The Thoughtful Analyst: Enabling Critical Thinking in Intelligence Analysis

by Lieutenant Colonel Brian Gellman

Making predictions is hard, especially about the future.

—Yogi Berra
Professional baseball player

Introduction

The intelligence profession exists in a complicated, complex environment. The 2018 National Defense Strategy (NDS) describes a strategic environment with the reemergence of long-term, strategic competition with revisionist powers such as China and Russia, as well as rogue regimes in Iran and North Korea. The NDS also describes a security environment affected by rapid technological advancements and the changing character of war. Among the many NDS solutions, the Department of Defense is accelerating modernization programs, specifically in the realm of artificial intelligence and machine learning. All of this may seem unprecedented, but it is not.

In post-World War II and the early days of the Cold War, a nascent U.S. intelligence community faced a similar uncertain world, and like today, it had access to emerging forms of collection and data management. Sherman Kent, who is commonly credited with professionalizing the U.S. intelligence community, described this period of U.S. history in his 1949 book *Strategic Intelligence for American World Policy*. When reflecting on his book 15 years later, Kent noted that no matter how complicated or complex the environment and no matter how sophisticated the means of collecting and storing data, there will never be a replacement for the thoughtful analyst.[1]

Artificial intelligence and machine learning will change the intelligence profession in the same way satellite surveillance and computers changed the intelligence profession for Kent, but they will not replace the need for a thoughtful analyst. Kent recognized that employing new technologies in the early Cold War required innovative, adaptive, and critical thinking problem solvers to enable intelligence analysis in the new environment. The same holds true for today's intelligence analysts.

ADP 2-0, *Intelligence,* defines intelligence analysis as the process by which collected information is evaluated and integrated with existing information to facilitate intelligence production. ADP 2-0 further states that the following attributes enable an analyst to effectively provide staff support and intelligence analysis: critical thinking, embracing ambiguity, and collaboration.[2] The purpose of this article is to provide military intelligence leaders with ideas on how they can foster an analytical environment that enables these attributes by reflecting on—

- How we make decisions and judgments.
- How we evaluate arguments and evidence.
- How we can benefit from collaboration and diversity of thought, as they can result in innovative analysis.

Intelligence Analysis

Critical thinking. Critical thinking is essential to analysis. Using critical thinking, which is disciplined and self-reflective, provides more holistic, logical, ethical, and unbiased analysis and conclusions. Applying critical thinking ensures analysts fully account for the elements of thought, and standards of thought, and the traits of a critical thinker.

Embracing ambiguity. Well-trained analysts are critical due to the nature of changing threats and operational environments. They must embrace ambiguity, and recognize and mitigate their own or others' biases, challenging their assumptions, and continually learn during analysis.

Collaboration. Commanders, intelligence and other staffs, and intelligence analysts collaborate. They actively share and question information, perceptions, and ideas to better understand situations and produce intelligence. Collaboration is essential to analysis; it ensures analysts work together to effectively and efficiently achieve a common goal. Often analytical collaboration is enabled by [Department of Defense] DOD intelligence capabilities.

—ADP 2-0, *Intelligence*[3]

Thinking about Thinking, aka #metacognition

It is the mark of an educated mind to be able to entertain a thought without accepting it.

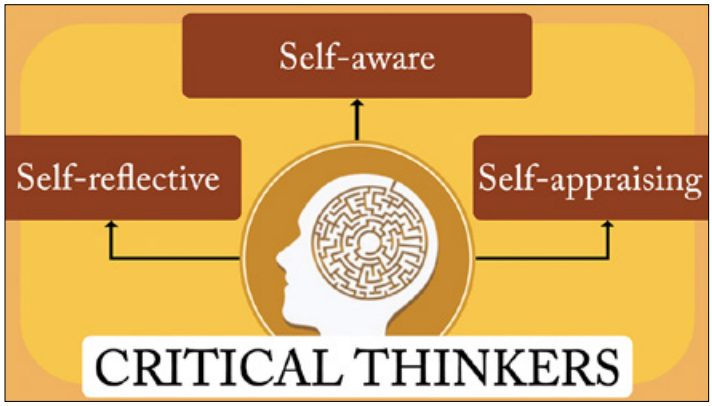
—Aristotle

Just as we can train a Soldier to fire a weapon, we can train a Soldier to think critically. When you train a Solider to shoot, you divide the task into increments. It starts with good body positioning, stance, and grip. Once the Solider has a good firing position, the next step is learning sight picture, breath control, and aiming. Finally, the trigger squeeze

completes the primary task; however, many other tasks complement shooting, including immediate action drills, remedial actions, and weapons maintenance.

When we train Soldiers to shoot, we don't hand them the weapon and say, "Go shoot!" We divide the task into subtasks, train each subtask separately, and then put them all together. We have to take the same reductionist approach when we train Soldiers on how to think critically. We cannot hand the Solider a laptop and say, "Go think critically!" We have to divide the experience into smaller chunks.

According to the American Philosophical Association, "critical thinking is the process of purposeful, self-regulatory judgement. This process gives reasoned consideration to the evidence, context, conceptualizations, methods, and criteria."[4] In other words, critical thinkers consider the problem holistically. Critical thinkers are aware of their approach to making judgments and the things that may influence and hinder those judgments.



Critical thinkers must first understand themselves

The first subtask in critical thinking is metacognition, which is thinking about thinking. When first learning how to shoot, the new Solider has to think about shooting. Shooting only becomes automatic through deliberate practice and repetition. New shooters have to think about their positioning, their target, their point of aim, and their breathing. When learning how to think critically, the new analyst must think about thinking. It works the same way. Critical thinking must also be trained through deliberate practice and repetition. Only with practice can thoughtful analysts become aware of their limitations, preconceptions, and biases.

We have to start by knowing our limitations. Critical thinkers must be self-reflective, making an honest self-appraisal of what they do and do not know. In the intelligence field, what we know is often dwarfed by what we do not know, so one would think it is easy to be humble. However, admitting you don't know something requires letting go of your pride and ego. Analysts may be concerned that admitting a knowledge deficit is admitting a weakness and that it may negatively affect their credibility. In truth, it is the opposite. Disclosing what you don't know is a sign of maturity and wisdom.

Paradoxically, admitting knowledge deficits may be easier for junior analysts than for senior (mature) analysts. Junior analysts may feel more open to admitting ignorance of a topic, whereas senior analysts may fear the loss of credibility with their leadership and will "fake it until they make it." This is a selfish and counterproductive approach. As leaders, we have to encourage our Soldiers not to be afraid to admit when they do not know something. We must also lead by example and humbly admit our own limitations and knowledge deficits. This approach will better enable a critical-thinking environment.

Preconceptions are another pitfall the thoughtful analyst must be aware of because we all have them. In fact, the more experience we have, the more preconceptions we have. As an old boss used to tell me, "We are all victims of our experiences, and now you are all victims of mine." This leader was keenly aware that our experiences inform our judgment, for good or for bad, and he was warning us that his preconceptions would be a driving force in our organization. There is nothing wrong with having preconceptions as a critical thinker; however, we must be actively aware of how they influence our judgment.

Finally, an analyst must be aware of his or her biases. Biases are implicit shortcuts that our brain takes to solve problems and make judgments. Our cognitive faculties will take the path of least resistance to come to a conclusion. This is perhaps the hardest metacognition task because "implicit" means we may not be aware we are doing it. In order to understand how we make decisions or judgments, we have to understand how our brain works.

Richards Heuer, a career analyst at the Central Intelligence Agency, wrote a book in 1999 titled *Psychology of Intelligence Analysis*. In his book, he describes how we perceive things and how our memory works. He further explains how these cognitive processes lead to biases in how we evaluate evidence, how we estimate probabilities, and how we perceive cause and effect. Additionally, he states that our viewing of events in hindsight can actually reinforce our faulty reasoning. Heuer also suggests strategies and analytical frameworks to mitigate the effects of our own biases on our reasoning. The book's introduction includes a summary of Heuer's central ideas with regard to the cognitive challenges intelligence analysts face: "The mind is poorly 'wired' to deal effectively with both inherent uncertainty (the natural fog surrounding complex, indeterminate intelligence issues) and induced uncertainty (the man-made fog

fabricated by denial and deception operations)."[5] Heuer believes that making the analyst aware of how the brain works, of the heuristic tools and shortcuts that our cognitive faculties use, will result in an analyst being less likely to fall prey to distorted and subjective reasoning. Every thoughtful analyst should read Heuer's book, which is available online.[6]

Evidence Evaluation, aka #beliefsvsfacts

The important thing is not to stop questioning. Curiosity has its own reason for existing.

—Albert Einstein

Acknowledging limitations and awareness of our own personal preconceptions and biases is important in self-assessment. After an analyst looks within, the next step in critical thinking is recognizing the difference between assertions and evidence. An assertion is a statement of a belief. We make assertions when we provide intelligence estimates or assessments. To strengthen an assessment, analysts must view their assessment as making an argument. A good argument provides evidence in the form of observable, verifiable facts or sound reasoning to support the assertion. Too often, analysts will support their assertion with other assertions without realizing it because they don't think in terms of assertions and evidence—beliefs versus facts.

During mission analysis, it is sometimes necessary to make assumptions for planning. An assumption is a belief based on a valid fact. In intelligence analysis, we also have to make assumptions. We assume the enemy is following their doctrine, we assume the enemy is seeing the same battlefield that we are, and we assume the enemy defines victory in the same way we do. Are these valid assumptions? Do we treat them like beliefs or facts? Thoughtful analysts must be aware that assumptions are beliefs and must identify them as part of the assessment. They must constantly challenge the assumptions until proven as facts. An argument based on assumptions can lead to a false sense of certainty. Clearly identifying assumptions provides greater transparency about what analysts know versus what they think they know.

GEN Colin Powell said to his briefers, "Tell me what you know. Tell me what you don't know. Then you are allowed to tell me what you think." A good drill that leaders can use to meet GEN Powell's briefing requirements—reinforce the difference between beliefs, facts, and assumptions and encourage creative thinking—is called "See, Think, Wonder." In this drill, analysts are provided an intelligence product, or even a piece of artwork, and are asked to describe what they see, what it makes them think about, and what it makes them wonder.[7]

For example, an imagery product depicts a tank at a known location on a map at a specific time. The tank is a T-72 and is in a defensive position. This is what the analyst can *see.* What they *think* is their assessment of what they believe is happening that they can't see. They *think* that there are more tanks and that these tanks are in a defense. The idea that there are more tanks is not an observable fact; it is an assertion. They assume the adversary is following their doctrine, and by doctrine, the adversary does not defend with a single tank. Based on these assumptions, assessing that more tanks are in the area is a good assertion because it is supported with factual evidence about how we know the enemy fights. Next, the analyst describes what they *wonder,* or what they don't know. They *wonder* not only where the other tanks are, but also where their lines of communications are. Where is their maintenance area? Will they stay in the defense, or will they transition to the offense? When we *wonder,* we are expanding to the second and third levels of the problem we are observing by asking questions. This exercise takes analysts through a deliberate thought process that separates what they *see* (observable facts) from what they *think* (assertions or assessments) and takes them to the next level of critical thinking by *wondering* what else they need to know.

Ambiguity is Ambiguous aka #itscomplicated

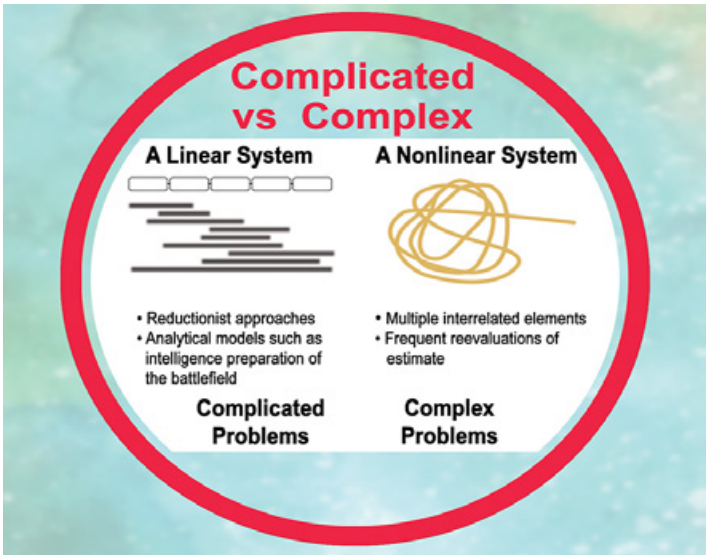
I wanted a perfect ending. Now I've learned, the hard way, that some poems don't rhyme, and some stories don't have a clear beginning, middle, and end. Life is about not knowing, having to change, taking the moment and making the best of it, without knowing what's going to happen next. Delicious Ambiguity.

—Gilda Radner
Comedian and actress

When defining the role of intelligence, a common response is "to reduce uncertainty." Ambiguity leads to uncertainty, and uncertainty can result in discomfort. We can never truly eliminate uncertainty; we can only hope to reduce it. Even after an event occurs, we still cannot eliminate all uncertainties that surround the event. To be successful, analysts must be comfortable with an ambiguous environment in which uncertainty is high. The thoughtful analyst accepts the "delicious ambiguity."

Reducing uncertainty through thoughtful analysis is difficult because intelligence has both complicated and complex problems. For the purpose of this article, a complicated problem has a relatively small number of possible outcomes and can be solved given multiple perspectives and the right data. A complicated problem can be compared to advanced mathematics, where given sufficient data and an understanding of the math, an answer can be determined through finite direct-causal (linear) relationships. How an enemy defense

is set up and when they will transition to the offense is complicated and requires knowledge about the enemy, the terrain, the operational environment, and the leaders' decision-making process. However, a single truth is out there waiting for the analyst to discover it, if given sufficient data. In most cases, the analyst will be able to narrow it down to a couple of high probability courses of action.



Complicated vs Complex Problem Solving

On the other hand, in a complex problem, too many variables exist, both dependent and independent, for the analyst to consider every single possibility. Complex problems tend to be nonlinear, and the problem cannot be reduced into smaller parts to understand the whole. Consider ecological and biological systems as examples. It was not easy for Hawaiian sugar farmers to predict that introducing mongooses into the local ecosystem to control rats would result in endangering local bird and turtle populations (while failing to control the rats). Or a physician attempting to diagnose a headache may be able to eliminate the most serious causes, such as a brain tumor, but never learn the true cause because too many unique variables exist, such as environment, genetics, nutrition, pharmacology, allergies, and psychology. In this complex system, the actions the physician takes might have unintended consequences that make the condition worse. The "cure" might be worse than the disease. This is also true in intelligence, when an intelligence-driven activity inadvertently creates the conditions the intelligence was intended to assess or avoid.

The thoughtful analyst must recognize the difference between complicated problems and complex problems because solving them requires a different approach and may result in different levels of uncertainty. In complicated problems, what we know is often more than what we don't know. It is a linear system whereby the analyst can use reductionist approaches, dividing the problem into smaller parts that add up to an understanding of the whole. At the conclusion of a complicated problem, we often learn the answer, even if in hindsight. For example, predictive analysis on improvised explosive device emplacement locations, high-value target locations, or a tank division's defensive posture is a complicated problem that can be divided into parts to explain the whole. With enough data, the analyst can build predictive templates to a high degree of accuracy leaving only a finite amount of information requirements to confirm or deny the templates. For complicated problems, analytical models such as intelligence preparation of the battlefield (IPB) or operational environment can be used as an analytical framework to reduce uncertainty.

Reducing uncertainty in a complex problem is less likely to allow for templates because it usually represents a nonlinear system for which reductionist approaches will not work. In a complex problem, what we know is often insignificant compared to what we don't know, and even after a complex event occurs, we may still not understand the true nature of what happened and why. An example of a complex problem is the Arab Spring. How did protests in one Arab country spread to another, then another, and then another? Social media? Wheat crop failures? Globalization? Climate change? Authoritarian regimes? The complex answer is probably yes and no to each of these questions. Each likely had a role, but no single factor could have caused the Arab Spring. Will there be another similar Arab Spring event, and if so, what are the indicators? To reduce uncertainty for this kind of complex problem, you have to consider your analytical approach, build a team of diverse thinkers, and frequently reevaluate your estimate.

Approaching a complex problem is much more difficult for analysts, especially in the Army because we do not have a lot of doctrine that helps us to do this. IPB can serve as a starting point for discussion, but ultimately it isn't suitable for handling complex problems. Heuer provides a description of the analysis of competing hypotheses (ACH), offering analysts another tool that may be more suitable for complex environments. ACH is better equipped to handle complex situations in which there is a wide range of possible outcomes and variables. No perfect model exists, hence the difficulty. Leaders should research and try out different analytical models on complex problems until they find something that works best for the specific problem set and the organization. Don't be afraid to try multiple methods; anything that gets the group thinking in new ways has value.

In addition to considering analytical tools, as part of the self-assessment, the analyst should recognize requirements

for expertise that does not reside on the team. Because of the nature of complex environments and the vast number of variables involved, leaders will likely have to include additional subject matter experts to provide new perspectives on relationships in the complex problem. (Collaboration is discussed further in a later section.)

Finally, we have to be keenly aware that the estimate can and should change. When problems drag on, when they seem to move from complicated to complex, we sometimes attempt to simplify the problem. We tend to use two fallacious models in these situations. The most common model is based on the assumption of linear progression. We have data points that result in a straight line, like a stock that starts at $5, in 6 months is $10, and in 12 months is $15. A linear progression assumes that the stock will be $20 in 18 months. However, if you are a stock investor, I hope you are not investing solely based on this method. This is a fallacy because conditions drive the movement of the stock up, and without knowing these conditions, you are investing on an observed trend and hope, not on an understanding of the trend. Despite this clear example of a poor investing strategy, we see analysts who assume a linear progression without understanding the underlying conditions. If you don't understand the conditions, then your estimate is only a guess based on a straight line and nothing else. Hope is a method, but not the preferred one for the thoughtful analyst.

Another fallacious model we use, especially in extended deployments or persistent problem sets, is incremental analysis. Beware the dangers of incremental analysis and confirmation bias. In the incremental analysis trap, we begin with an estimate and each day look for evidence (reporting) to support that estimate. This commonly occurs when we produce daily intelligence summaries. We tend to focus more on data that confirms our theories, and we discount or explain away evidence that refutes our estimate. As Heuer observes, "New data received incrementally can be fit easily into an analyst's previous image. This perceptual bias is reinforced by organizational pressures favoring consistent interpretation; once the analyst is committed in writing, both the analyst and the organization have a vested interest in maintaining the original assessment."[8]

To avoid incremental analysis, analysts must be able to think critically about their own assessment, and leaders must be willing to accept a morphing estimate. Applying what they know about their own limitations, their preconceived notions, and their biases, thoughtful analysts ask out loud, "What if I am wrong? What piece of evidence that I used to construct my assessment is most vulnerable? If that evidence proves false, does it change the entire assessment?" For enduring problems, these questions should be asked regularly (weekly, monthly, and yearly) at which time a team of analysts reviews estimates and reevaluates all evidence presented during that period to ensure the estimate is still valid. It is especially important to review evidence that was previously discounted to ensure the evidence wasn't discounted out of bias toward the preferred estimate. Allowing an estimate to change over time may be hard for an analyst because the intelligence consumer may see this as flip-flopping or being inconsistent. However, the thoughtful analyst has to overcome these pressures.

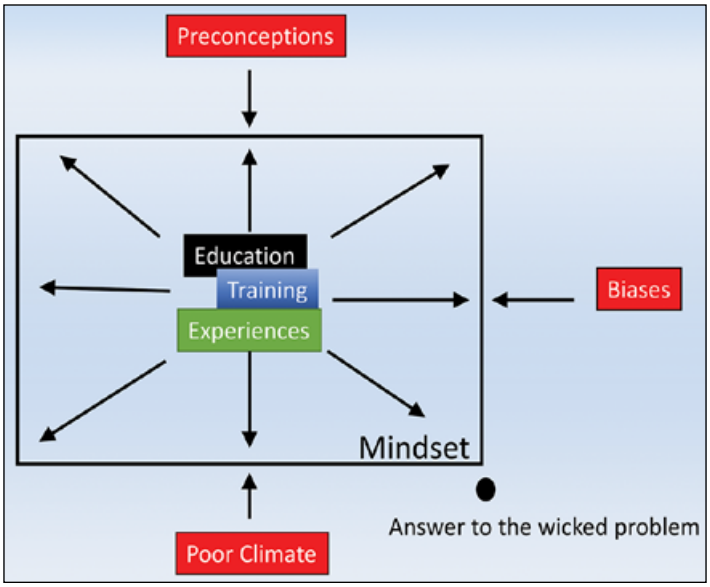
Collaborative Innovation aka #thinkoutsidethebox

If you haven't read hundreds of books, you are functionally illiterate, and you will be incompetent because your personal experiences alone aren't broad enough to sustain you.

—GEN James Mattis
Retired U.S. Marine Corps and former Secretary of Defense

Think outside the box. I can't stand that cliché. Thinking outside your "box" is not possible because your "box" is your mindset. Your mindset is a result of your training, education, and experiences. Constraining the size of your "box" are internal and external factors that include biases, knowledge deficits, preconceptions, and stifling work environments. Answers that lie beyond your mindset are beyond your reach. You need growth or help to get there.

When people suggest you should think outside the box, they are looking for creativity. They are asking someone to create new connections, take innovative approaches, reevaluate existing data from different perspectives, or introduce new data that is seemingly unrelated. How can we



Thought Boxes

do this? How can we enable analysts to solve problems to which the answer lies outside their mindset? The answer is to help them grow the size of their box and to add more boxes.

This is not as difficult as it sounds. Your mindset is a result of internal growth (training, education, and experiences) constrained by your internal and external constraints. In the long term, we have to be lifetime learners, constantly striving to expand our mindset though training, education, and experiences. We can do this through reading (self-education), accepting new experiences (assignments outside our comfort zone), and always striving to learn about new technologies. We can also accomplish this by being aware of the biases and preconceptions constraining our growth.

In the short term, to solve the wicked problem of the day, we can identify our knowledge deficits and research the problem. When this research isn't sufficient, or if our limitations in the form of internal biases or culture constrain our thinking, it is time to bring in another mindset to help us. We need more boxes.

Exercise 1: See, Think, Wonder Applied. Try this example using a work of art. The picture in Figure 1 is of a display of art from the Chinese dissident Ai Weiwei.

Make a list of what you *see*, what you *think*, and what you *wonder*. After writing down what you *think*, take the time for an internet search on the artist to stimulate further thoughts and write down additional thoughts, categorized as what you *think,* or assess, and what you *wonder,* or don't know. Highlight these new thoughts stimulated by your research. Ask someone else to do the exercise, but do not collaborate yet. Work on it independently. When complete, compare your table, your coworker's table, and my table, shown in Figure 2 (on the next page). Then write down anything new that you *think* or *wonder* about after collaborating with others and highlight these new ideas.

After comparing your notes to Figure 2, did you see anything you didn't observe or think about? Did that stimulate new thoughts? When you include a second or a third analyst in the exercise, each potentially seeing different observable facts, and very likely thinking and wondering in different directions, the analysts will be able to make connections and ask questions they may not have developed on their own.

Exercise 2: Brainstorming to Creativity. After using the See, Think, Wonder exercise to examine the artwork, you should have developed questions that require answers. Intelligence analysis often requires analysts to think creatively and with imagination to develop theories to explain what they see and what they think. Brainstorming is an excellent tool for drawing out a variety of creative answers to a problem. However, to be effective, the facilitator of the brainstorming session must establish and enforce four rules:

Figure 1. Work of Art Example

What I See	What I Think	What I Wonder
• Multiple urns from the Han dynasty painted over. • Ai Weiwei dropping an urn with an unconcerned look on his face.	• Research suggests that urn is from the Han dynasty. • The dropped urn was likely worth a lot of money. • This is likely a political statement against the Han Chinese-run government.	• The Han Chinese have majority control of the People's Republic of China, so was this an attack on them? Was it perceived as such? • Is Ai Weiwei very wealthy? Or does he have wealthy benefactors who are financing his veiled political statements? If so, who are they?

Figure 2. Author's See, Think, Wonder Table

- ✦ Do not allow criticisms or negative judgments.
- ✦ Arrange for a relaxed atmosphere.
- ✦ Think quantity, not quality.
- ✦ Add to or expand on the ideas of others.[9]

For this exercise, the question is, "How did Ai Weiwei acquire the urns he painted and destroyed?" Applying the rules of brainstorming, encourage a group to provide at least 100 possible solutions. That sounds like a ridiculous number; however, it is very achievable. Use a whiteboard so that everyone can see each other's ideas to build on. When an idea is especially good, the facilitator should encourage the team to drill down on that idea and create additional variations. For example, rich benefactors who intend to discredit the Chinese government may support Ai Weiwei. The facilitator should prompt, "Who?" Drilling down to this idea may result in a long list: the U.S. Government, Russian government, Russian mafia, Chinese mafia, Chinese dissidents, Uighurs, Free Tibet protestors, Hong Kong protestors, Anonymous, or aliens. The list of people, organizations, or governments that could support this effort may account for 20 to 30 ideas alone.

Rules of Brainstorming[10]

1. No criticisms or negative judgments are allowed. These come later, after the session is finished. The basic idea is to obtain new ideas and not to rate them. The introduction of criticisms, judgments and evaluations will stop the flow of creative ideas by making individuals defensive and self-protective, and thus afraid to introduce truly new and different ideas for fear of ridicule.

2. Arrange for a relaxed atmosphere. If the environment is noisy, crowded or full of distractions, concentration will be lost. Also, the positions and personalities of the participants are important. An autocratic supervisor could ruin a session if people are afraid of appearing "silly" and thus do not speak up when they have novel ideas.

3. Think quantity, not quality. The point of brainstorming is to obtain large numbers of different types of ideas. Again, judgments come later when ideas which do not look promising can be filtered out. By concentrating on quantity, the subconscious is encouraged to continue making new connections and generating more ideas.

4. Add to or expand the ideas of others. This is not an ego-building contest, but a group effort to solve a common problem. A basic premise is that ideas from one person can trigger different ideas (some closely related and some not so closely related) in other people. That is why this technique works better in a group, as opposed to when used in isolation.

—G. Venkatesh
"Follow Brainstorming Basics to Generate New Ideas"

After a fixed period of time or when it is obvious the group has reached the point of diminishing returns and focus, then and only then the group will evaluate the quality of their ideas. Some ideas may be dismissed right away after brainstorming, such as financial support from extraterrestrials. Ideas that are more reasonable may be ranked in terms of likelihood. The group will also divide the ideas into broader categories to better organize the most likely answers. In this example, this exercise would stop here; however, in an intelligence problem, the next step would be to establish a collection plan to help confirm or deny the most probable theories.

In these exercises, you expanded your own mindset by researching the artist, by laying your box alongside the box of a coworker, and by getting new ideas from the author that you did not have before your collaboration. This exercise is an overly simplistic demonstration of something you already know—two heads are better than one. But are they? What happens if both analysts' mindsets are essentially the same?

To expand the collective box or mindset of a group, it is important to have diversity in thought. This does not mean diversity in an equal opportunity context. This is not about ethnicity; this is about thinking differently. Two analysts who are of different ethnicities but share the same training (for example, at Fort Huachuca, Arizona), same college education, and similar experiences (tactical military intelligence) may still have boxes that closely converge, leading to similar thought outcomes and groupthink. To achieve an optimally diverse collective mindset, the leader should assemble a group with sufficient diversity in experience, education, and training to give you the best opportunity to find that answer outside your box.

One potential solution is to bring in expertise from outside the intelligence section. We used to call this "reverse BOS [battlefield operating system]." (The battlefield operating system was the equivalent to what we know today as the warfighting functions.) We would ask logisticians to

put on the red hat and develop adversary logistics plans for the overall enemy course of action. The air defense officer would suggest the location of the adversary air defense units on the map to best match capabilities to terrain and mission. As part of developing the enemy course of action, reverse BOS brings diverse mindsets into a collaborative product.

In multinational efforts, partner forces could also bring a diverse way of thinking, especially when tackling the problem of cultural mirror imaging whereby our own culture constrains our mindset. As information security and legal requirements allow, analysts can invite members from industry and other nonfederal entities. Of course, all good things should be in moderation. If their thinking is too divergent, it will not work because people will not be able to understand each other's point of view. Even if their combined boxes cover the answer, they may not be able to communicate with each other in a way that allows the team to find it. In other words, diversity of thought is essential, but you can have too much of it. The thoughtful analyst has to be aware of when this becomes counterproductive.

Conclusion

A thoughtful analyst is a critical thinker who approaches a problem holistically. This analyst is aware of his or her own limitations, preconceptions, and biases and takes active steps to mitigate the vulnerabilities that constrain their thoughts and cloud their judgments. The thoughtful analyst is aware of which evidence is a fact and which evidence is based on reasoning or assumptions, and is constantly challenging those assumptions. The analyst must strive to grow his or her mindset as a lifelong learner through new training, education, and experiences. This includes professional reading in intelligence and other disciplines because it expands the analyst's mindset through diversity of thought.

Leaders have a responsibility to enable this growth and to establish and maintain a collaborate environment. Leaders must train analysts to think critically, evaluate evidence, and expand their mindset by encouraging analysts to deconstruct how they think, "show their math," and separate evidence from assertions and facts from beliefs. Leaders should establish diverse reading lists appropriate to their mission and schedule regular meetings to discuss and share ideas. It is also important that leaders allow analysts to explore different analytical models and demand constant reevaluation of estimates. Finally, leaders must build teams of critical thinkers that have sufficient diversity of thought while ensuring enough common ground to allow for the communication of ideas.

Endnotes

1. Sherman Kent, *Strategic Intelligence for American World Policy*, 2nd ed. (Princeton, NJ: Princeton University Press, 1966), xxiv.

2. Department of the Army, Army Doctrine Publication 2-0, *Intelligence* (Washington, DC: U.S. Government Publishing Office, 31 July 2019), 2-6.

3. Ibid.

4. "Expert Consensus on Critical Thinking," Insight Assessment, accessed December 19, 2019, https://insightassessment.com/article/expert-consensus-on-critical-thinking.

5. Jack Davis, introduction to *Psychology of Intelligence Analysis* by Richards J. Heuer, Jr. (Central Intelligence Agency: Center for the Study of Intelligence, 1999), xx, https://www.cia.gov/library/center-for-the-study-of-intelligence/csi-publications/books-and-monographs/psychology-of-intelligence-analysis/PsychofIntelNew.pdf.

6. Heuer, *Psychology of Intelligence Analysis*.

7. Julie Carmean, "Teaching Critical Thinking through Art with the National Gallery of Art," edX, accessed December 8, 2019, https://www.edx.org/course/teaching-critical-thinking-through-art-with-the-na.

8. Heuer, *Psychology of Intelligence Analysis,* 16.

9. G. Venkatesh, "Follow Brainstorming Basics to Generate New Ideas," ISIXSIGMA, accessed December 8, 2019, https://www.isixsigma.com/tools-templates/brainstorming/follow-brainstorming-basics-generate-new-ideas/.

10. Ibid.

LTC Brian Gellman is the senior intelligence officer, G-2, for the U.S. Army John F. Kennedy Special Warfare Center and School. He has more than 16 years of military intelligence experience working primarily in support of special operations. His most recent deployment was as the J-2 of the Special Operations Joint Task Force–Operation Inherent Freedom during the Mosul counterattack in late 2016. LTC Gellman holds a master of science in science and technology intelligence from National Intelligence University. He is an adjunct professor for National Intelligence University at Fort Bragg, NC, and Angelo State University in San Angelo, TX.