

Distinguishing Between Inferences and Assumptions

To be skilled in critical thinking is to be able to take one's thinking apart systematically, to analyze each part, assess it for quality and then improve it. The first step in this process is understanding the parts of thinking, or elements of reasoning.

These elements are: purpose, question, information, inference, assumption, point of view, concepts, and implications. They are present in the mind whenever we reason. To take command of our thinking, we need to formulate both our purpose and the question at issue clearly. We need to use information in our thinking that is both relevant to the question we are dealing with, and accurate. We need to make logical inferences based on sound assumptions. We need to understand our own point of view and fully consider other relevant viewpoints. We need to use concepts justifiably and follow out the implications of decisions we are considering. (For an elaboration of the Elements of Reasoning, see a Miniature Guide to the Foundations of Analytic Thinking.)

In this article we focus on two of the elements of reasoning: inferences and assumptions. Learning to distinguish inferences from assumptions is an important intellectual skill. Many confuse the two elements. Let us begin with a review of the basic meanings:

1. **Inference:** An inference is a step of the mind, an intellectual act by which one concludes that something is true in light of something else's being true, or seeming to be true. If you come at me with a knife in your hand, I probably would infer that you mean to do me harm. Inferences can be accurate or inaccurate, logical or illogical, justified or unjustified.
2. **Assumption:** An assumption is something we take for granted or presuppose. Usually it is something we previously learned and do not question. It is part of our system of beliefs. We assume our beliefs to be true and use them to interpret the world about us. If we believe that it is dangerous to walk late at night in big cities and we are staying in Chicago, we will infer that it is dangerous to go for a walk late at night. We take for granted our belief that it is dangerous to walk late at night in big cities. If our belief is a sound one, our assumption is sound. If our belief is not sound, our assumption is not sound. Beliefs, and hence assumptions, can be unjustified or justified, depending upon whether we do or do not have good reasons for them. Consider this example: "I heard a scratch at the door. I got up to let the cat in." My inference was based on the assumption (my prior belief) that only the cat makes that noise, and that he makes it only when he wants to be let in.

We humans naturally and regularly use our beliefs as assumptions and make inferences based on those assumptions. We must do so to make sense of where we

are, what we are about, and what is happening. Assumptions and inferences permeate our lives precisely because we cannot act without them. We make judgments, form interpretations, and come to conclusions based on the beliefs we have formed.

If you put humans in any situation, they start to give it some meaning or other. People automatically make inferences to gain a basis for understanding and action. So quickly and automatically do we make inferences that we do not, without training, notice them as inferences. We see dark clouds and infer rain. We hear the door slam and infer that someone has arrived. We see a frowning face and infer that the person is upset. If our friend is late, we infer that she is being inconsiderate. We meet a tall guy and infer that he is good at basketball, an Asian and infer that she will be good at math. We read a book, and interpret what the various sentences and paragraphs — indeed what the whole book — is saying. We listen to what people say and make a series of inferences as to what they mean.

As we write, we make inferences as to what readers will make of what we are writing. We make inferences as to the clarity of what we are saying, what requires further explanation, what has to be exemplified or illustrated, and what does not. Many of our inferences are justified and reasonable, but some are not.

As always, an important part of critical thinking is the art of bringing what is subconscious in our thought to the level of conscious realization. This includes the recognition that our experiences are shaped by the inferences we make during those experiences. It enables us to separate our experiences into two categories: the raw data of our experience in contrast with our interpretations of those data, or the inferences we are making about them. Eventually we need to realize that the inferences we make are heavily influenced by our point of view and the assumptions we have made about people and situations. This puts us in the position of being able to broaden the scope of our outlook, to see situations from more than one point of view, and hence to become more open-minded.

Often different people make different inferences because they bring to situations different viewpoints. They see the data differently. To put it another way, they make different assumptions about what they see. For example, if two people see a man lying in a gutter, one might infer, “There’s a drunken bum.” The other might infer, “There’s a man in need of help.” These inferences are based on different assumptions about the conditions under which people end up in gutters. Moreover, these assumptions are connected to each person’s viewpoint about people. The first person assumes, “Only drunks are to be found in gutters.” The second person assumes, “People lying in the gutter are in need of help.”

The first person may have developed the point of view that people are fundamentally responsible for what happens to them and ought to be able to care for themselves. The second may have developed the point of view that the problems people have are often caused by forces and events beyond their control. The reasoning of these two people,

in terms of their inferences and assumptions, could be characterized in the following way:

Person One

Situation: A man is lying in the gutter.

Inference: That man's a bum.

Assumption: Only bums lie in gutters.

Person Two

Situation: A man is lying in the gutter.

Inference: That man is in need of help.

Assumption: Anyone lying in the gutter is in need of help.

Critical thinkers notice the inferences they are making, the assumptions upon which they are basing those inferences, and the point of view about the world they are developing. To develop these skills, students need practice in noticing their inferences and then figuring the assumptions that lead to them.

As students become aware of the inferences they make and the assumptions that underlie those inferences, they begin to gain command over their thinking. Because all human thinking is inferential in nature, command of thinking depends on command of the inferences embedded in it and thus of the assumptions that underlie it. Consider the way in which we plan and think our way through everyday events. We think of ourselves as preparing for breakfast, eating our breakfast, getting ready for class, arriving on time, leading class discussions, grading student papers, making plans for lunch, paying bills, engaging in an intellectual discussion, and so on. We can do none of these things without interpreting our actions, giving them meanings, making inferences about what is happening.

This is to say that we must choose among a variety of possible meanings. For example, am I "relaxing" or "wasting time?" Am I being "determined" or "stubborn?" Am I "joining" a conversation or "butting in?" Is someone "laughing with me" or "laughing at me?" Am I "helping a friend" or "being taken advantage of?" Every time we interpret our actions, every time we give them a meaning, we are making one or more inferences on the basis of one or more assumptions.

As humans, we continually make assumptions about ourselves, our jobs, our mates, our students, our children, the world in general. We take some things for granted simply because we can't question everything. Sometimes we take the wrong things for granted. For example, I run off to the store (assuming that I have enough money with me) and arrive to find that I have left my money at home. I assume that I have enough gas in the car only to find that I have run out of gas. I assume that an item marked down in price is a good buy only to find that it was marked up before it was marked down. I assume that it will not, or that it will, rain. I assume that my car will start when I turn the key and press the gas pedal. I assume that I mean well in my dealings with others.

Humans make hundreds of assumptions without knowing it---without thinking about it. Many assumptions are sound and justifiable. Many, however, are not. The question then becomes: "How can students begin to recognize the inferences they are making,

the assumptions on which they are basing those inferences, and the point of view, the perspective on the world that they are forming?"

There are many ways to foster student awareness of inferences and assumptions. For one thing, all disciplined subject-matter thinking requires that students learn to make accurate assumptions about the content they are studying and become practiced in making justifiable inferences within that content. As examples: In doing math, students make mathematical inferences based on their mathematical assumptions. In doing science, they make scientific inferences based on their scientific assumptions. In constructing historical accounts, they make historical inferences based on their historical assumptions. In each case, the assumptions students make depend on their understanding of fundamental concepts and principles.

As a matter of daily practice, then, we can help students begin to notice the inferences they are making within the content we teach. We can help them identify inferences made by authors of a textbook, or of an article we give them. Once they have identified these inferences, we can ask them to figure out the assumptions that led to those inferences. When we give them routine practice in identifying inferences and assumptions, they begin to see that inferences will be illogical when the assumptions that lead to them are not justifiable. They begin to see that whenever they make an inference, there are other (perhaps more logical) inferences they could have made. They begin to see high quality inferences as coming from good reasoning.

We can also help students think about the inferences they make in daily situations, and the assumptions that lead to those inferences. As they become skilled in identifying their inferences and assumptions, they are in a better position to question the extent to which any of their assumptions is justified. They can begin to ask questions, for example, like: Am I justified in assuming that everyone eats lunch at 12:00 noon? Am I justified in assuming that it usually rains when there are black clouds in the sky? Am I justified in assuming that bumps on the head are only caused by blows?

The point is that we all make many assumptions as we go about our daily life and we ought to be able to recognize and question them. As students develop these critical intuitions, they increasingly notice their inferences and those of others. They increasingly notice what they and others are taking for granted. They increasingly notice how their point of view shapes their experiences.

This article was adapted from the book, *Critical Thinking: Tools for Taking Charge of Your Learning and Your Life*, by Richard Paul and Linda Elder.