Visualizing Chess, Patterns & Paranoia

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James Troxel, 2021

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"Dear colleagues! World Champion Anatoly Karpov has asked me, as press attaché of the Soviet delegation, to bring the following to the notice of the representatives of the press.

Over a number of years Korchnoi has made insulting remarks about Karpov, other grandmasters, and well-known chess officials. Nevertheless, following the principles of sportsmanship and to meet the wishes of the esteemed organizers of such a significant event as a match for the World Championship, the World Champion was prepared to shake hands with his opponent before the start of each game. And he did this even after, at his pre-match press conference in Manila, Korchnoi once again took the liberty of insulting the World Champion and a number of members of his delegation.

Recent events have shown that the Challenger has no intention of rejecting his course of aggravating the situation. Under such circumstances Karpov does not wish to shake hands with Korchnoi."[1]

-Aleksander Roshal
Baguio City, Philippines - 1978

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INTRODUCTION

The contrast between the 1974 Candidates Final and the 1978 World Chess Championship could hardly be sharper. Game two of the 1974 match has come to be regarded as a modern classic in tactics, strategy, and chess brilliance between two of the game's best. The absurdist theatre witnessed throughout the entire 1978 Championship quickly earned notoriety as an example of the type of superstition, paranoia, and scandal commonly observed in chess lore throughout the game's rich history. However, a few key similarities will emerge as the focus of this paper that also carry broad implications for the way we extract meaning from information. The visualizations that accompany the game analysis are designed to help readers see chess in the same way that a grandmaster does, and in so doing, help them to identify similarities between a grandmaster's state of mind and their own.

1 Anatoly Karpov, *From Baguio to Merano*, 33

I will argue that, in many ways, a grandmaster's heightened sensitivity to pattern recognition is both a blessing and a curse. In 1974, we simply observe that the quality of the games were the result of each player's singular ability to perceive threats on the board and respond to them. By contrast, the championship in the Philippines is characterized by each player's preoccupation with threats, real or imagined, off of the board, and we should not be surprised to learn that today, few people study these games in order to gain a better understanding of how to play chess. This is clearly illustrated by Karpov's own written account of the 1978 match in, "From Baguio to Merano." One could easily forget that the story is told from the winner's perspective while reading each grievance-filled page so concerned with perceived slights, settling of scores and foiled subplots, that the few instances of any game analysis read like footnotes. Is this sudden obsession with what is happening beyond the game due to boredom? Is this a natural progression once you have reached chess at this level? This paper does not attempt to answer these questions but intends to qualify and quantify the relationship between chess, pattern recognition, and the pitfalls therein with supporting documentation from other historical accounts and written works on chess theory, statistics, and cognitive psychology.

Among the documentation supporting this hypothesis will be a probabilistic study on the veracity of what may very well count as one of the more plausible conspiracies put forth in the last 30 years by Bobby Fischer, when the budding Holocaust denier[2] claimed that all of the games in the 1985 World Chess Championship were rigged.[3] The only evidence provided by Fischer to support this claim was a sequence of 18 consecutive moves observed in the fourth game between Karpov and Kasparov, all of which happened to land on white-colored squares. From this, we will see further evidence that the relationship between the ability to see patterns and a proclivity for conspiracy theory is not limited to the unique dynamic between Karpov and Korchnoi, or any single set of circumstances in 1978. Chess trains each player always to be one step ahead of every scheme, subplot, feint, decoy, and other deceit. While the key is to focus this energy on the 64 squares located within the boundaries of the chessboard, the author shows us how easy it is for this attention to wander beyond the limits of both the chessboard and math.

Also included are a number of studies that analyze the effects of time pressure on chess skill and expert-level decision-making. Chess skill is widely understood to be a balance of fast pattern recognition processes and slow search processes.[4] The hypothesis here being that when the time required to think 10-15 moves ahead is curtailed, pattern recognition becomes the decisive factor in the outcome. While *The Effects of Time Pressure on Chess Skill* remains inconclusive about the precise role of pattern recognition in a high stress environment, the author's analysis does reveal that the strength of the relationship between chess skill and time increases as the length of the game decreases.[5] This suggests that fast processes do play an out-sized role in some way. Other studies show still clearer evidence of the relationship between time and pattern recognition. In *Response Time Distributions in Rapid Chess*, researchers analyze the response times of each move in rapid chess games using highly precise data only made available in recent years through online chess platforms. The researchers also make an important note

2 Chun, Rene. "Bobby Fischer's Pathetic Endgame."
3 Segal, Mark R. "Chess, Chance and Conspiracy."
4 Mariano Sigman, Pablo Etchemendy, Diego Fernández Slezak and Guillermo A. Cecchi, "Response time distributions in rapid chess: a large-scale decision making experiment"
5 Van Harreveld, F., Wagenmakers, E., Van der Maas, H. L. (2006). "The effects of time pressure on chess skill: An investigation into fast and slow processes underlying expert performance."

about chess played in its ideal form as a "state function," absent of any true codependencies, and where choosing each move is based solely on the current board position. The crucial point here being that humans are largely incapable of this kind of play, "rather, the existence of plans and schemes, the influence of previous thoughts and evaluations, the assessment of the opponent ability in deciding whether to gamble on a risky move, and in particular, the presence of a time constrain, are likely to be reflected in an interaction between successive moves."[6]

The question here of grandmaster level chess players' high sensitivity to pattern recognition, and the ways this can act for or against them, will be tested first with a reconstruction of the 1978 match. This analysis consists almost entirely of qualitative data which includes photos, diagrams, and textual data to best depict the often-unquantifiable nature of this particular chess match.

From there, we travel back to game two of the 1974 Candidates match, which is divided naturally into three parts: the opening, middle game, and end game, in order to compare and contrast the two matches. It features Anatoly Karpov's annotations of each board position throughout, in addition to my own analysis and quantitative research to support the conclusion that a strong relationship exists between chess skill and pattern recognition that can be decisive when leveraged well, and counterproductive when this type of mental energy lacks focus.

Methodology

The data collected for this story ranges from textual data gathered from multiple first-hand, written accounts, to quantitative statistics found in game databases and academic research papers. But one thing I was struck by was the amount of available qualitative documentation of the 1978 World Chess Championship, versus the amount of quantitative data used to describe the 1974 match. While it is true that qualitative and quantitative data exist for both events, no one, to my knowledge, was as concerned about who was in the audience, what the weather was like, or what each player ate in the 1974 match, as they were in the 1978 tournament. Conversely, while there are game analyses of the 1978 match, these are not nearly as common as the amount of books that cover game two of the 1974 Candidates Final, and are presented as if more for the sake of posterity than to convey anything particularly revelatory. Embracing this fact by limiting the analysis of the 1978 match to mostly qualitative data, and the 1974 match to quantitative data, helped to underscore just how different these two matches were, as well as to support Sigman's claim that chess, in its ideal state, functions within a vacuum, ignorant of any factors beyond the current board position.

Capturing the tense absurdity of the 1978 melodrama involved compiling notes from a number of first-hand accounts, including those from Anatoly Karpov's own *From Baguio to Merano, The World Championship Matches of 1978 and 1981* and E.B. Edmondson's *Chess Scandals, The 1978 World Chess Championship.* The narrative was reconstructed in a way that took tips from other whodunits ranging from the Warren Commission to the work of the firm, Forensic Architecture. The interactive diagram showing the seating positions of Doctors Zoukhar and Berginer is equal parts faithful retelling of a bizarre storyline, and tongue-in-cheek reference to the endless reconstructions of Dealy Plaza and the Texas School Book Depository that are so-often found in both the official and many, many unofficial investigations into who shot JFK.

6 Mariano Sigman, Pablo Etchemendy, Diego Fernández Slezak and Guillermo A. Cecchi, "Response time distributions in rapid chess: a large-scale decision making experiment"

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Figure 1 from *The Effects of Time Pressure in Chess Skill*

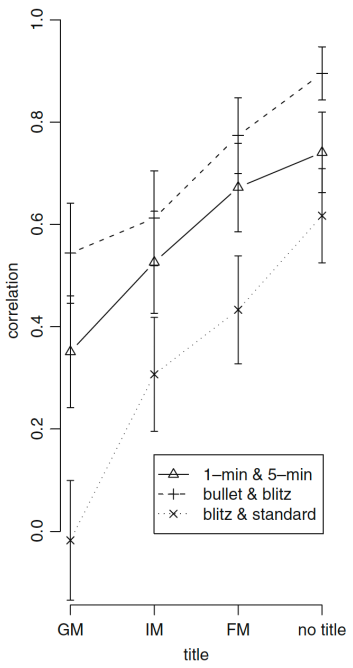

Fig. 1 Correlations and standard errors between chess ratings for strict and lenient time controls, clustered in four categories according to playing strength. In order of decreasing status, the four categories are: *GM* international grandmaster, *IM* international master, *FM* FIDE master, no title

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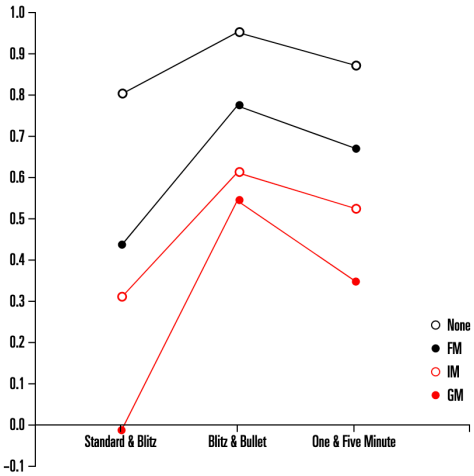
Transposed correlation data



However, what originally clued me into the story of 1978 was Segal's statistical analysis of an outlandish claim of Bobby Fischer's in *Chess, Chance and Conspiracy* that also sparked a broader inquiry into the phenomenon of paranoia in grandmaster-level chess. Further investigation revealed a breadth of research into the roles of time pressure and pattern recognition. A link began to emerge between grandmasters who traded in conspiracy theories, and a reliance on pattern recognition at this level. Time pressure and high stress was identified as a significant catalyst.

Correlations Between Time Constraints and Player Rank

After reading *The Effects of Time Pressure on Chess Skill: An Investigation into Fast and Slow Processes Underlying Expert Performance,* I reached out to the authors about obtaining the data used to generate figure 1, so that I might include it in my project. I brought the dataset into R and ran Pearsons R calculations to generate the appropriate correlations. One interesting discrepancy arose in doing this which resulted in a simple but significant change to the way the data was represented in my own project. In the original paper, the authors focus on the way that the strength of the relationship between rank and time controls decreases with higher titled players.* This observation is used to claim that their research runs counter to much of the prior research done in this area. "The two studies reported here both show that while previous research has suggested that increasing the playing tempo during a game of chess will benefit the stronger player due to his decreased reliance on slow skills such as calculation of variations, data of online play and world championship matches indicates otherwise."[7] However, transposing the data to show the correlations grouped by title, rather than game format, makes it much clearer that the relationship between shorter time controls and chess rank is still a positive one, regardless of title.** While it is true that weaker players see wilder swings in their chess rankings under tighter time controls, this can easily be explained by the higher frequency of blunders seen in weaker players in general.

Sankey Diagrams

Due to the significance of pattern recognition in much of the research cited, it was important to visualize the decision making of each player as one way to highlight the behavioral patterns so common to the game of chess. Tree diagrams have long been used as one way to represent the various paths a player can take, but the advent of online chess clubs and databases has given us the opportunity to give this information much greater context. Chessbase's Database gives us access to data from eight million games, for example, and served as the source not only for my own research, but that of other papers cited here, including Segal's *Chess, Chance and Conspiracy*. The ability to show the game distribution data of each move from Chessbase's database gave additional weight to the moves Karpov and Korchnoi eventually made throughout the course of game two in 1974. This also made the sankey diagram well-suited to visualize this data, due to its ability to show distribution flows over time. However, it quickly became clear after working with the data that simply showing all of the possible moves at once would create an unintelligible knot of nodes and links. Figuring out a way to reduce this complexity was needed in order to maintain legibility and as much focus as possible on retracing the moves that were actually made. Being able to see the options in front of each player with every move is also helpful as a way to spot when deviations occur, as well as to show the "brain" of the game as it is taking place.

7 Van Harreveld, F., Wagenmakers, E., Van der Maas, H. L. (2006)." The effects of time pressure on chess skill: An investigation into fast and slow processes underlying expert performance."

As a result, the decision was made to first split the data into smaller chunks that only represented the current state of the board, with an abbreviated view of the possible ways forward, rather than all possible moves at once, from start to finish. This was done by reducing the moves shown to that of the current move in the first column, the top five responses to this move in the second column, and then the top five responses to each of those moves in a third column, so that in the end, we are able to look ahead only two moves at a time. This limitation may at first appear to run counter to the specified aim of visualizing chess "in the same way a grandmaster does," but compartmentalizing information is still an important part of seeing the forest for the trees. I arrived at the number five simply by testing the data to get a sense of how many possibilities could be shown at once without vertical space and legibility becoming serious issues. Because of this more surgical approach to the required data, collecting this data manually, although time consuming, made the most sense.

As we follow the game from its root, first move, to its outer-most branch, the amount of game data distributed across the narrowing list of viable moves becomes less and less. The weakening precedent makes this type of visualization more helpful in the opening stage of the game than in the middle game and this is why we see this visualization drop out at move 11. The programmatic nature of the opening stages of the game are also reflected in the fact that Karpov's own game annotation has very little to say about any individual moves until about move 16, which is where the annotations begin to take the place of the sankey diagrams.

Stockfish Board Evaluation

Chess engines evaluate each board position as a way of ranking each possible move and choosing the best one. This returns a value that can also be useful both in tracking the performance of each player and adding color to other game statistics. The Stockfish game engine is known to be one of the top engines, and is available for use in Chessbase's own game interface. This is where I gathered the data to create the bars that visualize the score, for or against each player, found at the bottom of the screen.

Encyclopedia of Chess Openings

The data used to show examples of different openings is pulled from 365chess.com in order to retrieve the Forsyth–Edwards Notation (FEN) string that chessboard.js requires to generate each board position. 365chess.com references the standardized classifications for each opening found in the Encyclopedia of Chess Openings (ECO). Here, each opening can be referred to by a specific name and alpha numeric code. For example, the "Scotch Game" is also known as "C45", while the "Queen's Gambit Declined Slav accepted, Alapin variation" is referred to as "D16."

Additional Research

In my initial proposal, I had proposed much of what you see in the finished project in addition to a number of other areas of research. In an effort to offer the most thorough account of my methods, I will outline some of the analysis that I pursued and would like to continue to explore.

While the Opening section introduces the opening theory and ways to visualize this, the middle game portion of the 1974 match was considered a good place to visualize the effect that different openings strategies can have on the way

space is created on the board. A heat map that showed the board traffic over the course of a game held a lot of possibilities to strengthen the data story in an a visually impactful way. Making something like this first requires parsing files written in Portable Game Notation (PGN), and i was able to find a number of R libraries and Python packages that are made to do this. However, PGN files generally not much more than a list of the moves made in a game, formatted in a very specific way. Translating this information into data about which squares on the board were visited as a result of each move requires additional processing and analysis that can take considerable time. For this reason, the heat map was de-prioritized due to time limitations.

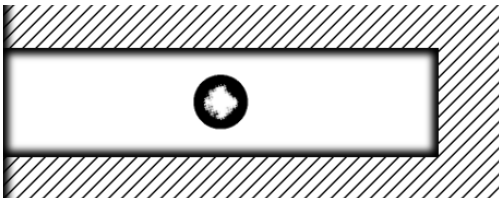
Calculating the relationship between time and chess ability was of special interest to me and I had also reached out to the authors of *Response Time Distributions in Rapid Chess: A Large-Scale Decision Making Experiment,* to see about obtaining the data used for their paper. Diego Slezak, who was the lead data scientist on the study, was kind enough to share a little bit about his process as well as the package of scripts he created to generate the visualizations. Diego had built a complex network of script files that automatically downloaded game data from https://www.ficsgames.org/download.html, parsed the data with a customized python package, inserted the data into a PostgreSQL database and, "finally, a parallel process was run in a cluster that reads games from the PSQL DB, runs a modified version of Stockfish which prints intermediate calculations and quality of each move [and] is then stored back in PSQL DB."

While the database he created was no longer up and running, and I lacked the time and expertise required to reverse engineer his python and SQL scripts, I was excited to learn of FICS Games Database, where internet chess club data could be downloaded in large quantities that included entries for the time lapsed between each move of a game. I was interested in exploring the correlations between chess rank and game format, similar to what was seen in *The Effects of Time Pressure on Chess Skill,* but with the ability to calculate the slope and coefficient of this higher quality, continuous data. Collecting this data has only been made possible recently with online chess clubs where the time stamps can be recorded automatically, and with great precision. But the fact that this type of data is so uncommon also meant that parsing libraries lack the built-in tools to extract this type of data. When the time I was spending to research and experiment this began to cut into more essential pieces of my project, I decided to set this aside for the time being.

Design Decisions

The design approach went through many iterations and took inspiration from a number of sources including Constructivist design, the work of Hans Rudolf Bosshard, and various references found in the book, "A New Childhood, Picture Books from Soviet Russia." The overall look and feel aimed to capture the spirit of the Soviet brand in the 70s and could best be described as an odd mix of pragmatism and idealism mixed with a healthy dose of frugality. For example, I designed the chessboard to resemble one you would find in a 1978 issue of *64*, and modeled the pieces to look as if they were reproductions made from several previous reproductions out of shear thrift. Univers was an obvious choice for the font due to its Modernist legacy and the way the bold, condensed style mimicked the signage visible in much of the documentation from 1978.

The logotype itself is a type study of the name plaques seen on the side of the chess table in Baguio. The skew is intended to reinforce the spacial reference as well as to say, quite literally, that something is slightly askew here. The use of



this visual echo was a subliminal nod to the subject of pattern recognition that I utilized in other details as well. The bamboo caning of Karpov's chair mimics the diagonal stripe pattern seen in the chessboard and other elements. The photo of a bearded, be-turbaned Steven Dwyer teaching Viktor Korchnoi yoga prefigures a visual of the original Mechanical Turk that immediately follows. It is not a coincidence that the diagram visualizing the seating positions of parapsychologists resembles the chessboard in more than one way.

Page layout presented a series of different challenges throughout the project. The design brief warranted a fairly rigid obedience to some type of grid and since the 1974 game would require the most complexity, I decided to design the grid system around what would likely need to be a three column setup. The biggest challenge here was due to the fact that the chessboard, body copy and charts all shared equal weight, and were required to appear on the page synchronously throughout the experience. This lent itself well to the editorial-style design, but made hierarchy and responsivity a larger issue than I would have preferred. Referring to examples such as Chessbase's own three-column game statistics interface leads one to believe that this is not an entirely unique problem however.

These design decisions were favored for their minimalist qualities that helped draw attention to the visualizations, and gave structure to a project with a lot of moving parts.

The subtitle promises to "visualize paranoia," and does this by presenting the statistical and anecdotal data like forensic evidence from a crime in a way that echoes the melodramatic storyline behind it. Grainy, black and white head shots treated like criminal profiles next to carefully crafted recreations of the crime scene add to this effect of an amateur conspiracy theorist unraveling some type of grand scheme.

One More Thing

It is important to note that the intention here is not to diagnose all grandmaster-level chess players as somehow paranoid or crazy by nature. Rather, the attempt is made to identify the type of skill set required to navigate a specific kind of high-pressure environment, and to draw parallels between the ways that both the subjects of my research and the reading public manage this. The goal is that it may help shed light on the ways in which we interpret data in today's exhausting, 24-hour, 280-character media landscape, which conditions us to consume vast amounts of complex information in microseconds. Are we under the same kind of pressure as a chess genius? Is this reasonable? What ways do chess prodigies respond to this pressure and what are the possible outcomes?

The analysis begins with pointing out the most obvious link between these two very different events; match-ups between Anatoly Karpov and Viktor Korchnoi. During the four years between the two matches, Korchnoi defected to Switzerland, and Karpov was, by default, crowned World Champion after Bobby Fischer took issue with the rather conventional terms of the 1975 Championship match, and left chess for good. The veteran Korchnoi won the opportunity to redeem himself against the young prodigy, and the long history between these two reached a crescendo by 1978.

The 1978 World Chess Championship was the inaugeral event of the Baguio City Convention Center. Not long before the championship, Baguio City was designated as the country's official site for international, national and regional conventions. The convention center was built with this in mind and modeled after a traditional Igorot hut, but one capable of hosting 1,000 spectators.

E.B. Edmonson, M. Tal, *Chess Scandals*, 11

Baguio, 1978

Typhoon Emang struck the Philippines on the first day of game five. Karpov described the sound of the rain as sufficient to drown out the noise of an already tempestuous affair inside the brand new Baguio City Convention Center.*[9] Up until this point, the loudest protest came from the precise meaning of the violet colored yogurt being delivered to Karpov during each game. "It is clear that a cunningly arranged distribution of edible items to one player during the game, emanating from one delegation or the other, could convey a kind of coded message," read the official complaint to the Chief Arbiter. "Thus, a yogurt after move 20 could signify 'we instruct you to offer a draw'; or a sliced mango could mean 'we order you to decline a draw'. A dish of marinated quails' eggs could mean 'play Ng4 at once', and so on. The possibilities are limitless," it continued.[10] But this had, by game five, become a tightly choreographed ritual, and the colorful yogurt arrived by waiter at 7:15pm sharp, without exception. There were of course, other squabbles over which flag Korchnoi should be allowed to play under, for instance, or Karpov's endless suspicion towards the decisions of the event organizers on everything from the location of the tournament, to the make and model of the chess clocks. He even went so far as to have Korchnoi's hand-picked, designer chair x-rayed for signalling devices at one point. Additionally, Korchnoi's predictable refusal to stand for the Soviet National Anthem during the opening ceremony was rendered moot when the orchestra mistakenly played the *Internationale* instead. However, it wasn't until game five that things took a dark turn.

There was a growing awareness of Dr. Vladimir Zoukhar's presence in the room that appeared to arrive with the weather. The storm had knocked out the power and a dim emergency lamp was all that lit the main stage for a time. The opponents played fast.[11] In the middle of this, Petra Leeuwerik, Head of the Korchnoi Delegation, reportedly rose from her party's designated seating area in the back and, against regulation, quietly advanced towards the front spectator rows. She sat next to Dr. Zoukhar and handed him a copy of "The Gulag Archipelago."[12] This was not a gift.

Petra had spent nine years in the notorious Vorkuta labor camp for spying in Soviet Vienna after World War II.[13] Dr. Vladimir Zoukhar was a known psycho-neurologist and director of the Central Laboratory for Psychology in Moscow's School of Medicine.[14] His expertise had been sought ever since the 1974 Candidates Final where Korchnoi had bragged that his mind games forced Karpov to seek therapy. Karpov repeatedly insisted that Zoukhar was not an official member of the Soviet Delegation and thereby free to do as he pleased. "The Soviets want to kill him in a mental way" Leeuwerik had said of Korchnoi. The Challenger's delegation had begun to develop the theory that Dr. Zoukhar was hypnotizing Korchnoi from a distance through his noticeable habit of staring fixedly at the Challenger from the front left row during much of the contest until now. Seemingly every shortcoming of Korchnoi's was now attributed to the work of this mysterious hypnotist. Naturally, Karpov would

8 Anatoly Karpov, *From Baguio to Merano*, 18
9 Anatoly Karpov, *From Baguio to Merano*, 26
10 E.B. Edmonson, M. Tal, *Chess Scandals*, 27
11 E.B. Edmonson, M. Tal, *Chess Scandals*, 37
12 Anatoly Karpov, *From Baguio to Merano*, 29
13 E.B. Edmonson, M. Tal, *Chess Scandals*, 34
14 E.B. Edmonson, M. Tal, *Chess Scandals*, 7

repeatedly boast of his ability to overcome these forces.[15] The press ate it up. Leeuwerik accused Dr. Zoukhar of being a bad actor and demanded that no official, or unofficial members of either camp be allowed in the front row. The Chief Organizer obliged and this sideshow began to compete for attention with the game as the melodrama unfolded. Dr. Zoukhar's seating position began to be recorded with diligence by all those concerned. The first row on the left during games two, three, four and five. The right side of row two in game six and seven. On the left side of the fifth row in game eight and the right side in game nine. Games ten and 11 have him on the right side again, but back two ranks on the seventh. One begins to imagine the diagonal movements of a Bishop.

A volley of official complaints and counter complaints over the seating positions of hypnotists plagued the rest of the match. Game 12 saw the introduction of Korchnoi's own parapsychologist, Dr. Vladimir M. Berginer, who, in addition to an army of local students of a parapsychology guru named Father Bulatao[16], had been recruited to counter Dr. Zoukhar's psychic energy. He took a seat in the fourth row to the left, where he would remain until game 14, when Karpov took a decisive lead after a two-game streak. The post game celebration was interrupted by three earthquakes, with Typhoon Miding due to strike in time for game 15.[17]

Typhoons, earthquakes, floods, and at least one deadly landslide menaced the immediate area throughout the event. But given the especially disastrous turn of events since his arrival, Dr. Berginer's effectiveness as a parapsychologist had quickly come into question by the Korchnoi delegation. "Viktor is now convinced that neither Zoukhar nor Berginer can have any effect upon a player during a game," Leeuwerik announced before Korchnoi's game 14 loss. Dr. Berginer left the Philippines shortly after the game.

Analysis

A certain amount of psychological warfare always takes place during a chess game. For example, the ongoing fuss over Korchnoi's mirror-tinted glasses (nicknamed, "the device" at the time) was the result of a passive aggressive attempt to thwart Karpov's own tactic of staring directly into the eyes of his opponent. A compelling argument could also be made that Korchnoi's accusations against Dr. Zoukhar merely came from an attempt to explain away his own blunders, rather than a deeply held belief in telekinesis. There is, in fact, substantial evidence pointing to a familiarity with paranoia, superstition, and pseudo science between the two, which may or may not always track with a number of contradictory statements made by either one.[18] The answer, befittingly, appears to be somewhere between belief and suspicion.

Karpov may not demonstrate a remarkable interest in the field of parapsychology beyond a token impulse to avoid being out gunned on this or any other front, but his paranoia is evident through his continued suspicion towards the maneuvers of not only the Korchnoi delegation, but the allegedly neutral organizing committee itself. As it happens, the scrutiny that Karpov placed on the bidding process for the host city was not entirely unwarranted,[19] but the length to which he goes to account for every potential scheme, to characterize motivations, and to assess the implications for his position in

15 Anatoly Karpov, *From Baguio to Merano*, 48
16 Anatoly Karpov, *From Baguio to Merano*, 48
17 E.B. Edmonson, M. Tal, *Chess Scandals*, 109
18 E.B. Edmonson, M. Tal, *Chess Scandals*, 47
19 E.B. Edmonson, M. Tal, *Chess Scandals*, 8

virtually every other stage of the event is remarkable.

Likewise, we see Korchnoi waffle on his faith in parapsychology at various times throughout the tournament, though the executive director of the U.S. Chess Federation describes Korchnoi's "fascination" with parapsychology spanning many years.[20] Much has been written about Viktor Korchnoi's daily regimen that we may also draw from. He laced his morning oatmeal with whiskey and plugged himself into a heating battery at night to treat his hypochondria, believing this condition was in part due to excess static electricity.[21,22] After the Dr. Berginer debacle, Korchnoi enlisted the help of two particularly militant members of the Ananda Marga religious sect, who were currently out on bail in the Philippines for the attempted murder of an Indian diplomat. Steven Dwyer and Victoria Shepherd, or Dada and Didi, as they became known, had been given a mandate to teach Korchnoi concentration techniques using yoga and other methods for the remainder of the match. His devotion to the teachings of Didi and Dada would become a sticking point going forward.

By game 32, both players' nerves were shot. Chess at this level is hard enough without having to endure a veritable arms race of parapsychologists, murderous Ananda Marga yogis, and Soviet operatives doing everything they can to subvert your efforts amidst a biblical onslaught of natural disasters. Karpov had missed a number of opportunities to win the match outright going as far back as game eight, and watched as his 5-1 lead dwindled to 5-5 by the final game. "The tiresome weather with its constant rain and wind had suddenly begun to irritate me," Karpov conceded.[23] The Ananda Marga contingent had maintained a presence "casting spells" in the lotus position until game 20, when the organizers disallowed the attendance of "persons of known criminal records."[24] The Ananda Margas multiplied, terrifying various officials with threatening messages while Didi and Dada continued to hold clandestine yoga classes from Korchnoi's FIDE-sponsored hotel room. The Korchnoi delegation became so overwhelmed with offers of support from members of this feared religious cult that they petitioned the appeal jury for protection. The irony was lost on no one.[25] The breach of an agreement reached a month earlier regarding the presence of any and all hypnotists also brought Dr. Zoukhar back to the fourth row for the final game. The conclusion of the longest final in the tournament's history would arrive in a somewhat anticlimactic fashion. The biggest controversy came from Korchnoi's refusal to officially concede, preferring instead to simply decline a return to the board after the game had been adjourned for the day. Korchnoi was not seen again for the remainder of the ending ceremonies.

Discussion

Though many factors and dynamics stand out about this match, time was clearly the most important factor, first and foremost. Spanning almost 100 days, the individual games were often split into multi-day sprints. Could the way each player experienced time be a factor in the quality of their attention in Baguio? How exactly does time effect what each player sees or doesn't see? Neither player exhibited much brilliance when given such an extended opportunity to demonstrate their abilities. How did two fine specimens of

20 E.B. Edmonson, M.Tal, *Chess Scandals*, 47
21 Anatoly Karpov, *From Baguio to Merano*, 31
22 E.B. Edmonson, M.Tal, *Chess Scandals*, 36
23 Anatoly Karpov, *From Baguio to Merano*, 65
24 Anatoly Karpov, *From Baguio to Merano*, 49
25 Anatoly Karpov, *From Baguio to Merano*, 68

Kasparov's "Drosophila of reasoning"[26] become so consumed with fear and loathing in the Philippines, while having delivered a masterclass only four years prior? A look back four years to game two of their Candidates Final in Moscow helps answer these questions.

SLAYING THE DRAGON

Moscow, 1974

We have seen the ways in which various behavioral patterns were interpreted in 1978, either to the benefit or apparent detriment of those perceiving them. We now look at another example that further illustrates the role of pattern recognition within grandmaster-level chess, but in a much more controlled environment that allows us, in addition to the players themselves, to analyze the statistical patterns on the chessboard more carefully.

The Opening

The English Opening, the Queen's Gambit, the Ruy Lopez, the Pirc, the Slav and the Grunfeld are examples of the many openings with which all grandmasters are intimately familiar. "The successful choice of opening is a great skill (not only in the chess sense, but also psychologically)", says Karpov.[27] The study of opening theory includes developing a vocabulary of the opening move sequences collected from centuries of precedent in the Encyclopedia of Chess Openings (ECO). These moves have become known as book moves and account for approximately the first ten moves of the game.

Openings can be visualized as tree diagrams, with each branch tracing a variation of a particular line through each move. Different lines give the game a different shape. Will it be the "open" Sicilian or the "closed" variation? Is it the Queen's Gambit "accepted", or "declined?" Players commonly decide which line to take based on their own preferred playing style and that of their opponent. In Karpov's words, "It is necessary to understand yourself and your opponent, and to use this knowledge in concrete situations on the chessboard; to deviate from the strongest continuation in order to place your opponent in a position he does not like to play."[28]

In game two of the 1974 Candidates Final, Karpov opened with e4, the King's Pawn Opening. This is by far the most common first move for White due in part to the way it controls the center squares, a key objective in the opening phase. Korchnoi responded with c5, which signifies the start of the Sicilian Defense, another common opening classified as a flank defense by its method of controlling the center from the flanks. The game continued in a rather straightforward pattern of book moves until move six. Karpov threw a curve ball and our tree is no longer useful. As it turns out, Karpov had made a good study of Korchnoi, anticipating 5.g6, which marks the "Sicilian Dragon" variation of Black's position. It is named the "Dragon" for the way Black's pawns trace the snake-like profile of a dragon, with the soon-to-arrive bishop on g7 defending the King and breathing fire across the board, from f6 down to a1. "The so-called Dragon variation. Korchnoi is probably the strongest player today who still employs it. In particular, this opening was twice used by him in

26 Kasparov, Garry. "Chess, a Drosophila of Reasoning."
27 Anatoly Karpov, *From Baguio to Merano*, 68
28 Anatoly Karpov, *My Best Games*, 16

his candidates match in 1971 with Geller," Karpov states, "of course, in 1974 I did not overlook the possibility of meeting this variation."[29] When Karpov sees the formation of the Dragon, he quickly switches plans from castling King-side, to castling Queen-side beginning with Be3, which he will use to sever the dragon's head (Bg7) and begin marching up the weakened king-side. The next several moves follow a common theme when players have castled on opposite flanks, characterized by a rush to castle and use their rooks as battering rams to open a path to the King. White inevitably forces the exchange of bishops on the 17th move with Bh6.

Misperceptions

Bobby Fischer has pointed to the memorization component of chess to support his theory that the game is largely predetermined. Fischer took this a step further with his frequently repeated claim that the entire 1985 World Chess Championship was rigged.[30] The basis of this conspiracy is placed entirely on the occurrence of 18 consecutive moves landing on white squares during game four of Karpov's match against Kasparov. *Chess, Chance and Conspiracy* studies the probability of this claim by first acknowledging that "luck and/or randomness have no apparent role in move selection when the game is played at the highest levels."[31] The author also notes that while it may not be worth breathing oxygen into the musings of someone with Fischer's "diminished faculties", his claim has gained support by other grandmasters, including none other than Boris Spassky, whom Fischer took the title from in 1972. This research began by testing the significance of such a phenomenon against the 5,540 total moves played in the 144 games encompassing both players' WCC records. This initial test returned a p-value of 0.0105, which is far from what one would call statistically significant. The research found that even when reducing the criterion to practical restrictions such as legal moves, the presence of black or white Bishops, and other covariates, calculations returned a p-value no lower than 0.0065.

The author then turns his study to Fischer himself by searching for similar runs in Fischer's 827 games found on Chessbase's Big 2000 database. After running the same test and applying the same criteria as before, Segal found that a 13-move sequence in Fischer vs. Reshevsky from 1957 returned a p-value of 0.0023. Still a relatively weak argument, it would amount to the strongest evidence yet to indicate any irregularity in this type of underlying pattern. The data shows yet another example of a grandmaster-level chess player distracted by patterns that aren't there.

The element of time

"Until this point, Korchnoi and I had both been playing at blitz speed" remarks Karpov."[32] His last move, Rd3!, is another deviation from the theoretical position of the game and has caused Korchnoi to pause. His overextended Knight standing guard on f6 is the only thing preventing checkmate with Qh7#. Exerting pressure on this Knight is the key to the castle for Karpov and his long game has begun to show its teeth. When two opponents have castled on opposite corners of the board, the game becomes razor sharp. Spotting disturbances in the sequence of moves becomes critical and the fact that they have been playing "at blitz speed" up until now demonstrates the power of pattern recognition at this level.

29 Anatoly Karpov, *My Best Games*, 66
30 Chun, Rene. "Bobby Fischer's Pathetic Endgame."
31 Mark R. Segal, *Chess, Chance and Conspiracy*
32 Anatoly Karpov, *My Best Games*, 68

The Effects of Time Pressure on Chess Skill is one of many studies that evaluate this relationship. The authors examined the correlations between chess rankings and time controls using two similar-but-different methods. They start by identifying the two main thought processes at play; pattern recognition and deep search. When pattern recognition and the ability to think ten moves ahead are understood respectively as "fast" and "slow" processes, evaluating this temporality can reveal insights into the more precise roles that these abilities play. Their research does, in fact, show that as time pressure increases, its relationship with player strength increases. This would indicate that sensitivity to pattern recognition is highest under time pressure. While the authors highlight the fact that this positive trend is weaker for grandmasters than for less skilled players, I argue that not only does the positive trend remain, but that this can be accounted for by the fact that grandmasters generally make less mistakes than novices. Grouping the data in Fig. 1 by game format, rather than title shows this pattern more clearly.[33]

Even more conclusive is the exhaustive study conducted in *Response Time Distributions in Rapid Chess*, where researchers acquired rapid-chess game data from *Free Internet Chess Server* in order to conduct a series of experiments that focus primarily on the time recorded between each move. They found that, "time pressure provokes a selective enhancement of rapid object recognition, favoring the best players, but also increases the likelihood of errors and blunders, which in turn tends to equalize the game." We have seen the way that this "selective enhancement" can entice players to find meaning in empty signifier, but the authors of this research contend that, "in perfect play, the best move is solely a function of the position and should not depend on how this position was reached or in other elements of the history of the previous moves." They go on to assert that humans are incapable of maintaining this static relationship with the board position and that, "the existence of plans and schemes, the influence of previous thoughts and evaluations, the assessment of the opponent ability in deciding whether to gamble on a risky move, and in particular, the presence of a time constrain, are likely to be reflected in an interaction between successive moves."[34]

And so Korchnoi takes his time. Karpov clocks him at 36 minutes before he responds with R4c5?, the only recorded mistake of the entire game.[35]

The Middle Game

At this point in Karpov's annotation of the game, we follow him as he entertains a number of possible responses to R4c5? while pointing out the themes on the board that make these good or bad decisions.[36] Board awareness and the ability to recognize the shape of the game inform each player on what strategy to take. The two main openings in this game were the Open Sicilian Defense and eventually the Yugoslav Attack. Both of these openings have flank positions that helped to determine the asymmetrical shape of this position. Rahim Rajahi, a well known figure in the West Village chess community, believes that the Open Sicilian gives you "less space but more time." By analyzing the board traffic as a heat map, we can see how different strategies determine the space on the board. Here, Korchnoi might be in trouble but his Queen and Rook pose very serious threats if White is not careful. Karpov

33 Van Harreveld, F., Wagenmakers, E., Van der Maas, H. L. (2006). "The effects of time pressure on chess skill: An investigation into fast and slow processes underlying expert performance."

34 Mariano Sigman, Pablo Etchemendy, Diego Fernández Slezak and Guillermo A. Cecchi, "Response time distributions in rapid chess: a large-scale decision making experiment"

35 Anatoly Karpov, *My Best Games*, 69

36 Anatoly Karpov, *My Best Games*, 70

points out that "in such positions you must 'sit on your hands'; i.e., not rush to make pretty moves. It is still not too late to lose."[37] Likewise, Karpov's attack on the King-side is made possible in part by his castling on the opposite end of the board.

The End Game

Korchnoi resigns after briefly giving chase to the long-awaited 26. Qxh7+. Rajahi observes that "grandmasters don't play the books or the lines, they play each other." Karpov was prepared for Korchnoi by studying his behavioral patterns beyond this single game. He attributes his win merely to "the wrong choice of opening variation."[38] This is, of course, an over simplification. The reason it was the wrong opening variation is because Karpov was prepared for it in granular detail. Developing tactics and strategy based on your opponent's tendencies is the mark of a grandmaster. The conditions required to treat the board as Sigman's "state function" simply cannot be met with the presence of humans. Book moves and minor tactical combinations become second nature at this level, forcing the grandmaster to take into account human factors outside of the board.

CONCLUSION

If we are to use the research cited here as our guide, it would appear as if Viktor Korchnoi struggled to distinguish meaningful cues from meaningless information in 1974, and even more so in 1978. Korchnoi failed to anticipate Karpov's strategy in game two of the 1974 match in spite of available data and personal experiences with the man. We saw this again in 1978 when his awareness and accounting of external factors were much more apparent, however misguided, while viewing Karpov and his delegation as if they were some twisted version of the Mechanical Turk. Karpov on the other hand, while demonstrating an acute sensitivity to all manner of plots and schemes, was able to discipline his own paranoia in order to exploit that of his opponent. As previously stated, Korchnoi's attitudes towards parapsychology were well-known by 1978, and it would be naive to claim that Karpov was not aware of this when he invited his own parapsychologist to the Philippines.

Are there parallels to be drawn between the pressures experienced by a grandmaster-level chess player and those of our own "disinformation" age? Consider the state of mind of a person experiencing this drama unfold through an extended drip of imminent threats, plots, conspiracies and other developments. Today's fragmented, 24-hour news cycle conditions us to consume vast amounts of complex information in microseconds. Whether the information we are receiving comes from polling data, marinated quail's eggs, or YouTube Q-Anon videos, we are often required to digest this stimuli under similar stresses. If this saga from 1978 strikes anyone as somehow "binge-worthy", I would argue that it has less to do with my gifts as a storyteller, and more to do with certain similarities between the way time is experienced in a bizarre, grandmaster-level chess tournament, and the way we experience time today.

We have seen plenty of evidence that shows the increasing difficulty of connecting the dots in a high pressure environment. Gary Kasparov once

37 Anatoly Karpov, *My Best Games*, 70
38 Anatoly Karpov, *My Best Games*, 70

described chess as a "laboratory of cognition."[39] I argue that today, we find ourselves the guinea pigs in a grand experiment of a similar nature, but with much higher stakes.

KEYNOTE SCRIPT

"The name of my project is Karpov vs. Korchnoi, visualizing chess, patterns, and paranoia.

Anatoly Karpov and Viktor Korchnoi often found one another sitting on opposite ends of a chessboard throughout the 1970's. But the contrast between their 1974 Candidates Final and 1978 World Chess Championship could hardly be sharper. One has come to be regarded as a modern classic in tactics, strategy, and chess brilliance between two of the game's best. The other quickly earned notoriety as an example of the type of superstition, paranoia, and scandal commonly observed in chess lore throughout the game's rich history. However, a few key similarities will emerge as the focus of this visualization project that also carry broad implications for the way we extract meaning from information. Are there parallels to be drawn between the pressures experienced by a grandmaster-level chess player and those experienced in our own "misinformation" age? Perhaps today's global citizenry could learn something from the way chess grandmasters interpret information under pressure.

Analyzing chess as a game of fast pattern recognition processes, and slow search processes allows us to see how two fine specimens of Kasparov's "Drosophila of reasoning" became so consumed with fear and loathing in the Philippines, while having delivered a master class only four years prior. Chess trains each player always to be one step ahead of every scheme, subplot, feint, decoy, and other deceit. While the key is to focus this energy on the 64 squares located within the boundaries of the chessboard, research has found this to be easier said than done. The roles of pattern recognition and time pressure are examined across these two very different scenarios with supporting documentation from other historical accounts and written works on chess theory, statistics, and cognitive psychology.

The story begins in the middle of the action at the chaotic 1978 final, which has devolved into an absurd melodrama during peak monsoon season in the Philippines. Each player has managed to find meaning in everything from the precise color of yogurt, to the seating arrangement of hypnotists. Chess at this level is hard enough without having to endure a veritable arms race of parapsychologists, murderous Ananda Marga yogis, and Soviet operatives doing everything they can to subvert your efforts.

The visualizations that accompany the game analysis are designed to help readers see chess in the same way that a grandmaster does, and in so doing, help them to identify similarities between a grandmaster's state of mind and their own.

The decision-making of each player in the 1974 match is retraced with interactive flow diagrams that include the top moves for each position pulled from Chessbase's database of hundreds of thousands of similar games played. This highlights the significance of move sequences, as well as any deviations from these patterns.

39 Kasparov, Garry. "Chess, a Drosophila of Reasoning."

Additional research reveals that the strong correlation between chess ability and time pressure also indicates the increasing role of pattern recognition under high stresses.

While reading this bizarre story in today's exhausting, 24-hour, 280-character media landscape, it is worth asking; Are we under the same kind of pressure as a chess genius? Is this reasonable? What ways do chess prodigies respond to this pressure and what are the possible outcomes?"

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