

The Effect of COVID-19 on Female and Male Chess Improvement

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ABSTRACT

The COVID-19 pandemic had a severe impact on the chess community since all the in-person tournaments had to be cancelled, but on the other hand, chess streamers and online chess websites gained much popularity due to the fact that people had more leisure time indoors. This research project is designed to examine gender differences in fluctuation of chess rating through the pandemic. A dataframe in Python was set up and filled up with data of top chess players' information published on USCF website, followed by exportation of the data to an Excel document where analysis was performed in order to extract the results of monthly rating improvements, and the reasons behind them. In addition, surveys were conducted, and responses were collected then coded into graphable data. Findings are showing that while male players outperformed female players in general during pandemic, the opposite took place in terms of the top 5% of chess players. In terms of practice during the pandemic, overall all chess players demonstrated a drastic increase in practice, with female players showing less practice than their male counterparts. This research project shows that chess participation increased significantly both during and after the pandemic. Furthermore, this study provides insights as to the gender imbalance, i.e., female players in the top 5% made more progress than male counterparts. Hopefully the findings of this project become valuable to future research, for example innovating coaching styles tailored to female chess players as compared to male chess players.

Introduction

The coronavirus (COVID-19) is an infectious disease caused by the SARS-CoV-2 virus. The disease originated in Wuhan, China on December 1st, 2019, and quickly spread around the world, reaching the United States and forcing the country into lockdown to avoid the deadly virus being spread among citizens. During the lockdown, people were expected to stay in their houses, minimize contact, and wear masks to keep the virus from spreading. Different states declared quarantine at different times, all states declaring quarantine around March of 2020. The last official chess match was played on March 8th, 2020, while the last in-person tournament was on March 11th, 2020. Once in quarantine, many chess players modified their training routine as tournaments were no longer available.

Chess "ratings" are numbers assigned to chess players to measure their strengths. The higher the rating, the stronger the player. A beginning player starts unrated and after going to a few tournaments, should reach around 600. The best chess players in the world are around 2800-2900, and the highest possible rating is 3000. The US Chess Federation (USCF) has set up a USCF chess rating system for all chess players in the United States. To change your USCF rating or gain a USCF rating, one must go to a USCF-rated tournament. Depending on where one lives, tournaments can be hard to find, and as a result, different states can have different rating inflations. For example, a person rated 1600 in Washington D.C. might be 1800 strength in New York, but due to a lack of tournaments in Washington D.C., their USCF rating will only be 1600. Every month, on the official USCF website, the top 100 players of different ages and gender are ranked based on their USCF ratings, with their ranking, rating, state, and name stated. Player rankings are directly related to USCF ratings.

Overall, the understanding of the impact COVID has had on chess, namely the pandemic-induced suspension of tournaments, in association with chess players rating and rankings remains limited. Furthermore, there is currently a limited understanding of how chess participants used the events of the pandemic, to continue to train for chess with the absence of tournaments, and whether the training impacted chess players rating and rankings after the COVID lockdown had ended. Such insight may be used to inform next steps as how to best train to be top ranked as chess resumes, as well as responses to future unanticipated change-events in Chess. In order to analyze the effect of COVID-19 on chess, the USCF top player lists of each month were scraped and put into spreadsheets. Using the data this research project aims to understand the effect COVID had on Chess, focusing on ratings fluctuating pre, during, and post-COVID-19 as it relates to gender.

Background Information

The COVID-19 pandemic had a severe impact on chess, with in-person tournaments being canceled, as having many people close to each other, separated only by a chess board (Ghaemmaghami, 2021), was a COVID-19 hazard. COVID-19 lockdown started in March 2020, and was officially lifted around May 2020, fluctuating depending on the state. Despite the lockdown being lifted, many people stayed inside for a couple more months, and many tournaments remained online rather than in person. Additionally, people had more leisure time, and interest in chess increased, whether they had played chess before COVID-19 or were new to the board game. As a result, chess streamers and chess content gained much popularity, and online chess websites gained many new members, such as chess.com, with 12.2 million new (Chess.com, 2022) users. COVID-19 changed the chess community, making both veteran and beginner players have to adjust their attitude towards the game. Online chess has become more predominant (Fuentes-García, Patiño, Villafaina, Clemente-Suárez, 2020, 10.3389/fpsyg.2020.01812), and ways to improve at the game have changed. Online resources such as videos and ebooks have also become more popular than physical books and in-person lessons. Due to an influx of new members, speed chess, also known as blitz/bullet chess (Keener, 2022), has gained popularity, along with other informal chess variants. Chess as a whole has joined mainstream entertainment, becoming a streaming category on Twitch (D' Anastasio, 2020), and is seen as entertainment more often than pre-COVID-19 while still maintaining professional aspects.

As in-person tournaments returned, many chess aspects affected by COVID-19 remained. Ratings started changing again, as opposed to being static as they were when in-person tournaments were unavailable during COVID-19. For a while many people were underrated due to the extreme training they went through in quarantine, but after a couple of months rating stabilized and once again accurately represented one's strength. Despite the temporary inaccurate ratings, the rankings remained somewhat accurate with players maintaining their strength relative to each other. Online resources and online chess remained extremely popular, especially for people unable to go to chess tournaments. Before the COVID-19 pandemic, chess tournaments were always in person, and training was extremely different than it is now. Physical books and in-person tournaments were heavily favored by the majority of chess players due to their unfamiliarity with online chess and resources. Ratings and rankings were straightforward, with the opponent's rating deciding the magnitude of the rating change and rankings following suit.

Male chess players perform better than female chess players, with a large margin of skill and rating. The gender imbalance heavily favors men, with only 37 female grandmasters out of over 1700 active grandmasters and 1 female player amongst the top 100. The ratio of female to male chess players in the United States is around 1 to 7. At the younger stages, girls and boys tend to perform approximately the same from ages 5-8, but as time passes, girls fall behind while boys continue progressing. Eventually, the gap widens to the point where males are significantly better than their female counterparts. Previous papers written also claim the reason women perform worse in chess is due to women's aggression decreasing (Dilmaghani, 2021, www.elsevier.com/locate/jce) when facing men and increasing when facing women. Experiments demonstrated that when women falsely believed they were playing same-sex opponents, they performed better than when they were aware they were playing men, proving there is a lack of confidence ruining women's performance.

There are many reasons the gender imbalance occurs, including that women aren't exposed to and encouraged to play chess as often (Barbier, 2020), women who do play are often looked down upon by society as nerds or weird, and the lack of women in chess discourages other women from participating. A phenomenon called the "stereotype threat" (Maass, D'Ettola, Cadinu, 2007, 10.1002/ejsp.440) also applies, where gender stereotypes of women being worse at chess affect women's performance, lowering their self-confidence and performance. It also boosts men's confidence when playing women, making their playing style more aggressive and making them more hesitant to resign. COVID-19 facilitated an environment where the "stereotype threat" was rendered inactive due to the canceling of in-person tournaments, and the gender imbalance may have become less apparent due to being unable to physically see the difference in a number of males compared to females. Through this, women in chess potentially gained confidence, and the "stereotype threat" lost its intimidation. Along with the confidence gained, Queen's Gambit further boosted the popularity of chess amongst women with the superstar effect (Bilen, Matros, 2022), reducing the stigma of women in chess being weird or nerdy. This research project addresses how COVID-19 affected chess rates as it created a situation never created before. Specifically exploring if a gender imbalance still existed during and after COVID-19 as new factors such as representation (ie. Queen's Gambit), training resources, and chess as a leisure activity presented itself.

Methods

The ages of the people analyzed were ages 13 through 16, of years 2019 through 2022. Firstly, the top player lists, posted publicly on the USCF website, were scraped and put into a dataframe. This was done by importing the libraries beautiful soup, pandas, and requests. Requests allowed the downloading of the webpages, beautiful soup scraped the webpage, and pandas set up the data frame. Once the data frame was set up, the first column that was set up was "MonthYear," which consisted of the month and year of each row. The second column was the urls of the hyperlinks that corresponded with the MonthYear. Once completed, more columns were added similarly, including ranking, NameID, age, state, and rating. After this, the data frame was exported to an excel document. Using the excel document I then did my analysis by subtracting each month's rating from the previous month's rating to find the monthly rating improvement of each month. I decided to focus on rating improvement and change to see the progress made in a month, as opposed to considering the progress made over potential years of playing chess, which would occur if I focused on just rating. Exporting the data to tableau to graph the information, the first figure I made graphed both male and female average monthly rating improvement over 2019-01 - 2022-05, and compared them to each other, to clearly show COVID-19's effect on rating improvement between the two genders. The second figure graphed the 95th percentile of males and females' average rating improvement over 2019-01 - 2022-05 to analyze only the top players' improvement, as they are the ones most dedicated to the game.

Along with the spreadsheets, surveys were sent to many different people from different states, with both male and female responses. This survey was conducted so that I could understand the reasons behind the trends noted in figures 1 and 2. I requested age, gender, state, rating, the amount of time spent playing chess, the amount of time spent studying pre-COVID-19, during COVID-19, and post-COVID-19, how study habits were affected by COVID-19, tournament participation, and other factors. The survey responses were coded into a simplified version, quantifying word responses to graph them. The codes are described in table 1. Practice was given a number 1-5, with a lower number signifying less practice and a higher number signifying more practice. Study habits in COVID-19 were given a number 0-2, with 0 signifying a decrease, 1 signifying consistency, and 2 signifying an increase. Tournament participation was given a number 1-5, with a lower number signifying less tournament participation, and a higher number signifying more tournament participation. Small quantities were used as codes so the graphs wouldn't be overcomplicated.

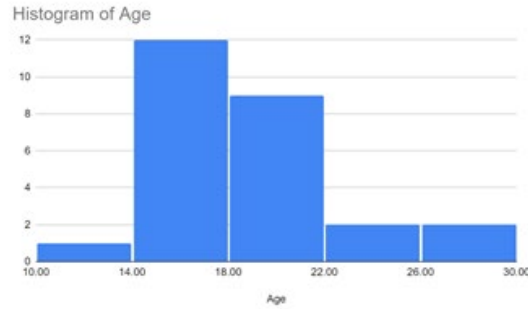


Table 1. translated word answers into numbers, allowing me to take averages and manipulate the data into understandable graphs.

	0	1	2	3	4	5
Practice (Pre-COVID-19, during COVID-19, and post COVID-19)		No practice	No serious practice	Some practice	Serious practice	Extreme practice
Did COVID change any of your study habits?	Decreased	Stayed the same	Increased			
How often did you go to tournaments pre-Covid? During Covid? Post-Covid?		No tournaments	Once every few months	Every other month	Every month	Every week

Findings

The analysis as described in the methods section yielded various insights into how COVID-19 affected chess ratings as it relates to males and females. Figure 1 shows the average rating improvement of females of ages 13-16 of each month in orange, and then the average rating improvement of males of ages 13-16 of each month in blue. Each month from 2019-02 to 2022-05 is plotted, to show the monthly rating improvement before and after COVID-19. As figure 1 shows, males consistently outperformed females from 2019-02 to 2022-05, with a few months such as 2019-03, 2019-09, 2019-12, 2020-03, and 2022-03, being rare exceptions.

Conversely, when focusing on the top 5% of females and males, females tend to outperform males, aside from months 2020-05 to 2021-07, when COVID-19 was at its peak. This is likely because the top 5% of females are rated lower than the top 5% of males, and it's therefore easier for them to improve, since improving from a lower rating is easier than improving from a higher rating. Along with this, the top 5% of females are more dedicated to the sport in comparison to the rest 95%, showing as much dedication as their male counterparts, if not more, resulting in more training and tournament participation for them. These two factors combined explain their superior performance despite the gender imbalance. The weaker performance during COVID-19's peak is likely because females were more cautious of the pandemic, while males were not.

As described in the methods section a survey was done to gain insight into the findings from the first analysis. While the individuals that participated in the survey are not a part of the data analyzed in the first half of the study, it gives perspective into how COVID-19 affected the weaker, average, and stronger chess player.

Most chess players are between 1000-1500, meaning most surveyed people are weaker tournament players, as figure 3 shows that group to be the most populated. The second most populated group was 1500-2000, stronger tournament players. The survey accurately represents chess community rating wise, since most people are weaker tournament players, and then stronger tournament players, with occasional 2000+ players, who are considered masters. People below 1000 are likely new to chess and started during the pandemic, and will soon become 1000-1500.

Chess teams/clubs don't seem to have much effect on average rating, although there is a slight increase if one is part of a chess team/club. Since chess is an individual sport, teams/clubs likely don't affect one's performance much. Females play for less time on average, likely because they aren't encouraged to play chess by society the same way males are.

Figure 5 shows all chess players demonstrated a drastic increase in practice during COVID-19, and decreased their practice a bit when COVID-19 ended. Females showed a higher amount of practice pre-COVID-19, but during COVID and after COVID their practice was less than their male counterparts. Figure 6 shows that tournament participation drastically decreased when COVID-19 started, and drastically increased when COVID-19 ended, with tournament participation exceeding its original numbers for both genders. Although this seems to contradict earlier graphs, many more males than females took the survey, as there are many more males than females in chess. This resulted in the males who can't access chess tournaments bringing the average tournament participation down.

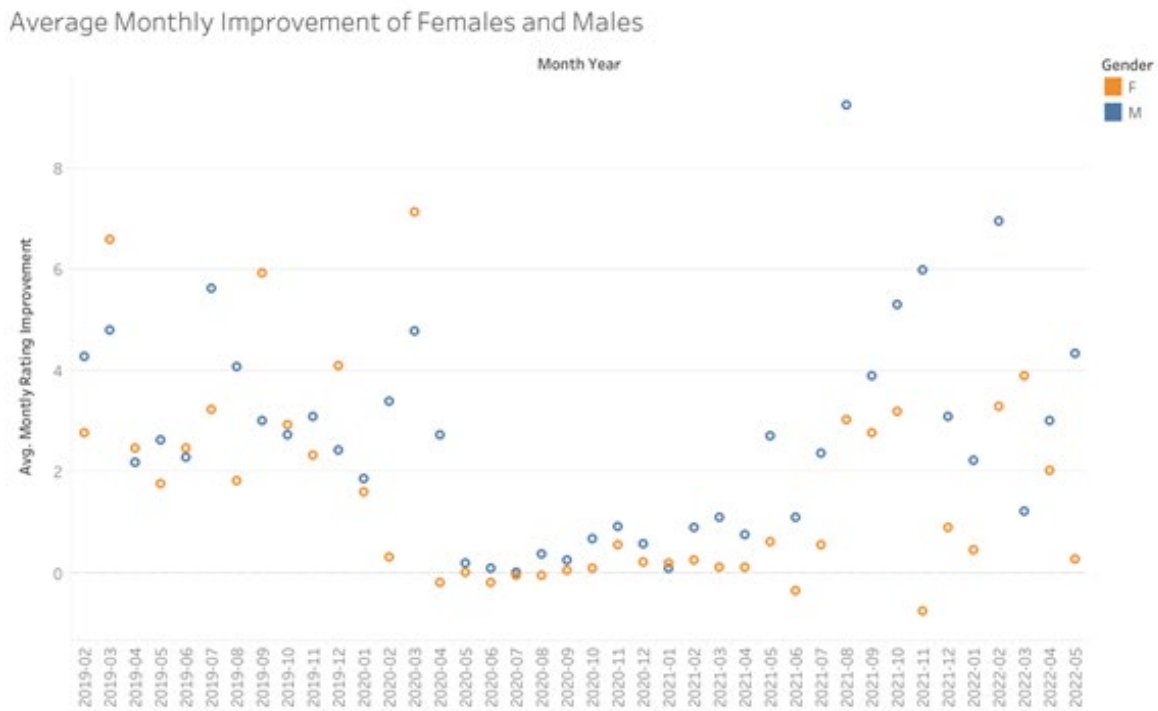


Figure 1

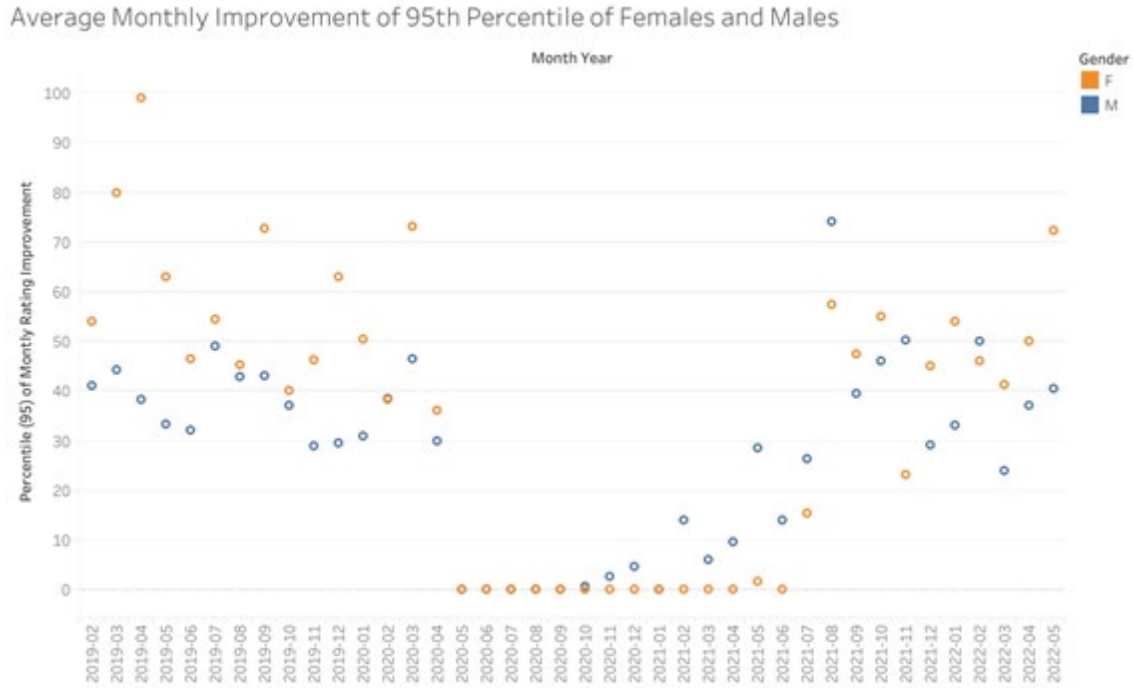


Figure 2

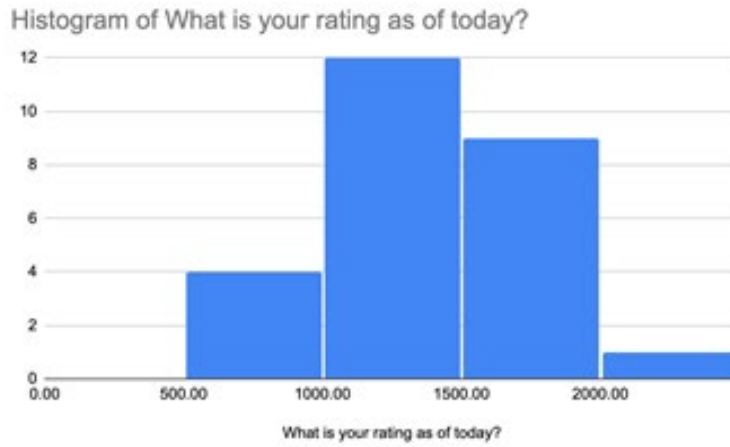


Figure 3

Chess team/club?	AVERAGE Rating	STDEV Rating
No	1,349	340.9232214
Yes	1,448	558.1278975

Figure 4

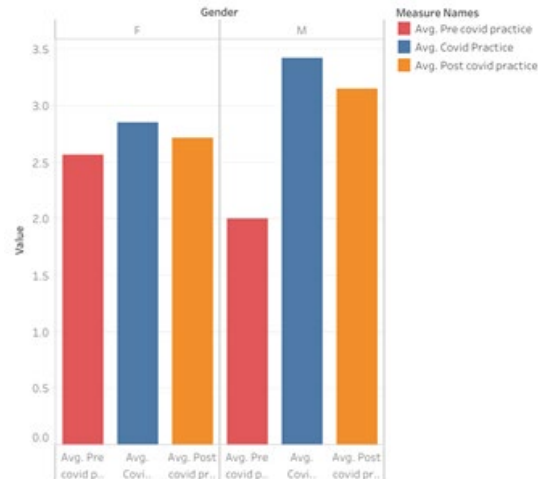


Figure 5

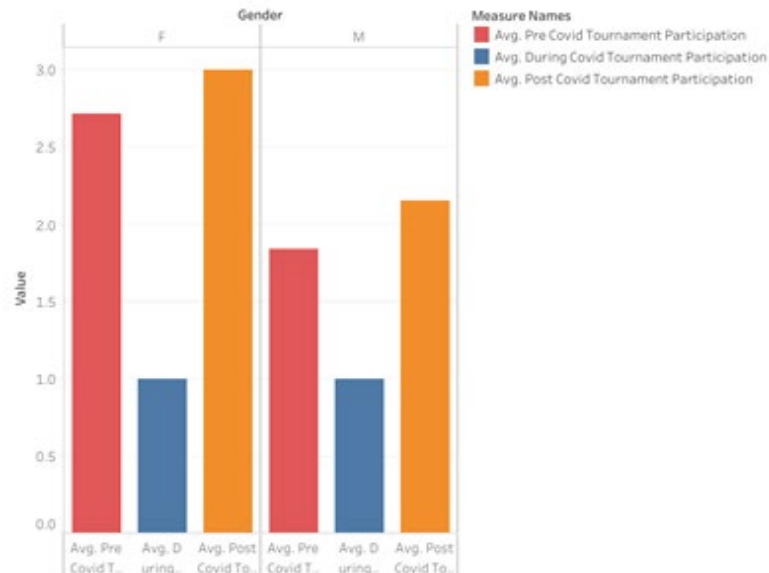


Figure 6

Discussion

On average, males performed better, while in the 95th percentile, females performed better, except the time period at which COVID-19 was at its peak. Males performing better than females on average was expected for many reasons, for example the stereotype threat. Even with in-person tournaments removed, the stereotype threat remained, and females could not match the average male performance. Unexpectedly, the top females showed a better performance than the top males, which, although in part due to being lower-rated and gaining rating being easier, prove with proper dedication and work, females can produce the same results as males. The underperformance during COVID-19 months showed that females were more cautious about spreading the disease, but the post-COVID-19 recovery was quick.

As the survey graphs show, COVID-19 drastically increased chess participation amongst males and females while in quarantine, and after COVID-19, tournament participation also increased. More than half the surveyed people reported noticing more people joining chess, and almost everyone reported increasing the amount of training they did.

Training has always been the most difficult part of chess and also one of the most important. Many people seek coaches, read books, do training puzzles, etc., but nothing's guaranteed to improve your skill. The amount of training one does depends entirely on their interest and commitment to chess, and COVID-19 changed many people's training schedules. With the abundance of spare time COVID-19 allowed, many people started extreme training regimens, including people who had just started the game.

Conclusion

This study showed COVID's effect on the chess community, which, in conclusion, turned out to be positive. Chess participation dramatically increased during COVID-19 due to quarantined people looking for entertainment, and although the interest in chess decreased slightly after COVID-19, it was still a much larger amount than pre-COVID-19 chess interest. Tournament participation reflected this statistic, as while during COVID-19 tournament participation decreased due to in person tournaments being canceled, after COVID-19 tournament participation increased by an extreme amount, surpassing the original tournament participation of pre-COVID-19. During this period, many veteran chess players got used to online resources such as chess.com and lichess.org, while newer players started with online resources, resulting in an increased use of digital chess that remained even when in person tournaments returned. Along with COVID-19's effect on chess, this study also revealed insights into the chess gender imbalance. Although seeing the average male performance consistently rise above the average female performance showed the stereotype threat persisted throughout COVID-19, looking at the 95th percentile helped uncover that girls in the top 5% made more progress than boys in the top 5%, with two reasons to explain this statistic. Firstly, girls in the top 5% are rated lower than the boys in the top 5%. It is easier for them to gain rating points, since rising from a lower rating is easier than rising from a higher rating. However, this alone isn't enough, and the girls showed strong dedication to the game to improve so rapidly, surpassing their male counterparts.

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