Recorded Crime Victim Statistics (RCVS), Police Stations

(Datasets Policedata.nz: AEG_Full_Data_data.csv, UAEG_Full_Data_data.csv)

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```
VD <- read.csv("AEG_Full_Data_data.csv")
UVD <- read.csv("UAEG_Full_Data_data.csv")

library(ggplot2)
library(dplyr)
```

```
##
## Attaching package: 'dplyr'

## The following objects are masked from 'package:stats':
##
##     filter, lag

## The following objects are masked from 'package:base':
##
##     intersect, setdiff, setequal, union
```

```
library(tidyr)
library(data.table)
```

```
##
## Attaching package: 'data.table'

## The following objects are masked from 'package:dplyr':
##
##     between, first, last
```

```
library(RColorBrewer)
```

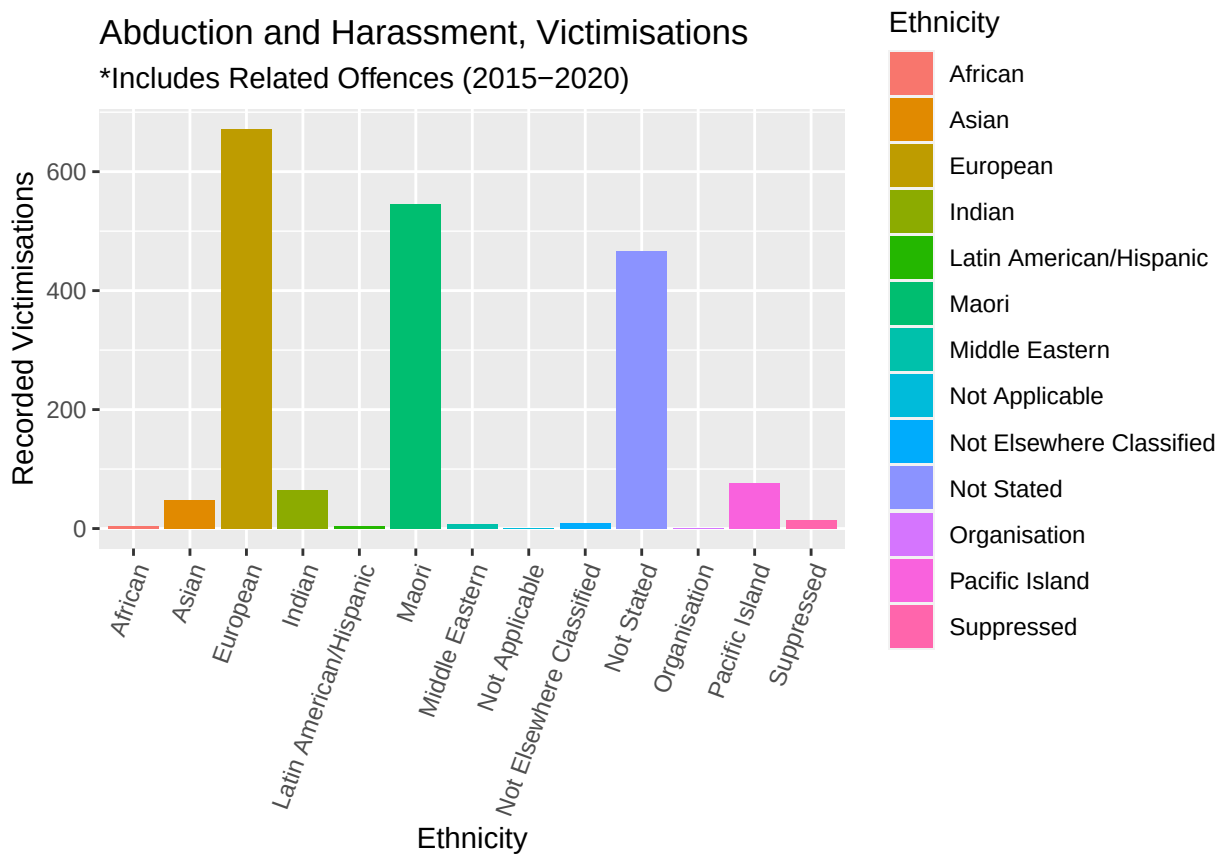
Victimisations (Police Stations):

Crime Division, Ethnicities of Victims

```r
division_ethnicity <- VD[, c(2, 9)]
names(division_ethnicity)[names(division_ethnicity) ==
    "Anzsoc.Division"] <- "Division"
names(division_ethnicity)[names(division_ethnicity) ==
    "Abduction, Harassment and Other Related Offences Against a Person"] <- "Abduction"

victimisation_count <- dcast(setDT(division_ethnicity,
    keep.rownames = TRUE), Ethnicity ~ Division,
    length)

kable(head(victimisation_count))
```

Ethnicity	Abduction, Harassment and Other Related Offences Against a Person	Acts Intended to Cause Injury	Robbery, Extortion and Related Offences	Sexual Assault and Related Offences	Theft and Related Offences	Unlawful Entry With Intent/Burglary, Break and Enter
African	4	665	63	47	967	0
Asian	48	4563	1053	575	11849	0
European	672	62113	4287	9901	85993	0
Indian	65	6395	2331	461	12351	0
Latin American/Hispanic	5	354	33	69	1079	0
Maori	546	50251	1580	5705	35300	0

```r
# Visual Observation: victimisation ONE
# crime division with Bar Chart
ggplot(data = victimisation_count, mapping = aes(x = victimisation_count$Ethnicity,
    y = victimisation_count$Abduction, fill = victimisation_count$Ethnicity)) +
    geom_bar(stat = "identity") + theme(axis.text.x = element_text(angle = 70,
    hjust = 1)) + labs(title = "Abduction and Harassment, Victimisations",
    subtitle = "*Includes Related Offences (2015-2020)",
    fill = "Ethnicity") + xlab("Ethnicity") +
    ylab("Recorded Victimisations")
```



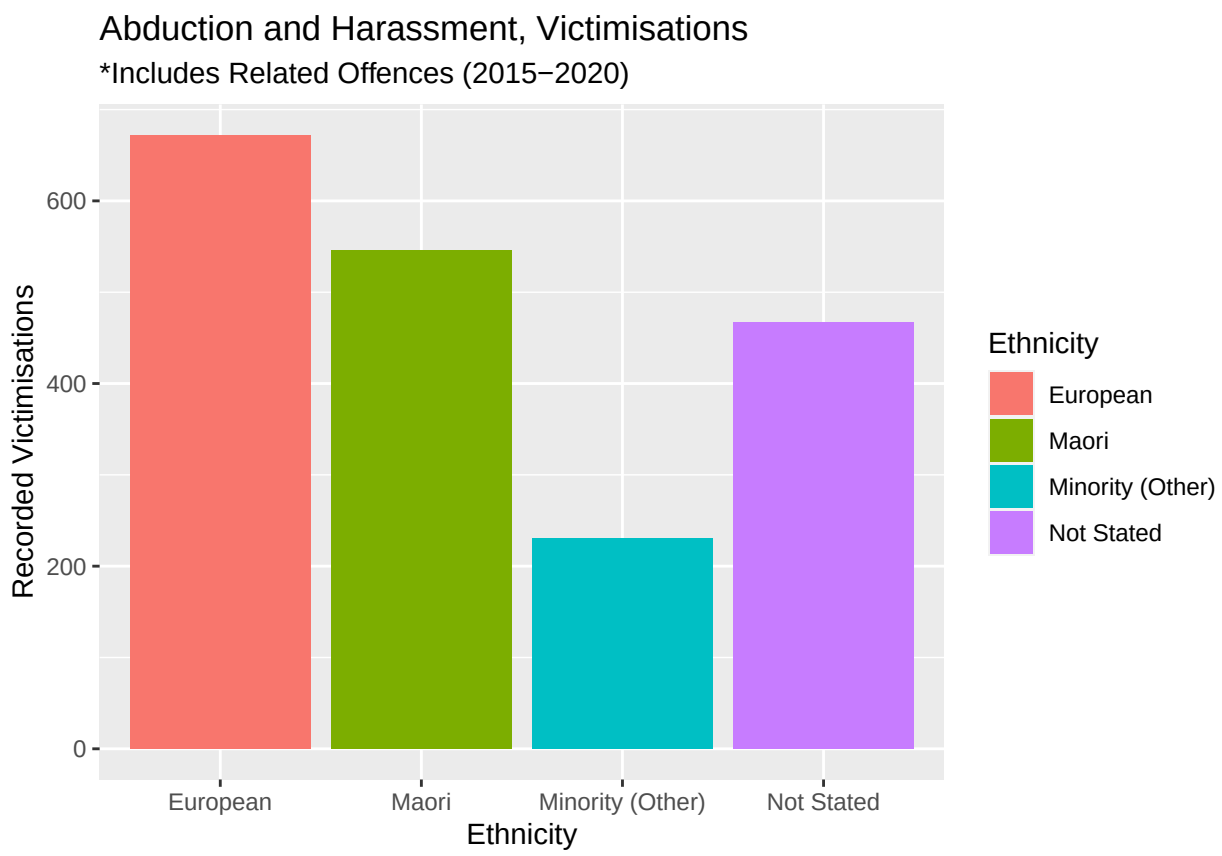
Victimisations (Police Stations):

Crime Division, (Aggregated) Ethnicities of Victims

```
# Aggregated Minority (Other) Retain 'Not
# Stated'
aggregation <- c(0, 0, 1, 0, 0, 2, 0, 0,
    0, 3, 0, 0, 0)
victimisation_count_copy <- victimisation_count
victimisation_count_copy$Ethnicity <- aggregation
aggregate_victimisation <- aggregate(x = victimisation_count_copy,
    by = list(victimisation_count_copy$Ethnicity),
    FUN = sum)
names(aggregate_victimisation)[names(aggregate_victimisation) ==
    "Abduction, Harassment and Other Related Offences Against a Person"] <- "Abduction"
aggregate_victimisation$Ethnicity <- c("Minority (Other)",
    "European", "Maori", "Not Stated")
# drop added grouping
aggregate_victimisation <- aggregate_victimisation[,
    -(1)]
kable(head(aggregate_victimisation))
```

Ethnicity	Abduction	Acts Intended to Cause Injury	Robbery, Extortion and Related Offences	Sexual Assault and Related Offences	Theft and Related Offences	Unlawful Entry With Intent/Burglary, Break and Enter
Minority (Other)	230	27155	5278	2750	98265	83748
European	672	62113	4287	9901	85993	0
Maori	546	50251	1580	5705	35300	0
Not Stated	467	41133	4526	8644	102914	0

```
# Visual Observation of ONE division with
# Bar Chart
ggplot(data = aggregate_victimisation, mapping = aes(x = Ethnicity,
    y = Abduction, fill = Ethnicity)) + geom_bar(stat = "identity") +
    theme(axis.text.x = element_text(angle = 0)) +
    labs(title = "Abduction and Harassment, Victimisations",
        subtitle = "*Includes Related Offences (2015-2020)",
        fill = "Ethnicity") + xlab("Ethnicity") +
    ylab("Recorded Victimisations")
```



Victimisation (Police Stations):

Crime Division to Year of Report

```
victimisation_series <- VD[, c(2, 5)]

names(victimisation_series)[names(victimisation_series) ==
    "Anzsoc.Division"] <- "Division"
series_count <- dcast(setDT(victimisation_series,
    keep.rownames = TRUE), Year.Month ~ Division,
    length)
```

```
agg_series_count <- series_count
years <- c(2015, 2016, 2017, 2018, 2019,
    2020)
for (k in years) {
    year <- grepl(k, agg_series_count$Year.Month)
    index <- 0
    for (y in year) {
        index <- index + 1
        if (y == TRUE) {
            agg_series_count$Year.Month[index] = k
        }
    }
}

names(agg_series_count)[names(agg_series_count) ==
    "Year.Month"] <- "Year"
names(agg_series_count)[names(agg_series_count) ==
    "Abduction, Harassment and Other Related Offences Against a Person"] <- "Abduction"

agg_series_count <- aggregate(cbind(Abduction,
    `Acts Intended to Cause Injury`, `Robbery, Extortion and Related Offences`,
    `Sexual Assault and Related Offences`,
    `Theft and Related Offences`, `Unlawful Entry With Intent/Burglary, Break and Enter`) ~
    Year, agg_series_count, sum)

kable(head(agg_series_count))
```

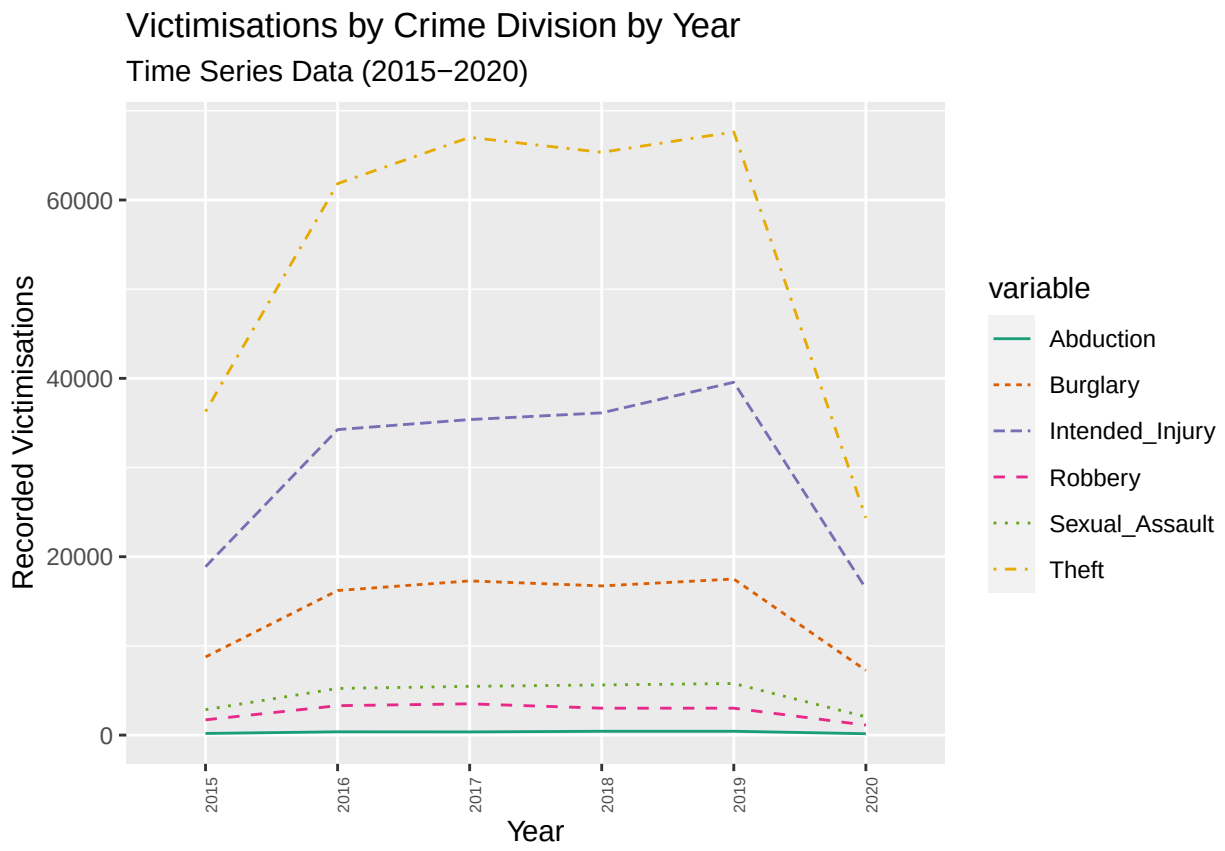
Year	Abduction	Acts Intended to Cause Injury	Robbery, Extortion and Related Offences	Sexual Assault and Related Offences	Theft and Related Offences	Unlawful Entry With Intent/Burglary, Break and Enter
2015	182	18879	1712	2849	36279	8760
2016	369	34255	3300	5234	61834	16211
2017	356	35380	3506	5465	67026	17290
2018	428	36132	3017	5621	65344	16728
2019	428	39562	3019	5783	67628	17502
2020	152	16444	1117	2048	24361	7257

```r
# Set up visualisation
all_colnames <- c("Date", "Abduction", "Intended_Injury",
    "Robbery", "Sexual_Assault", "Theft",
    "Burglary")
index <- 0
for (col in all_colnames) {
    index <- index + 1
    names(agg_series_count)[index] <- all_colnames[index]
}

agg_series_count <- agg_series_count %>%
    select(Date, Abduction, Intended_Injury,
        Robbery, Sexual_Assault, Theft, Burglary) %>%
    gather(key = variable, value = value,
        -Date)
```

Time Series, Victimisations (Police Stations):

Change in Recorded Victimisations by Crime Division (Annually)

```r
# Draw Time Series
ggplot(agg_series_count, aes(x = Date, y = value,
    group = variable)) + geom_line(aes(color = variable,
    linetype = variable)) + scale_color_brewer(palette = "Dark2") +
    theme(axis.text.x = element_text(angle = 90,
        size = 6, hjust = 1)) + labs(title = "Victimisations by Crime Division by Year",
    subtitle = "Time Series Data (2015-2020)",
    fill = "Crime Division") + xlab("Year") +
    ylab("Recorded Victimisations")
```



Unique Victims (Police Stations):

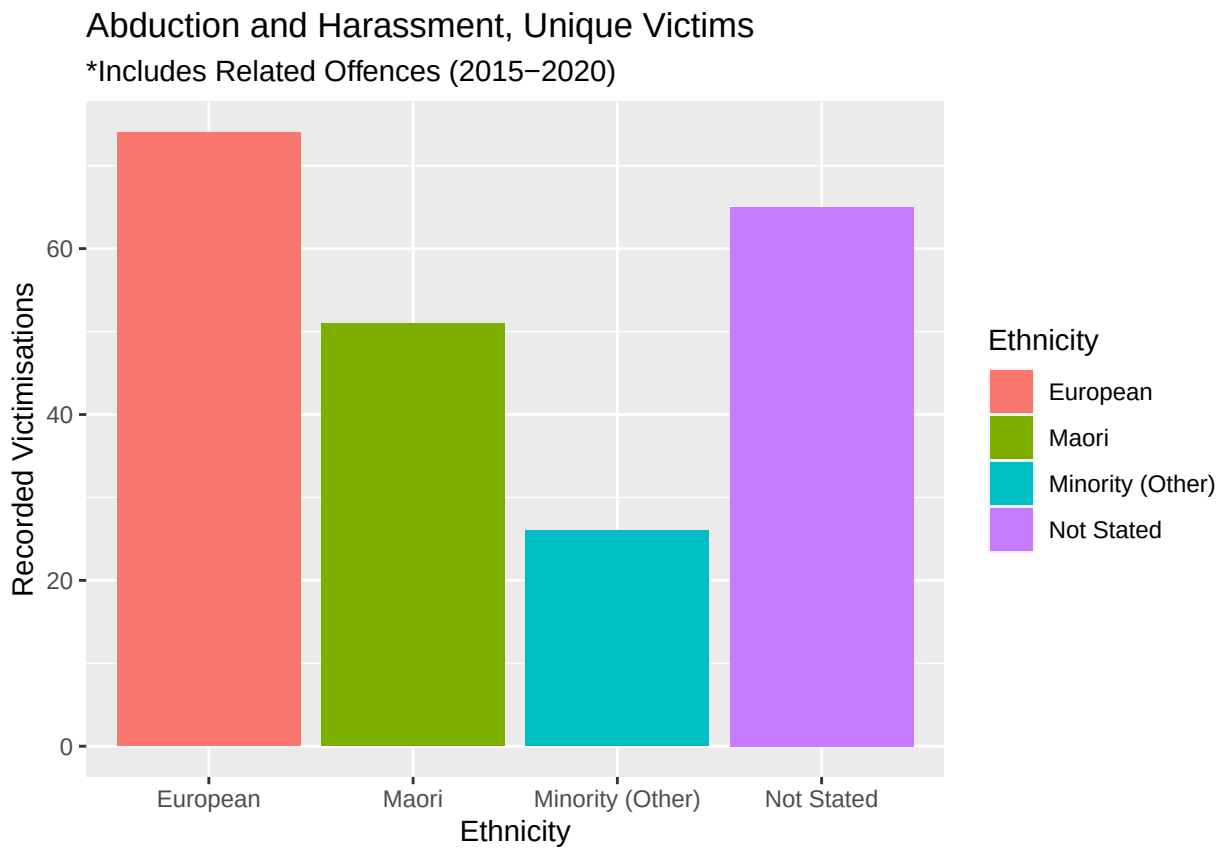
Crime Division, (Aggregated) Ethnicities of Victims

```
# head(UVD)
uv_count <- UVD[, c(2, 8)]
names(uv_count)[names(uv_count) == "Anzsoc.Division"] <- "Division"

uv_count <- dcast(setDT(uv_count, keep.rownames = TRUE),
    Ethnicity ~ Division, length)

# Aggregated Minority (Other) Retain 'Not
# Stated'
aggregation <- c(0, 0, 1, 0, 0, 2, 0, 0,
    0, 3, 0, 0, 0)
uv_count_copy <- uv_count
uv_count_copy$Ethnicity <- aggregation
aggregate_uv <- aggregate(x = uv_count_copy,
    by = list(uv_count_copy$Ethnicity), FUN = sum)
names(aggregate_uv)[names(aggregate_uv) ==
    "Abduction, Harassment and Other Related Offences Against a Person"] <- "Abduction"
aggregate_uv$Ethnicity <- c("Minority (Other)",
    "European", "Maori", "Not Stated")
```

```r
# drop added grouping
aggregate_uv <- aggregate_uv[, -(1)]

kable(head(aggregate_uv))
```

Ethnicity	Abduction	Acts Intended to Cause Injury	Robbery, Extortion and Related Offences	Sexual Assault and Related Offences	Theft and Related Offences	Unlawful Entry With Intent/Burglary, Break and Enter
Minority (Other)	26	3887	716	478	9870	6268
European	74	7614	691	1386	7489	0
Maori	51	6229	255	897	3445	0
Not Stated	65	5788	742	1460	9445	0

```r
# Visual Observation of ONE division with
# Bar Chart
ggplot(data = aggregate_uv, mapping = aes(x = Ethnicity,
    y = Abduction, fill = Ethnicity)) + geom_bar(stat = "identity") +
    theme(axis.text.x = element_text(angle = 0)) +
    labs(title = "Abduction and Harassment, Unique Victims",
        subtitle = "*Includes Related Offences (2015-2020)",
        fill = "Ethnicity") + xlab("Ethnicity") +
    ylab("Recorded Victimisations")
```



Unique Victims & Victimisations (Police Stations):

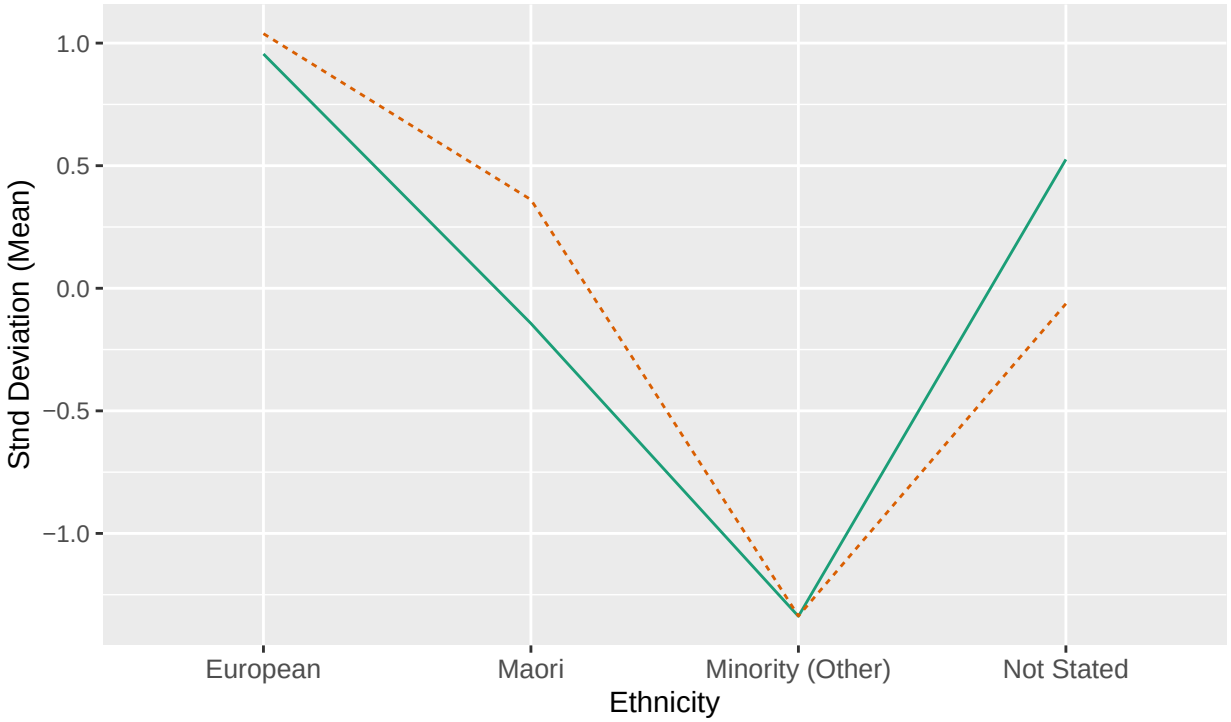
Distribution Analysis with Standard Deviation

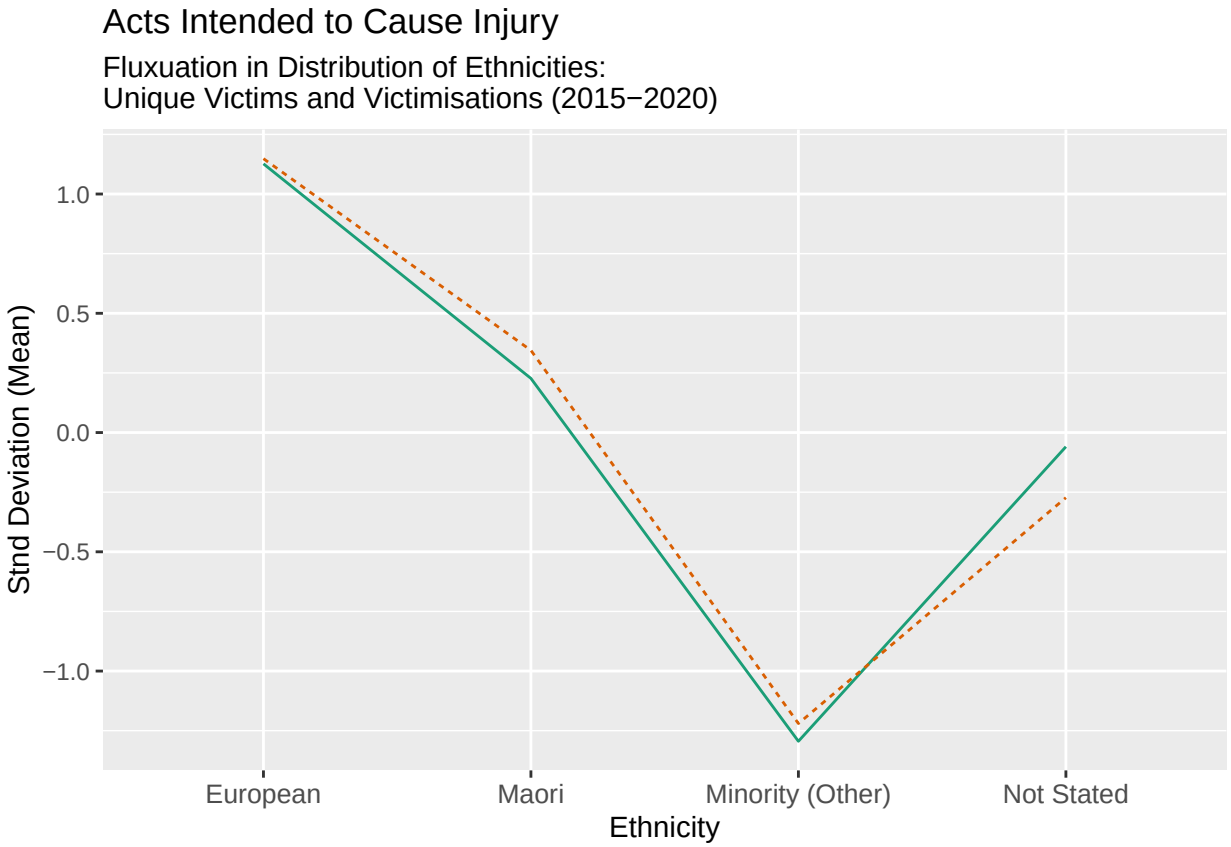
```
distribution_names <- colnames(aggregate_uv[1,
    ])

distribution_names <- distribution_names[-1]


# Comparing Distributions
set.seed(1234)
for (n in 1:length(distribution_names)) {
    name <- distribution_names[n]

    uv_vals <- aggregate_uv[, grepl(name,
        names(aggregate_uv))]
    v_vals <- aggregate_victimisation[, grepl(name,
        names(aggregate_uv))]

    uv_group <- data.frame(x = aggregate_uv$Ethnicity,
        y = uv_vals)
    uv_group$group = c(0, 0, 0, 0)
```

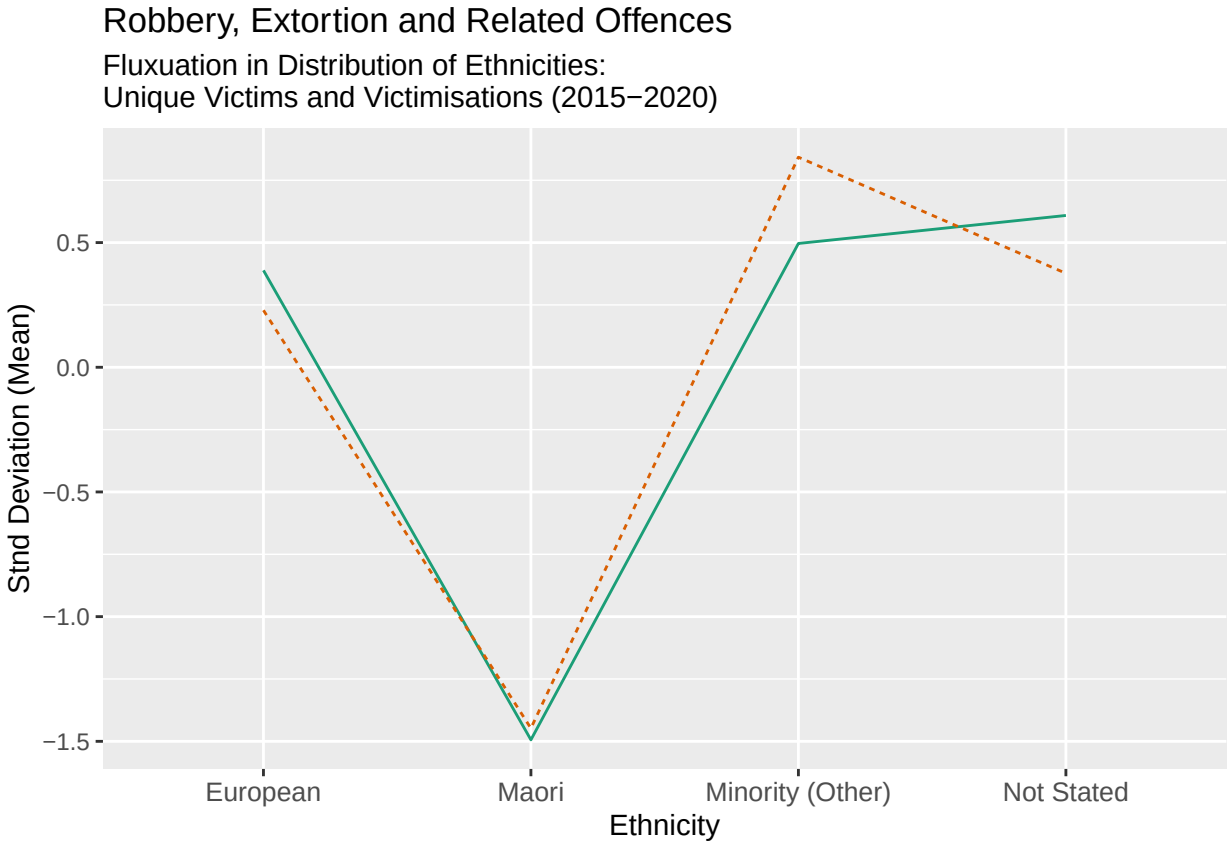
```
    uv_group <- uv_group %>% mutate_at(c("y"),
        ~(scale(.) %>% as.vector))

    v_group <- data.frame(x = aggregate_victimisation$Ethnicity,
        y = v_vals)
    v_group$group = c(1, 1, 1, 1)
    v_group <- v_group %>% mutate_at(c("y"),
        ~(scale(.) %>% as.vector))

    # Merge dataframes
    distribution_analysis <- merge(uv_group,
        v_group, by.x = "x", by.y = "x")

    # Pivot data
    distribution_analysis_copy <- distribution_analysis %>%
        select(x, y.x, y.y) %>% pivot_longer(cols = c(y.x,
        y.y), names_to = "variable", values_to = "value")
    # print(distribution_analysis_copy)

    # Plot
    p <- ggplot(distribution_analysis_copy,
        aes(x = x, y = value, group = variable)) +
        geom_line(aes(color = variable, linetype = variable)) +
        scale_color_brewer(palette = "Dark2") +
        theme(axis.text.x = element_text(angle = 0,
            size = 10), legend.position = "none") +
        labs(title = name, subtitle = "Fluxuation in Distribution of Ethnicities: \nUnique Victims and
            fill = name) + xlab("Ethnicity") +
        ylab("Stnd Deviation (Mean)")
    show(p)
}
```

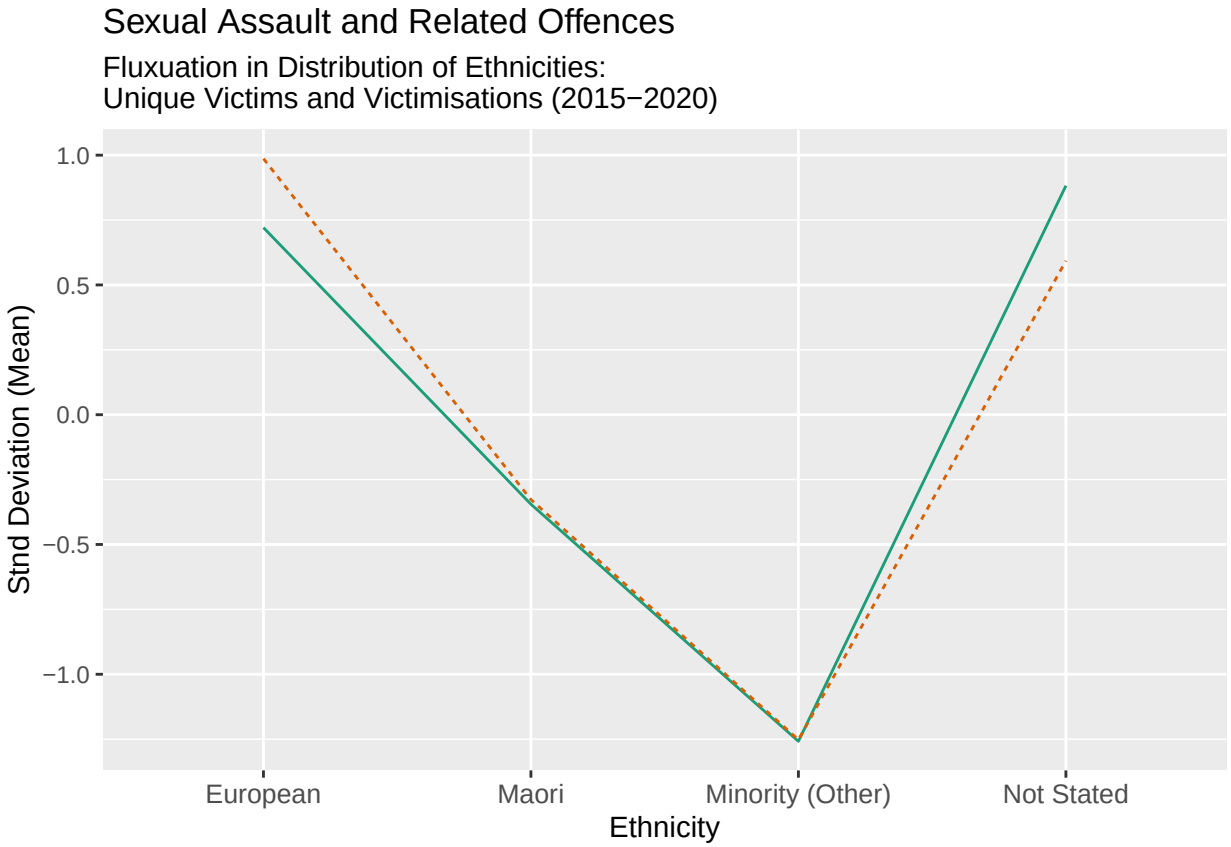
Abduction

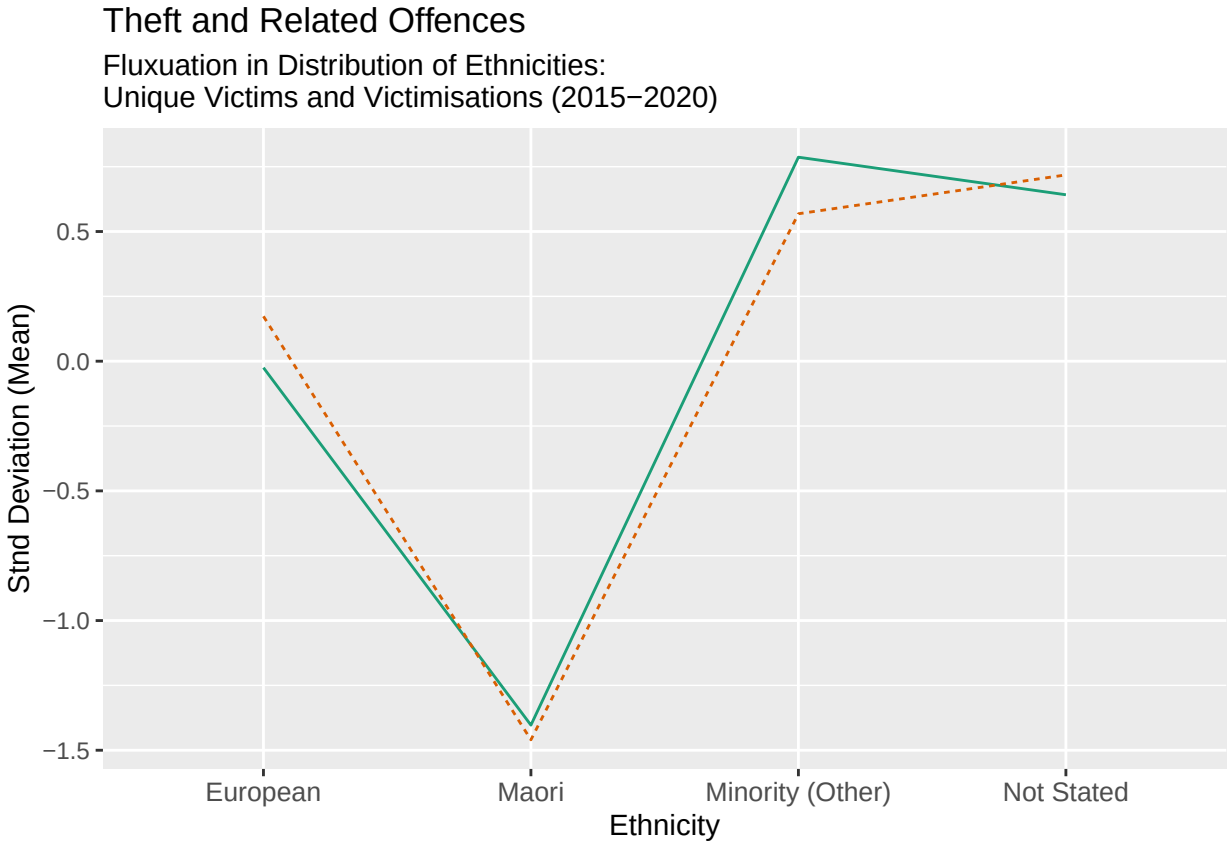
Fluxuation in Distribution of Ethnicities:
Unique Victims and Victimisations (2015−2020)

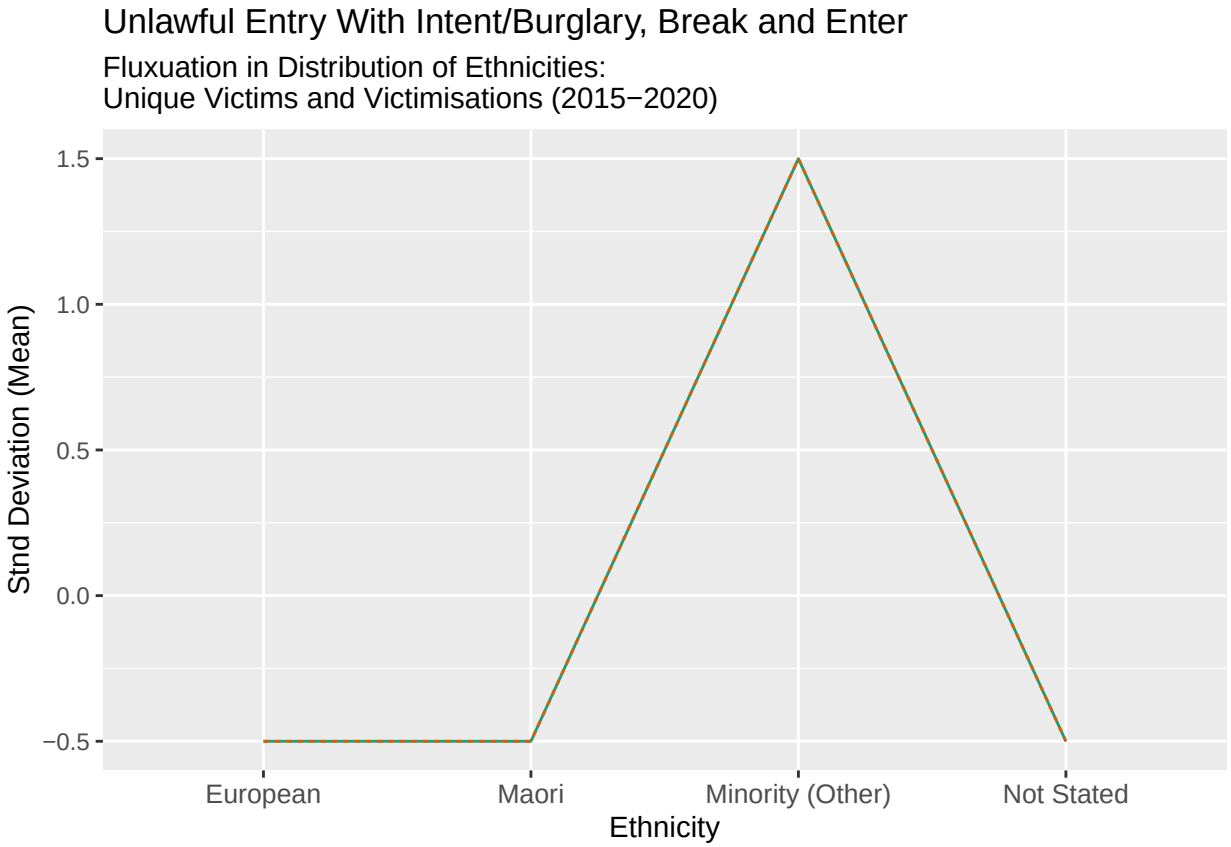



Acts Intended to Cause Injury
Fluxuation in Distribution of Ethnicities:
Unique Victims and Victimisations (2015−2020)
Stnd Deviation (Mean)
1.0
0.5
0.0
−0.5
−1.0
European
Maori
Minority (Other)
Not Stated
Ethnicity


Robbery, Extortion and Related Offences
Fluxuation in Distribution of Ethnicities:
Unique Victims and Victimisations (2015−2020)
Stnd Deviation (Mean)
0.5
0.0
−0.5
−1.0
−1.5
European
Maori
Minority (Other)
Not Stated
Ethnicity


Sexual Assault and Related Offences
Fluxuation in Distribution of Ethnicities:
Unique Victims and Victimisations (2015−2020)
Stnd Deviation (Mean)
1.0
0.5
0.0
−0.5
−1.0
European
Maori
Minority (Other)
Not Stated
Ethnicity


Theft and Related Offences
Fluxuation in Distribution of Ethnicities:
Unique Victims and Victimisations (2015−2020)
Stnd Deviation (Mean)
0.5
0.0
−0.5
−1.0
−1.5
European
Maori
Minority (Other)
Not Stated
Ethnicity


Unlawful Entry With Intent/Burglary, Break and Enter
Fluxuation in Distribution of Ethnicities:
Unique Victims and Victimisations (2015−2020)
Stnd Deviation (Mean)
1.5
1.0
0.5
0.0
−0.5
European
Maori
Minority (Other)
Not Stated
Ethnicity