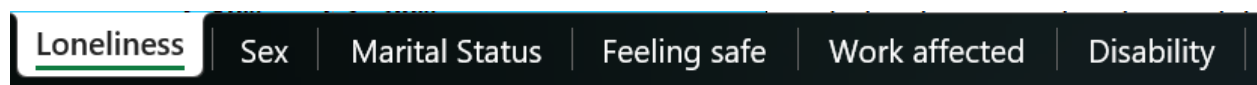


## Background:

Many people throughout the world are dealing with mental health problems. This project aims to raise awareness and help the government put more funds towards mental health issues, especially in times of tragedy or distress. During the coronavirus pandemic, the level of stress from the virus was at its highest as people dealt with problems like feeling safe, worried about their jobs, or lonely. By showing information about the general public's anxiety level during COVID-19, we can push the idea that we need more funds for mental health support in these nations.

## Summary:

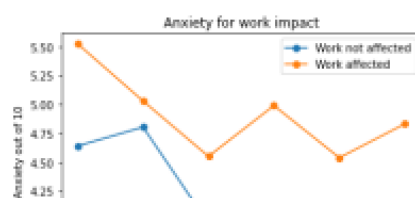
The coronavirus anxiety dataset involves the use of many different tabs in Excel, each representing a different category and the anxiety associated with that category.



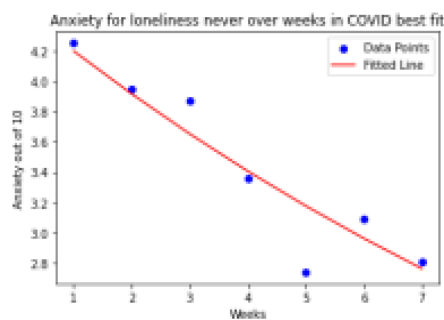
Respondents were asked questions like “How anxious did you feel yesterday” on a scale of 0 to 10, 0 being not at all and 10 being completely. This would be done for 7 weeks, saving the mean and upper and lower intervals. The data was obtained from ons.gov.uk, and there are no ethical/privacy concerns about it being collected as they knew what was being surveyed. There could be potential bias in that people were dealing with problems prior for groups like sex, which only is based on gender and not if they were dealing with issues prior, causing bias. However, other tabs like loneliness specify if they dealt with it before, so this issue is resolved in other tabs.

I used another dataset from uns.gov.uk again this time about the weekly deaths of people by COVID. It is organized in one tab and includes weekly deaths that day, deaths by COVID-19, and the week in which the deaths correspond.

## Data Science approaches:



For this project, I applied many uses of statistics and Python techniques in finding data. The most basic one is comparing variables by using graphs. By comparing the graph and the values over time, you can make predictions and understand the data better. I used best-fit plots to find how accurate the plots are in forming a linear model. The more accurate the best-fit plot the more

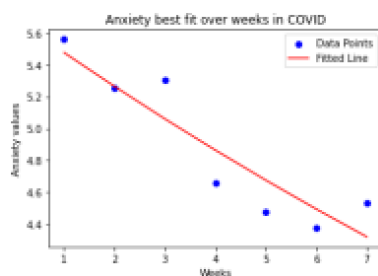


linear the relationship is. If the data is more linear the r-value will be bigger and the linear relation will be stronger. I used the train test split function in sklearn to predict the future values of the data. It goes through the data and trains it to make predictions later by using the test part of the function.

By using best-fit plots alongside this I can test how accurate my predictions are. Good to note these regressions aren't truly linear so I used the Poisson regression to predict data. The reason is that the data points were out of 10 and can't be less than 0, and the Poisson regression ensures it is not less than 0.

### Results/Conclusion:

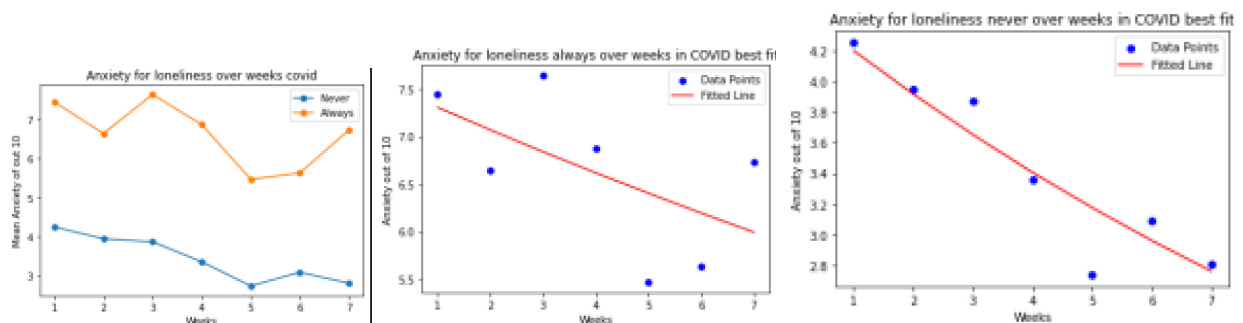
I found that for anxiety over time in COVID, the numbers appeared to start initially high then slowly decrease over the next weeks. This could be due to people initially fearing the virus or due to confusion about what is going on in the world. It is likely also the fact the end of the surge was starting by week 7 as well as cases were decreasing. I ran a linear regression of the initial



data when relating to loneliness and found the same idea with the R-value being negative meaning decreasing as well as being very linear. Using pearsonr we also found that there was a correlation that over time anxiety will decrease, as with a P-value that was

.003, I reject the null hypothesis meaning there is a relationship between time and anxiety.

However, when furthering my investigation on this I found that this regression is inaccurate as it fails to take into account specific cases like if they felt lonely before the virus and seeing how that relates to anxiety. Looking at this data, it showed that the never category remained the same with the R-value being -.93 still, however, the always category had an R-value of -.58, showing a less linear model. This is because if you always felt lonely before COVID-19, your anxiety will be high even if you get more used to the coronavirus pandemic.

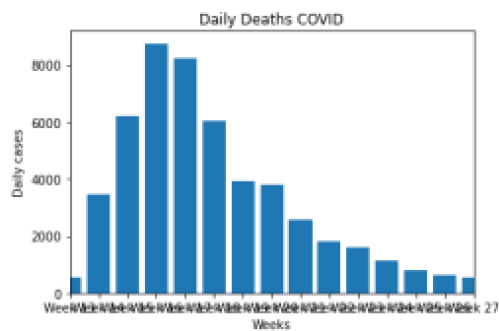


Using the plots relating to always you can see more variety in the points and the graph furthers this with the values from week 1 to week 7 being similar. The regression plot earlier for all data shows mean anxiety at the start of COVID to be 5.5, which means that of the people surveyed, most feel pretty anxious to receive a score of that, which ties back to the original idea that we

need more funds towards mental health to fix this score, especially at the peak of a pandemic. I was curious if the trend would continue in that anxiety would keep decreasing over the next weeks so I used the Poisson Regression to find values during the next 7 weeks and here are the results: Starting from week 7 to week 14, the values slowly level out at around 2.96, which if things during COVID remained the same would make

	Predicted
0	3.930967
1	3.748614
2	3.574719
3	3.408892
4	3.250756
5	3.099957
6	2.956153

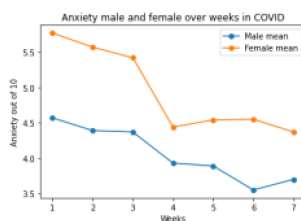
sense, however, the reason this could change is if a sudden surge were to occur and invoke more



stress in the region. I did some research on the UK's COVID data and found that there was no surge during this period so the prediction is pretty accurate, however, it is good to note this would not be effective for a long period, or had there been a surge in cases.

The barplot shows that cases are decreasing by the time we start predicting, showing that the relative anxiety will start decreasing over weeks. This death plot also shows that in times of surges, anxiety is at its highest, and with this not being the only surge, there is a need for resources to help those in need during those times of hardship.

For gender, I ran a plot to see if there was a difference in anxiety between the two genders male



and female. The plot showed a big difference with females having a score 1 higher than males, a 10% difference. The reason is likely due to the initial inaccessibility to reproductive needs due to the lockdown, which was a new concept for a lot of people. People dealing with this and the

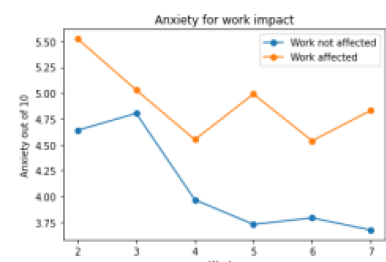
added stress of dealing with pregnancy is likely the cause. This is why there is a need for more gender-specific mental health care as well as resources for women dealing with reproductive issues during the initial surge in cases.

Finally, I looked to see if people's work was affected by the virus. I

first looked at the graph between work affected and work not affected. The plot says that for people with work impacted, the anxiety levels are higher than people whose work was not affected.

This is likely due to the people not being able to make money and

provide for families, and the uncertainty of when they will get work again. The solution is



welfare programs for those in financial need/find virtual options for jobs that can provide them.

This as well as the normal mental health needs that can be provided to help those with anxiety, as like with loneliness, the dropoff is not very present therefore those affected are anxious for an extended time.

### **Future Work:**

These results can lead me to expand the dataset. This data is only talking about Europe, and with the new monkeypox epidemic plaguing Africa, learning more about other viruses and nations that are either more or less advanced will be useful in understanding what life is like under a pandemic/epidemic. Incorporation of socioeconomic status is another big thing as the relative anxiety for those who are poorer versus those who are wealthy can help further push the mindset for the need for welfare programs for those under a certain wage, and also mental health resources too. Provide more advanced machine learning by learning more that Python can offer. By using more advanced machine learning, I can make better predictions. Also linking the average anxiety with deaths and predicting using multiple models can help predict even the anxiety today. Working with health officials, I also can get more data from patients during COVID to provide more data while also getting smarter predictions for anxiety today. Lastly, making an actual movement for local governments to raise awareness about these issues so money can be provided to those struggling. This can even be done internationally, like providing aid for people in Africa struggling with monkeypox currently.

