CUNY SPS

DATA698: Master’s Research Project

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Project: The Effects of COVID-19 on Exercise Behavior in the US

# **Introduction**

The Coronavirus disease 2019 (COVID-19) was declared a global pandemic by the World Health Organization on March 11th, 2020.[1](#_Relevant_Research/Journal_Papers) As a response, the United States declared a national emergency on March 13th, 2020 to slow the spread of COVID-19. The national emergency imposed school closures, nonessential businesses closures, cancellation of large public gatherings, cancellation of as sporting and entertainment events[2](#_Relevant_Research/Journal_Papers), travel restrictions, quarantines for travelers, and stay-at-home orders implemented by governors and mayors.[3](#_Relevant_Research/Journal_Papers)

Due to the global pandemic and US national emergency, the behavior and attitude of US public changed. Surveys from May 5-12, 2020 showed US citizens avoided groups of 10 or more persons and agreed with rules that prohibited inside dining.[4](#_Relevant_Research/Journal_Papers) Another study by the CDC showed a drastic decrease in US population movement from state-to-state during March, April and May, 2020.[5](#_Relevant_Research/Journal_Papers) All of this change is continually shaping a “new normal” in the United States.[6](#_Relevant_Research/Journal_Papers)

However, what exactly does and will “new normal” look like? Some differences are obvious and well-covered, like more working from home[7](#_Relevant_Research/Journal_Papers) and Netflix subscriptions[8](#_Relevant_Research/Journal_Papers). But what about the non-intuitive differences? The changes in our day-to-day life?

This project will dig into the “new normal” for exercise in the US, a major component of American Health.[11](#_Relevant_Research/Journal_Papers) The US national emergency halted the infrastructure of community exercise; gyms closed and team sports were canceled.[9](#_Relevant_Research/Journal_Papers) In tandem, dining out was altered, community/group meals changed, and the US experienced agriculture production changes.[10](#_Relevant_Research/Journal_Papers) How did all this change exercise? Were these temporary changes, or will pre-COVID-19 exercise behavior resume with time in the US? Will commercial gyms be different in 2025? This project will use many datasets to examine these questions and more.

# **Relevant Research/Journal Papers**

A summary of key journal papers relevant to your work.

1. WHO

Timeline of WHO’s response to COVID-19

World Health Organization, 2020

<https://www.who.int/news-room/detail/29-06-2020-covidtimeline>

Date accessed: September 25, 2020

1. Chowell, Gerado, and Kenji Mizumoto. “The COVID-19 Pandemic in the USA: What Might We Expect?” The Lancet, 4 Apr. 2020, [www.thelancet.com/journals/lancet/article/PIIS0140-6736(20)30743-1/fulltext#seccestitle10](http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(20)30743-1/fulltext#seccestitle10).
2. Gostin LO, Wiley LF. Governmental Public Health Powers During the COVID-19 Pandemic: Stay-at-home Orders, Business Closures, and Travel Restrictions. JAMA. 2020;323(21):2137–2138. doi:10.1001/jama.2020.5460, <https://jamanetwork.com/journals/jama/article-abstract/2764283>
3. CDC

Public Attitudes, Behaviors, and Beliefs Related to COVID-19, Stay-at-Home Orders, Nonessential Business Closures, and Public Health Guidance — United States, New York City, and Los Angeles, May 5–12, 2020

Center for Disease Control, 2020

<https://www.cdc.gov/mmwr/volumes/69/wr/mm6924e1.htm?s_cid=mm6924e1_w#T1_down>

Date Accessed: September 25, 2020

1. CDC

Timing of State and Territorial COVID-19 Stay-at-Home Orders and Changes in Population Movement — United States, March 1–May 31, 2020

Center for Disease Control, 2020

<https://www.cdc.gov/mmwr/volumes/69/wr/mm6935a2.htm?s_cid=mm6935a2_w>

Date Accessed: September 25, 2020

1. Roberts, Jennifer. “Environments, Behaviors, and Inequalities: Reflecting on the Impacts of the Influenza and Coronavirus Pandemics in the United States.” MDPI, 22 June 2020. <https://www.mdpi.com/1660-4601/17/12/4484/htm>
2. Ahmad, Tabrez, Corona Virus (COVID-19) Pandemic and Work from Home: Challenges of Cybercrimes and Cybersecurity (April 5, 2020). <http://dx.doi.org/10.2139/ssrn.3568830>
3. Dias, Murillo. (2020). NETFLIX: FROM APOLLO 13 TO THE CORONAVIRUS PANDEMIC. 8. 21-35. 10.11216/gsj.2020.08.42678. <https://www.researchgate.net/publication/343445075_NETFLIX_FROM_APOLLO_13_TO_THE_CORONAVIRUS_PANDEMIC>
4. Gentil, Paulo et al. “Resistance Training in Face of the Coronavirus Outbreak: Time to Think Outside the Box.” Frontiers in physiology vol. 11 859. 7 Jul. 2020, doi:10.3389/fphys.2020.00859, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7358585/>
5. J Surg

The socio-economic implications of the coronavirus pandemic (COVID-19): A review

NCBI, 2020

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7162753/>

1. AHA Medical/Scientific Statement on Exercise

American Heart Association

<https://www.ahajournals.org/doi/pdf/10.1161/01.CIR.86.1.340>

# **Problem Statement**

The focus of this research is to use data assess the hypothesis:

* *Did COVID-19 permanently change exercise behavior in the US?*

To address the above hypothesis, I broke it down into sub-hypothesis:

* For an person in the US, was the frequency of exercise the same before and after COVID-19?
* Did the types of exercise shift after COVID-19?
  + Were there more runners after COVID-19?
* If there was a change in exercise in the US, was it uniform geographically?
* Will there be the same number of gyms in the US in 2025 as there were in 2019?
* Will commercial gyms in 2025 have the same equipment they had before COVID-19?

# **Methodology**

* A statement of objectives, proposed methodology, and the evaluation measure for the performance of the proposed methodology.

For this research, exercise data will be collected from many sources:

1. Health Apps:
   1. Garmin Health API: <https://developerportal.garmin.com/>
   2. Strava API: <http://developers.strava.com/>
   3. Fitbit API
   4. Google Fit
   5. Human API
2. Twitter
   1. Twitter API
3. Podcast Data:
   1. Spotify API
   2. Podgist podcast transcripts
4. Kaggle Datasets
5. (optional) Statista
6. Public commercial gym statements

After the data has been collected, I will build a small, cloud-based data warehouse with Oracle Database 12c (<https://www.oracle.com/database/12c-database/>). Here I can store the data in one place, and merge datasets.

From there, I will address each sub-hypothesis one at a time to challenge my larger hypothesis.

During this project I will use the data science concepts:

1. DATA 604 – Simulation and Modelling Tech
   1. Project number of runners by month across the US
   2. Project number of commercial gyms in 2025
2. DATA 602 – Advanced Programming Techniques
   1. Building API connections with class objects in python
3. DATA 620 – Web Analytics
   1. Use Social Network Analysis to connect types of exercise, and communities
4. DATA 607 – Data Acquisition and Management
   1. Web scraping
5. DATA 608 – Visual Analytics
   1. Presenting findings in a Dash application
6. DATA 621 – Business Analytics and Data Mining

# **Assumptions**

* A conceptual/high-level description includes assumptions, what aspects will be considered in your model/approach, and a study logic.

The main assumption(s) for this research are:

1. Enough historical exercise data can be collected from health apps to compare against current data.
   1. May be able to find this data stored online (personal githubs, Kaggle, etc)

# **Datasets**

1. Podcast reviews dataset: <https://www.kaggle.com/thoughtvector/podcastreviews/discussion>
2. Spotify API data: <https://developer.spotify.com/>
3. Twitter API data: <https://developer.twitter.com/en>
4. Strava API data: <http://developers.strava.com/>
5. Garmin API data: <https://developer.garmin.com/health-api/overview/>
6. FitBit API data
7. Human API data
8. Statista datasets