



ETC5513 Assignment 4

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1 Introduction

The number and rate of offences in Australia are affected by various factors. In recent year, Australia is continually strengthening law enforcement. Although this can reduce the offence rate, the number of offences is also rising with the continuous increase of the population. This report shows the current status of criminal activity in Australia and changes in criminal activity in terms of age, gender, states or territories, and police proceeding.

In the first section, look at the offenders by age group in Australia. The purpose is to explore the distribution of offenders across age groups, what principal offences account for the majority of the offences in each age group, and the changes in the number of offenders by year. By conducting this analysis, an overview of the distribution and trend of the number of offenders by age group can be obtained.

Although the status of female offence in modern society is more prominent than in the past, it is a recognised fact that in general, under various social systems and historical conditions, the proportion of female offenders in the total number of offenders is significantly lower. At the same time, the gender difference in the number of offences has more significant uncertainty. We will analyse the number and rate of offenders for each gender and explore the yearly changes of the offences on each gender group in the second section.

For section three, we analyse the crime statistics on states or territories in Australia. The intention is to explore how the primary offences take account in each state or territory in 2018, and which state or territory have competitively higher crime rates. By analysing the crime statistics on states or territories, the report will offer insights on how each state or territory differs on the frequency of primary offences recorded.

Furthermore, in the fourth section, we analyse the court actions of offenders in Australia. The purpose of this section is to investigate the distribution of court and non-court actions of offenders in each state, and which specific crime will be resulting in more court actions than non-court actions. By analyse the court actions of the criminal, we also provide some detailed explanations and the possible reason to cause this phenomenon.

2 Analysis

Gender difference in the number and rate of offences

```
## `summarise()` regrouping output by 'year', 'offence_type' (override with '.groups' argument)
```

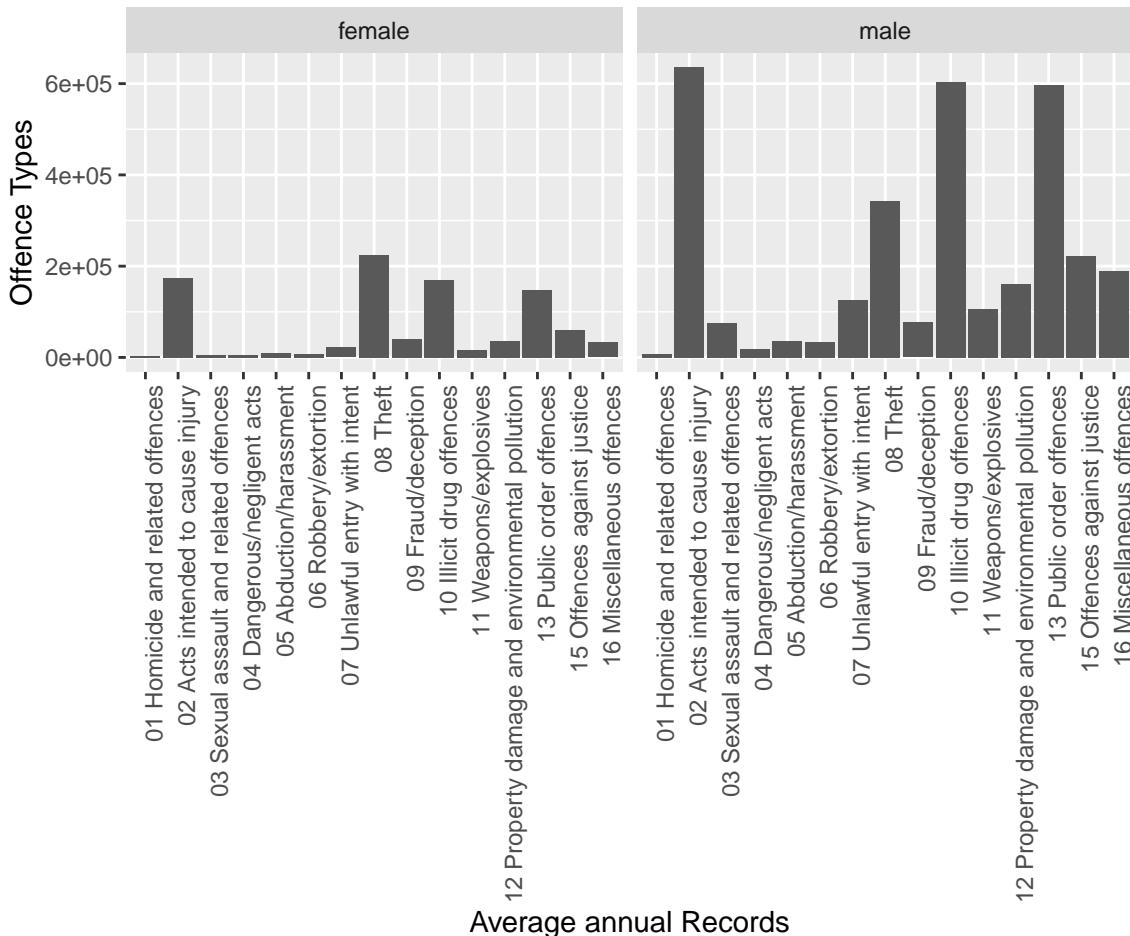


Figure 1: Yearly average offence records of different offence type

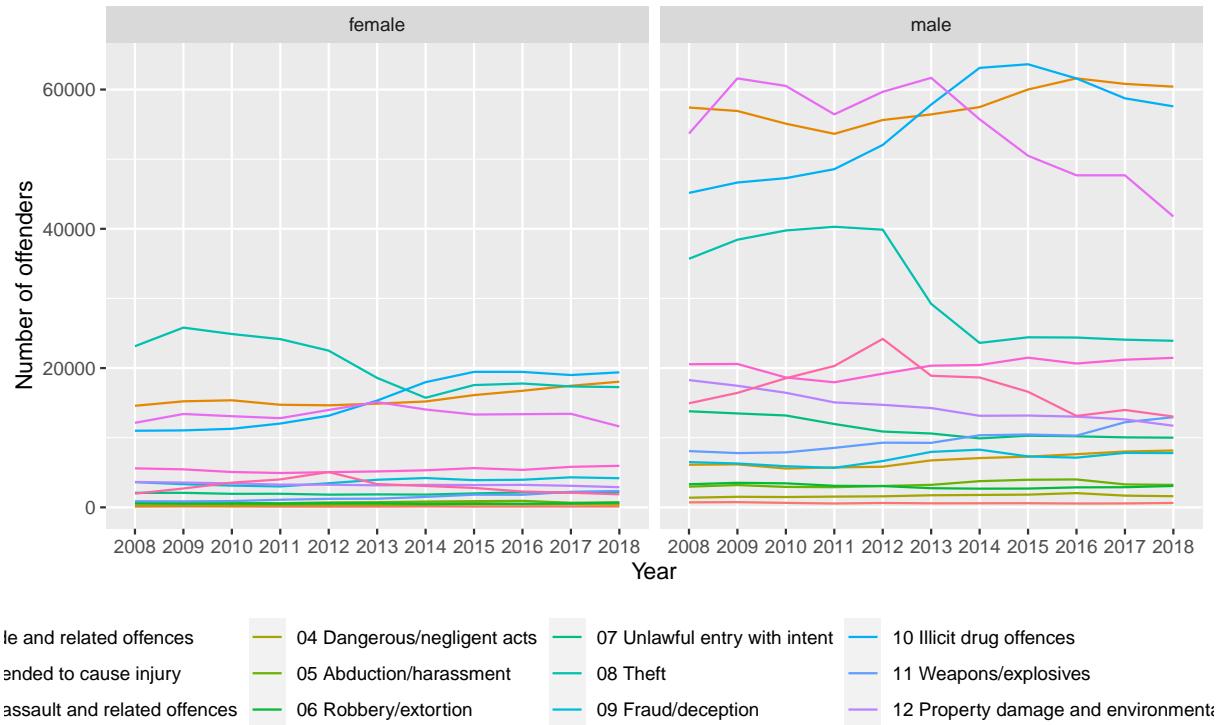
As showing in Figure 1, each bar represents the average number of records for each type of offence and gender over the ten years. The overall offence recorded that the number of male offenders is significantly higher than female offenders. The highest number of offence type for males are “Acts intended to cause injury” and for females are “Theft”.

```
## `summarise()` ungrouping output (override with '.groups' argument)
```

Table 1: Summary of yearly average number of offences

Offence Type	Male	Female	Result
01 Homicide and related offences	614.7	114.1	Males are 5.39 times higher
02 Acts intended to cause injury	57770.5	15729.0	Males are 3.67 times higher
03 Sexual assault and related offences	6756.7	397.2	Males are 17.01 times higher
04 Dangerous/negligent acts	1650.2	360.5	Males are 4.58 times higher
05 Abduction/harassment	3320.8	728.9	Males are 4.56 times higher
06 Robbery/extortion	3034.2	556.7	Males are 5.45 times higher
07 Unlawful entry with intent	11305.4	2005.5	Males are 5.64 times higher
08 Theft	31245.6	20435.6	Males are 1.53 times higher
09 Fraud/deception	7029.2	3732.1	Males are 1.88 times higher
10 Illicit drug offences	54745.5	15374.8	Males are 3.56 times higher
11 Weapons/explosives	9737.7	1443.4	Males are 6.75 times higher
12 Property damage and environmental pollution	14539.6	3268.2	Males are 4.45 times higher
13 Public order offences	54268.5	13303.9	Males are 4.08 times higher
15 Offences against justice	20230.7	5397.5	Males are 3.75 times higher
16 Miscellaneous offences	17153.3	2975.1	Males are 5.77 times higher
Total	308136.3	90450.5	Males are 3.41 times higher

If we look at the summary (Refer to Table 1), the result also indicates that in all the offence types, the number of male offenders is significantly higher than female offenders. The “Sexual assault and related offence” is the most significant difference between the number of males and females, and the average number of males is about 17 times higher than females. The difference in “Theft” is relatively minimal; males are about 1.53 times higher than females. Over the ten years, the average number of male offenders is 4.42 times higher than that of females.

**Figure 2:** Yearly Number of Offenders on Female and Male

From Figure 2, we can observe that the yearly changes on the number of records of most types of the offence are stable on both genders. However, there still have some changes. For females, the number of "Theft" drop highly, from about 25,000 reduced to 15,000 and "Illicit drug offences" increased by nearly 10,000. For males, although some type offences remain at a relatively high level, "Unlawful entry with intent and Property damage" and "environmental pollution" have decreased by about 20,000. Government still need to pay attention to the issue of "Illicit drug offences", because the number of records has increased a lot compared to 2008.

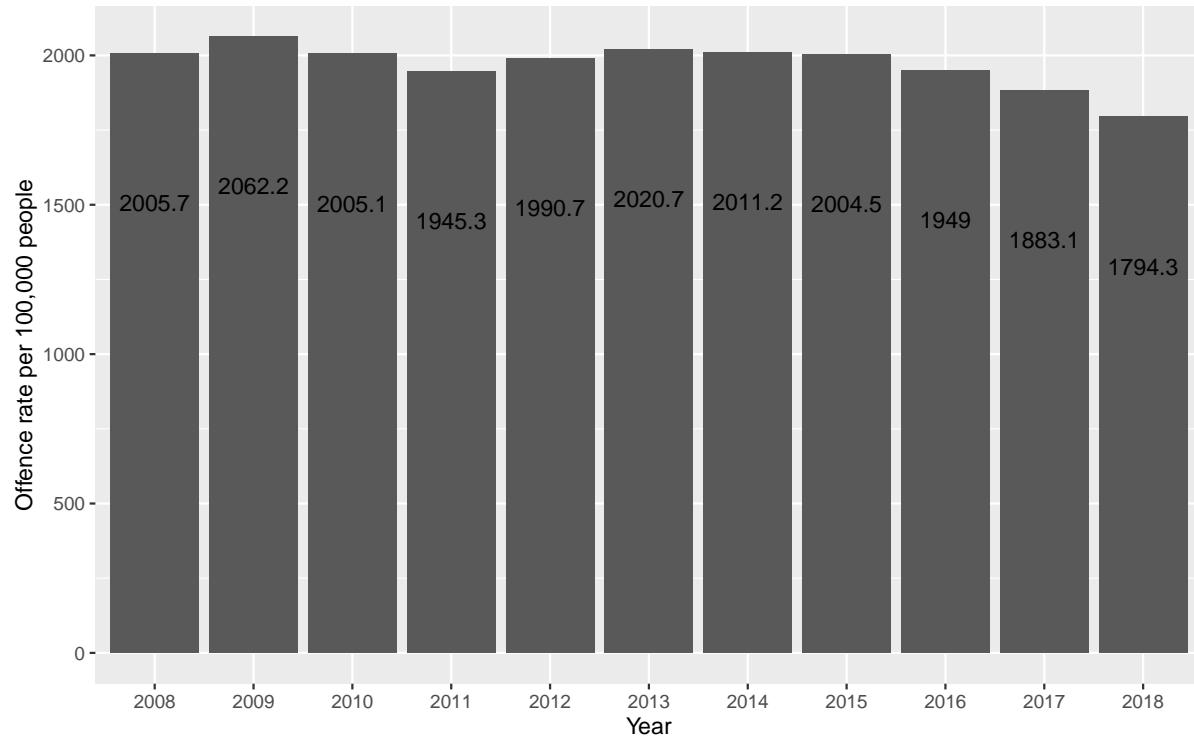


Figure 3: Rate of offenders recorded in Australia

In Figure 3, it represents the offender rate on both genders; the rate indicates the number of offenders in 100,000 people. In 2009, the rate was 2,062 offenders in 100,000 people. After the overall trend is decreasing, in 2018, there are about 1,794 offenders in 100,000 people. The rate decreased to their lowest levels in six years.

Table 2: Yearly change rate of offence rate

Year	Rate of male	Rate of female
2018	-0.0516427	-0.0354850
2017	-0.0347731	-0.0249341
2016	-0.0354036	-0.0029570
2015	-0.0142071	0.0372600
2014	-0.0057571	0.0025054
2013	0.0159161	0.0159667
2012	0.0276546	0.0072253
2011	-0.0313991	-0.0225538
2010	-0.0274735	-0.0273654
2009	0.0230747	0.0428654

Focus on the change on the genders (Refer to Table 2); the rate of both genders offenders is continuously decreasing in recent years.

Table 3: Difference and change rate on number and rate of offence between 2008 to 2018

	Gender	Difference	Growth Rate
Number of Offender	male	5239.0	0.0178715
Number of Offender	female	13594.0	0.1662631
Rate of Offender	male	-408.4	-0.1292691
Rate of Offender	female	-9.3	-0.0107452

From Table 3, we can conclude that the number of offenders recorded in Australia increased on both males and females from 2008 to 2018. However, the rate of offenders recorded has dropped significantly, and the offence rate of males has decreased more than that of females.

- The number of male offenders increased by 5,239, and the increasing rate is 1.79%.
- The number of female offenders increased by 13,595, and the increasing rate is 16.63%.
- The rate of male offenders has dropped by 408 per 100,000 people, and the decreasing rate is 12.93%.
- The rate of female offenders has dropped by 9 per 100,000 people, and the decreasing rate is 1.07%.

Crime analysis by age group

```
## `summarise()` ungrouping output (override with `.groups` argument)
```

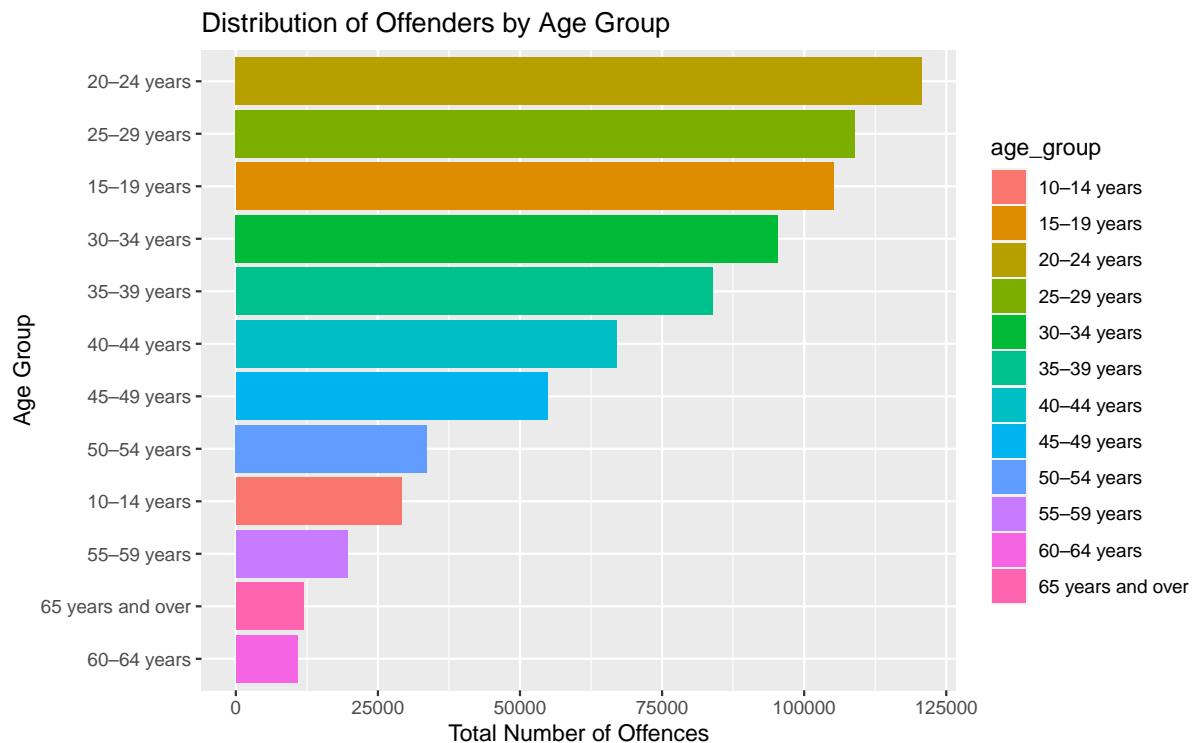
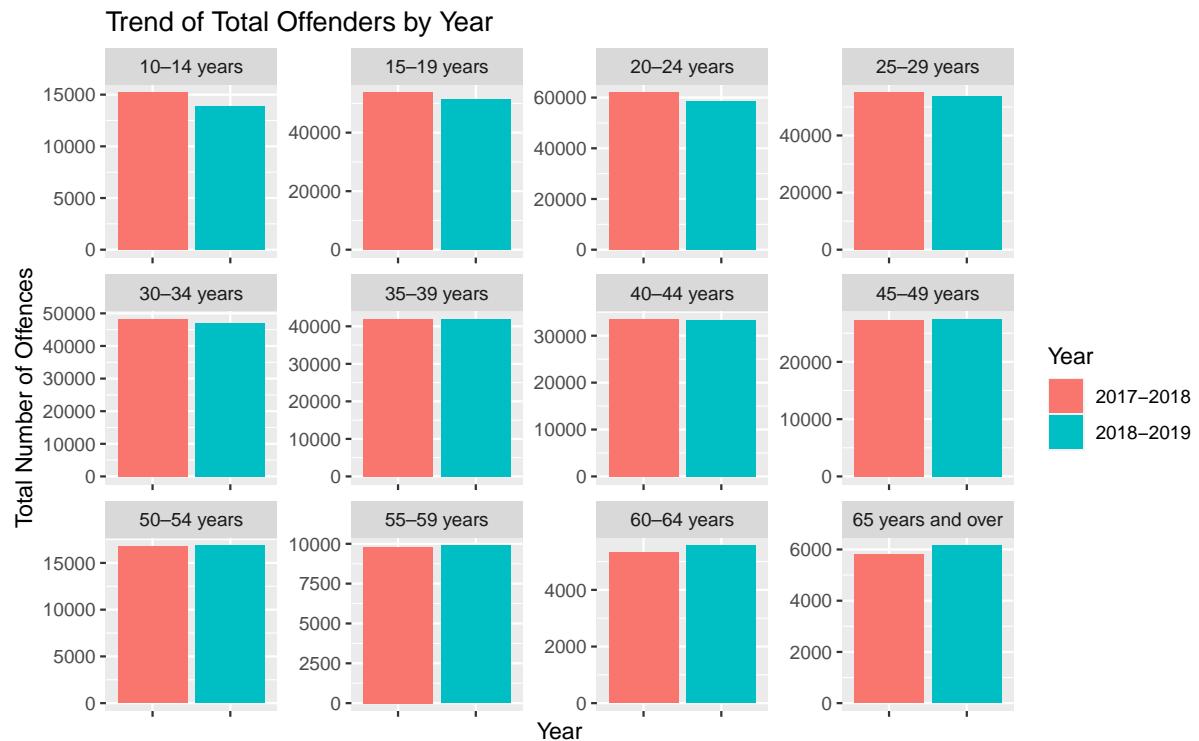


Figure 4: Total offenders across age groups

Figure 4 shows the distribution of offenders across age groups, with each bar representing the total number of offences for certain age group. The highest proportion of offenders is from the age of 20-24 years, followed by 25-29 and 15-19 years, while the lowest proportion of offenders is from 60-64 years age group. This indicates that older people tend to not commit an offence and the majority of offenders are young people.

```
## `summarise()` regrouping output by 'age_group' (override with `.groups` argument)
```

**Figure 5:** Distribution of total offenders yearly

```
## `summarise()` ungrouping output (override with `.`groups` argument)
## `summarise()` ungrouping output (override with `.`groups` argument)
```

Table 4: Changes in total offenders

age_group	Total 2017-2018	Total 2018-2019	Difference	Percentage Changes
10-14 years	15239	13929	-1310	-8.5963646
15-19 years	53835	51383	-2452	-4.5546578
20-24 years	62138	58612	-3526	-5.6744665
25-29 years	55171	53750	-1421	-2.5756285
30-34 years	48311	47100	-1211	-2.5066755
35-39 years	41982	41914	-68	-0.1619742
40-44 years	33593	33355	-238	-0.7084809
45-49 years	27329	27507	178	0.6513228
50-54 years	16767	16854	87	0.5188764
55-59 years	9800	9888	88	0.8979592
60-64 years	5323	5565	242	4.5463085
65 years and over	5808	6151	343	5.9056474

An interesting trend to notice from Figure 5 and Table 4 is that the number of offences for age group below 45 decreased in 2018-2019, while it increased for age group above 45. This is due to the structural ageing that is experienced by all Australian states and territories (Rosevear (2012)). The overall changes however are not that high. Age group 10-14 years has the most significant change which is a decrease of 1310 or around -8.6%. And the age group with the least change is 35-39 years which is only a decrease of 68. The number of offences committed by middle age groups do not change much.

Next, we are looking at the top three highest and lowest age group in more details.

```
## `summarise()` regrouping output by 'age_group', 'principal_offence' (override with '.groups'
```



Figure 6: Top three highest age group principal offences

From Figure 6, we can see a clear trend here that all age group has the highest number of offences in illicit drug offences. However, the number is decreasing in 2018-2019, which is resulted from 'lower level' offences being diverted from the courts (Australian Institute of Health and Welfare (2020)). While the changes in other types of offence seem to be little, the changes for "Public order offences" seems to be high.

```
## `summarise()` regrouping output by 'age_group', 'principal_offence' (override with '.groups'
```

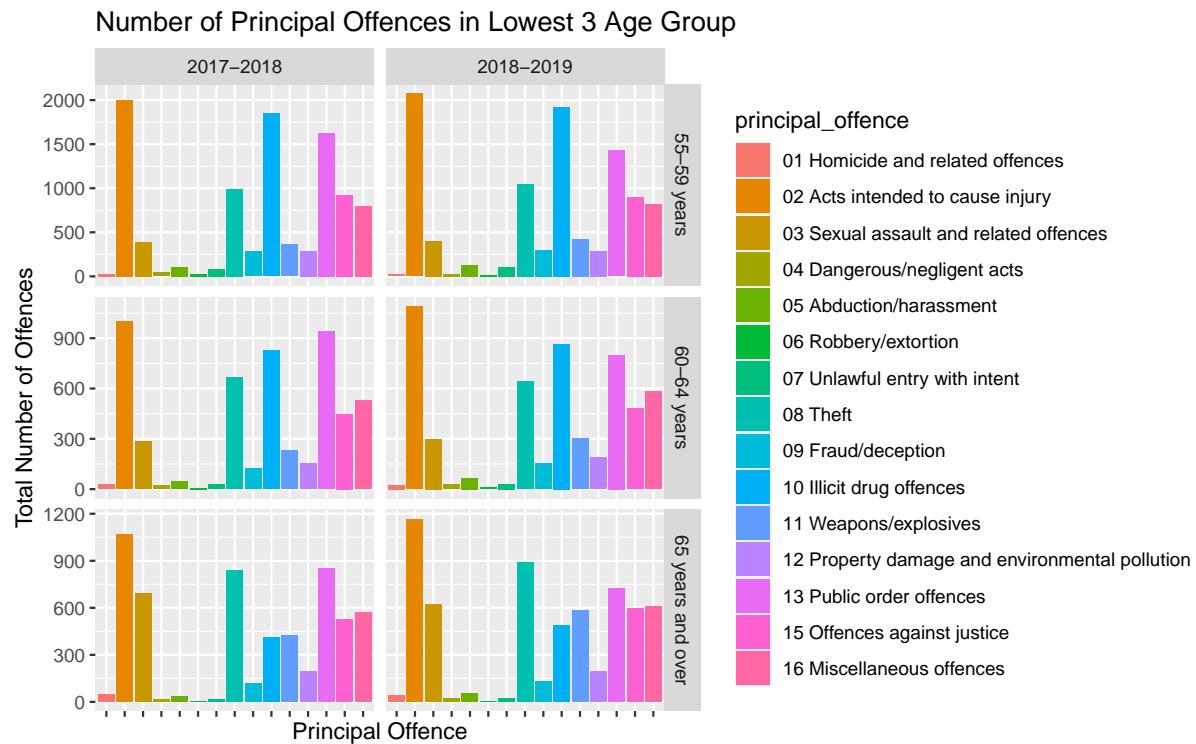


Figure 7: Lowest three highest age group principal offences

Figure 7 illustrates the distribution of total offenders in each principal offence for the lowest 3 age groups. There are some differences compared to the top 3 age groups. The highest principal offence for these lowest 3 groups is “Acts intended to cause injury”. Interesting findings here are that total offenders in “Illicit drug offences” decreased as the age group moves up and also “Offences against justice” and “Miscellaneous offences” tend to be higher in older ages compared to younger ages. While most of the offence types experienced an increase over time, one similar finding as in the top 3 data is that there is a significant decrease in “Public order offences”.

Crime analysis by State and Territory

In this section, we are exploring the Australian crime statistics between states/territories. The analysis will be exploring which state has the highest crime rates, and what principal offence accounts for a large proportion.

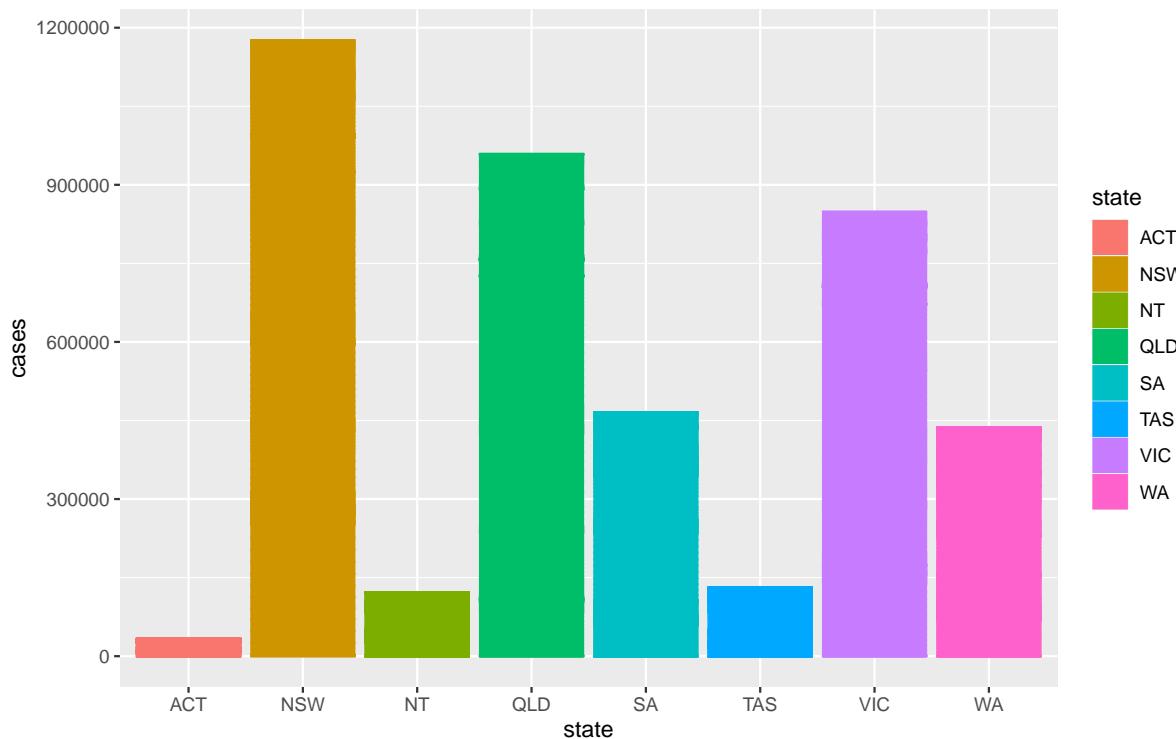


Figure 8: state-crime

The figure above demonstrates high crime cases recorded by NSW, QLD, SA, VIC and WA. However, the high number of crime cases recorded in these states may due to its high population compared to other states/territories like ACT, NT and TAS.

Next, We'd like to look into the frequency of the principal offence in 2018 for top 4 crime-level states. (NSW, QLD, SA and VIC)

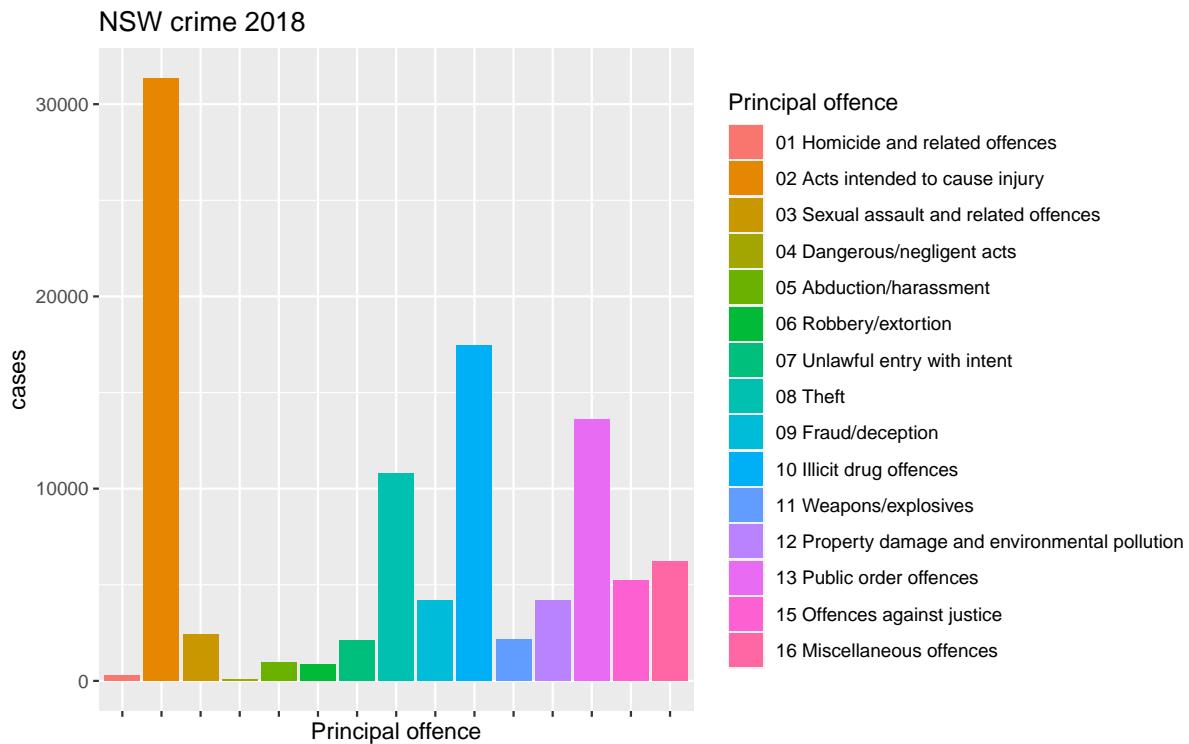


Figure 9: NSW crime 2018

The figure 9 demonstrates that 02 Acts intended to cause injury takes the largest proportion in NSW's 2018 crime statistics.

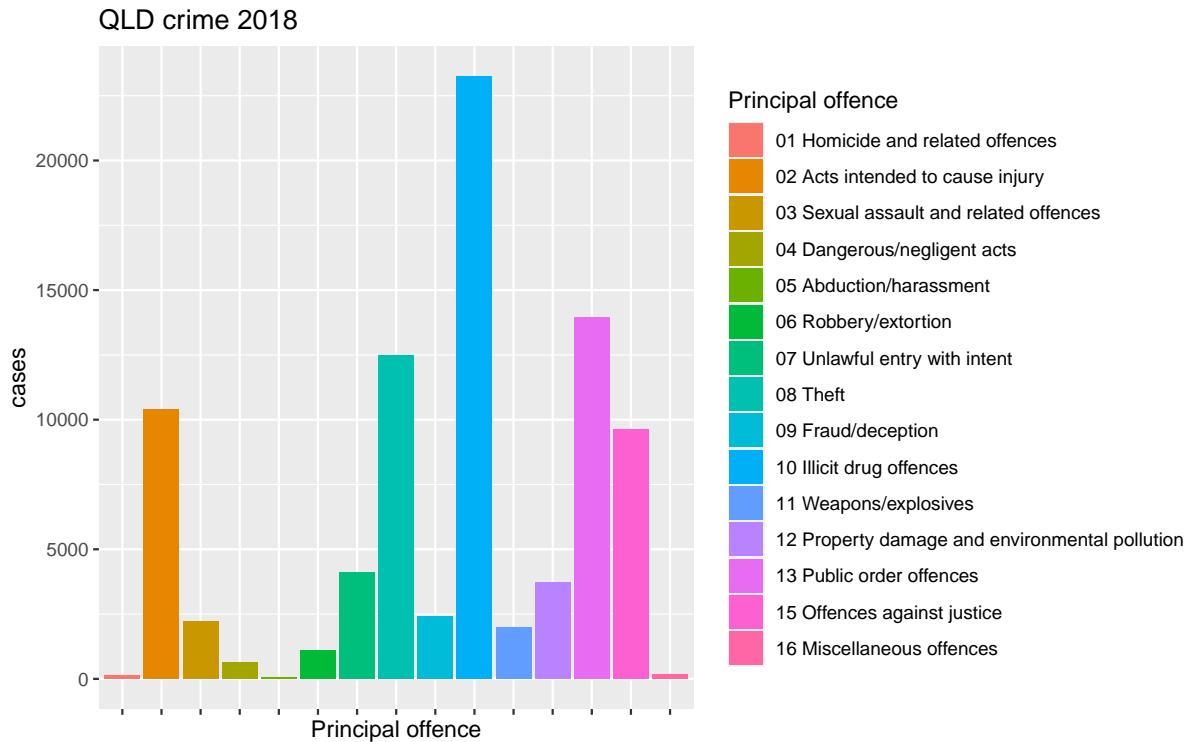


Figure 10: QLD crime 2018

The figure 10 demonstrates that 10 Illicit drug offences takes the largest proportion in QLD's 2018 crime statistics. So why some states like QLD have drug offences on rife? Tony Fleming explains in the brisbane times that, "Largely it is because the Valley and CBD is a night and party precinct. A lot of the drug use is associated with people socialising and whatnot." ([Lynch \(2019\)](#))

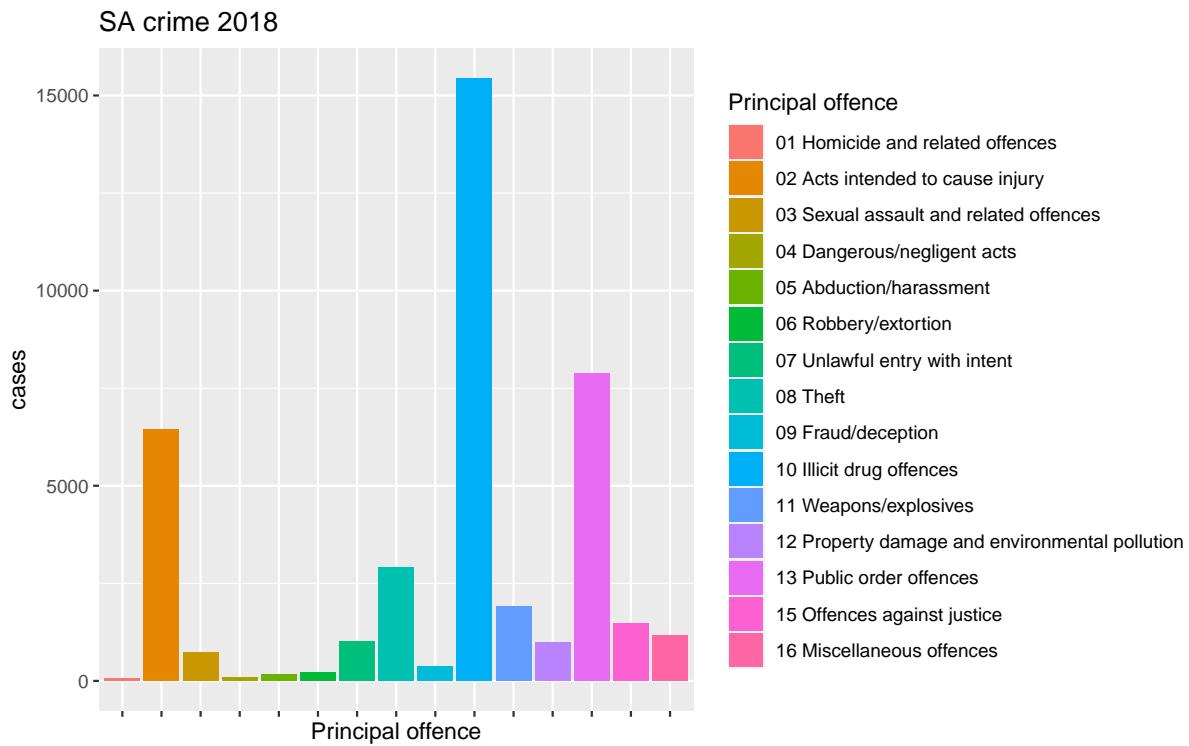
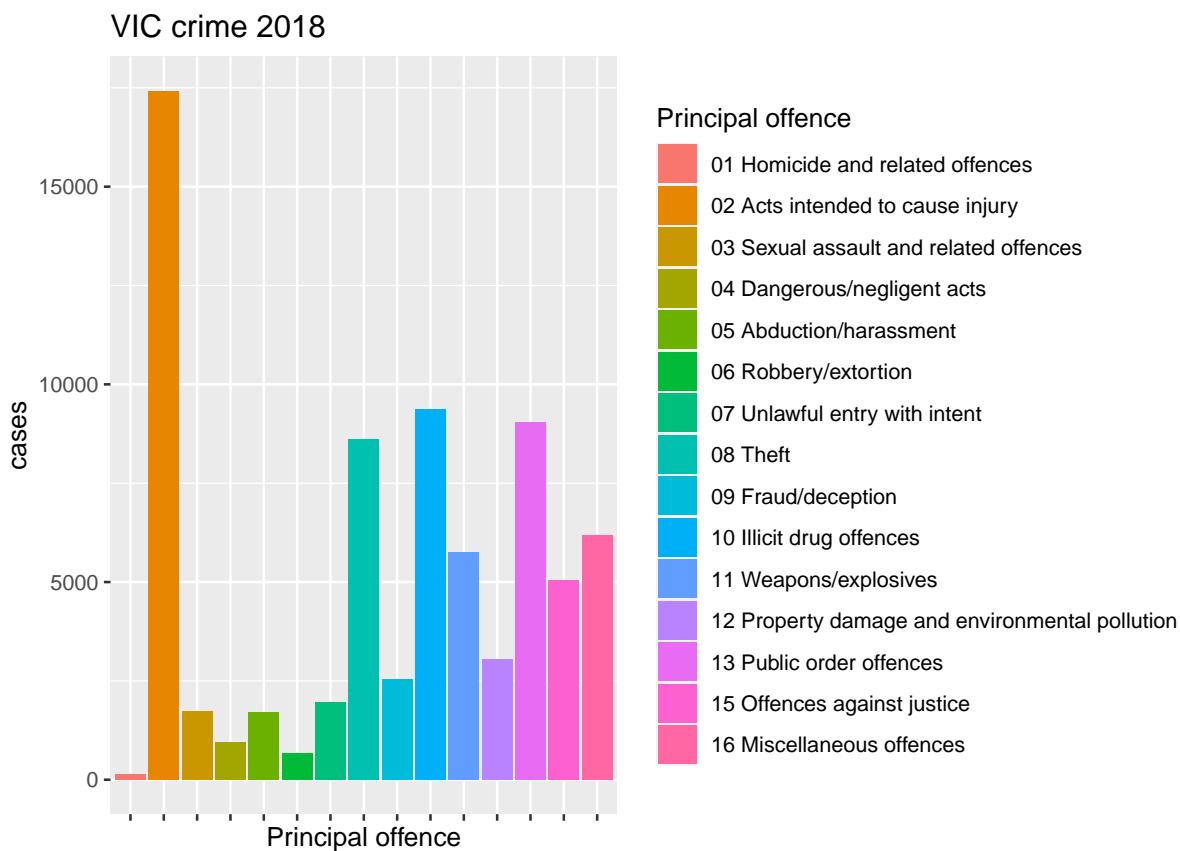


Figure 11: SA crime 2018

The figure 11 also represents the outstanding proportion of 10 Illicit drug offences in South Australia's 2018 crime statistics.

Table 5: Crime statistics 2018 AU

State	Proportion
NSW	27.8823529
VIC	20.3036936
QLD	23.6136799
SA	11.1898769
WA	10.7370725
TAS	2.6268126
NT	2.9699042
ACT	0.6766074

**Figure 12: VIC crime 2018**

In the figure 12, 02 Acts intended to cause injury resulted in the highest proportion compared to other offences recorded in Victoria's crime statistics.

Furthermore, table 5 also implies the top 4 states accounted for highest proportion of total crime cases recorded in Australia 2018.

Court Actions

NT does not have any information about the court action, therefore, in this part of the analysis we exclude the data of North Territory.

The figure 13 show more offenders will be prosecuted by the court than others. But offenders in SA and TAS have a smaller proportion of criminals result in court action compared to other states in the past ten years. TAS and ACT have the least of the criminals result in court action compared to other states.

```
## `summarise()` regrouping output by 'States' (override with '.groups' argument)
```

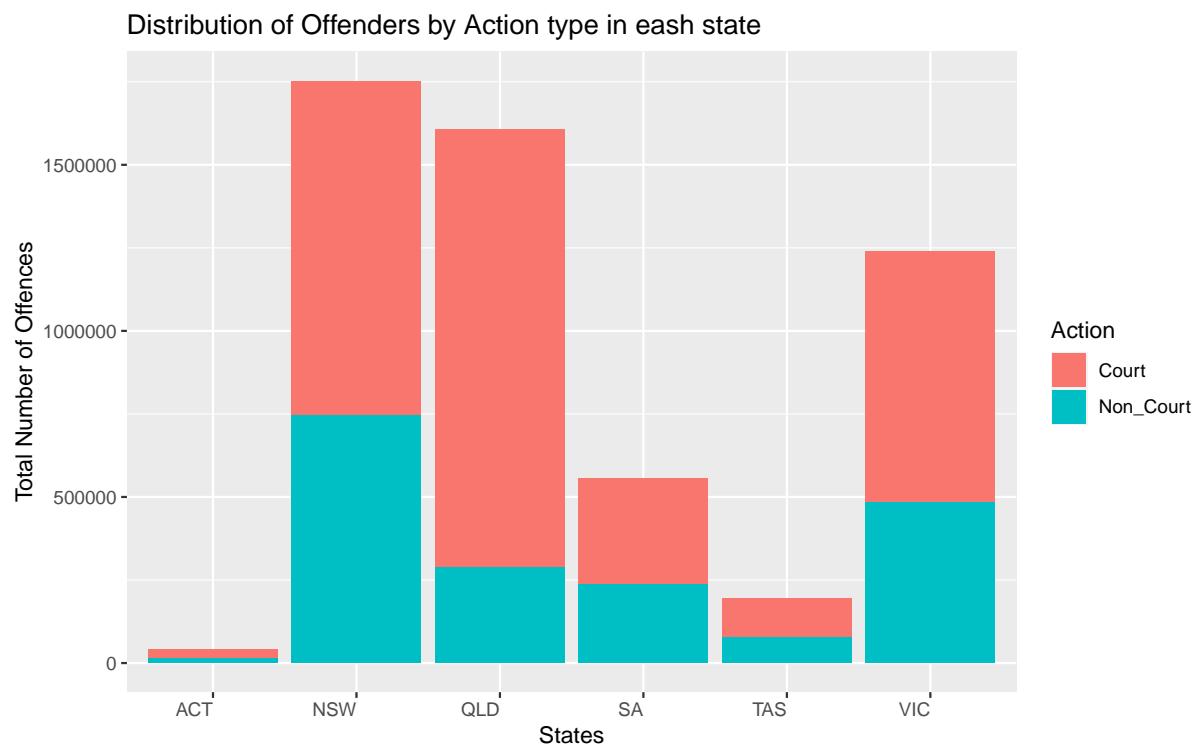
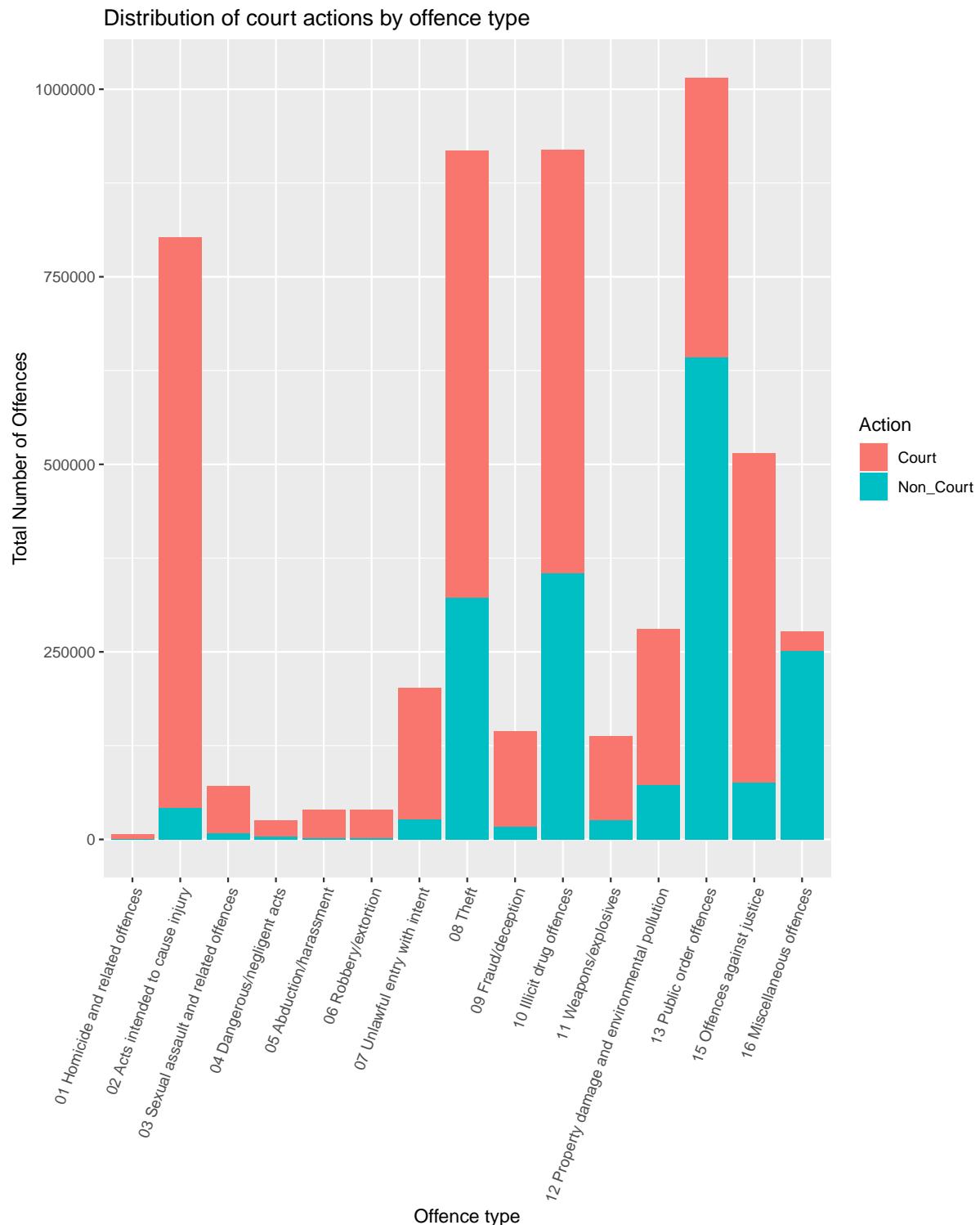


Figure 13: Distribution of Offenders by Action type

From Figure 14 Most types of crime will result in court actions. However, public order offenses and miscellaneous offenses have less possibility to be litigated by the court.

```
## `summarise()` regrouping output by 'Principal offence' (override with '.groups' argument)
```

**Figure 14:** Distribution of court actions by offence type

The figure 15 indicate only public order offenses and miscellaneous has less possibility to be litigated by the court. The result in 2018 is not much different from the aggregated data from the past 10 years.

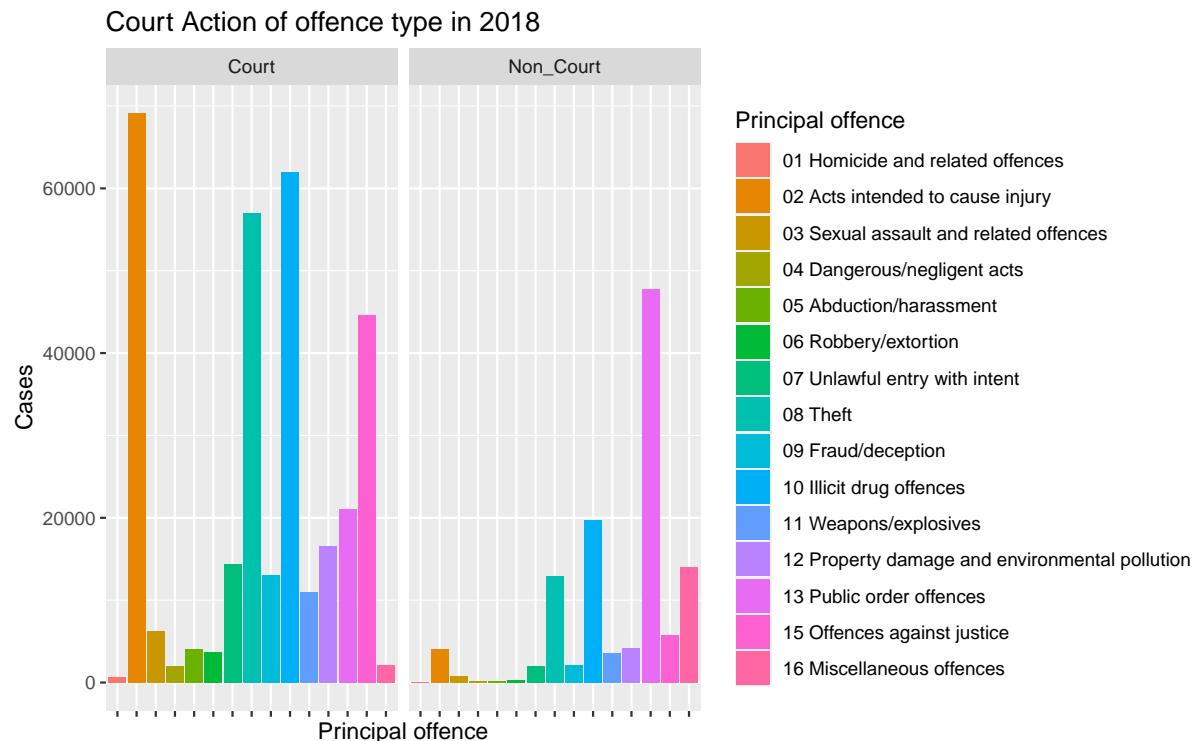


Figure 15: Court Action of offence type in 2018

```
## `summarise()` regrouping output by 'States' (override with '.groups' argument)

## `summarise()` regrouping output by 'States', 'Year' (override with '.groups' argument)
```

Since NSW QLD and VIC have the most offenders compared to other states, we need to do further analyze the trend of court actions in the past ten years of these states.

According to figure 16, from 2007 to 2010 the percentage of criminals result in the court action is decrease. However, after 2010 the percentage of criminals results in the court action is increased. And the difference between the court and non-court actions of offenders become more significant over time.

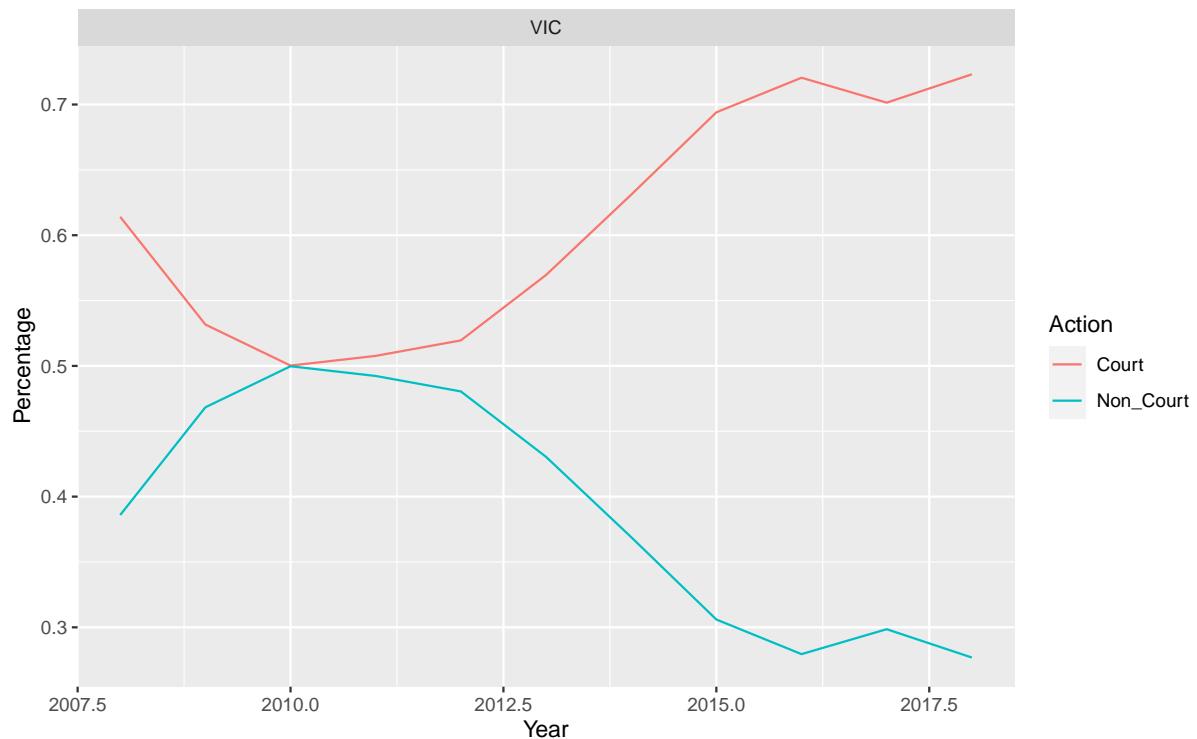


Figure 16: Court actions of offenders in VIC

From figure 17, in QLD the percentage of offenders results in court, and non-court action is quite stable. In most of years the more than 80% of offenders will result in court prosecution. Less than 20% of offenders will not be prosecuted by the court.

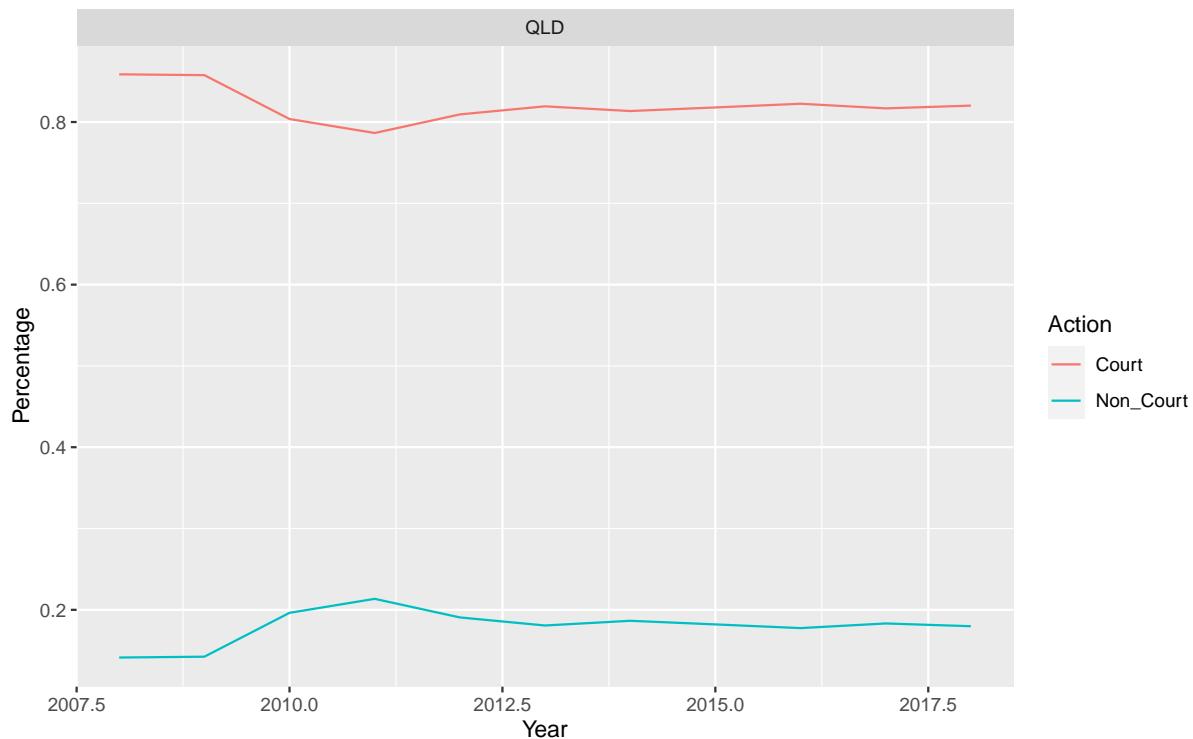


Figure 17: Court actions of offenders in QLD

According to figure 18, in NSW before 2010 the percentage of offenders prosecuted by court or not are getting closer. From 2010 to 2012 the percentage of criminals resulting in non-court action is approximate the same as results in court action. After 2012 the percentage of criminals results in the court action is increased. And the difference between the court and non-court actions of offenders become more significant over time.

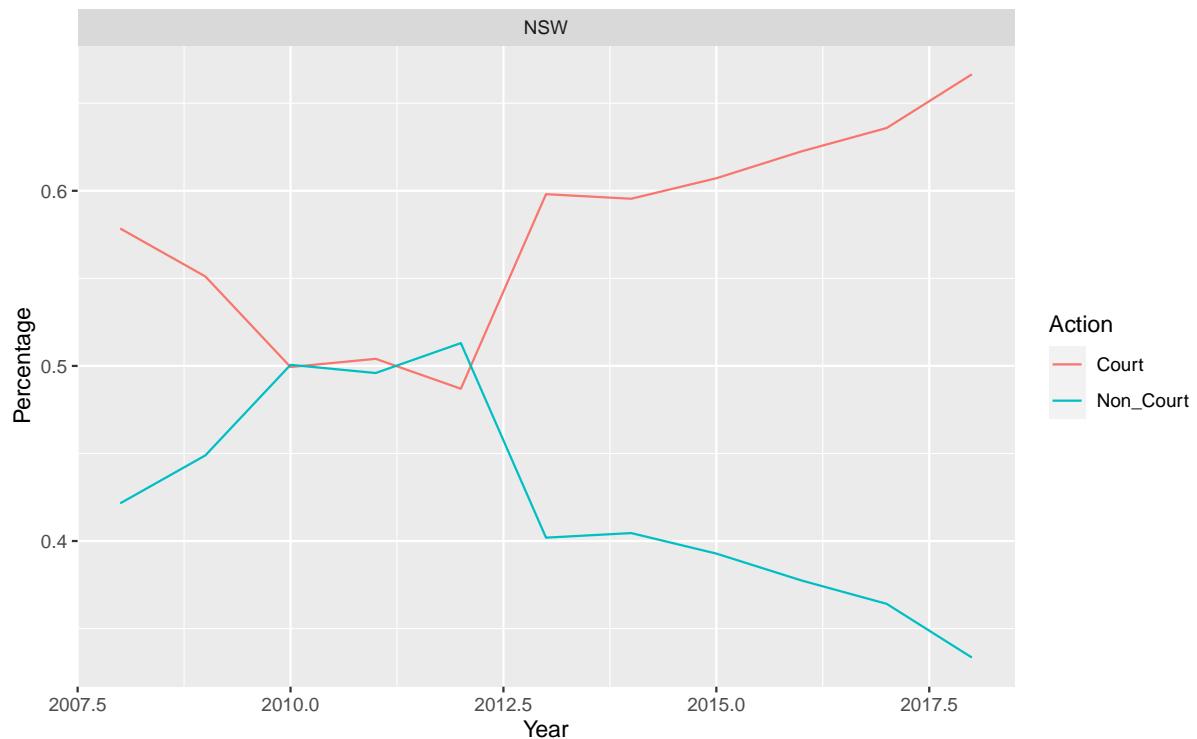


Figure 18: Court actions of offenders in NSW

3 Conclusion

The crime offender's dataset collected by the Australian Bureau of Statistics allows our group to analyse the insight of the crime circumstances in Australia by gender, age group, states/territories, and police proceedings. The number and rate of male offenders recorded in Australia are significantly higher than that of female offenders. Although the number of offences on both genders has increased in recent years, the growth rate in the number of male offenders is lower than that of females. The rate of male offenders has dropped far more than females. Besides, the majority of the proportion of offenders is from younger age groups. One interesting thing is that the number of offences for the age group below 45 decreased in 2018-2019, while it increased for the age group over 45. Even though the total number of offenders differs across age groups, the trend is pretty similar with 10, 2, 13 being the top three highest principal offences. On the other hand, through the visualisations created for crime statistics on states/territories, the report concludes the top 4 states/territories as NSW, QLD, SA, and VIC. The common grounds of these states are, QLD and SA both had 'Illicit drug offences' as the most frequent primary offence, whereas, NSW and VIC had 'Acts intended to cause injury'. Lastly, it can be clearly concluded that most criminals will be prosecuted by the court in all states. But offenders in SA and TAS have a smaller proportion of criminals result in court action compared to other states. Most types of crime will result in court actions. However, public order offenses and miscellaneous offenses have less possibility to be litigated by the court.

4 Acknowledgement

The dataset used is offenders dataset of Australia (Australian Bureau of Statistics (2020)). Packages used are Wickham (2016), Wickham et al. (2019), Xie (2019), Schmidt (2019), Grolemund and Wickham (2011), Wickham and Bryan (2019), Zhu (2019), Xie (2020), Auguie (2017), Müller (2017), Wickham et al. (2020), and Wickham, Hester, and Francois (2018).

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