Analyzing and Detecting Persuasion in an Online Discussion Forum

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Goal: Understanding aspects of persuasion that occur at the intersection of discourse and conceptual form

Research questions:

- Can we empirically validate an annotation scheme for conceptual aspects of argumentation?
- What relationship exists between the semantic type of argumentative components and persuasion?
Data

Change My View

- Subreddit from reddit.com where users post an opinion on a topic and other users attempt to change their view on that topic.
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- The subject of the posts are always of the form “CMV: opinion” and if their view is changed the original poster will indicate this with a delta character: $\Delta$. 

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CMV: Patriotism is the belief that being born on one side of a line makes you better

I would define patriotism quite simply as supporting one’s country, but not *necessarily* disparaging others

Someone who assists another country that is in worse shape instead of assisting their own can still be a patriot, but also recognize significant need in other nations and decide to assist them as well

This is true, but, I think, supporting the common good is also more important than supporting your country

Yes, but the two are often one the same, especially when you live in a country as large as the U.S. most acts which serve the common good generally support your country.
Previous Work

- **Persuasion**
  - predicting persuasiveness of comments in CMV (Tan et al., 2016)
  - ranking arguments in CMV according to “karma” scores (Wei et al., 2016)
  - identifying influencers in social media using agreement, dialog patterns, credibility (Rosenthal and McKeown, 2017)
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- **Argumentation**
  - identifying argumentative components (claims and premises) and relations (support/attack) (Stab and Gurevych, 2016; Peldszus and Stede, 2016)
  - predicting persuasiveness of essays using argumentative components and relations (Ghosh et al., 2016)
Previous Work

- Argumentation (continued)
  - Semantics
    - emotion and logic (Habernal and Gurevych, 2017; Walker et al., 2012; Das et al., 2016; Lukin et al., 2017)
    - situation entity types (Becker et al., 2016)
    - subjectivity and objectivity (Park et al., 2015)
  - Pragmatics
    - inference anchoring theory (Budzynska et al., 2014; Budzynska and Reed, 2011)
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Two-stage annotation:

1. Label propositions as claims and premises

2. Label semantic types
   - claims - one of interpretation, evaluation (emotional or rational), and agreement/disagreement
   - premises - one or more of pathos, ethos, or logos
Analysis

**Claim** - stance expressed by a speaker

Based on Freeman’s classification of contingent statements
Analysis

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- **evaluation**: positive or negative judgment. Sub-classified as:

  - **evaluation-rational**: opinion based on evidence or credible sources (Her political program is very solid. or She is a very smart student.)
  
  - **evaluation-emotional**: opinion based on emotional reasons and/or subjective beliefs (Going to the gym is an unpleasant activity. or I do not like doing yoga.)

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- agreement or disagreement: beliefs shared/not shared with another speaker (I agree that going to the gym is boring. or I do not like your ideas.)

Based on Freeman’s classification of contingent statements
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Premises - justifications in support of a claim

Based on Aristotle’s modes of persuasion
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- **pathos**: appeals to emotions or personal experience (*You should put comfy furniture into your place. The feeling of being home is unforgettable*)

- **ethos**: appeals to the credibility established by personal experience/expertise (*I assure you the consequences of fracking are terrible. I have been living next to a pipeline since I was a child.*)
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[I would define patriotism quite simply as supporting one’s country, but not *necessarily* disparaging others]  

CLAIM\_DISAGREEMENT

Someone who assists another country that is in worse shape instead of assisting their own can still be a patriot, but also recognize significant need in other nations and decide to assist them as well]  

PREMISE\_LOGOS/\_PATHOS

[This is true]  

CLAIM\_AGREEMENT, but, [I think, supporting the common good is also more important than supporting your country]  

CLAIM\_RATIONAL\_EVALUATION

[Yes]  

CLAIM\_AGREEMENT, but [the two are often one the same]  

CLAIM\_INTERPRETATION, [especially when you live in a country as large as the U.S. most acts which serve the common good generally support your country]  

PREMISE\_LOGOS.
Analysis

Two-stage annotation:

1. Label propositions as claims and premises using *expert* annotators

2. Label claims (choose one of five) and premises (multi-label) for their semantic types using *crowdsourcing* with Amazon Mechanical Turk
Two-stage annotation:

- 78 discussion threads comprising 278 turns of dialogue with 2615 propositions in 2148 sentences
- 36.5% of sentences contain a claim, 49.7% contain a premise, 22% do not contain either
- 15.8% of sentences contain rational evaluations, 2.3% contain disagreement and 44% contain logos, 3% contain ethos

Krippendorff’s α

- Claims: 0.63
- Premises: 0.65
- Claim Types: 0.46
- Premise Types: 0.73
Analysis

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<tr>
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Annotator Confusion

- The problem isn't always bad parenting, though that can play a role, the problem is a black and white educational system (Gold: Interpretation Annotation: Evaluation-Rational)

- This is the best argument I have seen (Agreement or Evaluation-Rational?)
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- Transitions - sequences of claim/premise semantic types
- Claims/Premises - pairs of premises and their most recent claim
- Persuasion - features of winning arguments
Analysis

- Transitions
  - rational evaluations, agreements, and interpretations (claims) appear at the start of the post
  - pathos and unnannotated sentences appear at the end

\[ p < 0.01 \] by chi-squared test of independence with Bonferroni correction
Analysis

- **Transitions**
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- **Claims/Premises**
  - logos follows rational evaluations and pathos follows emotional evaluations

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- Claims/Premises
  - logos follows rational evaluations and pathos follows emotional evaluations

- Persuasion
  - pathos and logos are more likely to be used jointly
  - agreements are more likely to be used at the beginning
  - winning arguments are more likely to have consecutive premises of the same type

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Examples:

- Enjoying the moment is possible, but doesn’t make life have a point. For once I die, all memories and all point is gone. (Evaluation-Emotional and Pathos)

- I do agree that today’s moderates are potentially tomorrow’s conservatives. However this isn’t about being just a bit conservative. (Agreement and Interpretation)
Ongoing Work

- Label arguments for support/attack relations between claims and premises
- Build models to predict claims and premises and their semantic types
- Build models that incorporate claim and premise types for persuasiveness prediction
- Generate structured dialogues with argumentative components
Conclusions

- Moderate agreement for argumentative components and the semantic type of premises but not for claim types

- Sequences of semantic components are correlated

- Winning arguments show significant differences in semantic types compared to non-winning arguments
Questions

Thanks to DARPA-DEFT, SNFS, and all the annotators!