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# The American Ape at the CIA: The Origin of Evolved and Learned Cognitive Mechanisms that Cloud Intelligence Analysts' Reasoning

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**Abstract:** All human behavior may be understood as an interaction between genes and the environment. The integration of innate cognitive mechanisms (from genes) and learned cultural mindsets (from the environment) profoundly affects our ability to perceive and interact with the world around us rationally. While we share innate cognitive mechanisms across the human population, cultural mindsets have substantial variation, even within the same country. Both the innate cognitive mechanisms and learned cultural mindsets have a substantial influence on intelligence and security analysts' objective reasoning abilities. Challenges arise when analysts' cultural mindsets do not align with their targeted group's (or individual's) cultural mindsets. Although the Intelligence Community (IC) has made significant strides to address these challenges, through structured analytical techniques (SATs), the professionalization of intelligence analysis, and uniform analytical standards, insights from other academic disciplines may offer additional/alternative solutions. In this paper, knowledge from Evolutionary Psychology, Cultural Anthropology, and Neuroscience is explored to gain insight into why humans view the world in diverse but shared ways, and its implications on the intelligence community.

**Keywords:** Evolutionary psychology, structured analytic techniques, intelligence analysis, information analysis, intelligence services, cheater-detection

# What is Intelligence Analysis?

Evolutionary and cultural forces engage with, influence, and shape analysts' views of the world. Before exploring the origins of these forces, it is crucial to understand the roles and responsibilities of analysts across the intelligence community. To this end, we will consider the common themes and considerable variation across some of the world's premier intelligence agencies. Only after understanding the definitions, processes, analysts, and agencies that make up the intelligence discipline, can we explore the evolutionary and cultural forces that shape them.

## *The Definitions*

Finding a universally accepted definition of intelligence analysis (IA) is difficult. Some intelligence practitioners might say, there are an equal number of definitions for "intelligence analysis" as there are former and current intelligence analysts. This disparity is because defining intelligence analysis often depends on the definer's context and their relationship or role within the intelligence community. This variation is best shown through the definitions provided by the Central Intelligence Agency (CIA) and the RAND Corporation (a prominent think-tank in the United States).

The CIA is focused on national security and foreign policy concerns for the United States. This mission is reflected in the definition of intelligence analysis, posted on their website as "*the application of individual and collective cognitive methods to weigh data and test hypotheses within a secret socio-cultural context."*[234]*.* Their internationally-focused and often classified missions are reflected in their definition of IA, hence their inclusion of "*secret socio-cultural context."*

A slightly different definition offered by RAND Corporation reflects RAND's past projects and current clients within the military community. RAND

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[234] Rob Johnson, "Analytical Culture in the U.S. Intelligence Community: An Ethnographic Study", Central Intelligence Agency (Central Intelligence Agency, June 28, 2008), https://www.cia.gov/library/center-for-the-study-of-intelligence/csi-publications/books-and-monographs/analytic-culture-in-the-u-s-intelligence-community/chapter_1.htm, 4.

defines intelligence analysis as *"the process by which the information collected about an enemy is used to answer tactical questions about current operations or predict future behavior."*[235]. RAND's definition has a military focus, reflecting their role within the defense industry. Their role is shown through their operational control over four federally funded research and development centers (FFRDCs), in cooperation with the U.S. Army, U.S. Air Force, U.S. Department of Homeland Security, and U.S. Office of the Secretary of Defense[236].

Our definition of IA will correspond to this paper's focus – innate cognitive mechanisms and culturally learned mindsets. For the working definition, we will define **intelligence analysis** as *processing environmental data until it possesses an advantage for an entity operating within that environment.* This definition is an all-encompassing one, that does not unnecessarily constrain intelligence to mediums of collection, methods of analysis, customers of products, or scope and context of functional value. Furthermore, it presents the contemporary structure and goal of intelligence analysis as an attempt to expand and refine reasoning abilities that are naturally evolved and purposely cultivated within all humans.

## *The Processes*

Similar to defining intelligence analysis, conducting intelligence analysis is done through different processes depending on the mission and its desired outcome. Despite these differences, the foundational steps for intelligence analysis are relatively similar across all applications. Dr. Noel Hendrickson, the founder of the Intelligence Analysis program at James Madison University (JMU), describes the general process in his book *Reasoning for Intelligence Analysis*[237]*.* Hendrickson explains the four steps as the following.

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[235] "Intelligence Analysis", RAND Corporation, accessed August 18, 2020, https://www.rand.org/topics/intelligence-analysis.html.

[236] "RAND Federally Funded Research and Development Centers (FFRDCs)", RAND Corporation, accessed August 18, 2020, https://www.rand.org/about/ffrdc.html.

[237] Noel Hendrickson, *Reasoning for Intelligence Analysis: A Multidimensional Approach of Traits, Techniques, and Targets* (New York City, NY: Rowan and Littlefield, 2018), 26–27.

1. "Search and collect" to generate data to analyze.
2. "Represent and structure" the data into meaningful information.
3. "Evaluate and infer" knowledge in the context of its relation to the truth.
4. "Disseminate and use" the inference in a practical way for the client.

Because Dr. Hendrickson has an educator's role within the IC, his definition of the intelligence process is an analyst-centered one, concerned with developing students into junior analysts. Other versions account for an "administrative step" before an analyst begins searching and collecting information. Katherine and Randolph Pherson – widely regarded in the intelligence community for their contributions towards standardizing the intelligence discipline, present in their book *Critical Thinking for Strategic Intelligence*, a version of the intelligence cycle widely used by the U.S. and Canadian government. Their version includes the additional administrative step[238]. The five steps are:

1. Planning, Direction, Needs, and Requirements
2. Collection
3. Processing and Exploitation
4. Analysis
5. Dissemination

In addition to the added step, Pherson and Pherson describe the intelligence process as a cycle[239]. Once intelligence assessments are disseminated, analytical judgments are used to inform future planning, direction, needs, and requirements. This workflow restarts the process, creating a continuous intelligence cycle. Regardless of how many steps are included within the intelligence process (or cycle), each step is critical to producing relevant, accurate, and timely intelligence.

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[238] Katherine Pherson and Randolph Pherson, *Critical Thinking for Strategic Intelligence*, 2nd ed. (Thousand Oaks, CA: CQ Press, 2017), 89.

[239] Pherson, *Critical Thinking*, 89.

## *The Analysts*

While the IA discipline has become increasingly aided by artificial intelligence and data analytical tools, at its very core is a human-centered field. Because humans are fallible, their created processes and expressed behaviors follow suit. Humans add this imperfect dynamic to the intelligence cycle, which creates ambiguity and inaccuracies. Because of the imperfect nature of humans (and in turn analysts), it is important to understand different positions and roles analysts take on within the intelligence cycle, especially in search of the origins of past intelligence shortcomings. While analysts are not the only cause of intelligence shortcomings, they certainly play a large role.

### Roles of Analysts

As a community, analysts conduct intelligence analysis across multiple mediums, on vastly different subjects, and for many clients. As a result, they are required to perceive, analyze, and assess a range of topics. Because of this diversity, the roles and desired technical skills recruited for, greatly vary among agencies.

Most analysts within the community, are concentrated on specific elements of the intelligence cycles defined above. Because of their specific focuses, roles for intelligence analysts range from technical jobs in cybersecurity and satellite imaging, to human-centered jobs like interrogators and linguists, to dissemination-focused jobs like multimedia producers and technical writers, to other various subject matter expertise ranging from nuclear physics to aerospace engineering[240].

As we will see in the following sections, academic background and technical skills are not the only things that distinguish analysts. Experiences ranging back to their first years, including childrearing techniques in infancy and parenting-styles during childhood, have significant influences on

[240] "Careers & Internships: Browse Jobs by Category", Central Intelligence Agency (Central Intelligence Agency, December 12, 2019), https://www.cia.gov/careers/opportunities/cia-jobs/index.html.

analysts' variability in reasoning, perception, and judgment[241]. However, despite the vast array of roles, expertise, and influences an analyst can have, there is a shared suite of traits that is cross-culturally agreed upon to be beneficial for analysts to possess.

## Traits of Analysts

Regardless of roles, analysts are charged with taking an independent and objective-based perspective on issues, free from pressure to "prove" or "support" a given worldview or hypothesis. Because of this uniform goal, the suite of traits that are recruited for and trained towards across all intelligence agencies are rather similar. Dr. Hendrickson encapsulates this suite of traits into four "sought-after" characteristics of analysts[242].

1. Intellectual Courage – *summarized as balancing confidence vs. uncertainty, neutrality vs. real-world concern, and breadth vs. depth of inquisitive knowledge.*
2. Intellectual Self-Control – *summarized as balancing sensitivity towards similarity vs. change, thoroughness vs. expediency, and descriptive quality vs. quantity.*
3. Discernment – *summarized as reflectiveness on self vs. other, versatility between spontaneity and deliberateness, and integration of "bottom up" vs. "top-down" approaches of thought.*
4. Intellectual Fairness – *summarized as recognizing threats vs. opportunities, conveying specificity vs. simplicity, and reflecting objections vs. refinements.*

These characteristics, or "cognitive virtues" as Hendrickson calls them, help analysts provide an independent and objective analytical stance on incoming information. However, these traits are difficult to gain and maintain by even the most disciplined analysts. As we will explore in later sections, our evolutionary past and specific cultural upbringing have much to do with this.

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[241] Michael Harris Bond, *The Oxford Handbook of Chinese Psychology* (Oxford, UK: Oxford University Press, 2015), 32–67.

[242] Hendrickson, *Reasoning*, 72–82.

## *The Agencies*

Analysts are regularly recruited based on an agency's specific mission and home country's unique challenges. Additionally, Dr. Timothy Walton – a senior CIA analyst and Kent School instructor turned university professor – notes, how intelligence agencies often reflect the cultural values within a particular country[243]. This assertion is supported by other intelligence reformers[244] and is reflected in recent job postings for analysts in the United States' CIA and Japan's Public Security Intelligence Agency (PSIA)[245, 246].

### U.S. vs. Japanese Intelligence Recruitment

The CIA is charged with collecting and assessing foreign intelligence, relying heavily on foreign language skills. Because only 20% of American K-12 students enroll in foreign language classes (compared to 92% in the European Union), many CIA job postings place an emphasis and premium on foreign language skills and international travel[247]. The premium placed on foreign language skills shows how American culture and current challenges are reflected in CIA job postings.

In another example, the application for the PSIA reflects a wider cultural emphasis and reliance on standardized testing. The Japanese education system places extraordinary pressure on high school students to score good grades on entrance exams to enter college[248, 249]. This reliance on exams is at the forefront of assessing intelligence candidates. The PSIA demands

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[243] Timothy Walton, Lecture at James Madison University, March 23, 2020.

[244] Mark M. Lowenthal, *Intelligence: From Secrets to Policy*, 8th ed. (Thousand Oaks, CA: SAGE/CQ Press, 2020), 441–499.

[245] Central Intelligence Agency, "Careers & Internships".

[246] "About the PSIA", PSIA | 公安調査庁 (Public Security Intelligence Agency, 2020), http://www.moj.go.jp/psia/English.html.

[247] Kat Devlin, "Unlike in US, Most European Students Learn a Foreign Language", Pew Research Center (Pew Research Center, August 6, 2018), https://www.pewresearch.org/fact-tank/2018/08/06/most-european-students-are-learning-a-foreign-language-in-school-while-americans-lag/.

[248] Yoshitaka Saito. "Consequences of high stakes testing on the family and schools in Japan". *KEDI Journal of Educational Policy* 3, no. 1 (2006).

[249] Kathleen Kitao and Kenji Kitao, *An Analysis of Japanese University Entrance Exams Using Corpus-Based Tools*, 2008, http://www.j-let.org/~wcf/proceedings/d-053.pdf.

candidates to pass the "National Civil Service Recruitment Comprehensive Employment Exam" before being considered for an interview[250]. This emphasized importance on exams is heightened by customary "lifetime" employment once selected, an absence of an initial probationary period, and a low degree of lateral mobility once hired[251]. These Japanese cultural norms surrounding its PSIA and civil service increase the selectivity and reliance on a standardized examination.

## Unique Challenges and Threats

As many intelligence practitioners point out, agencies are often formed as a reactive need to a past problem. This trend is shown in the presidential directives that established the Office of Strategic Services, National Security Agency, and Homeland Security Agency within the United States.[252] Once created, the focus and organizational structure of these newly formed agencies, reflect the current threats and challenges being faced by that nation. Outside of the United States, this reflection is seen in Chinese, French, and Japanese intelligence agencies.

China's recent economic expansion and regional security issues guide their intelligence agency's efforts. Chinese espionage appears to be focused on four primary targets: economic data, military equipment, reconnaissance of critical infrastructure, and attacks on critics[253]. This focus reflects their national strategy of maintaining remarkable economic growth[254], updating their military into a modern superpower[255], conducting widespread

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[250] "Career Track Recruitment", Public Security Intelligence Agency (Public Security Intelligence Agency, 2020), http://www.moj.go.jp/psia/sougou.html.

[251] Byung Chul Koh. "The Recruitment of Higher Civil Servants in Japan: A Comparative Perspective". *Asian Survey* 25, no. 3 (1985): 292–309. Accessed August 18, 2020. doi:10.2307/2644120.

[252] "What Was OSS?" Central Intelligence Agency. Central Intelligence Agency, June 28, 2008. https://www.cia.gov/library/publications/intelligence-history/oss/art03.htm.

[253] Lowenthal, *Intelligence*, 454.

[254] Xing-Ping Zhang, and Xiao-Mei Cheng. "Energy consumption, carbon emissions, and economic growth in China". *Ecological Economics* 68, no. 10 (2009): 2706–2712.

[255] Elsa Kania. "Innovation in the New Era of Chinese Military Power". The Diplomat. The Diplomat, July 25, 2019. https://thediplomat.com/2019/07/innovation-in-the-new-era-of-chinese-military-power/.

infrastructure projects (both domestically and internationally)[256], and guarding their political image against dissidents[257].

Because of recent terrorist attacks, France now puts a significant intelligence emphasis on terrorism. In 2012, a lone-wolf terrorist attack killed seven people; this attack was followed in 2015 with ISIL-backed terrorist attacks in Paris, killing over 100 people and injuring over 350[258]. Additionally, because France is one of several nuclear-weapons powers of Europe, it remains concerned about the development and proliferation of Weapons of Mass Destruction (WMDs). One government official estimated half of intelligence activity is devoted to WMDs and counterterrorism[259]. Presently, these two concerns are the regional issues that guide France's intelligence efforts.

Japan is restricted within their military and intelligence community, because of limitations imposed following World War II[260]. This limitation, along with their dynamic and threatening regional neighbors, has compelled Japan to maintain a regional (rather than global) focus on the intelligence efforts. Their consistent monitoring of China and North Korea, along with security sharing agreements between South Korea and Australia, reflect Japan's emphasis on regional concerns[261].

As demonstrated, a country's intelligence agencies reflect their current and anticipated threats, national culture, and tasked mission. Despite these differences, most agencies share similar overall missions: to provide accurate and timely intelligence to decision-makers. However, the inflow

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[256] Sarker, Md Nazirul Islam, Md Altab Hossin, Xiaohua Yin, and Md Kamruzzaman Sarkar. "One Belt One Road initiative of China: Implication for future of global development". *Modern Economy* 9, no. 4 (2018): 623–638.

[257] Danny O'Brien. "China's Global Reach: Surveillance and Censorship Beyond the Great Firewall". Electronic Frontier Foundation, December 29, 2019. https://www.eff.org/deeplinks/2019/10/chinas-global-reach-surveillance-and-censorship-beyond-great-firewall.

[258] Lowenthal, *Intelligence*, 458.

[259] Ibid, 459.

[260] Lee Hudson Teslik,. "Japan and Its Military". Council on Foreign Relations. Council on Foreign Relations, April 13, 2006. https://www.cfr.org/backgrounder/japan-and-its-military.

[261] Lowenthal, *Intelligence*, 493.

of information in today's "Information Age" makes this mission increasingly challenging. To counter this, agencies use various techniques, called Structured Analytical Techniques (SATs) to help analysts conduct their assessments.

## *The Techniques*

Intelligence Analysts use structured analytical techniques (SATs) to "*challenge judgments, identify mental mindsets, stimulate creativity, and manage uncertainty*."[262]. They were created and standardized in response to a long history of intelligence failures. While this is certainly not an exhaustive list, the CIA's Tradecraft Primer lists these techniques in three basic categories[263].

First, diagnostic techniques are primarily *focused on making the methodology transparent, that was used to arrive at an assessment*. Examples include Key Assumptions Check, Quality of Information Check, Indicators or Signposts of Change, and Analysis of Competing Hypotheses (ACH)[264]. One example of how these techniques could have been useful is in the case of the 2002 DC sniper. In the fall of 2002, an onset of sniper attacks occurred in the Washington DC region. Law enforcement quickly made a set of assumptions about the sniper: it was a lone white male with military training driving a white van[265]. By conducting a **Key Assumptions Check**, analysts could have *challenged the assumptions*, remained receptive to all leads (including reports of the sniper fleeing in a Chevrolet car). Further investigations and arrests found the sniper to be a team of black males driving a car – far from the initial assumptions.

Next, contrarian techniques are primarily *used to provide alternatives to current assessments*. Examples include Devil's Advocacy, Team A/Team B,

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[262] *A Tradecraft Primer: Structured Analytic Techniques for Improving Intelligence Analysis* (Washington, DC: U.S. Government, 2009), https://www.cia.gov/library/center-for-the-study-of-intelligence/csi-publications/books-and-monographs/Tradecraft%20Primer-apr09.pdf.

[263] Ibid.

[264] Ibid.

[265] CIA, *Tradecraft,* 8.

High-Impact/Low-Probability Analysis, and "What if?" Analysis[266]. Intelligence shortcomings revolving around the Pearl Harbor attack could have benefited from all three techniques listed above. By forming a devil's advocacy team, or *group of analysts to challenge the consensus belief* surrounding Pearl Harbor (the Japanese would not attack), the government could have outlined possible reasons for the Japanese to initiate an attack.

Finally, imaginative thinking techniques are primarily *aimed at moving analysts out of fixed mindsets to develop new insights and perspectives*. Examples include Brainstorming, Outside-In Thinking, Red Team Analysis, and Alternative Futures Analysis[267]. Again, preceding the attack on Pearl Harbor, analyst could have conducted a Red Team analysis, or *looked at the situation from the adversary's perspective*. Doing this would have shown a formidable United States, quickly gaining strength while building up their military-industrial base. An imminent attack would have provided any hope in crushing the United State's Pacific fleet and will to fight.

The previous section shared a collection of some of the main SATs used within intelligence agencies. As demonstrated, many of these techniques are applicable to the same situation and can be used in conjunction with each other. While the scope of this paper does not intensely focus on the individual techniques, it is important to note the main purpose of creating and standardizing them: to counter evolved and learned mindsets of analysts.

## *Intelligence Analysis: summary*

Understanding the different definitions of Intelligence Analysis, variations in the missions of intelligence agencies, and the diverse roles intelligence analysts carry out is critical. However, seeing the commonality across all agencies and countries through shared missions and challenges is equally important. In this paper, I presented a brief overview of the definitions, processes, analysts, and agencies that make up the Intelligence

[266] Ibid.

[267] Ibid.

Community. We explored the common themes across all agencies and the diverse influences that creates unique variations among them. We will use this foundational overview to examine the evolutionary and cultural forces that engage with, influence, and shape analysts' views of the world.

## Evolved Cognitive Mechanisms

Many questions about our species origins remain unanswered today. Each year archaeologists, anthropologists, and geologists uncover more clues into how modern humans evolved from past ancestors. Despite these unanswered questions, the Theory of Evolution is one of the most established and scientifically supported theories across modern science – below we explore some of its themes. First, we attempt to condense the theories which describe millions of years of evolution into a few pages. After, we will use this brief overview to help explain the current cognitive mechanisms and processes within analysts' brains. While the evolved cognitive mechanisms explored below are present in all of us, some readers may find them invisible or nonexistent within their own minds.

### *Evolution of the Human Body*

The theory of evolution describes how all life has evolved and, of relevance, how humans evolved into our modern form over the last 200,000 years[268]. The theory describes how changes in heritable traits that increase the **fitness level** of an individual, or *ability to survive and reproduce,* slowly spread throughout a population. These changes are often brought on by a **selection pressure**, or *an agent that affects survival and reproduction within a species*[269]*.* When *a trait, that increases the individual's fitness, is selected for and gains prevalence in a population*, it is known as an **adap-**

[268] Daniel E., Lieberman, Brandeis M. McBratney, and Gail Krovitz. "The evolution and development of cranial form in Homo sapiens". *Proceedings of the National Academy of Sciences* 99, no. 3 (2002): 1134–1139.

[269] Joel S. Brown, John W. Laundre, and Mahesh Gurung. "The Ecology of Fear: Optimal Foraging, Game Theory, and Trophic Interactions". *Journal of Mammalogy* 80, no. 2 (1999): 385–99. Accessed August 23, 2020. doi:10.2307/1383287.

**tion**. For example, **bipedalism**, or *the ability to walk on two legs*, is an evolved trait (adaptation) caused by either selection pressures related to environmental changes (e.g., aridification of the habitat that leads to fewer forests), or social changes (e.g., walking on two legs instead of four frees up the hands to carry food or infants)[270]. Whatever the specific selection pressures are that led to the evolution of bipedal walking, **hominins**, or *bipedal ape-like ancestors of the human species,* who evolved slightly more arched feet, curved spines, and wider hips, had an easier time balancing and walking on two feet[271]. This adaptation helped them to save calories (which were increasingly more difficult to obtain)[272]. Those who possessed these advantageous traits out-survived and out-reproduced those who had inferior versions of these traits. As a result, more of the next generation possessed these traits. This change continued until the collective advantage (of arched feet, curved spines, and wider hips) became more refined and increased in frequency across the entire population. Once bipedality had evolved, selection pressures continued to act on the human skeleton to make bipedal walking more efficient.

Much like physical traits, such as bone/muscle changes for efficient bipedal walking, humans also evolved cognitive traits, which similarly presented an adaptive advantage for those who possessed them. The evolution and dissemination of these traits happened much like those of our physical adaptions: individuals possessing a beneficial cognitive mechanism out-survived and out-reproduced those that did not have that mechanism.

## *Evolution of Cognition*

Evidence suggests that two mechanisms influence human cognition and behavior: the instincts we inherit through genes, and the "cultural download" of information we learn through social interactions[273].

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[270] Daniel E. Lieberman, *The Story of the Human Body: Evolution, Health, and Disease* (New York City, NY: Vintage Books, 2013), 25–48.

[271] Ibid.

[272] Ibid., 42.

[273] Peter J. Richerson, Robert Boyd, and Joseph Henrich. "Gene-culture coevolution in the age of genomics". *Proceedings of the National Academy of Sciences* 107, no. Supplement 2 (2010): 8985–8992.

More so than any other species, humans have a collection of innate cognitive mechanisms that are used to survive in our environment – evolutionary psychology studies these mechanisms. Charles Darwin, "the father of evolution", foresaw the emergence of this discipline. Towards the end of *Origin of Species*, he envisions the field of psychology expanding towards new research areas that sought to understand the design and adaptations that led to the modern human minds[274]. Decades later, William James released a groundbreaking piece of work titled *Principles of Psychology*, that began to explore this, choosing to focus heavily on **instincts,** or *specialized, innate, neural circuits, present across a species, that emerged as a product of evolution*[275]. At the time, it was commonly understood that animals were mostly guided by instincts (and had many of them), while humans were mostly guided by reason (and had fewer instincts). Furthermore, scientists believed the lower amount of human instincts allowed humans to be "more flexibly intelligent than other animals."[276]. James countered this by arguing that humans had higher "flexible intelligence" because we had more instincts[277]. These instincts function efficiently and effortlessly (by collecting environmental stimuli, processing information, and guiding behavior) that we are "blind" to their existence. Years later, advancements in genetics, biology, neuroscience, and psychology have universally and unequivocally supported that instincts are shared cross-culturally across all of humanity[278]. However, the idea that they solely guide our behavior and account for our "flexible intelligence" is highly disputed. As we will learn in later sections, cultural and social influences play a significant role in our intelligence superiority over our primate relatives.

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[274] Charles Darwin. *On the Origin of Species*. *www.gutenberg.org*. 6th ed. Accessed August 18, 2020. http://www.gutenberg.org/files/2009/2009-h/2009-h.htm.

[275] William James. *The Principles of Psychology*. Vol. 1. Cosimo, Inc., 2007.

[276] Leda Cosmides and John Tooby. "Evolutionary psychology: A primer". (1997).

[277] James William, *Principles*.

[278] Robert Boyd and Peter J. Richerson. "Culture and the evolution of the human social instincts". *Roots of human sociality* (2006): 453–477.

## *Evolution of Environments*

As we covered, innate cognitive mechanisms play a critical role in our cognitive success. However, they play an equally detrimental role in our cognitive errors and failures. These failures or misalignments are a result, in part, by our rapidly changing environment.

The modern environment we live in is extraordinarily different from the **Environment of Evolutionary Adaptedness** (EEA), or *the past environment our species adapted to*. Hunting and gathering account for most of our evolutionary past, with groups traveling 5–15 kilometers a day to gather food[279]. Among many factors, predators, hostile groups, natural disasters, and lack of modern medicine made the past environment a harsh and formidable place. As we learned, humans evolved biological and psychological solutions to these adaptive problems.

However, a peculiar trait of the environment is that it changes much more rapidly than the speed of adaptation. This is because the rate of adaptation is set by the generation time of the species – for humans, the generation time is 22–33 years[280]. Demonstrated through the evolution of bipedalism, it could take tens of thousands of generations for an adaptation to gain prevalence in a population. As a result of this timeline, we still carry the same biological and psychological adaptions we evolved to solve the EEA challenges. Many of these adaptions we evolved in the past, such as attraction to sugar[281], and aversion to strangers[282], may now have lost their advantages or even present a disadvantage in this new environment. As we will see, these disadvantages encompass some of the gaps in logic and flawed reasoning that taint analysts' assessments today.

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[279] Lieberman, *The Story*, 42.

[280] Ansley Johnson Coale. *Growth and Structure of Human Populations: A Mathematical Investigation*. Princeton University Press, 2015.

[281] Satyawan Damle. "Smart sugar? The sugar conspiracy". *Contemporary Clinical Dentistry* 8, no. 2 (2017): 191–191.

[282] Jennifer Hahn-Holbrook, Colin Holbrook, and Jesse Bering. "Snakes, spiders, strangers: How the evolved fear of strangers may misdirect efforts to protect children from harm". *Protecting children from violence: Evidence-based interventions* 26 (2010): 3–289.

## *Impacts on the Intelligence Community*

The misalignments of our evolutionary past and present cognition have contributed to intelligence shortcomings since the creating of intelligence agencies. The CIA's Tradecraft Premier attempts to categorize these misalignments into four categories of perceptual and cognitive biases[283].

1. Perceptual Biases – we tend to perceive what we expect, resist change (even in the face of notable counter-evidence), and ambiguous information disproportionately interferes with correct judgments of a situation.
2. Biases in Evaluating Evidence – we do not immediately change our perception in light of discrediting information, we have more confidence in concluding small bodies of data that are consistent rather than large bodies of data with less consistency, and we have difficulty judging the potential impact of missing information.
3. Biases in Estimating Probabilities – people are often overconfident, unimaginative, and inconsistent when judging probabilities of an event in light of new evidence.
4. Biases in Perceiving Causality – people attempt to fit events into a perceived linear pattern of causality, often discrediting randomness and accidents.

The publication continues to cite these biases as the reason leading to recent intelligence failures including analysts over-connecting WMD but also under-connecting the evidence leading up to 9/11, over-estimating the spread of democracy after the Arab-Spring but under-estimating the response of Russia in Crimea, over-rating the Iraqi Army's ability in recent conflicts, but under-rating the strength of ISIS, and many others[284]. These biases have remained in the spotlight of intelligence agencies since their inception, as efforts are undertaken to counter them.

After the recent intelligence shortcomings around the 9/11 terrorist attacks and WMD programs in Iraq, congressional oversight committees

[283] CIA, *Tradecraft Primer*, 2.

[284] CIA, *Tradecraft Primer*, 2.

demanded the intelligence community (IC) become professionalized and standardized across all 17 agencies through added training and education opportunities, directives outlining analytical standards, and an emphasis on SATs. Additions to education across the IC, such as the CIA University, College of Analytical Studies, and National Intelligence University, attempted to do this[285]. Supporting directives, such as ICD 203, were released in an effort to institutionalize the roles, responsibilities, and analytical standards expected from intelligence analysts[286]. Later publications, such as the CIA's Tradecraft Primer, were publicized and distributed to normalize SATs[287]. Indeed, in the past two decades, great strides have been made in improving intelligence analysis efforts.

Despite these changes to the IC, intelligence practitioners such as Dr. Stephen Marrin, renowned for his work in intelligence reform and education, call for further improvements while questioning past ones. Dr. Marrin explores in several published essays whether SATs work better than intuition[288, 289]. He proposes, among many things, that more time, energy, and resources be devoted to evaluating their accuracy and utility towards real-world applications.[290] In other publications, he scrutinizes the fast-paced and continuous nature of intelligence production. He argues the IC places undue emphasis on short-term, daily intelligence briefings, rather than long-term, prospective, deep-analysis of a topic[291]. This focus inhibits analysts' ability to develop the foundational and topical expertise required to make sound judgments. I propose that this may increase the reliance on structured analytical techniques to do the "thinking" and "analysis" for intelligence professionals, since they have not developed enough "topical

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[285] Stephen Marrin, "Training and Educating U.S. Intelligence Analysts", *International Journal of Intelligence and CounterIntelligence* 22, no. 1 (November 2008): pp. 131–146, https://doi.org/10.1080/08850600802486986.

[286] Intelligence Community Directive 203 (2015).

[287] CIA, *Tradecraft Primer*.

[288] Marrin, *Training and Educating*.

[289] Stephen Marrin. "Intelligence Analysis: Structured Methods or Intuition?" *American Intelligence Journal* 25, no. 1 (2007): 7–16. Accessed August 18, 2020. www.jstor.org/stable/44327067.

[290] Marrin, *Training and Educating*.

[291] Ibid.

expertise." Although the effectiveness of certain SATs is not agreed upon or established, SATs have been offered as a solution to counter the intuitive mindsets of analysts.

### *Evolved Cognitive Mechanisms: the summary*

These new insights show that humans possess a vast collection of instincts that broadly guide our attention, influence our thinking, and regulate our behavior. These instincts, or innate cognitive mechanisms, create biases in our thoughts, inconsistencies in our judgments, and inaccuracies in our perceptions. However, while our evolutionary past plays a large role in guiding our current mindsets and behaviors, it does not play the only role. In the next section, we will explore the second influence on human cognition – the "cultural download" received from birth into adulthood.

## Learned Cognitive Mindsets

The innate cognitive mechanisms undoubtedly help lead to our success as a species – but they're not the complete solution. For example, imagine a stockbroker from Wall Street, born and raised in the city, was placed into the Amazonian rain forest. There are no instinctual modules that "fire up" to help him find food, make fire, or build a shelter – yet humans have survived in the Amazon Basin for thousands of years[292]. He is missing, what Dr. Joseph Henrich (an evolutionary biologist at Harvard) describes as, a "cultural download" of knowledge (in this case, knowledge on how to survive in the jungle.)[293] In his book, *The Secret of Our Success*, he describes the "flexible intelligence" (previously talked about) as not coming from our instincts but being socially learned and passed down from one generation to the next. These social connections and cultural institutions, he argues,

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[292] Jonas Gregorio De Souza, Denise Pahl Schaan, Mark Robinson, Antonia Damasceno Barbosa, Luiz E. O. C. Aragão, Ben Hur Marimon, Beatriz Schwantes Marimon, et al. "Pre-Columbian Earth-Builders Settled along the Entire Southern Rim of the Amazon". *Nature Communications* 9, no. 1 (2018). https://doi.org/10.1038/s41467-018-03510-7.

[293] Joseph Patrick Henrich, *The Secret of Our Success: How Culture Is Driving Human Evolution, Domesticating Our Species, and Making Us Smarter* (Princeton, NJ: Princeton University Press, 2016).

have allowed us to produce sophisticated technologies, complex languages, and an ever-growing body of knowledge.

## *Defining Culture*

Humans, within a specific environment, faced many of the same challenges. These shared challenges led to a similarly shared collection of solutions used to solve these challenges. Many of these shared solutions take the form of cultural norms such as languages, numbering systems, spices in cuisine, and building styles. From this stance, we define **culture** as *a set of shared experiences*. Because of this broad definition, culture is not limited to ethnicity, religion, or geographies, as some definitions often restrict it to. Instead, it encompasses the shared behaviors, mindsets, and perspectives that are passed down through means other than genetics[294]. Cultures range across all domains of life, including hobbies, sports, hometowns, countries, religions, ethnicities, academic degrees, and much more. Since humans participate in many of these experiences, we can say that humans are the sum of many different cultures. Before understanding the influence of these cultures on our cognition, we must conduct an overview of our brain and its ability to be influenced by experience (and culture) – to that end, we continue.

## *Early Brain Development*

Our brain is constructed by more than 86 billion nerve cells[295], connected in functional networks and pathways, all with specific jobs[296]. These *functional networks of neurons*, or **neural circuits**, are created during prenatal development and guided by **genes**, or *life-building instructions within our chromosomes*[297]. Genes specify how the body and brain are assembled

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[294] Robert Sapolsky, *Behave: The Biology of Humans at Our Best and Worst* (London, UK: Penguin Random House, 2017), 271.

[295] Suzana Herculano-Houzel. "The human brain in numbers: a linearly scaled-up primate brain". *Frontiers in human neuroscience* (2009): 31.

[296] Department of Biochemistry and Molecular Biophysics Thomas Jessell, Steven Siegelbaum, and A.J. Hudspeth. *Principles of neural science*. Edited by Eric R. Kandel, James H. Schwartz, and Thomas M. Jessell. Vol. 4. New York: McGraw-hill, 2000.

[297] Ibid.

during development[298]. These genes are inherited from our parents, and immediately begin building a brain capable of learning. Simply put, **learning** is *external stimuli strengthening or weakening existing pathways, in anticipation of future usage*. At the earliest stages of life, during prenatal development, these circuits and pathways immediately began being used (and not used), subsequently becoming more strongly (or weakly) connected[299]. This concept is known as **Hebbian theory**[300], which states *the connections between two neurons are strengthened through repeated firing*. As we grow older, the *ability for our neural connections to change in response to environmental stimuli*, or **neural plasticity**, weakens. This term explains why children generally have an easier time learning languages and new skills[301]. Because of the tremendous amount of neural plasticity in children's brains, the events and environments they encounter profoundly impact their brain development[302]. This early usage of neural networks (or lack of) dramatically affects our neural connections, and consequently, how we process information and the world around us.

All behavior is guided by the interaction between genes and the environment[303]. To this end, two things determine the usage and subsequent strengthening and weakening of all neural pathways. First, genes create and assemble the brain into specialized modules. The second way the usage of these pathways is determined is through external environmental information input through the senses. Each human inherits a unique "starting point" of neural pathways (from their parent's genes), as well as a unique "cultural download" from their parents and the surrounding environment. As previously mentioned, prominent anthropologists such as Dr. Henrich,

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298 Ibid.

299 Donald Olding Hebb. *The organization of behavior: a neuropsychological theory*. J. Wiley; Chapman & Hall, 1949.

300 Ibid.

301 Heidi C Dulay and Marina K. Burt. "Natural sequences in child second language acquisition 1". *Language learning* 24, no. 1 (1974): 37–53.

302 J.P. Mersky, J. Topitzes, and Arthur J. Reynolds. "Impacts of adverse childhood experiences on health, mental health, and substance use in early adulthood: A cohort study of an urban, minority sample in the US". *Child abuse & neglect* 37, no. 11 (2013): 917–925.

303 Jessell, *Principles*.

suggest this cultural download is the secret to our flexible intelligence (or as he puts it in the title of his book *The Secrets of Our Success*.) We know that even these earliest changes and manipulation of neural pathways have fundamental and foundational implications towards learning[304], temperament[305], socialization[306], and perception of the world[307].

## *Shared Brain Development*

These earliest influences, known to be "relative, conditional, and changeable", are ultimately dependent on the environment of development[308]. However, shared experiences within a circumscribed social group or population are shown to produce similar effects on cognition and emotion; simply put, different cultures can have different shared experiences and thus different cognitive biases[309]. These psychological similarities within cultural groups are developed in the first months of infancy[310]. Shared cultural norms and current geopolitical events that guide parenting techniques and childrearing styles can become distinct from other cultures, leading to cultural diversity. This is in part because culturally common parenting styles result in similar environmental stimuli introduced to children, resulting in similar neural network manipulations[311]. The related effects on neural networks result in children collecting and processing information (cognition), as well as behaving and expressing emotions in similar ways within a culture. Because socioeconomic and cultural factors determine

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[304] Bond, *The Oxford,* 32–67.

[305] Ibid.

[306] Ibid.

[307] Ibid.

[308] Fan, L. "On contradiction in cognition development: A personal view". In *Issues in cognition: Proceedings of a joint conference in psychology.* Washington, DC: National Academy of Sciences, American Psychological Association. 1984.

[309] Sapolsky, Behave, 266–302.

[310] Ibid.

[311] Chen, Xinyin, Janet Chung, Rachel Lechcier-Kimel, and Doran French. "Culture and Social Development". *The Wiley-Blackwell Handbook of Childhood Social Development*, 2011, 141–60. https://doi.org/10.1002/9781444390933.ch8.

parenting and childrearing techniques[312] it is safe to say an individual's ecological environment, including language, culture, education, social class, etc., plays a critical and significant role in accounting for differences in cognition between cultures[313].

Many theories explore cultural effects on human development. According to Bronfenbrenner's ecological theory, the beliefs, values, and practices of culture play a significant role in lifetime development[314]. Other theories concentrate on the indirect consequences of culture by viewing the social institutions, education systems, and community services that culture constructs to affect development[315, 316]. Still, other theories look at the transmission and internalization of language and its effect on early childhood development[317, 318]. Language may have a profound impact on cognition because of its immediate focus to learn, constant exposure, and use for mental processes in practically all cognitive tasks[319]. As these studies suggest, by simply varying the language in which an analyst speaks, perceptions of the same event or information may differ similarly – other variations among analysts are likely to cause related effects on perception.

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[312] Marc H. Bornstein, "Cultural Approaches to Parenting". *Parenting* 12, no. 2–3 (2012): 212–21, https://doi.org/10.1080/15295192.2012.683359.

[313] Antonio E Puente, Maria Sol Mora, and Juan Manuel Munoz-Cespedes, "Neuropsychological assessment of Spanish-speaking children and youth", In *Handbook of clinical child neuropsychology*, pp. 371–383. Springer, Boston, MA, 1997.

[314] Urie Bronfenbrenner, Pamela A. Morris, William Damon, and Richard M. Lerner, "Handbook of child psychology", *The ecology of developmental process. Wiley Publishers* (2006).

[315] Ibid.

[316] Charles M. Super, and Sara Harkness, "The developmental niche: A conceptualization at the interface of child and culture", *International journal of behavioral development* 9, no. 4 (1986): 545–569.

[317] Barbara Rogoff, *The cultural nature of human development*, Oxford university press, 2003.

[318] Lev Vygotsky, "Interaction between learning and development", *Readings on the development of children* 23, no. 3 (1978): 34–41.

[319] Alexander V. Kravchenko, "How Humberto Maturana's biology of cognition can revive the language sciences", *Constructivist Foundations 6*, no. 3 (2011): 352–362.

## *Mental Maps of Reality*

Apart from behavioral differences, culture also affects the way we experience the world around us. This component of culture is known as **mental maps of reality (or mental mindsets)**, which act as *cognitive templates to help us navigate and organize sensory information*[320]*.* Because sensory input from the surrounding world has the potential to overload us with too much data and trivial information, mental maps aid us in: creating **heuristics** (or *mental shortcuts*), categorizing objects (such as color), guiding attention, and supporting memory[321].

Through **enculturation,** or *the process of learning culture*, people learn the cognitive lens and mental models in which their social groups view, organize, and understand the world[322]. This is an important concept to understand while analyzing an organization or individual of a different culture. Growing up in a Western country has ensured that Western norms, values, cognitive models, and mental maps are deeply inscribed into typical Euro-American analyst's "psychological fingerprint". These components are used subconsciously to interact with and understand the world surrounding them, events unfolding in front of them, and other individuals' actions opposing them.

However, the goal of analyzing particular groups or individuals has historically been described as *objectively* understanding that person or groups' past actions, *rationalizing* their current motives, and anticipating their *planned* future behavior. This understanding of the goal of analysis may be fundamentally misleading. As we have read, humans perceive the world, process information, and behave in subjective, biased, and irrational ways that are largely influenced by evolution and enculturation. Assuming that someone will act in an *objective*, *rational*, or *planned* way is stripping them of their humanity. The challenges of conducting analysis across

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[320] Kenneth J. Guest. *Cultural Anthropology: A Toolkit for a Global Age*. New York, NY: W.W. Norton & Company, 2014. 40.

[321] Jennifer S. Blumenthal-Barby, "Biases and heuristics in decision making and their impact on autonomy". *The American Journal of Bioethics* 16, no. 5 (2016): 5–15.

[322] Guest, *Cultural*, 36.

two different cultures (a European-born analyst following and tracking an Afghan farmer turned Taliban operative) are not created because the European-born analyst is allowing culture to "cloud" their judgment, but because the culture that is "clouding" his/her views is vastly different than the culture "clouding" the Taliban operative's views.

Often, these mental models are strengthened through constant and uniform stimuli. Because of this, humans are likely to develop intuitive and automatic responses to environments with little uncertainty or change. As we will see in the next section, this can either be good or bad, depending on the situation and profession.

## *Mental Models: Helpful or Harmful?*

A useful way to decide whether mental mindsets and models are useful is to look at different professions and their usage within them. Because jobs, sports, and leisurely activities all have unique experiences attributed to them, we can look at each instance as its own culture (or collection of shared experiences). Within these "cultures" we briefly examine some examples where mental models are advantageous, and some where they are not.

In some professions, fixed mental models are directly correlated to performance. People such as poker players, chess masters, and golfers all develop expertise through massive amounts of specific, hyper-focused, and repetitive practice. In these careers, players use "muscle memory" and cognitive equivalents, to intuitively recognize patterns and produce solutions. Chess masters are often quoted as knowing their next move within seconds, only taking more time to explore less plausible alternatives[323]. Through the repetitive study of patterns, players develop an intense domain-specific memory, aimed at recognizing and remembering these patterns once they appear. The amount of repetition required to develop this intuitive sight is so large, psychologists found a competitive chess players'

[323] David J. Epstein, *Range: Why Generalists Triumph in a Specialized World* (New York City, NY: Riverhead Books, 2019), 25–26.

chance of reaching international master status dropped from one in four to one in fifty-five if they had not begun intense training by age twelve[324]. It is important to note, intelligence analysis does not follow suit of the above careers. Specialized expertise developed over decades of repetition do little to aid in an analyst's judgment of a developing and novel situation. These findings suggest that analysts who specialize too narrowly, for too long, may make less accurate judgments and predictions.

As we saw, people who develop domain-specific expertise through repetitive experiences, are often engaged in disciplines with constant statistical regularities, that is, predictable rules govern the patterns with predictable outcomes. People who develop this type of intuitive expertise lose their inherent advantage when rules are slightly altered. A study asked accountants to apply a new tax law to their accounting report – the experienced accountants did worse than the novice ones[325]. In another study, scientists gathered experts and nonexperts in the game of bridge to compete. Before the games, however, scientists altered the order of play to the game, surprisingly nonexperts had an easier time adapting to the rule[326]. Through the above evidence, we see that developed intuition becomes disadvantageous when the rules and principles surrounding a domain are altered. As somebody reading this might guess, within the analysts' world of geopolitics and global economies, the "rules and principles" rarely remain the same. This shows the importance for analysts to deconstruct and challenge their preconceived notions and mental models of reality. Doing so may allow analysts to begin seeing the world in a whole new way – possibly, more like a scientist.

## *Impact on Intelligence Community*

Intelligence analysis is less like the narrowly focused fields above and more like a science discipline, tasked with exploring the unknown to make sense of the things around us. Much like scientists, analysts cannot intensely and

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[324] Epstein, *Range*, 26.

[325] Ibid.

[326] Ibid.

repetitively practice a task in hopes of developing domain-specific mental models. Each situation they encounter has new and unique characteristics. Unfortunately, this does not stop analysts from forming their own mental models and biased perspectives.

Analysts can counter these mental models and fixed mindsets through taking on hobbies and diversifying their education; in other words, by becoming generalists. One study found that scientists with memberships in the highest academies were more likely to have unrelated hobbies outside of work[327]. Additionally, Nobel prize winners are twenty-two times more likely to participate in amateur dancing, acting, and other performance types of hobbies[328]. Furthermore, compared to other scientists, nationally recognized scientists are more likely to be musicians, sculptors, mechanics, writers, etc. with Nobel prize winners more likely still[329]. The creative success of these top engineers and scientists can be partly attributed to their interests outside of their field. Dean Keith Simonton, a psychologist and creativity researcher, states, "rather than obsessively focus[ing] on a narrow topic", leading scientists have broad interests. He continues, "this breadth often supports insights that cannot be attributed to domain-specific expertise alone."[330]. These studies suggest that intelligence analysts, like scientists, should be encouraged to explore hobbies and interests outside of their focused expertise. These outside interests may help relieve analysts of their fixed perceptions and learned mindsets of the world around them.

Studying past intelligence shortcomings, one will see that analysts' mindsets are not problematic because they create biases, but rather they are problematic because they create biases that do not align with the biases of the adversary they are studying. Dr. Walton, a senior analyst turned author and professor, notes in his book *Challenges in Intelligence Analysis,* many intelligence shortcomings where analysts were not "thinking like the

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[327] Ibid, 32–33.

[328] Ibid.

[329] Epstein, *Range*, 26.

[330] Ibid., 33.

adversary"[331]. He describes, among many examples, the criticisms outlined in the 9/11 Commission, on the intelligence community not having red teams[332]. Red teams are, as defined in the US Department of Defense's Dictionary of Military and Associated Terms June 2020 edition, "an organizational element comprised of trained and educated members that provide an independent capability to fully explore alternatives in plans and operations in the context of the operational environment and from the perspective of adversaries and others."[333]. By not thinking like the enemy, Dr. Walton explains, analysts were not asking the right questions, focusing on the right threats, or collecting the right information. Katherine and Randolph Pherson, back this assertion in their book, *Critical Thinking for Strategic Intelligence*. They write, "almost every postmortem of past intelligence failures concludes that analysts were working from outdated or flawed mental mindsets and had failed to consider alternative explanations."[334]. They continue by commenting on intelligence failures such as the efforts before the 9/11 terrorist attacks "need[ed] to incorporate more rigor and creativity into the analytic process"[335]. This evidence suggests that intelligence analysts routinely and historically make faulty assessments because of misaligned cultural mindsets.

Mark Lowenthal – an internationally respected intelligence practitioner, researcher, and author -goes further in his book *Intelligence: From Secrets to Policy*, describing one of the most common flaws in analyst logic – mirror imaging, which he defines as *"assum[ing] that other leaders, states, and groups share motivations or goals similar to those familiar to the analyst."*[336]. Assumptions about the Soviet Union during the Cold War is an example of this. Analysts examined Soviet leaders, attempting

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[331] Timothy Walton. *Challenges in Intelligence Analysis: Lessons from 1300 BCE to the Present*. New York City, NY: Cambridge University Press, 2010.

[332] "The 9/11 Commission Report", The 9/11 Commission Report § (2002), https://govinfo.library.unt.edu/911/report/911Report.pdf, 339–383.

[333] "DOD Dictionary of Military and Associated Terms", www.jcs.mil (Joint Chiefs of Staff, June 2020), https://www.jcs.mil/Portals/36/Documents/Doctrine/pubs/dictionary.pdf, 181.

[334] Pherson, *Critical Thinking,* xxv.

[335] Ibid.

[336] Lowenthal, *Intelligence*, 163.

to categorize them as **hawks** (*a politician favoring military use)* or **doves** (*someone opposing military use)*. There was absolutely no evidence to suggest such divisions existed among soviet leaders, but it was assumed the political hierarchy shared similarities with the United States' political system (of which there were plenty hawks and doves). This assumption led analysts down unproductive reasoning paths, resulting in the mischaracterization of Soviet leaders.

As evidence suggests, analysts engaged in methods like red teaming are hindered by their own cultures' mental maps of reality (and mindsets). To counter these culturally learned mindsets, analysts must temporarily but deliberately step away from the western academic institutions that taught us scientific inquiry and causal thinking, Judeo-Christian family structures that taught us values, and nationalistic cultural groups that taught us social norms and cultural mindsets. We have seen how culture directly influences cognition and perception, starting at birth. Only by attempting to strip off western culture can we step outside of western cognition. Only by understanding and attempting to embody our target's culture can we step into the target's mindsets, views, and biases, to understand their cognition. Doing this will help us understand their past biases, examine their current irrationalities, and anticipate their future motives and behavior.

## *Moving Forward*

Analysts face a host of challenges to their analytical thinking. While some challenges arise from our evolutionary past, others are learned through our cultural upbringing. Although SATs and professionalization have attempted to counter these "threats to reason", more work is required on the intelligence communities' part.

Perhaps analysts should receive more encouragement to study alternative disciplines, apart from the traditional cybersecurity, political science, and economics fields. It could be that simply encouraging extracurricular activities and hobbies helps analyst become more generalist. Maybe red teaming operators can use "method-acting" techniques, seen in theatrical studies, to help divest from their cultural mindsets, and adopt their adversary's

cultural mindsets. Or perhaps there are cognitive mechanisms within our brain, evolved to solve an adaptative challenge, that we can use for sound analytical judgments.

## *Cheater-Detection*

One example of these cognitive mechanisms that may be advantageous is the "cheater-detection" module. Humans possess a tendency to be co-operative with each other[337]. However, when you cooperate or do a favor for someone, you temporarily reduce your fitness-level while increasing theirs, but with the expectation that they will do the same when needed. The advantages of exchanging favors and participating in cooperation aid individuals and family units in times of need and strengthen social groups. This tendency towards cooperation (or reciprocal altruism) guides our social behavior and our reasoning ability. Experiments show for a group to adopt a tendency towards reciprocal altruism, it must have the abil-ity to identify and "punish" noncooperators (also called "cheaters" or "defectors")[338]. Engaging in cooperation with a cheater would be costly to that individual; thus, specialized modules within our brain evolved to recognize cheaters.

The following "Wason selection problem" is a simple example of this evolved mechanism that demonstrates the idea that humans are particu-larly attuned to recognize cheaters. Imagine you are hired as an adminis-trative assistant. Your task is to check a set of documents to confirm they are marked according to the following office rule. "If the document has a D rating, then it must be marked code 3". Each card below has a letter rating on the front and numerical rating on the back. Which cards must you turn over to check for errors?

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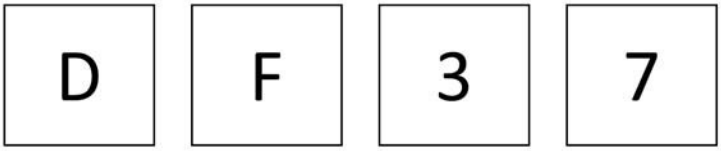
[337] Ernst Fehr, and Urs Fischbacher. "The Nature of Human Altruism". *Nature* 425, no. 6960 (2003): 785–91, https://doi.org/10.1038/nature02043.

[338] Michael S. Gazzaniga, Leda Cosmides, and John Tooby. "Social Exchange: The Evolutionary De-sign of a Neurocognitive System". In *The Cognitive Neurosciences*, 1295–1308. Cambridge, MA: MIT Press, 2004. https://psycnet.apa.org/record/2005-01373-087.




Do you have your answer? Before revealing the correct one, let us look at a second scenario with the same logical structure. Imagine you are hired as a bouncer in a bar. Your task is to check the bar patrons according to the following local law, "If a person is drinking beer, they must be over 20 years old". Each card below has the person's age on the front and beverage on the back. Which cards must you turn over to check for lawbreakers?


Do you have your answer? The solution to both questions is the first card and the last card. Chances are, you found the second scenario much easier to solve than the first. In the first scenario, you must ensure the 1st card has a 3 on the back, and the card marked 7 does not have a D on the front – the middle two cards are not restricted to any rules. Likewise, in the second scenario, you must ensure the person drinking the beer is 21, and the 16 year old person is not drinking beer, but there are no restrictions on drinking cola (you can be of any age) or being 25 years old (you are old enough to legally drink alcohol). Both scenarios have the same logical structure, but it is much easier to solve the second scenario.

The hypothesis that explains this difference in solving logically equivalent tasks at different levels of accuracy is that humans are evolved to instinctively detect cheaters within a social situation. If these cheater-detection modules developed in our evolutionary past, they should be apparent in all cultures and ages – and subsequent studies confirm this. The reasoning advantages of cheater-detection strategies have been observed in

children as young as three years old, across many different cultures[339, 340]. There are two theories in which this cheater-detection module is activated, by combining both, analysts may gain an edge in assessing specific situations.

## Social Exchange Theory

Leda Cosmides and John Tooby, two pioneers in evolutionary psychology, issued several Wason selection problems to groups of people and noticed an interesting trend[341, 342]. If the problem contained an element of "cheater-detection" or discerning whether somebody was benefiting from something they were not entitled to (the second scenario) then most participants could solve it. If the problem had no cheaters involved in the logical structure (such as the first scenario), participants had a hard time solving the problem. In their experiment, only 25% of participants solved the first scenario correctly, while 75% were able to solve the second one. Cosmides and Tooby reason reciprocal altruism could not evolve in a widespread and stable manner without the ability to recognize "cheaters" that do not reciprocate cooperation. Their explanation, called **Social Exchange Theory**, proposes these *cheater-detection modules evolved to identify cheaters and preclude them from future social interactions and exchanges*.

This theory was developed further in another study by Gigerenzer and Hug[343]. A rule, in the form of a social contract, was described to

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339 Denise Dellarosa Cummins, "Evidence for the innateness of deontic reasoning". *Mind & Language* 11, no. 2 (1996): 160–190, https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1468-0017.1996.tb00039.x.

340 Paul L. Harris, and María Núntez, "Understanding of permission rules by preschool children", *Child development* 67, no. 4 (1996): 1572–1591, https://srcd.onlinelibrary.wiley.com/doi/abs/10.1111/ j.1467-8624.1996.tb01815.x.

341 Leda Cosmides, "The logic of social exchange: Has natural selection shaped how humans reason? Studies with the Wason selection task", *Cognition* 31, no. 3 (1989): 187–276. https://www.sciencedirect. com/science/article/pii/0010027789900231.

342 Jerome H. Barkow, Leda Cosmides, and John Tooby, eds., *The adapted mind: Evolutionary psychology and the generation of culture*, Oxford University Press, USA, 1992. 163–229.

343 Gerd Gigerenzer, and Klaus Hug. "Domain-specific reasoning: Social contracts, cheating, and perspective change". *Cognition* 43, no. 2 (1992): 127–171. https://www.sciencedirect.com/science/article/pii/001002779290060U.

participants as follows, "If you stay overnight in a mountain shelter, you must help out by carrying up some firewood to add to the supply." Both groups of participants were asked to look for violations of the rule; however, group A was asked to look for violations to catch cheaters (cheater-detection), while group B was instructed to look for violations to determine if the rule was in effect (truth/hypothesis-testing). Group A solved the "cheater-detection version" between 78–90% of the time while Group B only solved it correctly around 40% of the time. In conclusion, not only must a social contract be present, but there must also be a possibility of cheating, to activate this module.

## Dominance Theory

While the phenomenon of the cheater-detection modules is observed cross-culturally, some anthropologists offer a different theory than Cosmides and Tooby's one. Dr. Denise Cummins – a renowned cognitive scientist and author – proposes **Dominance Theory**, which states that *cheater-detection is a cognitive adaption to sort through a group of problems surrounding social hierarchies*[344, 345, 346]. Cheating, in this definition, is simply violating a social norm. Violation detection, Cummins describes, is a function that constrains behavior within one's social group and maintains status – particularly a dominant position within that social group. Dominant positions are evolutionary beneficial because they have better access to food[347], are less likely to be preyed on,[348] and have higher

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[344] Denise Dellarosa Cummins. "Dominance hierarchies and the evolution of human reasoning". *Minds and Machines* 6, no. 4 (1996): 463–480. https://link.springer.com/article/10.1007%2FBF00389654.

[345] Denise Dellarosa Cummins. "The evolutionary roots of intelligence and rationality". *Common Sense, Reasoning, and Rationality, Oxford UP, Oxford* (2002): 132–147.

[346] Denise Delarosa Cummins. "Social norms and other minds". *The evolution of mind* (1998): 30-50. https://psycnet.apa.org/record/1998-06595-002.

[347] Tim Clutton-Brock and Paul Harvey, Patrick Bateson, Robert Hinde-Brock, T.H., P.H. Harvey, P.P. C. Bateson, and R.A. Hinde. "Growing points in ethology". (1976): 195–237. https://openlibrary.org/books/OL4880107M/Growing_points_in_ethology.

[348] Dorothy L Cheney, and Robert M. Seyfarth. *How monkeys see the world: Inside the mind of another species*. University of Chicago Press, 2018.

reproductive success[349, 350, 351, 352]. She argues that low-ranking members attempt to improve their social status within a group through cheating and deception[353, 354, 355], while dominant individuals maintain hierarchies and priority of access to resources by detecting and stopping attempts to cheat and deceive. Additionally, these dominant social positions are obtained and maintained through alliance formation, largely based on the reciprocal altruism described above[356, 357, 358, 359]. Therefore, it was a highly adaptive advantage to evolve the cheater-detection modules within all of us.

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[349] Tim H. Clutton-Brock, ed. *Reproductive success: studies of individual variation in contrasting breeding systems*. University of Chicago Press, 1988.

[350] Donald A. Dewsbury. "Dominance rank, copulatory behavior, and differential reproduction". *The Quarterly Review of Biology* 57, no. 2 (1982): 135–159. https://www.journals.uchicago.edu/doi/abs/10.1086/412672.

[351] Lee Ellis. "Dominance and reproductive success among nonhuman animals: a cross-species comparison". *Ethology and sociobiology* 16, no. 4 (1995): 257–333. https://www.sciencedirect.com/science/article/pii/016230959500050U.

[352] Linda Marie Fedigan. "Dominance and reproductive success in primates". *American Journal of Physical Anthropology* 26, no. S1 (1983): 91–129. https://onlinelibrary.wiley.com/doi/abs/10.1002/ajpa.1330260506.

[353] Richard Byrne, and Richard W. Byrne. *The thinking ape: Evolutionary origins of intelligence*. Oxford University Press on Demand, 1995.

[354] Robert W. Mitchell, "The psychology of human deception". *Social Research* (1996): 819–861. https://www.jstor.org/stable/40972317?casa_token=X2JzNdkqR7gAAAAA%3A7221pajpJcC7CggH2eIqRmauL1pPRi6N5mA_NBbVZc71Gm_2Vh7zMfV-R_drxirSzeyl5e9RNHAI9cMU0OuyFPPzesQ4ElMdNAO-JxGShwny_eU6WTug&seq=1#metadata_info_tab_contents.

[355] Andrew Whiten and Richard W. Byrne. "The manipulation of attention in primate tactical deception". (1988). https://psycnet.apa.org/record/1988-98392-016.

[356] Paul L. Vasey, Bernard Chapais, and Carole Gauthier. "Mounting interactions between female Japanese macaques: testing the influence of dominance and aggression". *Ethology* 104, no. 5 (1998): 387–398. https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1439-0310.1998.tb00077.x?casa_token=XZoeta3NEHQAAAAA:Rd2QfL86XJlmnca8iHiGnGagzAookH2tSK_Ur_206qwrJl8Vmg_rgExz6lgWmb5elhWQaEwDK6w_nw.

[357] Sudip Datta "Relative power and the acquisition of rank". *Primate social relationships* (1983). https://ci.nii.ac.jp/naid/10015026754/.

[358] Alexander H. Harcourt. "Alliances in contests and social intelligence". (1988). https://psycnet.apa.org/record/1988-98392-011.

[359] Robert M., Seyfarth and Dorothy L. Cheney. "Grooming, alliances and reciprocal altruism in vervet monkeys". *Nature* 308, no. 5959 (1984): 541–543. https://www.nature.com/articles/308541a0.

This theory was tested by a Wason Selection Experiment, similar to the ones described above[360]. Student participants were broken into two groups, a cheater-detection group (Group A) and a truth-testing group (Group B). Group A was given an important rule in the dormitory to follow, "if someone is assigned to tutor a study session, that person is required to tape-record the session."[361]. Similar to other Wason selection tasks, students were told to determine whether the rule was followed with a series of cards. Group B was presented the same rule, but with a different "cue". They were told to imagine overhearing someone in the hall say, "If I'm assigned to tutor a session, I always tape-record the session". They were shown the same four cards and told to turn over which ones were needed to know whether or not the person in the hall was telling the truth (truth-testing). Finally, both groups were subdivided into four subgroups: High-ranking, low-ranking, equal high-ranking, and equal low-ranking.

High-ranking: told they were Resident Assistant (RA) checking on students

Low-ranking: told they were a student checking on RAs

Equal high-ranking: told they were an RA checking on other RAs

Equal low-ranking: told they were a student checking on other students

The results validated the Dominance Theory. In every cell, 15–20% of the students correctly identified the violators, except for the "high-ranking" group. The exception, the High-ranking RAs checking the low-ranking students, tripled the percentage correct to 65%. These results mirror the results of the previously reviewed experiment and show how adopting a "high ranking" role within a social group may aid in detecting cheaters (or violators of social rules).

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[360] Denise Dellarosa Cummins. "Cheater detection is modified by social rank: The impact of dominance on the evolution of cognitive functions". *Evolution and human behavior* 20, no. 4 (1999): 229–248. https://www.sciencedirect.com/science/article/pii/S1090513899000082?casa_token=WsucrMHDZmcAAAAA:tnxFJVcH1A8DFQoiKL-Rb9NIs8pqr9nXs8X9c7BmTY3Ncqa80VBvkn3HO4qG7Jf9IhELTyjHMw.

[361] Ibid.

## The Application

An easy example to envision using this "cheater-detection" module as an analyst is to apply it within a social phenomenon accessible and familiar to most humans – competitive sports. In this example, imagine you are a drug investigator for the Tour de France, tasked with investigating potential doping misconduct and performance enhancing drug usage. As an investigator, you want to "get inside the head" of an athlete, to understand their motivations and anticipate their future misconduct. One way of doing this may be to use the innate cognitive mechanisms and learned cultural mindsets discussed throughout this paper (along with SATs).

First, an investigator trying to "activate" their "cheater-detection module might assume the role of a gold medalist cyclist who does not use performance-enhancing drugs or dishonest means to train and compete. By doing this, the investigator assumes a position of dominance within the social hierarchy of cyclists. Doing this evokes the "cheater-detection" module through both the *Social Exchange Theory* and *Dominance Theory*. Furthermore, an investigator trying to "activate" their cultural mindsets with the cyclists may use method-acting techniques used in theater studies to adopt the character of a cyclists. Doing this, the investigator attempts to indoctrinate themselves with the cultural mindsets and mental maps of reality, shared by top-level cyclists. Instead of using structed analytical techniques to objectively and rationally analyze a potential cheating cyclists' subjective and irrational behavior, they evoke artificially enculturated mindsets and naturally evolved instincts to help ask the right questions, search in the right places, and collect the right information.

Parallel applications for this may be found within: a Security and Exchange Commission's analysts investigating tax fraud, a DEA agent investigating illegal drug trade, a CIA or FBI analysts investigating election fraud, or a Department of State analyst investigating the misuse of disaster relief funds to a country. As you can see, there is a wide range of applications for domestically engaged or internationally focused analysts.

# Conclusion

Innate cognitive mechanisms and learned cultural mindsets have adverse effects on intelligence analysts' objective and logical decision-making. The paper supported this claim by showing (1) intelligence analysts are tasked with possessing objective and logical decision-making skills (2) evolved cognitive mechanisms that cause irrational thinking are innate within all humans (3) learned cultural mindsets adopted from childhood and the environment affect out impartial perception of the world. To counter the adverse effects, agencies have rigorous selection processes, employ structured analytical techniques, and use computer-aided analysis. The later section of the paper explored possible ways in which we might use innate cognitive mechanisms (cheater detection) and artificially learned mindsets (assuming the role of a cyclists) for an additional edge in sound analytical thinking.

Although we continue to develop new technologies and methods that help us collect, assess, and visualize information, humans will forever be at the center of analysis. For as long as the United States continue to exist, sitting at the CIA's desk in its Langley headquarters, will be an analyst defined by their evolutionary past and cultural upbringing – the American Ape.