

Chapter 2

Strategic Decision Making: Is it Chess or Poker?

If the opponent offers keen play I don't object; but in such cases I get less satisfaction, even if I win, than from a game conducted according to all the rules of strategy with its ruthless logic.

– Anatoly Karpov, Soviet and Russian Chess Grandmaster

The decisions we make in life involving our health practices, our choice of spouse, our educational pursuits, and our investments are major determinants of how our lives unfold. Though chance and opportunity are wild cards in the ultimate outcomes, the trajectories of our lives can often be traced back to our decisions made at key watershed moments. Though many of these choices are made on a spur-of-the-moment impulse, the most important decisions often follow information gathering and extended reflection. In chapters 2, 3, and 4, we examine the interplay of the cognitive processes involved in *strategic decision-making*—the process of translating our goals into a course of action. In particular, we address two important questions:

- What are the visceral and rational components of decision-making?
- Can decision-making in a crisis be decided by the logic of game theory?

If chess models a game of “ruthless logic,” then poker—involving bluffing, reading body language, and intimidation—models a game with both visceral and rational components. Which of these two games best models strategic decision-making in a crisis?

Strategic Decision Making and Game Theory

Inspired by the early triumphs of the hard sciences, the social sciences in the second half of the 20th century sought to add rigor and predictive power to their subjects by incorporating mathematical models. Research papers in a variety of subjects including economics, psychology, education, and business were increasingly populated with equations and mathematical formalism. With this evolution, fluency in mathematics was becoming an increasingly important component of *the new literacy*.

In 1944, John von Neumann and Oskar Morgenstern published their groundbreaking *Theory of Games and Economic Behavior* in which they sought to mathematize strategic decision-making.¹ By listing the options available to two adversaries and exploring the payoffs and penalties of each option, they sought to find an optimal solution for each combatant. As one of the fathers of the computer, von Neumann may have been anticipating a

future use of computer-based decision-making. Human judgements in the decision-making process would be replaced by algorithmic procedures that would yield optimal results the way today's computer chess programs scan the available options and choose the most promising move. What emerged from this publication was an entirely new branch of economics that is known today as *game theory*. Coincidentally, in fewer than ten years after its creation, this theory would be tested on the world stage in a dramatic political struggle that would threaten the existence of the human species, and be remembered as the most important period of decision making in human history.

The thirteen-day confrontation, known as *The Cuban Missile Crisis*, began on October 16, 1962 when President John F. Kennedy learned that the Soviet Union had secretly installed missiles in Cuba, posing a potential nuclear threat to the United States. For six tension-filled days, Kennedy and his executive committee, known as ExComm, debated the pros and cons of four possible responses to the Soviet-backed threat. In the end, it was decided to issue a naval blockade of Cuba, preventing any shipments of military equipment to that island. In the days following the announcement of that quarantine, the future of our species hung precariously on the decisions of the two most powerful men in the world and on the visceral reactions of a third man—a passionate patriot.

John F. Kennedy announces the Quarantine on Cuba—October 22, 1962

This government, as promised, has maintained the closest surveillance of the Soviet military buildup on the island of Cuba. Within the past week, unmistakable evidence has established the fact that a series of offensive missile sites is now in preparation on that imprisoned island. The purpose of these bases can be none other than to provide a nuclear strike capability against the Western Hemisphere.



courtesy of the JFK Library

...To halt this offensive build-up, a strict quarantine on all offensive military equipment under shipment to Cuba is being initiated. All ships of any kind bound for Cuba from whatever nation or port will, if found to contain cargoes of offensive weapons, be turned back: This quarantine will be extended, if needed, to other types of cargo and carriers. ... My fellow citizens, let no one doubt that this is a difficult and dangerous effort on which we have set out. No one can foresee precisely what course it will take or what costs or casualties will be incurred... But the greatest danger of all would be to do nothing.²

—John F. Kennedy

Strategic Decision Making: Is it Chess or Poker?

For almost two decades since the development of the nuclear bomb, scientists had warned of the devastation that would result from a war between two nuclear powers. With Kennedy's proclamation, the scientists' greatest fears teetered on the brink of a horrible reality. The two world superpowers, the United States and the Soviet Union, were on a collision course with potentially catastrophic consequences. If Chairman Khrushchev of the Soviet Union were to challenge the blockade, it could trigger the first war in history with the potential to eradicate life on this planet.

The Arbor Room: Tuesday, October 23, 1962

It was the day after Kennedy's strident ultimatum. With the specter of annihilation lurking in our collective unconscious, we shuffled around the circular table of the Arbor Room, claiming our personal territories. Eldon, the supernerd who often took leadership in our weekly meetings, was the last to arrive. Placing his briefcase on the floor and his aluminum teapot on the table, he raised his voice above the ambient din. "Well, guys do you think human emotions are about to trump our cerebral powers?"

David, a nerd of gentler temperament, had an understated presence—seldom aggressive, but deeply reflective, playing devil's advocate whenever the rest of us seemed to be in agreement. Responding in his typically phlegmatic fashion, he observed, "Well, we're in a very different place than we were a week ago, when you were dismissing the World Series as a tribal contest of us-against-them." (The New York Yankees subsequently defeated the San Francisco Giants in a tight 7-game contest.)

"What a difference a week makes!" responded Eldon, "We're in a tribal contest, except it's a *real* sudden-death east-west contest with a lot more than braggin' rights at stake."

"And a sudden-death struggle that both teams may lose," commented David, voicing the quiet desperation that hung over us like a foreboding cloud.

"This is a textbook example of the game of Chicken, and the entire human race is a potential victim," asserted Eldon in his characteristically-provocative style.

All four of us had seen the 1955 movie, *Rebel without a Cause*, in which James Dean stars as a rebellious teenager who engages in a dangerous game called "Chickie Run." In this supposed test of courage, two adversaries race stolen cars along parallel tracks towards a cliff. The first driver who ejects from the car loses and is deemed the "chicken". So, we were up to speed with the "Chicken" terminology.

"What do you mean, 'textbook example'?" I asked.

Eldon's intense eyes ignited and he sat erect, as I had observed on those

occasions when he relished the chance to showcase his knowledge. “It’s classic *game theory*. Have you all heard of it?”

The other two members of our motley gathering muttered that they had heard the term “game theory,” but claimed no formal knowledge of its content. Eldon’s range of knowledge was surprisingly broad; every branch of knowledge seemed to be grist for his intellectual mill and he ground down deeply into the content—he would never be chaff.

Waxing eloquent, Eldon continued in his professorial manner, “Game theory is the study of strategic decision making. It was invented by John von Neumann, a father of the modern computer and a key scientist involved in the creation of the first atomic bomb. In this case, the players in this game of Chicken are Kennedy and Khrushchev. In the game theory version of Chicken, a table is used to show the payoff associated with these four possible outcomes.” On a sheet of paper torn from his binder, Eldon sketched this simple table.

Table 2-1

		Player B	
		Swerve	Drive Straight
Player A	Swerve	tie game	B wins
	Drive Straight	A wins	worst outcome

“In the classic game of Chicken, two players are speeding toward each other on a collision course...”

“Wait, aren’t the two players driving in parallel tracks toward a cliff?” interjected David.

“No, that’s the movie version. In game theory, Chicken has the two players driving toward each other on the same track. The worst possible outcome for both players occurs if neither player swerves, i.e., they crash head-on and perish.”

“O.K., I got it,” nodded David in agreement.

Eldon continued, “The most desirable outcome for each player is to drive straight while the opponent swerves. The one who swerves is declared chicken and faces total humiliation while the winning player basks in the glory of victory.”

“So you’re saying that game theory can model this confrontation as a game of Chicken between Kennedy and Khrushchev; how so?” interjected David.

“Well it all began a week ago when Kennedy discovered that Khrushchev, with Castro’s cooperation, had placed missiles in Cuba. This left Kennedy with only two options, accept the missiles, i.e., capitulate, or take action against the missiles, i.e., escalate.

David pressed on, “But how does game theory enable either of them to

Strategic Decision Making: Is it Chess or Poker?

find a winning strategy?”

“Wait for it; it gets better! Suppose that both players in a game of Chicken are racing toward each other and one player signals his intention not to swerve by yanking out the steering wheel and throwing it out the window. The other player has only two options: total disaster or swerve and accept the “chicken” humiliation. Choosing humiliation is the rational solution for the other driver. When Kennedy announced the blockade, and asserted, ‘The greatest danger of all would be to do nothing’ he indicated that he would not capitulate. This declaration was equivalent to throwing the steering wheel out the window. Kennedy took mutual capitulation off the table as an outcome, leaving Khrushchev with capitulation as his rational solution.” Eldon didn’t draw another table, but his description brought this table to mind.

Table 2-2

		Khrushchev		Kennedy removes these options.
		Capitulate	Escalate	
Kennedy	Capitulate	not available	Khrushchev wins	
	Escalate	Kennedy wins	worst outcome	

“Hold on, it’s not that simple,” interjected David as he leaned back in his chair, and chewed pensively on his coffee stick. “Khrushchev has the option of further negotiation!” David, who boasted an IQ in excess of 170, seemed to derive special pleasure in playing devil’s advocate. “Khrushchev could announce a conditional withdrawal of missiles in Cuba contingent on Kennedy’s removal of the US missiles in Turkey that threaten the Soviet Union.”

“Sorry for the pun, David, but that ship has sailed. Once Khrushchev reverses his field, and submits to the blockade, he’s done and it’s game over. It’s Kennedy 1, Khrushchev 0,” retorted Eldon with a gesture of closure.

David resumed his challenge, “This model is too simplistic for me. Kennedy’s refusal to capitulate is not equivalent to throwing the steering wheel out of the window. Khrushchev knows that the newly-elected president doesn’t want war and that he would be open to negotiation. This model doesn’t offer that as an option. A good model would offer more alternatives and would factor in the probabilities that each antagonist would assign to his adversary’s possible moves.”

Eldon leaned forward in an offensive gesture, “What order does Khrushchev give when the Americans attempt to board his ships to inspect the cargo for missiles? Capitulate or escalate?”

David paused and then responded thoughtfully, “Well, if you look at the payoff matrix for this game of Chicken, [Table 2.2] you get a Nash equilib-

rium³, and the rational strategy for both players is to escalate; then everything spirals out of control.”

“I thought you said you didn’t know any game theory,” queried Eldon, somewhat dazzled by David’s use of game theory terminology.

“I know enough to challenge the reliability of a mathematical model for human decision making,” responded David.

Sean, who had been watching intently, devoured a chocolate donut as if it were his last meal before the arrival of Armageddon. Wiping his chocolate-covered fingers methodically with a tissue, he interjected, “This reminds me of *The Ballad of East and West*. What we have here is two strong men, standing face-to-face from opposite ends of the earth.” Scanning our group for signs of accord, he asked, “Do you guys like Kipling?”

*Oh, East is East and West is West,
and never the twain shall meet,
Till Earth and Sky stand presently
at God’s great Judgment Seat;
But there is neither East nor West,
Border, nor Breed, nor Birth,
When two strong men stand face
to face, though they come from
the ends of the earth!*

Rudyard Kipling

“I don’t know, I’ve never kippled,” quipped Eldon.

Sean winced. It was a joke he’d heard before and he wasn’t amused by the dismissal of what was offered as a serious contribution to the discussion. Unrelenting, he continued, “Kipling’s observation is relevant here. This confrontation isn’t about East vs. West; it’s really about a contest between Kennedy and Khrushchev—a confrontation between two strong men who cannot afford to lose face on the world stage.”

The animated discussion continued for an hour or so, without consensus, though I could see my three companions beginning to converge in their perspectives. Originally, Eldon was strongly promoting his thesis that the Cuban Missile Crisis could be modeled using the tenets of game theory. He had assumed that the adversaries were plotting their strategies in a purely cerebral way, as in a chess match, where all options are considered and the move with the greatest perceived promise is chosen. Sean and David, on the other hand, had originally assumed that the crisis was a power struggle between two strong males in a turf war, alternately employing the tactics of intimidation and concession to gain the upper hand. They felt that the decisions were significantly influenced by visceral responses to confrontation.

Fig. 2.1

**Perceptions of the Decision making Process
in the Cuban Missile Crisis**



Through the course of the debate, it became apparent to us that there were many more “unknowns” than “knowns.” In the absence of more complete information, we agreed to suspend further debate until more details emerged—perhaps acknowledging the 2500-year-old wisdom of ancient Chinese philosopher Confucius who observed, “True wisdom is knowing what you don’t know.”

The Missile Crisis Escalation & Climax

We didn’t have to wait long for events to unfold. The next day, Wednesday, October 24, the world learned that Kennedy, consistent with his promise, had set up a naval blockade with a radius of 800 miles off the coast of Cuba. Establishing a blockade in international waters, was traditionally regarded as an act of war, so Kennedy had called it a *quarantine*. The tension between the two superpowers seemed to be building to a calamitous climax. Would the Russian ships submit to a search? Would they attempt to run the blockade and trigger an irreversible military exchange of fire? Would an unauthorized act by someone of low rank precipitate a thermonuclear war?

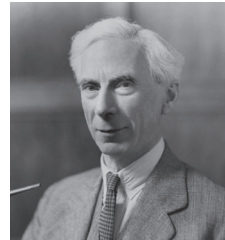
Bertrand Russell, who had been asserting for a decade that the Cold War was a game of Chicken, sounded the alarm: “It seems likely that within a week we shall all be dead.”⁴ Many waited in quiet desperation for life’s grand finale.

When Armageddon seemed inevitable, news came from the Director of the Central Intelligence Agency (CIA) John McCone, reporting that Soviet ships in the face of the blockade had turned around. Secretary of State Dean Rusk announced, “We’re eyeball to eyeball, and I think the other fellow just blinked.”⁵ For a brief period, it appeared that Kennedy had won the game of Chicken and Khrushchev had capitulated; a resolution may be in the offing. However, it would soon be apparent that this was merely the calm before the storm. The Soviet Union continued to deny that there were missiles in Cuba and Kennedy began to consider further escalation.

On Thursday, October 25, Kennedy’s Executive Committee continued discussing in secret the removal of the missiles by force. In the greatest mobilization of troops since World War II, the US prepared for a possible invasion of Cuba to remove the missiles with “surgical” air strikes.

Not more than 24 hours later, Fidel Castro sent a letter to Khrushchev calling for a nuclear response in the event of an invasion of Cuba. In what is now called the *Armageddon Letter*, Castro raised the ante another notch⁶:

I believe the imperialists’ aggressiveness is extremely dangerous and if they actually carry out the brutal act of invading Cuba in violation of



Bertrand Russell
1872–1970

By Bassano Ltd via Wikimedia Commons

international law and morality, that would be the moment to eliminate such danger forever through an act of clear legitimate defense, however harsh and terrible the solution would be.

Castro's ominous threat of a nuclear response brought the Cuban Missile Crisis to a climax on October 27—now known as *Black Saturday*. At 12:12 a.m., the US sent its NATO allies a message indicating, “The United States may find it necessary within a very short time in its interest and that of its fellow nations in the Western Hemisphere to take whatever military action may be necessary.”⁷ At 6 a.m. the CIA reported that its reconnaissance had revealed that all the Soviet missiles in Cuba were set for deployment. Then, just before noon, Major Rudolf Anderson flying an American U-2 spy plane was shot down and killed by a surface-to-air missile launched from Cuba. The US had suffered its first casualty in what appeared to be an imminent nuclear exchange. A critical escalation in the game of Chicken was unfolding.

Later that afternoon, a Soviet submarine armed with a nuclear-tipped torpedo approached the blockade line. The US Navy dropped a series of warning depth charges unaware that the three officers on board the submarine had orders to launch the torpedo if engaged in battle. One of the three Soviet officers, Vasili Arkhipov, prevailed over the other two officers who were urging the launch of the deadly torpedo in retaliation. Many decades later the world would learn the details of what happened on that fateful day and how close the human race had come to a nuclear holocaust.

Denouement

On Sunday, October 28, Khrushchev announced over Radio Moscow that he had sent a letter to President Kennedy, agreeing to remove the missiles from Cuba. In exchange for this, Kennedy had agreed that the United States would not invade or support any invasion of Cuba. The thirteen-day Cuban Missile Crisis was over. It appeared to the world that Khrushchev had capitulated and that Kennedy had stared down the Soviet Chairman in a battle of nerves. Fidel Castro, feeling betrayed by Khrushchev, expressed outrage and accused the Soviet leader of cowardice in the face of the American might. China's leader of the Communist Party, Mao Zedong, joined in the condemnation of what they perceived as Khrushchev's lack of courage.

What Really Happened During those Critical 13 Days?

In the decades that followed the Cuban Missile Crisis, new information began to emerge that told the real story in the negotiations and strategies that took place behind closed doors. Robert F. Kennedy's posthumous memoir, *Thirteen Days*⁸, released in 1969, revealed a secret contract between him

Strategic Decision Making: Is it Chess or Poker?

and the Soviet leaders who occupied the Kremlin. A series of conferences⁹ between 1987 and 1992 featured interviews with his brother's former aides, Soviet insiders, and Cuban veterans, including Fidel Castro, that revealed the motives of the key decision makers in the US, the USSR (Union of the Soviet Socialist Republics), and Cuba throughout the Crisis.

In 1998, Aleksandr Fursenko and Timothy Naftali published *One Hell of a Gamble: Khrushchev, Castro, and Kennedy, 1958-1964: The Secret History of the Cuban Missile Crisis*¹⁰, in which they revealed information from the secret archives in Moscow, including notes of Politburo meetings and Khrushchev memos. These documents provided insights into Khrushchev's leadership style, his personality, and the inner workings of the Kremlin prior to and during those thirteen critical days. These new sources of information revealed a substantial gap between the public perception of the Crisis throughout the 1960's and the reality of what happened.

How Did Kennedy and Khrushchev Analyze their Options?

In the next chapter, we explore the secret files that reveal how Kennedy and Khrushchev made decisions in the high-stakes game of super-power dominance. As some of their "unknowns" became "knowns", they saw their options and the consequences through a different lens. These changing perceptions profoundly modified their decisions as events unfolded. Through a detailed study of this process, social scientists have gained invaluable insights into several vital questions such as:

- How did Kennedy and Khrushchev prioritize the options available to them prior to making a decision?
- What were the critical factors in reaching a decision?
- Was the decision making predominantly visceral or cerebral?
- Can a mathematical discipline such as game theory prescribe decision making in situations such as the Cuban Missile Crisis?

In the past three decades, researchers studying the dynamics of decision making have discovered some fascinating aspects of human instinct that evolved over the past million years to optimize our chances of survival. These insights have widespread implications that extend well beyond political confrontation and into areas as comparatively innocuous as marketing and lifestyle.

Epilog

Our Arbor Room foursome came through the Cuban Missile apocalypse sharing the popular assumption that Kennedy had won a slightly modified version of the game of Chicken. We were relatively confident, albeit to different individual degrees, that decision making is predominantly rational. This would enable us to mathematize the process sufficiently to predict the outcome of the decision making in any confrontation. We continued to believe that game theory, in particular, and mathematics in general, would enable us to solve many of the important problems facing our species. The austere and dispassionate allure of mathematical reasoning was so seductive that we embraced this vision with the bold confidence of youth. Indeed, we set out on our journey through life with the optimistic naïveté that Alexander Pope had described 250 years earlier when he, himself, was only 23 years of age:¹¹

*Fired at first sight with what the Muse imparts,
In fearless youth we tempt the heights of Arts;
While from the bounded level of our mind
Short views we take, nor see the lengths behind...*

–(from *An Essay on Criticism*– Alexander Pope 1711)

As our story unfolds, I will share with you the discussions and experiences that shaped the perspectives of my three friends in their journey from high intelligence to wisdom. In the process, one of them became a billionaire, another became a world-renowned physicist, and the third ... well, we'll discover that in time.

Chapter 3

Strategic Decision Making in a Crisis: The Cerebral Component

True wisdom is knowing what you don't know

–Confucius, Chinese philosopher c. 500 BC

Khrushchev fears that Kennedy intends to invade Cuba;
Kennedy fears that Khrushchev wants to “bury” the US.



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November 18, 1956
Nikita Khrushchev:

Мы вас похороним!
translated into English
by Khrushchev's
personal interpreter
Viktor Sukhodrev as:
We will bury you!

The Arbor Room: Tuesday, October 30, 1962

It was just two days after the climax of the Cuban Missile Crisis. In spite of the gloomy skies and drizzle on this late October day, all four of us were basking in a mood of muted jubilation. We had come from an animated lecture in applied mathematics in which Professor Ross had demonstrated how the equations of the orbits of the planets could be derived from Newton's Law of Universal Gravitation. Using the calculus and the polar coordinates that Newton had developed, we were able to solve these differential equations and predict the locations of the planets at any time in the future. This was the mathematics of rocket science and the burgeoning new field of space exploration! With calculus and the techniques for solving differential equations, we would be able to describe and predict natural events with almost any degree of precision. It was a heady time for anyone equipped with some basic mathematical skills and elevated aspirations. In the decades that followed, I would never recapture that euphoric intellectual optimism.

Wiping the remnants of a chocolate donut from his lips, Sean prodded Eldon, “Hmmm, looking a little smug today?”

Eldon paused as he prepared his response, “Well guys, I don't want to gloat, but it looks like Kennedy won the game of Chicken. Khrushchev

had to turn tail and remove his missiles from Cuba and Kennedy merely had to promise not to invade Cuba. A game theory analysis of each player's options has shown itself to be a powerful tool in determining an optimal strategy in a conflict situation."

Though David was small in stature and mild mannered, he had a mind that pursued a line of argument with the passion of a dog after a bone. He wasn't going to let Eldon get away with a simplistic analysis of the events. "Surely, you don't believe that Khrushchev merely chickened out. There had to be something going on behind the scenes that we don't know about."

"I agree with David", asserted Sean. "Losing face is something that the leader of a world power like the Soviet Union can't afford. Neither nation in this Cold War can appear to be weak, so Khrushchev must have received some concessions somewhere. The old Chinese proverb, 'build golden bridges behind your enemy', recognizes the importance of leaving your adversary a smooth path for retreat. So, I assume Kennedy must have made some undisclosed concessions to the Soviets in return for the missile removal."

"Alright," responded Eldon, "you tell me. What did Khrushchev get out of this? Some of his ships had to turn tail and flee the blockade and others had to submit to a search. After denying at the United Nations that the Soviet Union had placed offensive weapons in Cuba, he had to admit that he had lied and that there were, indeed, Soviet missiles in Cuba. Then he had to agree to remove all the missiles from Cuba. Can you imagine how ticked Castro must have been? Khrushchev lost credibility with the world, and he alienated his allies, Cuba and China. If that's not losing face, what is?" demanded Eldon, with the intensity of a courtroom lawyer.

The more we debated the issue, the more we realized that we did not have enough information to draw any reliable conclusions. We would have to live with our impressions of what had happened and wait for the other shoe to drop.

What really happened?

For the rest of the decade and beyond, the common perception of the Cuban Missile Crisis was that it was, indeed, as Eldon had suggested, the classic game of Chicken and Kennedy had won. However, new information that emerged in the final two decades of the 20th century told a different story. Throughout the confrontation, the decision makers toggled back and forth between cerebral and visceral modes, revising their estimates of the efficacy of each option and the payoff of each outcome. Understanding the complex interplay of cerebral and visceral components in the decision making process through the Cuban Missile Crisis requires an insight into the contrasting personalities of the two antagonists.

Why did Khrushchev Place Missiles in Cuba?

John F. Kennedy was inaugurated on January 20, 1961. A few days later, he was informed of a secret plan, initiated the previous year by the Eisenhower administration, to sponsor an invasion of Cuba. The US Secret Service had been recruiting anticommunist exiles from Cuba with the intention of overthrowing the Castro regime. The invasion was to be launched from Guatemala and all US involvement was to be secret. The plan required that the incoming President make the final decision on whether to proceed.

Three months after taking office, the youngest person elected to the US Presidency convened a groupthink meeting at the White House, in which he sought advice from the CIA, the military, and members of his administration about the viability of the invasion. Based mainly on the advice of his military advisors, John F. Kennedy signed the order, on April 4, 1961 to proceed with a preemptive attack on the beaches of the Bay of Pigs on April 15.

What later became known as the “Bay of Pigs fiasco” was a disaster for the invading forces, and was subsequently regarded as one of the greatest blunders in American foreign policy. Castro’s military decimated the invaders within 3 days, and the American prestige on the world stage suffered a devastating blow. Kennedy later commented to his journalist friend Ben Bradlee, “The first advice I’m going to give my successor is to watch the generals and to avoid feeling that because they were military men their opinions on military matters were worth a damn.”¹ The bungled operation convinced both Castro and Khrushchev that Kennedy was determined to invade Cuba. This set the stage for the Missile Crisis.

Understanding Khrushchev’s great gamble in Cuba requires an insight into the Soviet leader’s personality and political style. The secret archives in Moscow reveal that Khrushchev seldom sought advice from the KGB during this tense period². Frequently, he made unilateral decisions based on his own instincts. In this way, his style was more akin to a high-stakes poker player than a methodical chess master. He would bluff, bully, and gamble to gain advantage, even when his hand was significantly weaker than his opponent’s.

On one occasion, he convened a meeting of his top nuclear scientists in the Kremlin’s Oval Room, where he announced his decision to resume nuclear testing of the Soviet bombs. Andrei Sakharov, the pre-eminent Soviet nuclear physicist and future Nobel Prize winner, challenged this decision, suggesting that a resumption of testing might benefit the US more than the USSR. At the dinner that followed, Khrushchev delivered a scathing response to the esteemed scientist who dared presume to understand the intricacies of political strategy³:

[Sakharov’s] moved beyond science into politics. Here he’s poking his nose where it doesn’t belong. You can be a good scientist without understanding

a thing about politics. Politics is like the old joke about the two Jews traveling on a train. One asks the other: "So, where are you going?" "I'm going to Zhitomir." "What a sly fox," thinks the first Jew. "I know he's really going to Zhitomir, but he told me Zhitomir so I'll think he's going to Zhmerinka."

The angry outbursts and emotional tirades of Nikita Khrushchev belied his shrewd political instincts. He used these emotional displays to test his adversaries and plan his strategies. It was no accident that he was able to reach the pinnacle of power in a regime dominated by intrigue and secret alliances.

Since Kennedy had only come into power in January 1961, Khrushchev had a limited basis for anticipating how the young president might react to political pressure, bullying, or friendly overtures. In characteristic style, he sought to test him and exploit any weaknesses he might find. His brief encounters with JFK had convinced him that the inexperienced president was an intellectual who could be bullied. In fact, decades later, Khrushchev's son Sergei recalled his father asserting⁴, "If Kennedy discovers the missiles in Cuba, he will make a fuss, make more of a fuss, and then agree." This was a key assumption that underpinned Nikita Khrushchev's decision to place nuclear missiles in Cuba.

Khrushchev met with Castro in the spring of 1962 and by the summer, Soviet ships were transporting missiles, nuclear warheads, and tens of thousands of Soviet troops to Cuba under secret cover. By September 1962, the Soviet Union was rushing to complete its missile installations in Cuba. Khrushchev needed to test his assumption about Kennedy's response when he would eventually discover the missiles. Would this precipitate a nuclear attack on Cuba, or would Kennedy merely capitulate? The Soviet leader decided to investigate by inviting JFK's close friend and famous poet, Robert Frost to meet with him, ostensibly to initiate a "noble rivalry" between the superpowers in the creation of literary works. The venerated poet was delighted to accept the invitation. He had hoped to tap into Khrushchev's openness and persuade him to take a road not taken by previous Soviet administrations. Stewart Udall, Secretary of the Interior, who accompanied Frost on the visit later wrote an article titled, *Robert Frost's Last Adventure*:⁵

At the time, I wondered why Khrushchev was so solicitous about Frost, and why he spent so much time with me. We realized later that he was [using] us because he was obsessed with President Kennedy's forthcoming response to his nuclear lunge. Would Kennedy order an invasion of Cuba? Would nuclear weapons be used by the United States? The condition of Kennedy's nerve, and his initial interpretation of Khrushchev's intentions would be decisive. When I look back now with the benefit of hindsight, Khrushchev's conduct was both conservative and cunning. He was trying, with deceptive twists and turns,

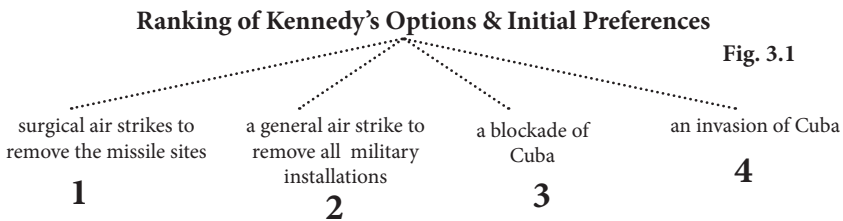
Strategic Decision Making in a Crisis: The Cerebral Component

to keep Washington guessing, to present a peaceful face one day and a tough stance the next. He mentioned Cuba to me only once, and it involved a typical Khrushchevian anecdote. To show me he was abreast of Washington politics, he noted that “some Senators” were demanding that Kennedy invade Cuba. He said it reminded him of a conversation young Maxim Gorki once had with the elderly Tolstoy. Gorki asked Tolstoy about his sexual prowess, and the older man replied, “I have the same desires -- but my performance doesn’t measure up.” There was an earthy guffaw, and a sharp challenge: “That’s the way your Senators are. They talk big, but they can’t perform.”

The US missiles in Turkey and Italy on the borders of the USSR represented a potential threat to Soviet security, while the US was an ocean away from a reciprocal Soviet threat. Khrushchev wanted to redress this perceived imbalance in nuclear strike capability. Furthermore, the ill-fated Bay of Pigs Invasion in 1961 convinced Khrushchev that the US was planning to invade Cuba. The Soviet missiles with nuclear warheads that targeted the entire US mainland would enable Cuba, an ally of the USSR, to provide a powerful deterrent against such an attack. It was also possible, in the long term, that Cuba could provide a beachhead for the eventual spread of Communism into the Western Hemisphere. Hoping that the missile sites in Cuba would be a *fait accompli* by the time they were discovered and gambling that Kennedy would acquiesce once their existence was known, Khrushchev bet on his instincts, and shipped the missiles and nuclear warheads to Cuba.⁶ It was a gamble that launched the Cuban Missile Crisis.

The Cerebral Component of Kennedy’s Decision Making

When Kennedy saw the photos of missile sites in Cuba on October 16, he cursed and dismissed acquiescence as an option. Having a Soviet missile base with nuclear potential situated 90 miles off the American mainland was unacceptable. Realizing that further delays would enable the completion of the missile site installations, he initially dismissed further negotiation as an option. Then he and his ExComm identified four possible responses to Khrushchev’s preemptive move.⁷



In figure 3.1, Kennedy’s original preferences are numbered from 1 to 4

with 1 denoting his favored option. His eagerness to remove the missiles before they became operational, prompted him to favor an immediate “surgical” air strike that might be less likely than a general air strike to precipitate an all-out conflict.

As the ExComm discussions continued, all the options were explored and each option had its group of supporters. The ExComm consisted of “Hawks”, who supported strong military action, (options 2 and 4) and “Doves”, who were prone to seek less drastic responses (options 1 and 3). When the military contingent indicated that a surgical air strike would probably not remove all the missiles, Kennedy began to move toward his second choice, a general air strike. Though the fourth option, an invasion of Cuba was supported by some of the Hawks, it was taken off the table because it violated international law in the way that the Japanese invasion of Pearl Harbor had in 1941. When the meeting ended, Kennedy was committed to the general air strike and the date for this attack was set at October 20.

Thursday, October 18: New reconnaissance U-2 plane photographs of missile installations in Cuba revealed that there were intermediate-range ballistic missile (IRBM) sites. These missiles could reach most of the continental US excluding the Pacific Northwest, enabling the Soviet-controlled arsenal in Cuba to obliterate the US missile sites in a preemptive strike. This new information prompted General Maxwell Taylor, the chairman of the Joint Chiefs of Staff to recommend reinstatement of option 4—a full invasion of Cuba, arguing that anything less would not be enough to remove these offensive weapons. Meanwhile, Llewellyn Thompson, a special advisor on Soviet affairs was urging the consideration of a naval blockade, but this was dismissed by the generals because it wouldn’t address the missiles that were already in Cuba. JFK’s memory of the bad advice, received from the Chiefs of Staff during the Bay of Pigs invasion, prompted him to assign greater credibility to advice from Thompson and the Secretary of Defense, Robert McNamara, who both cautioned that an invasion might precipitate a nuclear war. Furthermore, option 3, a blockade, would provide for more negotiation and give Khrushchev a respectable path for retreat.

Friday, October 19: John Kennedy held a 45-minute meeting with the Joint Chiefs of Staff to inform them of his inclination to institute a blockade. He wanted to present a united front to the American public and wanted to ensure that the Chiefs were on board. A blockade would require the full cooperation of the military.

The generals were outraged by what they perceived to be the equivalent of Chamberlain’s appeasement at Munich before World War II. General Curtis LeMay, nicknamed, “Old Iron Pants,” for his “devil-take-the-hindmost” approach to confrontation, was furious with Kennedy’s reluctance to take

immediate military action. Suggesting that many Americans would feel that Kennedy had “wimped out” under the Soviet threat, he stared the President in the eye, and asserted, “You are in a pretty bad fix at the present time.”

Kennedy paused as if he couldn’t believe his ears. “What did you say?” LeMay repeated his assertion, “You are in a pretty bad fix.” Containing his anger, Kennedy responded with a sardonic chuckle, “You’re in there with me.” It was clear to the President that he was squeezed between a hostile foreign power and his military Chiefs who saw preemptive strike as the only viable option.

When JFK left the meeting, he was livid. He said to his political advisor, Kenneth O’Donnell, “These brass hats have one great advantage in their favor. If we...do what they want us to do, none of us will be alive later to tell them that they were wrong.”⁸

Before departing on a five-day campaign swing across the US, JFK asked his brother, Robert, to attempt to gain unanimity on the decision to establish a blockade. Any dissension among members of the ExComm could lead to political problems if the blockade were to fail. In his absence, the ExComm continued to deliberate. Throughout the day, the preferred options ran through the entire spectrum of choices from invasion to blockade, and concluded with a majority of support for an invasion.

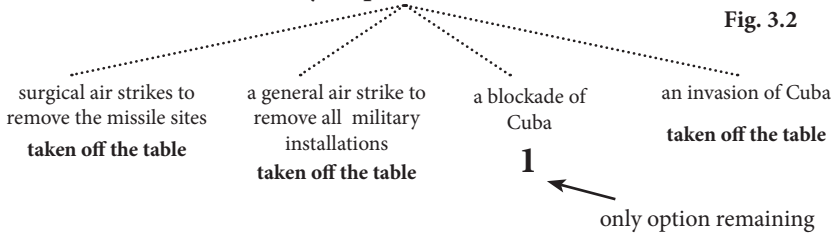
Saturday, October 20: Robert Kennedy called the President who was in Chicago, and urged him to come back to Washington immediately to lead the ExComm deliberations. New intelligence reports revealed that at least eight medium-range ballistic missiles (MRBMs) in Cuba were operational. This meant that any attack by the US was unlikely to remove all the Cuban offensive weapons, leaving some nuclear sites capable of retaliation. A nuclear response by Cuba to an air strike therefore seemed highly probable. This information suggested that the cost of any military strike in human lives was much greater than originally estimated. After two hours of discussion, a vote was taken and the blockade option became the official ExComm choice. It was agreed that the President would deliver a nation-wide address informing the American public about the missiles in Cuba and his intent to institute a “quarantine” to prevent the transport of additional missiles to that island. A copy of Kennedy’s speech along with a covering letter would be sent to the Soviet premier Nikita Khrushchev.

As the flow of new information emerging from the discussion reduced the gap between the perceptions of the decision-makers and the reality, the order of the preferred options had changed dramatically. JFK’s preferences had taken the new ordering in figure 3.2. The fear of precipitating a nuclear war had trumped the immediate impulse to remove the missiles by force.

INTELLIGENCE

Kennedy's Options & Final Decision

Fig. 3.2



Monday, October 22: President Kennedy, wrapped up his meeting with the ExComm and left to deliver his speech announcing the blockade. One of the audiotapes from the Oval Office, declassified years later, recorded his reason for choosing the blockade option⁹:

If we go into Cuba, we have to all realize that we have taken the chance that these missiles, which are ready to fire, won't be fired. We are prepared to take it, [but it would be] one hell of a gamble.

At 7:00 p.m. that evening, Kennedy delivered his address to the nation, indicating that the USSR had secretly installed in Cuba offensive missiles with nuclear capability. He stressed that this Soviet missile base threatened the entire Western Hemisphere and announced that the US would set up a naval quarantine to search ships that might be carrying offensive weapons to that island. The address contained this appeal to the Premier of the USSR:¹⁰

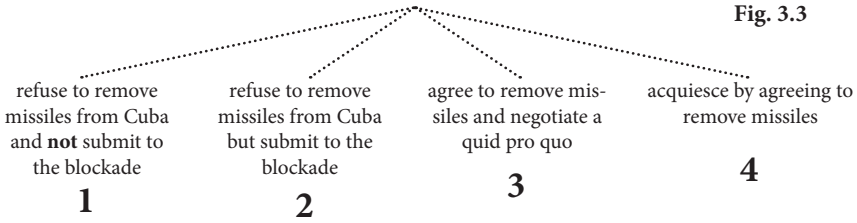
I call upon Chairman Khrushchev to halt and eliminate this clandestine, reckless and provocative threat to world peace and to stable relations between our two nations. I call upon him further to abandon this course of world domination, and to join in an historic effort to end the perilous arms race and to transform the history of man. He has an opportunity now to move the world back from the abyss of destruction...—by refraining from any action which will widen or deepen the present crisis—and then by participating in a search for peaceful and permanent solutions.

The Cerebral Component of Khrushchev's Decision Making

Khrushchev's opponent in this game had neither folded nor called the bet. Instead, he had chosen to up the ante. Kennedy had cleverly seized the moral high ground by announcing to the world that offensive nuclear weapons had been secretly installed 90 miles off US borders by the USSR. By announcing the blockade as a "quarantine," he sidestepped the charge that his actions were an act of war. Most importantly, he chose the option that provided his adversary with a face-saving exit strategy.

Ranking of Khrushchev's Options & Initial Preferences

Fig. 3.3



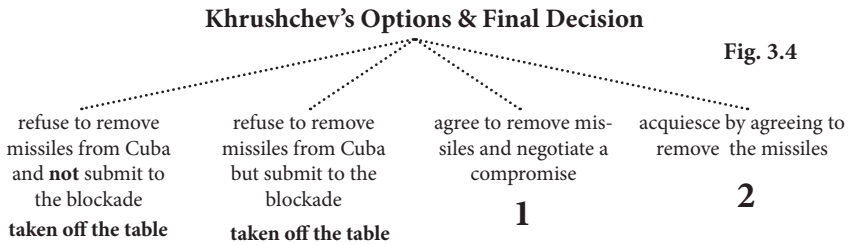
Khrushchev's initial response to Kennedy's letter was anger. His preferred options in order from 1 to 4 are shown in figure 3.3. The Soviet premier felt that the American missiles in Turkey and Italy that threatened Soviet borders entitled the USSR to station its missiles in Cuba. Consequently, he decided, in spite of the embargo, to press on with the installation of the missile sites. He put the entire military on high alert, suspended all leave, and prepared for war. For Khrushchev, options 3 and 4 were not viable choices. Option 1 was his visceral response to the threat of force implicit in Kennedy's blockade. It is not clear whether he had dismissed option 2 at this point. In his strident reply to the American president, on October 24, he threatened to run the blockade and apply force if necessary¹¹.

The Soviet Government considers that the violation of the freedom to use international waters and international air space is an act of aggression which pushes mankind toward the abyss of a world nuclear-missile war. Therefore, the Soviet Government cannot instruct the captains of Soviet vessels bound for Cuba to observe the orders of American naval forces blockading that Island. Our instructions to Soviet mariners are to observe strictly the universally accepted norms of navigation in international waters and not to retreat one step from them. And if the American side violates these rules, it must realize what responsibility will rest upon it in that case. Naturally we will not simply be bystanders with regard to piratical acts by American ships on the high seas. We will then be forced on our part to take the measures we consider necessary and adequate in order to protect our rights. We have everything necessary to do so.

In the Khrushchevian style described by Stewart Udall as "presenting a peaceful face one day and a tough stance the next," the Soviet premier wrote a conciliatory letter the same day to Bertrand Russell stating¹², "The question of war and peace is so vital that we should consider useful a top level meeting in order to discuss the problems that have arisen." Khrushchev was extending an olive branch to Washington in his open letter to Russell, but Washington did not respond. In fact, on the morning of October 25, Khrushchev received a strong letter from Kennedy admonishing him for his deception and his precipitation of the crisis. It was clear that Kennedy

would accept nothing less than the removal of all the missiles from Cuba.

Previously that morning, the Soviets in the embassy in Washington had informed Khrushchev that the US was preparing for some military action. Realizing that events were spiraling out of control, Khrushchev convened a meeting of the Presidium to formalize a new Soviet response to the US blockade. At that meeting, he indicated that it was necessary to step back from the brink of war and find another way to protect Cuba from invasion by the US. It has been conjectured that Khrushchev’s change of heart came from a recognition that the United States had a superior nuclear force and that the Soviets could not prevail in a battle fought so far off their shores. The 68-year-old Premier wished to investigate whether Washington would be amenable to an agreement whereby the Soviet Union would remove the missiles from Cuba, conditional on a US promise not to invade that island. Khrushchev’s plan was approved by the Presidium, but the details would depend on the negotiation process. In a period of one day, Khrushchev’s discovery of Kennedy’s refusal to accept the missiles in Cuba transformed his preferred options in accordance with figure 3.4.



The Final Agreement

Robert F. Kennedy’s posthumous memoir, *Thirteen Days*, provided some of the details of a series of secret negotiations he conducted with Soviet ambassador Anatoly Dobrynin that led to the final agreement in the settling of the Missile Crisis. When the dust had settled on a series of thrust-and-parry negotiations, President Kennedy pledged that the US would agree not to invade Cuba without direct provocation. Furthermore, the US would also remove the Jupiter missiles it had stationed in Turkey and Italy, in exchange for Soviet agreement to remove its missiles from Cuba and return them to the Soviet Union under United Nations supervision. An important part of this agreement was that while the US pledge not to invade Cuba should be made public, the removal of the missiles from Turkey and Italy must remain secret. John Kennedy feared that publicly announcing the removal of the missiles from Turkey might alarm American allies in NATO and also make the US appear to be submitting to the Soviet Union’s aggressive action.

How Kennedy and Khrushchev approached the Known Unknowns

In pure games there is no gap between reality and perception. Properly programmed, a computer can identify from a series of options the optimal choice. However, when we attempt to apply game theory to human decision making in real-life situations, we face the problem that our knowledge of the viable options is imperfect and we must make assumptions to fill the gap between reality and perception, i.e., what we know and what we know we don't know. Facts that we know are called *known knowns* and facts that we know we don't know are called *known unknowns*. On October 16, 1962, when Kennedy learned of the existence of the missiles, many questions emerged. How many Soviet technicians or troops were in Cuba? Where were the missile sites? How many sites were there? Were the missiles armed with nuclear warheads? These were known unknowns—things that Kennedy knew he didn't know. Khrushchev also wondered how Kennedy would react. The tables below display some of the known unknowns and the gaps between their assumptions and the corresponding reality.

Table 3-1

Table of Known Unknowns—The Gap between Perception and Reality

Kennedy		
Known Unknowns	Initial Assumptions	Reality
How many Soviet technicians were in Cuba?	Robert McNamara told Kennedy that there were about 6000 to 8000 Soviet technicians in Cuba.	There were in fact, 43,000 fully-armed, battle-ready Soviet troops in Cuba.
Did any of the missiles have nuclear warheads?	The military assumed the MRBM missiles were not operational nor equipped with nuclear warheads.	In addition to MRBMs, there were IRBMs and 100 nuclear tactical rockets aimed at US targets.
Would the Soviet submarine launch a nuclear torpedo if it had one?	Kennedy assumed that the Soviet submarine would not launch a nuclear torpedo.	The Soviet submarine was under orders to fire its nuclear torpedo if fired upon by depth charges.

Table of Known Unknowns—The Gap between Perception and Reality

Khrushchev		Table 3-2
Known Unknowns	Initial Assumptions	Reality
How would Kennedy react when he discovered the missiles in Cuba.	Kennedy would acquiesce when he discovered the missiles in Cuba. ¹³	Kennedy had dismissed acquiescence as an option. ¹⁴

The Quest to Transform Known Unknowns into Known Knowns

In the crucial days of strategic decision making, Kennedy worked intensely with the military intelligence to gain more information about the missiles and reduce that gap between his assumptions and reality. As he reduced this gap, the viability of each option changed dramatically and that changed his decisions.

In *One Minute to Midnight: Kennedy, Khrushchev, and Castro on the Brink of Nuclear War*, author Michael Dobbs observed:¹⁵

The President may be the best-informed person in the world, but there's still much that he doesn't know. The beginning of wisdom for any president—certainly including JFK—is understanding that you are groping about in the dark.

Kennedy had learned from the failed Bay of Pigs operation that his generals had not collected enough information to support competent decision-making. Not only had they underestimated the capability of Cuba's air force, but they had assumed that once the invaders established a beachhead on the Bay of Pigs, they could advance northward to the Escambray Mountains. From there, they had planned to conduct a series of raids—unaware that a formidable swamp, stretching over 100 miles, stood between the Bay and the Mountains. JFK had learned the importance of information gathering.

Khrushchev attempted to close the gap between his perceptions and reality by interviewing Americans who knew Kennedy. Both leaders sought to make more informed decisions by converting known unknowns into known knowns. As they gained more information, the priority order of their options changed. Kennedy moved away from a surgical air strike, that would likely have triggered a nuclear response, and chose *instead* a quarantine. In his ability to gather evidence to inform his decision-making, Kennedy was exhibiting one of the defining characteristics of higher intelligence.

Hypothesis 3.1

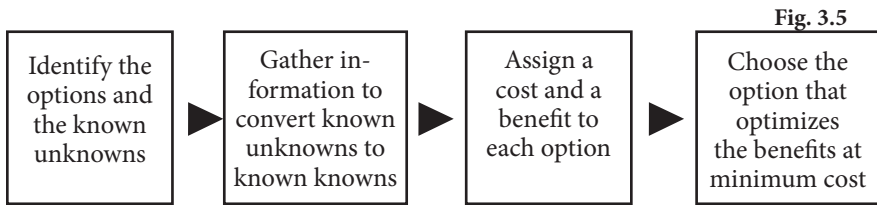
An important indicator of high intelligence is the ability to change your opinion in the face of compelling evidence.

Khrushchev retreated from his initial effort at intimidation and moved toward conciliation. The quest on the part of both leaders to convert their known unknowns into known knowns was the cerebral component of their strategic decision making. However, lurking beneath this process was a hidden visceral component that assigned payoffs to the possible outcomes and this became a vital determinant in the ultimate decision of each leader.

Epilog

Tapes, testimonials, and transcripts of deliberations during the Cuban Missile Crisis have provided us with a unique opportunity to analyze the decision-making process under dire circumstances. As the behind-the-scenes details of this confrontation were unveiled, we learned about the complex interplay of visceral and cerebral processes that began with a visceral reaction followed by a frenetic quest to gain information and a scramble to assign potential payoffs and penalties to each option. The flow chart in figure 3.5 summarizes the stages through which both leaders reached their final decisions.

Stages in the Decision-Making Process of Kennedy and Khrushchev



The first two steps in this flow chart represent the “cerebral” part of the decision-making process, as outlined in the previous section. However, it’s the third step in this flow chart that returns us to our original question about the efficacy of game theory in modeling decision making. A key assumption of game theory is that all participants make purely rational decisions based on their knowledge of the choices and the probable outcomes. If an optimum choice of several options exists, then any two participants with the same “known knowns” should reach the same decision. However, we observed in the discussions among members of the ExComm, that there was substantial disagreement at each stage about the preferred option—in spite of the fact that all members were in possession of the same facts. The generals perceived an aggressive military strike as the appropriate choice, while Llewellyn Thompson and Robert McNamara preferred negotiation and a less aggressive choice.

Since all these men were in possession of the same facts, it was in the third stage of the flow chart that they must have differed—likely in their perceptions of the probable costs and benefits of each option. Since all the known knowns were shared, these opinions must have been spawned from instincts at the unconscious level. What were these visceral elements that caused Kennedy to differ from his generals, and caused Khrushchev to capitulate and risk global humiliation?

INTELLIGENCE

In the next chapter, we reveal the visceral component of the decision making that, in the end, averted an apocalyptic conclusion to the greatest potential disaster in the history of the human race. These insights reveal the challenges faced by any attempt to reduce all human decision making to an algorithmic process that can be modeled by artificial intelligence.

Chapter 4

Strategic Decision Making in a Crisis: The Visceral Component

Truly successful decision making relies on a balance between deliberate and instinctive thinking.

–Malcolm Gladwell, Canadian journalist and author

The Arbor Room: Tuesday, November 6, 1962

The carefree ambience of early fall faded into the past as the bright October days of colored leaves and football parades with marching bands yielded to the dank and dreary days of early November. As I walked across the University of Toronto campus to Hart House, I heard a different kind of marching band and turned to my left to see a column of old men in navy blue tunics and grey trousers stepping proudly to the beat of the drummer. Their brilliant red poppies revealed that they were rehearsing for the Remembrance Day ceremonies, commemorating those who died in the two World Wars. The parade ended at the Soldiers' Tower where the names of alumni who had died in battle were inscribed. In a flash, I recalled a poem that our grade five class at Roselands Public School had memorized under protest.

World War II had ended just 17 years earlier, and only two weeks ago, we had a brush with World War III. My mother, a voracious reader of history, had asserted that every generation has a war. She spoke sardonically of World War I that was declared to be *the war to end all wars*. "How naive," she would say, "to believe that humans can put an end to war. War is part of our tribal instinct, programmed into our genes by evolution to prevent us from over-populating our planet." I had assumed that rational thinking would always overrule our emotions in de-

In Flanders Fields

*In Flanders fields the poppies blow
Between the crosses, row on row,
That mark our place; and in the sky
The larks, still bravely singing, fly
Scarce heard amid the guns below.*

*We are the Dead. Short days ago
We lived, felt dawn, saw sunset glow,
Loved and were loved, and now we lie
In Flanders fields.*

*Take up our quarrel with the foe:
To you from failing hands we throw
The torch; be yours to hold it high.
If ye break faith with us who die
We shall not sleep, though poppies grow
In Flanders fields.*

– Lieutenant Colonel John McCrae¹

cision making during crises. In my enthusiasm for the power of rational thought, I dismissed her assertion with the same dispatch as her declaration that if Kennedy were elected President, he would be assassinated. It was easy to dismiss her predictions as “off-the-wall,” because mother was not good at chess or checkers.

As I entered the Arbor Room, I could hear Eldon’s voice above the din. “War is who we are; look at our cousins!”

“What do you mean?” inquired David.

“We’re primates. Before we learned to farm 12,000 years ago, we were hunter-gatherers, traveling in tribes and killing animals to survive. We, like our primate cousins, fought for territory and killed competing tribes when our space was threatened,” responded Eldon.

Sean interjected, “But not all primates are prone to war. The gorillas are gentle creatures who live in small families. They’re herbivores, so they don’t eat meat and they kill only in self-defense. You can’t pick a particular species of primate and make a generalization to humans.”

Eldon sat straight in his chair, as if grouping a flood of ideas into a single response. “I agree. We have to look at the record of human history to determine which primate species we most resemble. Let’s take a simple example. Before the Europeans came to America this continent consisted of Indian tribes who staked out hunting grounds that they protected in territorial wars. When the Europeans came to America, they used their superior technology and numbers to slaughter the Indians and occupy their territory. The human propensity for war has not only allowed the strongest tribes to prevail, but has given our species a survival advantage in limiting our population to match the available resources.”

“I’m with Eldon on this one,” I asserted. “We don’t have to go back as far as the conquest of America. Look at World War II. It was a direct result of Hitler’s invasion of Czechoslovakia and Poland, and Japan’s conquest of mainland China, that later culminated in the attack on Pearl Harbor. As our world population increases, these territorial instincts are going to come to the fore in a much more dramatic way.”

Looking Eldon squarely in the eye, David changed tactics, “Eldon, are you saying that the human instinct for war is so strongly hardwired into our psyche that we are unable to overrule its influence in our decisions?”

Eldon saw where David was going and he could see a potential checkmate. “I know I argued that the decision making in the Cuban Missile Crisis was predominantly cerebral, and that the visceral or instinctive component was minimal. That challenges my current assertion that our instinct for war may prevail over our cerebral decision making. Let me backtrack a little. I am asserting that our instinct to respond to a threat with a warlike

response will always be with us, but I believe that our cerebral abilities can overrule this instinct. That's how we averted a disastrous war during the Cuban Missile Crisis."

Sean, who had been listening intently as he devoured his donut, responded, "Actually, the point that David and I were making in last week's discussion is that it was the human instinct for self-preservation that overruled the tribal instinct for war. That was the major determinant that moved Kennedy and Khrushchev to a peaceful resolution of the problem."

Eldon sat back in his chair and poured his tea from the silver aluminum pot as he reflected on Sean's comments. "You raise a good point. I've tended to think of the decision making as a contest between the cerebral and the visceral, but the resolution of the Cuban Missile Crisis may, as you suggest, have resulted from two competing instincts—war vs. self-preservation."

"Yes," agreed David, "Our instincts are unconscious programs that evolved in the past few million years or so, but their operation is invisible to us. We're seldom in touch with the reasons behind our responses."

Eldon reflected, "It's ironic that we use our recently-acquired reasoning power to create atomic weapons, yet we continue to invoke the instincts of our tribal beginnings to make decisions about their use."

Supporting what seemed to be an evolving agreement, I inserted a personal anecdote. "A few years ago, our family considered acquiring a dog. My father suggested we make a list of the pros and cons of owning a dog and then decide. In the list under 'cons' we noted that dogs cost money, they need frequent walking, they can complicate travel arrangements, etc. It was a very long list. Under the 'pros' column, we had only one item, 'we want to include a dog in our family.' Guess what? We bought a dog. Assigning a weight to each factor was a purely visceral exercise—all the reasons against acquiring a dog were outweighed by the single desire to have a dog. How can you make purely rational decisions when the weights assigned to the outcomes are derived from your emotional needs?"

Sean listened attentively during my description of our dog conundrum. "Actually, I think our decisions involve a combination of the cerebral and the visceral. If the price of acquiring a dog were beyond your family's financial reach, that factor could trump the desire to have a dog. The intuition is a powerful distillation of inherited and learned behaviors, but we need to resort to rational thinking when our intuitions lead us astray. Last summer we were at the cottage where there are lots of rocks inhabited by large garter snakes. My mother was freaking out; the stealth movement of these reptiles pushes her terror button, so she asked me to kill the snakes. I decided to move them to another location. Although I knew that garter snakes are not venomous and are incapable of harming me, I was afraid to grab one.

So, I put on a glove and moved slowly and quietly toward a snake that was sunning itself on a rock. My heart was racing and I could feel an elevated anxiety as I seized it by the tail. The writhing reptile spiralled upward to attack my hand. The snake seemed heavier than expected and that increased my anxiety as I ran down the lane and tossed it into the dense brush. The pounding in my chest told me that something in the deeper underbrush of my brain was overriding my cerebral understanding that the snake was harmless. I subsequently removed more of those snakes, attempting to re-program my intuition, though I never fully eradicated this fear.”

“Right now,” interjected David, “I’m consumed by an irrational fear that if I don’t get to the physics lab early I’ll incur the wrath of Cuddles.”

“Hey, that’s a very rational fear,” commented Sean as he snapped the clasps on his briefcase. “Cuddles is definitely a force to be reckoned with. I’m right behind you.”

Cuddles was, indeed, a formidable presence in the McLennan Lab² and she terrorized more than one generation of MPC students—but more about her later. As I too scurried to the physics lab, I reflected on the give and take of our Arbor Room discussion. Most people I encountered would take a position in a debate and defend it to the limit, barely acknowledging other points of view and often repeating the same argument with escalating vehemence. However, our group was distinctly different in their openness to opposing opinions. My confreres seemed to welcome challenging opinions as an opportunity to learn. In the years that followed, it became evident that this disposition paid significant dividends in enhancing our learning and moving us into the higher echelons of sophisticated thinking.

How Prevalent is the Human Instinct for War?

In our Arbor Room discussion on October 23, 1962, we shared the general public perception of the Cuban Missile Crisis as a conflict that could be modeled by the game theory version of Chicken. However, during our discussion on November 6, we came to suspect that the visceral components might have played a more prominent role in the decision making, though none of us knew how prominently the emotions and the instincts of the antagonists factored into that confrontation.

On December 21, 2015, the US top-secret report *Strategic Air Command Atomic Weapons Requirements Study for 1959* was declassified.³ Contained in that report was the list of 1100 Soviet-bloc airfields and 1200 population centers in the Soviet Union that were targeted by the US for nuclear destruction in the event of a nuclear war. The US Strategic Air Command was committed to the idea that winning a nuclear war would require a quick preemptive or reactive strike that would quickly incinerate millions of

people and devastate the enemy.

The fact that intelligent humans could coldly contemplate the brutal annihilation of millions of members of their fellow species is a grim reminder that our visceral reaction to a perceived threat has not evolved much beyond our tribal days. Stephen Schwartz, author of *Atomic Audit*⁴ called the target list “grim and frankly appalling.”

However, the lessons of history have taught us that humans are territorial animals and the ongoing competition for land and resources demands that military escalation by a rival be met with a sufficient deterrent. Indeed, World War II taught us that if the Allies had been unwilling to prepare for or engage in war with the Axis Alliance they would have become subject to the tyranny of those aggressors. Even prominent intellectuals like Albert Einstein and Bertrand Russell—originally pacifists—revised their opinions on the necessity of preparing for war in the face of a bellicose adversary.⁵

Until recently our closest cousin, the chimpanzee (who shares 98% of our DNA) was believed to be one of the few primates that does not kill other members of its species for territorial acquisition. However, in 2010, anthropologist John Mitani and his colleagues completed a ten-year study in which they observed a large chimpanzee community at Ngogo, Kibale National Park in Uganda. During this time, they witnessed the Ngogo chimpanzees killing 18 members of a rival group and then occupying their territory. In their publication titled, *Lethal Intergroup Aggression Leads to Territorial Expansion in Wild Chimpanzees*, Mitani et al. state, “A causal link between lethal intergroup aggression and territorial expansion can be made now that the Ngogo chimpanzees use the area once occupied by some of their victims.”⁶ These findings support Eldon’s suggestion that the pursuit of territorial conquest may be an innate part of human nature that we and some other primates have inherited from our common ancestors.

In times of emotional stress, we humans revert to our instinctive biological beginnings. Like our fellow animals, we respond to threats from external tribes by mobilizing for war. It is naïve to think that people who plan for defense are evil, inhuman or uniquely hawkish. These are instincts we all share. As Walt Kelly said in his POGO cartoon, “We have seen the enemy



1997- The Russians prepare to destroy a ballistic SS-19 missile in Vakulenchuk, Ukraine—a former Soviet base.

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and he is us.” Indeed, our mere survival at the top of the food chain has shown that our instincts have served us well during the first million or two years in our evolution. However, our technology has changed more dramatically than our fundamental nature, and these primitive instincts are now threatening our survival.

Understanding the mechanisms that come into play as people make decisions in crisis situations requires a deeper insight into human cognition and the unconscious mind where all our hidden instincts reside. We refer to these instincts as *unknown knowns*, because they are programs or scripts etched in our brains through evolution or experience and are known only to our unconscious mind. They are visible only indirectly through our behaviors.

An Instinct that Plays a Key Role in Decisions during Crisis

In 2002, Daniel Kahneman, whom you met in the introduction, shared a Nobel Prize in economics for his research on human decision-making under conditions of uncertainty. In a series of studies, he and his colleague Amos Tversky presented to large numbers of people, choices such as the following:

Choose A or B

Choice A

Toss a coin. If it shows heads you win \$100; if tails, you win nothing.

OR

Choice B

You receive \$46 for sure.

Though the rational choice is A (because it yields the greater expected value⁷ of \$50), it was found that an overwhelming majority of people selected B as their preferred choice. The researchers themselves recognized that they too preferred choice B. This discovery led them to investigate more deeply how people make decisions and to develop a theory of choice that they called *Prospect Theory*. The major insight that ultimately became the essence of prospect theory was that humans have evolved to be *loss averse*. This loss aversion prompts us to take a sure thing over a potential gain, even when the potential gain is disproportionately greater than the sure thing. Furthermore, our loss aversion prompts us to seek risk when given the choice between a sure loss and the chance of a loss.

In his research, behavioral economist Matthew Rabin offered the following proposition to a large number of people:

Toss a coin. If it shows heads you win \$200; if tails you lose \$100.

Most people rejected the gamble, even though the expected value is a gain of \$50⁸. In 2000, he proved mathematically that according to standard (utility) theory, anyone who rejects the proposition above *must* also reject the following:⁹

Toss a coin. If it shows heads, you win \$20,000; if tails, you lose \$200.

It is clear that many people who would accept the second proposition might reject the first. Rabin's theorem proves that utility theory cannot distinguish between these two propositions. Hence, the loss aversion embedded in the human psyche prevents us from making purely rational decisions as defined in game theory. That is, in situations that threaten loss or regret we select less than the optimal solution. Furthermore, the degree to which a decision maker departs from a rational decision depends on that person's loss aversion—known as his *loss aversion coefficient*.

Loss Aversion in Golf—Playing Not to Lose

The human tendency toward loss aversion was observed in a study of golfers published in 2011. In golf, the number of strokes that a 0-handicap (excellent) golfer is expected to take from the tee shot to the final putt is called *par* for that hole. One stroke less than par represents a gain of one stroke against the golf course, and is called a *birdie*. One stroke more than par represents a loss of a stroke against the course and is called a *bogey*. If loss aversion is a factor in professional golf, then it would be expected that golfers would be more focused on protecting against a loss than making a gain. That is, they would sink a higher percentage of their par putts (protecting against a loss) than birdie putts of comparable length (attempting to gain). In their paper titled, *Is Tiger Woods Loss Averse? Persistent Bias in the Face of Experience, Competition, and High Stakes*¹⁰, Pope and Schweitzer analyzed 2.5 million birdie and par putts of 241 golfers on the PGA Tour. After collecting data on the success rates of birdie and par putts *from equal distances*, they verified that on average golfers make their birdie putts significantly less often than they make similar par putts. That is, professional golfers were significantly more focused on avoiding the loss of a stroke than on taking a risk to gain a stroke. Of particular interest in this study is the researchers' observation, “[variation in] loss aversion across players is significant,” that is, the loss aversion coefficients of professional golfers differ significantly.

Did Loss Aversion come into Play in the Cuban Missile Crisis?

The decision processes applied by Kennedy and Khrushchev were analyzed in a series of conferences organized by Blight and Lang of the Thomas J. Watson, Jr., Institute for International Studies at Brown University between 1989 and 1992.¹¹ It was found that those with the heaviest burden of responsibility for making decisions that could bring mass destruction to the human population tended to lean toward the least aggressive choices. Both leaders recognized that they carried the ultimate decision and hence the heaviest responsibility for their government's actions. Kennedy had expressed this emotion at the height of the Missile Crisis in reciting from a poem by Spanish bullfighter, Domingo Ortega:¹²

*Bullfighter critics ranked in rows
Crowd the enormous Plaza full;
But only one man is there who knows
And he's the man who fights the bull.*

While there was a “Chicken” component to the Kennedy-Khrushchev confrontation, the body of evidence emerging in the half-century following the Cuban Missile Crisis indicated that the situation was much more complex. Both antagonists struggled in repeated attempts to avoid a thermonuclear confrontation without appearing to capitulate. In the end, both Kennedy and Khrushchev capitulated. It may have been closer to a tie than an all-out victory for Kennedy, although JFK was the perceived victor. In the words of Thomas Blanton¹³:

We now know that the Cuban Missile Crisis arose from a certain degree of adventurism on both sides—Kennedy's covert actions against Castro and Khrushchev's secret missile deployment—and that it was resolved only because both men were willing to risk humiliation rather than Armageddon.

The fear of precipitating a nuclear war and the ethical burden of responsibility for mass destruction of human life moved both leaders back from the brink. This was the visceral component—risk aversion—in the final decision to negotiate. In his bestselling book *Blink: The Power of Thinking without Thinking*, Malcolm Gladwell notes “Truly successful decision making relies on a balance between deliberate and instinctive thinking.”¹⁴

In the Missile Crisis, the initial responses of Kennedy and Khrushchev were visceral. Kennedy was angry when he discovered missiles in Cuba. His initial inclination was to retaliate and he prepared for a “surgical strike”. This “gut” response was followed by a shift into rational mode when he met with the ExComm to solicit more information about known unknowns, such as the locations, numbers, and nuclear capabilities of the missile sites.

Strategic Decision Making in a Crisis: The Visceral Component

Meanwhile, Khrushchev operating in rational mode, attempted to determine how Kennedy might react on discovering the existence of the Russian missiles in Cuba. When Kennedy announced the blockade, Khrushchev was outraged. His initial reaction was visceral, i.e., to refuse access to his ships and to retaliate. He prepared for war.

After Major Rudolf Anderson's U-2 was shot down by a surface-to-air missile launched from Cuba, both leaders realized that the confrontation was escalating out of control. Not wishing to bear the responsibility for the first nuclear war, both leaders assigned a huge negative payoff to the "worst outcome" in the game theory model—they moved to negotiation.

The Cuban Missile Crisis provides some key insights into the interplay of the cerebral and visceral components in strategic decision making. It appears that skilled decision makers toggle back and forth between visceral and cerebral modes as they assess their options and assign weights to the outcomes. However, the weights assigned to the possible outcomes derive mainly from visceral considerations that vary from person to person.

Can Game Theory Model Decision Making in a Crisis?

In the classical economic theory of choice, each possible outcome of one or more decisions is assigned a payoff based on its perceived value. The payoff may be expressed in any currency such as money, status, or dominance, but the underlying assumption is that this payoff can be expressed as a number. A *rational decision* is one that selects from two or more choices, the one that yields the maximum payoff for the decision maker. A tacit assumption in theories of choice, such as game theory, is that payoffs can be assigned to outcomes in a sufficiently precise manner to allow for the computation of an optimal or rational decision. A second assumption is that the decision maker is expected to make a rational decision. Both assumptions have been challenged in the most recent decades by research in choice theory.

Variations in Risk Aversion Skew the Game Theory Payoff Matrix

While the existence of known unknowns limits the application of game theory to human decision making, there is an even greater impediment—assigning values to the payoff matrix. The emotional component of our decision making plays a key role in assigning payoffs to outcomes, and different decision makers may have significantly different loss aversion coefficients. For Kennedy and Khrushchev, the payoff for the "worst outcome" in Chicken was a huge negative. For Castro, nuclear war was not the worst possible outcome. In his "Armageddon letter" on Black Saturday, under the battle cry "Patria o muerte" [Homeland or death], he embraced the con-

cept of a “glorious death”, advising Khrushchev to use nuclear weapons to annihilate the United States if they were to attack Cuba.

Today, there are regimes like ISIS and al-Qaeda whose beliefs are rooted in ancient religious doctrines that promise an eternal life in exchange for a glorious death. In such cases, the “chicken” model no longer applies because the “worst outcome” may become a desirable outcome to one of the antagonists. The weights assigned to outcomes in a game theory model of conflict depend on the beliefs and visceral dispositions of the antagonists.

At the Polanyi Conference on Science and Social Responsibility held at the University of Toronto on November 15, 2014, Nobel Laureate, John Polanyi highlighted the paradox inherent in nuclear proliferation:

Nuclear threats, it is true, contributed to a peaceful outcome of the Cuban missile crisis of 1962. We owe our hair's-breadth escape from catastrophe to the spectre of nuclear war. But no one in a position of responsibility at that time would for an instant have contemplated its repetition. Yet, we are in danger of doing just that today.

The danger stems from this: deterrence requires for its success making real the possibility that it might fail. But we cannot responsibly play nuclear roulette with our future.

Stephen Hawking, in his 2018 posthumous publication, *Big Answers to the Big Questions*, warned:¹⁵

Aggression, ..., has had definite survival advantage up to the present time. But now it could destroy the entire human race and much of the rest of life on Earth. A nuclear war is still the most immediate danger ...

Epilog

My first glimmer of the power and secret workings of our hidden instincts or *unknown knowns* came to light in our Arbor Room discussion on November 6, 1962. These scripts that reside below our conscious level have a profound influence on our decision-making. Recent research in cognition has revealed some of these unknown knowns that work invisibly in the unconscious mind and are observable only through our behaviors. These irrational effects are most dramatically manifest in our decision making during stressful situations, such as direct confrontation, stock market chaos, or divorce.

Though game theory can be useful in modeling decision making, it is limited by the unpredictability of our instincts. The fact that decision making is not purely rational, especially in crisis, limits the reliability of a purely mathematical treatment. As sociologist W. B. Cameron observed, “Not everything that can be counted counts and not everything that counts can be counted.”¹⁶