclusion about a population on the basis of an examination of a sample that did not adequately reflect the characteristic you were testing the population for.* Was the test performed on the sample a valid measure of the presence of the characteristic?

Examples:

- a). "I say that it was the best movie of the year. You don't have to look any further than the lines that are two blocks long."
- b) In tests that were performed to determine how levels of aggression were influenced by violent

TV the aggression levels of the youngsters were measured by the number of times a child would strike a life-sized stuffed doll of a man when told by a researcher to "Punish that doll for hurting your friend."

- c) "I have a medical practice that specializes in headaches. Not one patient of mine that I have ever treated with aspirin has ever experienced relief, and I can tell you that the number is in the tens of thousands. I think that it's time that the American public was told of the ineffectiveness of aspirin for headaches. There should be labeling to that effect."

V. STATISTICAL FALLACIES: Fallacies Involving Probabilities: Does the argument estimate the probability of some event? If so, look for the following fallacies:

1. Gambler's fallacy—Treating probabilistically independent event as if they were not independent. Does the estimate assume that independent chance events affect each other's probability?

Examples:

- a) Lottery winner bragging: I was born on July 4, so the number 74 has always been my lucky number (July being the seventh month of the year, you know). So when I realized that 74 had not shown up in the lottery in the past six months (you can bet I was paying attention), I knew 74 was *due*. So I bet bundle on 74 and won! It pays to pay attention.
- b) When Jack heard the tragic news of the accidental death of his young nephew, he experienced a secret sense of relief that now it won't happen to his own children. The odds against two such events in the same family would be incredibly large.
- c) Franklin had to drive to Washington, D.C., from New York. He was afraid of driving ever since his accident. He could travel the Jersey Pike or Rt. 1. The morning he was to depart he heard of a terrible accident on the Jersey Pike, so he decided to take that route since it's very unlikely that there would be two such accidents on the same day.
- d) Will has had two straights in a row in poker. He now has to decide to go either for a third straight or for a full house. He figures that he would never get three straights in a row, and for that reason decides to go for the full house.
- e) Jake was trying to decide where to place his house on the large parcel of land that he had bought. He noticed that there was a tree that

had been damaged by lightning. He put his house on that spot, reasoning that at least here it would be safe from lightning.

- f) When Jake saw the terrible accident along the highway on his way home he breathed a sigh of relief. At least it's not my turn today, he thought, and jammed the accelerator to the floor.

2. Fallacy of Availability—Basing a judgment that one event is more likely than another on what real or possible events *most easily come to mind*. Is the most probable event the easiest to recall? Is frequency data available?

Examples:

- a) Mary was a clerical worker in the cardiac ward of Children's Hospital. On Friday her son came home from his first day of high school football practice complaining of pains in his chest. Mary decided not to see their family doctor, going immediately to the very expensive cardiologist.
- b) Jean bought a pit bull terrier (Scrappy) for a pet, and to protect her and her three young children. Sam asked whether she wasn't worried that the dog might injure one or more of the children. Jean thought about Scrappy, about how well he played with the little ones, about the time that her two-year-old stuck a pencil in its eye, and laughed. She answered Sam that she couldn't conceive of Scrappy ever hurting the kids. It just would never happen.
- c) Mimi works in the State Court building, which keeps records and statistics on marriage and divorce. She is about to be married, and a lawyer that she works with suggests a prenuptial contract that would protect her assets in the event of a divorce. Mimi has nothing in principle against such an agreement, but thinks about how much in love she and Humberto are; about how they never fight; about how they agree on everything; about how placid Humberto seems to be; and so Mimi decides that such an agreement is unnecessary in their case.

3. Fallacy of Equiprobability—Treating unequal probabilities as if they were equal. Does the estimate assume that events that have different probabilities are equiprobable?

Examples:

- a) James was beginning a new job for which he was not sure he was qualified. The expert at the employment agency believed that he would be fired in a week. He just didn't have the experience. James was not dismayed, arguing

that he had a fifty-fifty chance of success, since after all he was either going to succeed or fail.

- b) "Well folks, it's come down to this one field goal with 4 seconds left. If Kramer gets it, the Lions win. It's fifty-fifty, he either gets it or he doesn't. A whole game coming down to the flip of a coin."
- c) I didn't do so well in law school, but I'm either going to pass the bar exam or not. So my fifty-fifty chance is as good as anyone else's.
- d) Larry Bird can win the game with a foul shot. Since he will either make it or not, the probability that the Celtics (his team) will win is 50-50.

4. Fallacy of Ignoring comparative population sizes—Making a judgment that one thing is more likely to have some characteristic than something else of a different type, based only upon the different stereotypes, while ignoring the comparative sizes of the populations. Does the question involve stereotypes? Have you considered the sizes of the groups involved?

Examples:

- a) Jane is a rather intellectual person who loves to read Emily Dickinson's poetry and Flannery O'Connor's fiction. The clothes she wears are well-made and neat, but unstylish. Jane has no TV and lives in Sayville, New York. Is it more likely that Jane is a librarian or a waitress?

5. Fallacy of Raw mean—The mistake of assuming that the **mean** of a group of numbers is the most frequently occurring number, confusing mean with **mode**. The term "average" used in statistics can be misleading because you must have information on the **range** of values (the high and low numbers) and the **distribution** (how many numbers occur at various places along the range and their deviation from the mean) before you can interpret a statistical claim. Without this you cannot tell if the number is the mean, the median or the mode. Is range and distributional information included in the data? Would the conclusion be different if different ranges and distributions were the case?

The **mean** number is an average calculated by adding up all the numbers and dividing by the number of numbers.

The **mode** is the most frequently occurring number.

The **median** is the middle number, where half of all the numbers are greater and half are less.

Examples:

- a) Bob was astounded to discover that the average life expectancy in France in 1750 was 37 years old, whereas today it is 70. He felt that he now understood why progress came so slowly in the past. As soon as someone discovered something, he died with very little opportunity to educate the next generation.
- b) Briarmanor University advertises that the mean income of its graduates is \$73,000 with surprisingly little deviation. It bases this figure on the returned responses of 30 percent of its graduates to a questionnaire mailed to every graduate. All agree that this was a surprisingly large response rate.

6. Unknowable statistics: Arguing from essentially unknowable statistics as though they were established facts.

Example: Stating that in the past 5,000 years men have fought in 14,523 wars.

7. Questionable statistics: Employing statistics that are questionable without further support.

Example: Accepting government statistics on short-term business trends as completely accurate rather than as educated approximations.

8. Questionable uses of statistics: Perfectly good statistics also tend to be a problem—for two reasons. The first is the inability of so many people to understand the significance of this statistic or that, made worse by the natural tendency in all of us to see statistics as favoring conclusions we already have drawn. The second is the ability of charlatans to bamboozle the rest of us via cleverly employed statistics. (That is the import of the old saying that figures don't lie; liars figure.) *Example:* Accepting evidence that the murder rate in states that have adopted a death penalty for serious crimes is twice as high as in states that have done so as proof that the death penalty does not deter crime, without further evidence that this statistical evidence has a causal foundation.

Although *polls* are an important source of information, they need to be dealt with cautiously. Polls can be misleading (1) by virtue of the way in which questions are worded, (2) because they ask the wrong questions, (3) because respondents don't want to appear ignorant, immoral, odd, or prejudiced, or (4)

most importantly, because they are based on a sample that is too small or unrepresentative.

VI. CAUSAL FALLACIES: fallacies that are committed in the attempt to make a claim about cause and effect

1. Questionable cause or Post hoc: using the fact that one event preceded another as sufficient evidence for the conclusion that the first caused the second. Labeling A as the cause of B on evidence that is insufficient, negative, unrepresentative, or in serious conflict with well-established high-level theories. Check to see if the conclusion of the argument claims that some specific event is the cause of some other event without having established a causal link.

Examples:

- a) Nancy Reagan's conclusion that her husband was saved from harm by her insistence that he follow astrological advice.
- b) The stock of Acme corporation has risen three days in a row. The last time that happened, the stock kept rising for weeks, so it would be a good idea to buy the stock now.
- c. Six months after President Hoover took office in 1929, the stock market crashed and the Great Depression began. He is therefore responsible for this tragic episode in our national history.
- d. Twenty-five years after graduation, Harvard alumni have average incomes much higher than the average college graduate. A Harvard education must be the road to riches.
- e. I go to a therapist for depression and a year later I am over it. I conclude, without consideration of any other factors, that the therapy caused me to get well.
- f. If I buy a crystal and wear it for 6 months and don't get sick and then take it off and get sick and claim that the crystal CAUSES me not to get sick, this is a fallacy. All we have here is a correlation. A happened then B happened. There are rigorous procedures for testing causal connections. We are only warranted in claiming a causal connection when good reasoning has established.

2. False denial of a cause: Does the conclusion of the argument deny that something had an effect on something else without establishing a causal link?

Examples:

- a. Leroy was treated with AZT for AIDS. Now its three years later and he still has AIDS, so I

don't see why they are still giving him this worthless medicine.

- b. Jones was elected governor when the unemployment rate was 9%. She's coming to the end of her four years and it is virtually the same. I think we need to elect someone whose policies will have some effect.

Note: Some students have trouble distinguishing this fallacy from appeal to ignorance. False denial of cause is **only** about causal relations. Appeal to ignorance could be but is based on using as a premise a claim that we don't know something therefore something else is true, for example: We don't know crystals don't cure cancer, therefore it probably does. False cause would be: Cancer patients wore crystals for 6 months and their cancer did not go away. Therefore, crystals have no affect on cancer. We have no reason to conclude crystals do or do not affect cancer from any of this. No conclusion follows from a fallacy. In the case of causal claims, they must be properly tested before we have any grounds for asserting them.

Testing Correlations To See If They Are Causal Relations

In the sciences phenomena that are correlated or appear together in experience that are suspected to be causally related can be tested by means of experimental design. This design requires that the suspected causal factor, (called the *experimental, independent or manipulated variable*), be given a precise *operational definition*, otherwise it will be uncertain what was tested, how to interpret the results and it will not be possible to replicate the test to confirm or disconfirm its findings. The test should test only the effect of the suspected causal factor or variable. All other factors that could possibly cause some change in the outcome (the *dependent variable* or result) must be screened out. These possible problem variables are called *intervening variables* or *confounds*. Such tests can be set up artificially, as in a lab or in any situation in which the experimenter introduces the causal factor that is to be tested. This is called a *controlled experiment*. In a natural experiment, testing can be done by finding the variables you wish to test already present such as in astronomy where many of the phenomena under investigation cannot be artificially produced or in social science experiments where introducing the variable would be illegal or unethical, for example, one could not force people to smoke or take heroin in order to test the effects on health. You would have to find people who already do so.

***Experimental group:** The group exposed to the experimental or suspected causal factor or variable.

***Control Group:** The group that does *not* receive the experimental variable, but is otherwise the same

***ceteris parabis:** The requirement in testing a causal relation that all factors in the experimental and control groups be equal except the factor being tested.

Three confounding variables that must be guarded against are:

***Placebo Effect:** A change caused by belief that a change will occur.

***Hawthorne effects:** A change in the behavior of subjects in an experiment caused merely by the attention they are receiving.

***subject mortality:** If the number of subjects in a study is less at the end of an experiment than at the beginning, this may be what is causing a change, rather than what was being tested.

The overall design of the experiment should successfully screen out *confounding variables* that would render the experiment useless. This would be a failed experiment. An otherwise good experiment where insufficient evidence for a causal connection is not found is not a failed experiment. It helps further science by eliminating variables from consideration. Discovering causal connections advances the sciences and adds to our knowledge of the world.

3. Inadequate Testing of Causal Relations:

Does the conclusion claim that one thing is a cause or causal factor of another based upon experimental research? If so, check for the following fallacies:

- 3a. No controls**—Is the claim that A causes B based on pre- and post-testing of some group? Was a control group employed?

Example:

- a) You are depressed and visit a psychiatrist, who informs you that the therapy will be long and costly but that 80 percent of her patients with depression leave treatment symptom-free. Is that a logical reason to begin treatment? Yes or No?

- 3b. Inadequate controls**—If a control group was employed, was the *ceteris parabis* condition fulfilled? Were both groups randomly selected? Could the effect be more easily explained by placebo or Hawthorne effects, or by subject mortality?

Examples:

- a) Western University was interested in improving mathematics learning in its introductory courses. It decided to change to three

50-minute periods rather than the usual two 75-minute periods. To test its change, it took four sections of MATH 001 in the evening and made the change. At the end of the semester it compared the scores in these four sections to those in four day sections of MATH 001 that had stayed with the 75-minute periods. The 50-minute period students did much better on the final exam, so the university decided to make the change throughout its sections.

4. Inadequate decomposition: *Occurs in nonexperimental survey research when the ceteris paribus condition has not been met due to inadequate decomposition of groups being compared.* The groups must be subdivided into smaller groups according to relevant differences that may be causal factors influencing the outcome. Does the conclusion claim that one thing is a cause or causal factor of another based upon survey nonexperimental research? If so, were the groups adequately decomposed according to relevant differences in order to rule out alternative causal factors?

Examples:

- a) A "skin peel" is used to remove precancerous sun spots and also to remove wrinkles from your face. You are thinking of getting one in order to look younger, but then learn that there is a strong correlation between having the "peel" and having skin cancer. Should this make you more or less willing to get the peel done, or should it have no effect?
(Answer: inadequate decomposition: the group with skin peels and the group without were not decomposed. The group with skin peels is probably getting the treatment because their lighter skin has been damaged and is that is what is causing the higher incidence of cancer, not the skin peels.)
- b) Blacks who murder whites get the death penalty more often than black who murder blacks. Therefore, jurors, prosecutors, and judges are racist. Caution: This may be true, but other possibilities must be ruled out, such

as the fact that the death penalty is more frequently applied in rural areas. If more black on white murder occurs in rural areas, then location would be a causal factor, not racism, or not only racism.

- c) A study of fifteen-year-olds showed that those who had been breast fed scored significantly higher on test of self-esteem than those who had not been breast fed. Therefore, you should breast feed your child in order to increase his or her self-esteem.
- d) It was discovered that parents of seriously disturbed children lacked the same sort of physical nurturing and warmth toward the disturbed children as did parents of normal children. Should we institute parent warmth courses to try to decrease the incidence of seriously disturbed children?
- e) A recent study of TV habits of 10,000 youngsters found that those who watched more than twelve hours of violent TV per week tended to be significantly more aggressive in their social behavior than those who watched less. This is one good reason for preventing children from watching violent TV.
- f) It has been found that executives who are more willing to take risks are wealthier and more successful than those who are risk-averse. It is for this reason that I am planning to open a clinic to help executives overcome risk aversion. I expect significant corporate financing.
- g) Sam noticed that in a surprisingly large number of auto accidents the radio was playing loudly at the time of the accident. He concluded that loud radio playing must distract drivers, and so started a campaign to limit the decibel level of car radios.
- h) It was reported last week in the *Western Journal of Medicine* that a large study of coffee drinking and health has shown that those drinking five or more cups of coffee a day have a much greater likelihood of heart disease than those not drinking coffee at all. Fran decided that coffee was dangerous to the heart.

Sample test questions:

1. Which of these is NOT necessary to prove causation a) there must be correlation between a suspected cause and its effect b) The effect does not occur without the presence of the causal factor (all other things being equal: *ceteris paribus*) c) There must be controls where the causal factor is both present and not present and the difference in effect is measured d) The results should not lead to stereotyping e) all these are necessary

2. Which of these is NOT intended to eliminate confounding variables? A) Control group sample(s) of a population b) the ceteris paribus condition c) elimination of Hawthorne, placebo and subject mortality effects d) elimination of bias in sampling e) All these are intended to eliminate them

3. Which of a through d is false? A) Correlation does not prove causation without knowing why there is a correlation. B) Negative stereotyping is wrong and should be avoided C) The mere fact that something is not impossible is no reason to do or believe anything. For example, the possibility of winning the lottery is not a good reason for playing the lottery. D) None of these are false
4. When deciding what to believe and what actions to take, probabilities are relevant, possibilities are not. TF
5. Nancy Krieger, of the Harvard School of Public Health, said she had found that racism was a cause of high blood pressure among black Americans, since those who claimed they had faced no discrimination had lower blood pressure than those who said they had been subjected to racial bias. Dr. Kreiger believed professional black men in their reports of racism, but not working class black men, who have the highest average blood pressure, but reported less racial discrimination. Dr. Krieger's explanation was that those men found it painful to admit they had been the victims of bias. What flaw is there in her reasoning?
a) confirmation bias b) post hoc fallacy c) no control group d) invalid measure of the characteristic she was testing e) all these
6. From a newspaper article, June 2, 1994: Kenyan President Daniel Moi railed against Western nations yesterday for criticizing his government and challenged them to compare his country's record with that of African states such as Rwanda and Somalia, saying: "Kenya is not a political experiment in which all will perish." a) false dilemma b) Complex question: trying to get someone to accept a proposition by posing a question that presupposes it. c) tu quoque (two wrongs) d) appeal to emotion e) Questionable analogy
7. Paraphrase of part of a letter to the editor (*Washington Post National Weekly Edition*, March 13-19, 1989): It's true that the Ayatollah Khomeini has gone too far with his death sentence for author Salman Rushdie (because of his outrageous book *The Satanic Verses*), but Rushdie also has gone too far by offending all Moslems. I am a strong believer in the freedom of speech. However, books like Rushdie's only create hatred and division and weaken the ties of people to each other. Therefore, his book and others like it should be abolished. a) ad hominem b) straw man c) inconsistency d) begging the question e) false alternative
8. In order to interpret _____ it is crucial to know the distribution and range in addition to the average. a) an invalid measure b) a causal claim c) a statistical claim d) an ad hominem claim e) a post hoc fallacy
9. Performance enhancing drugs are banned from professional sports. But Viagra is a performance enhancing drug. Therefore, Viagra is banned from professional sports.
a. Composition.
b. No fallacy.
c. Appeal to unqualified authority.
d. Amphiboly.
e. Equivocation.
10. Nobody has ever seen Tyler play football, baseball, or go skiing or swimming, or engage in any other sport. Probably Tyler doesn't engage in sports.
a. Appeal to pity.
b. False cause.
c. Appeal to ignorance.
d. Begging the question.
e. No fallacy.
11. Every hair on Tony's head will fall out within five years. Therefore, Tony will be bald within five years.
a. Hasty generalization.
b. False cause.
c. Composition.
d. No fallacy.
e. Division.
12. Butane is combustible. Therefore, it burns.
a. Equivocation
b. False cause.
c. Appeal to ignorance.
d. Begging the question.
e. No fallacy
13. c) Global warming has never been a big problem in the past. Therefore, it won't be a big problem in the future.
a. Accident.
b. Suppressed evidence.
c. False cause.
d. Equivocation.
e. No fallacy

Notes