Chapter 3: Answers and Comments

Answers:

I. True or False

1. See textbook.

2. False. Even this well-established generalization is tentative and tests are ongoing. At best we have a very reliable belief, a generalization that is probably true and provides a reliable basis for practical decision.

3. True.

4. False.

5. False. On my campus a psychology teacher once told his class that it is possible to control every single variable in a well-designed study! Perhaps we might grant to this teacher that it is possible to control 'major' variables, but even acknowledging this, it is other inductions and beliefs that tell us what are major variables and what are not. We don't believe that it is necessary to control for chewing gum in cigarette studies, but that could change in the future. Until the early 1990s, few worried about controlling for radon gas in cigarette studies. Now it is thought to be very important. For instance, see John S. Neuberger, Charles Lynch, and Burton C. Kross, (1994), "Residential Radon Exposure and Lung Cancer: Evidence of an Urban Factor," *Health Physics*, March 1, Vol. 66, n.3, p. 263.

6. True. There have been literally thousands of randomized controlled studies done over at least four decades on the link between cigarette smoking and lung cancer.

7. See textbook.

8. False. See example 3-5. We don't want to oversimplify the difference between induction and deduction. All inductions generalize in their conclusions beyond the given evidence in the premises, but as 3-5 shows a general statement can be in the premise and a particular statement in the conclusion.

9. False. We need to have a vast imagination to come up with generalizations to test. Eratosthenes was very imaginative in putting together the trail of reasoning that concluded with the size and shape of the earth. Even with his use of geometric and mathematical deduction, he needed to have great insight in knowing what premises to use.

10. See textbook.

11. True.
12. False. We need abstractions and generalizations to function. The claimed link between cigarette smoking and lung cancer is a vast generalization. We cannot and should not avoid generalizing, but we can make a case for some generalizations being more reliable than simple stereotypes and hasty generalizations.

13. True. By contrast a strong inductive argument will be corroborated by many well-supported generalizations. Claims about cigarette smoking are supported by studies on toxic substances that are known to cause cancer. The biological theory of evolution is supported by well-supported generalizations in astronomy, chemistry, physics, geology, etc.

14. See textbook.

15. True. All generalizations involve risk. The major take-away message is that evidence can exist for a generalization and at best we can have enough evidence to believe the generalization is probably true. Plus, all inductive arguments, strong and weak, have some evidence for the conclusions. The goal of a reasonable person is to apply the hallmarks of strong inductive arguments.

II. Identification: Deductive arguments or Inductive generalization.

1. Inductive generalization. Generalizing from some Hondas to all Hondas.

2. See textbook.

3. Deductive argument. Deducing from the alleged state of all apples to the state of one in the middle.

4. Deductive argument. Some students might claim this argument is inductive because there is a missing premise, i.e., that lung cancer is dangerous. I credit them for being meticulous, but point out that the conclusion is not "John will probably get lung cancer" or "John will get lung cancer." Rather, the conclusion only attempts to establish potential harm, which I follow deductively from the general premise, assuming that it is understood that lung cancer is dangerous.

5. Inductive generalization. Generalizing from some smokers to all smokers. Note that this would be considered to be a weak inductive inference by modern science.

6. See textbook.

7. Deductive argument. Deducing from the alleged wealth of all presidents to one.

8. Inductive generalization. Inferring that the present or future will repeat the past is a type of generalization.
9. Inductive generalization. A prediction of what will happen (future) after a particular event takes place is also a type of generalization.

10. Inductive generalization. This argument not only generalizes (many to all), but also assumes that we should prohibit actions that are later regretted.

11. Inductive generalization. Generalizing from whales and dolphins to all animals.

12. Deductive. Deducing from what is allegedly true of all animals to whales and dolphins.

13. Inductive generalization. Generalizing from some liberal votes to all liberal voters.

14. Inductive generalization. Generalizing from most and some to one.

15. Deductive argument. Deducing from all U.S. soldiers in Afghanistan to the soldiers in one area of Afghanistan.

III. Deductive and Inductive argument structuring:

1. See textbook.

2. Deductive. “Hence” indicates the conclusion.

Conclusion: There is no doubt that John Eless must be a Republican.

Premises:

All Republicans support the president's Supreme Court nominee.
John Eless supports the president's Supreme Court nominee.

Some students will recognize that this is not a very good argument (it is invalid), and then conclude that it must be inductive. However this argument goes from general to particular and the author apparently thinks that he or she is providing a good deductive argument (the phrase "no doubt" in the conclusion).

3. Inductive. “Thus” indicates the conclusion.

Conclusion: U.S. manufactured cars are better than Japanese manufactured cars.

Premises:

My family has bought Chrysler cars since the first ones were made.
These cars have always been reliable.
A very weak inductive argument. This argument first generalizes from the reliability of a few Chrysler cars to all Chrysler cars, and then to all U.S. cars. It then concludes something about all Japanese cars without any examination of the quality of these cars.

4. Inductive. “Therefore” indicates the conclusion.

Conclusion: The winner of the presidential election in the year 2000 will probably be rich.

Premise: Most presidents of the United States have been rich.

From most to one, plus prediction of the future from the past. A good inductive argument? The premise makes a case for a trend based on many positive cases. Furthermore, if this argument is supplemented with the background knowledge that political campaigns have become very expensive, and that one needs to be networked with movers and shakers to even have a chance at being president, the conclusion does seem highly probable. At least this argument is better than #3.

5. See textbook.

6. Inductive.

Conclusion: John is having an affair with Jill.

Premises:

When Dierdre called John this evening, his phone was busy.
When Dierdre then called Jill her phone was also busy.

Although there are no premise or conclusion indicators, it should be easy to see that this conclusion is a big generalization from only some evidence a few mere positive cases. Very weak inductive argument. Worth considering in terms of awareness of relative strengths of evidence what kinds of evidence would make this conclusion better supported?

7. Inductive.

“It is most likely” identifies the conclusion and helps us see that this argument is inductive.

Conclusion: It is most likely that the murderer knew the victim.

Premises:

First, there were no signs of forced entry into the house.
Second, according to the neighbors, the victim's dog always barked at strangers and on the night of the murder no one heard the dog bark.
Third, two half empty glasses of wine were found in the living room where the victim's body was found.
Another type of generalization that the murderer knowing the victim is the best explanation for the facts. We have an explanation as part of an argument. In explanation format (C2), the implied conclusion is “The murder was caused by someone who knew the victim.” A much stronger inductive argument than #6. The premises provide significant positive cases plus background knowledge (higher-order induction) is used – general knowledge about dogs, forced entry, possible acquaintances sharing a glass of wine.

Of course there would be many other issues to investigate if this reasoning was part a trial and a particular friend of the victim was accused based partly on this evidence. That some of these inductive arguments are stronger than others enables us to make the crucial point again: Some inductive conclusions are much better supported and more reliable than others, even though all are uncertain in terms of a standard of absolute support. Notice that this reasoning would surely give detectives a basis for decision and action – they could start by finding out people who knew the victim, asking about where they were at the time of the murder, and checking if any acquaintances has suspect motives.

8. Deductive. “So” indicates the conclusion.

Conclusion: If we pay our medical bills, we can't make the car payment this month.
Premises:

If we pay our medical bills and car payment this month, we will not have enough money for basic necessities.

We have to have enough money for basic necessities.

Valid deductive argument. If two major bills are paid, then no money for basic necessities. So, if basic necessities are a must, then it is not possible to pay both of the major bills. So, if one is paid (the medical bills), the other cannot be paid. Remember that any argument that is valid will be deductive.

9. Deductive. “It must follow that” indicates the conclusion.

Conclusion:

Any female at Kansas State either under 110 pounds or with a grade point average below a "C" is not on the softball team.

Premises:

Only females at Kansas State above 110 pounds are members of the softball team.
All members of the softball team must have at least a "C" grade point average.

Valid deductive argument. The first premise states that being over 110 pounds is a necessary condition for being on the softball team. The second premise (no need to quibble over whether there is one or two premises) states that having at least a "C" grade point average is also a necessary
condition for being on the team. So, anyone who does not meet either of these conditions would not be on the softball team.

10. See textbook.

11. Inductive.

“So” indicates the conclusion and “it is likely” shows that the author knows that a probability claim is being made. This argument is also is generalizing from past experience to predicting the future.

Conclusion: It is likely that Iraq will turn into a quagmire and killing zone for American troops.

Premises:

Vietnam was a quagmire and killing zone for American troops because political circumstances interfered with military operations and most local people did not support our troops.

In Iraq political circumstances interfere with American military operations and most local people do not support our troops.

Strong or weak inductive argument? Surely this argument is stronger than #6. Historians do warn us that too often human beings repeat tragic histories. This argument should have at least provoked lots of open discussion and critical thought, discussion and critical thought that did not exist according to critics of the Bush apparent rush to war in 2003.

12. Deductive.

“This is clear, because” informs us that the first statement is the conclusion and the premises follow “because.”

Conclusion: The war with Iraq was not illegal.

Premises:

If Iraq violated the terms of the cease-fire agreements that ended the 1991 Persian Gulf War, and if enforcement of articles 16 and 17 of the United Nations Security Council resolutions are lawful, then the war with Iraq was not illegal.

Iraq did violate the terms of the cease-fire agreements and enforcement of articles 16 and 17 are lawful.

Valid argument, hence deductive. If two points are true, then a third point is true. Two points are true. So a third point is true.

13. Inductive.
Hard one. Close to being deductive, but a prediction of a future event. “So” indicates the conclusion.

Conclusion:

In the near future we can expect incidences of AIDS to increase in the adult film industry.

Premises:

Unprotected sex in unmarried couples is a major cause in the spread of AIDS. Unprotected sex is now common again in actors and actresses in the adult film industry.

Strong inductive argument? Similar to arguing that in general we know that smoking causes lung cancer, that smoking is increasing in China, so we can expect an increase in lung cancer deaths in China.


Conclusion:

With history as our guide we know the right thing to do in Iraq is to destroy the regime of Saddam Hussein.

Premises:

The world learned a hard lesson from Munich in 1938 when the British Prime Minister Neville Chamberlain gave into the demands of Adolf Hitler – appeasement of brutal dictators does not work.

It emboldens the dictator and makes the fight for liberation harder.

Strong or weak inductive argument? Compare with #11. Again, this argument is stronger than #6. This argument should have also at least provoked lots of open discussion and critical thought, but the points made in #11 should have been considered as well.

15. Deductive. Valid argument. “Hence” indicates the conclusion.

Conclusion: If we have to kill a thousand innocent people to get one terrorist, it is worth it.

Premises:

If civilization itself is at stake, then if we have to kill a thousand innocent people to get one terrorist, it is worth it.

Civilization itself is at stake.

Valid argument. If A, then B. A is true. So, B is true.