

R Notebook

Exploring the grades column.

```
suppressPackageStartupMessages(library(tidyverse))
suppressPackageStartupMessages(library(rprojroot))
```

```
source(file.path(rprojroot::find_root(rprojroot::is_rstudio_project),
  "analyses", "team2", "preprocess", "ec_functions.R"))
```

In this notebook I'm only going to examine data that are present in the `offenses_dispositions` data file.

```
dispositions <- read_csv(file.path(find_root(is_rstudio_project), "data",
  "offenses_dispositions_v3_periods.csv"),
  col_types = cols(
    X1 = col_double(),
    docket_id = col_double(),
    description = col_character(),
    statute_description = col_character(),
    statute_name = col_character(),
    sequence_number = col_double(),
    grade = col_character(),
    disposition = col_character(),
    disposing_authority__first_name = col_character(),
    disposing_authority__middle_name = col_character(),
    disposing_authority__last_name = col_character(),
    disposing_authority__title = col_character(),
    disposing_authority__document_name = col_character(),
    disposition_method = col_character(),
    min_period = col_character(),
    max_period = col_character(),
    period = col_character(),
    credit = col_double(),
    sentence_type = col_factor(levels = c("No Further Penalty",
      "Merged",
      "Probation",
      "IPP",
      "Confinement")),
    min_period_parsed = col_character(),
    max_period_parsed = col_character(),
    min_period_days = col_double(),
    max_period_days = col_double()
  ))
```

I began the analysis by limiting the data to sentencing by judges who are currently serving in Philadelphia County. The list of active judges was pulled from Ballotpedia ([https://ballotpedia.org/Philadelphia_County,_Pennsylvania_\(Judicial\)](https://ballotpedia.org/Philadelphia_County,_Pennsylvania_(Judicial))).

```
#only filter for 'Denis Cohen'
#there are two Powells
```

```
current_judges_last <- 'Anders
Anhalt
Brandeis-Roman
Bright
Brinkley
Bronson
Butchart
Campbell
Carpenter
Cianfrani
Clemons
Cohen
Coleman
Colins
Covington
Coyle
Cunningham
DeFino-Nastasi
DiClaudio
Djerassi
Dumas
Ehrlich
Erdos
Frazier-Clemons
Geroff
Kane
New
O\'Keefe
Olszewski
Padova
Palumbo
Patrick
Pechkurow
Perez
Powell
Powell
Rebstock
Robbins
Sawyer
Schulman
Schultz
Scott
Shaffer
Shirdan-Harris
Shreeves-Johns
Street
Tereshko
Tsai
Tucker
Woelpper
Woods-Skipper
Wright
Wright Padilla'
```

```
current_judges_first <- 'Daniel  
Diana  
Tracy  
Gwendolyn  
Genece  
Glenn  
Ann  
Giovanni  
Linda  
Deborah  
Lucretia  
Denis  
Robert  
Mary  
Roxanne  
Anne Marie  
Charles  
Rose  
Scott  
Ramy  
Lori  
Charles  
Michael  
Brenda  
Steven  
Harold  
Shelley  
J.  
Walter  
John  
Frank  
Paula  
Doris  
Mia  
Kenneth  
Crystal  
Robert  
Harvey  
Stephanie  
Susan  
Jennifer  
Kai  
Zac  
Lisette  
Karen  
Sierra  
Allan  
Stella  
Leon  
Donna  
Sheila  
Edward  
Nina'
```

```
last_names <- str_split(current_judges_last, pattern='\n')[[1]]
first_names <- str_split(current_judges_first, pattern='\n')[[1]]
current_judges <- data.frame(x=last_names, y=first_names)
#Denis Cohen
```

After creating a list of active judges, I grouped the data by judge.

```
by_judge <- dispositions %>%
  filter(!is.na(disposing_authority__first_name)) %>%
  filter(!is.na(disposing_authority__last_name)) %>%
  filter(disposing_authority__last_name %in% as_vector(current_judges['x'])) %>%
  filter(disposing_authority__first_name %in% as_vector(current_judges['y'])) %>%
  group_by(disposing_authority__last_name, disposing_authority__first_name)
```

To compare sentencing patterns among judges currently serving, I looked at top five most common crimes for which the judges have issued sentencing. The top five most common were 1. possession with intent to deliver/manufacture, 2. aggravated assault, 3. conspiracy to manufacture, deliver or possess with intent to manufacture or deliver, 4. simple assault, 5. firearms not to be carried without a license.

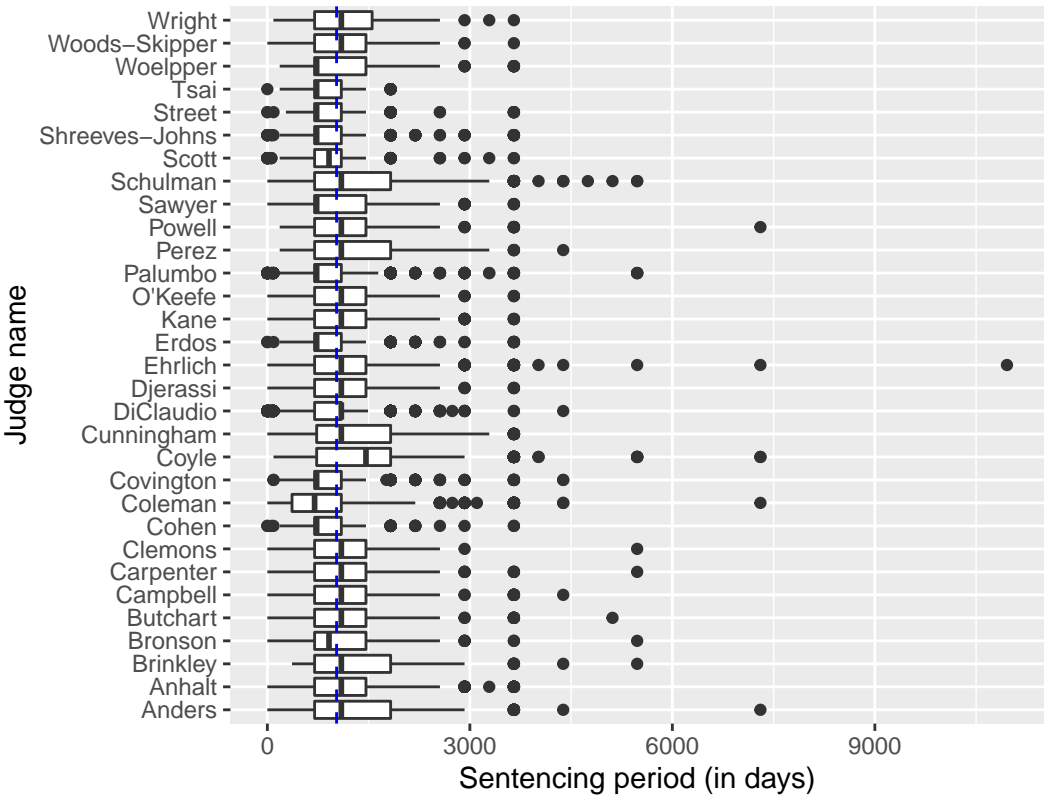
The boxplots serve as a visualisation of sentencing differences among judges. (Judges who have issued fewer than 100 rulings were removed from the boxplot.) The boxplots showed that Judge Coyle issued longer than average sentences for all five common charges. Judges Bronson, Cunningham, Ehrlich and O'Keefe also gave defendants longer than average sentences for the two charges of firearms not to be carried without license.

```
by_count_5 <- by_judge %>%
  filter(!is.na(max_period_days)) %>%
  group_by(description) %>%
  summarise(count=n()) %>%
  slice_max(order_by = count, n = 5)

most_common <- by_count_5$description

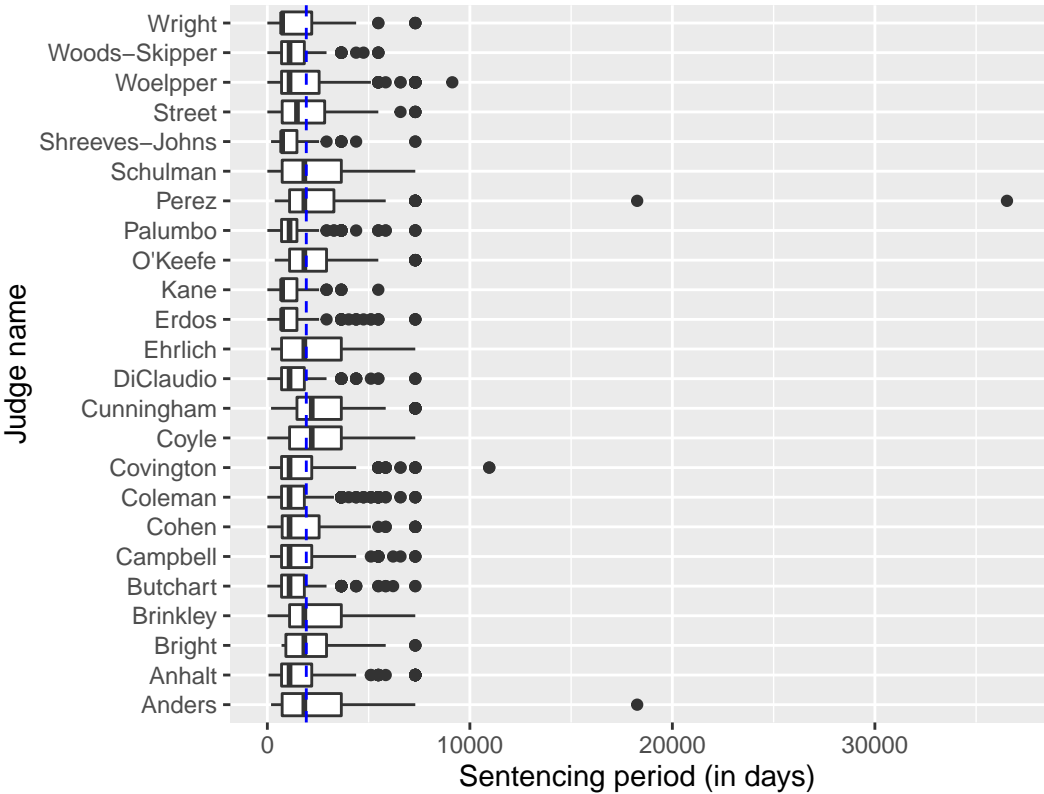
for (crime in most_common) {
  #aggregate further by offence for judges who issued > 100 sentences for given offence
  sentencing <- by_judge %>%
    filter(description == crime) %>%
    filter(!is.na(max_period_days)) %>%
    filter(n() > 100)
  print(ggplot(sentencing, aes(x = disposing_authority__last_name,
                              y = max_period_days)) + geom_boxplot() + geom_hline(aes(yintercept=mean(
    #file_name = sprintf('%s.png', substr(crime, 1, 10))
    #ggsave(file_name)
  )
}
```

Sentencing for manufacture, delivery, or possession with intent



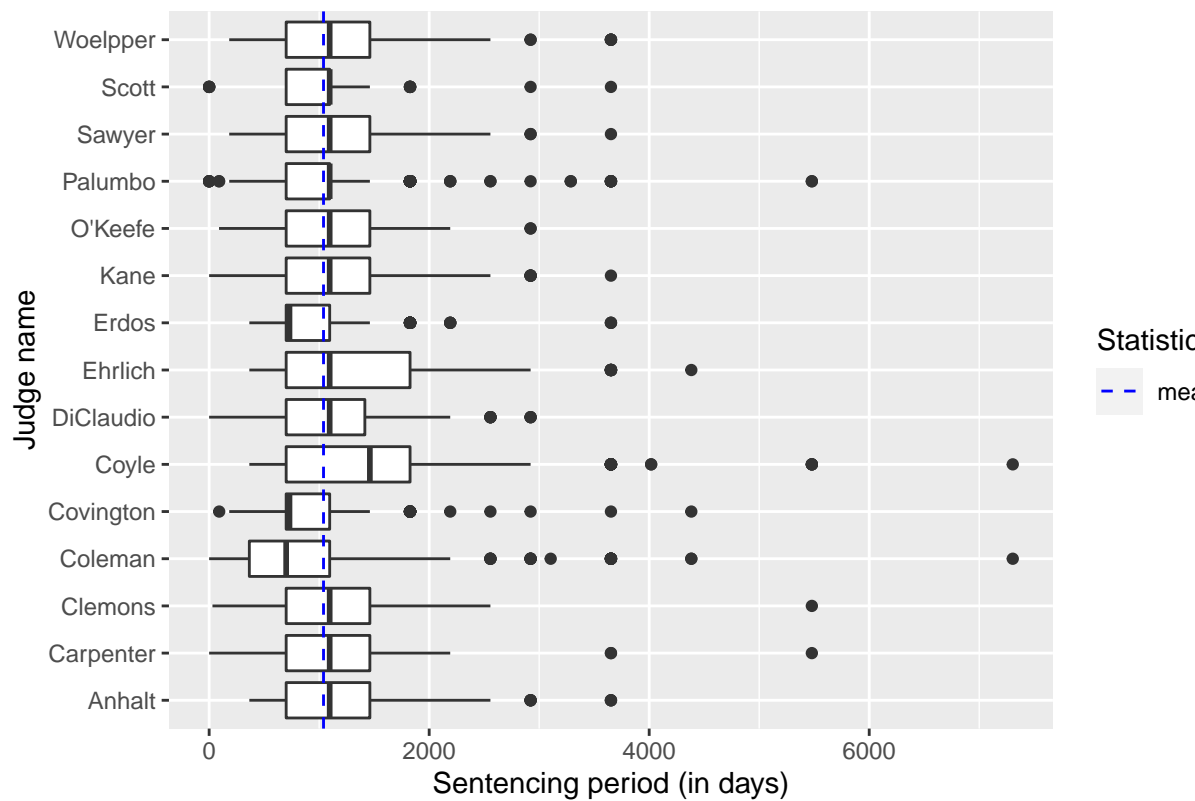
common crimes-1.pdf

Sentencing for aggravated assault



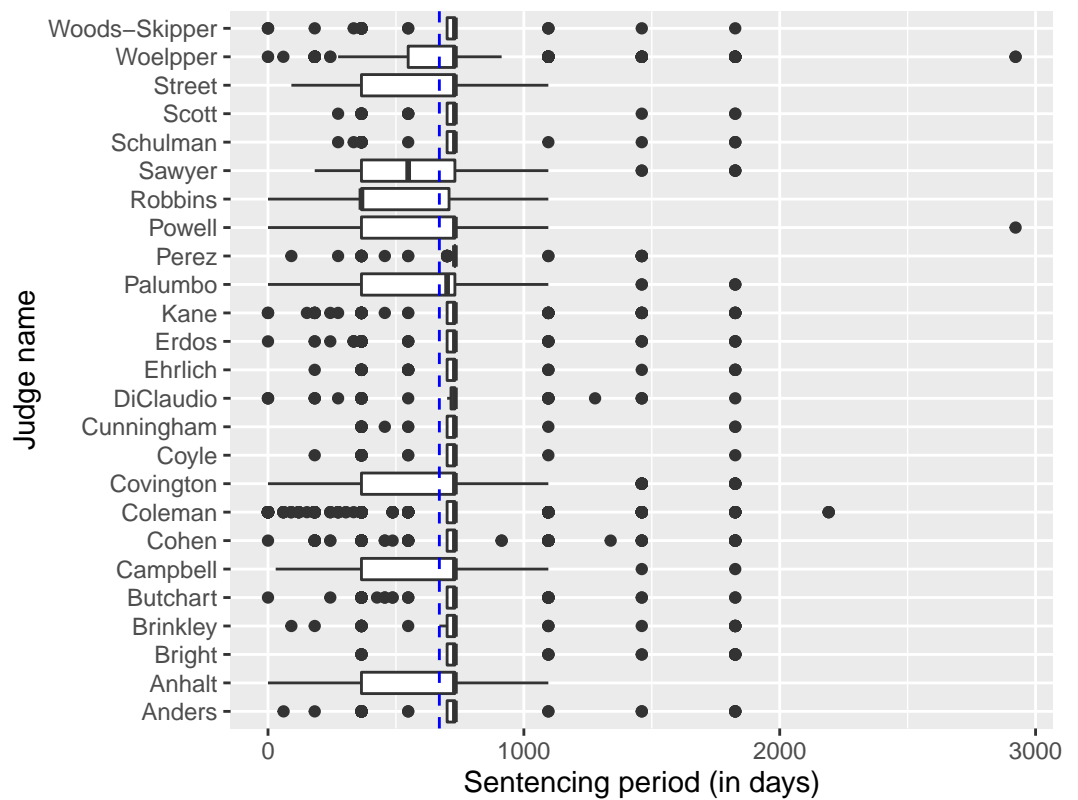
common crimes-2.pdf

Sentencing for conspiracy – manufacture, delivery, or possession w



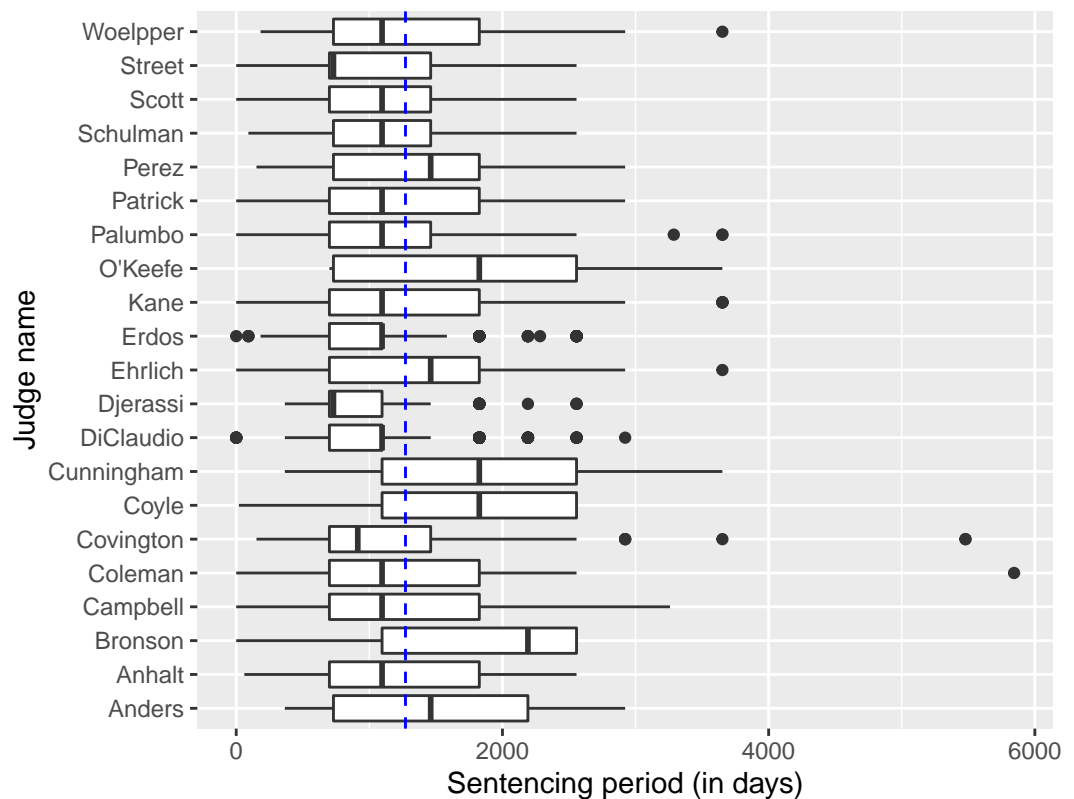
common crimes-3.pdf

Sentencing for simple assault



common crimes-4.pdf

Sentencing for firearms not to be carried w/o license



common crimes-5.pdf

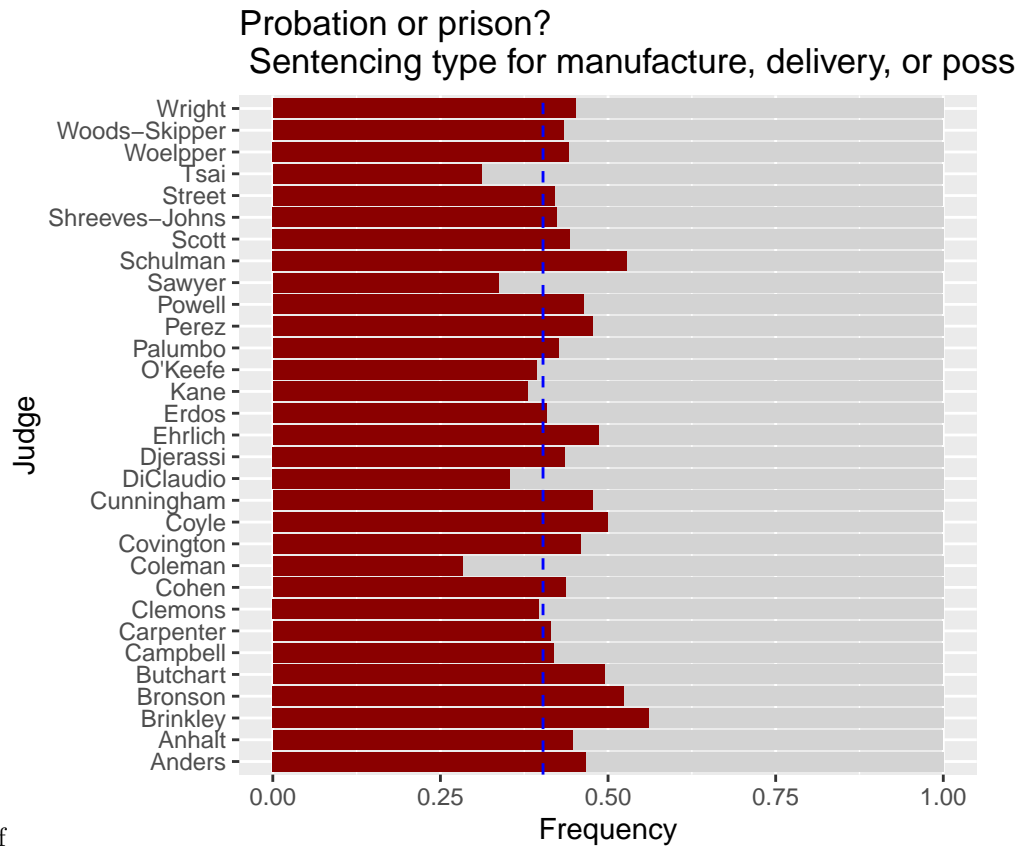
However, the duration of sentencing alone does not provide a complete picture. We can also examine another measure of sentencing harshness by looking at which judges are more likely to give prison sentences to the defendants. While Judge Coyle is among judges more likely to sentence defendants to prison rather than probation, we also observe multiple judges above the average.

```
for (crime in most_common) {
  probation_or_confinement <- by_judge %>%
    filter(description == crime) %>%
    filter(sentence_type %in% c('Confinement', 'Probation')) %>%
    filter(n() > 100) %>%
    group_by(disposing_authority__last_name, sentence_type) %>%
    summarise(count=n())

  print(ggplot(probation_or_confinement, aes(fill=sentence_type, y=count, x=disposing_authority__last_name))
    coord_flip())
}
```

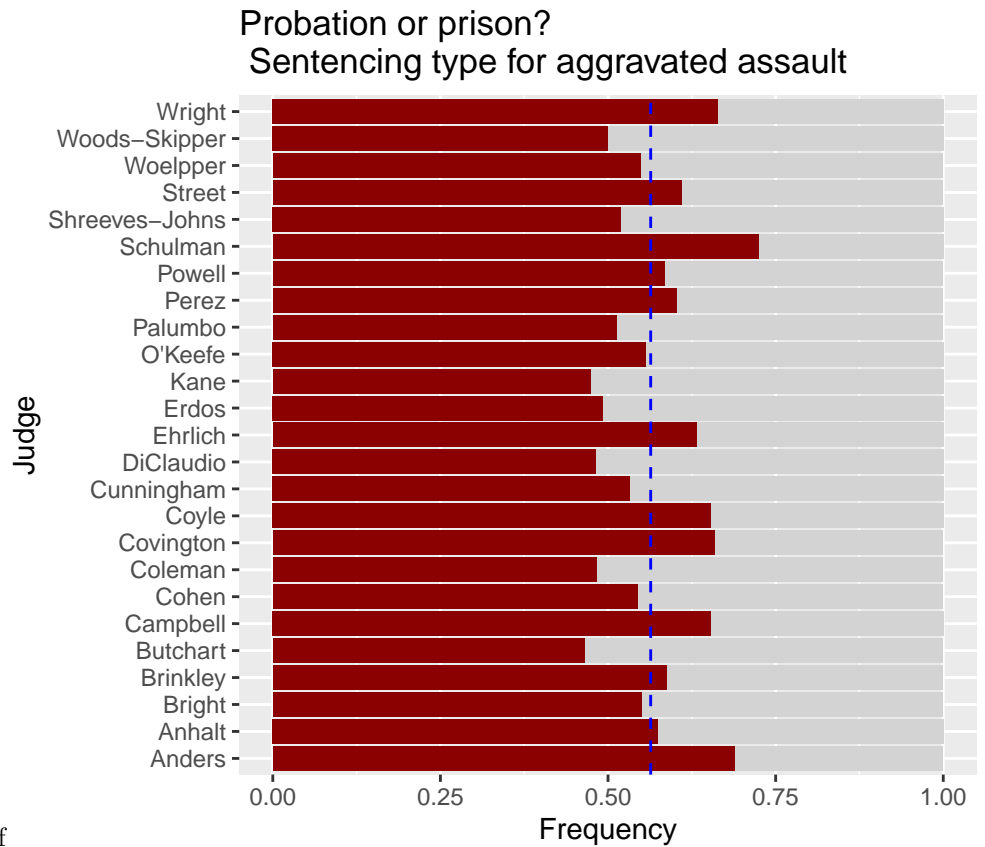
`summarise()` has grouped output by 'disposing_authority__last_name'. You can override using the `.groups` argument.

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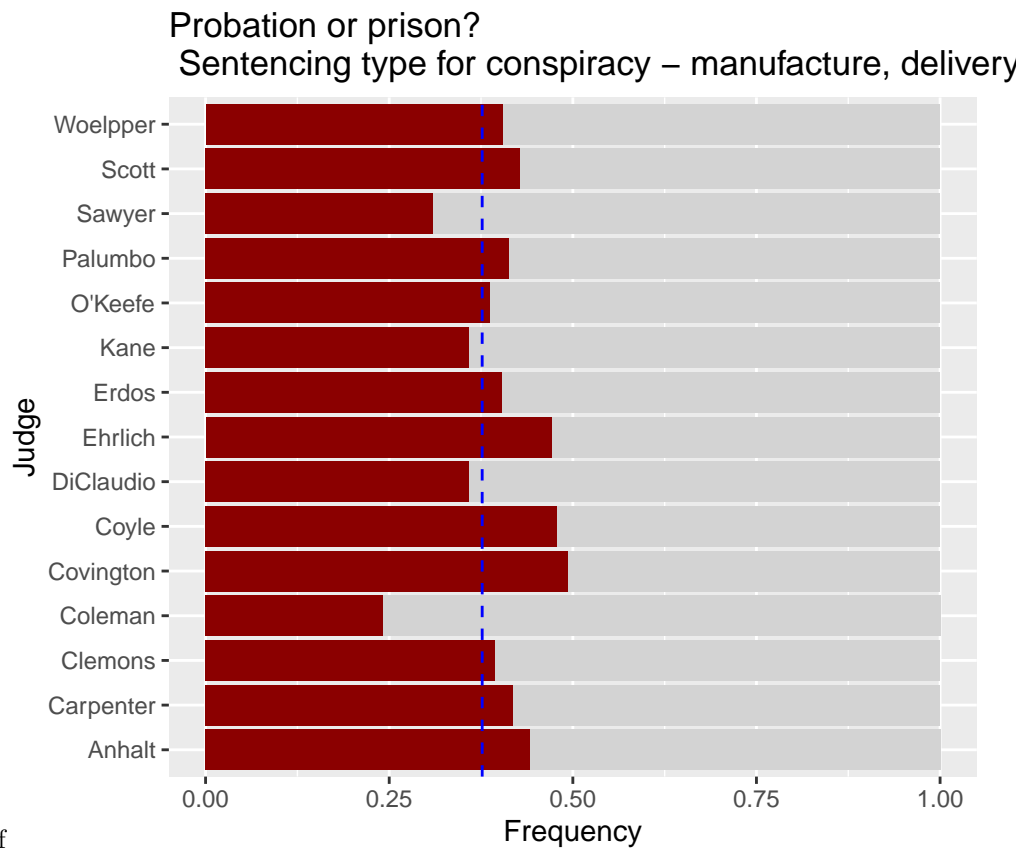
stacked barplot for top 5 offenses-1.pdf

`summarise()` has grouped output by 'disposing_authority__last_name'. You can override using the `.g



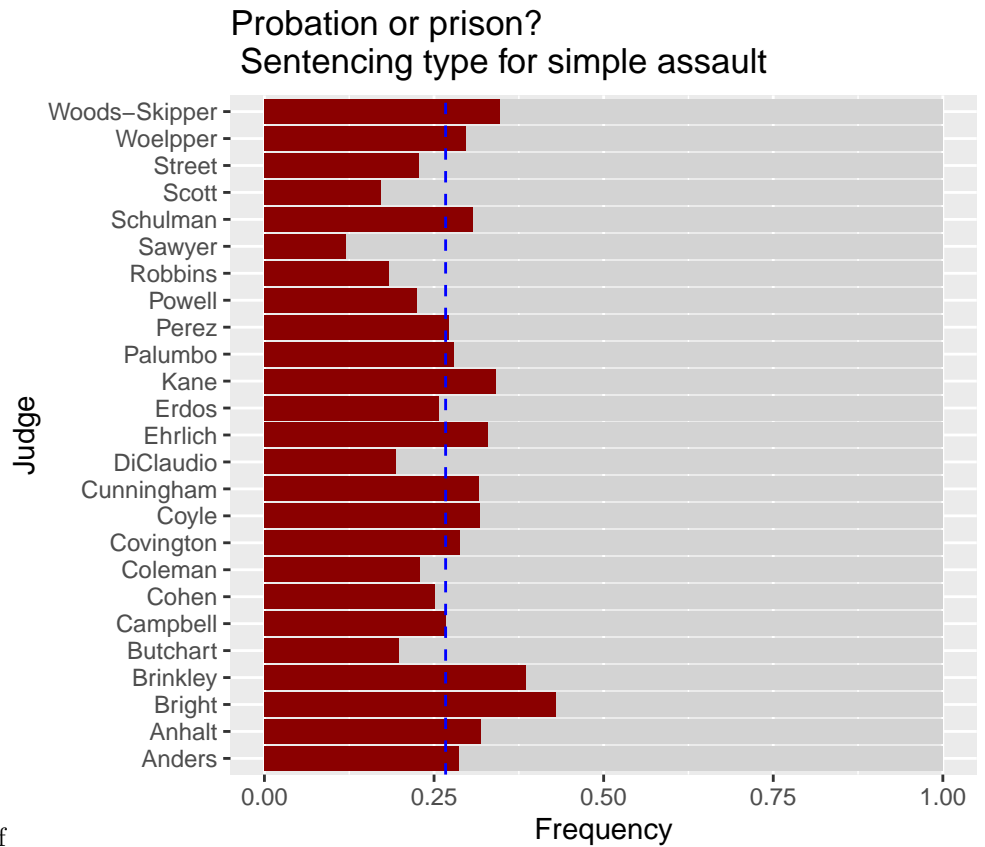
stacked barplot for top 5 offenses-2.pdf

``summarise()`` has grouped output by 'disposing_authority__last_name'. You can override using the ``.g`

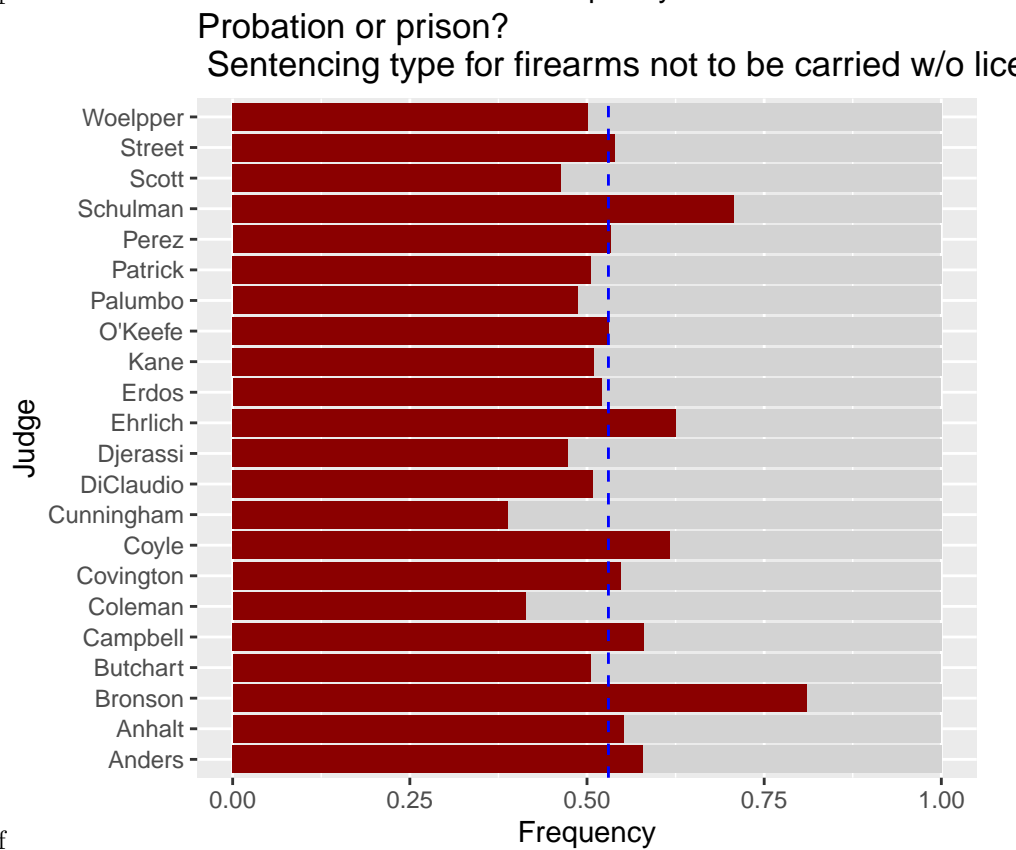


stacked barplot for top 5 offenses-3.pdf

``summarise()`` has grouped output by 'disposing_authority__last_name'. You can override using the ```.g`



stacked barplot for top 5 offenses-4.pdf



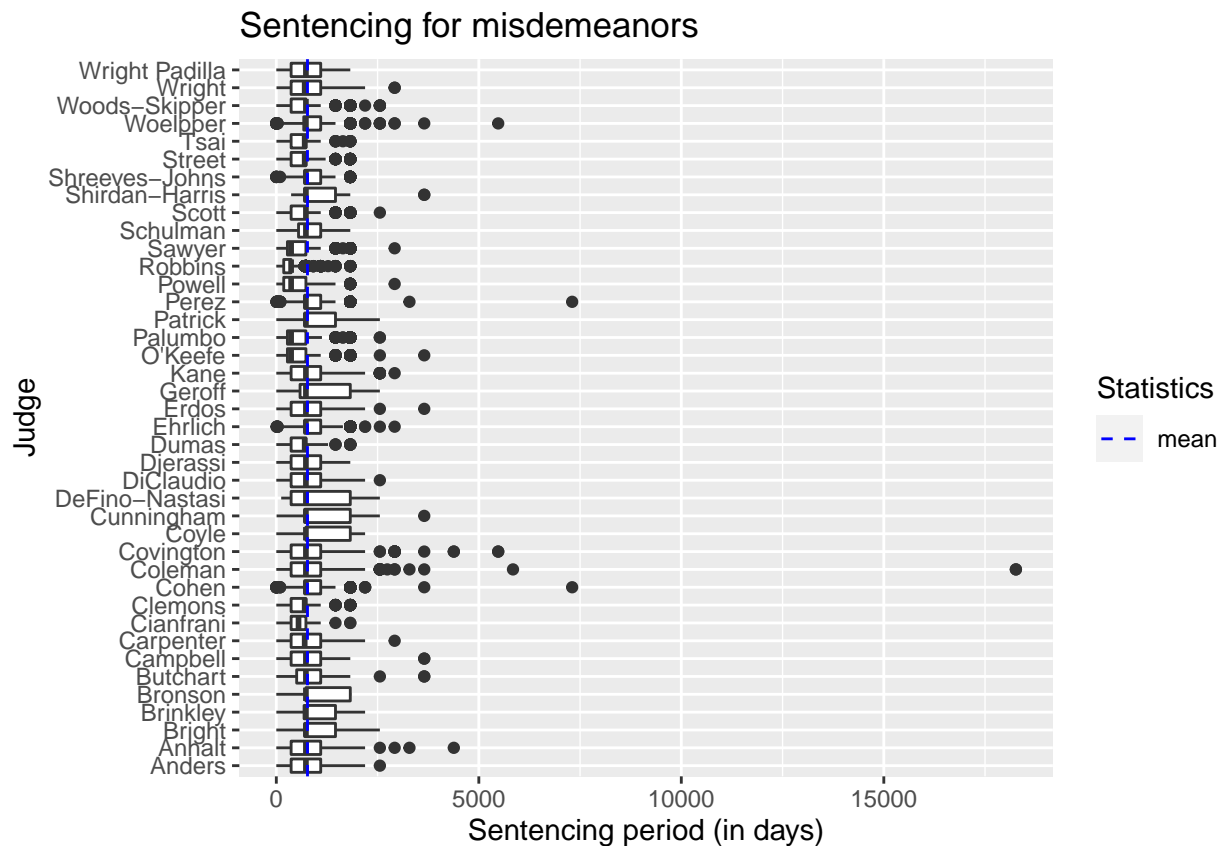
stacked barplot for top 5 offenses-5.pdf

The following boxplots shows sentencing patterns for misdemeanors. While there was no significant differences in the mean sentencing period, judges Powell, Robbins and Sawyer appeared to be the most lenient. On the other hand, Judges Coyle, Cunningham and DeFino-Nastasi showed a tendency to issue longer sentences.

#only count judges with more than 100 sentences for misdemeanor charges

```
misdemeanors <- c('M', 'M1', 'M2', 'M3')
by_judge_misdemeanor <- by_judge %>%
  filter(grade %in% misdemeanors) %>%
  filter(!is.na(max_period_days)) %>%
  filter(n() > 100)
```

```
ggplot(by_judge_misdemeanor, aes(x = disposing_authority__last_name, y=max_period_days)) + geom_boxplot
```



```
#ggsave('misdemeanors.png')
```

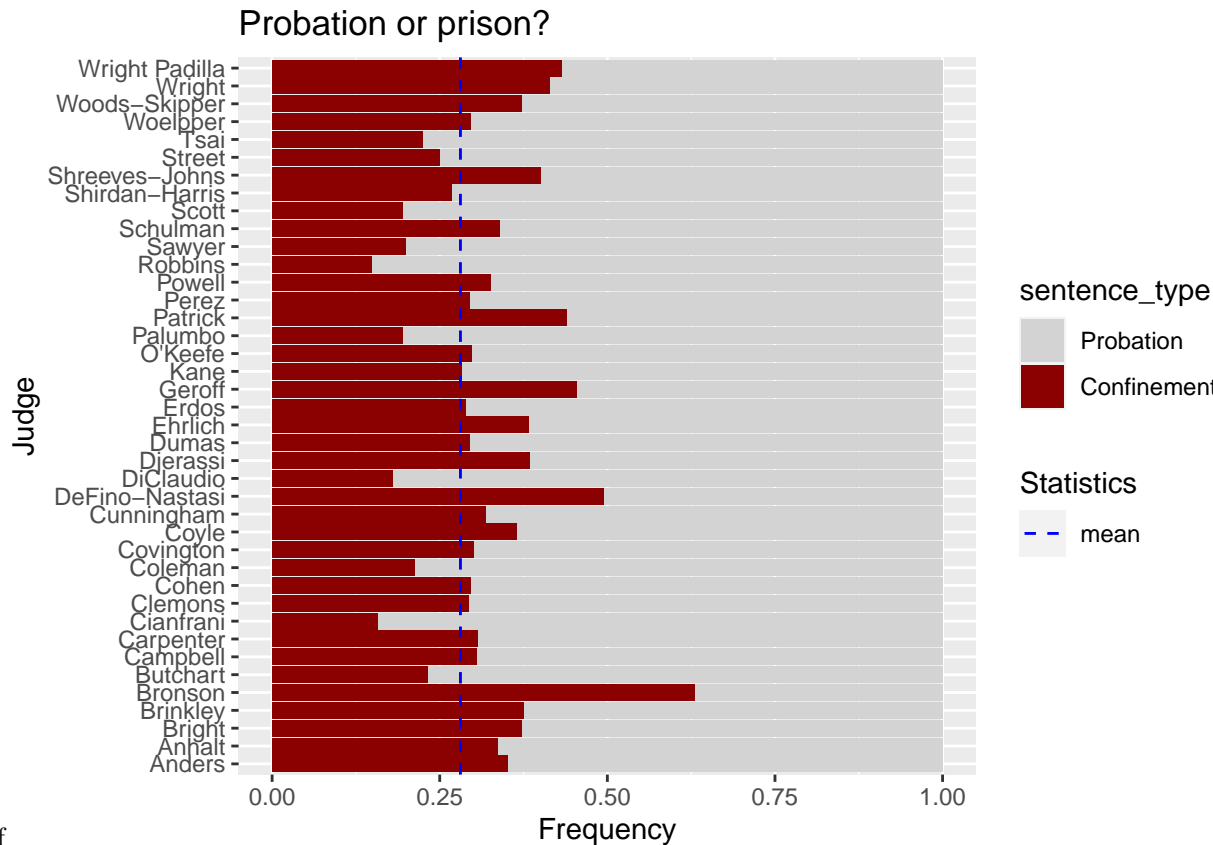
We again see which judges are more likely to sentence defendants to prison for misdemeanors. We again see similar patterns, with Judge Bronson sentencing defendants to prison far more often than other judges.

#for types of sentencing

```
probation_or_confinement_misdemeanor <- by_judge_misdemeanor %>%
  filter(sentence_type %in% c('Probation', 'Confinement')) %>%
  group_by(disposing_authority__last_name, sentence_type) %>%
  summarise(count=n())
```

`summarise()` has grouped output by 'disposing_authority__last_name'. You can override using the `.groups` argument.

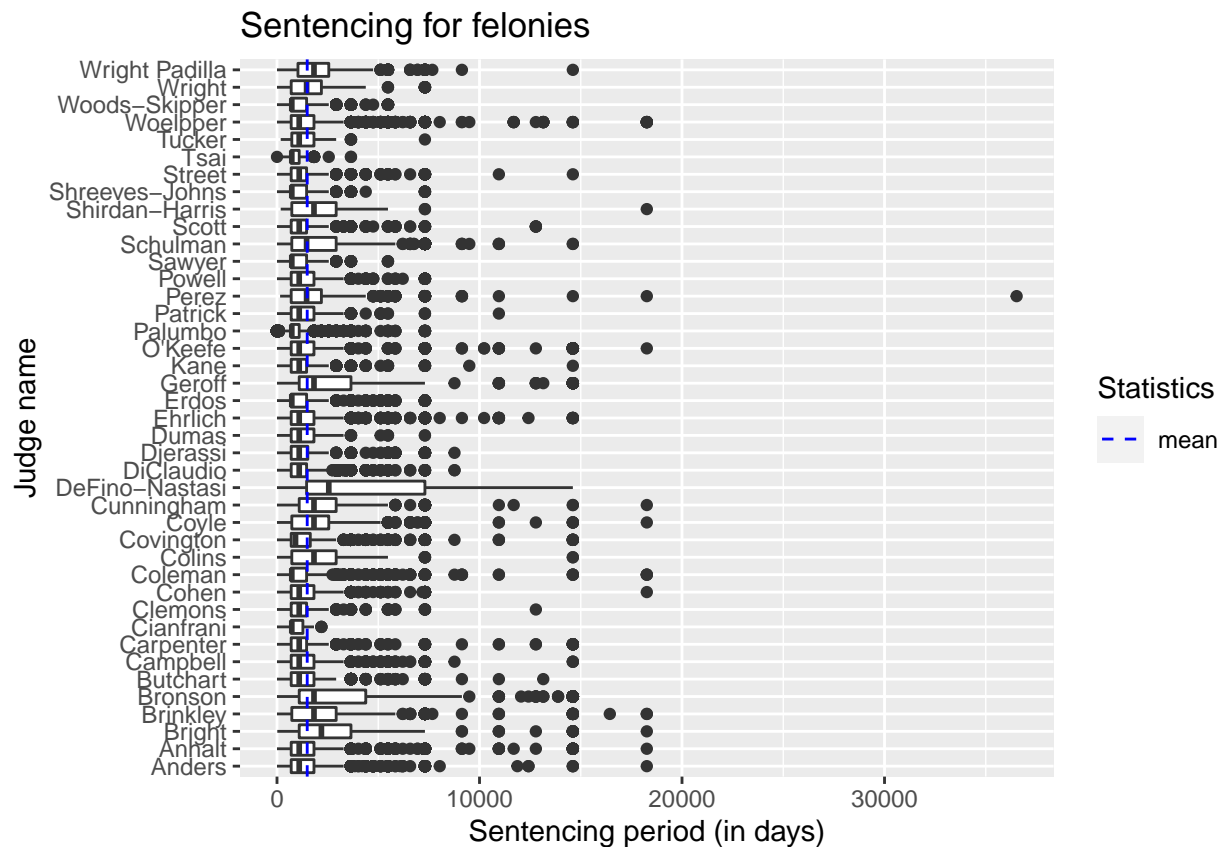
```
ggplot(probation_or_confinement_misdemeanor,
  aes(fill=sentence_type, y=count, x=disposing_authority__last_name)) + geom_bar(position="fill",
  coord_flip()
```



or confinement-1.pdf

```
felony_grades <- c('F', 'F1', 'F2', 'F3')
by_judge_felony <- by_judge %>%
  filter(grade %in% felony_grades) %>%
  filter(!is.na(max_period_days)) %>%
  filter(n() > 100)

by_judge_felony %>%
  ggplot(aes(x = disposing_authority__last_name, y=max_period_days)) + geom_boxplot() +
  geom_hline(aes(yintercept=mean(max_period_days), color="mean"), linetype="dashed") + scale_color_manual
```



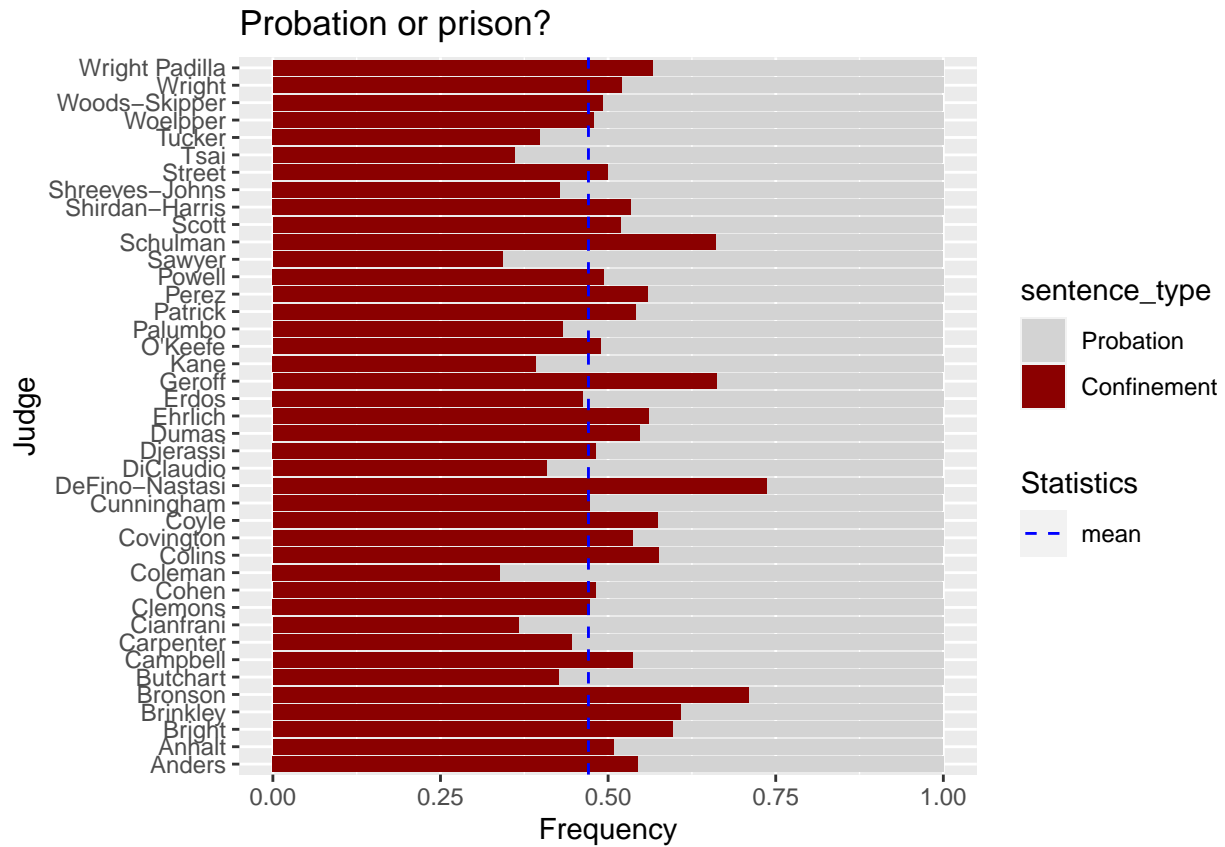
```
#ggsave('felonies.png')
```

The boxplot again shows Judge Coyle issuing longer than average sentencing. Judge DeFino-Nastasi issues the longest sentence on average for felony charges. Other judges issuing longer than average sentencing include judges Bright, Brinkley, Bronson, Cunningham, Geroff, Schulman and Shirdan-Harris.

```
probation_or_confinement_felony <- by_judge_felony %>%
  filter(sentence_type %in% c('Probation', 'Confinement')) %>%
  group_by(disposing_authority__last_name, sentence_type) %>%
  summarise(count=n())
```

`summarise()` has grouped output by 'disposing_authority__last_name'. You can override using the `.`g

```
ggplot(probation_or_confinement_felony,
  aes(fill=sentence_type, y=count, x=disposing_authority__last_name)) + geom_bar(position="fill",
  coord_flip()
```



The analysis shows significant differences in sentencing patterns among judges. In particular, Judge Anne Marie Doyle has shown to issue longer sentencing for multiple charges. Judge Bronson also stood out for his tendency to sentence defendants to prison far more often than the rest.