ASSESSMENT 2 - EXPLORATORY DATA ANALYSIS

TEAM FRUIT FLIES

Thomas Brettell (tbre2522)
Sumedha Dommatmari (sdom9253)
Alannah Frankel (afra9213)
Dylan Hensby (dhen2548)

TABLE OF CONTENTS

INTRODUCTION

Exploratory Data Analysis (EDA) is the process of exploring and becoming familiar with a dataset before forming insights (Jiahao Weng, 2019). Using EDA can help avoid biases which may lead to misrepresentation of what the data truthfully reflects. The EDA in this report examines and explores domestic violence related assaults in New South Wales (NSW).

DOMAIN

Domestic violence is any 'violent, threatening or other behaviour by a person that coerces or controls a member of the person's family (the *family member*), or causes the family member to be fearful' (Family Law Act 1975, 4AB (1)). According to the Australian Bureau of Statistics, domestic violence is an exceedingly prevalent issue that affects 13% of Australians above the age of 15 (Australian Bureau of Statistics, 2019). Victims of domestic violence reap serious short term issues which often manifest into long-term psychological and emotional distress, making it one of the most serious issues facing the NSW population (NSW Government, 2019). For the purposes of this EDA, we will be focusing on domestic violence assaults (DVA) (i.e. a physical attack by a family member directed towards another family member, excluding sexual assault).

HYPOTHESIS

Research found that in NSW, the rate of DVAs spike during some months more than others - specifically the summer months - December, January and February (Bureau of Meteorology, 2020). Furthermore, due to the currently ongoing Coronavirus pandemic, we have been seeing an increase in domestic violence as families are forced to remain in a close proximity to each other because of social distancing and isolation. This led us to hypothesis that the summer months could have a higher rate of domestic violence incidents as holidays and family time is more common during this season.

Therefore, the hypothesis we have arrived at is that *domestic violence related assault in NSW will occur more frequently in summer than in other seasons*. As seasonal months differ depending on geographical location, for the purposes of this report, Summer consists of December, January and February; Autumn consists of March, April and May; Winter consists of June, July and August; Spring consists of September, October and November.

THE DATASET AND SOURCE

The dataset we decided to explore, *Recorded Crime by Offence*, is from the NSW Bureau of Crime Statistics and Research (BOCSAR) (Bureau of Crime Statistics and Research, 2020). The Bureau itself is part of the Department of Communities and Justice, and was founded in 1969 (NSW Bureau of Crime Statistics and Research, 2019). Their main focus is on the collection and organisation of crime data, as well as conducting research and forecasting trends (Bureau of Crime Statistics and Research New South Wales, 1992). Widely consulted by numerous stakeholders including researchers, press, government and legal agencies for data, BOSCAR is a verifiable resource that provides access to large datasets through reports, interactive maps, as well as raw ".xml" and ".csv" formats (NSW Bureau of Crime Statistics and Research, 2019). The dataset chosen for this report represents each type of criminal offence that took place in NSW on a monthly scale ranging from January 1995 to December 2019. It consists of rows representing the type of crime, and columns representing the amount of times the crime occurred within each month of every year from 1995 - 2019.

EXPLORATORY DATA ANALYSIS

As our domain is domestic violence, this EDA process begins by extracting the domestic violence incidents from the BOSCAR dataset representing all crime. This came in the form of isolating all of row 6 of the dataset, "domestic violence related assaults".

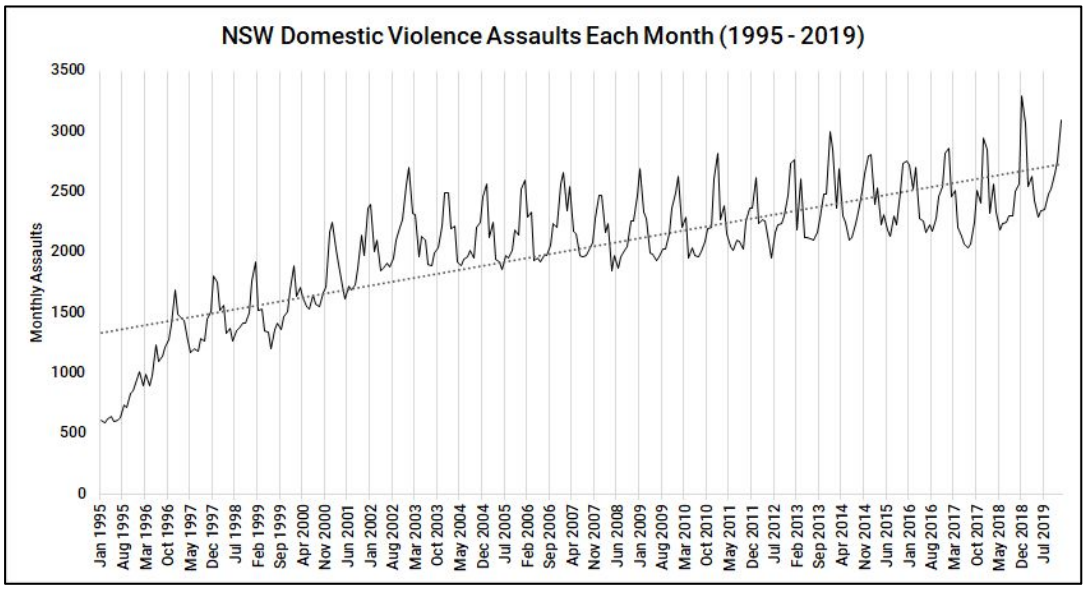


Figure 1.

Figure 1 represents the domestic violence statistics, from row 6 of the data set, as an initial line graph to observe the data in a completely raw form before performing any mathematical calculations or data wrangling. At first glance, we observe that DVAs have been steadily increasing since 1995, noticing a sharp increase around 2003 that then begins to plateau out with a moderate incline. This graph suggests there may be a consistent peak point each year which we will attempt to discover with further analysis. A possible theory is that changing social norms and trends promoted both reporting and increased awareness about domestic violence, as opposed to the likelihood of DVAs becoming more prevalent.

		Year																								Tot. by mon
		1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	
Month	Jan	613	1019	1488	1753	1921	1887	2246	2402	2707	2490	2569	2603	2659	2466	2696	2633	2821	2617	2767	2852	2809	2721	2866	2847	3066	59518
	Feb	591	897	1457	1526	1518	1633	2024	2009	2321	2199	2120	2287	2349	2164	2339	2205	2270	2237	2189	2368	2393	2523	2462	2328	2546	50955
	Mar	625	989	1435	1564	1532	1709	1901	2099	2310	2217	2247	2334	2546	2244	2276	2291	2387	2275	2606	2689	2534	2700	2516	2562	2631	53219
	Apr	640	900	1266	1329	1356	1627	1726	1852	1963	1925	1938	1928	2175	1848	1997	1950	2150	2258	2120	2300	2227	2285	2204	2335	2434	46733
	May	602	986	1171	1368	1345	1554	1611	1866	2129	1886	1919	1959	2156	1975	1986	2042	2045	2079	2119	2252	2312	2257	2133	2185	2293	46230
	Jun	608	1233	1209	1272	1203	1532	1722	1913	2105	1947	1860	1926	1971	1866	1937	1975	2014	1951	2111	2103	2182	2167	2070	2239	2347	45463
	Jul	639	1102	1186	1350	1367	1646	1694	1881	1896	1964	1978	1980	1969	1960	1967	1962	2105	2165	2101	2119	2136	2227	2037	2251	2355	46037
	Aug	741	1144	1286	1377	1413	1574	1735	1952	1895	2018	1952	1970	1979	2022	2029	2004	2088	2232	2170	2234	2300	2175	2072	2303	2484	47149
	Sep	714	1218	1271	1414	1365	1553	1872	2102	1991	1954	2012	2055	2012	2052	2030	2087	2030	2236	2286	2334	2225	2276	2249	2303	2522	48163
	Oct	830	1273	1451	1412	1469	1668	2148	2212	2037	2210	2189	2236	2085	2259	2156	2196	2261	2302	2484	2500	2508	2459	2509	2499	2655	52008
	Nov	851	1406	1506	1505	1508	1709	1977	2266	2215	2252	2146	2208	2277	2258	2361	2205	2367	2467	2483	2649	2731	2543	2405	2562	2758	53615
	Dec	948	1693	1806	1765	1692	2168	2363	2553	2497	2462	2520	2570	2474	2470	2491	2604	2369	2734	2995	2799	2756	2815	2947	3296	3096	60883
Tot. by year		8402	13860	16532	17635	17689	20260	23019	25107	26066	25524	25450	26056	26652	25584	26265	26154	26907	27553	28431	29199	29113	29148	28470	29710	31187	

Figure 2.

One of the first ways we analysed the data was by rearranging the raw numbers into a format that separated the categorical data into data points for each month in each year. This was vital as it allowed us to scrutinise and each data point efficiently and calculate subtotals, averages, and percentages. As Agrawala explains, 'One often needs to manipulate data prior to analysis…[including] re-formatting, cleaning, quality assessment, and...manual manipulation in spreadsheets.' (Agrawala, 2016, p.7). *Figure 2* plots the value for each data point with its month on the y-axis and its year on the x-axis, thus unpacking the data as a matrix with the added bonus of a heat map to assist with initial visual observations. The matrix was made by copying all the data points for a year and transposing them into the correct column, using the Excel autosum function to get combined totals for the months and years. Based on the heat map, it's apparent that as per our hypothesis, the months of January and December demonstrate higher reported DVAs while May and July had the least.

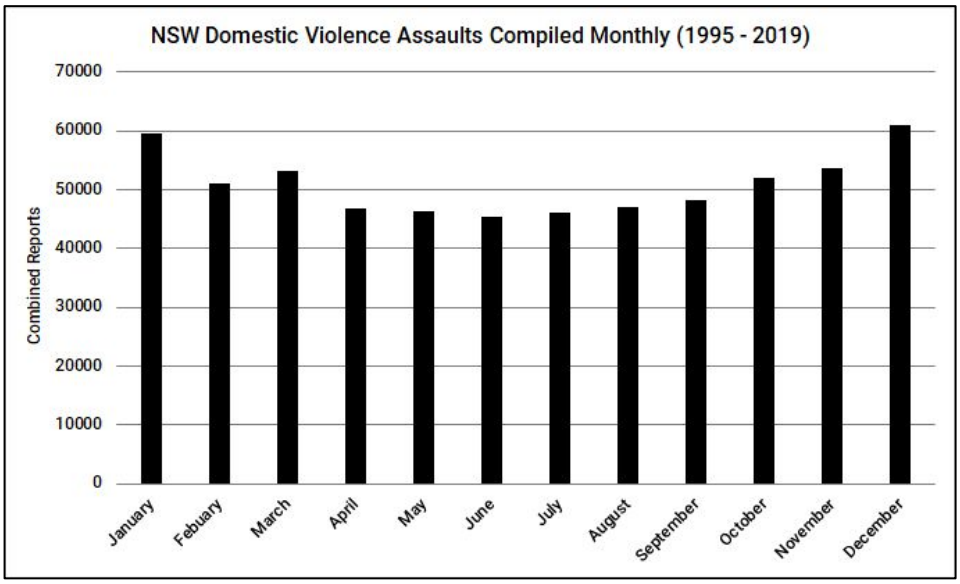


Figure 3.

Through the matrix in *Figure 2*, we derived a subtotal for each month across the 25 years. We plotted this data onto a column graph seen in *Figure 3*. Each column represents a month (x-axis) and its height (y-axis) represents each month's combined total across all years. This shows December and January had the most number of DVAs while June and July had the least, telling us DVAs peak at the end of the year, fall thereafter, and begin to rise again as the year ends. This somewhat supports our hypothesis as two of the summer months, January and December, have the highest number of combined reports. However, it's also worth noting that the lack of reports in February makes it an outlier amongst the other summer months, a fact which could disprove our hypothesis.

		Year																								Tot. by mon
		1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	
Month	Jan	10.1	16.5	23.9	27.8	30.2	29.3	34.5	36.5	40.9	37.5	38.4	38.6	39.0	35.6	38.3	36.9	39.2	35.9	37.5	38.1	37.0	35.3	36.5	35.8	38.0	847.5
	Feb	9.7	14.6	23.4	24.2	23.9	25.4	31.1	30.6	35.1	33.1	31.7	34.0	34.5	31.3	33.3	30.9	31.5	30.7	29.6	31.6	31.5	32.7	31.4	29.3	31.5	726.4
	Mar	10.3	16.1	23.0	24.8	24.1	26.6	29.2	31.9	34.9	33.3	33.6	34.7	37.4	32.4	32.4	32.1	33.1	31.2	35.3	35.9	33.4	35.0	32.1	32.2	32.6	757.6
	Apr	10.5	14.6	20.3	21.1	21.3	25.3	26.5	28.2	29.7	29.0	29.0	28.6	31.9	26.7	28.4	27.4	29.8	31.0	28.7	30.7	29.3	29.6	28.1	29.3	30.2	665.3
	May	9.9	16.0	18.8	21.7	21.1	24.2	24.7	28.4	32.2	28.4	28.7	29.1	31.6	28.5	28.2	28.6	28.4	28.5	28.7	30.1	30.4	29.3	27.2	27.5	28.4	658.7
	Jun	10.0	20.0	19.4	20.2	18.9	23.8	26.4	29.1	31.8	29.3	27.8	28.6	28.9	27.0	27.5	27.7	28.0	26.8	28.6	28.1	28.7	28.1	26.4	28.1	29.1	648.4
	Jul	10.5	17.9	19.0	21.4	21.5	25.6	26.0	28.6	28.7	29.5	29.6	29.4	28.9	28.3	28.0	27.5	29.2	29.7	28.5	28.3	28.1	28.9	26.0	28.3	29.2	656.6
	Aug	12.2	18.6	20.6	21.9	22.2	24.5	26.6	29.7	28.6	30.4	29.2	29.2	29.0	29.2	28.9	28.1	29.0	30.6	29.4	29.8	30.3	28.2	26.4	28.9	30.8	672.4
	Sep	11.7	19.8	20.4	22.5	21.5	24.1	28.7	32.0	30.1	29.4	30.1	30.5	29.5	29.7	28.9	29.3	28.2	30.7	31.0	31.2	29.3	29.5	28.7	28.9	31.2	686.8
	Oct	13.6	20.7	23.3	22.4	23.1	25.9	33.0	33.6	30.8	33.2	32.7	33.2	30.6	32.6	30.7	30.8	31.4	31.6	33.6	33.4	33.0	31.9	32.0	31.4	32.9	741.6
	Nov	14.0	22.8	24.2	23.9	23.7	26.6	30.4	34.5	33.5	33.9	32.1	32.8	33.4	32.6	33.6	30.9	32.9	33.9	33.6	35.4	36.0	33.0	30.7	32.2	34.2	764.4
	Dec	15.6	27.5	29.0	28.0	26.6	33.7	36.3	38.8	37.7	37.0	37.7	38.2	36.3	35.7	35.4	36.5	32.9	37.5	40.6	37.4	36.3	36.5	37.6	41.4	38.4	868.6
Tot. by year		138.0	225.0	265.2	280.1	278.1	315.0	353.4	381.8	394.0	383.9	380.7	386.8	391.1	369.7	373.5	366.9	373.5	378.2	385.1	390.0	383.3	378.2	363.0	373.4	386.4	

Figure 4.

Before conducting any further EDA, it was important to convert the numbers for each year into a rate based on the population of NSW. This provided a clearer image of each month's frequency in proportion to the population at the time. To calculate the rate, the matrix was refined to include the NSW population for each year, using data from *Estimated Resident Population, States and Territories*, to account for population growth over the years (see Appendix a) (Australian Bureau of Statistics, 2019). We decided that a rate per 100,000 people would achieve this; by dividing the population by 100k and then dividing each data point by its year's rate to obtain a rate per 100k persons for each month. The method of using rates over absolute numbers proved beneficial as it resulted in values more relative to the population at the time - providing a number that was more comprehensible by working around the large difference in the number of incidents and the population (i.e. 613 DVAs/60.8791 = 10.069137 as opposed to 613 DVAs/6087910 = 0.00010069).

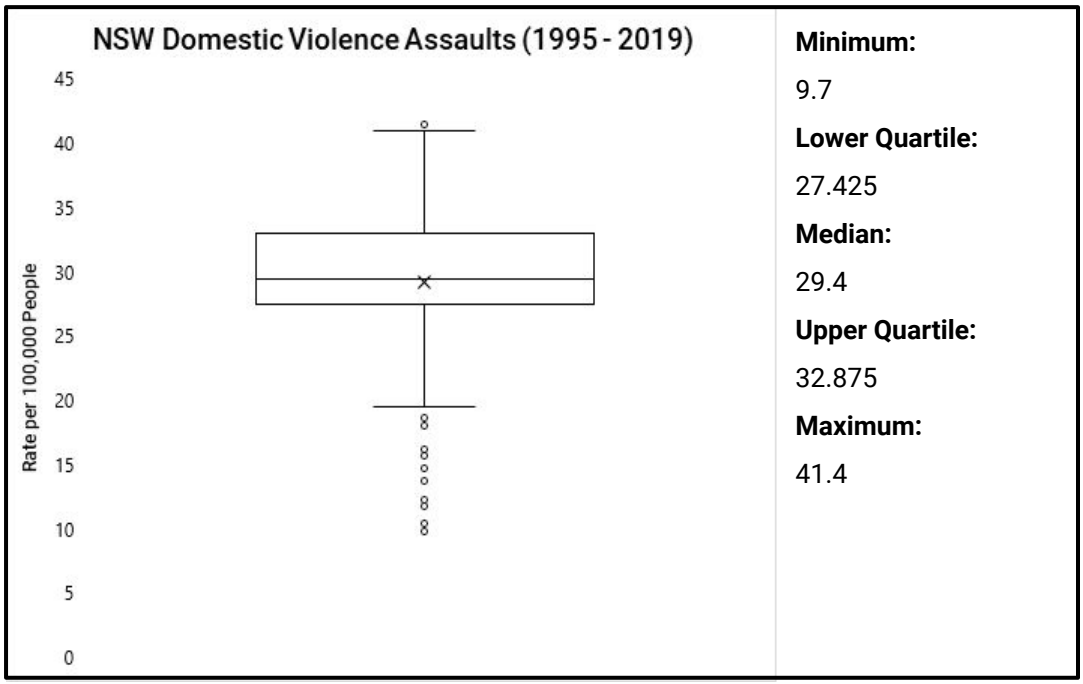


Figure 5.

The next step in our EDA was creating box and whisker plots with the addition of Tukey's five number summaries, to show the distribution of the data. In this graph, the rates per 100k people were used as the data points to be plotted. *Figure 5* made it immediately apparent that the highest outlier of 41.4 assaults per 100k people, which occurred in December of 2018, fell in line with our hypothesis. Additionally, while most of the data falls within the 27 - 32 range, 10 outliers were also found below the lower extreme quartile. This graph led to the unearthing of these lower outliers, in an attempt to identify where each outlier was located within the dataset as a whole. Using Excel, it was then found that these outliers pointed to the years 1995 and 1996.

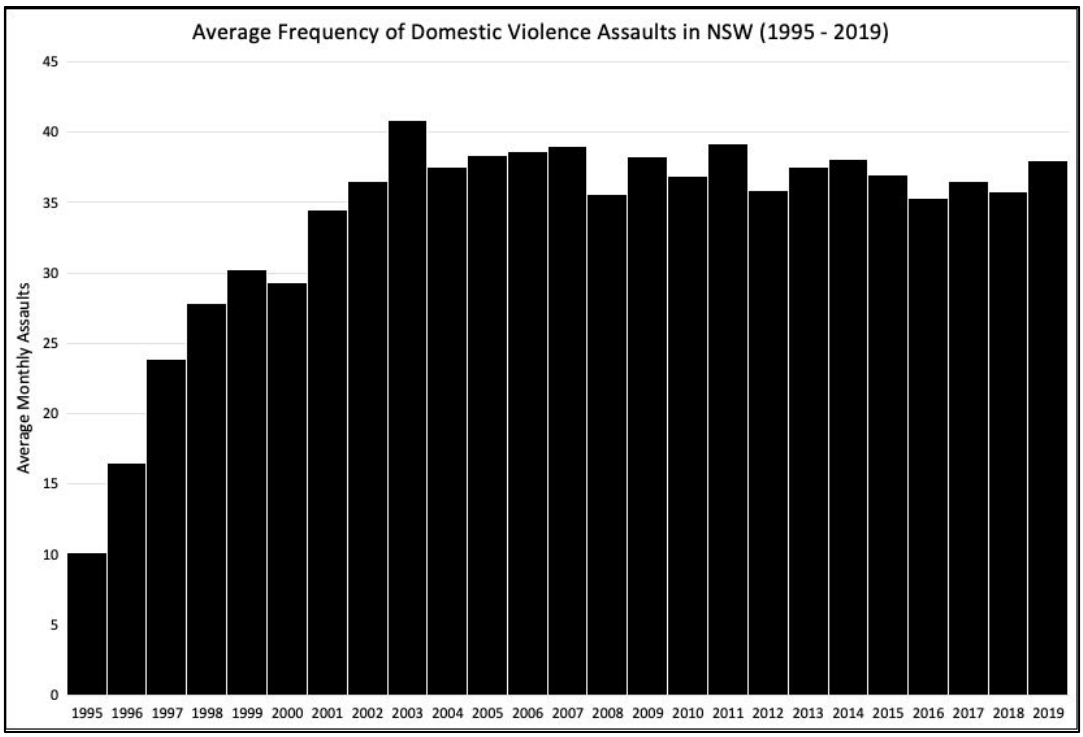


Figure 6.

Figure 6 was made to visualise the outliers discovered in *Figure 5,* which were caused by a large disparity in the amount of DVAs reported across the years. *Figure 6* is a histogram that plots the average rate for each year on the y-axis. This graph shows that the earlier years of 1995 - 2000 had a much smaller frequency of cases compared to the rest of the spectrum as it balances out from 2001 - 2019. While it's possible that an increase in social awareness and the promotion of reporting assaults led to this disparity, it is also possible that a large number of incidents were taking place in those early years.

Although determining the underlying cause of these outliers is beyond the scope of this analysis, further research revealed that they coincide with certain historical events. For example, the first 'Women's Safety Report' was released in 1996, which could have led to a rise in awareness of domestic violence (Australian Bureau of Statistics, 1996). The next year, John Howard organised a summit where a combined effort between the federal and state governments was organised to help stop domestic violence in Australia (Australian Women Against Violence Alliance, 1997). 1997 was also the year of the Port Arthur Massacre - a mass shooting by Martin Bryant who committed domestic violence as his family members were victims of the tragedy. The shooting led to both a radical change in gun laws in Australia, as well as the founding of the Alannah and Madeline foundation, a program dedicated to helping children facing abuse live in a safe environment (Alannah and Madeline Foundation, n.d.).

To reinstate, we do not postulate that these events are reasons for the outliers in the data. However, it is important to note that these events in 1996 - 1997 might have lead to a shift in attitude and awareness.

		Year																								Tot. by mon
		1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	
Month	Jan	7.3%	7.4%	9.0%	9.9%	10.9%	9.3%	9.8%	9.6%	10.4%	9.8%	10.1%	10.0%	10.0%	9.6%	10.3%	10.1%	10.5%	9.5%	9.7%	9.8%	9.6%	9.3%	10.1%	9.6%	9.8%	2.4
	Feb	7.0%	6.5%	8.8%	8.7%	8.6%	8.1%	8.8%	8.0%	8.9%	8.6%	8.3%	8.8%	8.8%	8.5%	8.9%	8.4%	8.4%	8.1%	7.7%	8.1%	8.2%	8.7%	8.6%	7.8%	8.2%	2.1
	Mar	7.4%	7.1%	8.7%	8.9%	8.7%	8.4%	8.3%	8.4%	8.9%	8.7%	8.8%	9.0%	9.6%	8.8%	8.7%	8.8%	8.9%	8.3%	9.2%	9.2%	8.7%	9.3%	8.8%	8.6%	8.4%	2.2
	Apr	7.6%	6.5%	7.7%	7.5%	7.7%	8.0%	7.5%	7.4%	7.5%	7.5%	7.6%	7.4%	8.2%	7.2%	7.6%	7.5%	8.0%	8.2%	7.5%	7.9%	7.6%	7.8%	7.7%	7.9%	7.8%	1.9
	May	7.2%	7.1%	7.1%	7.8%	7.6%	7.7%	7.0%	7.4%	8.2%	7.4%	7.5%	7.5%	8.1%	7.7%	7.6%	7.8%	7.6%	7.5%	7.5%	7.7%	7.9%	7.7%	7.5%	7.4%	7.4%	1.9
	Jun	7.2%	8.9%	7.3%	7.2%	6.8%	7.6%	7.5%	7.6%	8.1%	7.6%	7.3%	7.4%	7.4%	7.3%	7.4%	7.6%	7.5%	7.1%	7.4%	7.2%	7.5%	7.4%	7.3%	7.5%	7.5%	1.9
	Jul	7.6%	8.0%	7.2%	7.7%	7.7%	8.1%	7.4%	7.5%	7.3%	7.7%	7.8%	7.6%	7.4%	7.7%	7.5%	7.5%	7.8%	7.9%	7.4%	7.3%	7.3%	7.6%	7.2%	7.6%	7.6%	1.9
	Aug	8.8%	8.3%	7.8%	7.8%	8.0%	7.8%	7.5%	7.8%	7.3%	7.9%	7.7%	7.6%	7.4%	7.9%	7.7%	7.7%	7.8%	8.1%	7.6%	7.7%	7.9%	7.5%	7.3%	7.8%	8.0%	1.9
	Sep	8.5%	8.8%	7.7%	8.0%	7.7%	7.7%	8.1%	8.4%	7.6%	7.7%	7.9%	7.9%	7.5%	8.0%	7.7%	8.0%	7.5%	8.1%	8.0%	8.0%	7.6%	7.8%	7.9%	7.8%	8.1%	2.0
	Oct	9.9%	9.2%	8.8%	8.0%	8.3%	8.2%	9.3%	8.8%	7.8%	8.7%	8.6%	8.6%	7.8%	8.8%	8.2%	8.4%	8.4%	8.4%	8.7%	8.6%	8.6%	8.4%	8.8%	8.4%	8.5%	2.1
	Nov	10.1%	10.1%	9.1%	8.5%	8.5%	8.4%	8.6%	9.0%	8.5%	8.8%	8.4%	8.5%	8.5%	8.8%	9.0%	8.4%	8.8%	9.0%	8.7%	9.1%	9.4%	8.7%	8.4%	8.6%	8.8%	2.2
	Dec	11.3%	12.2%	10.9%	10.0%	9.6%	10.7%	10.3%	10.2%	9.6%	9.6%	9.9%	9.9%	9.3%	9.7%	9.5%	10.0%	8.8%	9.9%	10.5%	9.6%	9.5%	9.7%	10.4%	11.1%	9.9%	2.5
Tot. by year		100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	

Figure 7.

Based on the discovery made in *Figure 6,* we decided it was imperative to further transform the data so each data point represented the amount of cases for that month as a percentage of the total cases that year. By measuring each value as a percentage, we aimed to eliminate the possibility of disparity of values between years from skewing the overall data. This would then ensure that data across all years was balanced. This version of the matrix can be seen in *Figure 7*. Now, instead of each data point representing the absolute number of incidents for that month, or the amount of cases as a rate per 100k persons, it represents the percentage of cases that occured that month out of the total for its year. This version of the heat map shows that the peak months for each year resided at the beginning and end of the year, except for the years 1995 and 1996 as they appear to be following a different pattern.

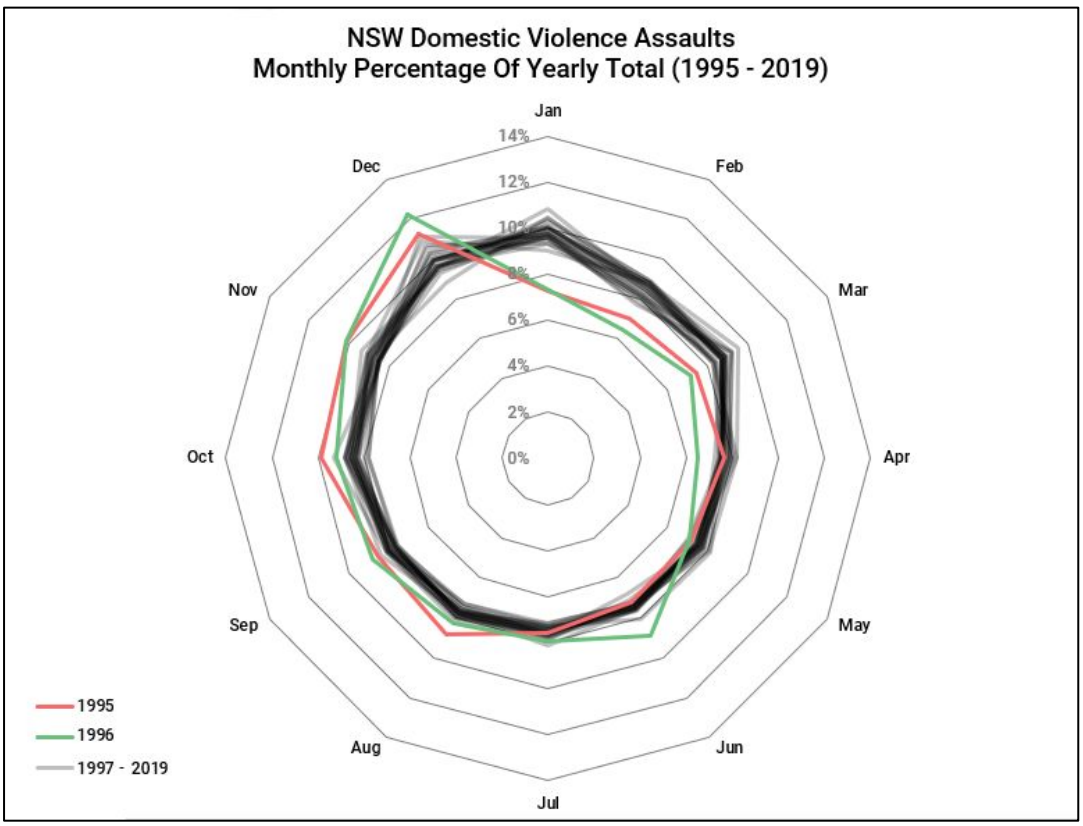


Figure 8.

We created *Figure 8* as a way to visualise and find the pattern that we noticed in *Figure 7*. Through this radial graph, we observed the majority of years cluster (in grey), while two outliers, made salient in red (1995) and green (1996), follow a different pattern altogether. Although each year makes a consistent circular shape, 1995 and 1996 deviate by having lower percentages in the beginning of the year and higher percentages at the end. We choose a radial graph to visualise this data as it not only demonstrates this consistent pattern, but also clearly highlights any deviations that emerge from it - upholding the design

principle of comparison, and making it more efficient than other graph types (Lidwell, Holden, Butler & Elam, 2003).

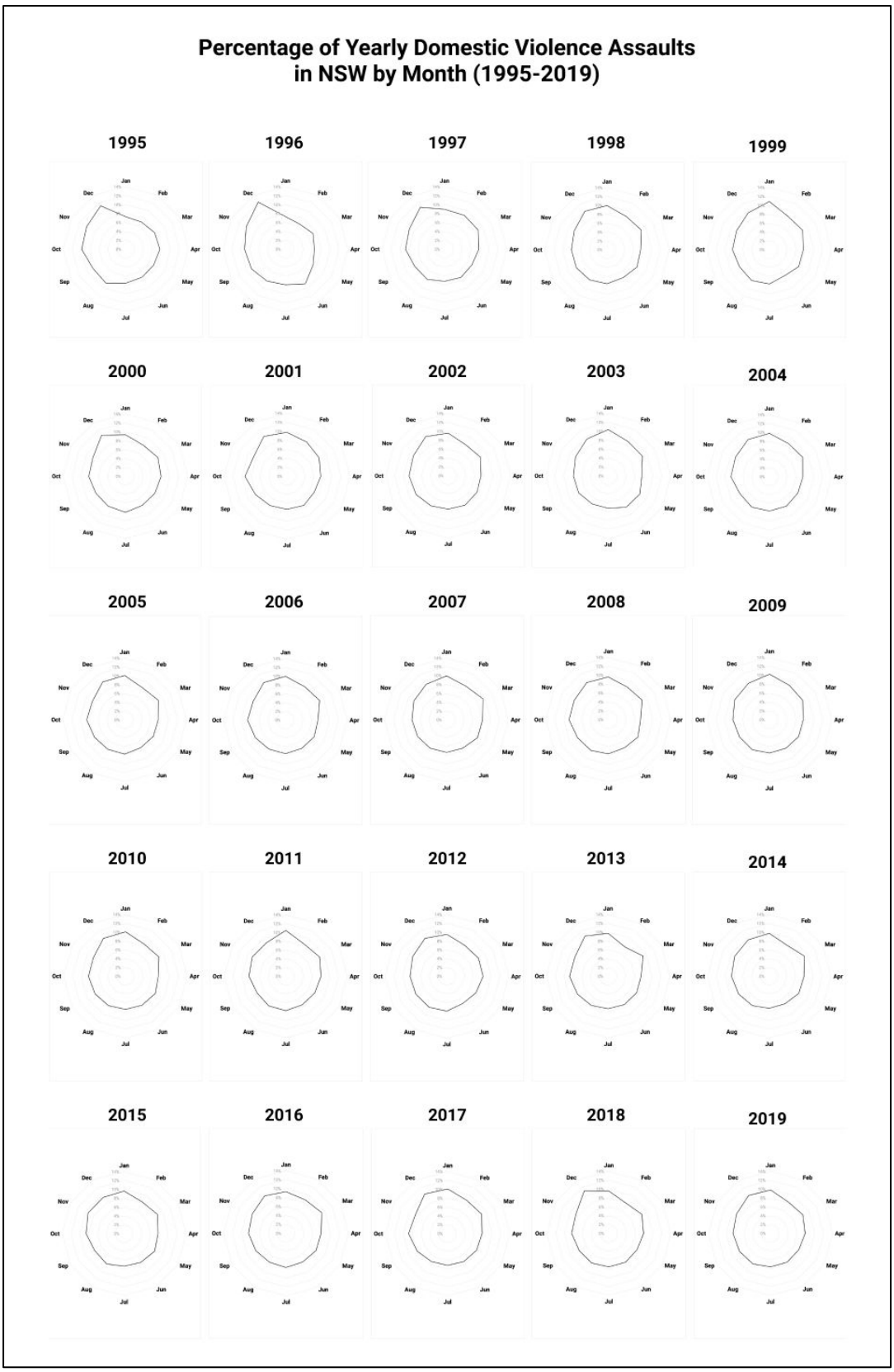


Figure 9.

Figure 9 portrays *Figure 8* broken down into small multiples to allow closer analysis of each individual year in isolation from one another. Arranging the data in this format allowed us to quickly perceive any major differences between the years that could be explored further. In this case, it was reiterated that 1995 and 1995 were indeed outliers.

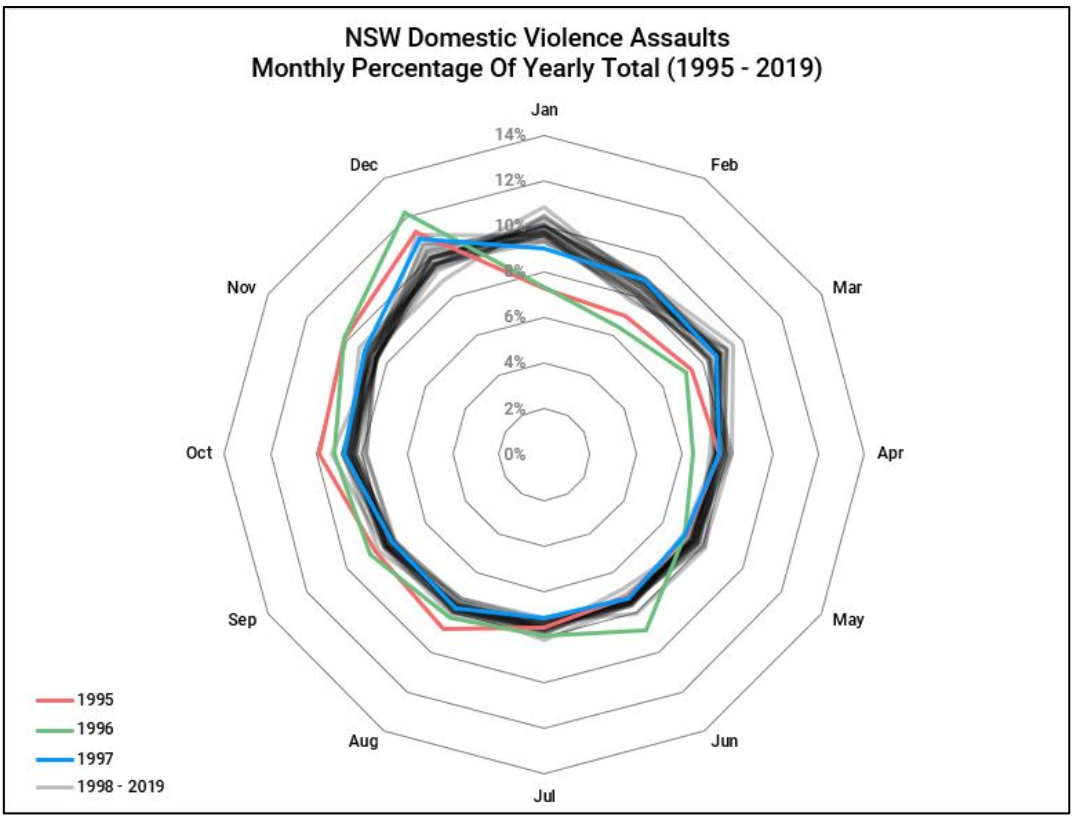


Figure 10.

After visualising the patterns in *Figure 8*, we felt it necessary to ensure that 1996 and 1995 were the only deviations. This lead us to develop *Figure 10*, bringing 1997 (the next chronological year) into the forefront with 1996 and 1995 to examine any changes. The inclusion of 1997 (highlighted in blue) indicates that it falls in line with the clustered pattern, thereby proving that this trend of the beginning and end months of the year (January and December) being the highest points while the middle months of the year (June and July) being the lowest points started in 1997 and has continued this way to the present day.

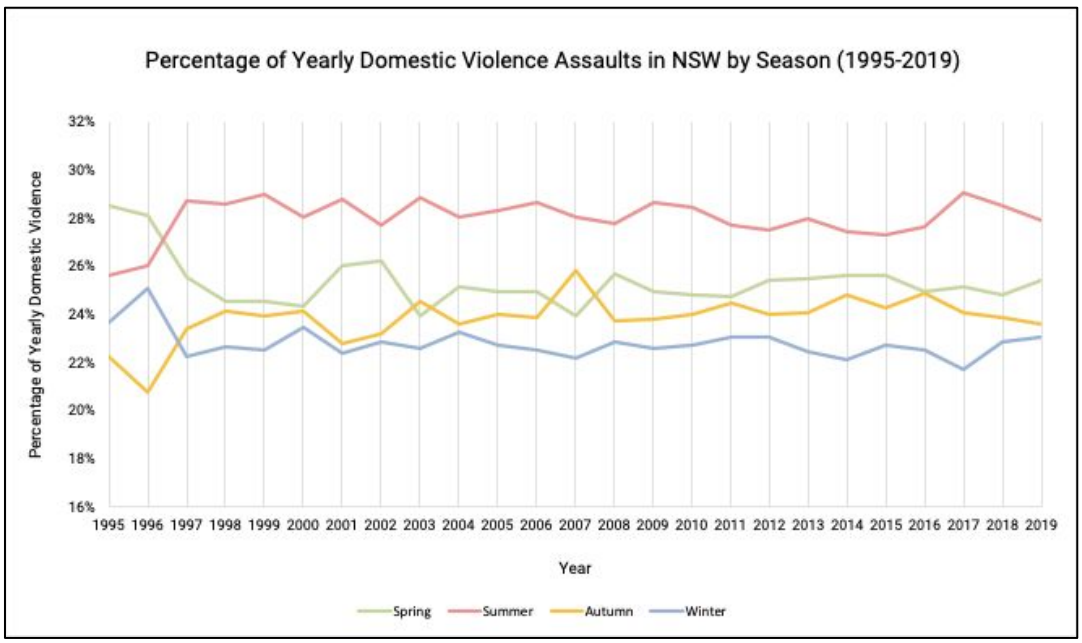


Figure 11.

Figure 11 follows up on *Figure 3*, where data for February was unusually low compared to other summer months. This presented a contradiction to our hypothesis, leading us to investigate whether the summer months as a whole (December, January, and February) contained the highest rates of DVA (as seen in *Figure 7*) despite February not holding as much weight. To look into this, we grouped the months into their respective seasons.

Evidently, summer remains consistently high from 1997 onwards, despite February's proportionally less weighting. Additionally, *Figure 11* once again brings our attention to the years 1995 and 1996, which are the only years to deviate from summer being the most prevalent season for DVAs. In fact, all seasons jump around 1997, indicating 1995 and 1996 stand out from the rest not only due to a lack of incidents, shown in *Figure 6*, but due to a difference in distribution shown in *Figure 11*. The deviation of 1995 and 1996 from our hypothesis continues to remain unanswered, needing further research to pinpoint the cause.

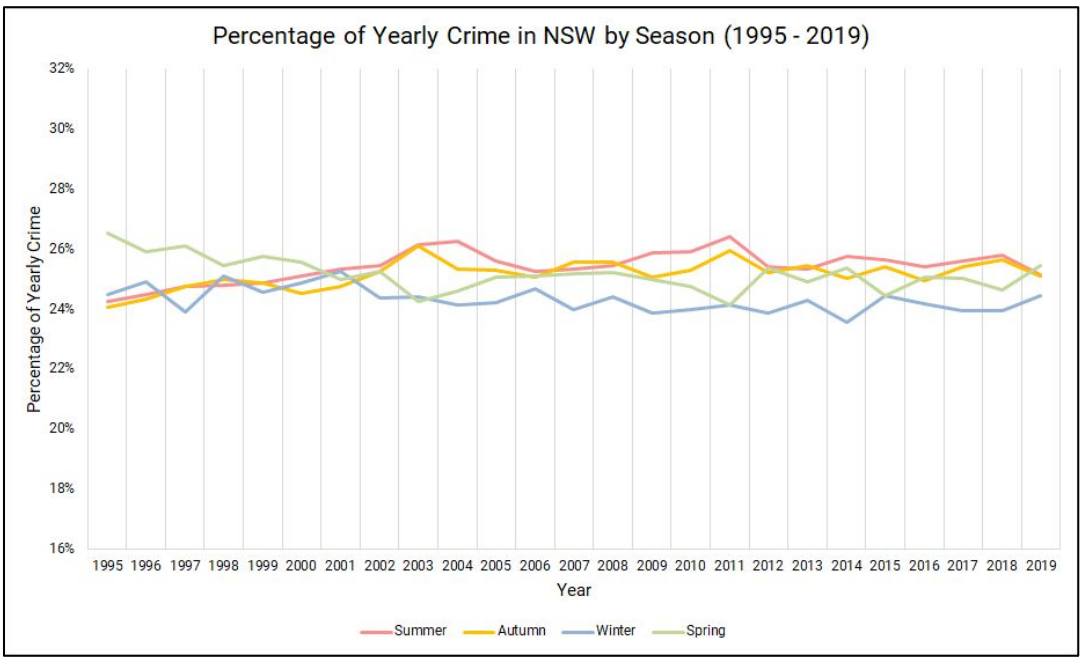


Figure 12.

In an attempt to cover all aspects of our hypothesis, we decided to explore whether the high rates in summer were unique to DVAs or if they were universal amongst all crime. *Figure 12* displays the percentage of all criminal cases in each year by season. Contrary to *Figure 11*, the summer months are not substantially or consistently higher than the others. Instead, the seasons are intermingled, showing no pattern between them with consistent weighting across the board. This infers that the trend of summer having the highest frequency is exclusive to DVAs.

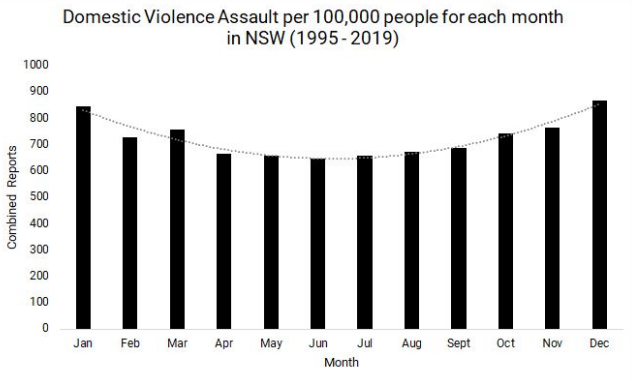


Figure 13a.

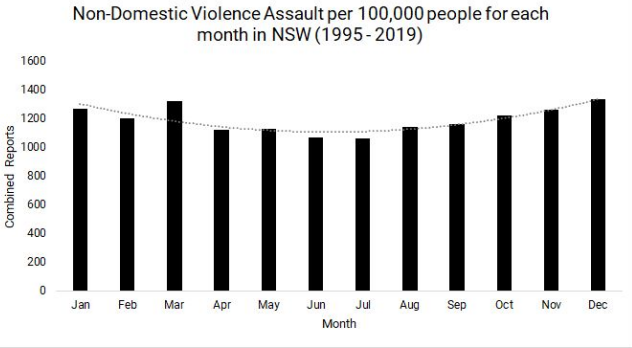


Figure 13b.

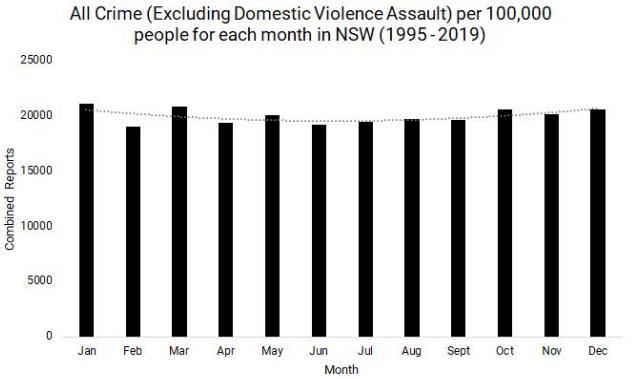


Figure 13c.

As we delved deeper into our EDA, we found certain patterns that were seemingly unexplainable but could have an effect on our hypothesis. As you can see in *Figure 3* and throughout the small multiples in *Figure 9*, March seems to spike, with this increase lying just outside of summer. This was a commonly occuring trend, despite the fact that summer was overwhelmingly the most prevalent month for DVAs, shown in *Figure 11*.

In order to explore this further and come up with a possible explanation, *Figure 13a, b, and c* were created. Here we can see the cumulative absolute numbers for DVAs (a), normal assault (b) and all crime (c) all contain spikes in March relative to the pattern found in *Figure 8.* March was also the most prevalent month for non-domestic violence assault, shown in *Figure 13b*. This is an anomaly still yet to be interpreted.

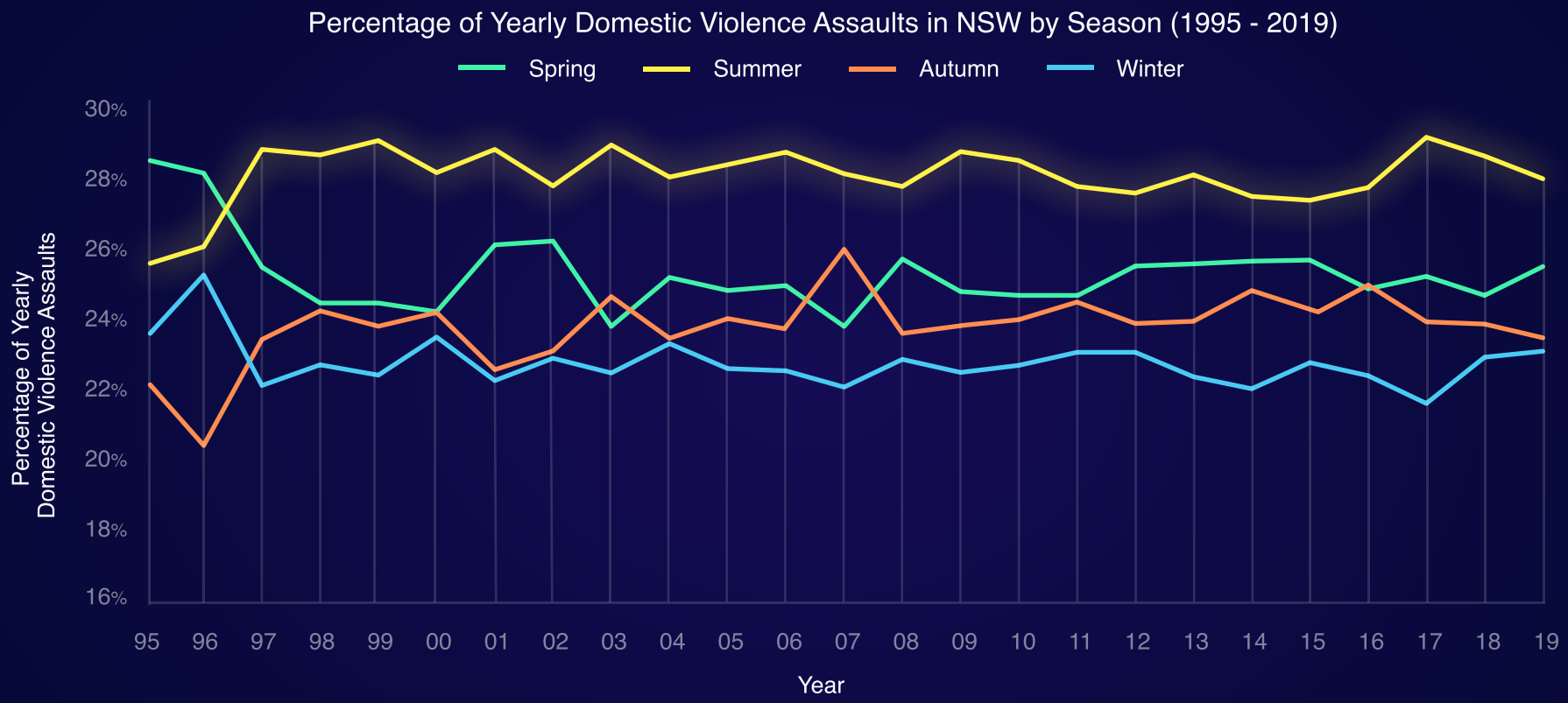
CONCLUSION

By conducting EDA on our chosen dataset, we discovered that our hypothesis was essentially correct. Our EDA has shown that there is a correlation between the season and the occurrence of DVAs in NSW. We arrived at this conclusion by representing the data in different values and visualizing them appropriately on a series of column graphs, line graphs, radial graphs, box and whisker plots and Tukey's five number summary.

Ultimately, our EDA shows that the percentage of DVAs in NSW occured to a higher degree in summer than other seasons from 1997 onwards. Although currently out of our scope, with future analysis, we would like cross-reference our data with geographical locations in NSW to determine if the trend we have identified is or isn't exclusive to specific areas. This could also provide clarity on why March performs differently from the conclusive trend we have found.

Is Summer the Season for Domestic Violence?

A look into how domestic violence assaults peak in summer.



23/25 years reported the highest number of domestic violence assaults in summer.

'97 onwards, summer is the highest season for reported assaults.

4% average increase in domestic violence assaults in summer compared to other seasons.

Australian Bureau of Statistics, 2019, Estimated Resident Population, States and Territories (Number), https://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/3101.0Mar%202019?OpenDocument

Bureau of Crime Statistics and Research, 2020, Recorded crime by offence, https://www.bocsar.nsw.gov.au/Pages/bocsar_datasets/Datasets-.aspx

RATIONALE

Our hypothesis stated that DVAs in NSW would occur more frequently during summer than in other seasons. Our visualization confirms this to a considerable extent through the use of a line graph displaying the percentage of DVAs in each year by season. Excluding the outlier years of 1995 and 1996, it is clear in the graph that summer consistently contains the highest frequency. This is true despite February holding a relatively low percentage of DVAs, since December and January consistently hold the largest.

Although no conclusive causation can be stated, similar developments have also been found in the United States, with rates of intimate partner violence being higher in the summer than during the winter, spring, or autumn (Lauritsen & White, 2014). Such information is compelling due to the fact that the U.S. is located in the Northern Hemisphere, making its summer season the months of June, July, and August (National Geographic, 2020). This further supports our hypothesis as it acts as evidence in favour of the seasons' influence on DVAs and not the universal time of the year.

BIBLIOGRAPHY

Agrawala, M. (2016). Exploratory Data Analysis. Presentation, Stanford University.

Alannah and Madeline Foundation. (n.d.). About Us. Retrieved from Alannah and Madeline Foundation website: https://www.amf.org.au/who-we-are/about-us/

Australian Bureau of Statistics. (2019). 4906.0 - Personal Safety, Australia, 2016. Retrieved 18 April 2020, from https://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/4906.0Main+Features302016?OpenDocument

Australian Bureau of Statistics. (2019). Estimated Resident Population, States and Territories. Retrieved 18 April 2020, from https://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/3101.0Mar%202019?OpenDocument

Australian Bureau of Statistics. (1996). Women's Safety Australia. Retrieved from Australian Bureau of Statistics website: https://www.ausstats.abs.gov.au/ausstats/subscriber.nsf/0/F16680629C465E03CA256980007C4A81/

Australian Government. (1975). Family Law Act 1975. Australian Government. https://www.legislation.gov.au/Details/C2016C01106

Australian Women Against Violence Alliance. (1997). Partnerships Against Domestic Violence (PADV) begins. Retrieved from Australian Women Against Violence Alliance website: https://timeline.awava.org.au/archives/482

Block, C. (1984). Is Crime Seasonal?. Illinois Criminal Justice Information Authority. Retrieved 18 April 2020, from https://bjs.gov/content/pub/pdf/ics.pdf

Bureau of Crime Statistics and Research. (2019). About Us. Retrieved 18 April 2020, from https://www.bocsar.nsw.gov.au/Pages/bocsar_aboutus.aspx

Bureau of Crime Statistics and Research. (2020). Datasets - Recorded crime by offence. Retrieved 18 April 2020, from https://www.bocsar.nsw.gov.au/Pages/bocsar_datasets/Datasets-.aspx

Bureau of Crime Statistics and Research New South Wales. (1992). BOCSAR NSW General Report Series. In informit.com.au. Retrieved from https://search.informit.com.au/documentSummary;dn=032513942058724;res=IELHSS

Bureau of Meteorology. (2020). Climate Glossary - Seasons. Retrieved 18 April 2020, from http://www.bom.gov.au/climate/glossary/seasons.shtml

Caffo, B. (2016). Exploratory Data Analysis [Image]. Retrieved from https://www.youtube.com/watch?v=5rTb6AkKhds

National Geographic. (2020). Season. Retrieved 19 April 2020, from https://www.nationalgeographic.org/encyclopedia/season/

Jiahao Weng. (2019). Exploratory Data Analysis (EDA): A Practical Guide and Template for Structured Data. Retrieved from Medium website: https://towardsdatascience.com/exploratory-data-analysis-eda-a-practical-guide-and-template-for-structured-data-abfbf3ee3bd9

Lauritsen, J., & White, N. (2014). Seasonal Patterns in Criminal Victimization Trends. St. Louis: U.S. Department of Justice. Retrieved from https://www.bjs.gov/content/pub/pdf/spcvt.pdf

Lidwell, W., Holden, K., Butler, J., & Elam, K. (2003). Universal principles of design. Beverly, Mass.: Rockport Publishers.

NSW Bureau of Crime Statistics and Research. (2019, August 26). About Us. Retrieved April 13, 2020, from www.bocsar.nsw.gov.au website: https://www.bocsar.nsw.gov.au/Pages/bocsar_aboutus.aspx

NSW Government. (2019). The effects of domestic and family violence. Retrieved 18 April 2020, from https://www.facs.nsw.gov.au/domestic-violence/about/effects-of-dv

Partnerships Against Domestic Violence (Australia). (2002). PADV Annual Report 2000-2001. Office Of The Status Of Women.

Sarkar, S. (2020). Exploratory Data Analysis Lecture 4: Information Visualisation Design Studio, DECO3100. Lecture, University of Sydney.

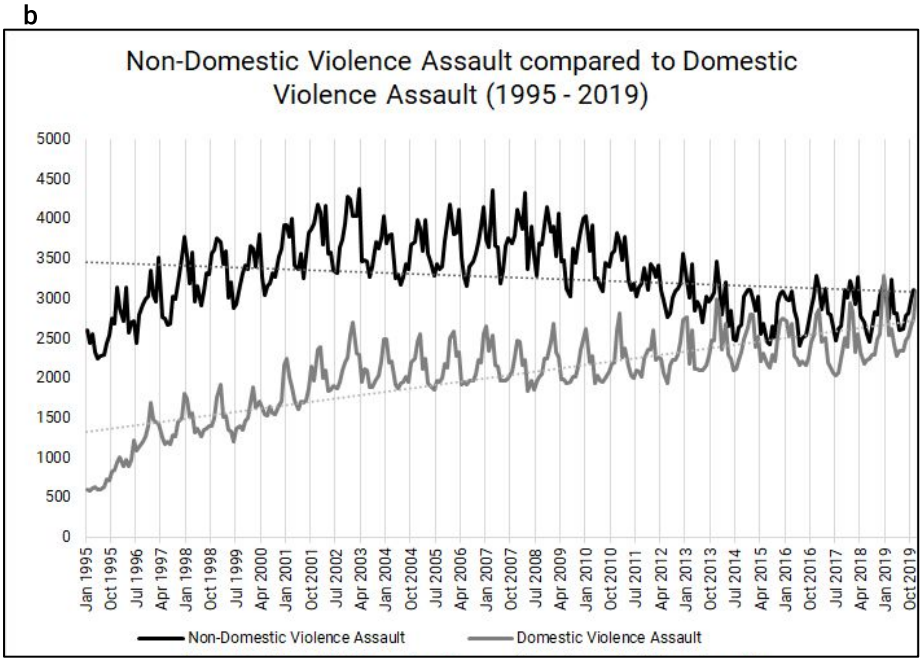
Tukey, J. (1977). Exploratory data analysis (2nd ed.). Addison-Wesley Publishing Company.

APPENDIX

a

Month	Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
	January	10.1	16.5	23.9	27.8	30.2	29.3	34.5	36.5	40.9	37.5	38.4	38.6	39.0	35.6	38.3	36.9	39.2	35.9	37.5	38.1	37.0	35.3	36.5	35.8	38.0
	Febuary	9.7	14.6	23.4	24.2	23.9	25.4	31.1	30.6	35.1	33.1	31.7	34.0	34.5	31.3	33.3	30.9	31.5	30.7	29.6	31.6	31.5	32.7	31.4	29.3	31.5
	March	10.3	16.1	23.0	24.8	24.1	26.6	29.2	31.9	34.9	33.3	33.6	34.7	37.4	32.4	32.4	32.1	33.1	31.2	35.3	35.9	33.4	35.0	32.1	32.2	32.6
	April	10.5	14.6	20.3	21.1	21.3	25.3	26.5	28.2	29.7	29.0	29.0	28.6	31.9	26.7	28.4	27.4	29.8	31.0	28.7	30.7	29.3	29.6	28.1	29.3	30.2
	May	9.9	16.0	18.8	21.7	21.1	24.2	24.7	28.4	32.2	28.4	28.7	29.1	31.6	28.5	28.2	28.6	28.4	28.5	28.7	30.1	30.4	29.3	27.2	27.5	28.4
	June	10.0	20.0	19.4	20.2	18.9	23.8	26.4	29.1	31.8	29.3	27.8	28.6	28.9	27.0	27.5	27.7	28.0	26.8	28.6	28.1	28.7	28.1	26.4	28.1	29.1
	July	10.5	17.9	19.0	21.4	21.5	25.6	26.0	28.6	28.7	29.5	29.6	29.4	28.9	28.3	28.0	27.5	29.2	29.7	28.5	28.3	28.1	28.9	26.0	28.3	29.2
	August	12.2	18.6	20.6	21.9	22.2	24.5	26.6	29.7	28.6	30.4	29.2	29.2	29.0	29.2	28.9	28.1	29.0	30.6	29.4	29.8	30.3	28.2	26.4	28.9	30.8
	September	11.7	19.8	20.4	22.5	21.5	24.1	28.7	32.0	30.1	29.4	30.1	30.5	29.5	29.7	28.9	29.3	28.2	30.7	31.0	31.2	29.3	29.5	28.7	28.9	31.2
	October	13.6	20.7	23.3	22.4	23.1	25.9	33.0	33.6	30.8	33.2	32.7	33.2	30.6	32.6	30.7	30.8	31.4	31.6	33.6	33.4	33.0	31.9	32.0	31.4	32.9
	November	14.0	22.8	24.2	23.9	23.7	26.6	30.4	34.5	33.5	33.9	32.1	32.8	33.4	32.6	33.6	30.9	32.9	33.9	33.6	35.4	36.0	33.0	30.7	32.2	34.2
	December	15.6	27.5	29.0	28.0	26.6	33.7	36.3	38.8	37.7	37.0	37.7	38.2	36.3	35.7	35.4	36.5	32.9	37.5	40.6	37.4	36.3	36.5	37.6	41.4	38.4
Totals by year		138.0	225.0	265.2	280.1	278.1	315.0	353.4	381.8	394.0	383.9	380.7	386.8	391.1	369.7	373.5	366.9	373.5	378.2	385.1	390.0	383.3	378.2	363.0	373.4	386.4
Yearly NSW Population																										
Population by year		6087910	6159806	6234303	6295260	6360552	6431826	6513844	6575296	6615712	6648280	6685875	6735528	6815359	6919907	7032423	7128356	7204737	7284982	7382957	7487834	7595731	7707412	7842821	7956992	8071071
Population per 100,000		60.8791	61.59806	62.34303	62.9526	63.60552	64.31826	65.13844	65.75296	66.15712	66.4828	66.85875	67.35528	68.15359	69.19907	70.32423	71.28356	72.04737	72.84982	73.82957	74.87834	75.95731	77.07412	78.42821	79.56992	80.71071

b

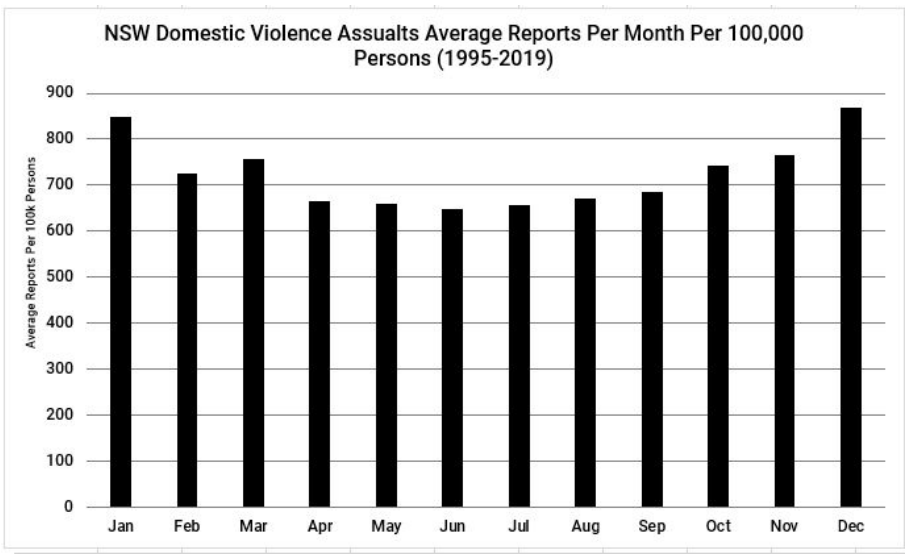


c

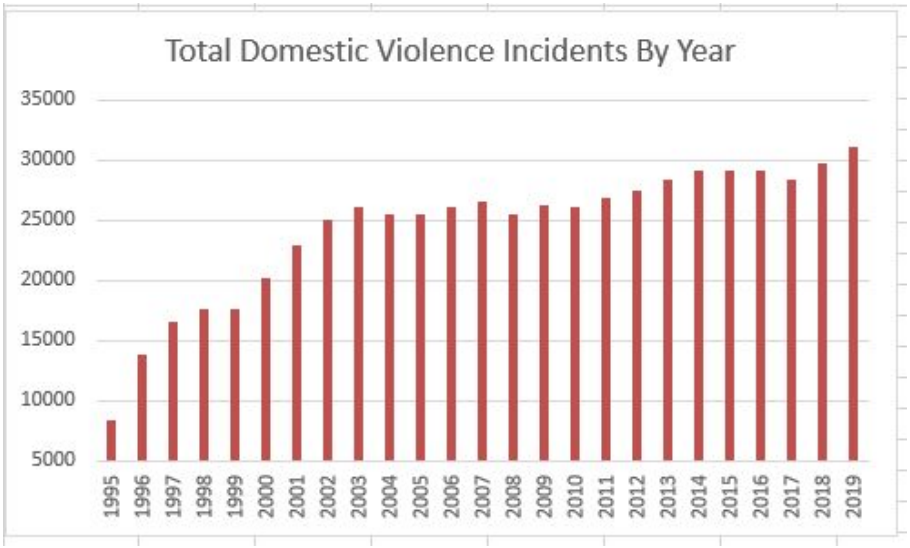
Average % for each month based on rate

Month	Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Totals by month
	Janu	1%	2%	3%	3%	4%	3%	4%	4%	5%	4%	5%	5%	5%	4%	5%	4%	5%	4%	4%	4%	4%	4%	4%	4%	4%	1.0
	Febu	1%	2%	3%	3%	3%	3%	4%	4%	5%	5%	4%	5%	5%	4%	5%	4%	4%	4%	4%	4%	4%	5%	4%	4%	4%	1.0
	Marc	1%	2%	3%	3%	3%	4%	4%	4%	5%	4%	4%	5%	5%	4%	4%	4%	4%	4%	5%	5%	4%	5%	4%	4%	4%	1.0
	April	2%	2%	3%	3%	3%	4%	4%	4%	4%	4%	4%	4%	5%	4%	4%	4%	4%	5%	4%	5%	4%	4%	4%	4%	5%	1.0
	May	2%	2%	3%	3%	3%	4%	4%	4%	5%	4%	4%	4%	5%	4%	4%	4%	4%	4%	4%	5%	5%	4%	4%	4%	4%	1.0
	June	2%	3%	3%	3%	3%	4%	4%	4%	5%	5%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	1.0
	July	2%	3%	3%	3%	3%	4%	4%	4%	4%	4%	5%	4%	4%	4%	4%	4%	4%	5%	4%	4%	4%	4%	4%	4%	4%	1.0
	Augu	2%	3%	3%	3%	3%	4%	4%	4%	4%	5%	4%	4%	4%	4%	4%	4%	4%	5%	4%	4%	5%	4%	4%	4%	5%	1.0
	Septe	2%	3%	3%	3%	3%	4%	4%	5%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	5%	5%	4%	4%	4%	4%	5%	1.0
	Octob	2%	3%	3%	3%	3%	3%	4%	5%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	5%	5%	4%	4%	4%	4%	4%	1.0
	Nove	2%	3%	3%	3%	3%	3%	4%	5%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	5%	5%	4%	4%	4%	4%	1.0
	Dece	2%	3%	3%	3%	3%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	5%	4%	4%	4%	4%	5%	4%	1.0
Totals by ye		0.2	0.3	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	

d



e


Total Domestic Violence Incidents By Year
35000
30000
25000
20000
15000
10000
5000
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019

f

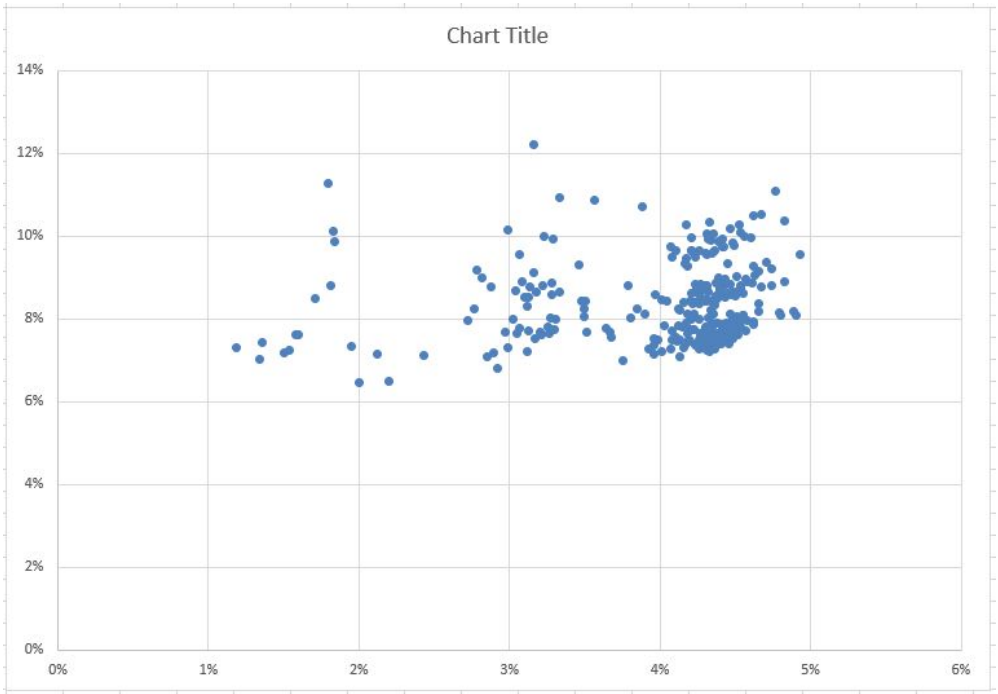


Chart Title
14%
12%
10%
8%
6%
4%
2%
0%
0%
1%
2%
3%
4%
5%
6%

g

All Crime (absolute numbers)	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Jan	43318	49335	53377	58028	57849	63494	65988	61783	62858	60053	57820	56353	57869	57875	56241	57835	58441	56620	57585	58218	60988	58730	59473	60142	59031
Feb	39342	45466	48563	51872	53818	59178	61894	57680	58183	56128	53546	51813	51258	53818	51549	52244	52294	51482	49347	50744	53847	50887	54128	52528	53011
Mar	43731	49157	54188	58498	59078	62888	63612	63498	64625	59489	58515	57125	58090	59395	56128	58702	58474	55273	56110	58099	57904	57793	59029	57867	58730
Apr	40115	45226	49894	54388	54238	57834	61169	61251	59087	54422	53385	52897	54891	54612	52229	51844	53773	52532	52892	51415	53498	56737	54578	54518	55080
May	41563	46829	51935	56897	57485	60783	64697	60815	61852	54722	54115	53689	55917	57622	52531	52444	54082	54344	55084	52803	57444	54894	57729	57467	56733
Jun	40394	47681	49869	55573	54139	59772	63588	57553	58523	52275	51572	52448	51704	55257	51181	51157	52837	50836	52190	50476	54702	53342	54269	52187	53624
Jul	42331	48707	50147	56257	55929	62755	65218	60630	58577	52808	53297	54828	52972	53788	50428	50481	50175	51201	50851	49943	55038	54817	53010	51993	55085
Aug	44338	50223	52031	58482	58414	61392	66113	60041	59525	55565	52572	54288	53747	54222	51808	51077	51975	51526	53500	50478	54371	55995	54005	54328	57187
Sept	44851	49146	53263	57460	56192	59208	63437	60807	57759	52302	52845	53418	53080	55217	51911	51480	53291	52057	51823	51890	52973	53088	53162	52994	57108
Oct	46043	53053	56836	58787	59448	63857	66581	63375	61940	54992	55942	55920	55725	57877	54826	53345	54409	55026	54274	56035	56340	56575	56236	54245	58972
Nov	45457	50252	56627	56509	59109	64028	63394	61387	58575	56353	53824	54678	57453	56972	53498	52743	56817	56062	54575	54647	55221	55832	57211	55900	57894
Dec	46809	50970	57018	56938	58264	62241	62923	60775	57989	56602	55283	56128	57526	54841	57204	56610	54188	56009	55032	57695	57989	60138	56937	57267	57388
	525770	585213	630336	678393	683730	739430	773560	734784	709769	664511	647936	653981	660039	671094	641340	635842	649644	642270	643603	640459	672464	673716	673603	661696	676943

h

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Summer	24.27%	24.51%	24.77%	24.82%	24.83%	25.10%	25.35%	25.47%	26.16%	26.27%	25.80%	25.27%	25.34%	25.46%	25.87%	25.93%	26.41%	25.41%	25.33%	25.77%	25.85%	25.42%	25.83%	25.80%	25.16%
Autumn	24.08%	24.35%	24.79%	24.69%	24.90%	24.55%	24.79%	25.25%	26.12%	25.38%	25.31%	25.08%	25.58%	25.57%	25.09%	25.29%	25.98%	25.22%	25.46%	25.03%	25.41%	24.98%	25.41%	25.84%	25.12%
Winter	24.51%	24.92%	23.93%	25.11%	24.50%	24.87%	25.25%	24.37%	24.41%	24.18%	24.21%	24.70%	24.00%	24.43%	23.89%	24.01%	24.16%	23.89%	24.31%	23.98%	24.48%	24.19%	23.89%	23.98%	24.48%
Spring	26.54%	25.92%	26.10%	25.41%	25.78%	25.57%	25.00%	25.27%	24.28%	24.83%	25.07%	25.11%	25.19%	25.21%	24.98%	24.78%	24.13%	25.37%	24.93%	25.38%	24.47%	25.39%	25.03%	24.88%	25.48%

i

Percentage	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	
Jan	8.24%	8.43%	8.47%	8.54%	8.44%	8.58%	8.56%	8.56%	8.78%	8.97%	8.93%	8.62%	8.77%	8.62%	8.76%	8.76%	8.73%	8.81%	8.84%	9.09%	9.07%	8.69%	8.83%	8.94%	8.73%	219.99% Jan
Feb	7.59%	7.73%	7.70%	7.69%	7.82%	8.00%	7.89%	8.20%	8.29%	7.98%	7.92%	7.77%	7.77%	7.99%	8.04%	7.92%	8.18%	8.00%	7.67%	7.92%	7.99%	8.25%	8.04%	8.00%	7.81%	198.24% Feb
Mar	8.40%	8.38%	8.60%	8.62%	8.62%	8.50%	8.48%	8.64%	9.11%	8.94%	8.72%	8.73%	8.80%	8.85%	8.75%	8.92%	9.13%	8.60%	8.72%	8.78%	8.61%	8.52%	8.78%	8.72%	8.69%	217.50% Mar
Apr	7.70%	7.69%	7.92%	8.02%	7.91%	7.82%	7.91%	8.34%	8.32%	8.19%	8.24%	8.09%	8.25%	8.34%	8.14%	8.12%	8.39%	8.17%	8.18%	8.03%	8.25%	8.36%	8.07%	8.24%	8.11%	202.64% Apr
May	7.98%	8.30%	8.24%	8.38%	8.38%	8.22%	8.36%	8.28%	8.69%	8.23%	8.35%	8.24%	8.47%	8.59%	8.19%	8.25%	8.44%	8.49%	8.58%	8.25%	8.34%	8.09%	8.37%	8.69%	8.38%	209.08% May
Jun	7.81%	8.10%	7.72%	8.19%	7.69%	8.08%	8.21%	7.83%	8.25%	7.98%	7.98%	8.02%	7.83%	8.34%	7.98%	8.09%	8.22%	7.91%	8.10%	7.88%	8.19%	7.88%	8.08%	7.89%	7.93%	200.33% Jun
Jul	8.13%	8.28%	7.98%	8.29%	8.16%	8.49%	8.43%	8.25%	8.25%	7.94%	8.23%	8.38%	8.03%	8.01%	7.88%	7.94%	7.83%	7.96%	7.69%	7.89%	8.18%	8.08%	7.87%	7.98%	8.11%	202.21% Jul
Aug	8.51%	8.54%	8.29%	8.62%	8.52%	8.30%	8.59%	8.29%	7.87%	8.38%	8.03%	8.30%	8.14%	8.08%	8.06%	8.03%	8.11%	8.01%	8.31%	7.88%	8.09%	8.25%	8.52%	8.21%	8.42%	205.78% Aug
Sept	8.58%	8.35%	8.45%	8.47%	8.49%	8.01%	8.20%	8.25%	8.14%	7.88%	8.16%	8.17%	8.04%	8.23%	8.09%	8.10%	8.32%	8.10%	8.02%	8.10%	7.88%	8.12%	7.89%	8.01%	8.41%	204.48% Sept
Oct	8.23%	8.02%	8.83%	8.67%	8.67%	8.91%	8.60%	8.83%	8.15%	8.27%	8.63%	8.55%	8.44%	8.62%	8.55%	8.33%	8.51%	8.58%	8.43%	8.75%	8.38%	8.34%	8.69%	8.20%	8.55%	214.51% Oct
Nov	8.73%	8.54%	8.82%	8.33%	8.62%	8.88%	8.20%	8.39%	7.97%	8.48%	8.28%	8.30%	8.70%	8.38%	8.34%	8.28%	7.81%	8.72%	8.49%	8.53%	8.21%	8.64%	8.49%	8.45%	8.50%	210.39% Nov
Dec	8.99%	8.67%	9.09%	8.24%	8.50%	8.42%	8.13%	8.27%	8.17%	8.53%	8.53%	8.58%	8.72%	8.17%	8.92%	8.90%	8.46%	8.71%	8.69%	9.01%	8.92%	8.68%	8.78%	8.68%	8.49%	214.99% Dec
	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	

j

Absolute Number	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Jan	2612	2856	3045	3546	3727	3644	3939	4090	4041	3699	3854	3811	3747	4014	3907	4041	3721	3393	3237	3176	2996	2999	3147	3123	3021
Feb	2454	2727	2978	3196	3445	3416	3783	3681	4053	3796	3602	3840	3655	3882	3539	3603	3487	3276	3025	2804	2854	2986	2879	2940	2760
Mar	2560	3152	3525	3592	3611	3825	4013	4175	4387	3811	4004	4122	4372	4337	4075	3936	3784	3420	3437	3214	3029	3107	3135	3272	3247
Apr	2337	2582	2776	2966	3013	3287	3428	3575	3475	3269	3580	3517	3675	3373	3482	3260	3224	3123	2851	2968	2939	2853	2815	2787	2818
May	2259	2713	2756	3159	3211	3045	3380	3592	3492	3310	3478	3273	3654	3917	3495	3263	3122	2984	2976	2856	2694	2734	2805	2702	2818
Jun	2283	2719	2670	2921	2883	3162	3576	3363	3474	3187	3302	3170	3192	3543	3138	3168	3190	2778	2903	2453	2459	2411	2636	2564	2610
Jul	2294	2456	2693	3098	2938	3190	3263	3322	3276	3277	3448	3408	3366	3294	3040	3094	3041	2818	2708	2482	2431	2521	2487	2461	2623
Aug	2442	2806	3033	3322	3177	3335	3551	3647	3414	3435	3370	3476	3677	3704	3641	3452	3148	3022	3037	2643	2653	2546	2624	2649	2797
Sep	2543	2932	2997	3319	3329	3286	3827	3759	3724	3377	3405	3567	3771	3682	3461	3407	3203	3106	2978	2677	2521	2705	2668	2844	2827
Oct	2754	3002	3200	3580	3434	3541	3889	3948	3635	3687	3733	3712	3703	3929	3652	3572	3390	3129	3026	3027	2958	2896	3112	2805	2981
Nov	2692	3030	3524	3616	3371	3644	3944	4252	3775	3720	3960	3920	3805	4157	3869	3611	3109	3197	3086	3120	3069	3043	3024	3045	3116
Dec	3143	3361	3765	3768	3678	3924	4195	4253	4053	3995	4190	4153	4125	3946	4020	3833	3445	3572	3480	3124	3107	3296	3226	3195	3062

k

Rate per 100k	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	total
Jan	42.9	47.0	48.8	56.3	58.6	56.7	60.5	62.2	61.1	55.6	58.1	56.6	55.0	58.0	55.6	56.7	51.6	46.6	43.8	42.4	39.4	38.9	40.1	39.2	37.4	1269.3
Feb	40.3	44.3	47.8	50.8	54.2	53.1	58.1	56.0	61.3	57.1	53.9	57.0	53.6	56.1	50.3	50.5	48.4	45.0	41.0	37.4	37.6	38.7	36.7	36.8	34.2	1200.2
Mar	42.1	51.2	56.5	57.1	56.8	59.5	61.6	63.6	66.3	57.3	59.9	61.2	64.1	62.7	58.0	55.2	52.5	46.9	46.6	42.9	39.9	40.3	40.0	41.1	40.2	1323.4
Apr	38.4	41.9	44.5	47.1	47.4	51.1	52.6	54.4	52.5	49.2	53.5	52.2	53.9	48.7	49.5	45.7	44.7	42.9	38.6	35.6	33.7	37.0	35.9	35.0	34.9	1121.2
May	37.1	44.0	44.2	50.2	50.5	47.3	51.9	54.6	52.8	49.8	52.0	48.6	53.6	56.6	49.7	45.8	43.3	41.0	40.3	38.1	35.5	35.5	35.8	34.0	34.5	1127.1
Jun	37.5	44.1	42.8	46.4	45.3	49.2	54.9	51.1	52.5	47.9	49.4	47.1	46.8	51.2	44.6	44.4	44.3	38.1	39.3	33.3	32.4	31.3	33.6	32.2	32.1	1072.3
Jul	37.7	39.9	43.2	49.2	46.2	49.6	50.1	50.5	49.5	48.3	51.6	50.6	49.4	47.6	47.6	43.2	43.4	42.2	38.7	36.7	33.1	32.0	32.7	31.7	30.8	32.5	1061.5
Aug	40.1	45.6	48.7	52.8	49.9	51.9	54.5	55.5	51.6	51.7	50.4	51.6	54.0	53.5	51.8	48.4	43.7	41.5	41.1	35.3	34.9	33.0	33.5	33.3	34.7	1142.8
Sep	41.8	47.6	48.1	52.7	52.3	51.1	58.8	57.2	56.3	50.8	50.9	53.0	55.3	53.2	49.2	47.8	44.5	42.6	40.3	35.8	33.2	35.1	34.0	35.7	35.0	1162.3
Oct	45.2	48.7	51.3	56.9	54.0	55.1	59.7	60.0	54.9	55.5	55.8	55.1	54.3	56.8	52.5	50.1	47.1	43.0	41.0	40.4	38.9	37.6	39.7	35.3	36.9	1225.8
Nov	44.2	49.2	56.5	57.4	53.0	56.7	60.5	65.3	57.1	56.0	59.2	58.2	55.8	60.1	55.0	50.7	43.2	43.9	41.8	41.7	40.4	39.5	38.6	38.3	38.6	1260.7
Dec	51.6	54.6	60.7	59.9	57.8	61.0	64.4	64.7	61.3	60.1	62.7	61.7	60.5	55.6	57.2	53.8	47.8	49.0	47.1	41.7	40.9	42.8	41.1	40.2	37.9	1336.0