travail de session

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Invalid Date

Introduction

En 2015, Justin Trudeau, l'actuel Premier ministre du Parti libéral, a promis de réparer "le système électoral défaillant du pays" en passant du scrutin majoritaire à un tour à une représentation plus proportionnelle afin que les votes soient reflétés plus fidèlement à la Chambre des communes (Carmichael 2017).

François Legault, l'actuel Premier ministre du Québec issu de la CAQ, a fait une promesse similaire : lors de l'élection de 2018, M. Legault a promis de réformer le système électoral en passant du scrutin majoritaire à un tour à un système électoral mixte de la représentation proportionnelle (Sidhartha 2022).

En théorie, un mode de scrutin proportionnel permettrait une meilleure représentation et une plus grande visibilité des petits partis concurrents, comme ceux composés de politiciens de la génération Millennials et de la génération Z, qui se concentrent souvent sur des questions essentielles pour ces générations. Cependant, tant au niveau fédéral que provincial au Québec, ces promesses ne sont toujours pas tenues. Les raisons pour lesquelles ces promesses n'ont pas été tenues sont au mieux ondulantes, comme "le statu quo servirait mieux les Québécois" (dans le cas de Legault) et le fait de souligner que le scrutin proportionnel permettrait à des "voix marginales" d'entrer au Parlement (Rands 2017). Si les Millennials et la Génération Z n'ont pas leur parti politique, peut-être que d'autres partis peuvent aborder les questions concernant ces générations ?

Problématique de recherche

Abacus Data montre qu'il existe un conflit générationnel concernant les problèmes les plus importants auxquels le Canada est confronté. Pour 57 % des baby-boomers et 42 % des membres de la génération X, les soins de santé sont un enjeu majeur. En revanche, la génération Z se préoccupe davantage de l'accessibilité du logement, 54 % des membres de la génération Z et 51 % des milléniaux considérant qu'il s'agit d'une préoccupation essentielle. En outre, il existe

un clivage permanent sur des questions telles que le changement climatique et l'environnement (Kishchuk 2023).

Une analyse révèle que les gouvernements canadiens dépensent entre 33 321 et 40 152 dollars par personne âgée de 65 ans et plus, entre 13 635 et 14 800 dollars par personne âgée de 45 à 64 ans, et entre 10 406 et 11 614 dollars par personne âgée de moins de 45 ans (Kershaw et Anderson 2016).

Analyses suggests that the preferential spending on the elderly can be explained from two perspectives: the preferences of an aging electorate and the influence of the ages of legislators on their policy-making decisions.

Valée-Dubois (2023) demonstrates how age can shape attitudes towards public spending. On average, seniors exhibit less support for state expenditures on education and the environment, yet they notably favor spending on transportation (p. 469). Furthermore, the research reveals that adults in their forties are more supportive of public investments in services for the elderly than other age groups (Vallée-Dubois 2023).

However, a study by McClean (2019), focusing on Japan, found that the age of politicians also significantly influences the development of public policies. Younger mayors tend to prioritize different social welfare policies compared to their older counterparts, notably increasing expenditures on child welfare over elderly welfare. The age bias within political institutions can, therefore, have profound implications for political representation and the formulation of public policy McClean 2019.

Alors, qui s'occupera des questions importantes pour les Millennials et la génération Z, si les assemblées législatives sont majoritairement composées d'autres générations ? Munger, dans son livre "Generation Gap", montre que le Congrès des États-Unis est principalement composé de la génération des baby-boomers, qui détient le pouvoir politique Les institutions politiques et le système de vote uninominal à un tour sont probablement un obstacle pour un nouveau parti représentant les jeunes générations (Munger 2022). De la même manière que McClean (2009), Munger prévient que les partis, composés principalement de personnes âgées, sont plus susceptibles de répondre aux besoins de leurs électeurs plus âgés (Munger 2022, 47).

Given the extensive body of research on the correlation between an aging electorate and its influence on public policies, our study aims to conduct a descriptive analysis of the generational composition of provincial legislative assemblies, with a focus on Quebec and Ontario as the two largest provinces in Canada. We will analyze the period of service in the legislature from 1961 to 2018. The starting year is significant as it marks when the first baby boomers became eligible for political participation at the age of 18. This approach will allow us to trace the start of their political careers and determine the duration of their service in Parliament.

La question de recherche est la suivante :

**Quelle est la composition générationnelle des Assemblées législatives de l'Ontario et du Québec, entre 1961 et 2021 ?

In this study, we plan to investigate the findings of McClean and Munger in the context of Quebec and Ontario's legislative assembly compositions. We aim to understand if the predominance of older generations within legislative assembly restricts Millennial involvement, leading to insufficient representation and a possible disregard for policies that address the needs of Millennials and Generation Z.

Données et méthodes

Notre étude sera basée sur une analyse quantitative des ensembles de données présentés, en se concentrant sur les statistiques descriptives. Cela nous permettra de généraliser et de décrire la composition des cohortes générationnelles des institutions politiques au niveaux provincial. Nous utiliserons la visualisation pour comparer les données entre les cohortes générationnelles et rendre les résultats accessibles.

Pour répondre à notre question de recherche sur la composition générationnelle des assemblées nationales du Québec et de l'Ontario, nous utiliserons l'ensemble de données 'Provincial Parliamentary Biographies' de Rivard et al, 2024.

Cet ensemble de données d'observation fournit des informations électorales sur les législateurs de quatre provinces canadiennes depuis la création de leurs assemblées coloniales au XVIIIe siècle, soit plus de 7 000 législateurs de l'Ontario, du Québec, du Nouveau-Brunswick et de la Nouvelle-Écosse. Puisque cet ensemble de données couvre une période du XVIIIe siècle jusqu'au XXIe siècle, il convient à notre analyse qui se concentre sur la période de 1961 à 2018, car il contient les informations qui nous intéressent.

Nous nous concentrerons sur le Québec et l'Ontario, les deux plus grandes provinces du Canada. Les variables dont nous aurons besoin sont 'year_of_birth' pour analyser la cohorte générationnelle, 'year' pour connaître l'année d'élection du législateur et ainsi déterminer son âge au début de sa carrière politique, et 'exit_year' pour déterminer combien de temps le député est resté à l'Assemblée nationale.

The dataset we have saved in our code under the name 'provinces' contains 17,038 observations and 48 variables. After cleaning the data and creating the new variables that we used two data sets :

- 'provinces_clean_unique' : 1,253 observations and 13 variables
- 'legislative_age' (based on 'provinces_clean_unique') : 1253 observations and 14 variables

In the dataset 'provinces_clean_unique', in addition to the initial variables we used, such as *'first_last'* for the names of the deputies, *'province'* for making comparisons between provinces, *'year_of_birth'*, *'year'* marking the beginning of the political career, and *'exit_year'*, we have created new variables:

- **gen_cohort**: We categorize the deputies by their *year_of_birth* into generational cohorts. For the definition of these cohorts, we relied on the Strauss-Howe Generational Theory, which provides a framework for the division of ages. Accordingly, we used the following categories: Silent, Boomer, Generation X, and Millennial.
- **year_range**: Represents the generational cohorts to which the deputies belong.
- **years_total**: Indicates the total number of years a deputy served in the legislative assembly, calculated as exit_year - year + 1. This formula includes the starting year in the total count.
- **sessions_total**: Given that each year comprises two sessions, this is calculated as years_total*2, representing the total number of sessions during the deputy's tenure.
- **start_year**: Refers to the initial year of the deputy's career in the assembly, allowing for the calculation of complete years of service without duplicating data. It's the year when they first started their career, marking the beginning of their tenure.

In the 'legislative_age' dataset, we have added the variable:

- **age_start**: This variable is used to analyze the age at which the deputy began their career, calculated as (start_year - year_of_birth).

However, during the data cleaning process, I encountered several issues related to inconsistencies in the initial dataset, which explains the reduced number of observations and influenced the results.

1. 62 deputies, with starting years ranging from 1990 to 2018, do not have a recorded year of birth, preventing me from determining their generational cohort and calculating the age at which they began their mandate
2. For deputies serving multiple mandates, the recorded exit year does not signify the end of their current mandate but rather the conclusion of their last mandate before any break. This nuance complicates the accurate calculation of total service years. To simplify calculations for deputies with multiple mandates, using the exit year as the beginning of the next mandate could help avoid overcounting years. However, with 17,000 observations, verifying each deputy's records individually presents a significant challenge. For example, in the case of Bob Chiarelli, we observe periods like 1987 - 1997, 1990 - 1997, and 1995 - 1997 for year and exit_year, indicating overlapping terms. Conversely, for Mike Davison (1975 - 1981, 1981 - 1985) and Evelyn Gigantes (1975 - 1981, 1981 - 1987), the exit year coincides with the beginning of the subsequent mandate. These inconsistencies raise problems in determining the total years spent in the legislative assembly.

first_last <chr>	province <chr>	gender <chr>	year_of_birth <dbl>	year_of_death <dbl>	year <dbl>	exit_year <dbl>	party <chr>
chiarelli_bob	Ontario	m	1941	*NA*	1987	1997	Liberal
chiarelli_bob	Ontario	m	1941	*NA*	1990	1997	Liberal
chiarelli_bob	Ontario	m	1941	*NA*	1995	1997	Liberal
chiarelli_bob	Ontario	m	1941	*NA*	2007	2018	Liberal
chiarelli_bob	Ontario	m	1941	*NA*	2011	2018	Liberal
chiarelli_bob	Ontario	m	1941	*NA*	2014	2018	Liberal
denis_lazure	Quebec	m	1925	2008	1976	1984	Parti Quebecois
denis_lazure	Quebec	m	1925	2008	1981	1984	Parti Quebecois
denis_lazure	Quebec	m	1925	2008	1989	1996	Parti Quebecois
denis_lazure	Quebec	m	1925	2008	1994	1996	Parti Quebecois

Figure 1: year and exit_year

	first_last	province	gender	year_of_birth	year_of_death	year	exit_year	party
1	chiarelli_bob	Ontario	m	1941	*NA*	1987	1997	Liberal
2	chiarelli_bob	Ontario	m	1941	*NA*	2007	2018	Liberal
3	davison_mike	Ontario	m	1950	*NA*	1975	1981	CCF/NDP
4	davison_mike	Ontario	m	1950	*NA*	1981	1985	CCF/NDP
5	eves_ernie	Ontario	m	1946	*NA*	1981	2001	Progressice Conservative
6	eves_ernie	Ontario	m	1946	*NA*	1999	2005	Progressice Conservative
7	gigantes_evelyn	Ontario	f	1942	*NA*	1975	1981	CCF/NDP
8	gigantes_evelyn	Ontario	f	1942	*NA*	1981	1987	CCF/NDP
9	gigantes_evelyn	Ontario	f	1942	*NA*	1990	1995	CCF/NDP
10	havrot_edward	Ontario	m	1927	2017	1971	1975	Progressice Conservative
11	havrot_edward	Ontario	m	1927	2017	1977	1985	Progressice Conservative
12	hayes_pat	Ontario	m	1927	2011	1985	1987	CCF/NDP
13	hayes_pat	Ontario	m	1942	2011	1990	1995	CCF/NDP
14	kells_morley	Ontario	m	1936	*NA*	1981	1985	Progressice Conservative
15	kells_morley	Ontario	m	1936	*NA*	1995	2003	Progressice Conservative
16	lessard_wayne	Ontario	m	1956	*NA*	1990	1995	CCF/NDP
17	lessard_wayne	Ontario	m	1956	*NA*	1995	1999	CCF/NDP
18	makarchuk_mac	Ontario	m	1931	*NA*	1967	1971	CCF/NDP
19	makarchuk_mac	Ontario	m	1931	*NA*	1975	1981	CCF/NDP
20	patten_richard	Ontario	m	1942	*NA*	1987	1990	Liberal
21	patten_richard	Ontario	m	1942	*NA*	1995	2007	Liberal
22	rinaldi_lou	Ontario	m	1947	*NA*	2003	2011	Liberal
23	rinaldi_lou	Ontario	m	1947	*NA*	2014	2018	Liberal
24	sorbara_greg	Ontario	m	1946	*NA*	1985	1995	Liberal
25	sorbara_greg	Ontario	m	1946	*NA*	1999	2012	Liberal

Figure 2: year and exit_year_2

3. I have 505 deputies whose tenure began between 1990 and 2018 and who do not have a recorded exit year. I assume this means they are still serving in the legislative assembly. In such cases, where 'exit_year' is NA, I calculate it as extending to 2024.

4. I have 11 observations where the year_of_birth does not correctly align with the year and exit_year, and these observations need to be eliminated. For example, consider Duncan McFarland, with a year_of_birth in 1973, which would place this deputy in the Generation X cohort. However, it is recorded that the mandate was from 1848 to 1851.

first_last <chr>	province <chr>	gender <chr>	year_of_birth <dbl>	year_of_death <dbl>	year <dbl>	exit_year <dbl>	party <chr>	gen_cohort <chr>	year_range <fctr>
Moses Gamble	Ontario	m	1942	*NA*	1816	1817	*NA*	Silent	1925–1942
Roger B. Conger	Ontario	m	1950	*NA*	1844	1848	*NA*	Babyboom	1943–1960
Reed Burritt	Ontario	m	1946	*NA*	1848	1851	*NA*	Babyboom	1943–1960
Duncan McFarland	Ontario	m	1973	*NA*	1848	1851	*NA*	GenerationX	1961–1981
George Wright	Ontario	m	1951	*NA*	1851	1854	Reformer	Babyboom	1943–1960
Daniel McKerlie	Ontario	m	1931	*NA*	1854	1857	Clear Grits	Silent	1925–1942
Donald Matheson	Ontario	m	1970	*NA*	1854	1857	Clear Grits	GenerationX	1961–1981
Robert Ferris	Ontario	m	1970	*NA*	1854	1857	Clear Grits	GenerationX	1961–1981
John Fraser	Ontario	m	1977	*NA*	1854	1857	Reformer	GenerationX	1961–1981
John R. Clark	Ontario	m	1941	*NA*	1857	1861	Reformer	Silent	1925–1942

Figure 3: year and exit_year_3

Résultats

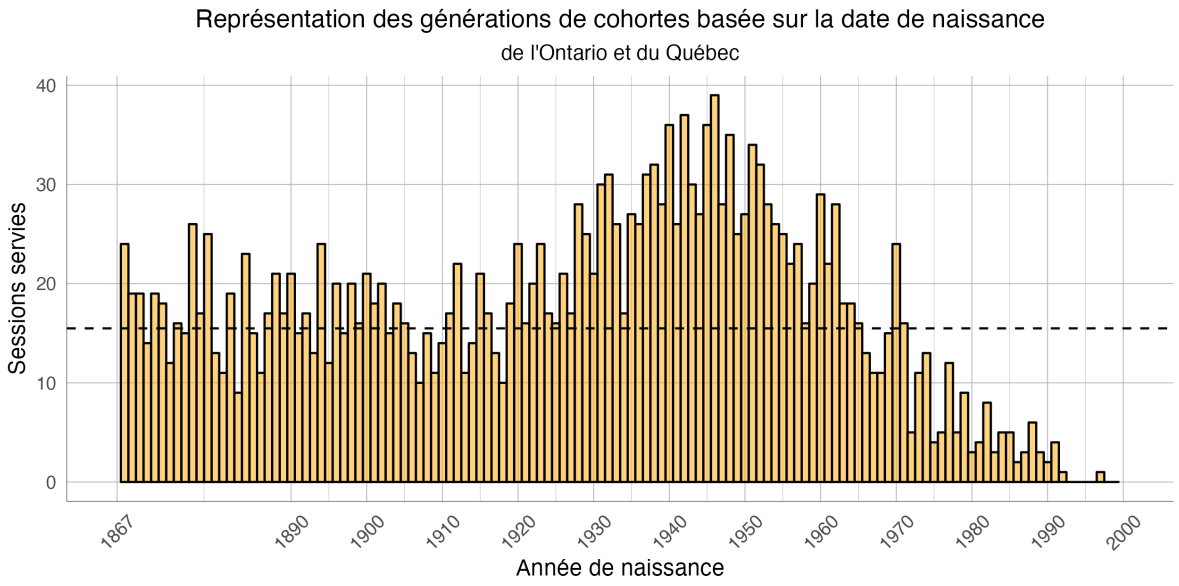
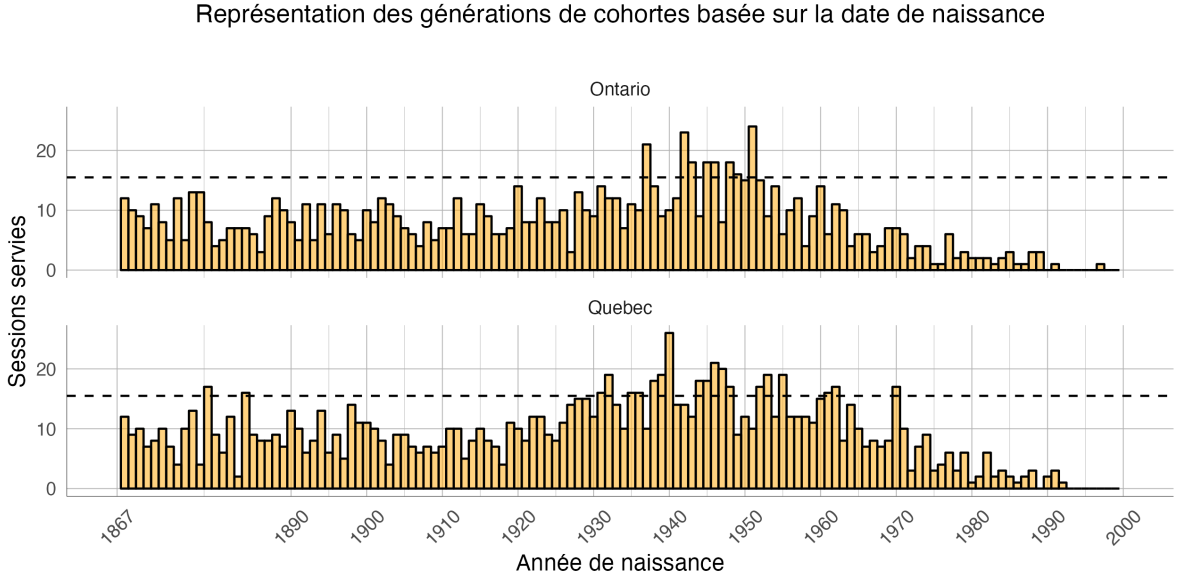


Figure 4: fig.1

Figure 1 was inspired by the figure in Munger's book (2022) on U.S. studies. It shows that time in the Legislative Assembly is not evenly distributed across generational cohorts. The dotted line represents a naive mean (a non-population-adjusted estimate) of the number of terms each cohort would serve if terms were distributed equally among cohorts. However, we observe that the majority of years in the Assembly are concentrated among deputies born between 1930 and 1960. This period encompasses the last years of the Silent Generation and covers the Boomer Generation (1943-1960). Members born between 1930 and 1960 have the highest bars, indicating that a large number of legislative sessions were served by individuals from these birth years.

Thus, Munger refers to this phenomenon as a "Boomer Ballast" and warns that it will remain active until approximately 2030. This suggests it will continue to influence subsequent generations, as they have been unable to enter political life due to Boomer domination in the Legislative Assembly. The graph indicates that this could be the case for the legislative bodies of Quebec and Ontario.



We decided to examine this distribution across Quebec and Ontario. We observe that the trend of domination by members born between 1940 and 1960 remains present in both provinces. There is a notable spike in Quebec for members born in 1940, while in Ontario, it corresponds to 1938, 1944, and 1951. We also note the active presence of deputies born in 1970 in the Legislative Assembly of Quebec. Thus, the trend of Boomer ballast can still persist in the two legislative assemblies, providing fewer opportunities for participation for younger generations.

Furthermore, we examine the age at which deputies began their mandates in the Legislative Assembly, focusing on the following generations: Silent, Baby Boom, Generation X, and Millennial. The graph indicates that the median age for both the Silent and Baby Boom generations

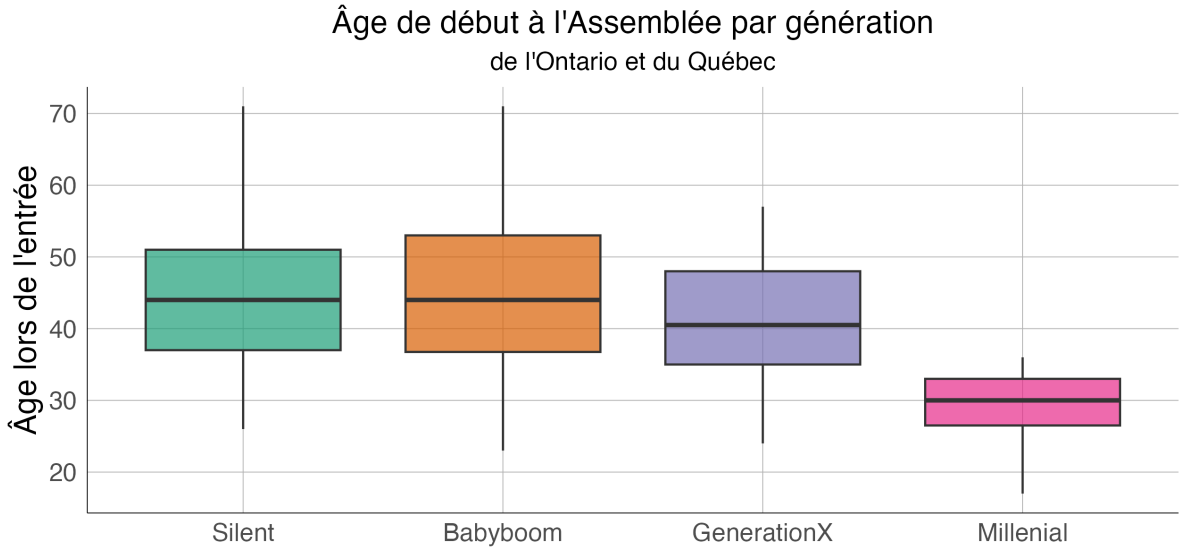
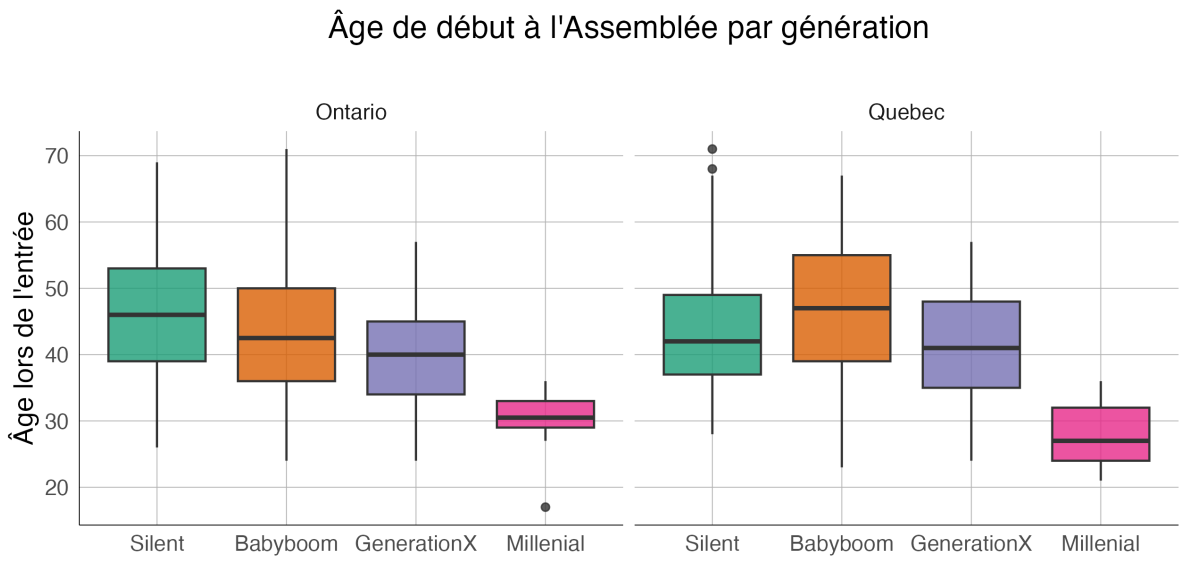
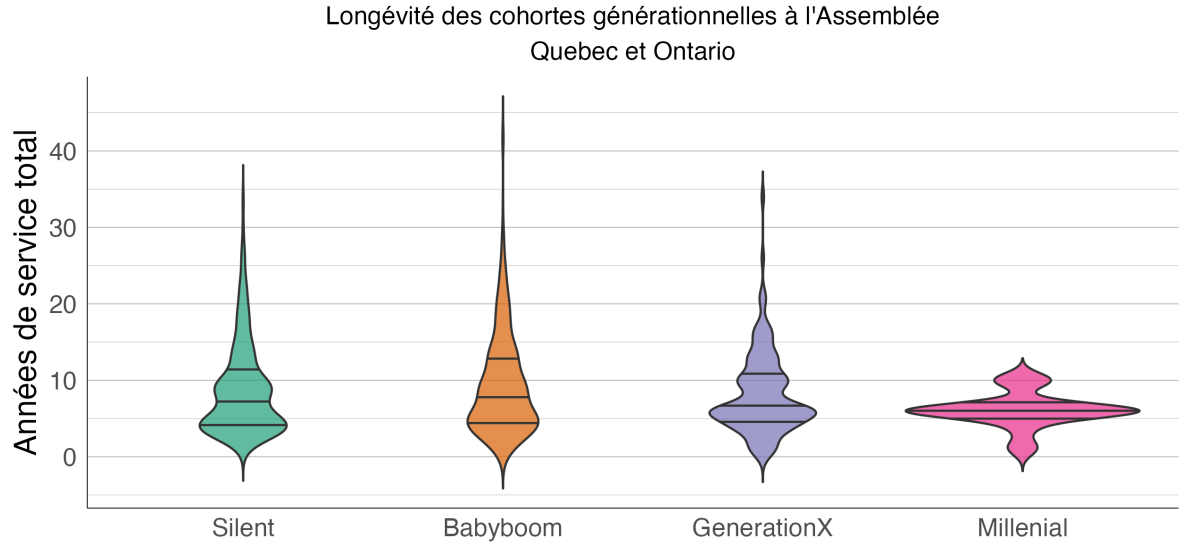


Figure 5: fig.3

is approximately 45 years, although the age distribution is wider among the Baby Boomers. Daryl Kramp and Roland Richer started their careers at the age of 71. For Generation X, the median age is lower, at 41. The youngest starting age of mandate is observed among Millennials, with a median of 30. Despite the fact that Millennials are still at the early stages of entering politics, we hypothesize that an earlier start to their political careers, compared to the Silent and Baby Boom generations, will allow them to remain longer in the legislative assembly. However, the Boomer Ballast will create an obstacle, making it difficult to form a significant counterbalance to the dominance of the Baby Boom generation.



However, when we analyze the years of entry into the Legislative Assembly for Ontario and Quebec, we can observe some differences: The median age for Baby Boomers in Ontario is 43, while for Baby Boomers in Quebec, it is 47. For the Silent Generation, the median age is 42. We note that the median age of entry in Ontario is 31, which includes a case of someone starting at 18 — Sam Oosterhoff, born in 1997, serves as an example. For Millennials in Quebec, the median age of entry is 27. For the Silent Generation, the median ages are almost the same across both provinces, at 40 and 41 years old. Since Millennials are starting their political careers earlier than their colleagues from the Baby Boomer generation, they may have the potential for longer political careers in the future.



The last graph presents the total years of service in the Legislative Assembly by generational cohort. It illustrates not only the typical length of service for each generation (indicated by the width of the violins) but also the diversity within each cohort. Thus, we observe that the Baby Boomer cohort exhibits the longest variation, with more than 40 years, and the Silent Generation shows over 35 years. Millennials have the shortest tenure, as they are the youngest generation, which explains why this group typically spends around 8 years in the Legislative Assembly.

Conclusion. Limits :

- 5 - implication des résultats pour le vrai monde (ce qu'on appelle communément en science, l'inférence)

Limits :

first_last <chr>	province <chr>	gender <chr>	year_of_birth <dbl>	year_of_death <dbl>	year <dbl>	exit_year <dbl>	party <chr>
chiarelli_bob	Ontario	m	1941	*NA*	1987	1997	Liberal
chiarelli_bob	Ontario	m	1941	*NA*	1990	1997	Liberal
chiarelli_bob	Ontario	m	1941	*NA*	1995	1997	Liberal
chiarelli_bob	Ontario	m	1941	*NA*	2007	2018	Liberal
chiarelli_bob	Ontario	m	1941	*NA*	2011	2018	Liberal
chiarelli_bob	Ontario	m	1941	*NA*	2014	2018	Liberal
denis_lazure	Quebec	m	1925	2008	1976	1984	Parti Quebecois
denis_lazure	Quebec	m	1925	2008	1981	1984	Parti Quebecois
denis_lazure	Quebec	m	1925	2008	1989	1996	Parti Quebecois
denis_lazure	Quebec	m	1925	2008	1994	1996	Parti Quebecois

Figure 6: year et exit_year

Annexe

```
library(tidyverse)
```

```
-- Attaching core tidyverse packages ------------------------ tidyverse 2.0.0 --
v dplyr     1.1.4     v readr     2.1.5
v forcats   1.0.0     v stringr   1.5.1
v ggplot2   3.5.0     v tibble    3.2.1
v lubridate 1.9.3     v tidyr     1.3.1
```

```
v purrr     1.0.2
-- Conflicts ---------------------------------------- tidyverse_conflicts() --
x dplyr::filter() masks stats::filter()
x dplyr::lag()    masks stats::lag()
i Use the conflicted package (<http://conflicted.r-lib.org/>) to force all conflicts to becor
```

```r
library(lubridate)
library(rvest)
```

```
Attaching package: 'rvest'

The following object is masked from 'package:readr':

    guess_encoding
```

```r
#importation de données

provinces <- read.csv("~/Dropbox/fas_1001_Zhuk/_travail_session/Data/Provincial Parliament

dim(provinces)
```

```r
#étudier les données : provinces

glimpse(provinces)
dim(provinces)
colnames(provinces)
table(provinces$year)
```

Annexe : variable gen_cohort, year_range

```r
#nettoyage des données: provinces

table(provinces$province)
```

```
New Brunswick   Nova Scotia       Ontario        Quebec
         2795          2969          5592          5682
```

```r
table(provinces$year_of_birth)
```

```
1696 1697 1701 1705 1709 1710 1711 1712 1713 1714 1715 1716 1717 1718 1719 1720
   1    1    1    1    4    3    1    1    1    1   10   10    6    4    2    6
1721 1723 1724 1725 1726 1727 1728 1730 1731 1732 1733 1734 1735 1736 1737 1738
   1    4    9    3    8    7    7    5    7    2    9    9   16    7    7   14
1739 1740 1741 1742 1743 1744 1745 1746 1747 1748 1749 1750 1751 1752 1753 1754
   6   14    7    9   22   28   16   15   12    8    8   44   56   38   46   21
1755 1756 1757 1758 1759 1760 1761 1762 1763 1764 1765 1766 1767 1768 1769 1770
  26   29   34   17   17   24   34   40   30   54   40   43   36   35   28   41
1771 1772 1773 1774 1775 1776 1777 1778 1779 1780 1781 1782 1783 1784 1785 1786
  26   29   27   22   29   73   50   28   29   28   34   23   36   38   51   72
1787 1788 1789 1790 1791 1792 1793 1794 1795 1796 1797 1798 1799 1800 1801 1802
  52   43   64   74   60   55   69   53   50   41   68   77   63   75   40   30
1803 1804 1805 1806 1807 1808 1809 1810 1811 1812 1813 1814 1815 1816 1817 1818
  43   62   72   52   47   88   48   56   65   72   52   56   68   57   86   71
1819 1820 1821 1822 1823 1824 1825 1826 1827 1828 1829 1830 1831 1832 1833 1834
  54   88   89   67   81   62   88   73   61   81   80   53   36   86   44   70
1835 1836 1837 1838 1839 1840 1841 1842 1843 1844 1845 1846 1847 1848 1849 1850
  78   62   78   63   54  112   73   91   93   79   63   77  102   83   77   52
1851 1852 1853 1854 1855 1856 1857 1858 1859 1860 1861 1862 1863 1864 1865 1866
  78   78   77   81   85   67  110   68   77   99   77   71   71   72   82   76
1867 1868 1869 1870 1871 1872 1873 1874 1875 1876 1877 1878 1879 1880 1881 1882
  95   77  102  106   57   62   72   76   64   83   88   73   76   73   56   80
1883 1884 1885 1886 1887 1888 1889 1890 1891 1892 1893 1894 1895 1896 1897 1898
  48   68   62   60   74   94   92   83   67   58   69   83   60   93   77   65
1899 1900 1901 1902 1903 1904 1905 1906 1907 1908 1909 1910 1911 1912 1913 1914
  73   70   77   67   39   92   67   58   50   60   55   58   74   89   60   69
1915 1916 1917 1918 1919 1920 1921 1922 1923 1924 1925 1926 1927 1928 1929 1930
  86   90   62   53   78   86   81   85   95   78   77   88   72  112   81   71
1931 1932 1933 1934 1935 1936 1937 1938 1939 1940 1941 1942 1943 1944 1945 1946
 117   94   94   86  107  102   98  112   77  130   86  190  118  131  128  146
1947 1948 1949 1950 1951 1952 1953 1954 1955 1956 1957 1958 1959 1960 1961 1962
 128  131  132  112  140  102   96  102  123   82   98   68   83   52   67   71
1963 1964 1965 1966 1967 1968 1969 1970 1971 1972 1973 1974 1975 1976 1977 1978
  63   63   48   52   31   37   36   67   39   28   30   35   29    7   25   14
1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1997
  18    6    6   14    9   11   12    7    4    8    3    3    4    2    2
```

```r
provinces_clean <- provinces |> select(first_last,
                                       province,
                                       gender,
                                       year_of_birth,
                                       year_of_death,
                                       year,
                                       exit_year,
                                       party) |>
  filter(str_detect(province, "Quebec|Ontario"))


#vérification
provinces_clean |> select(province) |> table()
```

```
province
Ontario  Quebec
   5592    5682
```

```r
#ajout d'une nouvelle variable de cohorte générationnelle (gen_cohort) et (year_range)
#The Strauss-Howe Generational Theory

provinces_clean <- provinces_clean |> mutate(gen_cohort = case_when(
  year_of_birth >= 1701 & year_of_birth <= 1723 ~ "Awakening",
  year_of_birth >= 1724 & year_of_birth <= 1741 ~ "Liberty",
  year_of_birth >= 1742 & year_of_birth <= 1766 ~ "Republican",
  year_of_birth >= 1767 & year_of_birth <= 1791 ~ "Compromise",
  year_of_birth >= 1792 & year_of_birth <= 1821 ~ "Transcendental",
  year_of_birth >= 1822 & year_of_birth <= 1842 ~ "Gilded",
  year_of_birth >= 1843 & year_of_birth <= 1859 ~ "Progressive",
  year_of_birth >= 1860 & year_of_birth <= 1882 ~ "Missionary",
  year_of_birth >= 1883 & year_of_birth <= 1900 ~ "Lost",
  year_of_birth >= 1901 & year_of_birth <= 1924 ~ "G.I",
  year_of_birth >= 1925 & year_of_birth <= 1942 ~ "Silent",
  year_of_birth >= 1943 & year_of_birth <= 1960 ~ "Babyboom",
  year_of_birth >= 1961 & year_of_birth <= 1981 ~ "GenerationX",
  year_of_birth >= 1982 & year_of_birth <= 2004 ~ "Millenial",
  year_of_birth >= 2005 & year_of_birth <= 2025 ~ "Homeland",
  TRUE ~ NA_character_)) |>
  mutate(year_range = case_when(
    year_of_birth >= 1701 & year_of_birth <= 1723 ~ "1701-1723",
    year_of_birth >= 1724 & year_of_birth <= 1741 ~ "1724-1741",
```

```
    year_of_birth >= 1742 & year_of_birth <= 1766 ~ "1742-1766",
    year_of_birth >= 1767 & year_of_birth <= 1791 ~ "1767-1791",
    year_of_birth >= 1792 & year_of_birth <= 1821 ~ "1792-1821",
    year_of_birth >= 1822 & year_of_birth <= 1842 ~ "1822-1842",
    year_of_birth >= 1843 & year_of_birth <= 1859 ~ "1843-1859",
    year_of_birth >= 1860 & year_of_birth <= 1882 ~ "1860-1882",
    year_of_birth >= 1883 & year_of_birth <= 1900 ~ "1883-1900",
    year_of_birth >= 1901 & year_of_birth <= 1924 ~ "1901-1924",
    year_of_birth >= 1925 & year_of_birth <= 1942 ~ "1925-1942",
    year_of_birth >= 1943 & year_of_birth <= 1960 ~ "1943-1960",
    year_of_birth >= 1961 & year_of_birth <= 1981 ~ "1961-1981",
    year_of_birth >= 1982 & year_of_birth <= 2004 ~ "1982-2004",
    year_of_birth >= 2005 & year_of_birth <= 2025 ~ "2005-2025",
    TRUE ~ NA_character_
  ))

provinces_clean |> select(gen_cohort, year_range)|> table()
```

```
               year_range
gen_cohort      1701-1723 1724-1741 1742-1766 1767-1791 1792-1821 1822-1842
  Awakening             2         0         0         0         0         0
  Babyboom              0         0         0         0         0         0
  Compromise            0         0         0       698         0         0
  G.I                   0         0         0         0         0         0
  GenerationX           0         0         0         0         0         0
  Gilded                0         0         0         0         0      1020
  Liberty               0        42         0         0         0         0
  Lost                  0         0         0         0         0         0
  Millenial             0         0         0         0         0         0
  Missionary            0         0         0         0         0         0
  Progressive           0         0         0         0         0         0
  Republican            0         0       385         0         0         0
  Silent                0         0         0         0         0         0
  Transcendental        0         0         0         0      1140         0
               year_range
gen_cohort      1843-1859 1860-1882 1883-1900 1901-1924 1925-1942 1943-1960
  Awakening             0         0         0         0         0         0
  Babyboom              0         0         0         0         0      1398
  Compromise            0         0         0         0         0         0
  G.I                   0         0         0      1176         0         0
  GenerationX           0         0         0         0         0         0
  Gilded                0         0         0         0         0         0
```

```
  Liberty                0         0         0         0         0         0
  Lost                   0         0       919         0         0         0
  Millenial              0         0         0         0         0         0
  Missionary             0      1235         0         0         0         0
  Progressive          959         0         0         0         0         0
  Republican             0         0         0         0         0         0
  Silent                 0         0         0         0      1270         0
  Transcendental         0         0         0         0         0         0
                year_range
gen_cohort       1961-1981 1982-2004
  Awakening              0         0
  Babyboom               0         0
  Compromise             0         0
  G.I                    0         0
  GenerationX          563         0
  Gilded                 0         0
  Liberty                0         0
  Lost                   0         0
  Millenial              0        53
  Missionary             0         0
  Progressive            0         0
  Republican             0         0
  Silent                 0         0
  Transcendental         0         0
```

Tinytable: generations

NA year_of_birth

```
# données : provinces_clean NA

provinces_clean_na <- provinces_clean |>
  select(first_last, year_of_birth, gen_cohort, year) |>
  filter(is.na(year_of_birth)) |>
  filter(year >= 1987) |>
  distinct(first_last, .keep_all = TRUE)

summary(provinces_clean_na$year)
```

```
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
   1990    2011    2018    2013    2018    2018
```

```r
dim(provinces_clean_na)
```

```
[1] 62  4
```

```r
# limits : J'ai 62 députés dont je ne connais pas l'année de naissance et je ne peux pas v
#png : NA_year_of_birth
```

Variable : years_total, sessions_total

```r
#créer une nouvelle colonne combien d'années de service et de sessions

provinces_clean <- provinces_clean |>
  mutate(years_total = exit_year - year + 1,
         sessions_total = years_total * 2)

provinces_clean |>
  filter(str_detect(first_last, "jacques_parizeau|chiarelli_bob|denis_lazure"))
```

```
         first_last province gender year_of_birth year_of_death year exit_year
1     chiarelli_bob  Ontario      m          1941            NA 1987      1997
2     chiarelli_bob  Ontario      m          1941            NA 1990      1997
3     chiarelli_bob  Ontario      m          1941            NA 1995      1997
4     chiarelli_bob  Ontario      m          1941            NA 2007      2018
5     chiarelli_bob  Ontario      m          1941            NA 2011      2018
6     chiarelli_bob  Ontario      m          1941            NA 2014      2018
7      denis_lazure   Quebec      m          1925          2008 1976      1984
8      denis_lazure   Quebec      m          1925          2008 1981      1984
9      denis_lazure   Quebec      m          1925          2008 1989      1996
10     denis_lazure   Quebec      m          1925          2008 1994      1996
11 jacques_parizeau   Quebec      m          1930          2015 1976      1984
12 jacques_parizeau   Quebec      m          1930          2015 1981      1984
13 jacques_parizeau   Quebec      m          1930          2015 1989      1996
14 jacques_parizeau   Quebec      m          1930          2015 1994      1996
            party gen_cohort year_range years_total sessions_total
1         Liberal     Silent  1925-1942          11             22
2         Liberal     Silent  1925-1942           8             16
3         Liberal     Silent  1925-1942           3              6
4         Liberal     Silent  1925-1942          12             24
5         Liberal     Silent  1925-1942           8             16
```

```
6          Liberal     Silent  1925-1942           5             10
7  Parti Quebecois     Silent  1925-1942           9             18
8  Parti Quebecois     Silent  1925-1942           4              8
9  Parti Quebecois     Silent  1925-1942           8             16
10 Parti Quebecois     Silent  1925-1942           3              6
11 Parti Quebecois     Silent  1925-1942           9             18
12 Parti Quebecois     Silent  1925-1942           4              8
13 Parti Quebecois     Silent  1925-1942           8             16
14 Parti Quebecois     Silent  1925-1942           3              6
```

```r
# Check how many NA in exit_year

serving_1 <- provinces_clean |>
  select(first_last, year, exit_year) |>
  filter(is.na(exit_year)) |>
  filter(year <= 1980)

# J'ai 11 députés qui n'ont pas d'année de fin (1871-1921), I should eliminate them

provinces_clean <- provinces_clean |>
  filter(!(is.na(exit_year) & year < 1980))

# verification

serving_1 <- provinces_clean |>
  select(first_last, year, exit_year) |>
  filter(is.na(exit_year)) |>
  filter(year <= 1980)
```

NA exit_year - 2024

```r
#NA dans exit_year correspond à ceux qui sont toujours à la Chambre des communes, je prend


# NA qui reste dans "exit_year"


serving_2 <- provinces_clean |>
  select(first_last, year, exit_year) |>
  filter(is.na(exit_year)) |>
```

```
  filter(year >= 1961)

dim(serving_2)
```

```
[1] 505   3
```

```
summary(serving_2$year)
```

```
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
   1990    2011    2014    2014    2018    2018
```

```
#NA dans exit_year correspond à ceux qui sont toujours à la Chambre des communes, je prend
#test_Chat_GPT

current_year <- as.numeric(format(Sys.Date(), "%Y"))

provinces_clean <- provinces_clean |>
  group_by(first_last) |>
  mutate(start_year = min(year[!is.na(year)])) |>
  ungroup() |>
  mutate(exit_year = if_else(year == start_year & is.na(exit_year) & gen_cohort != "Silent
  group_by(first_last) |>
  mutate(years_total = exit_year - start_year,
         sessions_total = years_total * 2) |>
  ungroup()

#verification

provinces_clean |> select(years_total) |> summary()
```

```
 years_total
Min.   : -1.00
1st Qu.:  6.00
Median : 10.00
Mean   : 12.33
3rd Qu.: 17.00
Max.   :144.00
NA's   :302
```

```
  provinces_clean |> select(first_last, year, exit_year, years_total) |>
    filter(years_total == "-1" | years_total == "75")
```

```
# A tibble: 5 x 4
  first_last     year exit_year years_total
  <chr>         <int>     <dbl>       <dbl>
1 carrere_john   1949      1948          -1
2 cragg_charles  1949      1948          -1
3 John White     1857      1867          75
4 John White     1861      1867          75
5 John White     1863      1867          75
```

```
  provinces_clean |> filter(first_last == "John White", .keep_all = TRUE)
```

```
# A tibble: 5 x 13
  first_last province gender year_of_birth year_of_death  year exit_year party
  <chr>      <chr>    <chr>          <int>         <int> <int>     <dbl> <chr>
1 John White Ontario  m               1761          1800  1792      1796 <NA>
2 John White Ontario  m               1811          1897  1851      1854 <NA>
3 John White Ontario  m               1811          1897  1857      1867 Reform~
4 John White Ontario  m               1811          1897  1861      1867 Reform~
5 John White Ontario  m               1811          1897  1863      1867 Reform~
# i 5 more variables: gen_cohort <chr>, year_range <chr>, years_total <dbl>,
#   sessions_total <dbl>, start_year <int>
```

```
  #Turns out I have two John Whites, I need to rename one

  provinces_clean <- provinces_clean |>
    mutate(first_last = if_else(first_last == "John White" &
                                year_of_birth == 1761 &
                                year_of_death == 1800, "John_White", first_last))

  provinces_clean |> filter(first_last == "John White", .keep_all = TRUE)
```

```
# A tibble: 4 x 13
  first_last province gender year_of_birth year_of_death  year exit_year party
  <chr>      <chr>    <chr>          <int>         <int> <int>     <dbl> <chr>
1 John White Ontario  m               1811          1897  1851      1854 <NA>
2 John White Ontario  m               1811          1897  1857      1867 Reform~
```

```
3 John White Ontario  m               1811          1897  1861      1867 Reform~
4 John White Ontario  m               1811          1897  1863      1867 Reform~
# i 5 more variables: gen_cohort <chr>, year_range <chr>, years_total <dbl>,
#   sessions_total <dbl>, start_year <int>
```

```
# copy the code after renaming John White to John_White

provinces_clean <- provinces_clean |>
  group_by(first_last) |>
  mutate(start_year = min(year[!is.na(year)])) |>
  ungroup() |>
  mutate(exit_year = if_else(year == start_year & is.na(exit_year) & gen_cohort != "Silent
  group_by(first_last) |>
  mutate(years_total = exit_year - start_year,
         sessions_total = years_total * 2) |>
  ungroup()


provinces_clean |> filter(first_last == "John White", .keep_all = TRUE)
```

```
# A tibble: 4 x 13
  first_last province gender year_of_birth year_of_death  year exit_year party
  <chr>      <chr>    <chr>          <int>         <int> <int>     <dbl> <chr>
1 John White Ontario  m               1811          1897  1851      1854 <NA>
2 John White Ontario  m               1811          1897  1857      1867 Reform~
3 John White Ontario  m               1811          1897  1861      1867 Reform~
4 John White Ontario  m               1811          1897  1863      1867 Reform~
# i 5 more variables: gen_cohort <chr>, year_range <chr>, years_total <dbl>,
#   sessions_total <dbl>, start_year <int>
```

```
#nettoyage d'observations -1 en "years_total" et <100 "years_total"
#andre_peltier something weird is happening with that observation. I don't know, how to so

provinces_clean <- provinces_clean |>
  filter(!str_detect(years_total, "-1")) |>
  filter(str_detect(gen_cohort, "Silent|Babyboom|GenerationX|Millenial")) |>
  filter(!str_detect(first_last, "andre_pelletier"))


provinces_clean |> select(gen_cohort) |> table()
```

```
gen_cohort
   Babyboom GenerationX   Millenial      Silent
       1278         445          48        1262
```

```
provinces_clean |> select(years_total) |> summary()
```

```
  years_total
 Min.   : 0.00
 1st Qu.: 6.00
 Median :11.00
 Mean   :12.73
 3rd Qu.:18.00
 Max.   :42.00
```

```
provinces_clean |> filter(years_total == "42")
```

```
# A tibble: 22 x 13
   first_last  province gender year_of_birth year_of_death  year exit_year party
   <chr>       <chr>    <chr>          <int>         <int> <int>     <dbl> <chr>
 1 francois_g~ Quebec   m               1944            NA  1976      2018 Part~
 2 francois_g~ Quebec   m               1944            NA  1981      2018 Part~
 3 francois_g~ Quebec   m               1944            NA  1985      2018 Part~
 4 francois_g~ Quebec   m               1944            NA  1989      2018 Part~
 5 francois_g~ Quebec   m               1944            NA  1994      2018 Part~
 6 francois_g~ Quebec   m               1944            NA  1998      2018 Part~
 7 francois_g~ Quebec   m               1944            NA  2003      2018 Part~
 8 francois_g~ Quebec   m               1944            NA  2007      2018 Part~
 9 francois_g~ Quebec   m               1944            NA  2008      2018 Part~
10 francois_g~ Quebec   m               1944            NA  2012      2018 Part~
# i 12 more rows
# i 5 more variables: gen_cohort <chr>, year_range <chr>, years_total <dbl>,
#   sessions_total <dbl>, start_year <int>
```

```
# I will try to choose the unique values of "years_total" for each deputy with the start y

provinces_clean_unique <- provinces_clean |>
  distinct(first_last, start_year, years_total, sessions_total, .keep_all = TRUE)

# verification
```

```r
provinces_clean_unique |> select(first_last) |> table()

# I still have someone who is mentioned several times

provinces_clean_unique |>
  filter(str_detect(first_last, "jacques_parizeau|chiarelli_bob|denis_lazure"))
```

```r
# verification
# It turns out that I have 68 deputies for whom the year of release is written differently
# year and exit_year 2.png

name_counts <- provinces_clean_unique |>
  group_by(first_last) |>
  summarise(count = n(), .groups = 'drop') |>
  filter(count > 1) |> distinct()

repeated_names <- provinces_clean_unique |>
  filter(first_last %in% name_counts$first_last)

# so, I'll eliminate these observations

provinces_clean_unique <- provinces_clean_unique |>
  anti_join(repeated_names, by = "first_last")

# verification

provinces_clean_unique |> select(years_total) |> summary()
```

```
 years_total
Min.   : 0.000
1st Qu.: 4.000
Median : 7.000
Mean   : 8.787
3rd Qu.:12.000
Max.   :42.000
```

```r
repeated_names <- provinces_clean_unique |>
  filter(first_last %in% name_counts$first_last)

provinces_clean_unique |> select(gen_cohort) |> table()
```

```
gen_cohort
   Babyboom GenerationX   Millenial      Silent
        503         263          43         475
```

```
# filter by "year" from 1961 when first boomers were 18

provinces_clean_unique <- provinces_clean_unique |> filter(year >= 1961)
```

```
#test verification

summary(provinces_clean_unique$year)
```

```
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
   1962    1981    1994    1993    2007    2018
```

Visualisation_1

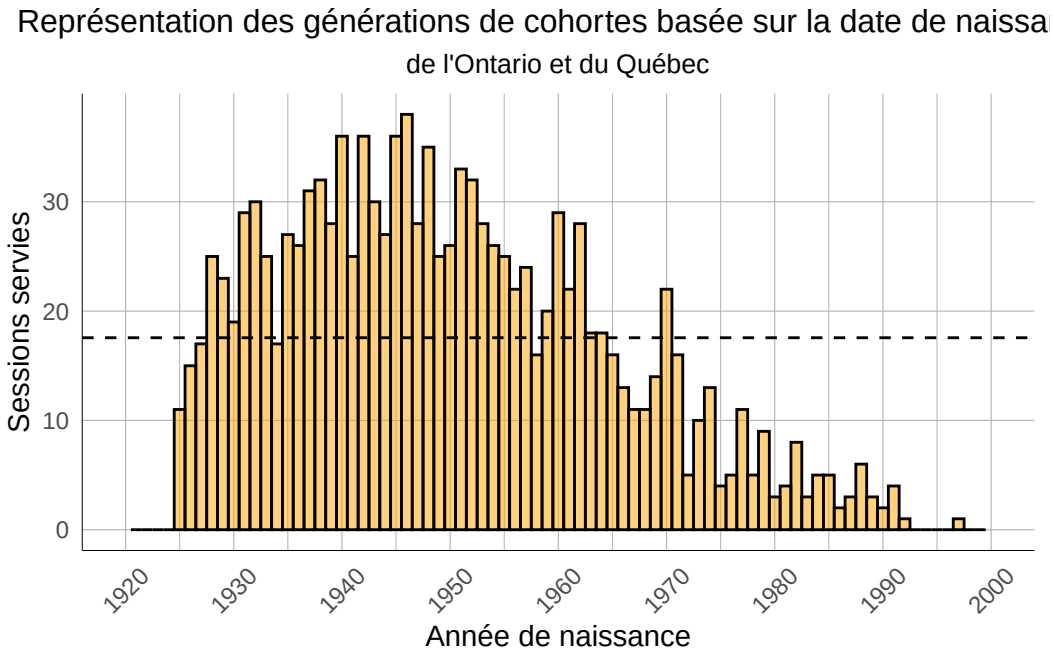
```
# visualisation_1
# Le graphique montre que le temps passé à la Chambre législative n'est pas réparti égalem

class(provinces_clean_unique$year_of_birth)

dim(provinces_clean_unique)

graph_1 <- ggplot(data = provinces_clean_unique, aes(x = year_of_birth)) +
  geom_histogram(binwidth = 1,
                 color = "black",
                 fill = "orange",
                 alpha = 0.5) +
    geom_hline(yintercept = mean(provinces_clean_unique$sessions_total, na.rm = TRUE),
               linetype = "dashed", color = "black") +
  scale_x_continuous(limits = c(1920, 2000),
                     breaks = seq(1920, 2000, by = 10)) +
    labs(title = "Représentation des générations de cohortes basée sur la date de naissanc
         subtitle = "de l'Ontario et du Québec",
         x = "Année de naissance",
         y = "Sessions servies") +
  theme_minimal() +
  theme(panel.grid.major.x = element_line(colour = "grey70", size = .2),
        panel.grid.minor.x = element_line(colour = "grey70", size = .1),
```

```
        panel.grid.major.y = element_line(colour = "grey70", size = .2),
        panel.grid.minor.y = element_blank(),
        axis.line = element_line(colour = "black",
                                 size = .1),
        axis.text.x = element_text(angle = 45,
                                   vjust = 0.5),
        plot.title = element_text(size = 12,
                                  hjust = 0.5),
        plot.subtitle = element_text(size = 10,
                                  hjust = 0.5),
        text = element_text(face = "plain")
        )
```

```
Warning: The `size` argument of `element_line()` is deprecated as of ggplot2 3.4.0.
i Please use the `linewidth` argument instead.
```

```
graph_1
```

```
Warning: Removed 2 rows containing missing values or values outside the scale range
(`geom_bar()`).
```

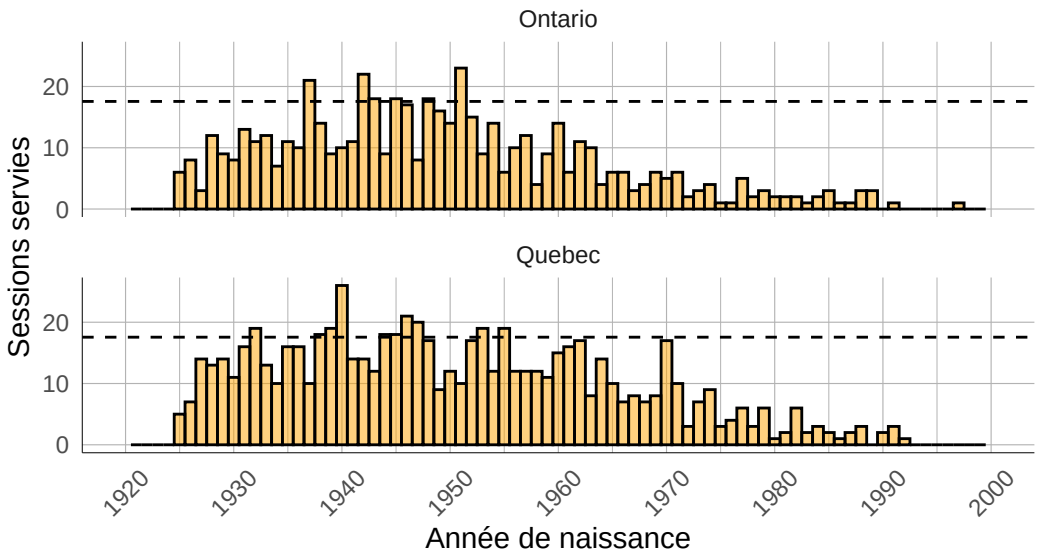


Visualisation_2

```
# Divisé entre le Québec et l'Ontario


graph_2 <- ggplot(data = provinces_clean_unique, aes(x = year_of_birth)) +
  geom_histogram(binwidth = 1,
                 color = "black",
                 fill = "orange",
                 alpha = 0.5) +
    geom_hline(yintercept = mean(provinces_clean_unique$sessions_total, na.rm = TRUE),
               linetype = "dashed", color = "black") +
  facet_wrap(~ province, ncol = 1) +
  scale_x_continuous(limits = c(1920, 2000),
                     breaks = seq(1920, 2000, by = 10)) +
    labs(title = "Représentation des générations de cohortes basée sur la date de naissanc
         subtitle = "",
         x = "Année de naissance",
         y = "Sessions servies") +
  theme_minimal() +
  theme(panel.grid.major.x = element_line(colour = "grey70", size = .2),
        panel.grid.minor.x = element_line(colour = "grey70", size = .1),
        panel.grid.major.y = element_line(colour = "grey70", size = .2),
        panel.grid.minor.y = element_blank(),
        axis.line = element_line(colour = "black",
                                 size = .1),
        axis.text.x = element_text(angle = 45,
                                   vjust = 0.5),
        plot.title = element_text(size = 12,
                                  hjust = 0.5),
        plot.subtitle = element_text(size = 10,
                                  hjust = 0.5),
        text = element_text(face = "plain")
        )

graph_2
```

```
Warning: Removed 4 rows containing missing values or values outside the scale range
(`geom_bar()`).
```

Représentation des générations de cohortes basée sur la date de naissa



Données : legislative_age, variable age_start

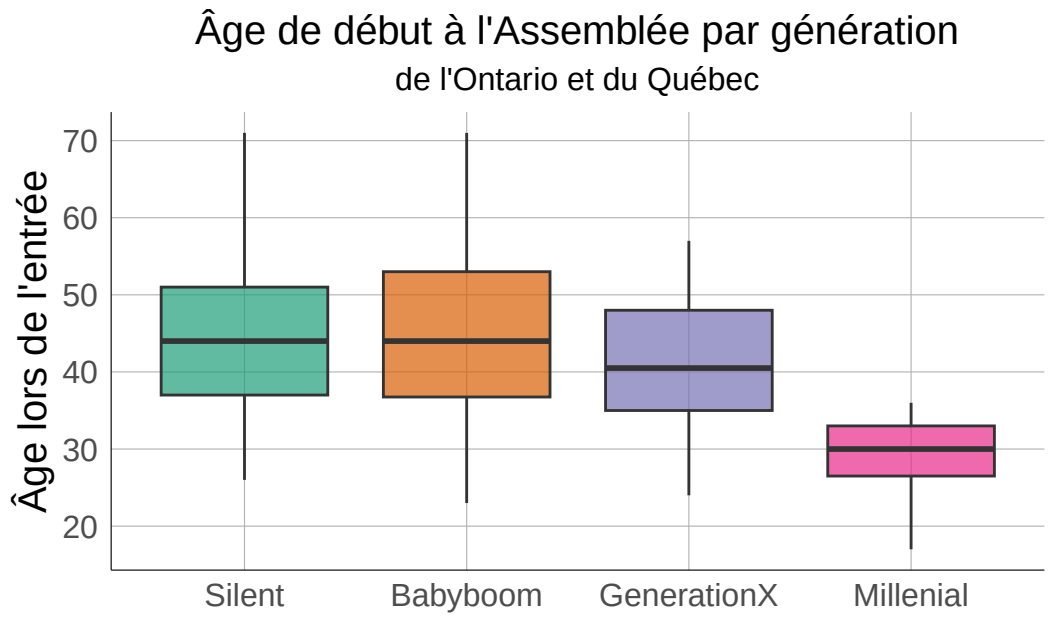
```
#créer de nouvelles variables, pour comprendre à quel âge et dans quelle cohorte générati

legislative_age <- provinces_clean_unique |>
  mutate(age_start = start_year - year_of_birth) |>
  drop_na(age_start, year_of_birth)

legislative_age |> glimpse()
legislative_age |> select(age_start) |> summary()

legislative_age |> filter(age_start == "-128")
# error : Donald McDonald year_of_birth 1969, year 1841, exit_year 1844, I also have to el

legislative_age <- provinces_clean_unique |>
  mutate(age_start = start_year - year_of_birth) |>
  drop_na(age_start, year_of_birth) |>
  filter(first_last != "Donald McDonald")

legislative_age |> select(age_start) |> summary()
```

```r
legislative_age |> filter(age_start >= -126 & age_start <= 0)

#error :I have 11 observations where birth_year does not correctly match start_year and ex

legislative_age <- provinces_clean_unique |>
  mutate(age_start = start_year - year_of_birth) |>
  drop_na(age_start, year_of_birth) |>
  filter(!(age_start >= -128 & age_start <= 0)) |>
  mutate(gen_cohort = factor(gen_cohort,
                             levels = c("Silent",
                                        "Babyboom",
                                        "GenerationX",
                                        "Millenial")))


legislative_age |> select(age_start) |> summary()

legislative_age |> filter(age_start == "71")

provinces |> filter(first_last == "kramp_daryl")
# wow, Daryl Kramp was elected to the Ontario Legislative Assembly at the age of 71! never

dim(legislative_age)
```

Visualisation_3

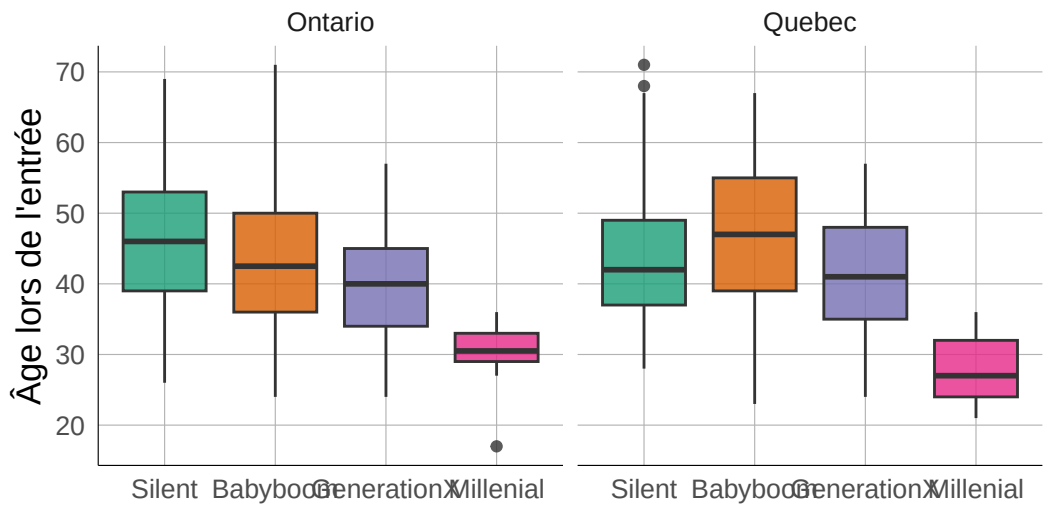
```r
# at what age deputies started to work, by generational cohort

library(RColorBrewer)


graph_3 <- ggplot(data = legislative_age, aes(x = gen_cohort,
                                              y = age_start,
                                              fill = gen_cohort)) +
  geom_boxplot(alpha = .7) +
  scale_fill_brewer(palette = "Dark2") +
  labs(title = "Âge de début à l'Assemblée par génération",
       subtitle = "de l'Ontario et du Québec",
       x = "",
       y = "Âge lors de l'entrée") +
```

```
  theme_minimal() +
  theme(legend.position = "none",
        panel.grid.major.x = element_line(colour = "grey70", size = .2),
        panel.grid.minor.x = element_line(colour = "grey70", size = .1),
        panel.grid.major.y = element_line(colour = "grey70", size = .2),
        panel.grid.minor.y = element_blank(),
        axis.line = element_line(colour = "black",
                                 size = .2),
        plot.title = element_text(size = 15,
                                  hjust = 0.5),
        plot.subtitle = element_text(size = 12,
                                  hjust = 0.5),
        text = element_text(face = "plain", size = 15))


graph_3
```



Visualisation_3_2 :

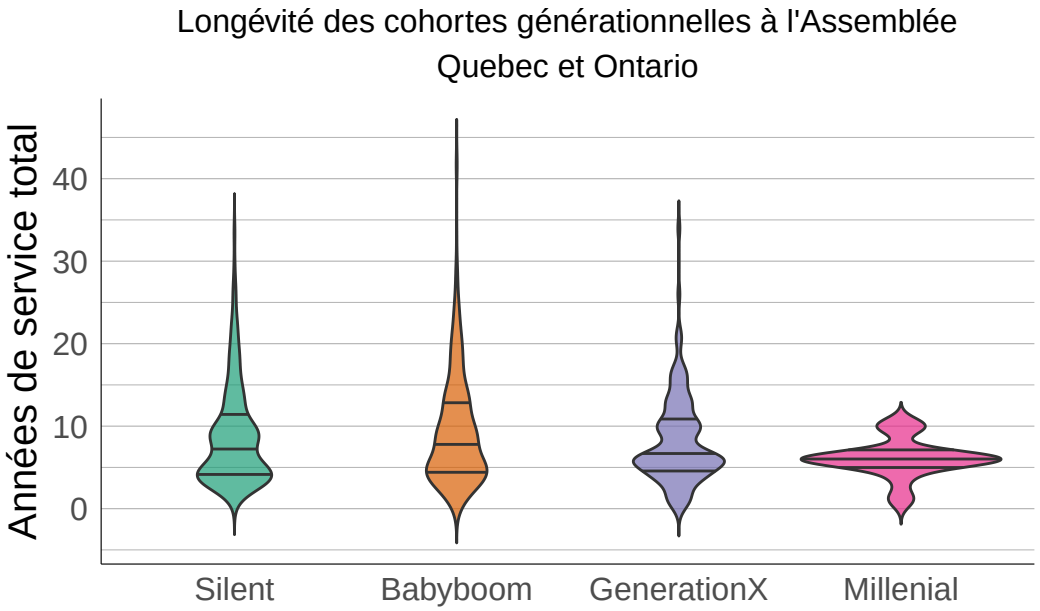
```
#graph Ontario Quebec

graph_3_2 <- ggplot(data = legislative_age, aes(x = gen_cohort,
                                                y = age_start,
                                                fill = gen_cohort)) +
  geom_boxplot(alpha = .8) +
  facet_wrap(~ province) +
  scale_fill_brewer(palette = "Dark2") +
  labs(title = "Âge de début à l'Assemblée par génération",
       subtitle = "",
       x = "",
       y = "Âge lors de l'entrée") +
  theme_minimal() +
  theme(legend.position = "none",
        panel.grid.major.x = element_line(colour = "grey70", size = .2),
        panel.grid.minor.x = element_line(colour = "grey70", size = .1),
        panel.grid.major.y = element_line(colour = "grey70", size = .2),
        panel.grid.minor.y = element_blank(),
        axis.line = element_line(colour = "black",
                                 size = .2),
        plot.title = element_text(size = 15,
                                  hjust = 0.5),
        plot.subtitle = element_text(size = 12,
                                  hjust = 0.5),
        text = element_text(face = "plain", size = 13))


graph_3_2
```



Visualisation_4:

```
# graph_ total_years

graph_4 <-  ggplot(data = legislative_age, aes(x = gen_cohort, y = years_total, fill = gen
  geom_violin(trim=FALSE, alpha = .7, draw_quantiles = c(0.25, 0.5, 0.75)) +
  #facet_wrap(~ province, ncol = 1) +
  scale_fill_brewer(palette = "Dark2") +
  labs(title = "Longévité des cohortes générationnelles à l'Assemblée",
       subtitle = "Quebec et Ontario",
       x = "",
       y = "Années de service total") +
  theme_minimal() +
  theme(legend.position = "none",
        panel.grid.major.x = element_blank(),
        panel.grid.minor.x = element_line(colour = "grey70", size = .1),
        panel.grid.major.y = element_line(colour = "grey70", size = .2),
        panel.grid.minor.y = element_line(colour = "grey70", size = .1),
        axis.line = element_line(colour = "black",
                                 size = .2),
        plot.title = element_text(size = 12,
```

```
                                hjust = 0.5),
        plot.subtitle = element_text(size = 12,
                                hjust = 0.5),
        text = element_text(face = "plain", size = 15))


graph_4
```



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