

The Voice of US Presidents

The message, sentiment, and
sophistication of words in
presidential history



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Overview & Objective

Words matter.

**"Speech is power: speech is to persuade,
to convert, to compel."**

- Ralph Waldo Emerson

We want to understand Presidents' use of a speech's power.

Examining:

- Sentiment
- Sophistication of words
- Focus of content

Looking for trends, patterns, and tactics.

Workflow



Data Pre-processing

991 Presidential Speeches

Regex

Stopwords

Lemmatization



'Starting Point' Analysis

CountVectorizer

Word clouds

'Top words'

Sentiment analysis



Topic Modeling

CountVectorizer, TFIDF

LSA, NMF, & LDA w/Gensim

stopwords, max_df, min_df,
n_grams

Topic Creation & Selection



'Readability' Analysis

Readability Score analysis
(sophistication of words)

*Pulling it all together
for visualization &
analysis! >*



Data Pre-processing

991 Presidential Speeches

Regex

Stopwords

Lemmatization



'Starting Point' Analysis

CountVectorizer

Word clouds

'Top words'

Sentiment analysis



Topic Modeling

Selected model:

CountVectorizer
LDA w/Gensim

custom stopwords,
max_df=0.8, Min_df=0.1,
bigrams



'Readability' Analysis

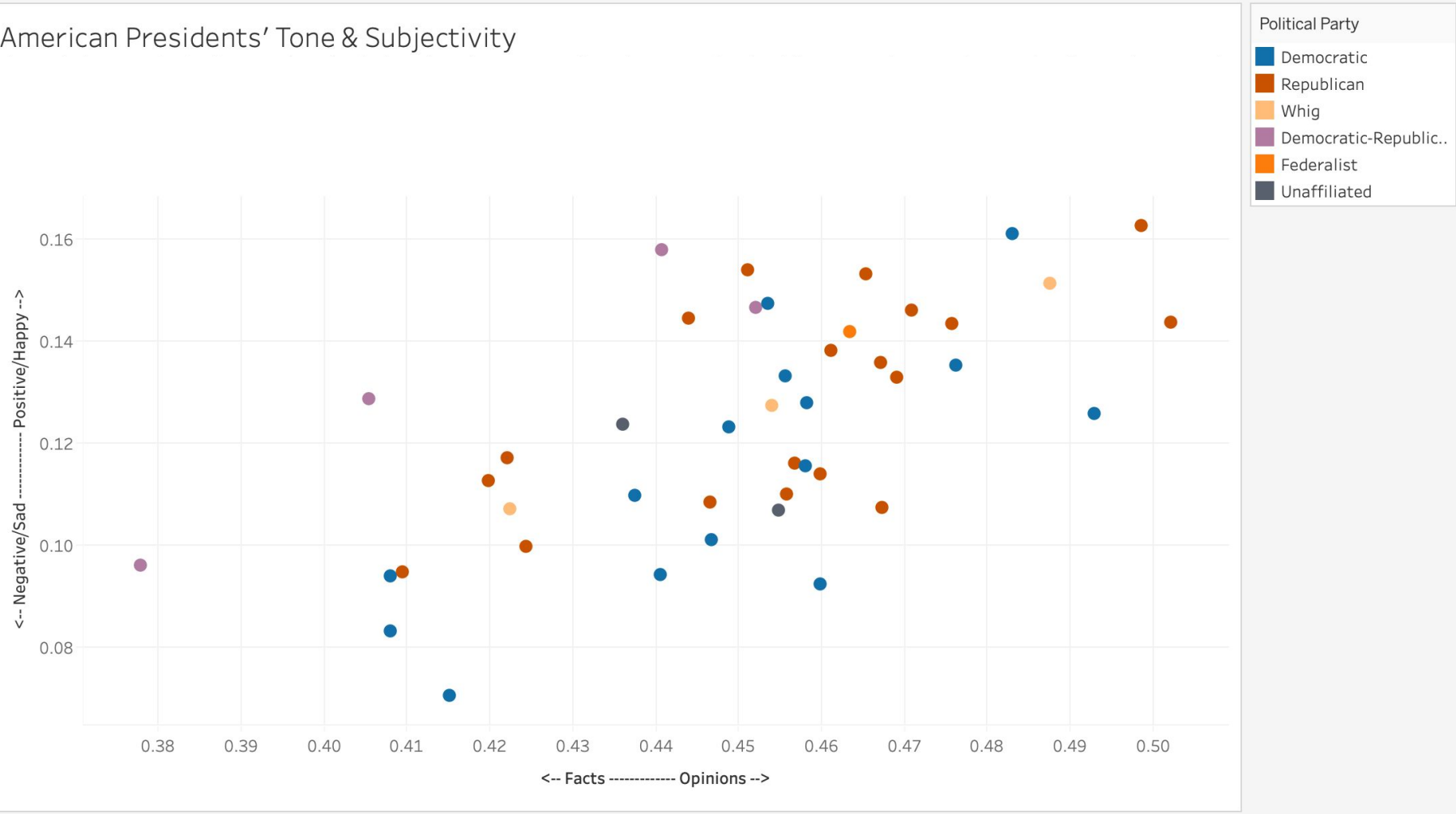
Readability Score analysis
(sophistication of words)

*Pulling it all together
for visualization &
analysis! >*

Findings

Findings: Sentiment

American Presidents' Tone & Subjectivity

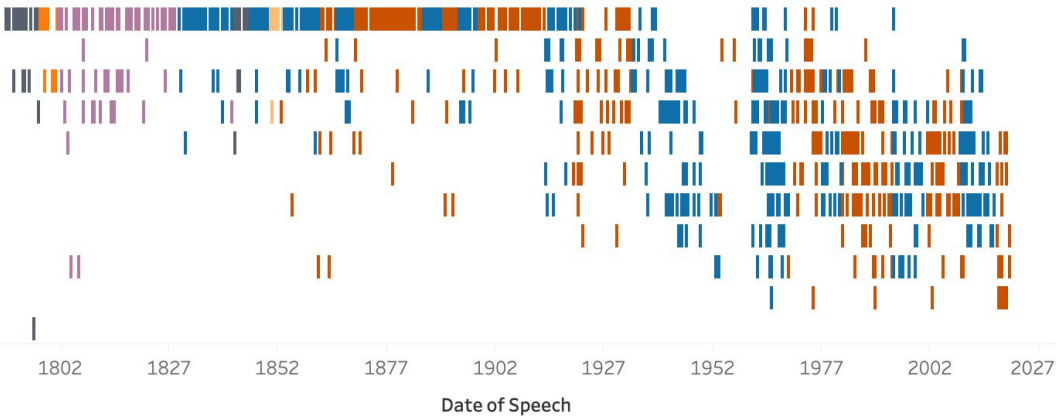


Findings: Sophistication of Words

Sophistication of Words in Presidential Speeches Over the Ages

Sophistication of Speech

- college-level or higher
- 13th and 14th grade
- 12th and 13th grade
- 11th and 12th grade
- 10th and 11th grade
- 9th and 10th grade
- 8th and 9th grade
- 7th and 8th grade
- 6th and 7th grade
- 5th and 6th grade
- 4th grade and below



- Party
- Democratic
 - Republican
 - Whig
 - Democratic-Republic..
 - Federalist
 - Unaffiliated

President

(All) ▼

Sophistication of Words in Presidential Speeches Over the Ages

Sophistication of Speech

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- 9th and 10th grade
- 8th and 9th grade
- 7th and 8th grade
- 6th and 7th grade
- 5th and 6th grade
- 4th grade and below

1802 1827 1852 1877 1902 1927 1952 1977 2002 2027

Date of Speech

Party

- Democratic
- Republican
- Whig
- Democratic-Republic..
- Federalist
- Unaffiliated

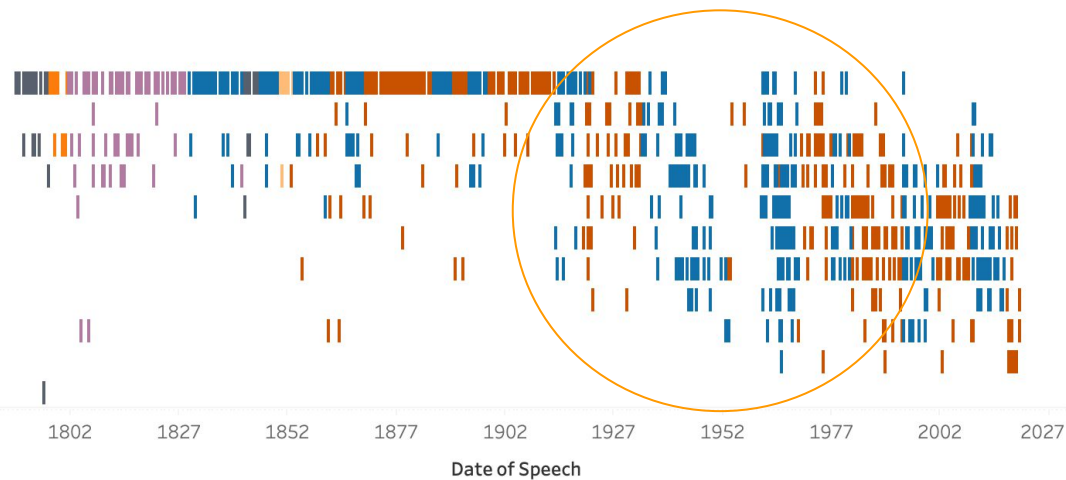
President

(All) ▼

Sophistication of Words in Presidential Speeches Over the Ages



college-level or higher
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6th and 7th grade
5th and 6th grade
4th grade and below



Party

■ Democratic

Republican

Whig

Democratic-Republic..

Federalist

■ Unaffiliated

President

(All)

Findings: Topics of Speeches

Topics of Speeches:

American jobs and family help & needs

Law, constitution, and rights

Laws, treaties, and action

Public power & duty

War with American freedom

Work & business

World peace with war & force

Topics of Speeches:

American jobs and family help & needs

Law, constitution, and rights

Laws, treaties, and action

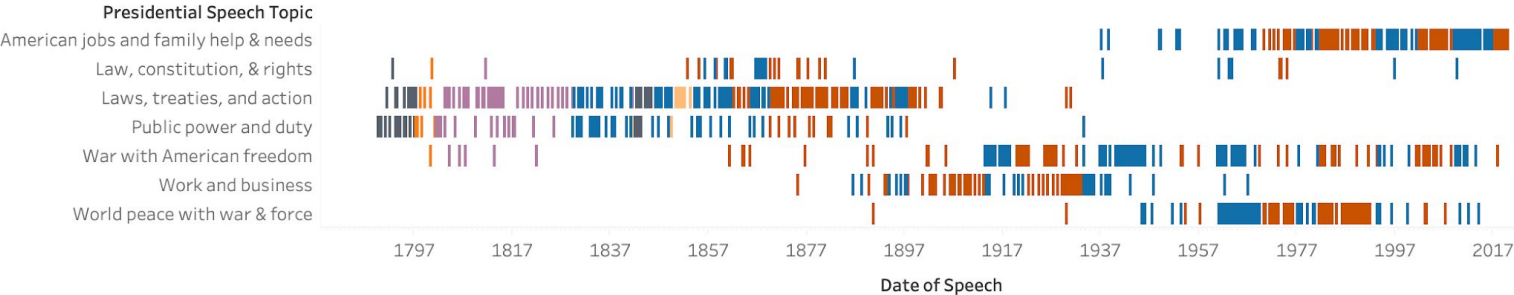
Public power & duty

War with American freedom

Work & business

World peace with war & force

Presidential Speech Topics Over the Ages



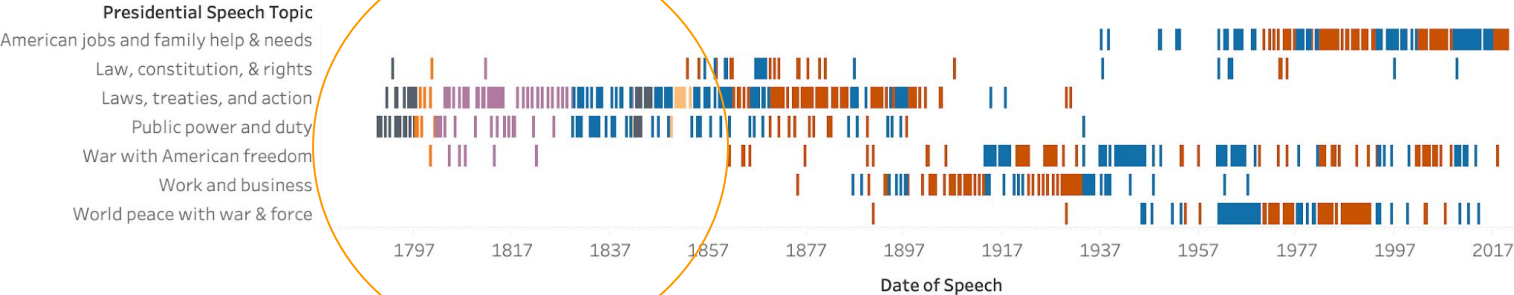
Political Party

- Democratic
- Republican
- Whig
- Democratic-Republic..
- Federalist
- Unaffiliated

President

(All)

Presidential Speech Topics Over the Ages



Presidential Speech Topics Over the Ages

- Presidential Speech Topic**
- American jobs and family help & needs
 - Law, constitution, & rights
 - Laws, treaties, and action
 - Public power and duty
 - War with American freedom
 - Work and business
 - World peace with war & force



- Political Party**
- Democratic
 - Republican
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 - Democratic-Republic..
 - Federalist
 - Unaffiliated

President

(All)

Presidential Speech Topics in USA's Historical Periods

This graph shows what speech topics were used during major historical periods of American history.

Historical Period	Presidential Speech Topic						
	American jobs and family help & needs	Law, constitution, & rights	Laws, treaties, and action	Public power and duty	War with American freedom	Work and business	World peace with war & force
1789-1799: New Democratic Nation		■	■	■	■		
1800-1860: Settlement & Expansion		■	■	■	■		
1861-1865: American Civil War		■	■	■	■		
1865-1890: Reconstruction Era & Gilded Age		■	■	■	■	■	
1890-1913: Progressive Era		■	■	■	■	■	■
1914-1918: World War I / Progressive Era			■		■	■	
1919-1928: Roaring Twenties / Progressive Era					■	■	
1929-1932: Great Depression			■		■	■	■
1933-1938: Great Depression/New Deal	■	■		■	■	■	
1939-1945: World War II					■	■	■
1946-1953: Cold War	■				■	■	■
1954-1964: Cold War / Civil Rights Movement	■	■			■	■	■
1965-1968: Cold & Vietnam Wars / Civil Rights Movement	■				■	■	■
1969-1972: Cold & Vietnam Wars	■				■		■
1973-1975:: Energy Crisis/Cold & Vietnam Wars	■	■			■		■
1976-1980: Energy Crisis/Cold War	■				■		■
1981-1991: Reagan Era / Cold War	■		■		■		■
1992-2000: Neoconservative / Dot-Com Era	■	■			■		■
2001-2006: 'War on Terror'	■				■		■
2007-2009: Great Recession / 'War on Terror'	■	■			■		■
2010-2019: Ongoing 'War on Terror'	■	■			■		■

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1861-1865: American Civil War		■	■	■	■		
1865-1890: Reconstruction Era & Gilded Age		■	■	■	■	■	
1890-1913: Progressive Era		■	■	■	■	■	■
1914-1918: World War I / Progressive Era			■		■	■	
1919-1928: Roaring Twenties / Progressive Era					■	■	
1929-1932: Great Depression			■		■	■	■
1933-1938: Great Depression/New Deal	■	■		■	■	■	
1939-1945: World War II					■	■	■
1946-1953: Cold War	■				■	■	■
1954-1964: Cold War / Civil Rights Movement	■	■			■	■	■
1965-1968: Cold & Vietnam Wars / Civil Rights Movement	■				■	■	■
1969-1972: Cold & Vietnam Wars	■				■		■
1973-1975:: Energy Crisis/Cold & Vietnam Wars	■	■			■		■
1976-1980: Energy Crisis/Cold War	■				■		■
1981-1991: Reagan Era / Cold War	■		■		■		■
1992-2000: Neoconservative / Dot-Com Era	■	■			■		■
2001-2006: 'War on Terror'	■				■		■
2007-2009: Great Recession / 'War on Terror'	■	■			■		■
2010-2019: Ongoing 'War on Terror'	■	■			■		■

Summary of Findings:

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Sentiment seems to vary by President, not necessarily party.

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‘Sophistication’ of words in speeches has trended down over years.

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Topics of speeches vary more over the years vs by political party.

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Topics of speeches vary more over the years vs by political party.

Topics of speeches seem to have a relationship with the state-of-nation

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Sentiment seems to vary by President, not necessarily party.

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Topics of speeches vary more over the years vs by political party.

Topics of speeches seem to have a relationship with the state-of-nation
and historical periods may serve as a catalyst for a shift in topics for generations.

Summary of Findings:

Sentiment seems to vary by President, not necessarily party.

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Topics of speeches vary more over the years vs by political party.

Topics of speeches seem to have a relationship with the state-of-nation
and historical periods may serve as a catalyst for a shift in topics for generations.

Future Opportunities

- Pair with American historian for deeper insights and examination
- Examine evolution of meaning & context words over time, such as:

Rights

Duty

International Countries

Women



Thank you

Do you have any questions?

Email: celinaplaza@gmail.com
LinkedIn: [linkedin.com/in/celinaplaza](https://www.linkedin.com/in/celinaplaza)
Website: celinaplaza.org

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APPENDIX

Greatest Future Opportunity: A woman's voice as President



50.8%

of US population

A Woman's Voice

Presidential Speeches Through the Ages

This is a 'master graph' for analysis of presidential speeches from 1789 - 2019. Each square represents a unique speech and is categorized by its date, speaker (President), and its main topic.

Use the filters on the right to narrow your results by Party, President, Historical Period, Sophistication of Speech, Subjectivity of Words, and/or Speech Topic.

Year of Date	President	American jobs and family help & needs	Law, constitution, & rights	Laws, treaties, and action	Public power and duty	War with American freedom	Work and business
1789	George Washington				■ ■		
1790	George Washington			■	■ ■		
1791	George Washington				■		
1792	George Washington	■		■	■		
1793	George Washington			■	■ ■		
1794	George Washington			■	■ ■		
1795	George Washington			■	■		
1796	George Washington			■ ■ ■	■		
1797	John Adams			■	■ ■		
1798	John Adams			■	■		
1799	John Adams			■		■	
1800	John Adams		■		■		
1801	Thomas Jefferson				■ ■ ■		
1802	Thomas Jefferson				■ ■ ■		
1803	Thomas Jefferson			■ ■ ■		■	
1804	Thomas Jefferson			■			
1805	Thomas Jefferson			■ ■	■		
1806	Thomas Jefferson			■ ■		■ ■	
1807	Thomas Jefferson			■ ■ ■ ■			
1809	James Madison			■ ■	■		

Party

(All)

President

(All)

Historical Period

(All)

Sophistication of Speech

(All)

<-- More Factual ----- More Opinonated -->

0.18940.6095

Presidential Speech Topic

■ American jobs and family help & needs

■ Law, constitution, & rights

■ Laws, treaties, and action

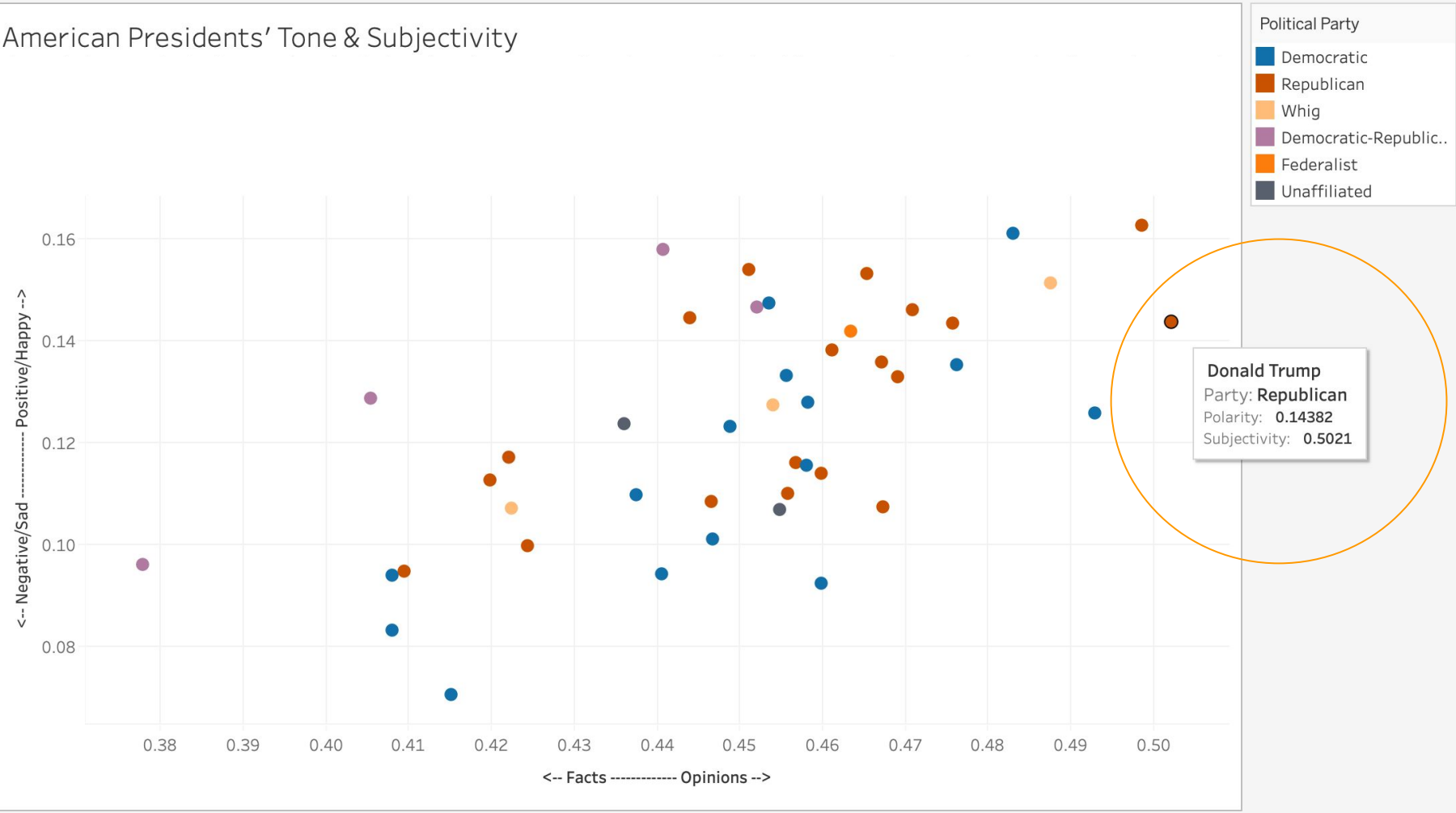
■ Public power and duty

■ War with American freedom

■ Work and business

■ World peace with war & force

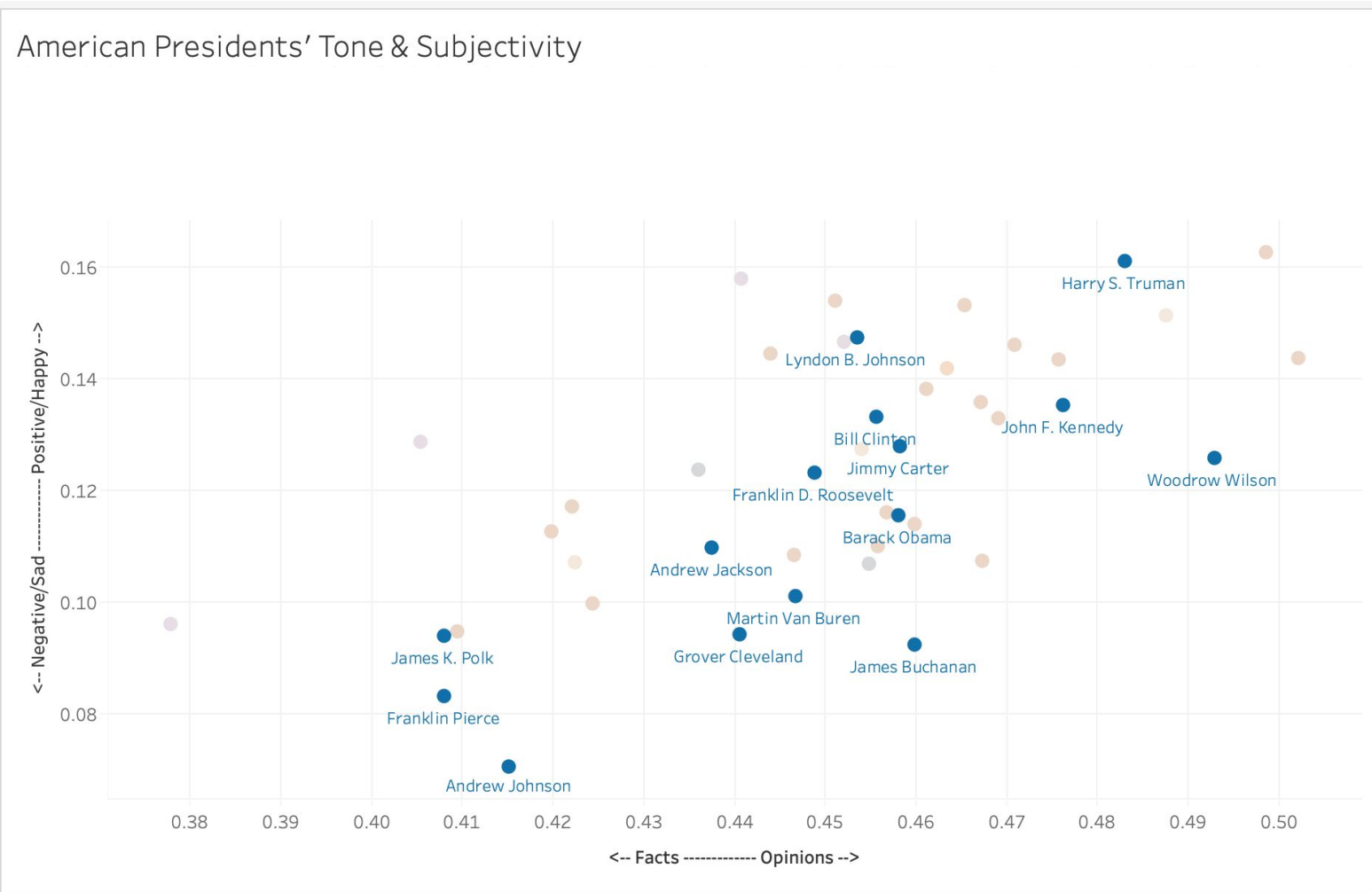
American Presidents' Tone & Subjectivity



American Presidents' Tone & Subjectivity

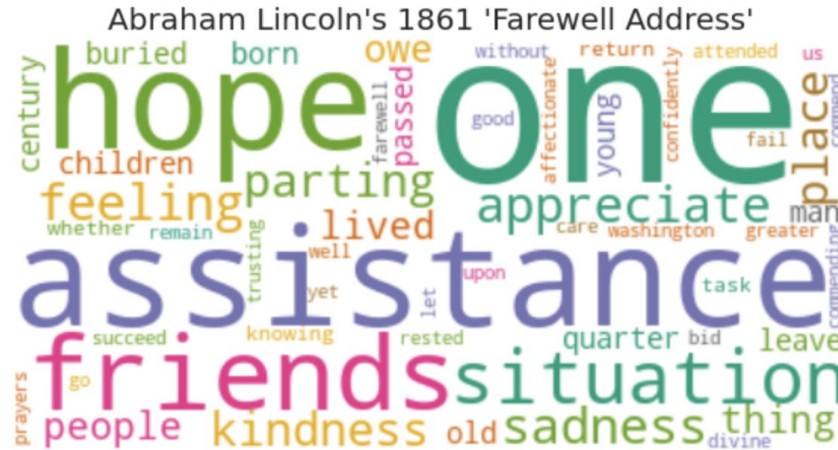
The scatter plot displays the relationship between the ratio of negative to positive sentiment (Fact vs. Opinion) on the x-axis and the ratio of positive to happy sentiment on the y-axis for various American presidents. The x-axis ranges from 0.38 to 0.50, and the y-axis ranges from 0.08 to 0.16. Presidents are plotted as colored dots, with labels indicating their names. The plot shows a general trend where presidents with higher subjectivity (higher x-value) also tend to have a more positive tone (higher y-value).

President	Fact vs. Opinion (X)	Positive vs. Happy (Y)
James K. Polk	0.408	0.094
Franklin Pierce	0.409	0.083
Andrew Johnson	0.415	0.071
Grover Cleveland	0.440	0.094
Martin Van Buren	0.441	0.094
Andrew Jackson	0.437	0.107
Franklin D. Roosevelt	0.448	0.123
Lyndon B. Johnson	0.452	0.147
Bill Clinton	0.455	0.130
Jimmy Carter	0.458	0.128
Barack Obama	0.458	0.115
James Buchanan	0.460	0.092
John F. Kennedy	0.468	0.132
Harry S. Truman	0.482	0.161
Woodrow Wilson	0.492	0.126

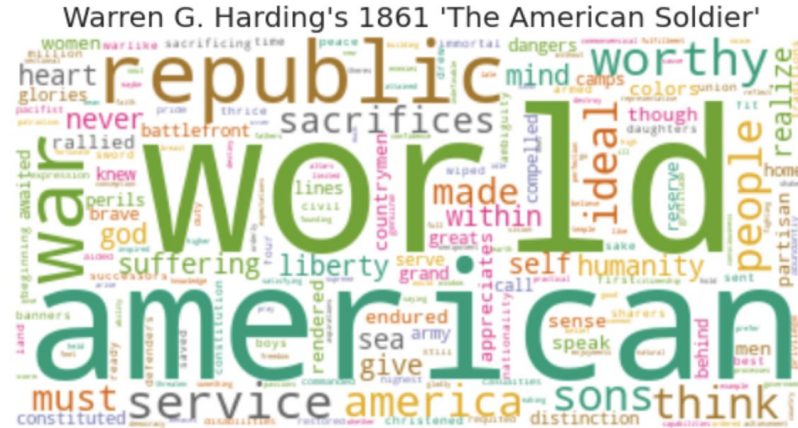


s ----- Opinions -->

The most 'negative' speech in this analysis:



Wordcloud for ‘most subjective’ speech



Wordclouds for George Washington's speeches

George Washington



Third Annual Message to Congress



Proclamation of Neutrality



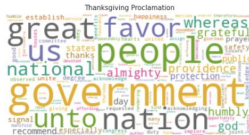
Proclamation of Pardons in Western Pennsylvania



Eighth Annual Message to Congress



Thanksgiving Proclamation



Veto Message on Congressional Redistricting



Fifth Annual Message to Congress



Seventh Annual Message to Congress



First Annual Message to Congress



Fourth Annual Message to Congress



Proclamation against Opposition to Execution of Laws and Excise Duties in Western Pennsylvania



Message to the House of Representatives, Declining to Submit Diplomatic Instructions and Correspondence



Second Annual Message to Congress



Proclamation Against Crimes Against the Cherokee Nation



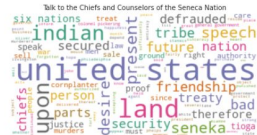
Proclamation of Militia Service



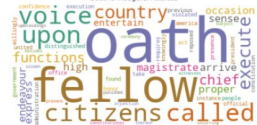
Talk to the Cherokee Nation



Talk to the Chiefs and Counselors of the Seneca Nation



Second Inaugural Address:



Sixth Annual Message to Congress



Farewell Address



Wordclouds for Barack Obama's speeches

Barack Obama Second Term

Nominee Acceptance Speech at 2012 Democratic National Convention



2012 Election Night Victory Speech



Remarks on Sandy Hook Elementary Shooting



Second Inaugural Address:



Remarks on Immigration Reform



2013 State of the Union Address



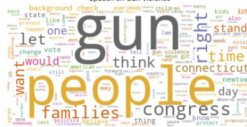
Statement on the Government Sequester



Address to the People of Israel



Speech on Gun Violence



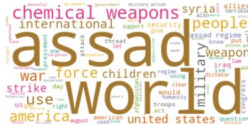
Remarks on Trayvon Martin



Remarks on Education and the Economy



Address to the Nation on Syria



Speech on Economic Mobility



2014 State of the Union Address



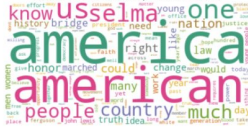
Address to the Nation on Immigration



2015 State of the Union Address



Remarks at the 50th Anniversary of the Selma Marches



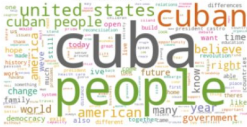
Remarks in Eulogy for the Honorable Reverend Clementa Pickens:



2016 State of the Union Address



Remarks to the People of Cuba



Commencement Address at Rutgers University



Remarks to the People of Cuba

Wordclouds for Donald Trump's speeches

Donald Trump



Remarks on National Security Strategy



Remarks at the Conservative Political Action Conference



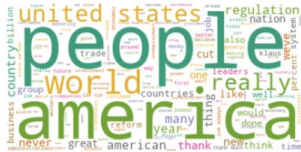
State of the Union Address



Address to Joint Session of Congress



Address at the World Economic Forum



Remarks on Combating the Opioid Crisis



Speech Declaring a National Emergency



Speech at the Unleashing American Energy Event



State of the Union Address



Speech at the Veterans of Foreign Wars National Convention



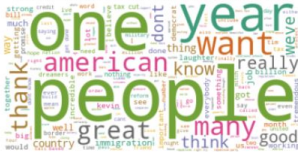
Remarks at the United Nations General Assembly



Speech at the Boy Scout Jamboree



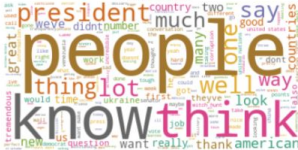
Remarks at the House and Senate Republican Member Conference



Address at the 73rd Session of the United Nations General Assembly



Press Conference



Address to the United Nations General Assembly



Statement on the School Shooting in Parkland, Florida



Remarks about the US Southern Border



Words within speech topics (1 of 2):

Law, constitution, and rights

0.018**"law" + 0.015**"constitution" + 0.015**"right" + 0.013**"question" + 0.010**"congress" + 0.009**"house" + 0.008**"election" + 0.008**"slavery" + 0.008**"act" + 0.007**"union"

World peace with war & force

0.014**"world" + 0.013**"peace" + 0.009**"vietnam" + 0.009**"american" + 0.009**"soviet" + 0.009**"war" + 0.007**"force" + 0.007**"new" + 0.006**"military" + 0.006**"security"

War with American freedom

0.019**"world" + 0.016**"war" + 0.013**"american" + 0.012**"peace" + 0.012**"men" + 0.010**"life" + 0.009**"america" + 0.009**"freedom" + 0.007**"right" + 0.007**"free"

Work & business

0.009**"law" + 0.008**"congress" + 0.008**"work" + 0.007**"business" + 0.006**"service" + 0.006**"public" + 0.006**"national" + 0.006**"american" + 0.005**"commission" + 0.005**"legislation"

Words within speech topics (2 of 2):

American jobs and family help & needs

0.017*"american" + 0.013*"america" + 0.010*"new" + 0.009*"job" + 0.009*"work" + 0.007*"tax" + 0.007*"child" + 0.007*"world" + 0.006*"help" + 0.006*"need"

Public power & duty

0.016*"public" + 0.016*"power" + 0.009*"duty" + 0.009*"bank" + 0.008*"constitution" + 0.007*"congress" + 0.007*"law" + 0.007*"citizen" + 0.006*"union" + 0.006*"present"

Laws, treaties, and action

0.012*"congress" + 0.008*"law" + 0.008*"treaty" + 0.007*"act" + 0.007*"war" + 0.006*"duty" + 0.006*"citizen" + 0.006*"power" + 0.005*"territory" + 0.005*"public"

Sophistication of Words in Presidential Speeches Over the Ages

Sophistication of Speech

- 5th and 6th grade
- 6th and 7th grade
- 7th and 8th grade
- 8th and 9th grade
- 9th and 10th grade
- 10th and 11th grade
- 11th and 12th grade
- 12th and 13th grade
- 13th and 14th grade

2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020

Date of Speech

Barack
Obama

Donald
Trump

Party

Democratic

Republican

President

(Multiple values)

Enter search text

☐ (All)

☐ Abraham Lincoln

☐ Andrew Jackson

☐ Andrew Johnson

☒ Barack Obama

☐ Benjamin Harrison

☐ Bill Clinton

☐ Calvin Coolidge

☐ Chester A. Arthur

☒ Donald Trump

☐ Dwight D. Eisenhower

☐ Franklin D. Roosevelt

☐ Franklin Pierce

☐ George H. W. Bush

☐ George W. Bush

☐ George Washington

☐ Gerald Ford

☐ Grover Cleveland

☐ Harry S. Truman

☐ Herbert Hoover

☐ James A. Garfield

☐ James Buchanan

☐ James K. Polk

☐ James Madison

☐ James Monroe

☐ Jimmy Carter

☐ John Adams

☐ John F. Kennedy

☐ John Quincy Adams

Number of speeches in each historical period

1800–1860: Settlement & Expansion	182
1865–1890: Reconstruction Era & Gilded Age	100
1890–1913: Progressive Era	82
1981–1991: Reagan Era / Cold War	74
1954–1964: Cold War / Civil Rights Movement	68
2010–2019: Ongoing 'War on Terror'	59
1965–1968: Cold & Vietnam Wars / Civil Rights Movement	47
1992–2000: Neoconservative / Dot-Com Era	44
1939–1945: World War II	36
1914–1918: World War I / Progressive Era	32
1919–1928: Roaring Twenties / Progressive Era	32
2001–2006: 'War on Terror'	30
1929–1932: Great Depression	29
1789–1799: New Democratic Nation	28
1976–1980: Energy Crisis/Cold War	27
1861–1865: American Civil War	27
2007–2009: Great Recession / 'War on Terror'	21
1973–1975: Energy Crisis/Cold & Vietnam Wars	20
1933–1938: Great Depression/New Deal	19
1946–1953: Cold War	17
1969–1972: Cold & Vietnam Wars	17