

# Silenced in the Chamber: Analyzing Gendered Speech Interruptions in the Australian Parliament (1998–2022)\*

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First sentence. Second sentence. Third sentence. Fourth sentence.

## 1 Introduction

Although interjections are officially prohibited during a member’s speech in the Australian Parliament, interruptions still occur frequently, particularly during heated debates often fueled by political disagreements (“Interruptions to Members Speaking” 2025). This raises crucial questions about gender dynamics within the context of parliamentary debates in Australia. Concerns are growing regarding whether women are disproportionately interrupted compared to men, highlighting potential underlying biases that could influence the effectiveness and fairness of parliamentary proceedings.

There has been considerable research on speech patterns and gender-based interruptions in government speeches across various countries. For instance, during U.S. Supreme Court confirmation hearings, female and minority nominees are interrupted more frequently than their male and white counterparts (Boyd, Collins, and Ringhand 2024). Additionally, in the US Congress, women also experienced more interruptions than men, especially during discussions of women’s issues, where women are more than twice as likely to be interrupted compared to non-gendered topics (Miller and Sutherland 2022). In the Ecuadorian Congress, female legislators not only deliver fewer speeches but also speak for shorter durations compared to their male peers. Furthermore, women often wait longer to regain the floor after interruptions, leading them to strategically shorten their speeches to minimize further disruptions. However, women in authoritative positions can mitigate some of these interruption-related penalties, with senior

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\*Code and data are available at: [https://github.com/hannahyu07/Hansard\\_Interruptions](https://github.com/hannahyu07/Hansard_Interruptions)

women’s speeches often exceeding those of men in length when they achieve comparable levels of experience or hold significant roles (Vera and Vidal 2021).

Contrastingly, studies of the Australian High Court reveal a different dynamic (Jacobi, Robinson, and Leslie n.d.). The result suggested that contrary to the U.S. Supreme Court, there is no significant difference between female and male justices regarding interruptions. Although women experience a higher rate of interruptions relative to their speaking time, the subtlety of this effect suggests that gender dynamics within the Australian court might be more balanced compared to the U.S. Supreme Court. This highlights the differences in how judicial interactions are influenced by gender across different legal systems.

Building on existing literature suggesting that the Australian High Court may exhibit better gender dynamics than its counterparts in the US, we aim to delve deeper into the issue of gender-based interruptions within the Australian Parliament. Utilizing the Australian Hansard, the official written record of parliamentary debates which has been digitized by Lindsay Katz and Rohan Alexander, we have access to comprehensive records of all parliamentary proceedings from 1998 to 2022 (Lindsay Katz and Alexander 2023). From the dataset, we aim to analyze the frequency and context of interruptions based on gender. Specifically, our study will focus on comparing the rates at which male and female parliamentarians are interrupted during their speeches.

The remainder of this paper is structured as follows: Section 2 demonstrates the data used for this paper, Section 3 describes, justifies, and explains my model, Section 4 highlights the results of the predictions using tables and graphs, and Section 5 contains important implications and conclusions based on the findings.

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# View the first few rows
#head(hansard_corpus, 150)
```

```
#summary(hansard_corpus)
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## 2 Data

Data analysis is performed using statistical programming language R (R Core Team 2023), with packages `tidyverse` (Wickham et al. 2019), `arrow` (Richardson et al. 2024), `here` (Müller 2020), `rstanarm` (Goodrich et al. 2022), `modelsummary` (Arel-Bundock 2022), `ggplot2` (Wickham 2016), `knitr` (Xie 2014), `tibble` (Müller and Wickham 2023), `gt` (Iannone et al. 2024), `patchwork` (Pedersen 2024), `testthat` (Wickham 2011), `kableExtra` (Zhu 2021), `dyplyr` (Wickham et al. 2023), `stringr` (Wickham 2023), and `lubridate` (Grolemund and Wickham 2011).

## 2.1 Data Source

The data used in this research is a compiled digital record of the Australian Hansard that documents parliamentary proceedings from 1998 to 2022 (L. Katz and Alexander 2022). This comprehensive database includes variables such as speaker details (e.g., name, party, gender, electorate), timestamps, speech content, and flags for interjections, questions, and other procedural elements. This dataset is favoured for its utility in examining parliamentary gender dynamics, speech patterns, and the evolution of political discourse over an extensive period.

## 2.2 Data Cleaning

## 2.3 Measurement

The Hansard dataset represents various real-world parliamentary phenomena through carefully constructed variables. However, as with all datasets, some considerations and limitations arise when transitioning from real-world events to structured data. This section discusses what the variables of interest are measuring and potential challenges in their representation.

Firstly, the variable `interject`, which indicates whether a speaker’s statement was interrupted, relies on the identification of interruptions as recorded in the Hansard transcripts. However, the variable may not fully capture the intent or context of interruptions, as it cannot distinguish between interruptions made in jest, as points of order, or as serious challenges. Additionally, subtle interruptions not formally acknowledged in the record or overlapping statements may go unflagged.

The variable `gender`, representing the speaker’s gender, was inferred by merging the dataset with external biographical sources, such as the `AustralianPoliticians` package. While this approach ensures consistency, it assumes the accuracy of external data sources, which may contain errors or outdated information. Furthermore, the binary classification of gender in the dataset does not account for non-binary or other gender identities, potentially limiting the scope of gender-based analyses.

The party variable categorizes speakers by their political affiliation. This information is directly parsed from the Hansard transcripts, where the party name or abbreviation is provided alongside the speaker’s details. However, variations in party naming conventions, particularly for smaller or region-specific parties, required standardization using external datasets like `Party Facts`. These efforts may introduce minor inconsistencies, especially in cases of historical party name changes or mergers.

Lastly, `word_count` quantifies the length of each speech by counting the number of words in the speech text. While straightforward to compute, this variable does not differentiate between substantive contributions and procedural or repetitive language. Additionally, transcription errors or inconsistencies in the Hansard record might slightly affect word count accuracy, though these are rare.

Overall, while the variables provide meaningful representations of parliamentary behavior, they are shaped by the limitations of transcription accuracy, data inference, and structural simplifications inherent in processing complex real-world phenomena.

## 2.4 Outcome Variables

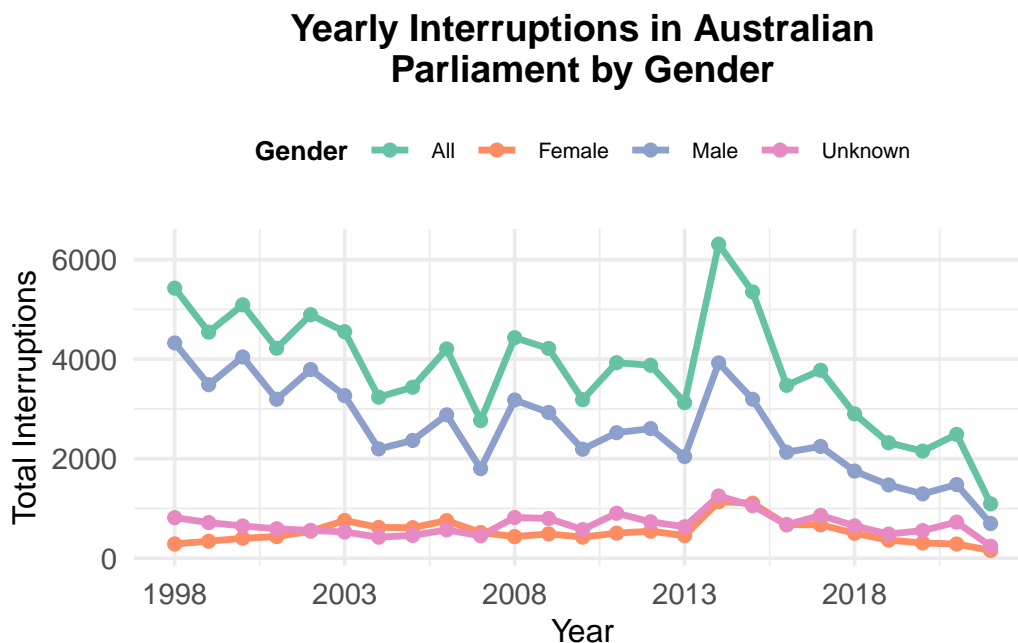


Figure 1: Yearly Interruptions in Australian Parliament by Gender

The outcome variable, interject, serves as a binary indicator of whether a speaker was interrupted during their speech. To explore the distributions of interruptions over years, we introduce the following plots. Figure 1 illustrates interruptions in the Australian Parliament from 1998 to 2022, categorized by gender. Notably, male speakers consistently faced more interruptions than females, with a peak in 2011 and a subsequent decline. Female speakers experienced fewer interruptions, with relatively stable figures across the years. The “Unknown” category, consistently low, suggests either minimal occurrence or documentation of such interruptions.

To provide a fair comparison of interruptions across different genders within the Australian Parliament, we normalize the data by calculating proportions. This method addresses the gender imbalance in parliament, ensuring that the analysis reflects the frequency of interruptions relative to each gender’s representation. Figure 2 presents the proportions of speeches interrupted by gender. It indicates that male speakers had a higher proportion of their speeches interrupted, especially during the mid-2000s to early 2010s, though the gap between genders

## Yearly Interruptions Proportions in Australian Parliament by Gender

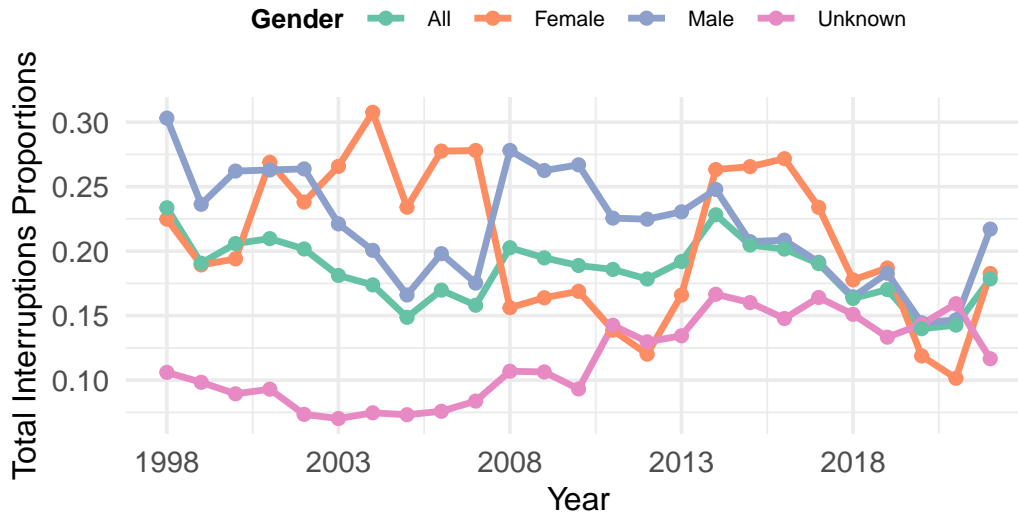


Figure 2: Yearly Interruptions Proportions in Australian Parliament by Gender

has narrowed over time. The proportion of interruptions for female speakers generally mirrors these fluctuations, implying that specific topics or periods may have incited more active parliamentary interactions. The “Unknown” gender shows minimal changes, highlighting its limited data representation. This analysis points out both the consistency and evolution of gender dynamics within parliamentary debates over the years.

## 2.5 Predictor Variables

Table 1: Gender-Based Interruption Analysis in Parliamentary Speeches

Proportion of Interruptions by Gender

Gender	Total Interruptions	Total Speeches	Interruption Proportion
Female	13301	65022	20.00%
Male	64995	292267	22.00%
Unknown	16697	148705	11.00%
All	94993	505994	19.00%

The predictor variables in this analysis capture key characteristics and contextual factors that may influence the likelihood of interruptions during parliamentary speeches. Gender represents

the speaker’s gender, allowing us to examine whether men and women experience interruptions at different rates. Party indicates the speaker’s political affiliation, reflecting potential partisan dynamics that could impact speech interactions. The government status variable identifies whether the speaker belongs to the governing party, which may affect their level of authority or the degree of scrutiny they face from the opposition. Lastly, the word count quantifies the length of each speech, providing insight into whether longer speeches are more likely to invite interruptions. Together, these variables offer a comprehensive framework for understanding how personal and contextual factors contribute to the dynamics of parliamentary discourse.

Table 1 provides a clear view of the proportion of interruptions by gender across all speeches in the dataset. The results show that male speakers were interrupted more frequently (21% of speeches) compared to female speakers (18% of speeches). Interestingly, the interruption proportion for unknown gender speakers is significantly lower, at only 11%. Overall, considering all speeches regardless of gender, the interruption proportion stands at 18%. This data suggests that gender may play a role in how frequently speakers are interrupted during parliamentary sessions, with male speakers facing a higher rate of interruption. This could reflect broader dynamics of gender interaction within the parliamentary setting.

Table 2: Gender Interruption Proportions Annual Comparison

Year	More Interrupted Gender
1998	Male
1999	Male
2000	Male
2001	Female
2002	Male
2003	Female
2004	Female
2005	Female
2006	Female
2007	Female
2008	Male
2009	Male
2010	Male
2011	Male
2012	Male
2013	Male
2014	Female
2015	Female
2016	Female
2017	Female
2018	Female
2019	Female

2020	Male
2021	Male
2022	Male

Table 2 displays the more interrupted gender every year in the parliament and compares all members and only chamber members. While most years are the same, there is a notable shift in the gender experiencing more frequent interruptions from 2018 to 2020. In the broader dataset, males were more frequently interrupted; however, this pattern shifts in the non-federal chamber data, where females became the more interrupted gender during these years. This change highlights the variability in gender dynamics within different parliamentary environments and suggests that factors specific to non-federal chamber settings may influence these interaction patterns more significantly for female members.

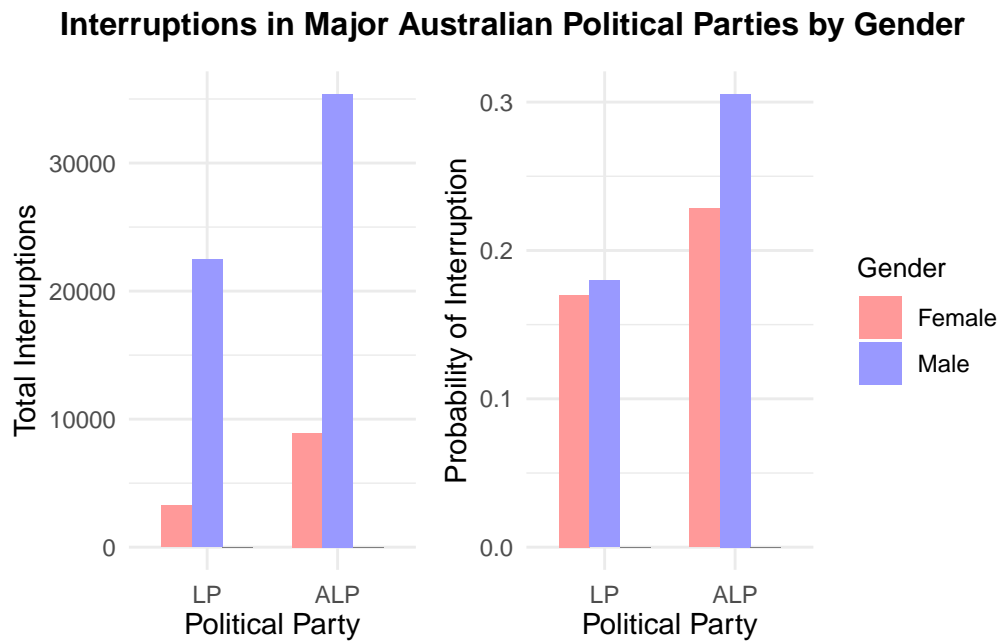


Figure 3: Interruptions in Major Australian Political Parties by Gender

Figure 3 focuses on the Liberal Party (LP) and the Australian Labor Party (ALP), the two major parties in Australian politics, to analyze interruptions by gender. Since these parties dominate parliamentary proceedings, they provide a significant sample of gender interaction dynamics. The total interruptions are higher in the ALP compared to the LP, with male members experiencing more interruptions than female members in both parties. We use proportions to normalize the data, accounting for differences in gender representation within these parties. This approach helps us understand the rate at which female and male members are

interrupted relative to their participation, offering a clearer insight into the parliamentary discourse dynamics.

Table 3: Interruption Summary by Government Status

Government Status	Interruption	Count
In Opposition	Yes	4
In Opposition	No	42920
In Government	Yes	22
In Government	No	61244
NA	Yes	94967
NA	No	306837

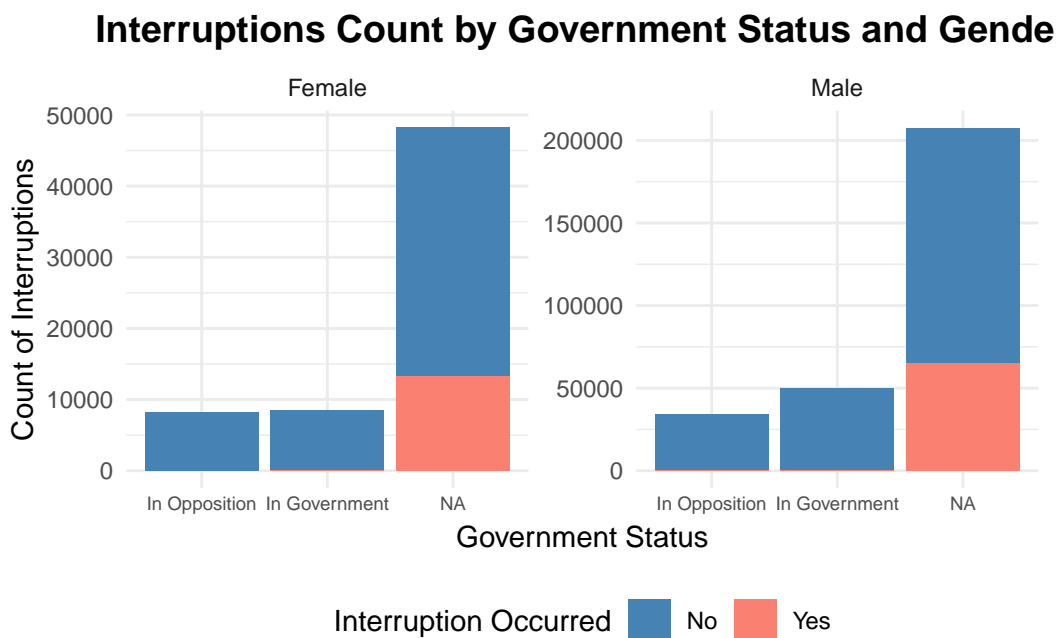


Figure 4: Count of Interruptions by Government Status and Gender

Table 3, `?@tbl-ingov2`, and Figure 4 offer a detailed look at interruptions during parliamentary sessions, categorized by members' government status and gender. Notably, interruptions are extremely rare for members with clearly identified status. This indicates a potential correlation between established government status and more orderly interactions, highlighting the importance of role clarity in maintaining decorum.

However, the significant amount of missing data makes reliable inferences about the true nature of interruptions and their correlation with member status challenging. The vast majority



of interruptions occur when the government status of the speaker is unknown. This trend is consistent across both the comprehensive dataset and the subset limited to non-federal chamber sessions. Interruptions are exceedingly rare for members whose government status is known, with only 22 interruptions for those “In Government” and an even fewer 4 for those “In Opposition” across all data. Due to this substantial amount of missing information, it is very difficult to firmly conclude whether our observed patterns hold true.

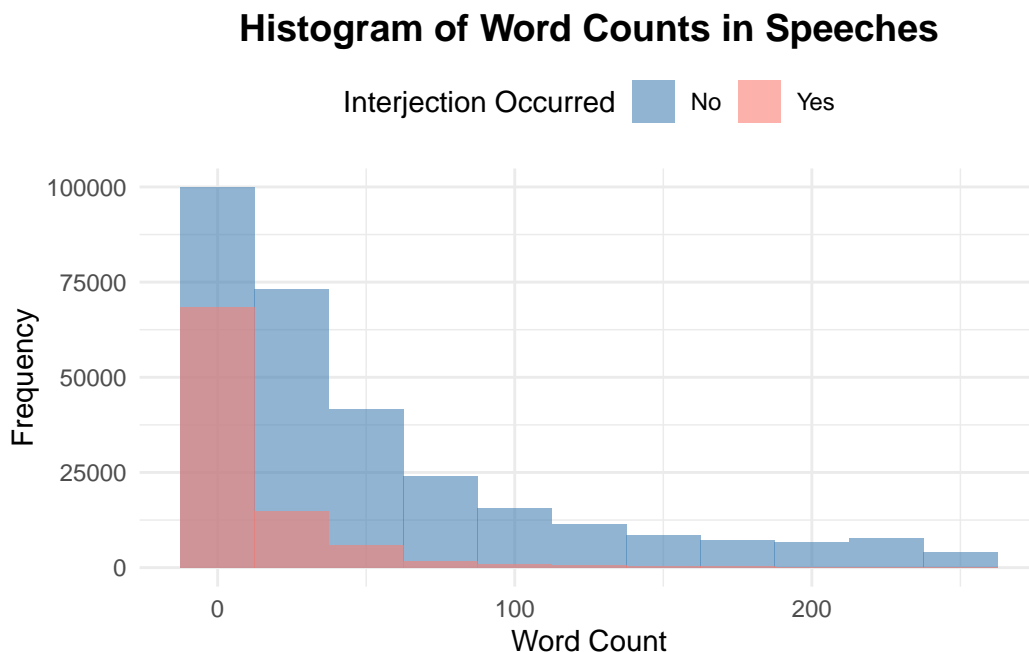


Figure 5: Histogram of Word Counts in Speeches (Up to 250 Words)

Figure 5 shows word counts in speeches divided into two categories: speeches where an interjection occurred and those without any interruptions. We can see that speeches without interruptions (blue bars) are more frequent across all word count ranges, especially as the number of words increases. Conversely, interrupted speeches (red bars) are less frequent and generally shorter. This trend suggests that interruptions tend to happen in shorter speeches or possibly cause speakers to shorten their remarks. This graph gives a clear visual indication of how interruptions might disrupt or influence the length of parliamentary speeches.

The density plot Figure 6 shows that the word count distribution for both male and female speakers is highly left-skewed, with the majority of speeches being very short. Both genders peak at shorter speeches, but male speakers tend to have even shorter speeches compared to females, as indicated by the higher peak density for men in the lower word count range. Notably, female speakers show a small rise in density between word counts of 200 and 300, suggesting that a subset of their speeches tends to be slightly longer compared to their male counterparts. This subtle difference highlights variation in speaking patterns between genders.

ensity Distribution of Word Count by Gender (Word Count = 500)

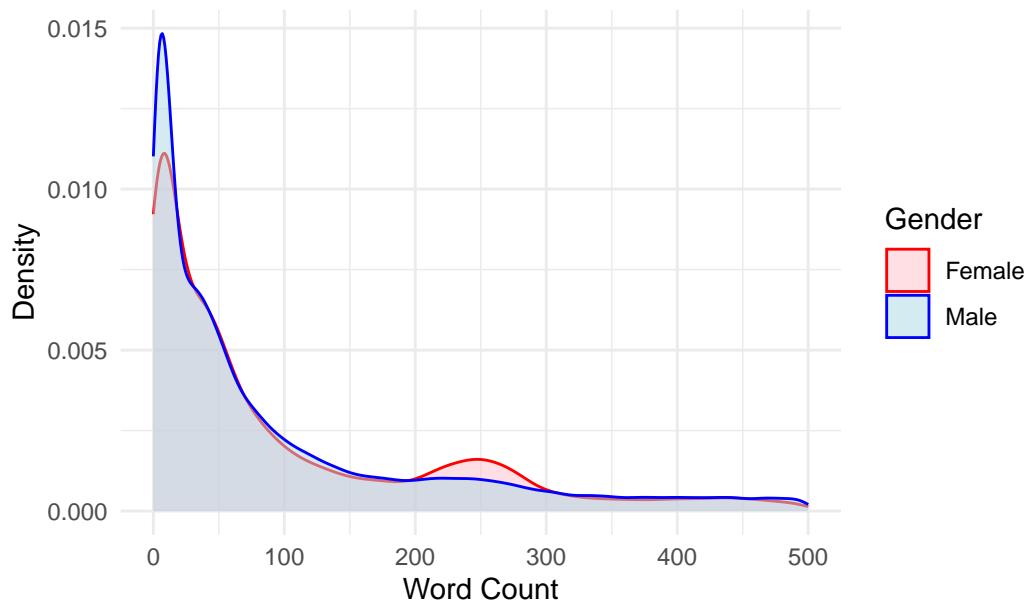


Figure 6: Density Distribution of Word Count by Gender

Table 4: Gender-Based Interruptions and Word Count

Gender	Interruption	Total Speeches	Average Words	Min Words	Max Words
Female	0	51721	519.30648	1	28893
Female	1	13301	35.78806	1	12762
Male	0	227272	410.61115	0	55752
Male	1	64995	28.39659	1	26098

Table 4 highlights that, on average, females tend to speak longer than males before an interruption occurs. For uninterrupted speeches, females average 560.72 words compared to 448.67 words for males. Even when interrupted, female speeches still have a higher average word count (37.76 words) than interrupted male speeches (28.76 words). This suggests that while females may face greater challenges overall, they tend to hold the floor longer before interruptions occur. However, the substantial drop in average word count for both genders during interruptions shows the disruptive impact, with females experiencing a steeper decline relative to their uninterrupted averages. This pattern indicates that while females often manage to speak at greater length initially, interruptions disproportionately diminish their overall speaking opportunities.

## 3 Model

### 3.1 Model set-up

I utilized a Bayesian logistic regression model to examine the relationship between speech interruptions and the speakers' genders. The model is formulated as follows:

$$\begin{aligned} y_i | \pi_i &\sim \text{Bern}(\pi_i) \\ \text{logit}(\pi_i) &= \alpha + \beta_1 \times \text{gender}_i + \beta_2 \times \text{party}_i + \beta_3 \times \text{word\_count}_i + \beta_4 \times \text{word\_count\_gender}_i \\ \alpha &\sim \text{Normal}(0, 5) \\ \beta_1 &\sim \text{Normal}(0, 2.5) \\ \beta_2 &\sim \text{Normal}(0, 2.5) \\ \beta_3 &\sim \text{Normal}(0, 2.5) \\ \beta_4 &\sim \text{Normal}(0, 2.5) \end{aligned} \tag{1}$$

## 4 Results

Table 5 identifies key predictors including gender, party, and word count of speech interruptions in parliamentary proceedings. Gender plays an important role, with male speakers more likely to experience interruptions compared to female speakers. This suggests that men face slightly higher odds of interjections during their speeches. Party affiliation also significantly influences interruptions, with some parties, such as the ALP, experiencing more frequent interjections, while others, like the LNP, are interrupted less often. These patterns highlight how political dynamics can shape interactions in debates.

Additionally, the length of speeches affects interruptions, with longer speeches slightly less likely to be interrupted, suggesting that concise speeches may invite more interjections. Notably, the interaction between word count and gender reveals that male speakers experience a slight increase in interruptions as their speech length increases, a trend that is less pronounced for female speakers. These findings underscore the combined effects of gender, party dynamics, and speech characteristics in shaping interruption patterns.

The logistic regression model Table 6 continues to highlight key predictors of interruptions during speeches, with the removal of party. Male speakers remain more likely to experience interruptions than female speakers, but the effect size has slightly decreased, reflecting a smaller increase in the likelihood of interruptions. The relationship between speech length and interruptions remains consistent, with longer speeches slightly reducing the likelihood of interruptions. The interaction between word count and gender also remains unchanged, suggesting that longer speeches by male speakers are still slightly more likely to invite interruptions compared to those by females.

Table 5: Model 1 for Interruptions (n = 1000)

Speech Interrupted		
(Intercept)		−0.723 (0.266)
genderMale		0.409 (0.268)
genderUnknown		−0.854 (2.059)
partyALP		0.638 (0.186)
partyIND		−0.060 (0.745)
partyNP		0.017 (0.601)
partyCLP		0.317 (1.253)
partyInd		1.817 (0.961)
partyNPA		1.998 (1.382)
partyLIB		1.022 (1.094)
partyNATS		−0.756 (1.100)
partyAG		−1.751 (1.722)
partyInd.		0.831 (1.297)
partyNats		−0.510 (0.683)
partyAUS		−0.052 (2.418)
partyCA		−0.533 (2.063)
partyKAP		−1.396 (1.813)
partyLNP		−1.559 (0.962)
word_count		−0.015 (0.002)
word_count_gender		0.008 (0.003)
Num.Obs.		1000
R2		0.250
Log.Lik.	12	−382.527
ELPD		−408.4
ELPD s.e.		35.0
LOOIC		816.8
LOOIC s.e.		70.0
WAIC		813.1
RMSE		0.34

Table 6: Model 2 for Interruptions (n = 1000)

	Speech Interrupted
(Intercept)	−0.358 (0.231)
genderMale	0.337 (0.250)
genderUnknown	−1.003 (1.889)
word_count	−0.016 (0.002)
word_count_gender	0.008 (0.003)
Num.Obs.	1000
R <sup>2</sup>	0.212
Log.Lik.	−396.689
ELPD	−410.7
ELPD s.e.	33.7
LOOIC	821.4
LOOIC s.e.	67.4
WAIC	819.6
RMSE	0.35

Topic 1 Top Words:

Highest Prob: ensure, national, australian, security, support, legislation, measures  
FREX: covidsafe, flag, app, detainees, compatibility, aboriginal, english  
Lift: jabiru, mirarr, #pridenotprofit, 10,000th, 115-97, 13the, 14-being  
Score: rights, security, ensure, aboriginal, app, human, national

Topic 2 Top Words:

Highest Prob: regional, industry, cent, research, waste, energy, universities  
FREX: holden, reef, intermediate-level, environmental, procurement, energy, pfas  
Lift: , µm, 0.65km, 0.8km, 100-metre, 150m, 200m  
Score: regional, industry, waste, energy, universities, reef, research

Topic 3 Top Words:

Highest Prob: support, also, member, new, year, last, first  
FREX: governor, climate, hayne, first, reserve, housing, drought  
Lift: 100-pound, 112-metre, 115-290, 1980s.according, 2013-perhaps, 2014ongoing211913nor  
Score: also, new, member, support, last, year, first

Topic 4 Top Words:

Highest Prob: \$, australians, work, million, jobs, local, sector  
FREX: interjecting, million, roads, lindsay, recycling, jobs, queensland  
Lift: bundamba, castlereagh, coo-ee, lizzie, workies, #makeamazonpay, 062597-16sa-bs  
Score: \$, million, jobs, australians, local, work, queensland

Topic 5 Top Words:

Highest Prob: minister, government, time, just, said, today, think  
FREX: hon, mpsenator, minister, heard, absent, think, shadow  
Lift: 2020titlesshadow, accountabilitysenator, affairsandrew, apprenticeshipsthe, artshor  
Score: minister, time, just, government, think, said, families

Topic 6 Top Words:

Highest Prob: will, australia, one, can, get, like, prime  
FREX: workers, teddy, petitioners, businesses, petition, insolvency, payments  
Lift: 101st, 115a, 2-day, 20-day, 45d, 50-degree, act2018  
Score: businesses, prime, get, will, workers, one, australia

Topic 7 Top Words:

Highest Prob: bill, will, committee, family, report, australia, commission  
FREX: court, parental, subsection, circuit, judges, law, mins  
Lift: 14no, 16no, 18no, 19partial, 2013-14, 20no, 36f  
Score: bill, committee, court, law, family, report, review

Topic 8 Top Words:

Highest Prob: people, government, need, now, many, know, us  
FREX: wages, poverty, pensioners, tafe, newstart, liberals, talking  
Lift: kulvinder, perronne, risch, 240-a-week, 35-which, 3m, 551st  
Score: people, government, need, back, know, go, now

Topic 9 Top Words:

Highest Prob: australian, per, community, will, around, make, public  
FREX: island, community, jobkeeper, ndis, investigator, open, lives

Lift: #bookthemout, 1,000,000.00maddie, 1,000,000.00walter, 1,084,852.43monash, 1,093,6  
Score: community, australian, per, jobkeeper, will, economic, billion  
Topic 10 Top Words:  
Highest Prob: health, house, care, question, cent, education, members  
FREX: veterans, adf, cancer, card, civilian, gp, omitted  
Lift: #endyouthsuicide, #rebuildingyounglives, #youthinsearch, 145523555079included, 15  
Score: health, care, question, education, house, veterans, superannuation

To analyze discussions in the Australian Parliament, I applied Structural Topic Modeling (STM) to identify key themes in speeches from 2020. The process began with data preprocessing, where I filtered the dataset to include only relevant entries, removed missing values, and structured the text data for analysis. A document-feature matrix (DFM) was then created, representing word frequencies while eliminating punctuation, stopwords, and low-frequency terms to improve model efficiency.

The STM model was trained with 10 topics and incorporated party affiliation and speaker gender as prevalence covariates, allowing for an examination of how these factors influence topic distribution. The model was optimized over 50 iterations, ensuring convergence and stability. The final output provided a breakdown of the dominant topics, with key terms extracted using highest probability words, FREX words (distinctive to each topic), Lift words (rare but highly relevant), and Score words (best summarizing a topic’s meaning).

Table 7 provides an overview of the most prevalent themes in the 2020 Australian parliamentary speeches. The x-axis represents the expected topic proportions, indicating how frequently each topic appears across the dataset. The y-axis lists the top topics, summarized by their most representative words.

From this visualization, Topic 5 (“minister, government, time, just”) emerges as the most dominant theme, suggesting that government policies, ministerial discussions, and legislative matters were central to parliamentary discourse. Topic 8 (“people, government, need, now”) follows closely, highlighting debates around public needs, government interventions, and social policies. Other significant topics include healthcare (Topic 10), economic measures (Topic 4), legal and family-related issues (Topic 7), and national security (Topic 1).

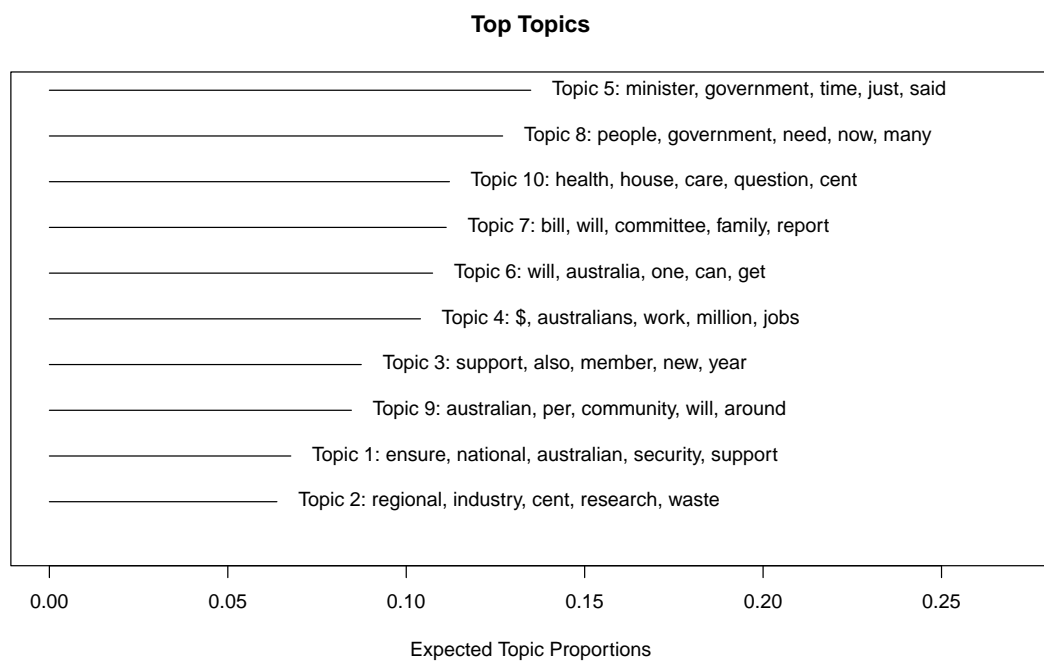
The distribution of topics provides insights into policy priorities and legislative focus areas during 2020. By incorporating metadata such as speaker affiliation and gender, further analysis can uncover how different political groups or demographics engaged with these key issues.

#### 4.0.1 Model justification

We expect a positive relationship between the size of the wings and time spent aloft. In particular...

We can use maths by including latex between dollar signs, for instance  $\theta$ .

Table 7: STM Topic Proportion Plot





## **5 Discussion**

### **5.1 First discussion point**

If my paper were 10 pages, then should be at least 2.5 pages. The discussion is a chance to show off what you know and what you learnt from all this.

### **5.2 Second discussion point**

Please don't use these as sub-heading labels - change them to be what your point actually is.

### **5.3 Third discussion point**

### **5.4 Weaknesses and next steps**

Weaknesses and next steps should also be included.

## **Appendix**

### **A Additional data details**

### **B Model details**

#### **B.1 Posterior predictive check**

#### **B.2 Diagnostics**

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