### 15. Emotive Words and False Analogies

Emotive words are used to provoke emotion and sometimes to obscure rationality. They can be positive emotive words—*motherhood, America, integrity, honesty*. Or they can be negative—*rape, cancer, evil, communist*. Likewise, metaphors and analogies can cloud thinking with emotion or steer us onto a side path. A pundit talks about inflation as "the cancer of society" or industry "raping the environment." In his 1992 Democratic nomination speech, Al Gore constructed an elaborate analogy between the story of his sick son and America as a sick country. Just as his son, hovering on the brink of death, was nursed back to health by his father and family, America, hovering on the brink of death after twelve years of Reagan and Bush, was to be nurtured back to health under the new administration. Like anecdotes, analogies and metaphors do not constitute proof. They are merely tools of rhetoric.

### 16. *Ad Ignorantiam*

This is an appeal to ignorance or lack of knowledge and is related to the *burden of proof* and *unexplained is not inexplicable* fallacies, where someone argues that if you cannot disprove a claim it must be true. For example, if you cannot prove that there isn't any psychic power, then there must be. The absurdity of this argument comes into focus if one argues that if you cannot prove that Santa Claus does not exist, then he must exist. You can argue the opposite in a similar manner. If you cannot prove Santa Claus exists, then he must not exist. In science, belief should come from positive evidence in support of a claim, not lack of evidence for or against a claim.

### 17. *Ad Hominem* and *Tu Quoque*

Literally "to the man" and "you also," these fallacies redirect the focus from thinking about the idea to thinking about the person holding the idea. The goal of an *ad hominem* attack is to discredit the claimant in hopes that it will discredit the claim. Calling someone an atheist, a communist, a child abuser, or a neo-Nazi does not in any way disprove that person's statement. It might be helpful to know whether someone is of a particular religion or holds a particular ideology, in case this has in some way biased the research, but refuting claims must be done directly, not indirectly. If Holocaust deniers, for example, are neo-Nazis or anti-Semites, this would certainly guide their choice of which historical events to emphasize or ignore. But if they are making the claim, for example, that Hitler did not have a master plan for the extermination of European Jewry, the response "Oh, he is saying that because he is a neo-Nazi" does not refute the argument. Whether Hitler had a master plan or not is a question that can be settled historically. Similarly for *tu quoque*. If someone accuses you of cheating on your taxes, the answer "Well, so do you" is no proof one way or the other.

## 18. Hasty Generalization

In logic, the hasty generalization is a form of improper induction. In life, it is called prejudice. In either case, conclusions are drawn before the facts warrant it. Perhaps because our brains evolved to be constantly on the lookout for connections between events and causes, this fallacy is one of the most common of all. A couple of bad teachers mean a bad school. A few bad cars mean that brand of automobile is unreliable. A handful of members of a group are used to judge the entire group. In science, we must carefully gather as much information as possible before announcing our conclusions.

## 19. Overreliance on Authorities

We tend to rely heavily on authorities in our culture, especially if the authority is considered to be highly intelligent. The IQ score has acquired nearly mystical proportions in the last half century, but I have noticed that belief in the paranormal is not uncommon among Mensa members (the high-IQ club for those in the top 2 percent of the population); some even argue that their "Psi-Q" is also superior. Magician James Randi is fond of lampooning authorities with Ph.D.s—once they are granted the degree, he says, they find it almost impossible to say two things: "I don't know" and "I was wrong." Authorities, by virtue of their expertise in a field, may have a better chance of being right in that field, but correctness is certainly not guaranteed, and their expertise does not necessarily qualify them to draw conclusions in other areas.

In other words, *who* is making the claim makes a difference. If it is a Nobel laureate, we take note because he or she has been right in a big way before. If it is a discredited scam artist, we give a loud guffaw because he or she has been wrong in a big way before. While expertise is useful for separating the wheat from the chaff, it is dangerous in that we might either (1) accept a wrong idea just because it was supported by someone we respect (false positive) or (2) reject a right idea just because it was supported by someone we disrespect (false negative). How do you avoid such errors? Examine the evidence.

## 20. Either-Or

Also known as the *fallacy of negation* or the *false dilemma*, this is the tendency to dichotomize the world so that if you discredit one position, the observer is forced to accept the other. This is a favorite tactic of creationists, who claim that life *either* was divinely created *or* evolved. Then they spend the majority of their time discrediting the theory of evolution so that they can argue that since evolution is wrong, creationism must be right. But it is not enough to point out weaknesses in a theory. If your theory is indeed superior, it must explain both the "normal" data explained by the old theory and the "anomalous" data not explained by the old theory. A new theory needs evidence in favor of it, not just against the opposition.

## 21. Circular Reasoning

Also known as the *fallacy of redundancy*, *begging the question*, or *tautology*, this occurs when the conclusion or claim is merely a restatement of one of the premises. Christian apologetics is filled with tautologies: *Is there a God? Yes. How do you know? Because the Bible says so. How do you know the Bible is correct? Because it was inspired by God.* In other words, God is because God is. Science also has its share of redundancies: *What is gravity? The tendency for objects to be attracted to one another. Why are objects attracted to one another?*

## 22. *Reductio ad Absurdum* and the Slippery Slope

*Reductio ad absurdum* is the refutation of an argument by carrying the argument to its logical end and so reducing it to an absurd conclusion. Surely, if an argument's consequences are absurd, it must be false. This is not necessarily so, though sometimes pushing an argument to its limits is a useful exercise in critical thinking; often this is a way to discover whether a claim has validity, especially if an experiment testing the actual reduction can be run. Similarly, the slippery slope fallacy involves constructing a scenario in which one thing leads ultimately to an end so extreme that the first step should never be taken. For example: *Eating Ben & Jerry's ice cream will cause you to put on weight. Putting on weight will make you overweight. Soon you will weigh 350 pounds and die of heart disease. Eating Ben & Jerry's ice cream leads to death. Don't even try it.* Certainly eating a scoop of Ben & Jerry's ice cream *may* contribute to obesity, which could possibly, in very rare cases, cause death. But the consequence does not necessarily follow from the premise.

## Psychological Problems in Thinking

### 23. Effort Inadequacies and the Need for Certainty, Control, and Simplicity

Most of us, most of the time, want certainty, want to control our environment, and want nice, neat, simple explanations. All this may have some evolutionary basis, but in a multifarious society with complex problems, these characteristics can radically oversimplify reality and interfere with critical thinking and problem solving. For example, I believe that paranormal beliefs and pseudoscientific claims flourish in market economies in part because of the uncertainty of the marketplace. According to James Randi, after communism collapsed in Russia there was a significant increase in such beliefs. Not only are the people now freer to try to swindle each other with scams and rackets but many truly believe they have discovered something concrete and significant about the nature of the world. Capitalism is a lot less stable a social structure than communism. Such uncertainties lead the mind to look for explanations for the vagaries and contingencies of the market (and life in general), and the mind often takes a turn toward the supernatural and paranormal.

Scientific and critical thinking does not come naturally. It takes training, experience, and effort, as Alfred Mander explained in his *Logic for the Millions*: "Thinking is skilled work. It is not true that we are naturally endowed with the ability to think clearly and logically—without learning how, or without practicing. People with untrained minds should no more expect to think clearly and logically than people who have never learned and never practiced can expect to find themselves good carpenters, golfers, bridge players, or pianists" (1947, p. vii). We must always work to suppress our need to be absolutely certain and in total control and our tendency to seek the simple and effortless solution to a problem. Now and then the solutions may be simple, but usually they are not.