

Think Twice

(Originally published in Oasis, November 1987, December 1987 and January 1988)

By Carl Harvey and Henry C. Scuoteguazza

We're faced with decisions every day. We're bombarded by claims and counter-claims. Does the government have the right to force us to wear seat belts? Is capital punishment murder? How do we decide what to believe?

We need some means for determining what is true and false, reasonable and unreasonable. Going by our feelings doesn't work. Emotions don't help us analyze arguments or weigh evidence. Facts by themselves also aren't enough. We need something more.

Consider the controversy over AIDS being a serious threat to the general public. Consider that over 35,000 people are reported to have AIDS, over half of whom have died. Ninety-five percent of all current cases involve high-risk groups—homosexual and bisexual men, intravenous drug users and hemophiliacs. AIDS is contracted through blood-to-blood contact, either sexual or non-sexual, but there are a growing number of cases being reported among people who don't belong to the high-risk groups.

Making use of facts

Given these as facts, we still need to decide which are relevant and to what degree; which constitute evidence and of what weight; and what further inferences and evidence are needed to arrive at a conclusion. But to admit this is to concede that something more than information is necessary.

The Greek philosopher Aristotle laid the basics for logic, the principles governing inference and proof. As Will Durant said in *The Story of Philosophy*, "The first great distinction of Aristotle is that almost without predecessors, almost entirely by his own hard thinking, he created a new science—logic." In fact, the collection of his work is known as the *Organon*, which appropriately means "tool." Aristotle defined *syllogisms*, a logically connected series of statements leading to a conclusion, the most famous being, "All men are mortal; Socrates is a man; therefore, Socrates is mortal." Medieval philosophers, particularly St. Thomas Aquinas, expanded on Aristotle's work by developing principles for induction (drawing general conclusions from masses of facts).

In dissecting ideas we need a blueprint for using logic. We'll call it *critical thinking*: the combination of logic and method. We have devised four steps to make it easy to organize the tools at our disposal: 1) determining what is being said; 2) drawing inferences; 3) looking for facts to confirm or invalidate these inferences; and 4) evaluating the evidence. Using this method, let's examine the question of whether AIDS is a serious threat to the general public.

Step I: Determine what is being said

Before you can properly evaluate an argument, problem or issue, you have to

understand it clearly and exactly. Our AIDS question has two potential ambiguities: Just what is AIDS, and in what sense can it be considered a threat to the general public? For our purposes, we can define AIDS as a collapse of the immune system caused by a human immunodeficiency virus (HIV).

We know that AIDS can be contracted by blood-to-blood contact through sexual intercourse, needle sharing, blood transfusions and open cuts or wounds. None of these is a serious vehicle of transmission to the general public. The salient concern is whether the AIDS virus can spread through *casual* contact such as touching, sharing eating utensils, or living with or in close proximity to AIDS victims. With a clear statement of the problem, we can proceed.

Step 2: Draw inferences

Some of what we know about ourselves and the world we know by direct experience and observation. But most of the questions that concern us are beyond our direct experience. Consequently, we need some means of going beyond the immediate. Fortunately, facts are not isolated but are connected by cause and effect. Thus, cause and effect make it possible for us to draw inferences, to pose a series of 'if-then' tests. Applying this method to our AIDS example we reason thus: If AIDS is spread by casual means then there should be a high incidence of AIDS cases among health care workers who deal with, and family members who live with, AIDS patients. If AIDS is casually spread, then the distribution of AIDS cases should significantly break out of the high-risk groups to the general public. If AIDS is not easily contracted then all new cases should be explained by some blood-to-blood contact.

The more 'if-then' tests posed, the more thorough the test and thus, the more reliable the conclusion. The AIDS question, like most complex issues, has many proposed answers but few correct ones. To isolate the few from the many, we must look for as many 'if-then' questions as we can.

Step 3: Look for facts

Armed with your series of testable statements you can now compare them with the facts at your disposal. In doing this comparison, no relevant facts can be ignored or dismissed. Like a balance sheet where all the figures must add up, so with a critical analysis all facts must be accounted for.

At this stage you must also be concerned with the source of your information. Since in most cases you will not have direct access to the facts, but will be depending on other sources or authorities, you must judge their credibility. When confronted with competing qualified authorities, the situation becomes clouded. You either have to suspend judgment or offer reasons for choosing one over the other.

With these considerations in mind, how do our three 'if-then' tests compare with the facts? First, since AIDS was first diagnosed in 1981, few health care workers or family members having contact with AIDS patients have contracted the disease. And the few who picked up the disease had blood-to-blood contact. As for questions 2 and 3, the distribution of AIDS cases has remained constant, with over 93 percent involving the high-risk groups. The newer AIDS cases do not significantly diverge from this distribution. Even the reported upsurge of cases outside the high-risk groups does not prove an exception to this trend, because on investigation, the majority involves some blood-to-blood contact.

What about the sources of information? The main ones are the Centers for Disease Control and the National Institutes of Health, which are competent to report on such matters and which have been credible in dealing with similar issues in the past. Nor have other authorities seriously challenged their statistics.

Step 4: Evaluate the evidence

The last step in the process is to evaluate the evidence to determine what it proves, its adequacy, and what further considerations would be needed to give a more decisive picture. What does our evidence show in the AIDS example? The three test implications strongly support the conclusion that AIDS is *not* highly contagious. But the limited number of inferences, the fact that health care workers take precautions against exposure to AIDS patients and their body fluids, and the 5-to-7 percent of AIDS cases of unknown origin prevent our conclusions from being decisive. Nonetheless, even if AIDS is contagious, the evidence does not support the claim that it is easily contracted through casual means.

In coming issues of *Oasis*, we will discuss in greater detail how to test your beliefs against the facts, how to analyze and evaluate arguments and evidence, and how to develop consistency in your thinking while being able to identify inconsistencies and errors in the thinking of others. We'll cover logical errors, analyzing arguments, induction, deduction—and how they fit into the four-step method. Our goal is to provide a simple means of testing ideas so you can choose, and choose responsibly; not just believe, but believe reasonably; not just think— but think twice.

Lay out the possibilities

To think critically understand what is being said by laying out the possibilities. For example, last summer people wondered whether President Reagan was responsible for the diversion of money from Iranian arms sales to the Nicaraguan Contras. But what does "to be responsible for" mean? Was the diversion Reagan's idea, which he delegated others to carry out? Did someone else initiate it and Reagan approve it? Did someone else execute it with Reagan's knowledge, but not his approval? If he didn't know about the plan, could he still be responsible?

Let's look at another claim: "Boston is the most racist U.S. city." Could this mean it has the most racially-motivated incidents? That the standard of living for minority groups is lower there than elsewhere? That minorities feel more persecuted?

Notice before accepting either of the above statements and drawing inferences, we had to ask, "What are the possible meanings of what's being said?" We came up with several choices for "responsibility" and "most racist."

Beware of the false alternative

When an issue is presented in such a way that only two possibilities are offered for your choice (as though there were no others) perhaps you are being thrown a false alternative. For example, poor airline service and safety—suspect claims to begin with—are blamed on the deregulation of the industry. Would-be re-regulators ignore the effects of an archaic, regulated air traffic control system, poor management practices or low-caliber employees. They would like to make us accept the false alternative they have created: unregulated, risky travel or regulated, non-

competitively priced, safe flights.

To ensure you don't fall into false alternatives, don't automatically accept only the choices given you. Look for other possible explanations and alternatives. You might have to do some research, but you'll be in for some pleasant surprises.

Make distinctions

After laying out the possibilities, make sure the issues are clearly defined—make distinctions. Something you should determine, particularly when people debate, is whether the opponents are talking to the same points. If they aren't— and this happens often—they're "cross talking." For instance, a recent talk show featured two health experts, one of whom claimed eggs were unhealthy. The other disagreed, saying he used eggs to shampoo his hair with good results. Obviously, the first expert was talking about the effects of eating eggs, not rubbing them on his scalp.

Cross talking can happen when someone purposely misconstrues an opponent's position in an attempt to cover a weak defense, or when both sides attach different meanings to the same words. Consider the concept of rights.' Some believe rights are God-given; others say they are created out of thin air by man; while still others believe rights are the recognition of the conditions we as human beings need to survive in a society.

The debate over abortion is another version of cross talking. Anti-abortionists claim it's murder to kill a fetus because it is a human being with the same right to life as any human already born. Pro-abortionists generally argue a woman has the right to do whatever she pleases with her body and anything that happens to be growing inside it. But you can see the nature of the arguments is different: one is based on morality, the other on legality. You can also see why the argument of one side doesn't affect that of the other side—they are talking past one another.

Another distinction to watch out for is "some vs. all." When someone says, 'Politicians are crooked,' or 'Drinking is bad for you,'" does he or she mean *all*, *most* or *some*? To prove a statement is true in *all* situations, enough evidence must be given to show there are no exceptions to disprove the assertion. Therefore, when someone makes a blanket assertion, the first thing to do is to find out if he means the statement to apply in all — or just some — instances.

The philosophical terms 'necessary' and 'sufficient' are often misunderstood. If B *never* occurs without the presence of A, then A is necessary for B. But A is a sufficient condition if A *by itself* is enough to cause B. Political arguments often hinge on whether something is necessary or sufficient. For example, conservatives often argue government welfare doesn't cure poverty, so it should be curbed. They are saying tax money by itself is not *sufficient* to help the poor. Liberals could counter this by asserting the conservative argument shows only that money is not a sufficient condition, but it could still be a *necessary* one.

Try to uncover causal connections

Most people understand 'cause and effect.' If you hit a baseball with a bat, it's no accident the ball, not the bat, flies away from you. If a tractor-trailer filled with steel hits a fire hydrant, the hydrant, not the truck, suffers the most damage.

Unfortunately, determining cause and effect is not always so straightforward when dealing with people. Some of the common problems encountered when trying to uncover causal connections are:

1. *Correlation (drawing parallels between two events) may be confused with causation.* A correlation between two events or things might be accidental or irrelevant. The increase in the national debt could be correlated with the increase in the number of people who play tennis. So what? Someone claiming a connection has to show a cause and effect relationship.
2. *The cause and effect could be in the opposite direction from that proposed.* Someone might say sex education in schools caused the increase in sexually transmitted diseases. Someone else could counter this by claiming the alarming rise in such diseases led to the establishment of sex education classes. You would have to look elsewhere to find the cause of the increase.
3. *Both assertions might actually be effects of some other unidentified cause.* For instance, the increases in both sexually transmitted diseases and sex education in schools might have been caused by changes in sexual mores.
4. *The causal relationship identified might be real but unimportant.* Maybe sex education spurred the curiosity of kids, which led to some of the increase in venereal diseases, but perhaps something else accounts for it.
5. *The causal connection might be more complex than imagined.* As we learn more about human nature and the world, we find some issues are more complicated or convoluted than we originally thought.

Test your critical thinking by deciding what you think of these conclusions:

- There is a correlation between drinking a lot of coffee and having heart attacks. Therefore, coffee drinking causes heart problems.
- It's claimed a large number of ships and planes disappear mysteriously in the Bermuda Triangle. There must be something destroying or capturing them in this area.
- A large number of people who go to hospitals die. Hospitals must cause death.
- High school students' SAT test scores dropped as the number of hours they watch TV increased. TV causes lower SAT scores.

Drawing inferences

Once we are clear on what is being said in an argument. We must look for evidence to support or refute it. The first step in doing this is to draw inferences.

Drawing inferences means grasping the cause-and-effect relationship between facts. Without the ability to grasp these connections, our knowledge would be limited to the immediate present.

Consider a mundane experience most of us have shared: our car won't start. We immediately enter an if-then mode of thinking. If the battery is dead, then If the gas tank is empty, then In thinking this way, we isolate the problem so it can be

corrected. Without being able to make these inferences, we'd have no choice but to begin randomly replacing pans, hoping to find the malfunction.

Since inferences' are indispensable to our understanding of the world, we need to learn how to make these connections. Will the cause-and-effect relations we observe today be valid tomorrow, or are they arbitrary and subject to change?

To draw sound inferences, we must accept the principle of identity: basically, that a thing is itself and whatever it happens to be determines what it can do. A ball that bounces today cannot explode or stick to the ground tomorrow. Eggs that today split open to reveal baby birds will not hatch elephants next week. The principle of identity ensures all cause-and-effect relations and the uniformity and regularity of the universe, thus allowing us to draw inferences.

How to draw inferences

As with our broken-down car, we begin to draw inferences by asking if-then questions. This means asking ourselves, if a particular claim is true, then what else must also be true? Or, what facts had to precede this event or follow from it? To think critically and draw informed inferences, we must be well-informed on the subject in question.

Spiritualists claim to have the ability to speak to the dead. How, using if-then questions, can we test this claim against the facts? Well, if someone could actually talk to the dead, we might expect to learn 1) information about the spirit world that had not been known, 2) answers to questions the dead left behind them, or, 3) precise details of past events not previously known. The fact that this never happens leads us to dismiss the claims made by spiritualists.

A defender of spiritualism might argue with us, saying for instance, the dead are forbidden to communicate. Is this an effective reply? No, because there is no evidence to support this claim. In the absence of evidence, we are justified in dismissing it.

On the other hand, suppose someone claimed that cigarette smoking causes cancer. It would be easy, using if-then questions, to show such an unqualified claim to be false, since many smokers never develop cancer- Yet, because the evidence does show a strong correlation between smoking and cancer, we would be justified in restating the claim thus: smoking significantly increases one's chances of developing cancer. This restatement is legitimate because it is faithful to the facts.

The rule of thumb is straightforward: to correctly restate a defunct claim or argument, one must introduce evidence. If not, the restatement is an *ad hoc qualifier* intended not to further understanding but to avoid refutation.

Sometimes in evaluating arguments, we find if-then questions are consistent with more than one answer. Any time you are confronted with competing explanations, just keep questioning until you have enough facts to make a judgment.

The hypothetical syllogism

If-then questions are part of what is formally known as the *hypothetical syllogism*.

The hypothetical syllogism asserts that if an antecedent is true, the consequent must also be true. Going back to the terms we discussed in last month's *Oasis*, this means the antecedent is a *sufficient* condition for the consequent, while the consequent is a *necessary* condition of the antecedent,

Example 1: Gorbachev is a communist.
Therefore, Gorbachev is an atheist.

This syllogism asserts that if the antecedent (Gorbachev is a communist) is true, then the consequent (therefore, Gorbachev is an atheist) must also be true. This form of hypothetical syllogism is called *affirming the antecedent*.

Example 2: If one is a communist, then one is an atheist. Pope John Paul II is not an atheist. Therefore, he is not a communist.

This example, asserting the same relationship, arrives at a different, but valid, conclusion. By denying the consequent in the second premise, it maintained the relationship between the antecedent and the consequent. This form of syllogism is called *denying the consequent*.

Problems arise when the relationship between antecedent and consequent are ignored. This happens in the following examples.

Example 3: If one is a communist, then one is an atheist. Madalyn Murray O'Hair is an atheist. Therefore, she is a communist.

Example 4: If one is a communist, then one is an atheist. Mother Theresa is not a communist. Therefore, she is not an atheist.

These are examples of invalid reasoning. In claiming that "if one is a communist, then one is an atheist," what is being asserted is that being a communist guarantees that one will be an atheist—not that being a communist is the only condition that guarantees atheism. Example 3 ignores this distinction by committing the fallacy of *affirming the consequent*. Example 4 makes the same error by committing the fallacy of *denying the antecedent*. Such fallacies are always fatal even though the conclusions sometimes turn out to be true. Remember, critical thinking involves more than just correct conclusions—it requires conclusions justified by the evidence.

The fallacy of the extended assertion

This fallacy occurs any time someone makes an assertion without proof.

Ronald Reagan is responsible for Irangate and should be held accountable. Nuclear war is unwinnable, so money should not be wasted on defense. A person is a product of his environment and should not be judged. Each of these statements is an assertion without evidence. To effectively respond to such claims, all we need to do is ask, "Where's the proof?" or simply deny the validity of the statements. The burden of proof is upon the shoulders of whomever commits the *fallacy of the extended assertion*.

As you think twice about the world, remember that critical thinking is not a gift, but a learned skill. Learn it well and it will enhance your life.