Limits of Intelligence Analysis

by Richards J. Heuer, Jr.

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The Senate Select Committee on Intelligence (ssci) Report on the U.S. Intelligence Community’s Prewar Intelligence Assessments on Iraq, dated July 7, 2004, provides a remarkably detailed account of information available to the intelligence community prior to the war in Iraq and how it was analyzed. The general impression it gives is one of unconscionable failure, due to the intelligence community’s very poor analysis of the information. Unfortunately, the magnitude and breadth of the Committee’s criticism shows a serious lack of understanding of the problems intelligence analysts face when making judgments based on incomplete, ambiguous, and potentially deceptive information.

This article applies insights from the psychology of intelligence analysis to help explain what went wrong and why. It also discusses broader questions not addressed in the ssci report: What can we reasonably expect from intelligence analysis? And what methods and procedures are available to improve intelligence analysis?

The Committee report evaluated 83 specific statements or actions by the intelligence community relating to Iraqi WMDs and found fault with 71 of them. It concluded not only that the analysis was wrong, but also that it was badly done—that it did not meet the Committee’s standards for objectivity or reasonableness. The report makes the following summary statements about Committee findings:

The Intelligence Community (IC) suffered from a collective presumption that Iraq had an active and growing weapons of mass destruction (WMD) program. This “groupthink” dynamic led intelligence community analysts, collectors and managers to both interpret ambiguous evidence as conclusively indicative of a WMD program as well as ignore or minimize evidence that Iraq did not have active and expanding weapons of mass destruction programs. This presumption was so strong that formalized IC mechanisms established to challenge assumptions and groupthink were not utilized.

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In each instance where the Committee found an analytic or collection failure, it resulted in part from a failure of intelligence community managers throughout their leadership chains to adequately supervise the work of their analysts and collectors. They did not encourage analysts to challenge their assumptions, fully consider alternative arguments, accurately characterize the intelligence reporting, or counsel analysts who lost their objectivity.1

This article evaluates the SSCI report and the intelligence community’s performance from the perspective of one whose knowledge of the Iraq analysis is limited to information available in the public media, but who has done substantial research on the phenomenon of intelligence failure and the human cognitive limitations that bedevil intelligence analysis. Briefly, it finds as follows:

- Occasional intelligence surprise is inevitable given the nature of the problems with which intelligence analysis must deal. The SSCI and some other policymakers and members of the public need to adjust their expectations about what intelligence analysis can do.
- Most of the analytical problems identified by the Committee result from cognitive limitations that are inherent in intelligence analysis. When dealing with incomplete and ambiguous information, analysts do not start with a blank mind. They start with certain assumptions—often about foreign capabilities and intent—that have been developed through education, training, and experience. These assumptions inevitably form a mindset that influences what information the analyst sees and what information is judged reliable and relevant. The authors of the SSCI report failed to recognize this. They viewed any analysis that is influenced by a mindset as bad analysis, and this mistake distorted their appraisal of the intelligence community performance. A well-developed mindset is both the strength, and occasionally the Achilles heel, of the experienced analyst. Only occasionally, as in the case of the Iraqi WMDs, does it turn out to be the latter.
- The Committee was correct in faulting the CIA for failing to clearly express the degree of certainty and uncertainty in its conclusions. This weakness in CIA analytical culture has a long history.
- The authors of the Committee report were subject to the same cognitive limitations as the intelligence community analysts. Their report is a textbook example of hindsight bias. Despite the best of intentions, there is no way that Committee members and staff could objectively reconstruct what analysts could or should have concluded on the basis of the information available to them before the Iraq war.

1 SSCI Report, pp. 18, 26.
• The difficulty of the intelligence analyst’s task is an explanation, but not an excuse. Procedures for identifying and questioning key assumptions are taught in the intelligence community but were apparently not widely used. In the case of Iraqi WMDs, it is unlikely that they would have led to different conclusions, although they would have identified some degree of uncertainty. Recent experiences show the need to institutionalize such procedures so that they are used in all major analyses where we cannot afford to be wrong.

**Occasional Surprise Is Inevitable**

The past century is littered with unanticipated events, and surprise and failure to issue timely warning of attacks are constants of international affairs. The failures to foresee the 9/11 attacks and to consider that Iraq may have ceased active development of WMDs are only the most recent in a long list of intelligence failures, and they are certainly not the last.\(^2\)

Intelligence surprise is not just an American problem. The Israeli failure to anticipate the Egyptian attack that initiated the Yom Kippur War in 1973 may be the most extensively analyzed intelligence failure of modern times. Israeli intelligence, which is generally acknowledged as one of the best in the world, dismissed the Egyptian military buildup as merely highly “realistic” maneuvers. Even when the Soviets unexpectedly began evacuating their dependents from Egypt, analysts ignored these signals because they assumed that Egypt and Syria would not go to war unless they were reasonably sure of winning. The Israeli analysts’ mindset did not allow for the possibility that some nations will go to war to achieve political goals, such as to restore a sense of national pride, even if chances of winning are low.\(^3\)

Surprises are not necessarily due to a lack of well-placed intelligence sources. Even when good sources are available, they may not be believed. Deception is most likely when the stakes are exceptionally high, and concern about deception can lead to the perception of deception when it is, in fact, not present. For example, Barton Whaley researched 68 cases in which surprise or deception was present in military operations between 1914 and 1968. He found ten cases in which detailed military plans were compromised to an enemy prior to an intended military attack. In half of these cases, the plans were carefully fabricated deception, while in the other half they were a genuine breach of security. The fabricated plans were accepted as genuine

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\(^3\) See various works by Michael Handel, especially *Perception, Deception, and Surprise: The Case of the Yom Kippur War* (Jerusalem: Leonard Davis Institute of International Relations, Jerusalem Paper No. 19, 1976).
in all five cases, while the genuine plans were rejected as fabrications in four of the five instances—a failure rate of 90 percent. Establishing the bona fides of clandestine sources is an exceptionally difficult task. Sources are more likely to be considered reliable when they provide information that fits what we already think we know. This reinforces existing preconceptions.

Cognitive Limitations

Of the diverse problems that impede accurate and timely intelligence analysis and contribute to intelligence failure, problems inherent in mental processes are surely among the most important and most difficult to remedy. The major failing of the SCI report, as noted above, is that it did not recognize this source of failure, blaming the failure instead on incompetence and groupthink. Intelligence judgments are, of necessity, often based on incomplete, ambiguous, and potentially deceptive information. Understanding the cognitive limitations faced by intelligence analysts when making such judgments is fundamental to understanding what went wrong with the Iraq WMD analysis.

A basic finding of cognitive psychology is that people have no conscious experience of most of what happens in their minds. Many functions associated with perception, memory, and information-processing are conducted prior to and independently of any conscious direction. What appears spontaneously in consciousness is the result of thinking, not the process of thinking.

Over fifty years ago, Herbert Simon first advanced the concept of “bounded” or limited rationality. Because of limits in human mental capacity, he argued, the mind cannot cope directly with the complexity of the world. Rather, we construct a simplified mental model of reality and then work with this model. We behave rationally within the confines of our mental model, but this model is not always well adapted to the requirements of the real world. The concept of bounded rationality has come to be recognized widely, though not universally, both as an accurate portrayal of human judgment and choice and as a sensible adjustment to the limitations inherent in how the mind functions.

Much psychological research on perception, memory, attention span, and reasoning capacity documents the limitations in our “mental machinery.” Moreover, this research demonstrates that the circumstances under which

accurate perception is most difficult are exactly the circumstances under which intelligence analysis is generally conducted—making judgments about evolving situations on the basis of incomplete, ambiguous, and often conflicting information that is processed incrementally under pressure for early judgment.

Perception. People tend to think of perception as a passive process. We see, hear, smell, taste, or feel stimuli that impinge upon our senses. We think that if we are at all objective, we record what is actually there. Yet perception is demonstrably an active rather than a passive process; it constructs rather than records “reality.” It is a process of inference in which people construct their own reality on the basis of information provided through the five senses. Perception implies understanding as well as awareness. What people in general and analysts in particular perceive, and how readily they perceive it, are strongly influenced by their past experience, education, cultural values, role requirements, and organizational norms in addition to the stimuli recorded by their receptor organs.

For example, when you look at Figure 1 above, what do you see? Now refer to the footnote for a description of what is actually there. Did you perceive Figure 1 correctly? If so, you have exceptional powers of observation, were lucky, or have seen the figure before. This simple experiment demonstrates one of the most fundamental principles concerning perception: We tend to perceive what we expect to perceive. Coincidentally, it also illustrates the hindsight bias, to be discussed below. Looking back, now that you know what is in the triangles, it is hard to imagine how you could have missed it.

A corollary of the principle that we perceive what we expect to perceive is that it takes more information, and more unambiguous information, to recognize an unexpected phenomenon than an expected one. One classic experiment to demonstrate the influence of expectations on perception used playing cards, some of which were gimmicked so the spades were red and the hearts black. Pictures of the cards were flashed briefly on a screen and, needless to say, the test subjects identified the normal cards more quickly and accurately than the anomalous ones. After test subjects became aware of the existence of red spades and black hearts, their performance with the gim-

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*The words “the” and “a” are written twice in each of the three phrases. This is commonly overlooked because perception is influenced by our expectations about how these familiar phrases are normally written.
micked cards improved but still did not approach the speed or accuracy with which normal cards could be identified.\(^9\)

The position of the test subject identifying playing cards is analogous to that of the intelligence analyst, policymaker, or Senate Committee staff member trying to make sense of the flow of information crossing their desk. What is actually perceived in that flow, as well as how it is interpreted, depends in part, at least, on the reader’s patterns of expectation. Analysts do not just have expectations about the color of hearts and spades; they have a set of assumptions and expectations about people’s motivations and foreign governments’ processes. Events consistent with these expectations are perceived and processed easily, while events that contradict them tend to be ignored or distorted in perception. Of course, this distortion is a subconscious or preconscious process, as illustrated by how you presumably ignored the extra words in the triangles in Figure 1.

This tendency of people to perceive what they expect to perceive is more important than any tendency to perceive what they want to perceive. In fact, there may be no real tendency toward wishful thinking. The commonly cited evidence supporting the claim that people tend to perceive what they want to perceive can generally be explained equally well by the expectancy thesis.\(^{10}\)

Patterns of expectations form a mindset that tells analysts, subconsciously, what to look for, what is important, and how to interpret what is seen. Analysts’ mindsets predispose them to think in certain ways.

**Impressions resist change.** One of the most important characteristics of mindsets is that they tend to be quick to form but resistant to change. Figure 2 illustrates this principle by showing part of a longer series of progressively modified drawings that change almost imperceptibly from a man into a woman.\(^{11}\) The right-hand drawing in the top row, when viewed alone, has equal chances of being perceived as a man or a woman. When test subjects are shown the entire series of drawings one by one, their perception of this intermediate drawing is biased according to which end of the series they started from. Test subjects who start by viewing a picture that is clearly a man are biased in favor of continuing to see a man long after an “objective observer” (for example, an observer who has seen only a single picture) recognizes that the man is now a woman. Similarly, test subjects who start at the woman end of the series are biased in favor of continuing to see a woman. Once an observer has formed an image—that is, once he or she has developed


a mindset or expectation concerning the phenomenon being observed—this conditions future perceptions of that phenomenon.

This is the basis for yet another general principle of perception: new information is assimilated to existing images. This tendency to assimilate new information to preexisting images is greater “the more ambiguous the information, the more confident the actor is of the validity of his image, and the greater his commitment to the established view.”

**Difficulty of looking at the same information from different perspectives.** Figure 3 provides the reader an opportunity to test for him or herself the persistence of established images. Look at the drawing in Figure 3. What do you see—an old woman or a young woman? Now look again with an “open mind” to see if you can visually and mentally reorganize the data to form a different image—that of a young woman if your original perception was of an old woman, or of the old woman if you first perceived the young one. If necessary, look at the footnote for clues to help you identify the other image. Again, this illustrates the principle that mindsets are quick to form but resistant to change.

When you have seen Figure 3 from both perspectives, try shifting back and forth from one perspective to the other. Do you notice some initial

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14 The old woman’s nose, mouth, and eye are, respectively, the young woman’s chin, necklace, and ear. The old woman is seen in profile looking left. The young woman is also looking left, but we see her mainly from behind so most facial features are not visible. Her eyelash, nose and the curve of her cheek may be seen just above the old woman’s nose.
difficulty in making this switch? One of the more difficult mental feats is to take a familiar body of data and reorganize it visually or mentally to perceive it from a different perspective. Yet this is what intelligence analysts are constantly required to do. In order to understand international interactions, analysts must understand the situation as it appears to each of the opposing forces, and constantly shift back and forth from one perspective to the other as they try to fathom how each side interprets an ongoing series of interactions. Trying to perceive an adversary’s interpretations of international events, as well as U.S. interpretations of those same events, is comparable to seeing both the old and young woman in Figure 3. It is quite possible to do, but once events have been perceived one way, there is some natural resistance to other perspectives.

A related point concerns the impact of substandard conditions of perception. The basic principle is that initial exposure to blurred or ambiguous stimuli interferes with accurate perception even after more and better information becomes available. This effect has been demonstrated experimentally by projecting on a screen pictures of common, everyday subjects such as a dog standing on grass, a fire hydrant, and an aerial view of a highway cloverleaf intersection.\(^\text{15}\) The initial projection was blurred in varying degrees, and the

pictures were then brought into focus slowly to determine at what point test subjects could identify them correctly.

This experiment showed two things. First, those who started viewing the pictures when they were most out of focus had more difficulty identifying them when they became clearer than those who started viewing at a less blurred stage. In other words, the greater the initial blur, the clearer the picture had to be before people could recognize it. Second, the longer people were exposed to a blurred picture, the clearer the picture had to be before they could recognize it.

What happened in this experiment is what presumably happens in real life; despite ambiguous stimuli, analysts form some sort of tentative hypothesis about what they see. The longer they are exposed to this blurred image, the greater confidence they develop in this initial and perhaps erroneous impression. For a time, as the picture becomes clearer, there is no obvious contradiction; the new data are assimilated into the previous image, and the initial interpretation is maintained until the contradiction becomes so obvious that it forces itself upon our consciousness.

The early but incorrect impression tends to persist because the amount of information necessary to invalidate a hypothesis is considerably greater than the amount of information required to make an initial interpretation. The problem is not that there is any inherent difficulty in grasping new perceptions or new ideas, but that established perceptions are so difficult to change. People form impressions on the basis of very little information, but once formed, they do not reject or change them unless they obtain rather solid evidence.

It is important to note that these circumstances under which accurate perception is most difficult are precisely the circumstances under which most intelligence analysis is conducted. The nature of the intelligence business forces analysts to deal with issues at an early stage, when hard information is incomplete. If there were no gaps in the information, and no ambiguity, it would not be an interesting intelligence problem. So the analyst is among the first to look at new problems at an early stage, when the evidence is very fuzzy indeed. To make sense of this ambiguous information, the analyst often has no choice but to lean heavily on prior beliefs and assumptions about how and why events normally transpire in a given organization or country. The analyst then follows events as additional increments of evidence are received and the picture gradually clarifies. Intelligence analysts typically receive information in small increments over time, which also facilitates assimilation of this information into the analyst’s existing mindset. No one item of information may be sufficient to prompt the analyst to change a previous view. The cumulative message inherent in many pieces of information may be significant but is attenuated when this information is processed incrementally.

Further, the intelligence analyst operates in an environment that exerts strong pressures for what psychologists call “premature closure.” Customer
demand for interpretive analysis is greatest within two or three days after an event occurs. The system requires the intelligence analyst to come up with an almost instant diagnosis before sufficient hard information and the broader background information that may be needed to gain perspective become available. This initial diagnosis can only be based upon the analyst's prior assumptions about how and why events normally transpire in a given society.

As time passes and more information is received, a fresh look at all the evidence might suggest a different explanation. Yet, the early judgment adversely affects the formation of future perceptions. Once an observer thinks he or she knows what is happening, this perception tends to resist change. This perceptual bias is reinforced by organizational pressures favoring consistent interpretation; once the analyst has committed him- or herself in writing, both the analyst and the organization have a vested interest in maintaining the original assessment. There is great reluctance to say in a follow up report that "we've changed our view; our first impression was mistaken."

Role of Mindsets in Analysis

Many scholars have applied these psychological insights to the study of international political behavior. A similar psychological perspective underlies much of the research on intelligence failure and strategic surprise. More major intelligence failures have been caused by failures of analysis than by failures of intelligence collection. Available information—or the absence of information—was discounted, misinterpreted, ignored, rejected, or overlooked because it failed to fit a prevailing mental model or mindset that influenced the analyst's perception and interpretation of the evidence.

A mindset is a "fixed attitude or state of mind." Because intelligence analysts are commonly working with incomplete, ambiguous, and often contradictory information, the analyst's own preconceptions, or mindset, are likely to have a greater impact on the analytical product than in other

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16 Most notably Jervis, Perception and Misperception in International Politics.
fields where analysts are working with less ambiguous and less discordant information. Mindsets generally have the following characteristics:

- They are quick to form and highly resistant to change.
- New information is usually made to fit into the existing conceptual framework.
- An initial impression based on incomplete or ambiguous data is likely to persist even after better information becomes available.

There is a tendency to think of a mindset as something bad, and to be avoided, because it biases our judgment. According to this line of argument, which underlies the SSCI report, analysts should have an open mind and be influenced only by the facts, not by preconceived ideas. Unfortunately, that is not how the mind works when processing a stream of fragmentary and ambiguous information of varying degrees of reliability to make a judgment about an uncertain situation. To cope with this level of complexity, the mind unconsciously adopts various simplifying strategies.

Intelligence analysts working the Iraqi WMD problem did not approach their task with empty minds. They started with a set of knowledge and assumptions about Iraqi capabilities and intentions, and these assumptions obviously influenced how they interpreted the evidence. Saddam Hussein had mounted unprovoked attacks against Iran and Kuwait, had been defeated and humiliated by the United States and its allies, and presented a missile threat to Israel. There was no credible evidence that Saddam's hostile intentions had changed, and many reasons to believe they had not changed.

Iraq's history of efforts to develop and deploy WMDs was also well documented. Iraq blocked Iraq's clandestine program to build a nuclear weapon by bombing its Osirak nuclear facility in 1981. Later in the 1980s, Iraq used chemical weapons against Iran and against its own people. After the 1991 Iraq war, analysts discovered that they had underestimated Iraq's inventory of WMDs, and they did not want to make the same mistake again. Since 1991, UN weapons inspectors found and destroyed the following:

- a supergun, 48 Scud missiles, 40,000 chemical munitions, 500,000 liters of chemical-weapons agents, 1.8 million liters of precursor chemicals, and large quantities of equipment related to biological warfare. Still, inspectors were sure that large quantities of weapons remained missing. In July 1998, for example, U.N. inspectors found a document showing that Iraq had deliberately overstated—by 6,000—the number of chemical bombs it had used in the Iran-Iraq War. (The document was immediately snatched from their hands by Iraqi 'minders.') The 6,000 chemical bombs—manufactured but not used—are still missing.19

As a consequence, analysts had a strong and seemingly well-justified mindset that Saddam had WMDs and would eventually use them, if not constrained from

doing so. This mindset was due not to groupthink, but to a body of historical evidence combined with inherent cognitive limitations, as discussed above. More recent information was sparse, incomplete, and ambiguous, and analysts were working in an environment in which Iraqi denial and deception had to be anticipated—again, based on past experience with Saddam. Under these circumstances, analytical judgments were driven more by the analyst’s mindset of basic assumptions regarding capability and intent than by fragmentary or ambiguous evidence of questionable origin. It is hard to imagine how it could have been otherwise.

Considering the strength of the historical precedents, why would any analyst have wanted—or dared—to try to make a case that Iraq under Saddam lacked either capability or intent to make WMDs and to use them at an appropriate time? Even if the CIA had had an inside source close to Saddam, with direct access to the most secret and heavily protected information, who claimed that Iraq had no WMDs, that source may not have been believed. The source may have been viewed as part of Saddam’s deception plan. Assessing the bona fides of clandestine sources with whom CIA has only indirect contact, or infrequent direct contact, is extremely difficult and is often based on the plausibility of the information provided.¹⁰

*Mindsets are neither good nor bad; they are inescapable.* They are, in essence, a distillation of all that we think we know about a subject. Analysts have no conceivable way of coping with the volume of stimuli that impinge upon their senses, or with the volume and complexity of the data they must sort out in their heads, without some kind of simplifying preconceptions about what to expect, what is important, and what is related to what. They do not achieve objective analysis by avoiding preconceptions. Objectivity is achieved by exposing oneself to alternative viewpoints and making one’s basic assumptions and reasoning as open and explicit as possible so that they can be challenged by others.

The advantage of mindsets is that they help analysts get routine intelligence production out on time and keep things going effectively between those watershed events that become chapter headings in the history books.²¹ Our mindsets serve us well when fundamental conditions remain relatively stable. However, the world is constantly changing, and mindsets tend to resist change. If assumptions that worked well in the past continue to be applied after conditions have fundamentally changed, the result may be intelligence failure.

Mindsets can color and control our perceptions to the extent that an experienced specialist may be among the last to see what is really happening when events take a new and unexpected turn. When faced with a major paradigm shift, analysts who know the most about a subject are often the last

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²⁰ Heuer, “Nosenko: Five Paths to Judgment.”
²¹ This wording is from a discussion with veteran CIA analyst, author, and teacher Jack Davis.
to recognize the change. This is because it is so much easier for analysts to learn new information than to unlearn what they think they already know. Consider, for example, how difficult it has been for many intelligent and knowledgeable people to unlearn what they thought they knew about Iraqi WMDs.

Communication of Uncertainty

One of the conclusions in the SSCI report is that “the intelligence community did not accurately or adequately explain to policymakers the uncertainties behind the judgments in the October 2002 National Intelligence Estimate.” The Committee was right to focus on this issue. The CIA has wrestled since shortly after its founding with the issue of how to communicate uncertainty in National Estimates. Sherman Kent, the first director of the CIA’s Office of National Estimates, was the first to recognize the problems of communication caused by these imprecise statements of probability and uncertainty. A National Estimate that Kent helped write in 1951 stated that a Soviet bloc attack on Yugoslavia “should be considered a serious possibility.” Kent was troubled to learn that important readers of the estimate interpreted the term “serious possibility” quite differently from what was intended by its authors.

When intelligence conclusions are couched in ambiguous terms, the reader can and usually will interpret the conclusions as being consistent with whatever the reader already believes. When that happens, the reader does not learn from the report. Policymakers, like analysts, also start with a mindset that orients them toward seeing what they expect to see. The problem is especially acute when using verbal expressions of certainty and uncertainty. Expressions commonly used in intelligence estimates, such as “we judge that,” “we believe,” “probably will,” and “could happen” have no clear meaning. They are empty shells. The reader or listener fills them with meaning through the context in which they are used and what is already in the reader or listener’s mind about that context.

This phenomenon is easily demonstrated in training courses for analysts. Give analysts a short intelligence report, have them underline all expressions of uncertainty, then have them note their understanding of the report by writing above each expression of uncertainty the numerical probability they believe was intended by the writer of the report. This is an excellent learning experience, as the differences among students in how they understand the report are typically so great, and so surprising, as to be quite memorable.

22 SSCI Report, p. 16.
In one experiment, an intelligence analyst was asked to substitute numerical probability estimates for the verbal qualifiers in one of his own earlier reports. The first statement was: "The cease-fire is holding but could be broken within a week." The analyst said he meant there was about a 30-percent chance the cease-fire would be broken within a week. Another analyst who had helped this analyst prepare the article said she thought there was about an 80-percent chance that the cease-fire would be broken within a week. Yet, when working together on the report, both analysts had believed they were in agreement about what could happen.\textsuperscript{25} Obviously, the analysts had not even communicated effectively with each other, let alone with the readers of their report.

Sherman Kent was the first to propose a chart that relates specific verbal expressions of probability to various ranges of numerical probability, e.g., probable equals 75 percent, give or take about 12 percent.\textsuperscript{26} Such percentage ranges as well as odds ratios have been talked about and used occasionally over the years. One part of the intelligence community found that odds ratios (e.g., 4-to-1 odds, or four times out of five) were better understood than percentage ranges. However, neither percentage ranges nor odds ratios have gained traction as a long-term solution to the problem of clear communication. They have not been compatible with the CIA analytical culture. Strong leadership will be required to change this aspect of the culture.

\section*{Hindsight Bias}

\textit{Post-mortem} analyses of intelligence performance are inevitably affected by hindsight bias that creates an illusion that past events were more predictable than was in fact the case. Knowing the outcome of a situation makes it harder to imagine other outcomes that might have been considered.

Hindsight bias is not surprising. Most people have observed this bias in others, although probably not in themselves. What may be surprising is that this bias is not simply a product of ignorance, self-interest, or lack of objectivity. Psychologists have tried without success to teach test subjects to overcome hindsight bias. Experimental subjects with no vested interest in the results were briefed on the bias and encouraged to avoid it or compensate for it when making a series of judgments, but could not do so. This intractability suggests that hindsight bias, like the difficulty of accurate perception discussed above, has its roots in the nature of human mental processes.

The SSCI report states that: "In all cases our staff endeavored, to the greatest extent possible, to disregard postwar discoveries concerning Iraq until after completing the analysis of the prewar intelligence material in order to


\textsuperscript{26} Kent, "Words of Estimative Probability."
replicate the same analytical environment IC analysts experienced prior to the war.” Unfortunately, good intentions don’t count. On a controversial issue such as Iraqi WMDs, when the evidence for WMDs seemed so compelling before the war and so absent after the war, there was no way that Senate Committee members and staff could “replicate the same analytical environment IC analysts experienced prior to the war.” The Committee’s report clearly demonstrates this.

Cognitive biases such as the hindsight bias are like optical illusions; they remain compelling even after we become aware of them. It appears that if new information is accepted as definitive or authoritative, it causes an immediate but unconscious restructuring of a person’s mindset to make it consistent with the new information. This occurs so naturally and so immediately that people usually have no conscious awareness of the change. Once past perceptions have been restructured, it is impossible to reconstruct accurately what one’s thought processes were or would have been before this restructuring. Once the information has rung a bell, the bell cannot be unrung.

Psychological experiments have documented three ways in which hindsight bias influences the evaluation of intelligence reporting.27

- Intelligence analysts normally overestimate the accuracy of their past judgments.
- Intelligence consumers normally underestimate how much they learned from intelligence reports.
- Overseers of intelligence production who conduct post-mortem analyses of an intelligence failure normally judge that events were more readily foreseeable than was in fact the case. This is shown in both the 9/11 Commission and SSCI reports.

Intelligence analysts, consumers, and overseers all have one thing in common. They try, without success, to erase the impact of recent knowledge in order to remember, reconstruct, or imagine the uncertainties they had or would have had about a subject prior to receipt of more or less definitive information.

Improving Intelligence Analysis

When officials in the intelligence community speak of improving intelligence analysis, they usually focus on relations between intelligence

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analysts and intelligence consumers, types of analytical products, organization of the analytical process, the quality of writing, or providing language and area studies to improve substantive expertise. When policymakers talk about improving intelligence analysis, they focus on moving boxes on an organization chart, Congressional oversight, and whatever it was that caused the most recent intelligence failure. Rarely is attention devoted to examining how analysts think and comparing this with a more sophisticated ideal.

To penetrate to the heart and soul of the problem of improving intelligence analysis, it is necessary to better understand, influence, and guide the mental process of intelligence analysts. To reduce the risk of surprise in a rapidly changing world, intelligence analysts need to develop habits of mind and use analytical tools that help them become the first to recognize that old assumptions may no longer apply. They must learn to recognize when underlying conditions have changed so much that their mindset, which has served them so well in the past, may no longer be appropriate. On a personal level, they need to learn how to recognize when to change their minds.

The training of intelligence community analysts already emphasizes the need to question assumptions, but this is easier said than done and often overlooked due to the pressure of reporting deadlines or the analyst's confidence that he or she already knows the right answer. In her February 11, 2004, address to employees of the CIA Directorate of Intelligence, the Deputy Director for Intelligence stated: "I want to focus on the danger of inherited assumptions. That may be the single most important aspect of our work that needs to be examined... How do we ensure that we are not passing along assumptions that haven't been sufficiently questioned or examined?"  

The intelligence community has a number of established analytical tools or tradecraft procedures that are designed to help analysts question assumptions and adjust their mindsets. These include:

- **Red Cell Analysis**—trying to predict the behavior of others by putting yourself in their shoes.
- **Devil's Advocacy**—assigning someone to challenge a single, strongly held consensus by building the best possible case for an alternative explanation.
- **Brainstorming**—an unconstrained group process for generating new ideas and concepts.
- **What If? Analysis**—taking as a given that an unexpected event has occurred and then trying to explain how it could have come about, also known as thinking backwards.
- **Alternative Futures Analysis**—applies the collective knowledge and imagination of a group of experts to identify driving forces that are

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28 Senate Select Committee Report, p. 6.
likely to shape an issue and how these different forces, when given different weights, might play out in plausible future scenarios.

- Analysis of Competing Hypotheses—discussed below.

Although analysts are trained in the use of these tools, there is no established procedure for determining when they should be used. Interestingly, these tools for challenging assumptions are commonly referred to in CIA as “alternative analysis” techniques. One goal for improving analysis might be to get to the point where the term alternative analysis no longer applies, because these methods have become fully integrated into the routine, day-to-day process of analysis.

The authors of the recent 9-11 Commission Report determined that it is “crucial to find a way of routinizing, even bureaucratizing, the exercise of imagination.”

Although that was written in a somewhat different context, it also applies to intelligence analysis in general. Tools for challenging assumptions and for generating alternative hypotheses, or alternative scenarios, will be widely used only if intelligence community managers establish policies and institutionalize procedures to ensure that these tools are used whenever analysts are dealing with important issues where we can’t afford to be wrong.

**Analysis of Competing Hypotheses**

One of the tools for more systematic analysis that warrants increased use is Analysis of Competing Hypotheses (ACH). This takes the analyst through a structured, eight-step analytical process that differs from conventional intuitive analysis and is less prone to analytical error. In addition to helping analysts identify and question basic assumptions, it provides a mechanism for testing hypotheses.

In conventional intuitive analysis, analysts generally start by identifying what appears to be the most likely hypothesis—that is, the tentative estimate, explanation, or description of the situation that appears most likely. Information is then collected and organized according to whether or not it supports this tentative judgment. Careful analysts will make a quick review of other possible hypotheses and of evidence not accounted for by the preferred hypothesis to ensure that they have not overlooked some important consideration. If the evidence seems to support the favorite hypothesis, analysts pat themselves on the back (“See, I knew it all along!”) and look no further. If it does not, they may either reject the evidence as misleading or develop another hypothesis and go through the same procedure again. The weakness of this procedure is that it focuses on only one hypothesis at a time.

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30 For a more detailed description, see Heuer, Psychology of Intelligence Analysis, Chapter 8.
This is quite different from the ACH procedure, which is grounded in basic insights from cognitive psychology, decision analysis, and the scientific method. ACH is designed to help intelligence analysts overcome, or at least minimize, some of the cognitive limitations discussed in this article that make accurate intelligence analysis so difficult. The following elements distinguish Analysis of Competing Hypotheses from conventional intuitive analysis.

- Analysis starts with a brainstorming session to identify a full set of alternative hypotheses, rather than with a most likely alternative for which the analyst seeks confirmation. This ensures that alternative hypotheses receive equal treatment.
- The analyst creates a matrix with hypotheses listed across the top and evidence listed down the side. “Evidence” is interpreted very broadly to include assumptions and logical deductions as well as hard intelligence reporting—anything that influences the analyst’s judgment about any of the hypotheses. For each item of evidence, the analyst asks the following question for each hypothesis: If this hypothesis were true, is it likely that I would be seeing this item of evidence? The analyst notes in the matrix an evaluation of each item of evidence against each hypothesis. This identifies and highlights the few items of evidence or assumptions that have the greatest diagnostic value in judging the relative likelihood of the various hypotheses.
- Analysis follows the fundamental precept of the scientific method that one should proceed by rejecting or eliminating hypotheses, while tentatively accepting only those hypotheses that cannot be refuted. The most probable hypothesis is the one with the least evidence against it, not the one with the most evidence for it. The statistical procedures of scientific methodology are not applicable to most types of problems that intelligence analysts deal with, but analysts can and should adopt the conceptual strategy of seeking evidence that refutes hypotheses rather than confirms them.

ACH assures that alternative hypotheses get a fair shake in the analysis. It systematically identifies the intelligence reporting and the assumptions and logical deductions that have the greatest impact on the analyst’s judgment concerning the relative probability of each hypothesis. In other words, it identifies and highlights those assumptions that need to be questioned and rechecked in depth. One of the specific steps in ACH is a sensitivity analysis to assess just how dependent a conclusion may be on a single piece or specific group of evidence. With regard to Iraqi WMDs, this step would have highlighted the excessive dependence on émigré sources of questionable reliability. The matrix also serves as a permanent record of the hypotheses that were considered, the evidence used, and how that evidence was interpreted.