Crime and Covid

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I. Data Story Summary

'**How does crime; a consequential aspect of our society, evolve through a world which is subject to a pandemic?**'

Crime is a consequential aspect of society, influenced by many factors and recently the impact of the Covid-19 pandemic. With a large amount of reliable government recorded statistics in regards to crime within the UK, it makes sense to analyse and create visualisations from this data to avail of possible insights and prompt action where discovered.

I initially explored how the number of crimes evolved over time for the regions the collected data has offered, this starts with a wider picture of the EU. This enables the viewer to see whether crime is increasing or decreasing across the explored regions. Afterwards, the visualisations delve deeper into more recent statistics which include timeframes both before and during the Covid-19 pandemic. When exploring how crime evolves through a pandemic attention is directed towards the UK and Northern Ireland where sociocultural determinants are near identical when looking at the global stage. I feel this is an important factor to account for as crime is something which is very different across the world.

The important statistics required to answer these questions will feature numerical values for the count of each type of crime seen within this country, over time. This time period will range from months to years depending on the context of the visualisation and the part of the story trying to be displayed.

II. Dataset Summary

There were various datasets collected so that this project could be completed, they were found online through credible sources but also had to be built using python scripts.

The first piece of data required was for visualisation 1 and this was the crime index for European countries over time [3]. I was unable to download this data into a .csv format therefore I was required to write a python script to manually populate a dataframe and then convert the dataframe to a .csv file or excel file.

The remaining visualisations were built from other datasets obtained through government collected policing statistics. The most useful datasets which I was able to avail of was ones of crime within Northern Ireland [1]. As the main focus of this was with crime within Northern Ireland, I was able to collect datasets with values of each crime from 1998 through to 2021. On top of this, I was also able to find crime figures by policing district which was used to create bubble charts as shown within this report. This dataset also includes the outcomes of reported crimes as well as the demographic of people who fell victim which was availed of for Visualisation 3.

III. Visualisations

The visualisations shown and described below have been published to a HTML file as part of this data story. Most of which have 2 charts to help convey the message attributed with the visualisation.

A. *Crime Index for European Countries represented as a Heat Map and Line Chart over time*

1) Description

The data required was "Crime Index of EU countries from 2014 to 2021", this was obtained by writing a python script to scrape this data and form a dataframe which could then be exported as a .csv file for use within Tableau.

The crime index value reported is created from the equation:

Crime Index Value = Count of Offence/Population

This chart shows the crime index for European countries, with the European average on show as well as highlighting the UK in this. Highlighting the UK is done to help convey the fact that the UK is the centre of this project.

2) Justification

This visualisation is used to bring viewers into the broader picture and what the context of this datastory is.

3) Narrative Design Patterns

There are many different design patterns shown through this visualisation. The first one is addressing the audience[2]. and is used to build an initial picture of the data story.
Next, we see the compare design pattern and users find themselves[2] combined so that users can compare the crime index for different European countries across different years and also find their own country if they so wish.

Another narrative design pattern shown is familiarisation[2]. This is displayed through a map of the EU to help the viewer relate to the story from the onset.

Finally, we see interactivity through exploration[2], the viewer can use the slider to change the year and see that minimal changes occur overall as backed up by the line chart.

4) Strengths and Weaknesses

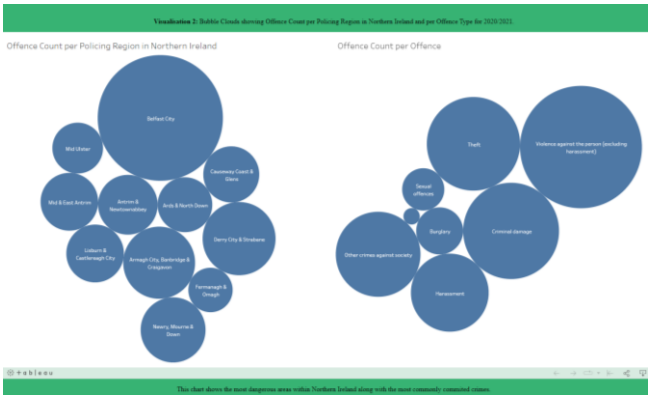
We can see that a few European countries have already been removed from the plot in an attempt to reduce chart junk, however the line chart is generally quite messy looking and still has quite a lot of chart junk even some removal.

A strength of the line chart is that the UK is highlighted originally as well as an average crime index value for European countries displayed. This average enforces the user to see that crime is an issue within the UK that should be reduced further.

5) Improvements

I could try to space the lines out more and reduce the size of the y axis so that there is not lots of space above and below the chart.

B. *Bubble Clouds showing Offence Count per Policing Region and per Offence Type within Northern Ireland for 2020/2021*



1) Description

This visualisation is comprised of two bubble charts which show the spread of offences and their counts across policing regions and crime types.

2) Justification

The justification for this visualisation is to show the viewer which policing regions are the most dangerous within Northern Ireland. On top of this the viewer can see which crimes happen most often and therefore what they might be most susceptible to be a victim of.

3) Narrative Design Patterns

The narrative design pattern shown here is physical metaphor[2] where the size of the bubble is an indication of the count represented. This forces this viewer to quickly see which policing regions are the most dangerous and which crimes occur the most often within Northern Ireland.

4) Strengths and Weaknesses

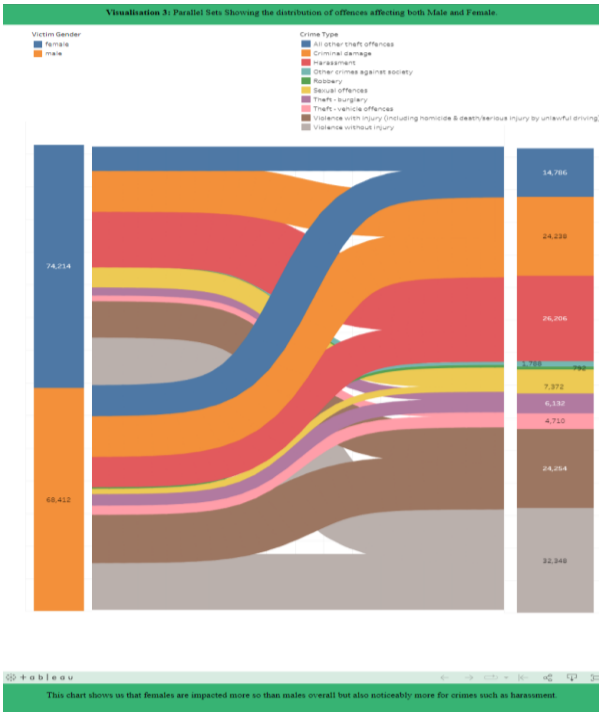
A strength of this visualisation is that there is no chart junk or colour to confuse the viewer.

One weakness displayed is that there is a bubble on the right bubble chart which does not have a label as it is too small for the text to show. Another weakness this visualisation shows is that the left bubble chart shows only the number of offences per policing region however a better representation would be to show the crime index of this region. Showing the crime index would give the viewer a better understanding of how safe or dangerous each region is.

5) Improvements

An improvement which should be done is combining both bubble charts into one. For example, only showing the left bubble chart with interactivity such that when the viewer hovers over a policing region, another bubble diagram opens up showing the spread of offence count per offence for the region selected.

C. *Parallel Sets of Male/Female Victim to Types of Crime*



1) Description

Parallel sets showing the distribution of crime per male or female victim.

2) Justification

This visualisation is to try and show the difference between what crimes males and females usually fall victim to. A notable example of this is the count of offences for harassment is nearly double for female as it is for males.

3) Narrative Design Patterns

The narrative design pattern shown here is firstly compare[2] as the viewer is able to compare the difference between male and female victim rates per crime.

4) Strengths and Weaknesses

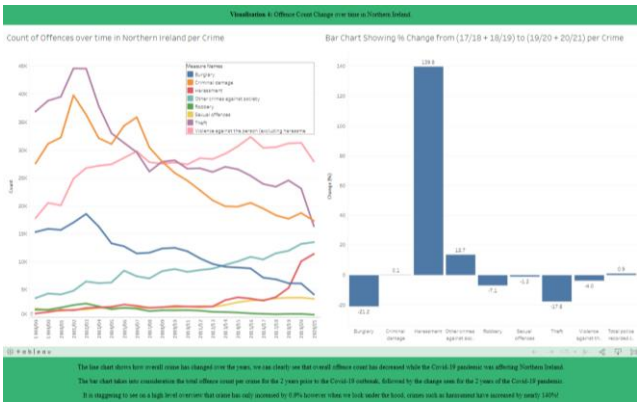
A strength of this visualisation is that there are filters for both sides of this parallel set which indicate what each group is.

A weakness of this visualisation is that there is no order encoding, it is therefore hard to compare orders of magnitude of discrepancy between male and females being victims of some crimes as individual values are not listed in the central flow of this chart and cannot be seen unless the user hovers their mouse over them.

5) Improvements

I wanted to add the age demographic to this chart, where the crime type would be in the middle, the victim gender on the left and the age of victims on the right. This would show the viewer even more information regarding "who" is affected by which crimes the most, forming a complete story.

D. Offence Count Change over time in Northern Ireland



1) Description

This is the final visualisation shown to wrap up the datastory. This visualisation has 2 charts, a line chart over time of multiple crimes, followed by a bar chart of %change in these crimes over the years of Covid-19.

Chart 1: Line Chart – This first chart is to show the audience how individual crimes have changed over the last few decades.

Chart 2: Bar Chart – This second chart is a bit creative and combines individual crime count for the 17/18 year and 18/19 year into one figure while doing the same for the 19/20 year and 20/21 year. The reason for doing this is to show the change in crime count between the 2 years prior to Covid-19 and the 2 years of which we have data collected for Covid-19. There is some extremely valuable insight in doing this as we can see.

2) Justification

The justification for using these two charts side by side is to alleviate any potential bias from being represented. We see that from the line chart the number of offences committed looks to be decreasing however when we see the bar chart we see that actually crime increased by 0.9% on a 2 year basis of non-Coivd-19 and Covid-19.

3) Narrative Design Patterns

The first narrative design pattern we see is compare[2]. This is through comparing how individual crimes change over time in Northern Ireland. The second narrative design pattern is call to action[2] as the bar chart displays the huge change in count of harassment, when thinking back to the previous visualisation we can come to the conclusion that the majority of these offences will have females as victims, showing that something drastic needs to change within our society especially when we don't know when Covid-19 will no longer be an issue.

4) Strengths and Weaknesses

This visualisation shows strength through conveying a strong message of how crime has changed and the horrible affects that Covid-19 has brought on females within our society. There is also a lot of colour to represent each individual crime displayed however a weakness of this is that there are no values shown on the line chart.

5) Improvements

A possible improvement which would improve this visualisation is to add a vertical reference line about the 2019/2020 point on the x-axis. This reference line would signify that the years which follow, were subjected to the Covid-19 pandemic and the societal changes which came with that such as lockdown and reduced social exposure.

IV. Conclusion

This datastory is trying to convey the message of how Covid-19 and its consequential government enforced lockdowns affect crime within the UK.

'**Does the total number of crimes committed and reported increase or decrease through a pandemic?**' We may believe that crime would decrease when as a society we are unable to leave or houses or socialise as a restriction put in place in the form of a lockdown. However, crime actually increases but only by a minimal amount of 0.9%.

'Does the type of crimes committed change when the region analysed is under the restrictions of a lockdown?'. Colnclusively from Visualisation 4 we are able to determine that the type of crime changes drastically which should prompt action.

'**Which policing regions within Northern Ireland are the most dangerous?**' We can see clearly from Visualisation 2 that the policing region of Belfast is the most dangerous part of Northern Ireland.

'**Which crimes occur the most often within Northern Ireland?**' We can see from Visualisation 2 that violence against the person and harassment account for the majority of crimes committed.

Another interesting question to ask would be '**Has online crime increased as a result of the Covid-19 pandemic and the government enforced lockdowns it has brought?**' This is an important question to explore as society moves more towards the online environment every day, whether it is for online payments, work-from-home jobs, social activity or gaming. However, for the purpose of this assignment I

was unable to answer this question as I could not source sufficient data.

We can confidently say that crime is reduced as a result of nationwide lockdowns however taking a deeper look into the statistics, we see that although some crimes reduce, others increase. This should not be neglected, and appropriate reallocation of resources should take place upon conducting this research and being able to visually see how the included data questions were answered.

These conclusions may be region specific, however basic intuition can extrapolate these conclusions into the greater picture as sociocultural factors remain extremely similar if not the same for all regions presented.

REFERENCES

[1] PSNI Statistics Branch, "Police Recorded Crime in Northern Ireland Update to 31st October 2021," Northern Ireland Statistics and Research Agency, Belfast, 2021.

[2] B. Bach, M. Stefaner, J. Boy, S. Drucker, L. Bartram, J. Wood, P. Ciuccarelli, Y. Engelhardt, U. Koeppen and B. Tversky, "Narrative Design Patterns for Data-Driven Storytelling," CRC Press, 2018.

[3] Numbeo, "Europe: Crime Index by Country 2021," [Online]. Available: https://www.numbeo.com/crime/rankings_by_country.jsp?title=2021&region=150. [Accessed 5 12 2021].