Twitter: Gender Balance in PhD jury

Answers to a tweet posted on 2020-08-26

Gilles Fischer

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Contents

```
# options(encoding = 'UTF-8')
knitr::opts_chunk$set(
  fig.width = 7, fig.height = 5,
  fig.path = 'figures/',
  fig.align = "center",
  size = "tiny",
  echo = TRUE,
  eval = TRUE,
  warning = FALSE,
  message = FALSE,
  results = TRUE,
  comment = "")


options(scipen = 3) ## Max number of digits for non-scientific notation
```

```
requiredLib <- c(
  "knitr",
  "readxl",
  "dplyr",
  "ggplot2",
  "hrbrthemes")
for (lib in requiredLib) {
  if (!require(lib, character.only = TRUE)) {
    install.packages(lib, )
  }
  require(lib, character.only = TRUE)
}
```

Original tweet

@G___Fischer

Country
Year of PhD defense
Gender
Number of women/men in your jury

This tweet recorded more than 2k answers on 2020-08-29

Dataset

Answers were manually recorded with the kind help of @Zhou_Xu_ into an excel file `PhD_twitter_stat.xlsx`.

```
raw.data <- read_excel("~/Documents/Twitter_gender_balanced/PhD_twitter_stat.xlsx")
kable(head(raw.data, n = 5), caption = "First 5 lines of the excel file")
```

Table 1: First 5 lines of the excel file

country	year	gender	women	men
UK	2010	M	0	2
Ireland	2018	M	0	3
USA	1998	F	1	3
USA	2006	M	2	2
UK	1996	M	2	3

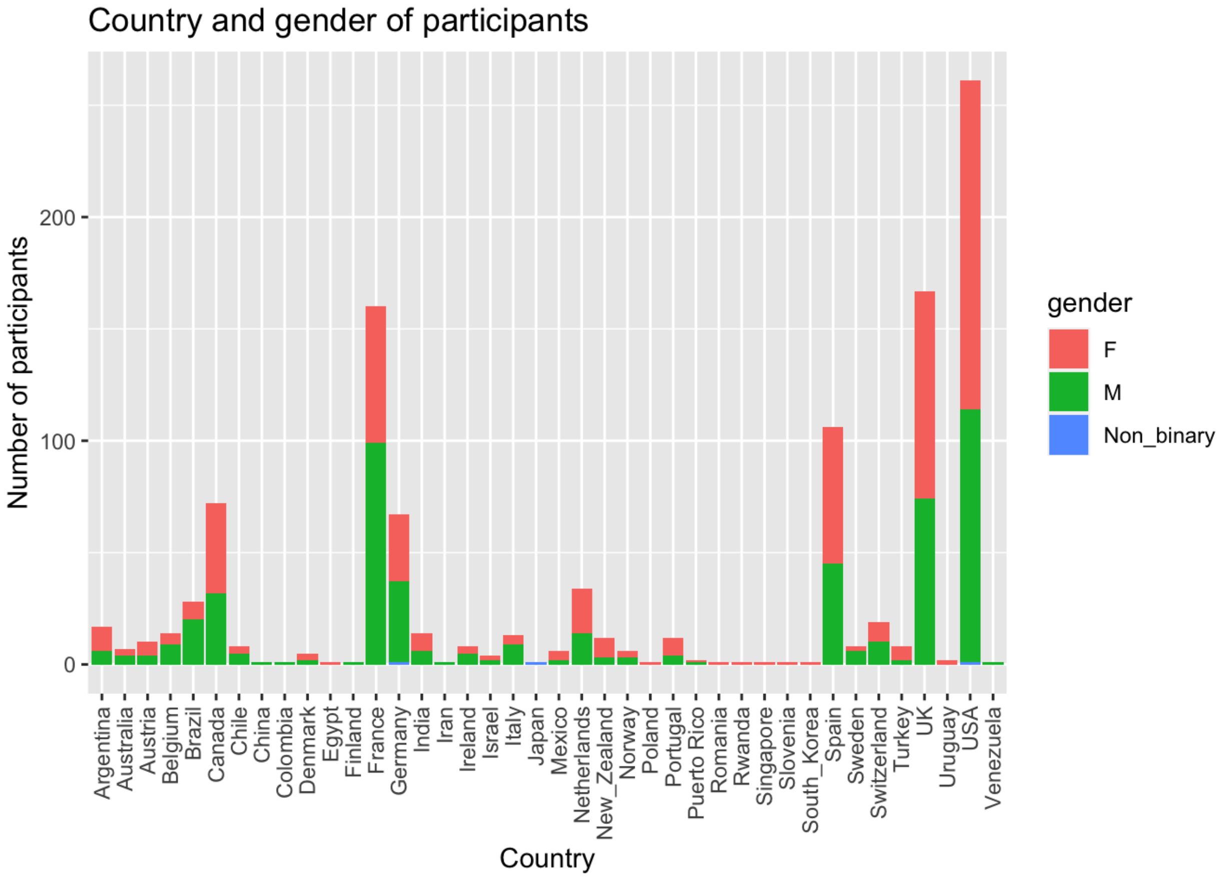
```
# clean manual record errors
raw.data$gender[raw.data$gender=="W"] <- "F"
raw.data$gender[raw.data$gender=="H"] <- "M"
raw.data$country[raw.data$country=="france"] <- "France"

# count by country and gender
country.gender <- raw.data %>% count(country, gender)

# prop female in jury per year
raw.data$prop.w <- 100 * raw.data$women/(raw.data$women + raw.data$men)
prop.year.w <- aggregate(raw.data$prop.w, by = list(raw.data$year), FUN = mean)
prop.year.w.sd <- aggregate(raw.data$prop.w, by = list(raw.data$year), FUN = sd)
names(prop.year.w.sd)[2] <-"sd"
prop.year.w.mean.sd <- cbind(prop.year.w, prop.year.w.sd)
prop.year.w.mean.sd <- prop.year.w.mean.sd[c(1,2,4) ]

# prop female in jury per year and per candidate gender
prop.year.w.F <- aggregate(raw.data$prop.w[raw.data$gender=="F"], by = list(raw.data$year[raw.data$gend
prop.year.w.F$gender <- "F"
colnames(prop.year.w.F) <- c("year", "prop.w", "gender")

prop.year.w.M <- aggregate(raw.data$prop.w[raw.data$gender=="M"], by = list(raw.data$year[raw.data$gend
prop.year.w.M$gender <- "M"
colnames(prop.year.w.M) <- c("year", "prop.w", "gender")

prop.year.w.gender <- rbind(prop.year.w.F, prop.year.w.M)

# subset raw.data for countries with more than 30 answers
t.country <- table(raw.data$country)
```

```
raw.data.country <- subset(raw.data, country %in% names(t.country[t.country > 50]))

prop.year.w.country <- aggregate(raw.data.country$prop.w, by = list(raw.data.country$year, raw.data.cou
colnames(prop.year.w.country) <- c("year", "country", "prop.w")

# total number of jury members
raw.data$members <- raw.data$women + raw.data$men
```

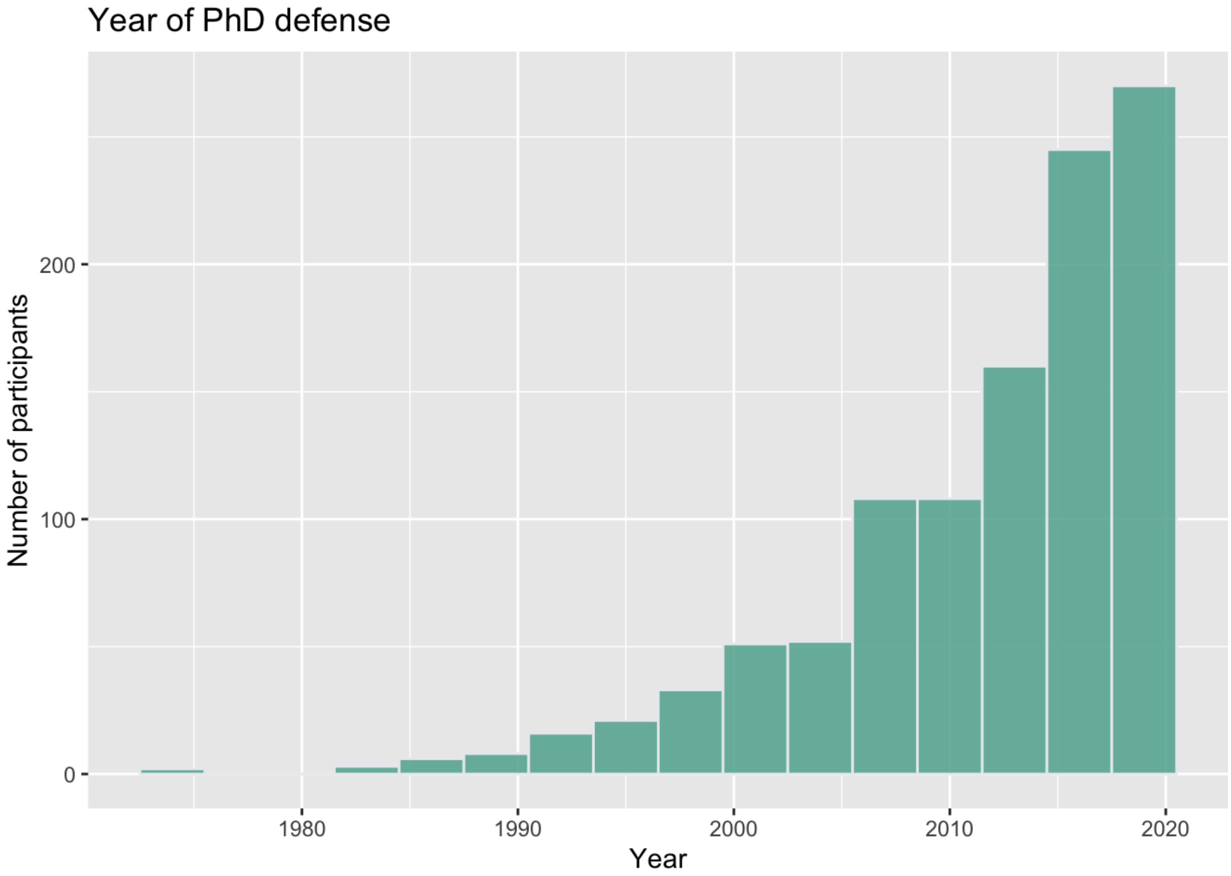
- The total number of recorded participants was 1083 and included 559 women, 521 men and 3 non-binary persons.
- The answers came from 40 different countries.
- PhD were defended between 1974 and 2020.
- The total number of members per jury ranged from 1 to 10.

Plots

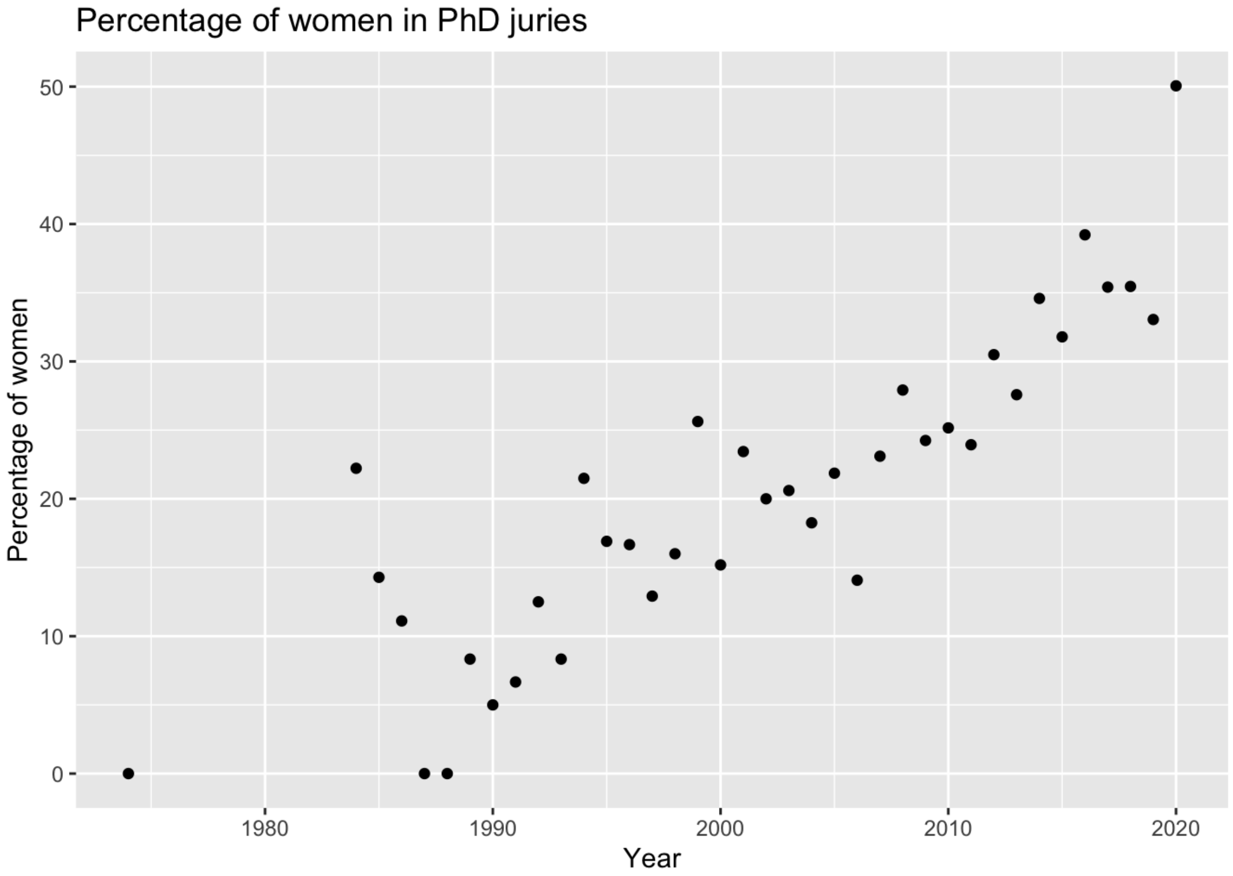
```
# stacked barplot by country and gender
ggplot(country.gender, aes(fill=gender, y=n, x=country)) +
    geom_bar(position="stack", stat="identity") +
  theme(axis.text.x = element_text(angle = 90, vjust = 0.5, hjust=1)) +
  ggtitle("Country and gender of participants") +
  ylab("Number of participants") +
  xlab("Country")
```



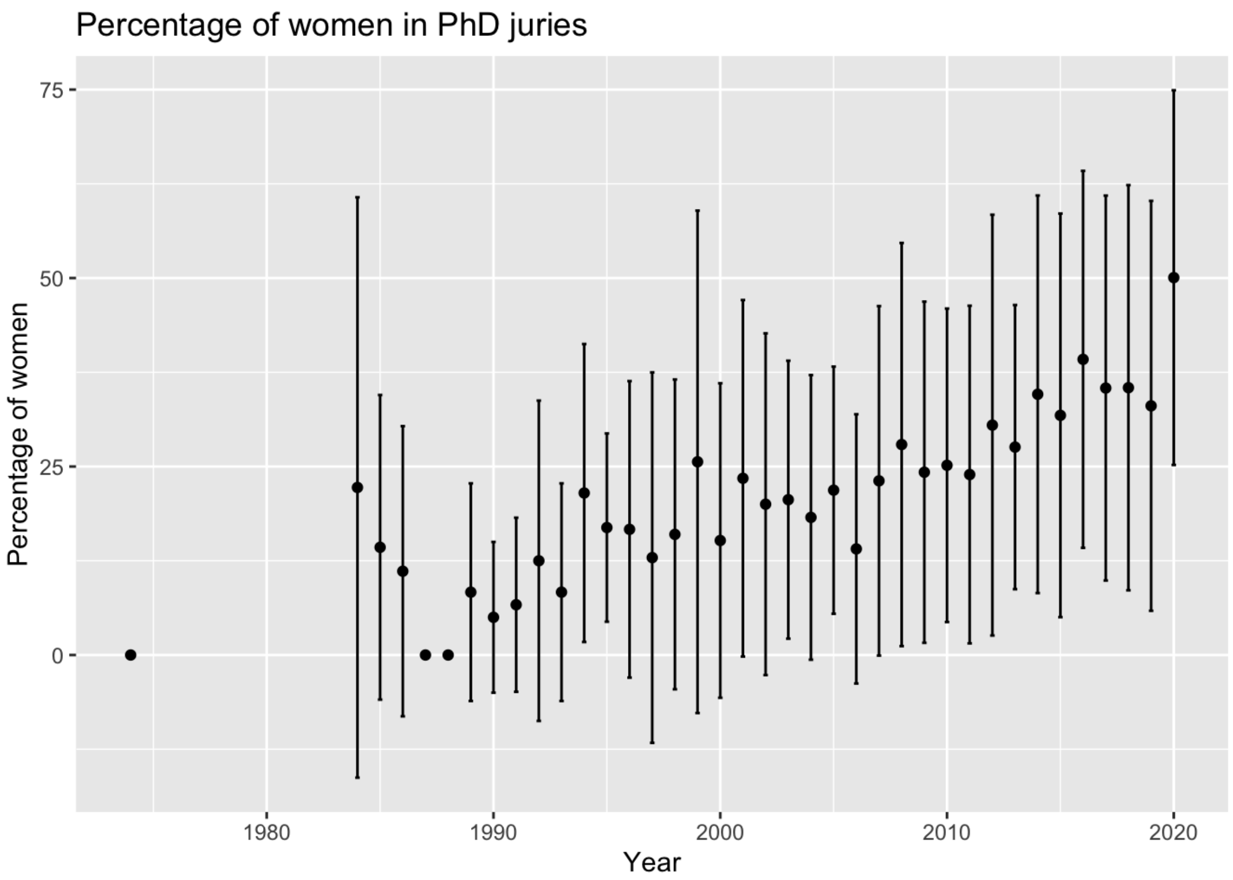
```r
# hist year
ggplot(raw.data, aes(x=year)) +
  geom_histogram(binwidth=3, fill="#69b3a2", color="#e9ecef", alpha=0.9) +
  ggtitle("Year of PhD defense") +
  ylab("Number of participants") +
  xlab("Year")
```



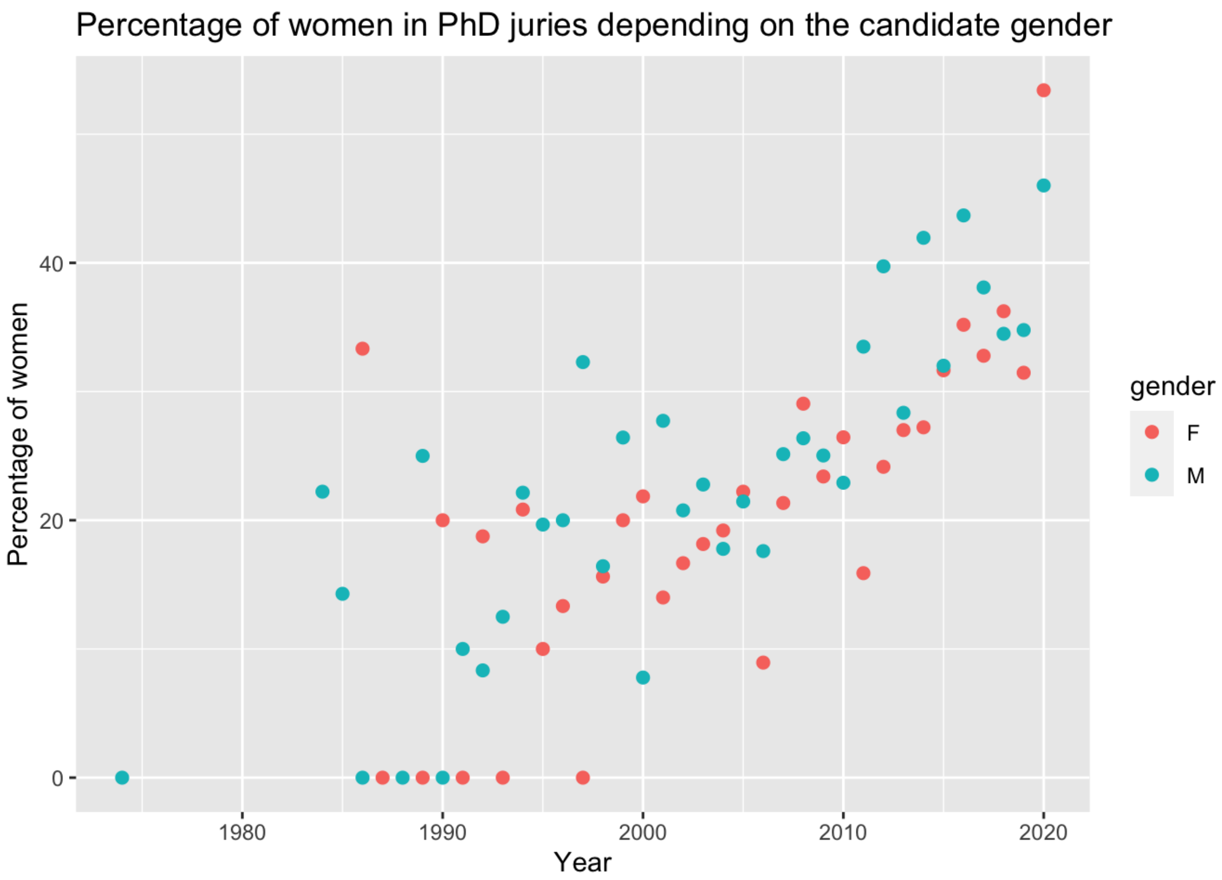
```r
# percentage women in jury
ggplot(prop.year.w, aes(x=Group.1, y=x)) +
  geom_point() +
  ggtitle("Percentage of women in PhD juries") +
  ylab("Percentage of women") +
  xlab("Year")
```



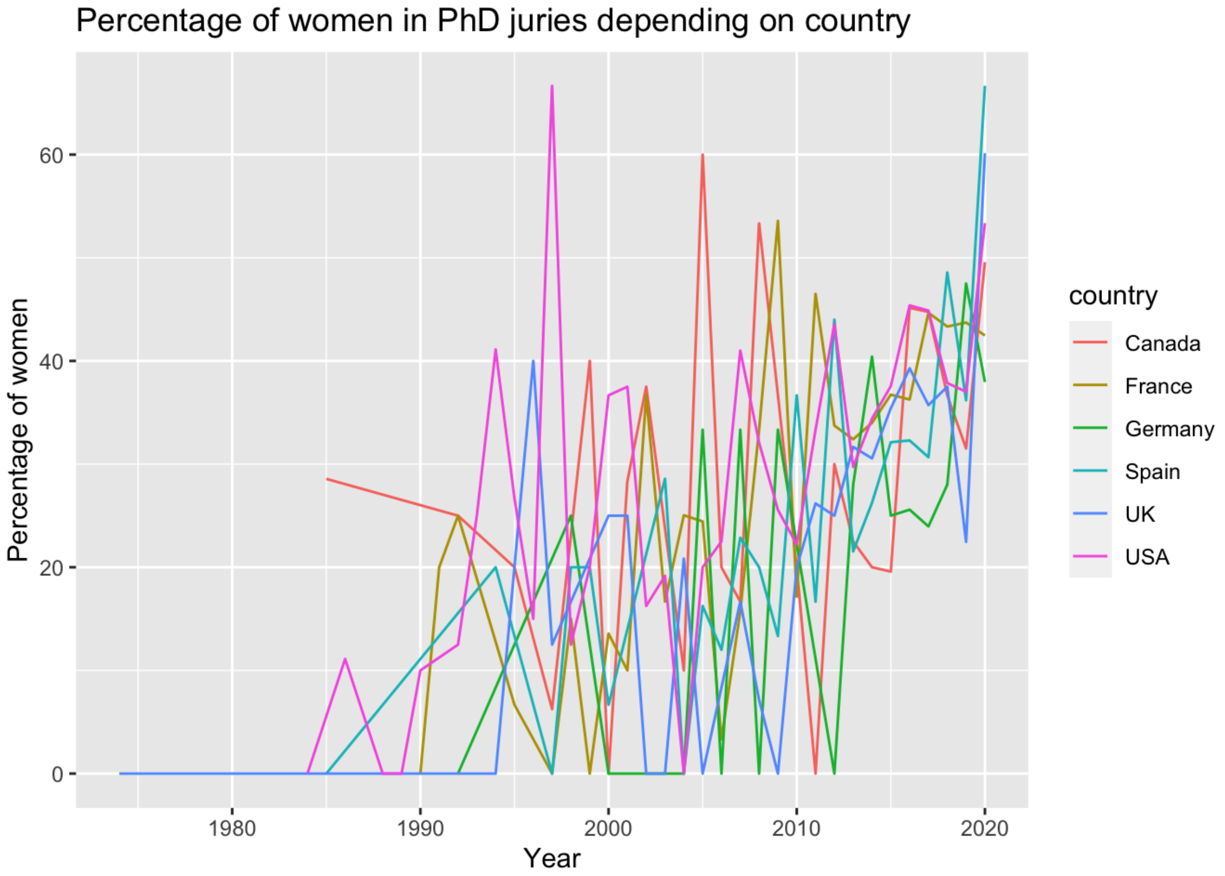
```r
# percentage women in jury with sd error bars
ggplot(prop.year.w.mean.sd, aes(x=Group.1, y=x)) +
  geom_point() +
  ggtitle("Percentage of women in PhD juries") +
  ylab("Percentage of women") +
  xlab("Year") +
  geom_errorbar(aes(ymin=x-sd, ymax=x+sd), width=.2,
                position=position_dodge(0.05))
```



```
# percentage women in jury depending on candidate gender
ggplot(prop.year.w.gender, aes(x=year, y=prop.w, color=gender)) +
  geom_point(size=2) +
  ggtitle("Percentage of women in PhD juries depending on the candidate gender") +
  ylab("Percentage of women") +
  xlab("Year")
```


Percentage of women in PhD juries depending on the candidate gender

```
# percentage of wommen in jury by country (n>50)
  ggplot(prop.year.w.country, aes(x=year, y=prop.w, color=country)) +
    geom_line() +
    ggtitle("Percentage of women in PhD juries depending on country") +
  ylab("Percentage of women") +
  xlab("Year")
```


Percentage of women in PhD juries depending on country
Percentage of women
0
20
40
60
1980
1990
2000
2010
2020
Year
country
Canada
France
Germany
Spain
UK
USA