

## CHAPTER 1

### CRITICAL REASONING AND CREATIVE THINKING

- CHAPTER OBJECTIVE: In this chapter, you will learn the principles of critical reasoning and creative thinking and identify their effect on Army writing.
- TASK: Identify the principles of critical reasoning, creative thinking, the standards for evaluating critical reasoning and creative thinking, and their application to effective Army writing.
- CONDITION: Given several questions relative to the principles of critical reasoning, creative thinking and the standards for evaluating critical reasoning and creative thinking. You may use Chapter 1, Critical Reasoning and Creative Thinking.
- REFERENCES: AR 25-50, *Preparing and Managing Correspondence* and DA Pamphlet 600-67, *Effective Writing for Army Leaders*.

## CHAPTER 1

### CRITICAL REASONING AND CREATIVE THINKING

Reasoning is the process of examining data (facts, information, evidence, observations, and experiences) and forming inferences, judgments, and conclusions from the data. Adding the term "critical" to reasoning may seem redundant; some argue that by definition reasoning is always critical. However, the reality is that much reasoning is on the superficial level; we quickly identify the problem and then implement a solution that seems to solve it. Too often in our rush to solve a problem we attack the symptom of the problem and the cause, short-circuiting the reasoning process. By adding the term "critical" we then must analyze our reasoning to ensure we have accurately identified the true problem. This also means that we have accurately analyzed the data, its implications, and its end state, and have selected the best workable solution to solve the true problem.

The Army is always changing. This is not new; change has always been with us and will continue to be as long as there is an Army. The increasing missions, new technologies, and having to do more with less requires soldiers who can create and contribute effective solutions to the many personnel problems and operational issues facing the military. This is what we call "creative thinking."

When you apply critical reasoning and creative thinking principles to the writing process, you will enhance your communicative skills.

#### SECTION I. CRITICAL REASONING PRINCIPLES

The following eight principles of critical reasoning are tools you can use to guide your reasoning process. We know from experience that the application of these principles will both reinforce and improve your skills as a soldier and as a leader.

##### 1. PURPOSE, GOAL, OR OBJECTIVE

A truism is that all tasks have some purpose, goal, or objective. Failure to clarify the "why" we need to perform a task may or may not result in goals that are contradictory, confusing, or unrealistic. However, failure to clarify the "why" may limit our understanding of what we have done. Therefore, we must take the time to clarify what it is we want to accomplish. The application of critical reasoning skills helps us to examine the "why" behind any given task.

Critical reasoning skills help us to:

- Clearly state our purpose, our end state.
- Ensure our purpose is realistic and significant.
- Distinguish our purpose from related purposes.
- Check periodically to be sure we are still on target.

The strategy used by the United States in Desert Shield/Desert Storm against Iraq is an example of a clear purpose. The purpose was to destroy Iraq's ability to wage offensive war against her neighbors—not destroy the country. The US reasoning was sound in terms of focus on the purpose.

##### 2. QUESTION AT ISSUE OR PROBLEM TO BE SOLVED

Whenever we attempt to understand something, there is at least one question at issue or one problem needing a solution, begging for our attention. The only way we are going to understand the issue or problem is to take the time to identify the underlying issues. We can only understand the issue or problem when we identify and ask the right questions.

Reasoning is an attempt to identify the true issue or problem and the right questions to ask. Therefore—

- Take time to clearly identify the issue(s) or problem(s).
- Identify whether it's a personal, organizational, or leadership issue or problem.
- Divide the issue or problem into subcategories.
- Identify the question(s) behind the issue(s) or problem(s).
- Express the question(s) in several ways to clarify meaning and scope.

### **3. POINT OF VIEW OR PERSPECTIVE**

Whenever we reason it is always from some point of view. A point of view is one's perspective on any issue or problem. A point of view reflects one's personality, educational development, experiences, and military position. Our continuing education, training, and ongoing experiences help us to reason through issues and problems to reach solutions. We must draw on our experiences, training, and education along with that of others to look at problems from multiple perspectives. Soliciting others' points of view will help us analyze and identify the hidden ideas underlying our assumptions.

Because reasoning begins with a point of view, we must—

- Identify our own point of view.
- Seek others' points of view.
- Identify the strengths and weaknesses of each point of view.
- Strive for objectivity in evaluating all points of view.

### **4. DATA**

Whenever we reason, there is some evidence that we use to support or reject a particular position. We call this evidence data. Data is the information, facts, observations, and experiences that may support or reject a given position or thesis. For example, your task is to report on the most significant technological advancement in warfare during the past 100 years. You need to identify what data you need, collect the data, analyze it to identify the supporting and opposing relationships, show how it supports and opposes various positions, and present your conclusions. Any defect or weakness in the data we use to support a position may be a possible source of problems.

Because we base our reasoning on data, we must—

- Identify what data we need.
- Search for information that opposes and supports our reasoning.
- Make sure all the data is clear, accurate, and relevant to the question at issue.
- Lay out the evidence to clearly identify supporting and opposing relationships.
- Restrict our claims to those supported by sufficient data.

### **5. CONCEPTS OR IDEAS**

Reasoning uses some concepts or ideas and not others. These concepts include the theories, principles, self-evident truths (we call these axioms), and rules implicit in reasoning. Any defect in the concepts or ideas serving as a basis for reasoning is a possible source of problems.

Because concepts and ideas shape our reasoning, we must—

- Identify key concepts and explain them clearly.
- Consider alternative concepts or alternative definitions to concepts.
- Make sure we are using concepts with care and precision.

## **6. ASSUMPTIONS AND PRESUPPOSITIONS**

Reasoning must begin somewhere and must take some things for granted. Assumptions and presuppositions are those things we often take for granted without examining; they are a part of life. They are essential conditions for any course of action to occur. We must clearly identify why our assumptions and presuppositions are essential or not, and reject those that are not essential. The following can help determine if our assumptions and presuppositions are essential.

- If the assumption or presupposition changes and the answer/conclusion changes, then it is essential.
- If the assumption or presupposition changes but the answer or conclusion does not change, then it is not essential.

Because our assumptions influence our reasoning, we must—

- Clearly identify our assumptions and check for their probable validity.
- Check the consistency of our assumptions.
- Reexamine the question at issue when assumptions prove insupportable.

## **7. INFERENCES SUGGEST CONCLUSIONS**

Reasoning proceeds by steps: "Because this is so, that also is so," or "Since this, therefore, that." Premises and evidence underlay the process of deriving an inference or conclusion from facts or evidence. Premises and evidence lead to inferences that suggest one or more conclusions. Inferences, therefore, are tentative conclusions that link premises and data to final conclusions. If there is something wrong with our inferences, our conclusions are defective.

Inferences are tentative interpretations that we use to draw conclusions and give meaning to the data.

## **8. IMPLICATIONS AND CONSEQUENCES**

No matter where we stop our reasoning, there will always be further implications and consequences. An implication(s) is a claim or truth that follows from two or more premises. Implication(s) suggests possible consequences or results that may or will occur if certain premises are true. We must always ask whether we have clearly identified the implications of any and all courses of action and clarified the consequences. Military personnel are good at planning and executing missions; however, not everyone asks the questions: "What do we do when we win?" "What are the long-term consequences of this decision?" The implications for each decision may have unanticipated consequences, both positive and negative, for our military policy, operations, and personnel.

Reasoning leads somewhere—it has implications and consequences.

- Identify the implications and possible consequences of all courses of action.
- Search for negative and positive consequences for each course of action.
- Anticipate unusual or unexpected consequences for each course of action.
- Examine the implications and consequences from various points of view.

## SECTION II. CREATIVE THINKING PRINCIPLES

Many writers have published checklists of factors that influence creative thinking. However, it is the principles behind the factors that are the most helpful. Creative thinking principles are the accepted rules that govern our thinking and behavior. Once we understand the principles, we can use this knowledge to enhance our creative thinking skills.

The creative thinking principles are like signs pointing to conditions along the journey and our progress toward the destination; but they are not the conditions or the destination. What follows is a grouping of signs, or creative thinking principles, that influence creativity. We have grouped these into two categories: "enhancers" and "inhibitors" of creative thinking. As we understand these principles and begin to use them positively, we are on the way to enhancing our skills in creative thinking.

### 1. PRINCIPLES TO ENHANCE CREATIVE THINKING

Individuals, whether seen as creative or not, follow four principles when producing creative ideas. First, they develop the principle of initiative and versatility. Second, they prepare their minds to be receptive to ideas regardless of the source. Third, they generate ideas that may resolve the problem at hand. Fourth, they test or validate the new ideas to see if the ideas are any good.

*a. Initiative and versatility* include bringing to life a new idea(s) out of existing information. It is also being able to lead others toward effective solutions despite changing situations. It is what you personally add to the process and how you go about it. Initiative and versatility, however, do not necessarily mean change, but a deeper understanding of why we are doing that which we do.

*b. Preparation* increases our appreciation of a new idea(s). Preparation includes commitment to the task of collecting data by reading, listening, discussing, and reflecting on all data, whether or not the data fits the problem at hand, recognizing that if it does not fit this problem, it will probably fit another problem. Three techniques to prepare us for new ideas are setting the stage, determination, and saturation.

(1) Setting the stage.

- Recognize and begin overcoming inhibitors.
- Challenge assumptions.
- Define and redefine the problem statement.
- Recognize "idea killer" words and phrases.
- Model creative behavior.
- Minimize risk.
- Look for more than one good answer.

(2) Determination. The price of an idea is intensive, concentrated, conscious thinking. You must have a commitment to understand some truth, resolve a problem, achieve an objective, or accurately understand what you are thinking. Your commitment is to discover new ideas and approaches for the way we've always done it. Your task is to bring chaos into order. Creative ideas often come from sheer stubbornness.

(3) Saturation. Research, research, research. Fill your mind with data. This step in creative thinking has no magic in it. It is hard, grueling, brain-beating work. Thorough, painstaking research is the foundation of creative thinking. Experience is part of research. Discuss ideas with the people who have been there and done that; they should know the most relevant information.

Thomas Edison's approach to a problem is a good example of saturation. He said, "I am more of a sponge than an inventor." When he wanted to discover something, he first read how others had attempted to solve the problem in the past. Then he gathered data from the others' experiments and studied that. This was only his starting point for his own attack on the problem.

c. *Generation* is the actual production of a new idea(s). This may not appear to be as much work as preparation, but it can require great effort in terms of patience. Generation involves letting your mind explore new directions, putting your subconscious mind to work, listening for the flash of illumination, the "ah ha" that suggests a possible solution, and visualizing solutions.

(1) Divergent thinking, a key concept during generation, is to let your mind explore beyond your normal self-imposed limits. Engage your curiosity and explore the many new avenues that appear before you. Follow your data and see what you discover.

(2) Incubation is the process of harnessing the power of your subconscious mind. The subconscious mind is the storehouse of all that we have learned and experienced in our lifetime. In some mysterious way your subconscious mind works to create new concepts or patterns from existing ideas. It's always working behind the scenes. It provides answers when your attention is on something else. The secret to using the subconscious mind is to refocus your attention. This is the time to relax, loaf, let go, walk away from your problem, and let your subconscious take over.

(3) Illumination is the actual flash of creative insight that comes from your subconscious mind during a period of incubation. There are specific ways in which you can stimulate and increase the flashes of illumination. Maintain an attitude of quiet expectancy. Keep your mental door open. Believe the idea you need will come to you. Do not reject ideas too soon or discriminate against them too rapidly. Remove all barriers of critical judgment. Allow for the free flow of ideas. Once ideas begin to come, write them down—at once! Many good ideas have escaped forever because people trusted their memories. As a Chinese proverb says, "The strongest memory is weaker than the palest ink."

(4) Visualization is useful in generating ideas from shapes, forms, or patterns. There are two steps to visualizing when generating ideas. The first is to actually see the image or picture of your idea. The second is to make your image do something; control it. Your visualizing begins with something you have seen. Then you can manipulate that image into creative ideas. With practice, you can become familiar with controlling the mental pictures you have.

d. *Validation* is when you test or validate the new idea(s) to see if it is any good. Every idea needs validation. This requires thinking that is more convergent in nature. Convergent thinking encourages knowledge, decision, and valuation. Test the idea. Conduct experiments.

Validation has to do with "proving, confirming, and substantiating" ideas. There is sound wisdom in having validation come at the end of the creative process. To interject judgment and critical analysis during preparation and generation would stop the flow of ideas. Idea stoppers say "It can't be done," "It won't work," "It is impossible." Idea stoppers stop ideas in their tracks.

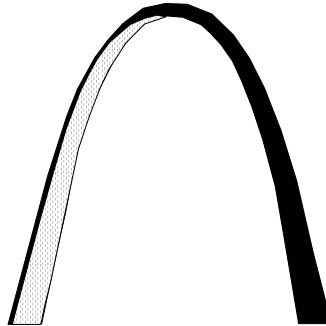
As you check and evaluate, you'll find the stockpile of ideas a gold mine of possibilities. The idea you laughed at, on analysis, may contain a hint for a completely new approach to an important problem. An idea that seems farfetched on the first hearing may open the way to the development of a new plan.

You'll find raw ideas that you can shape and polish into useful tasks or wild ideas that you can tame and harness to specific tasks. You will discard some ideas, but others, however, will be priceless.

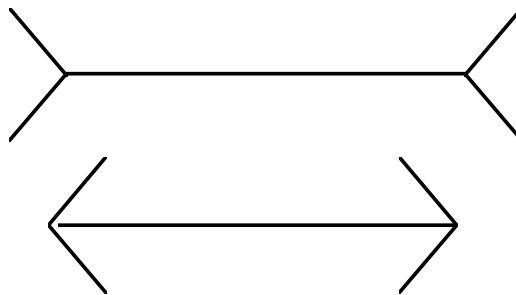
## 2. BIASES THAT MAY INHIBIT CREATIVE THINKING

Everyone develops a subjective way at looking at opportunities, issues, problems, accomplishments, and so forth. We call these biases. We all have biases that inhibit our creative thinking abilities. We've even allowed these to influence how we respond to situations, ideas, information, and decisions. The following biases are the most common inhibitors to creative thinking.

a. *Perceptual bias* says that what we see or understand may be different from actual reality. Our perceptual bias can prevent us from accurately seeing or understanding the problem or the information that will help solve it. For example, look at the following picture of an arch. Is the arch taller than it is wide, the same, or wider than it is tall?



The arch is as wide as it is tall. However, knowing that it is the same width and height does not change our visual perception. Visually it continues to appear taller than it is wide. Another example is the Muller-Lyer figure. Which of the following lines is longer?



When you measure the lines above you discover they are the same length. However, our visual perception sees the top line as longer than the bottom line. We call these perceptual biases.

b. *Mental bias*, like perceptual bias, influences our view of reality. For example, which would you rather have hit you, a pound of lead or a pound of feathers. I suspect that on reading this question your own bias automatically took control. What went through your mind? What picture did you see? We see feathers as fluffy and light while lead is dense and heavy. Both, however, weigh the same, one pound. What we see is a perceived difference in weight between feathers and lead. This perception includes the idea of force. We perceive that the force we use to lift an object equals the amount of damage the object can cause on impact. A pound of lead is smaller and harder to grasp than a pound of feathers. Therefore, we conclude that because it requires greater force to lift a pound of lead, it will cause more damage on impact.

We perceive that an object requiring greater effort to lift is heavier than the scales indicate. The reverse is also true. We perceive that an object that is easy to lift is lighter than the scales indicate. For example, place a small bowl filled with 8 ounces of water and a cup filled with 8 ounces of water on a table. Have someone pick up the cup with one hand, and the bowl with the other hand, and tell you which is heavier. Invariably the subject will report that the cup is lighter than the bowl. The only difference is that the cup has a handle while the bowl does not.

Our mental bias is to continue investing in any project in which we have already invested a large sum of resources. We want to believe that by continuing the investment we will complete the project. Suppose that you have invested \$40 in tickets so you and your spouse may attend the Infantry Ball at the Westin Crown Center in Kansas City, MO. On the evening of the Infantry Ball there is a terrible snowstorm that makes the 45-minute drive from Fort Leavenworth to Kansas City hazardous. However, the leaders have not called the ball off. How likely are you to make the drive? If you had not yet purchased your tickets to the ball but plan to buy them at the door, how likely are you to make the drive? Consider a third alternative where your first sergeant has purchased your tickets and you are to pick them up at the door when you and your spouse arrive. Will you make the drive through the storm to attend the Infantry Ball?

Perceptual and mental biases may prevent us from accurately understanding the problem or the data that will help solve it. On the other hand, an understanding of our biases can help us to understand why we need to accept or reject a given bias. For example, we may have a bias of establishing numerous boundaries around an issue. There are times when we need few boundaries and at other times more boundaries. However, unless we understand our biases we may accept a bias when it may be best to reject it. Some biases to consider include:

- A tendency to establish too many boundaries about an issue.
- Stereotyping or seeing what we expect to see.
- A failure to use all our senses.
- Getting stuck on the obvious.
- Protecting our investments.

*c.* *Cultural biases* include taboos, traditions, and proverbs that we use to explain why we can or cannot do something. It also includes our predisposition to pursue data supporting our viewpoint while downplaying contradictory evidence. Our cultural bias is part of who we are and helps us to make sense of our world. However, unexamined cultural biases may provide inappropriate or wrong answers. It is important that we become aware of how our culture influences our thinking.

- "It is common sense."
- "We've always done it that way."
- Reason, logic, numbers, utility, and practicality are good; feeling, intuition, qualitative judgments, and pleasure are bad.
- Tradition is preferable to change.

Recognizing our biases and how they inhibit creativity takes us a long way down the road toward increasing the effectiveness of our creative thinking. Some techniques you can use to examine your biases include:

- Identify what biases you may bring to the problem at hand.
- Ask others to identify what they see as your biases that affect the problem at hand.
- Ask questions to clarify your biases.
- Identify what affect your biases have on your problem.
- Make and implement a plan to use your biases appropriately.

### **SECTION III. STANDARDS**

Standards assist us to determine the quality of our reasoning and thinking on any topic. Your application of following standards can help you evaluate your reasoning and thinking process. These standards are not new. You have used them in many different circumstances. It's just that you have probably never given any thought about how you do it, nor how they enhance your communicative skills. We have included a series of questions you can use to evaluate your thinking.

1. **CLARITY.** Clarity requires that we express our thoughts clearly. For example, have we clarified our purpose so that it is clear to all or did we muddy the waters so no one understands our intent. Clarity helps us to judge the relevance, depth, significance, and accuracy of our ideas, recommendations, or decisions.

- Could you express that idea in another way?
- Could you elaborate further on that point?
- Could you give an example or illustration that clarifies that point?

2. **ACCURACY.** Accuracy describes a product or decision that conforms to some truth or standard. Correct on the other hand denotes that there are no errors, mistakes, or distortions. When we strive for accuracy we imply that we try to conform to a specific truth or standard. Some questions to help us achieve accuracy are:

- What evidence supports the assertion?
- How can we check for the validity of the evidence?
- How can we verify or test the assertion?

3. **PRECISION.** Precision describes the quality of accuracy and exactness. An issue M16A2 rifle differs from a match rifle in sights, barrel, and stocks. Manufacturers have machined the sights to closer tolerances on the match rifle than on the standard issue. We say that the sights are precise, that is, manufacturers hold them to closer tolerances so that soldiers can make accurate adjustments.

- Could you be more specific?
- Could you give me more details?
- Could you narrow the focus?

4. **RELEVANCE.** Relevance suggests that a close association exists between the subject and the data. Our task is to clarify if indeed there is an association and how strong it may be. Some questions that can help us explore the relevancy include:

- What is the relationship between the subject and the problem?
- How is this connected to the problem?
- How does this affect the problem?
- How does this help us with this issue?

5. **DEPTH.** Depth in contrast to surface knowledge seeks to understand the complexities of the subject under investigation. To assess depth, ask these types of questions:

- What are the complexities of this problem?
- How does an understanding of these complexities increase understanding of the problem?
- How does your answer address the complexities of the problem?

6. **BREADTH.** We may satisfy all of the above standards for assessment, yet have a narrow focus that prevents us from considering other points of view that may affect the problem. We need to ask ourselves:

- What are the other points of view that affect this problem?
- Can we look at this problem from another perspective?
- How would a conservative, a liberal, or an opponent understand this issue?
- What would this look like from the point of view of an enemy?

7. **SIGNIFICANCE.** When we say something is significant we are ascribing importance to it. There is a danger, however, that we may equate significance with relevance. The two are not synonymous. We may describe something as being relevant to the problem, but it may have no significance. For example, easy to read election ballots are relevant to a fair election but are not significant if the problem is ballot box security. Here are a few questions that can help you clarify the significance of each issue and its relation to the problem:

- Is this the most important problem to consider?
- Is this the central idea or issue?
- Which of these facts are most important?
- Which will have the greatest effect on the problem?

8. **LOGIC.** Logic refers to the relationship between ideas. It includes the order in which we place a variety of thoughts and how they support each other. Logic includes the rational conditions effecting whether an event will or will not take place. Logic includes the assumptions that underlie any discipline whether it be academic, business, or military. The principles of logic follow two basic patterns: nondeductive and deductive reasoning.

The most common type of nondeductive reasoning is inductive reasoning. Using inductive reasoning we gather data to support a hypothesis (the scientific method), or make observations that we then use as evidence to make an inference or generalization. Such predictions always require a "leap of faith" that goes beyond the narrow confines of the available data. So, although inductive arguments enable us to reason critically even when the content of our conclusions exceeds the content of the premises, we must keep in mind that even the most accepted of scientific laws may change as new data becomes available. For example, people believed the world was flat until the evidence proved this was a false belief.

Inductive arguments consist of premises and a conclusion. The conclusion is a statement of the point of view which the author wants us to take away from the argument. The premises are statements which contain the evidence to support the conclusion. Inductive arguments with true premises generally are judged successful if the premises are true enough to make it unlikely for the conclusion to be false. Inductive reasoning lacks the certainty that sound deductive reasoning provides. The conclusion of the argument may only be probably true—even if the premises are true.

The military regularly uses inductive reasoning. The intelligence preparation of the battlefield (IPB) process is one which makes full use of inductive reasoning methods. Another example is a deception plan. A good deception plan counts on the enemy's use of inductive reasoning to reach the conclusion we want him to reach.

Deductive reasoning moves from premises based on generalities to a conclusion about a specific situation. To reason effectively, we must start with premises that our audience generally accepts. As with inductive logic, we must be wary of fallacious thinking and patterns of reasoning that look persuasive, but don't hold up to scrutiny.

We analyze deductive reasoning using the ideas of validity and soundness. A valid deductive argument is one in which the premises support the conclusion structurally. In other words, there is a step-by-step, logical progression from the first premise to the conclusion. Validity is not an assessment of the truth of either the premises or the conclusion. Validity only describes the structure of the argument, not the truth of the premises or conclusion(s). If the premises of a valid argument are true, it is impossible to get a false conclusion. A sound argument contains both a valid structure and true premises.