

Persuasion of the Undecided: Language vs. the Listener

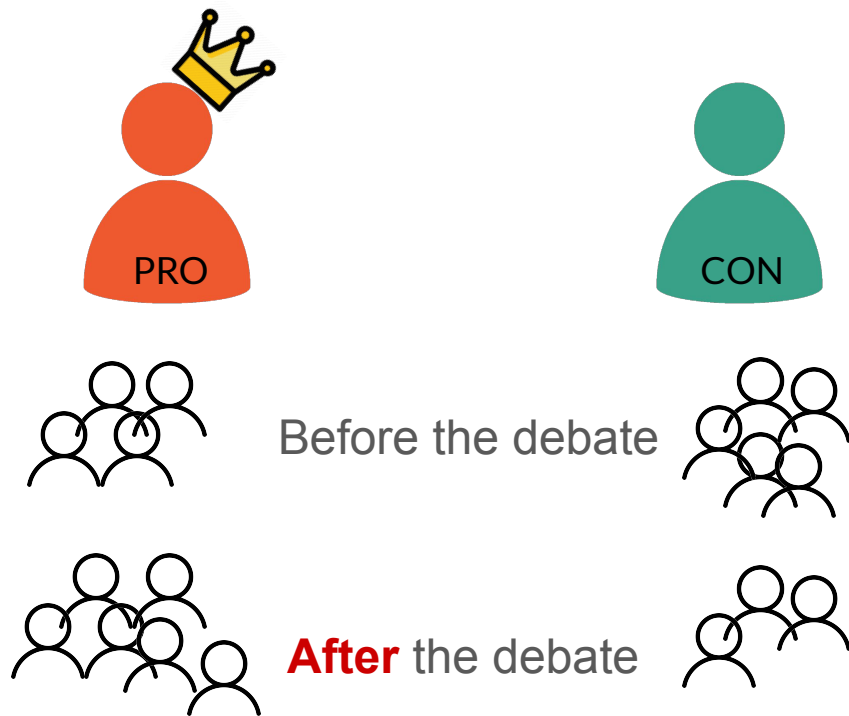
Liane Longpré, Esin Durmus, Claire Cardie

Examining Language Effects in Persuasion

Research Goal: explore the linguistic factors that determine and define persuasive arguments

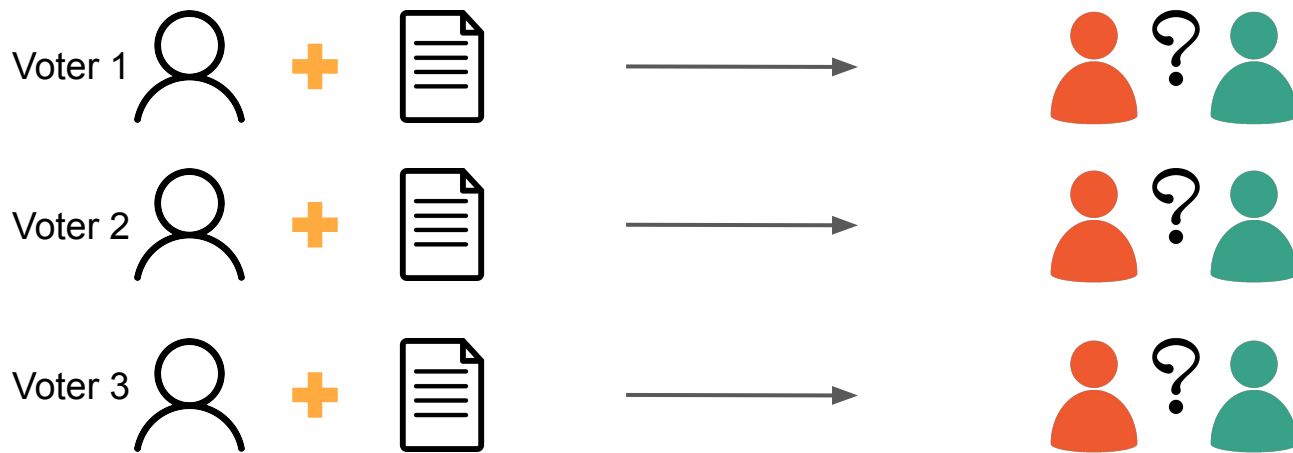
Prior Work in NLP on Persuasion

Pre- and post-debate vote outcomes of IQ2 debates (Zhang et al., 2016)



Prior Work in NLP on Persuasion

Individual-level vote outcome prediction, considering audience characteristics
(Durmus and Cardie, 2018)



Prior Work in Social and Political Science

2005 British general election

Undecided voters are more susceptible to campaign persuasion

(Kosmidis and Xezonakis, 2010)



2008, 2012 U.S. presidential debates

Critical portion of debate to undecided voters are content-rich statements

(Schill and Kirk, 2014)



European election campaigns

Affiliated voters adjust positions based on subjective perceptions of campaigns

(Adams et al., 2011)

Key difference in the persuasion of undecided and decided audience members

Research Question

What language features are important for persuasion?

Do these features differ for individuals who are persuaded **from the middle** versus persuaded **from the opposing side**?

Hypothesis

- The important linguistic features for persuasion differ between a priori undecided and a priori decided audience members
- Audience features provide important context

Dataset

Dataset of online debates (Durmus and Cardie, 2018)

- Collection of ~67k debates from *Debate.org*
- User information for ~36k users
- Varied debate topics (i.e. Politics, Religion, Movies, Science, etc.)

Dataset

Crystal 🌟

Online: 1 Year Ago

Updated: 9 Years Ago

Joined: 10 Years Ago

President: Not Saying

Ideology: Conservative

Party: Republican Party

Relationship: Married

Gender: Female

Education: Bachelors Degree

Ethnicity: White

Income: Not Saying

Occupation: Self-Employed

Religion: Christian

46-year old female

The BIG Issues

• Gay Marriage	Con
• Global Warming Exists	Con
• Abortion	Con
• Affirmative Action	Con
• Civil Unions	Pro
• Death Penalty	Pro

...

Example user profile

Dataset

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The BIG Issues

Gay Marriage	Con
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...	

Example user profile

Dataset

ROUND 1	
PRO:	... this reason, you are not free to make threats or defamatory statements against another person in both ...
CON:	... laws violate the fundamental freedom of speech which democracy is founded upon ...
ROUND 2	
PRO:	... has ignored my point about hate speech breeding an “us vs them” mentality, and how such perceptions ...
CON:	... question is, does our government have the right to tell us what our opinions are, and to define what is ...
ROUND 3	
PRO:	... as evidenced by the rise in violence against Hispanics and Muslims I cited in my second round, hate speech ...
CON:	... courts to be able to decide which opinions are “moral” and which are not? How fascist do we get here? ...

Example debate titled [OBJ]“HATE SPEECH LAWS ARE A GOOD IDEA”

Dataset

Vote Here

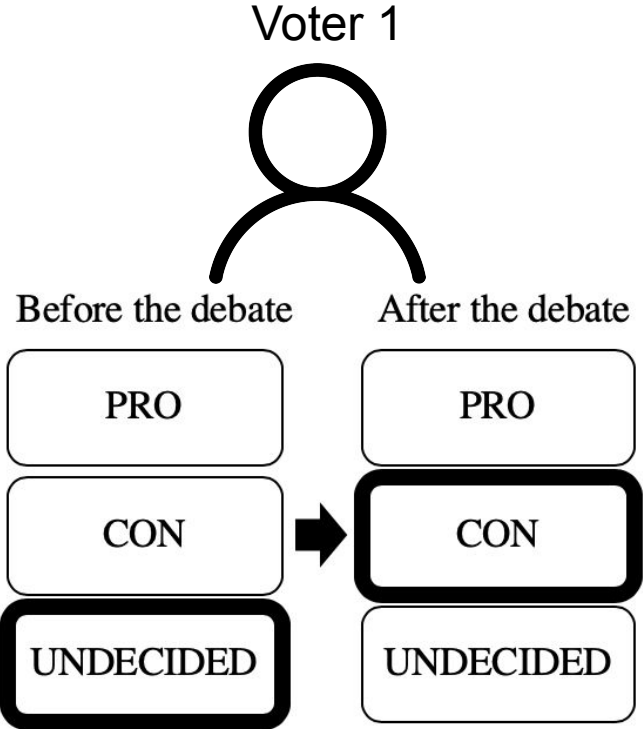
	Pro	Tied	Con
Who did you agree with before the debate?	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Who did you agree with after the debate?	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>

User votes on debates

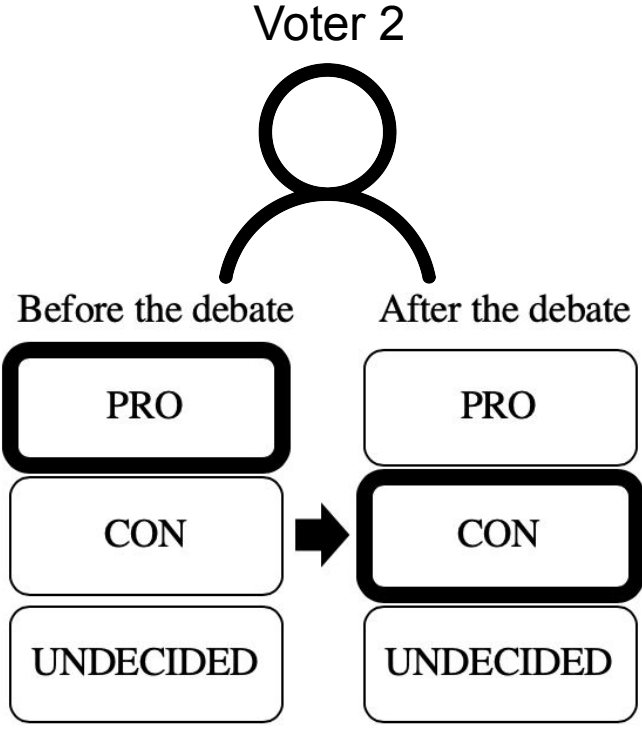
Experimental Approach

1. Build a classifier to predict persuasion vote outcomes
 - Prediction task: Given an individual voter, predict which debater/side (PRO or CON) the voter will be convinced by after the debate
2. Examine what features are most important for prediction accuracy

Distinct Cases of Persuasion



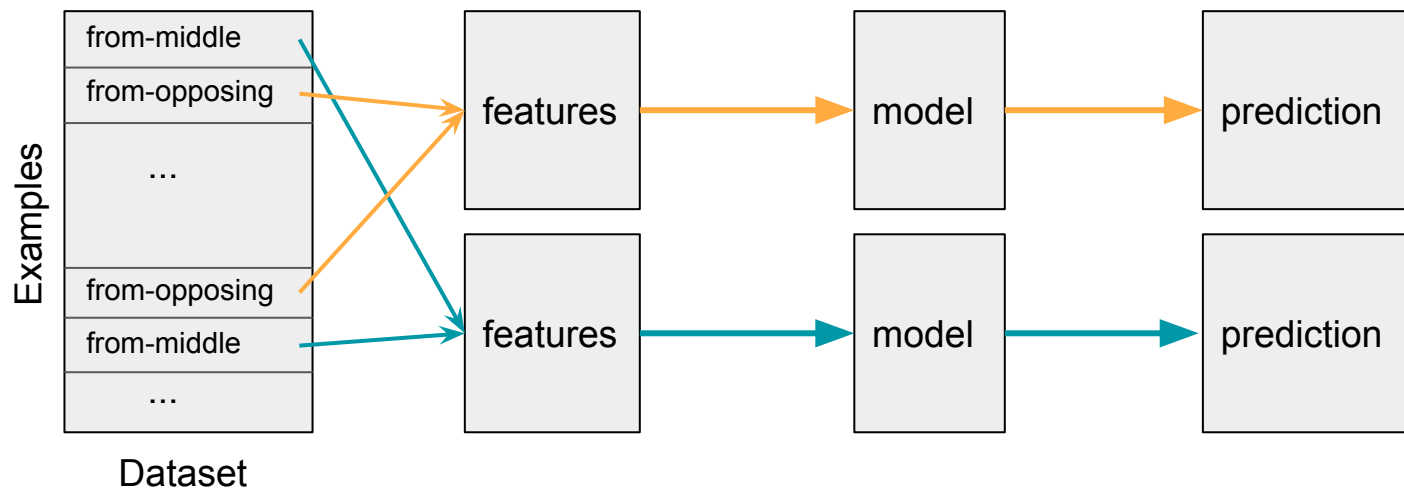
Case 1: FROM-MIDDLE



Case 2: FROM-OPPOSING

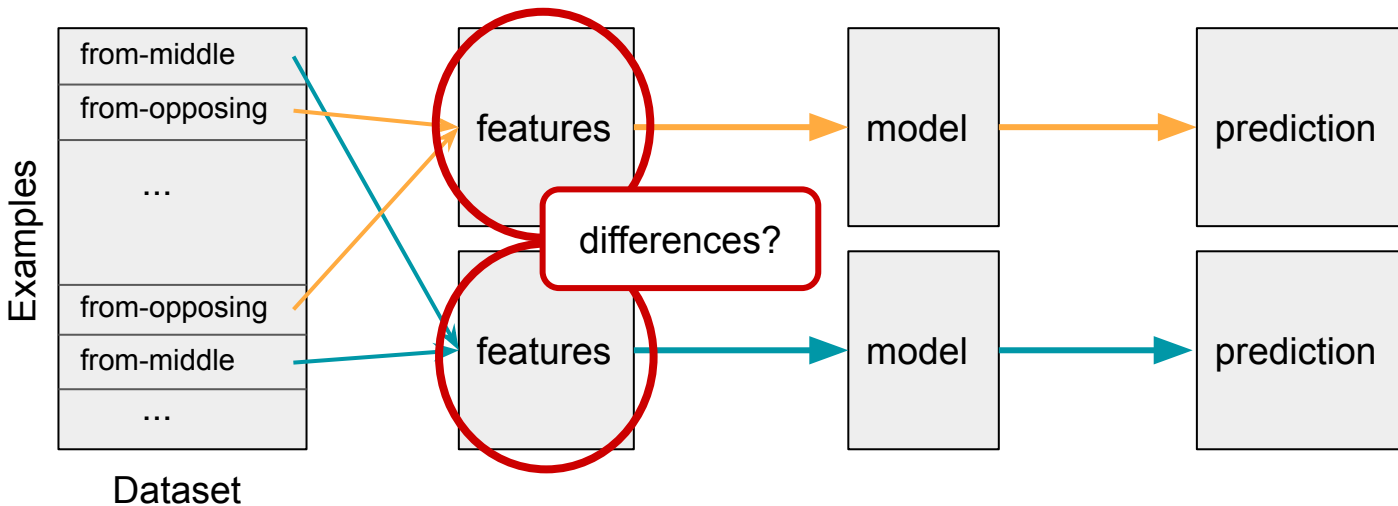
Experimental Approach

Divide the dataset into two subsets:

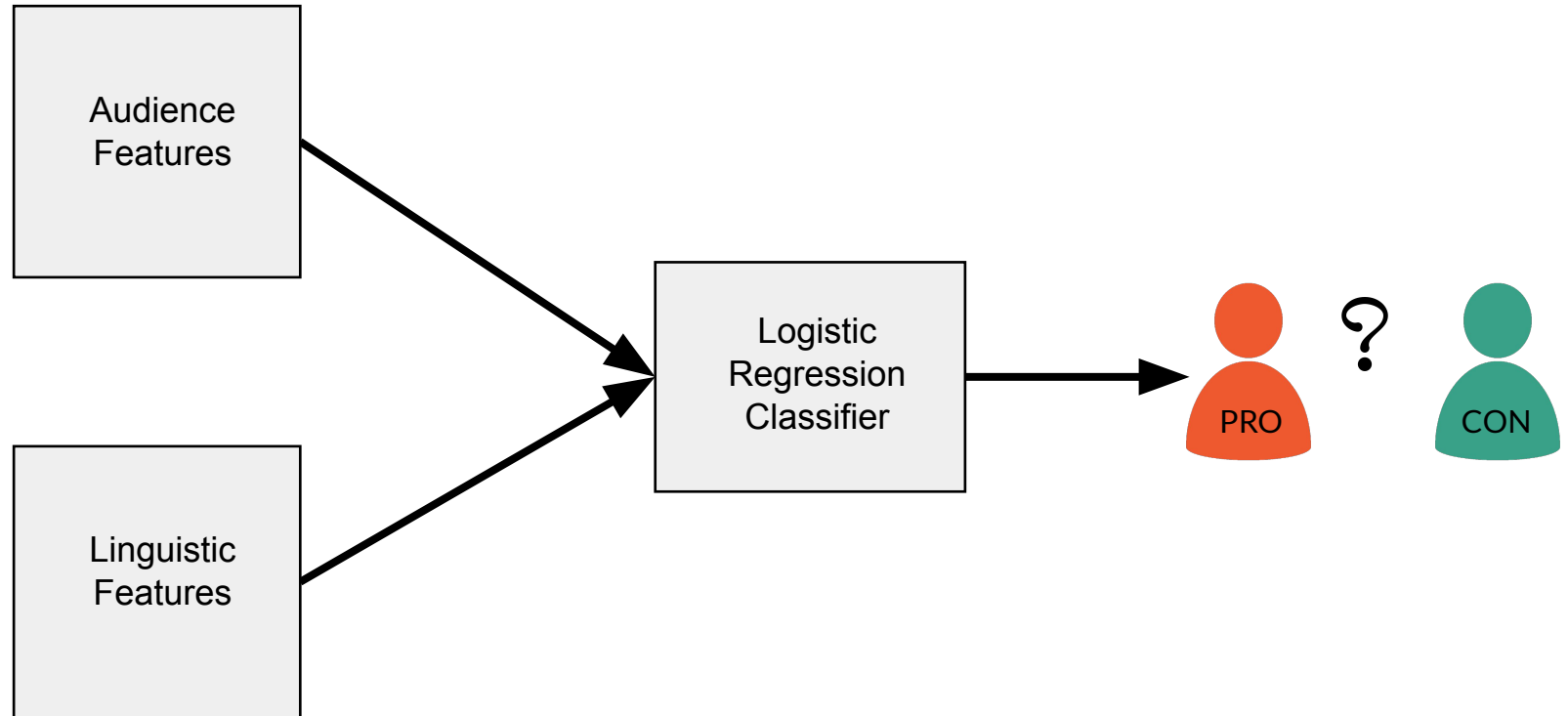


Experimental Approach

Divide the dataset into two subsets:



Predictive Model



Audience Features

- gender
- matching ideology
- opinion similarity
- decidedness
- persuadability

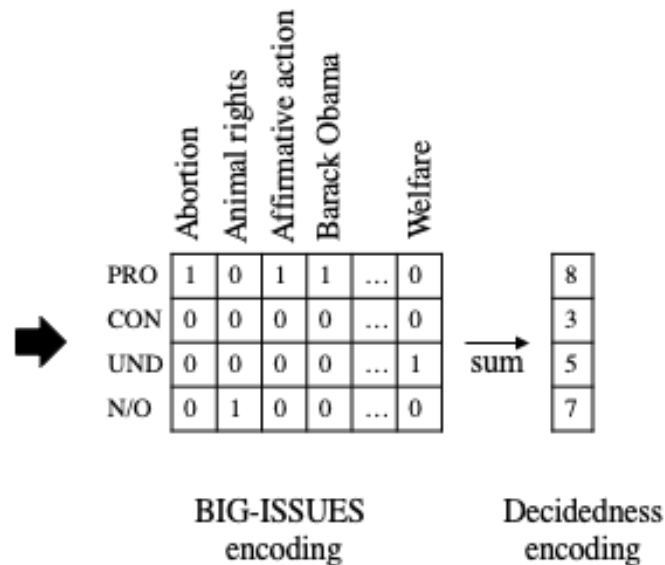
Audience Features

- gender
- matching ideology
- opinion similarity
- decidedness
- persuadability

User A

The BIG Issues	
• Abortion	Pro
• Affirmative Action	N/O
• Animal Rights	Pro
• Barack Obama	Pro
• Border Fence	Pro
• Capitalism	Pro
• Civil Unions	Pro
• Death Penalty	Pro
• Drug Legalization	Pro
• Electoral College	Con

Portion of *debate.org* User Profile



Example user profile and corresponding feature encodings

Linguistic Features

Lexical Features

TF-IDF

modal verbs

swear words

spelling errors

punctuation

Style Features

length

personal pronouns

referring to opponent

use of citations

links

Semantic Features

sentiment

subjectivity

connotation

politeness

Argumentation Features

assessment

authority

conditioning

contrasting

emphasizing

generalizing

desire

empathy

inconsistency

necessity

possibility

priority

rhetorical questions

difficulty

Results: Audience vs Linguistic Features

Accuracy of Model	FROM-MIDDLE	FROM-OPPOSING
Majority Baseline	57.43%	59.42%
All Features	69.01%	67.22%
Audience Features Only	61.47%	61.54%
Linguistic Features Only	66.95%	66.65%

Result: linguistic features are more important for predictive accuracy

Results: Best-Performing Feature Sets

Accuracy of Model	FROM-MIDDLE	FROM-OPPOSING
Majority Baseline	57.43%	59.42%
All Features	69.01%	67.22%
Audience Features Only	61.47%	61.54%
Linguistic Features Only	66.95%	66.65%
Best-performing Features	69.17%	68.21%

Result: not all linguistic features are helpful in predictive accuracy

Results: Best-Performing Feature Sets

FROM-MIDDLE

Features **Not** In Set

use of citations

referring to opponent

swear words

FROM-OPPOSING

Features **Not** In Set

subjectivity

modals

bi-/tri-gram TF-IDF

Conclusion

- **Key Result:** Linguistic feature differences correspond to rhetorical styles found to be effective on undecided and decided audiences
- **Key Takeaway:** the importance of studying undecided and decided audiences separately

End

For questions and suggestions, email lfl42@cornell.edu

Thank you!