

Using Network Motifs to Detect Populist Narratives at the Sub- sentence Level

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Thin-Centered Populism: Measurement Challenges

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- **Existing measures are coarse:**
 - Traditional approaches label entire speeches or actors as populist or not.
 - This **glosses over internal variation**.

Existing Measures and the Thin Centered Conceptual

Approach	Example	Fine-grained	Interpretable	Scalable
Experts Survey	Populism and Political - POPPA Meijers & Zaslove (2021), Global Party Survey (GPS) by Norris.	✗	✗	✗
Manual Coding	Jagers and Walgrave (2007), Jenne, Hawkins, and Silva (2021) Hawkins and Rovira Kaltwasser (2018), Hawkins et al. (2019)		✓	✗
Dictionary	Pauwels (2011), Rooduijn and Pauwels (2011), Rooduijn, Lange, and Brug (2014)	✗	✓	✓
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We need finer granularity to capture **when** and **how** populist narratives appear

The Aggregation Problem in Computational Measurement of Populist Speech

I will immediately restore and expand the Trump travel ban on an entry from terror plague countries, and I will implement strong ideological screening for all immigrants. If you hate America, if you want to abolish Israel, if you sympathize with Jihadists, then we don't want you in our country. We don't want you. Crooked Joe Biden puts China first, puts Asia first, puts Ukraine first, puts illegal aliens first, environmental maniacs first. Everyone else first. He puts everybody first. That's bad. But he puts America last. He puts Nevada last. He puts our workers last. He frankly puts unions last. Look what he did with the car. They're going to make all electric cars in our country, but not when I'm in there. I'll end that the first day. He puts our families last.

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In the new McLaughlin Poll of Nevada we're at 75% while DeSanctimonious is at 60 points behind us. He's at 15, so think of that, we're at 75, just came out. We're at 75. The DeSanctimonious is at 15, so we're leading by 60 points. But here's the thing you got to do, [inaudible 00:30:11], just go vote. Don't think about it. Pretend we're tied, pretend we're losing by three. You got to do this because the worst thing is everyone thinks, "Oh, what do we have to vote for? Trump is killing them, and then bad things happen when that..." Pretend we're losing. Assume that we're down by three, four, or five, okay? You don't want to do what the Washington Post does and others where they make it so that it doesn't make sense. In Wisconsin for two elections, they put me down in Wisconsin at 17, I'm 17 down, right? I said, "No way I'm 17 down. No way."

I asked John McLaughlin the great pollster, I said, "Why would they do that? I'm winning in Wisconsin." He said, "They do that because that way people don't vote." I said, "What do you mean? Well, why don't they do it like at 5:00? Because they do get killed when they lose." He said, "They don't care about that. At 17 people won't vote. They'll say, we love Trump, but we're not going to vote for him. At 5:00 they say, he has a chance. We'll vote." I said, "Wow, that's really sick, huh?" That's what it is. That's how bad they are that we won Wisconsin. They had us down 17 and we won Wisconsin, and then we did, frankly better the second time where we did better in most places the second time. People say, "How'd you do the second time?" I say, "We did much better."

If you take a look, we got millions more votes a second time, and the new Rasmussen Poll of general election we're dominating Biden by 10 points. That's a lot because a friend of mine said, "How come you're only winning by 10 or 14 points? There's another one 14 points." I said, "How could he be possibly that close?" But they have a lot of people voting for them that aren't going to vote for us. But I'll tell you, a lot of the people that would normally vote for them, like the union people are voting for us other than the top people in the unions and even some of the top people in the unions are going for us, this could be an incredible situation. African Americans, we have the highest poll numbers we've ever had. Hispanic Americans, we have the highest poll numbers the Republican Party has ever had.

We could actually win with Hispanics. I mean, it was unthinkable two or three years ago, we won the state of Florida. We did so well in Texas. We won the state of Texas and all of the border towns voted for Trump, and they're about 85, 90% Hispanic and won every single town along the border. First time in... They say the first time since reconstruction. You know what reconstruction means? That means the Civil War. I said, "Give me a definition of reconstruction to the governor of Texas who endorsed me recently, by the way, as did almost everybody else."

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Donald Trump, Reno, 12/2023

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CODE WHOLE SPEECH/PARTY/PERSON AS POPULIST

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- **Loss of interpretability**

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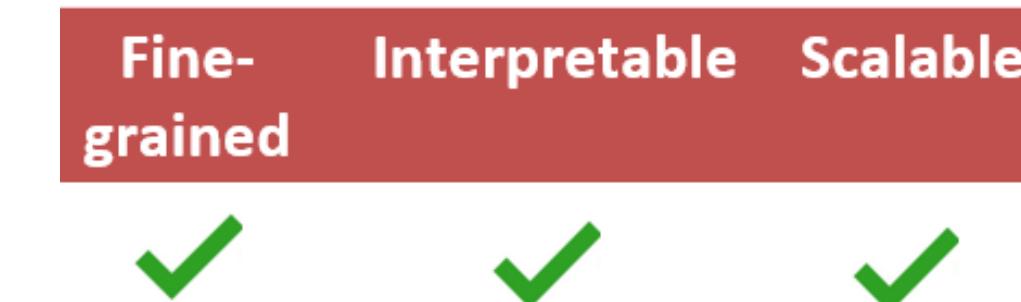
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Develop a **scalable, interpretable method** that identifies **populist narrative structures** at the most meaningful level of analysis – the actual sentences

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Our Approach: Fine-grained Interpretable Measure of Populism

Measuring Thin-centered Populism in Text

Populist narratives have defining traits:

Concepts



Label



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Populist narratives have defining traits:

Concepts	Label
<i>Narrative Components</i>	
<i>Narrative Composition</i>	

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<i>Actors and Targets</i>	People (acting / acted upon)
	Elites (acting / acted upon)
Narrative Composition	

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Connection between components	

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Populist Narrative Structures

We cast theoretical populist **narrative structures**:

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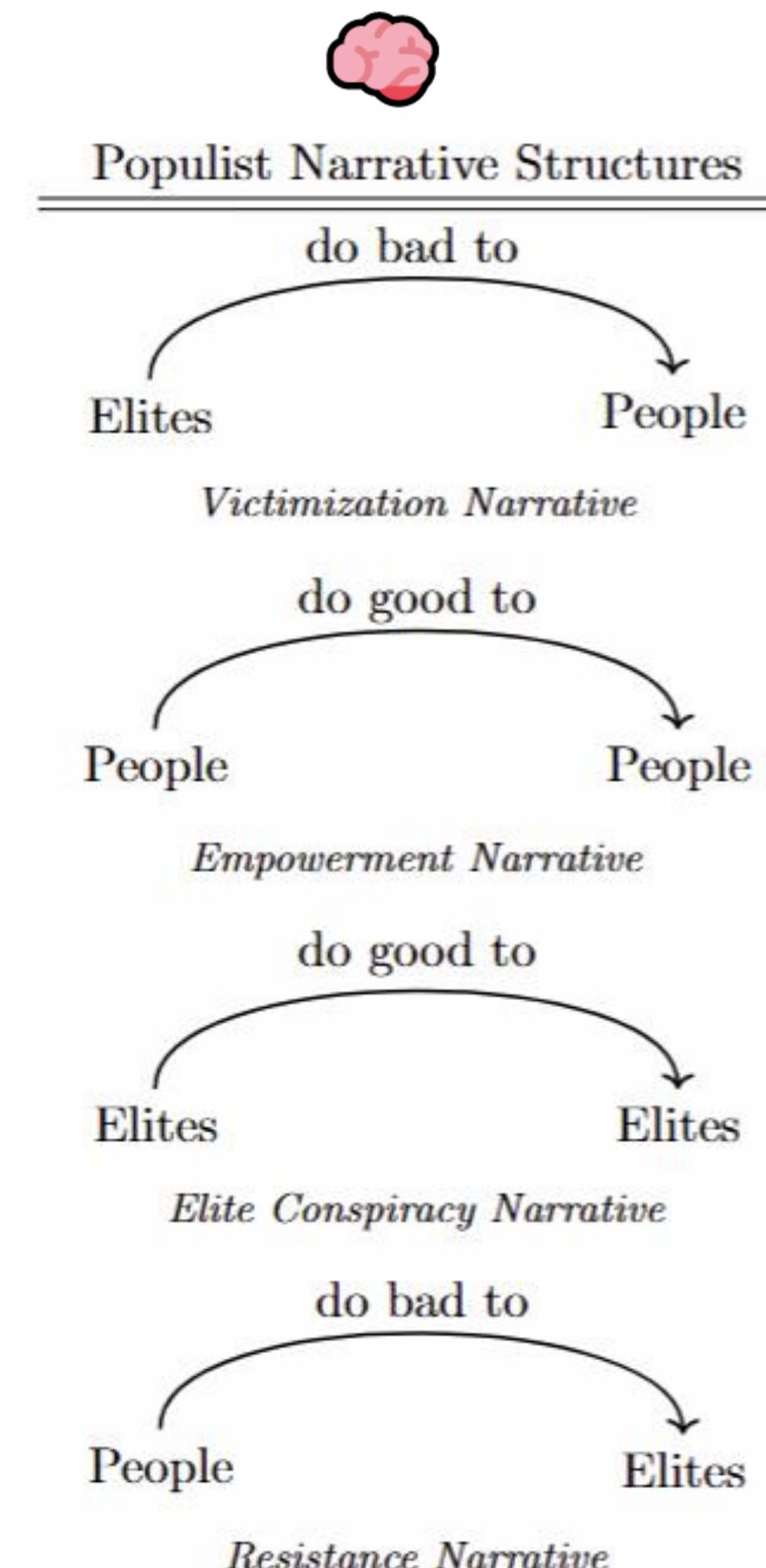
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The Structure of Populism

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→ Four representative **populist narrative structures**



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<i>Judgment</i>	Morally good / bad	Judgment-on-aspect (+ / - valence)
<i>Perspective</i>	Speaker / Non-speaker perspective	Judgment-holder (Speaker/Non-speaker)
Narrative Composition		
Connection between components	Groups	*

The Structure of Populism as Graph Motif

We measure populist **narrative structures**:

→ Labels

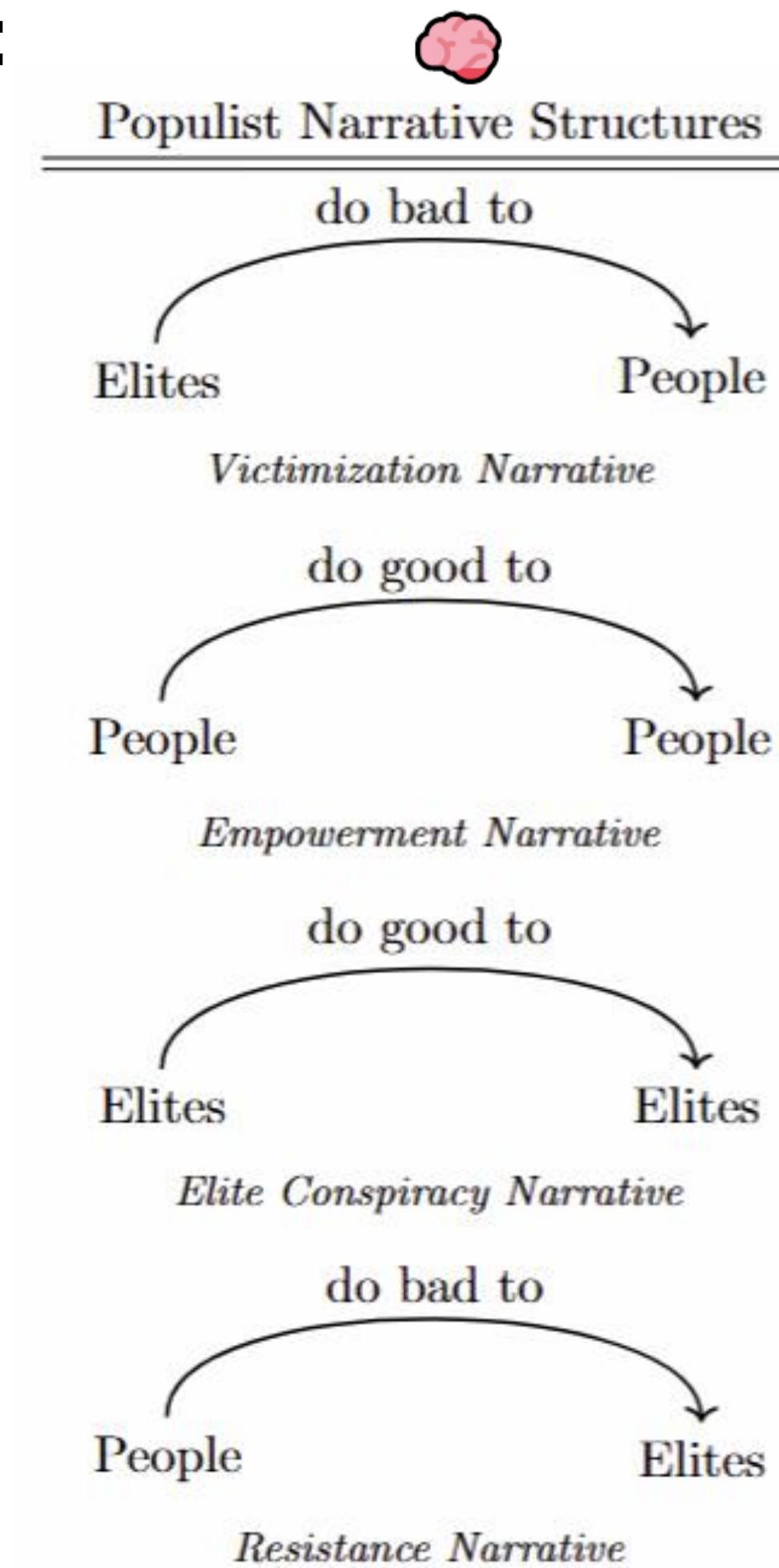
→ Actor vs Target

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→ Perspective

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Four representative **populist motifs**



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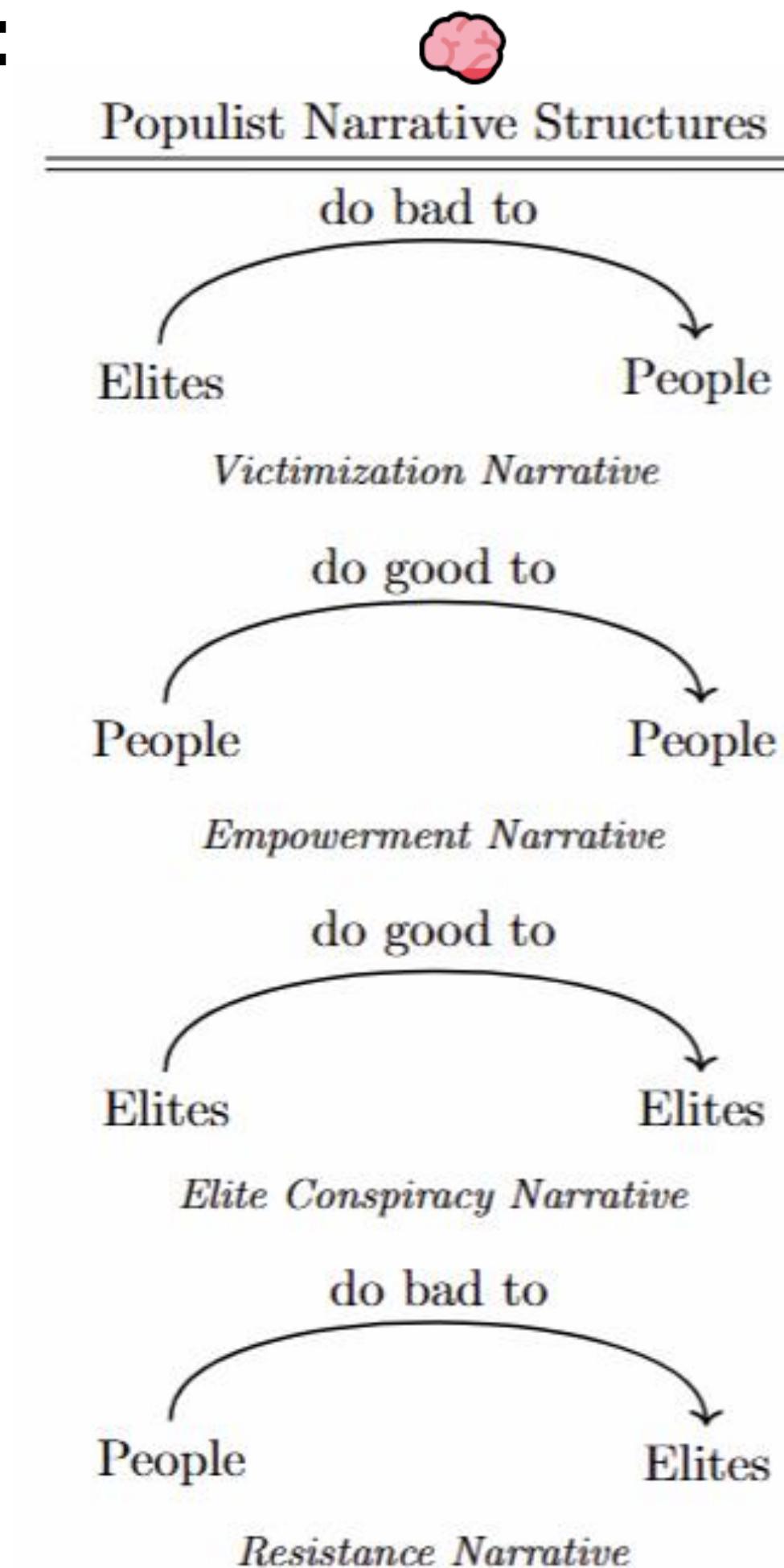
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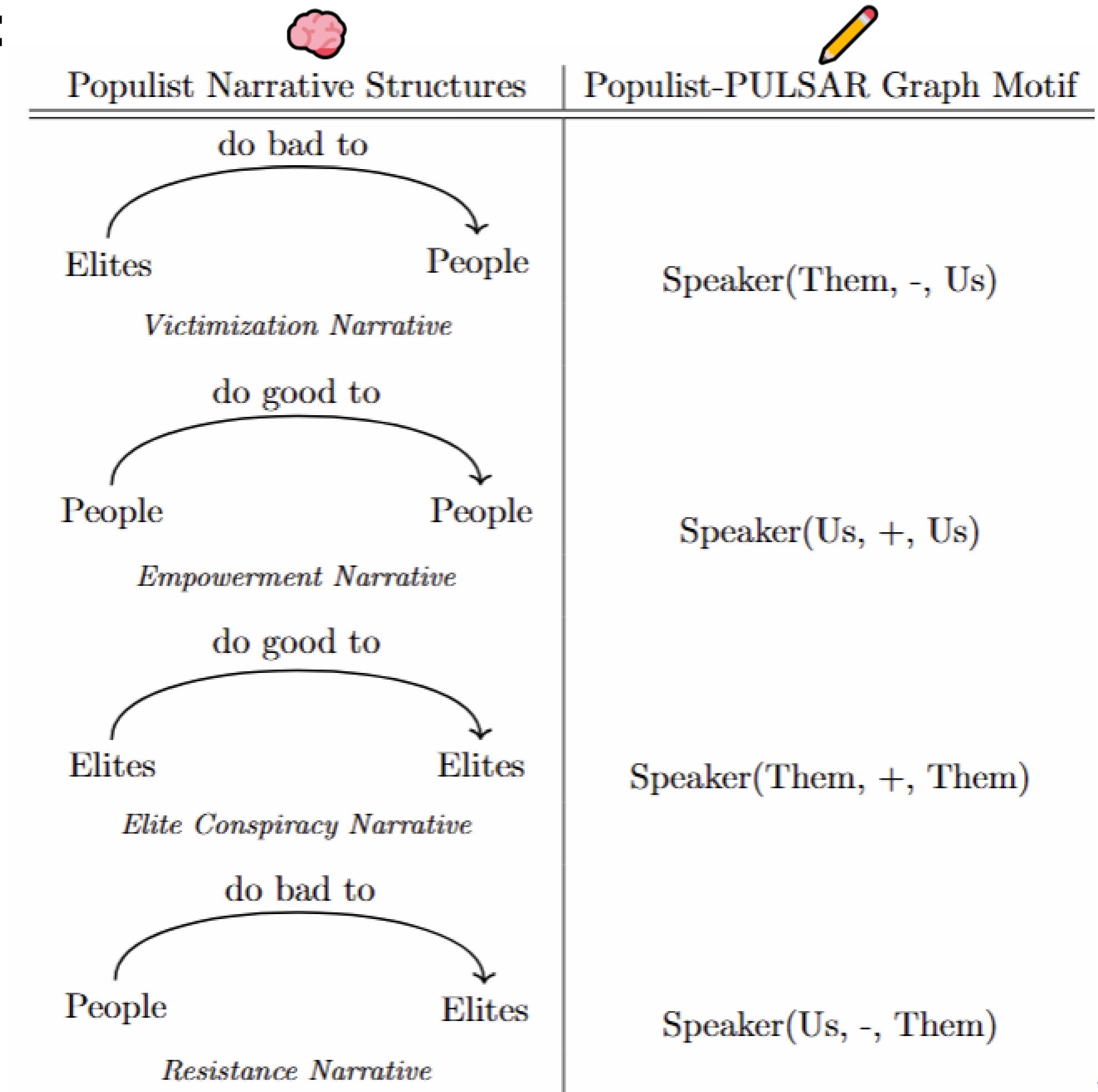
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“The corrupt elites are robbing the middle class”

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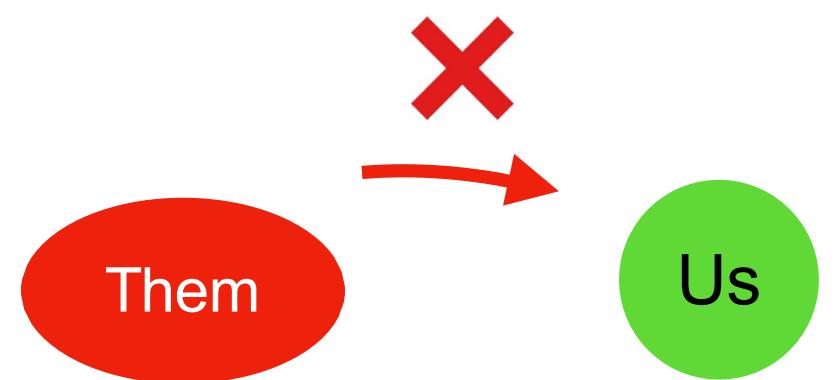
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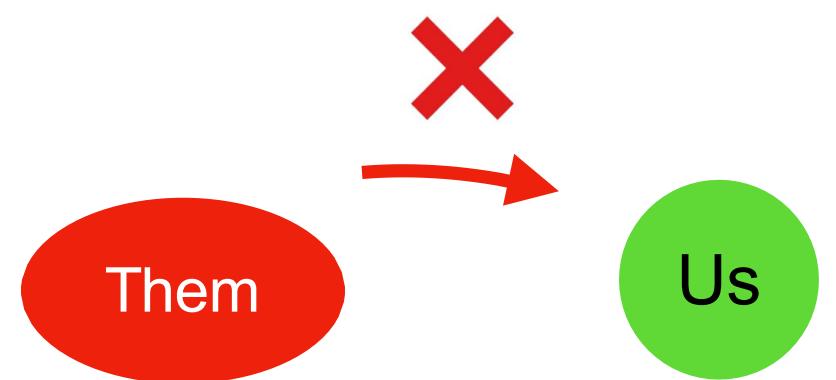
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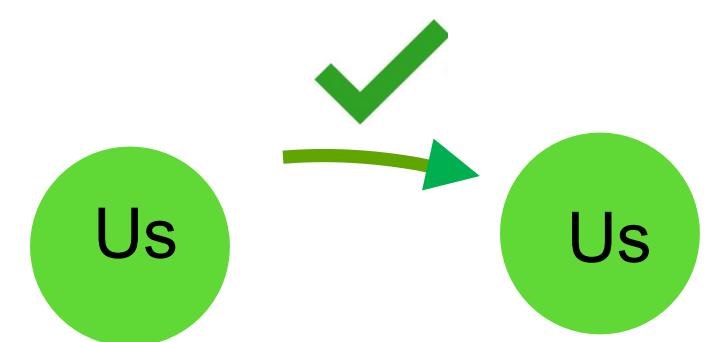
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Empowerment

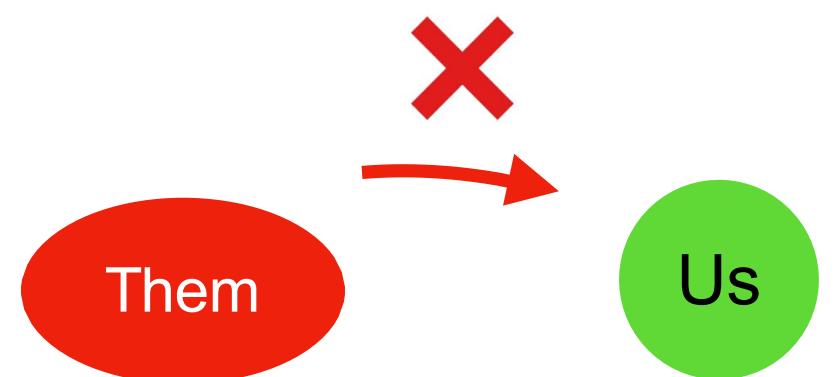
“**We** will bring back **our jobs**.”



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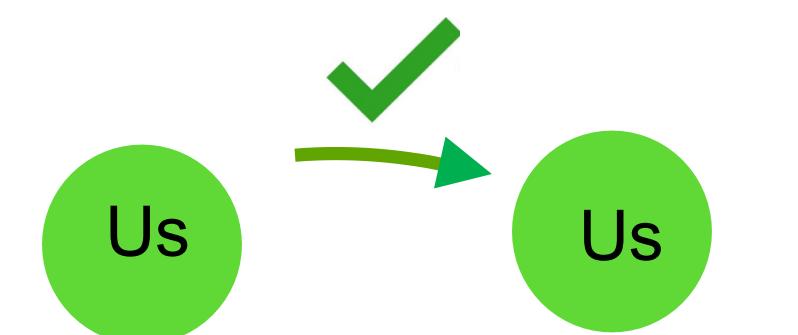
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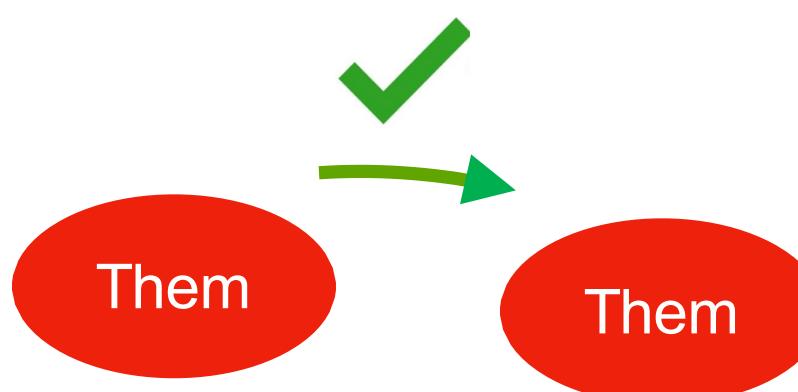
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Elite Conspiracy

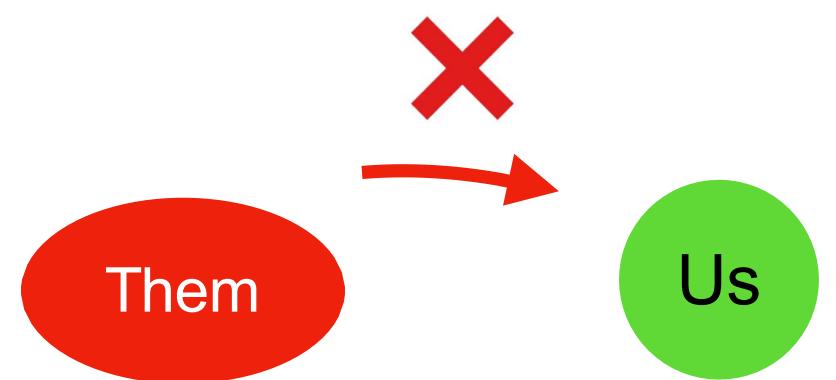
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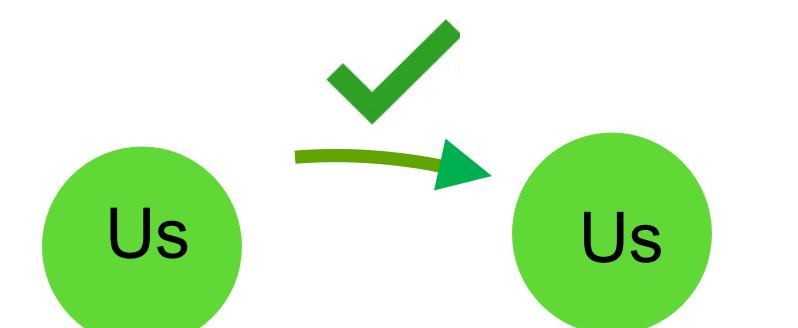
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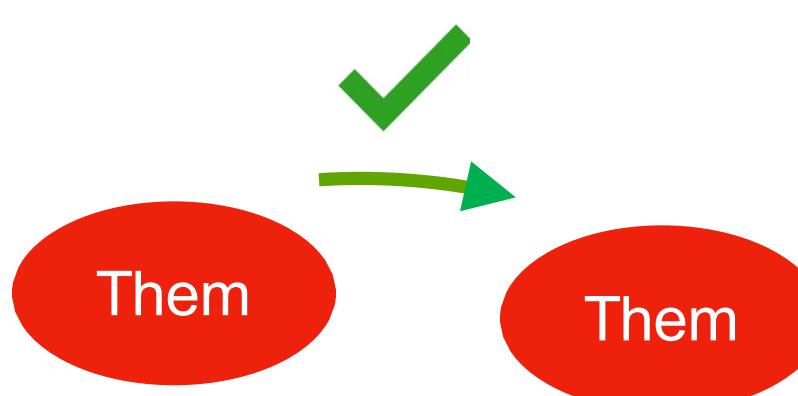
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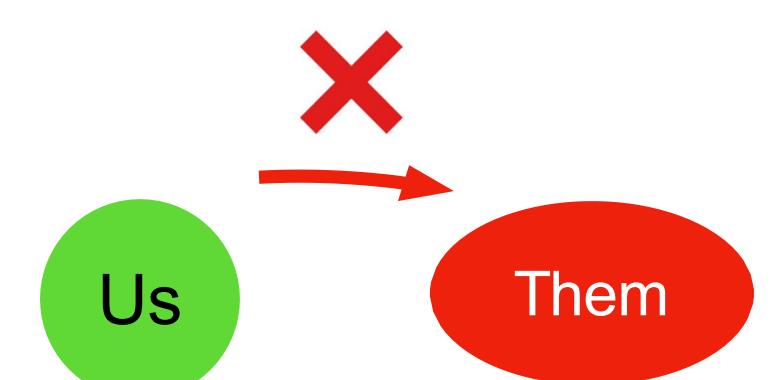
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Resistance

“**We** are transferring power from **Washington, D.C.**”



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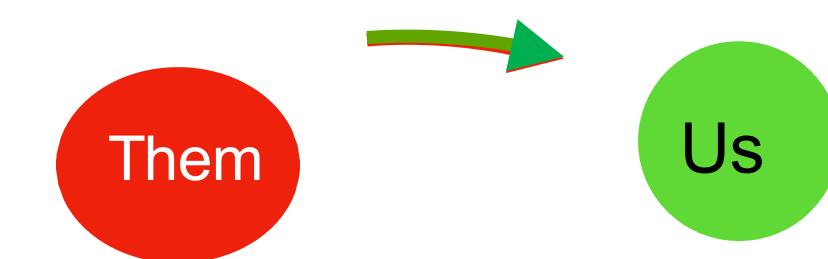
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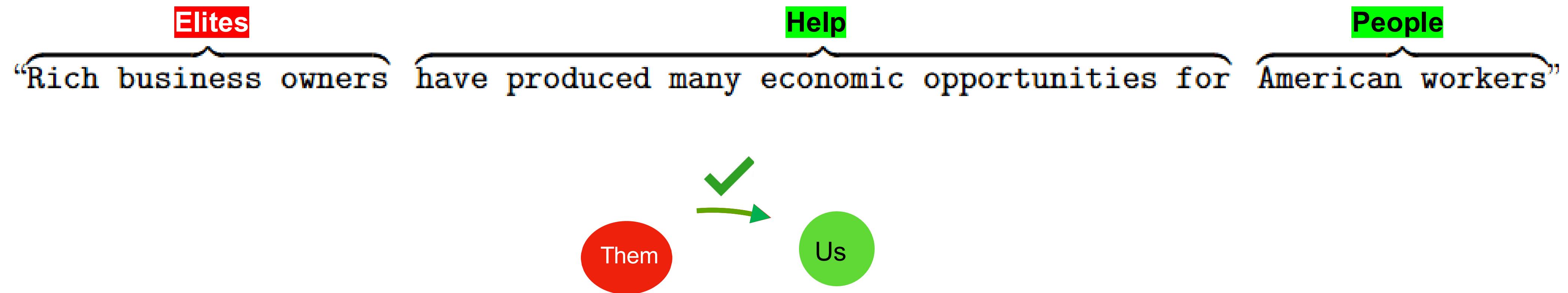
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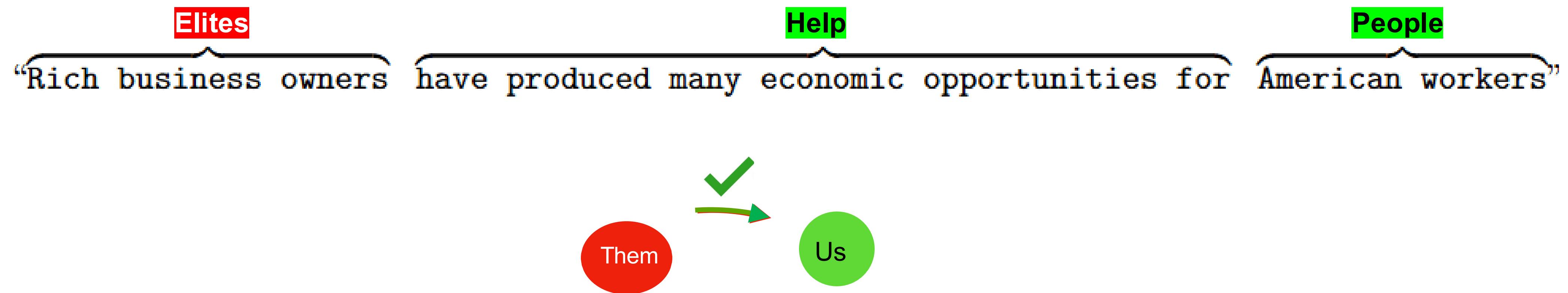
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(Contains populist elements but arranged incorrectly.)

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The Aggregation Problem in Computational Measurement of Populist Speech

I will immediately restore and expand the Trump travel ban on an entry from terror plague countries, and I will implement strong ideological screening for all immigrants. If you hate America, if you want to abolish Israel, if you sympathize with Jihadists, then we don't want you in our country. We don't want you. Crooked Joe Biden puts China first, puts Asia first, puts Ukraine first, puts illegal aliens first, environmental maniacs first. Everyone else first. He puts everybody first. That's bad. But he puts America last. He puts Nevada last. He puts our workers last. He frankly puts unions last. Look what they did with the car. They're going to make all electric cars in our country, but not when I'm in there. I'll end that the first day. He puts our families last.

In the new McLaughlin Poll of Nevada we're at 75% while DeSanctimonious is at 60 points behind us. He's at 15, so think of that, we're at 75, just came out. We're at 75. The DeSanctimonious is at 15, so we're leading by 60 points. But here's the thing you got to do, [inaudible 00:30:11], just go vote. Don't think about it. Pretend we're tied, pretend we're losing by three. You got to do this because the worst thing is everyone thinks, "Oh, what do we have to vote for? Trump is killing them, and then bad things happen when that..." Pretend we're losing. Assume that we're down by three, four, or five, okay? You don't want to do what the Washington Post does and others where they make it so that it doesn't make sense. In Wisconsin for two elections, they put me down in Wisconsin at 17, I'm 17 down, right? I said, "No way I'm 17 down. No way."

I asked John McLaughlin the great pollster, I said, "Why would they do that? I'm winning in Wisconsin." He said, "They do that because that way people don't vote." I said, "What do you mean? Well, why don't they do it like at 5:00? Because they do get killed when they lose." He said, "They don't care about that. At 17 people won't vote. They'll say, we love Trump, but we're not going to vote for him. At 5:00 they say, he has a chance. We'll vote." I said, "Wow, that's really sick, huh?" That's what it is. That's how bad they are that we won Wisconsin. They had us down 17 and we won Wisconsin, and then we did, frankly better the second time where we did better in most places the second time. People say, "How'd you do the second time?" I say, "We did much better."

If you take a look, we got millions more votes a second time, and the new Rasmussen Poll of general election we're dominating Biden by 10 points. That's a lot because a friend of mine said, "How come you're only winning by 10 or 14 points? There's another one 14 points." I said, "How could he be possibly that close?" But they have a lot of people voting for them that aren't going to vote for us. But I'll tell you, a lot of the people that would normally vote for them, like the union people are voting for us other than the top people in the unions and even some of the top people in the unions are ~~for~~ing for us, this could be an incredible situation. African Americans, we have the highest poll numbers we've ever had. Hispanic Americans, we have the highest poll numbers ... Republican Party has ever had.

We can handle that if we have the right president, but what's very difficult are these corrupt communists that we have within our own country. They're very dangerous people, and you must never forget, this nation does not belong to them. This nation belongs to you, it belongs to you. This is your home. This is your heritage, and our American liberty is your God-given right.

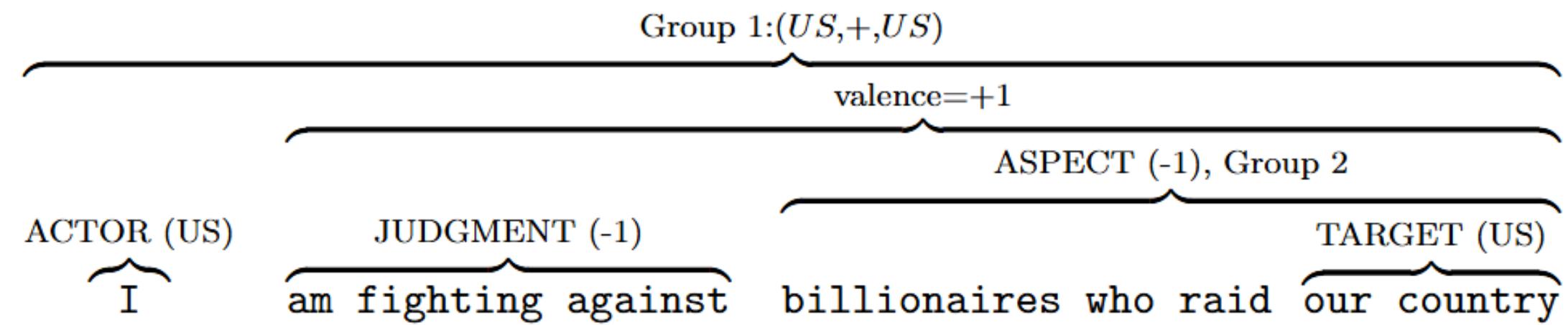
Handling Complex Cases: Nested

"I am fighting against billionaires who raid our country"

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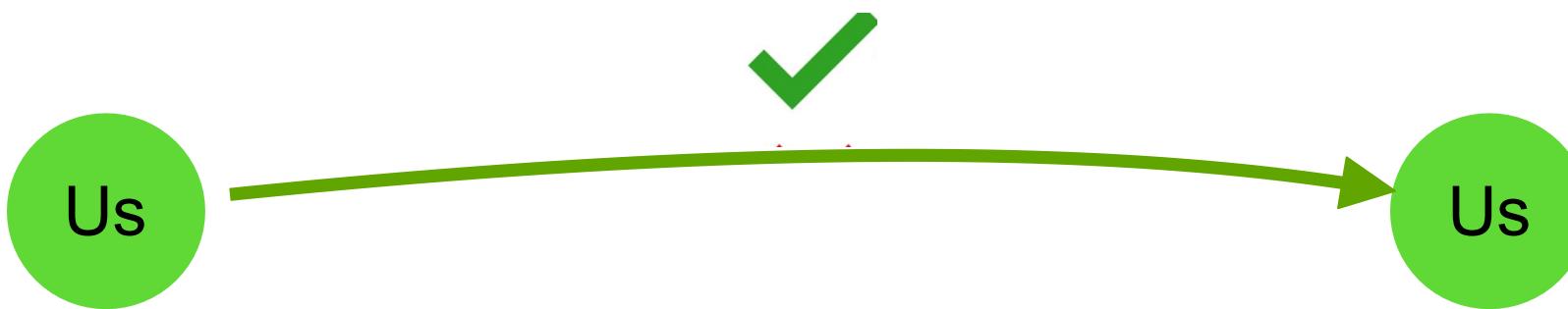
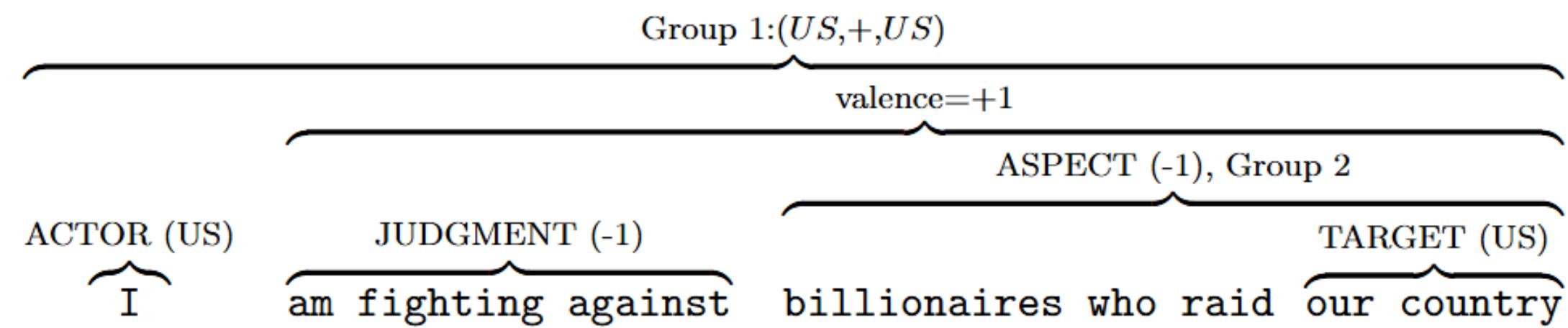
Outer Structure



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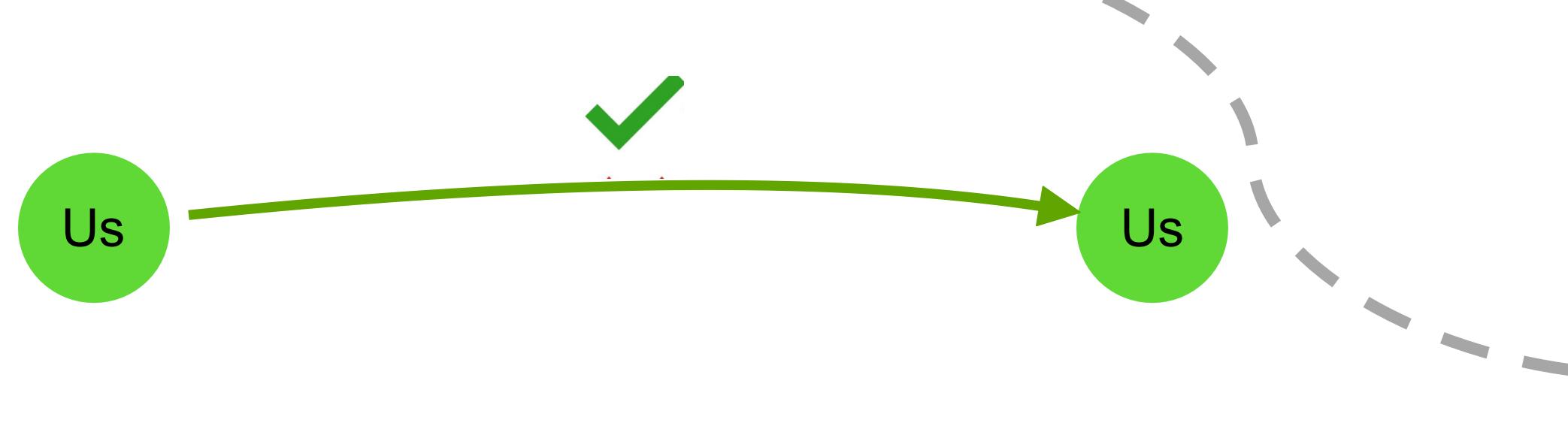
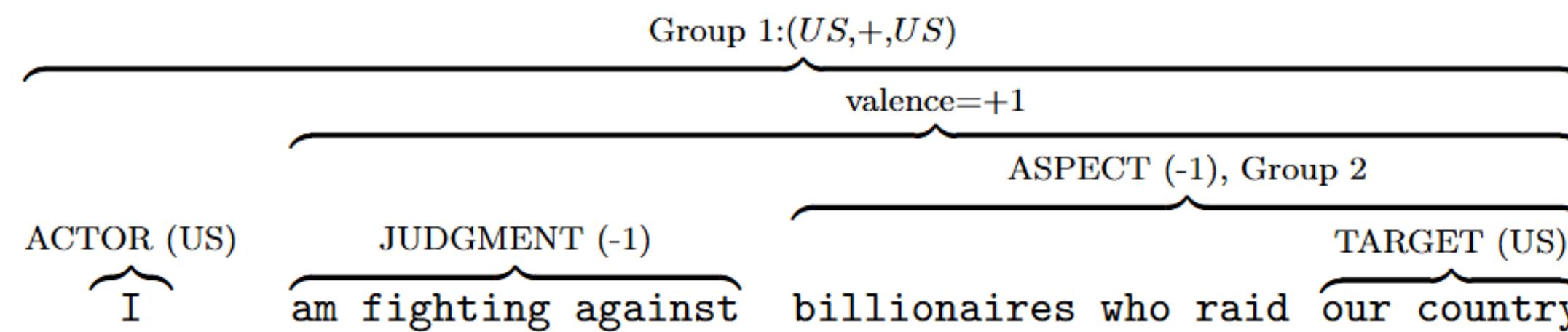
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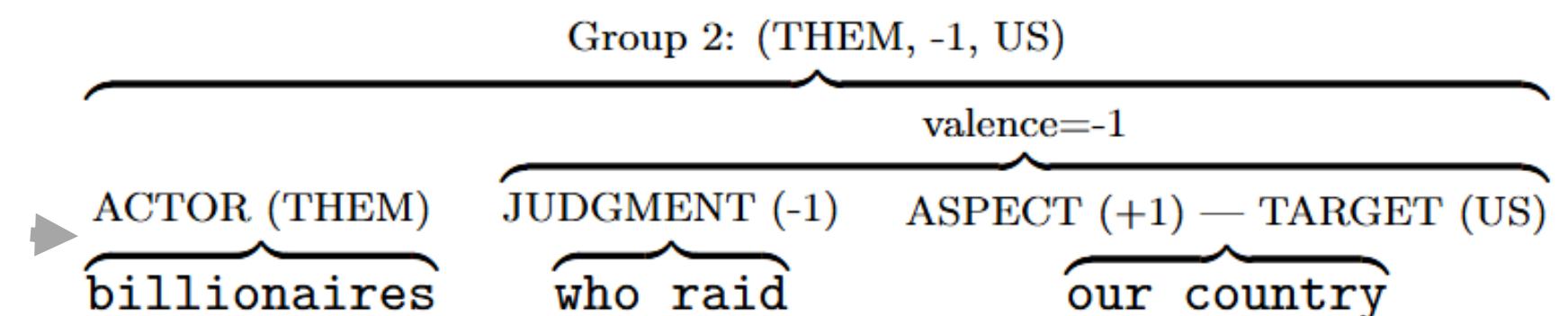
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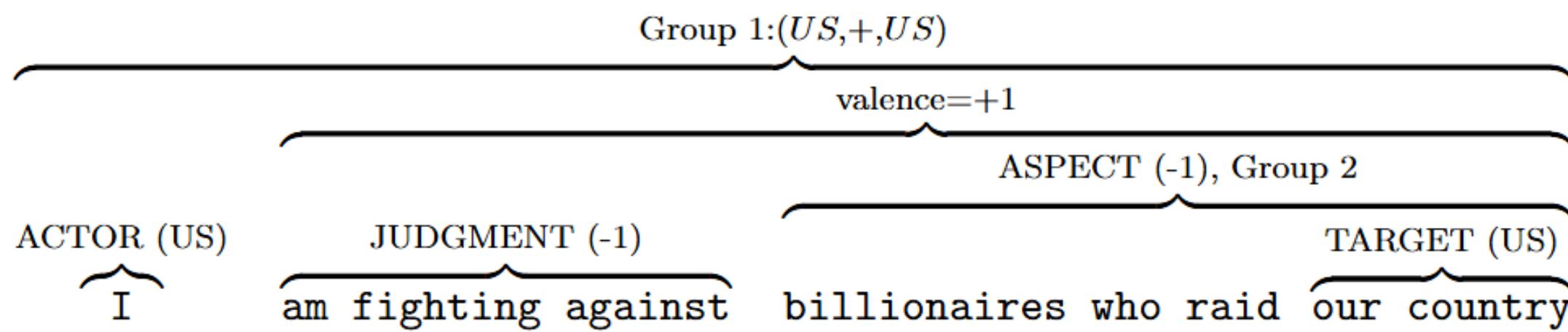
Inner Structure



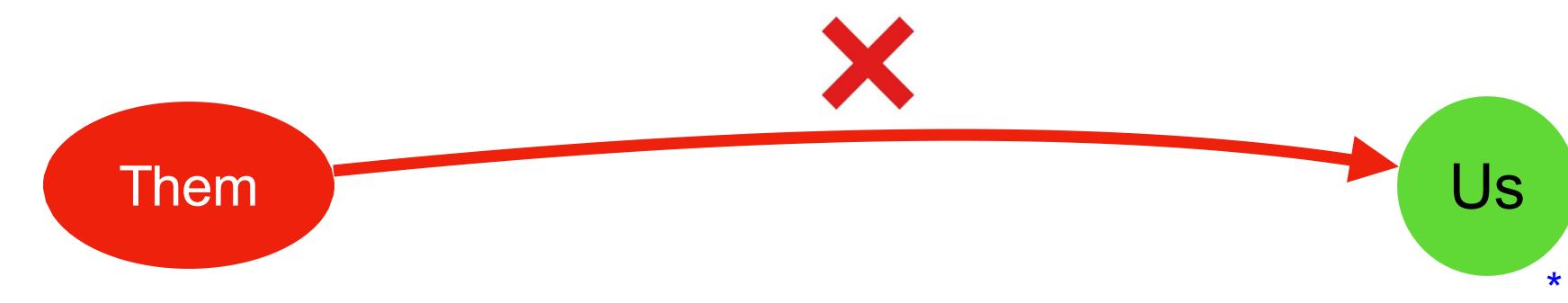
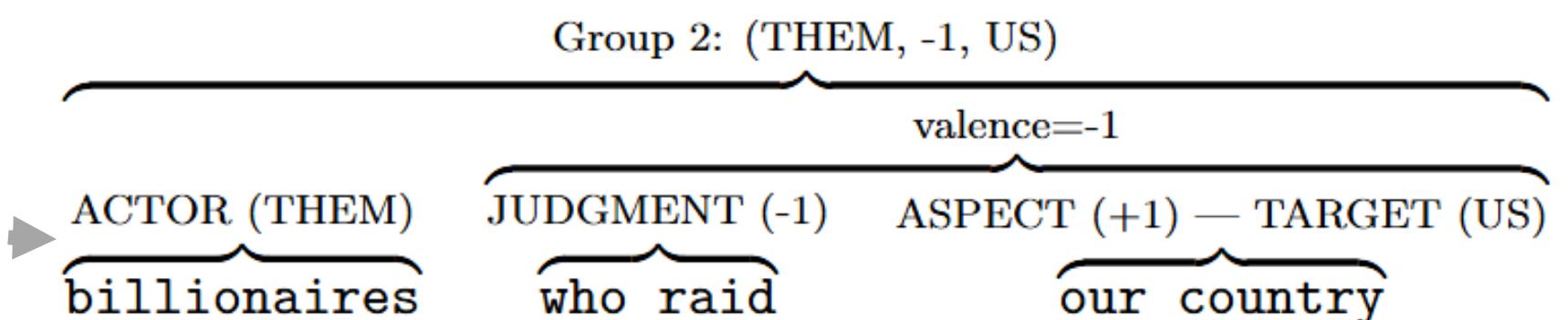
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Inner Structure



Handling Complex Cases: Nested



Handling Complex Cases: Not the Speaker

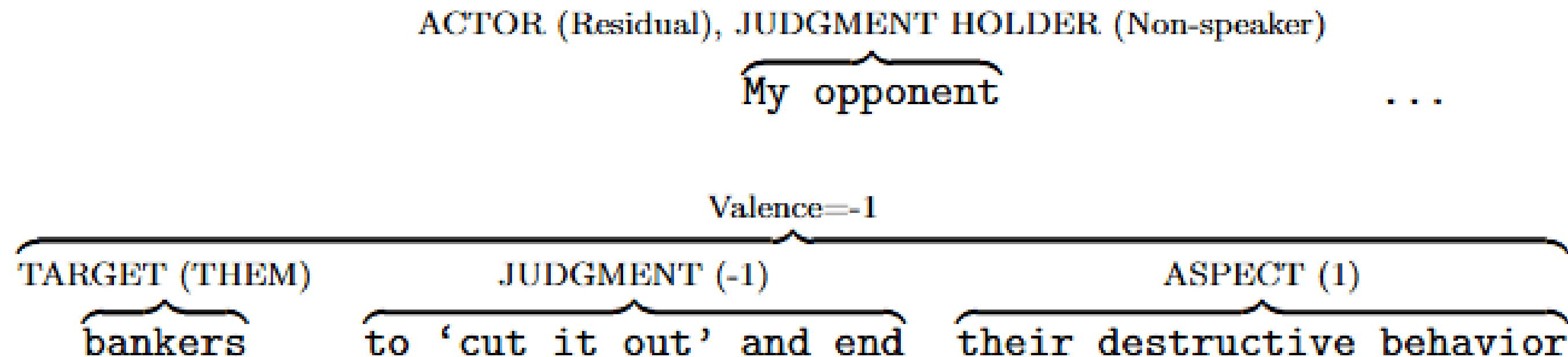
“My opponent says that as a senator, she told bankers to ‘cut it out’ and end their destructive behavior”

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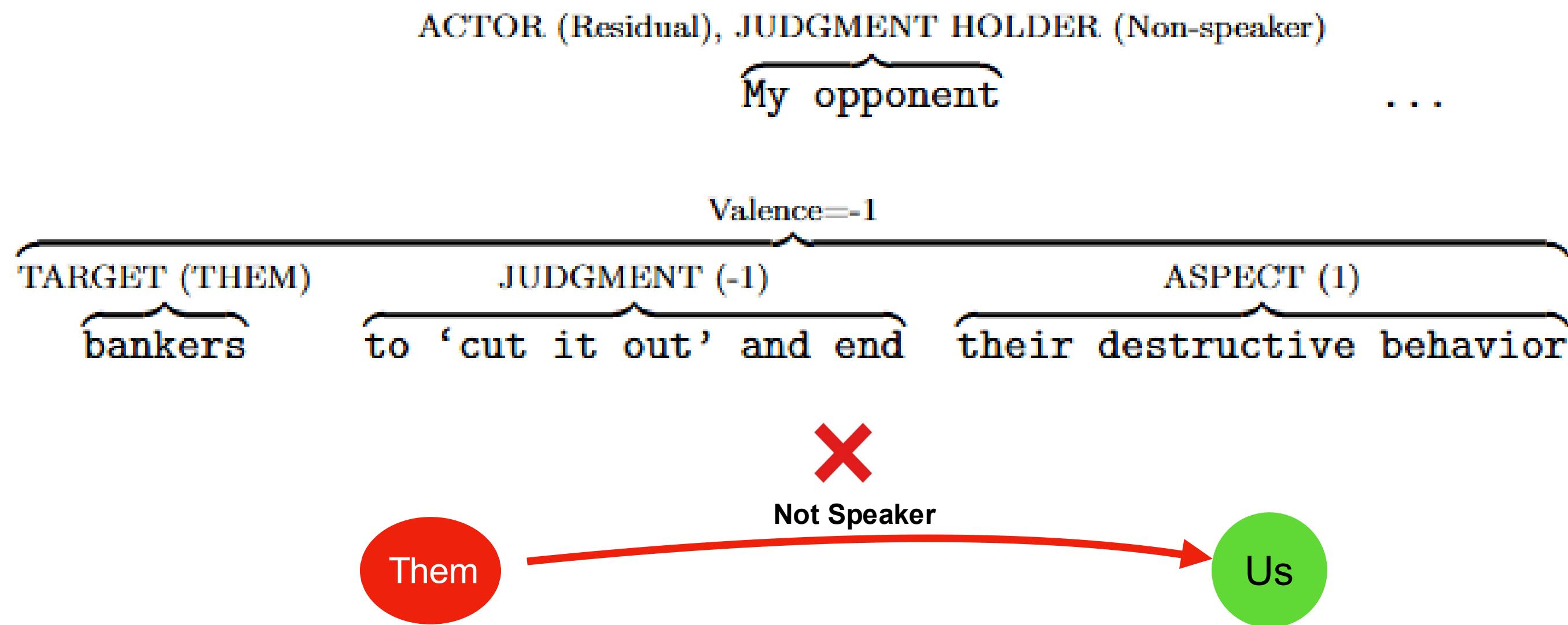
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How do we Compare Extracted Graphs to Populist Motifs?

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Graph Edit Distance

Matching Extracted Structures to Populist Motifs via GED

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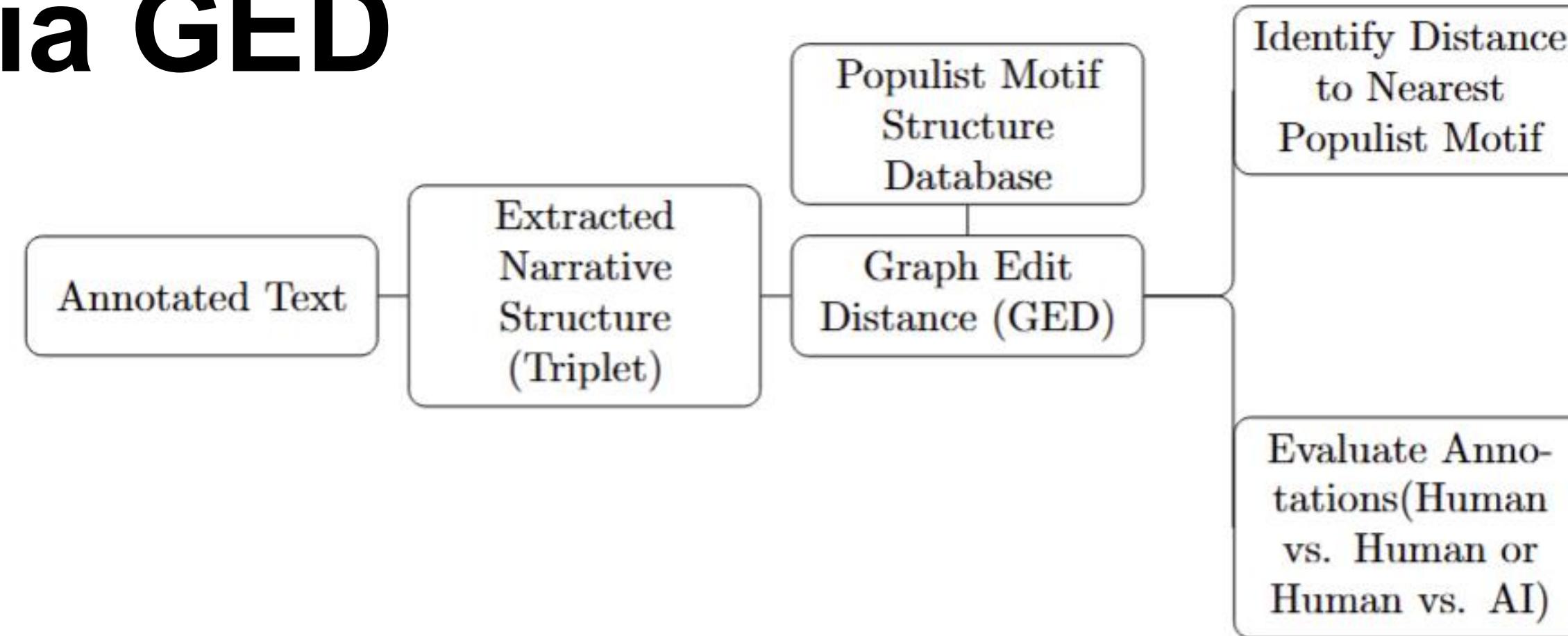
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- **Advantages:**
 - Captures **substantive alignment** beyond superficial wording
 - **Flexibility:** Allows partial matches and exact matching as special cases
 - **Evaluation:** Compares automated extraction to human annotations

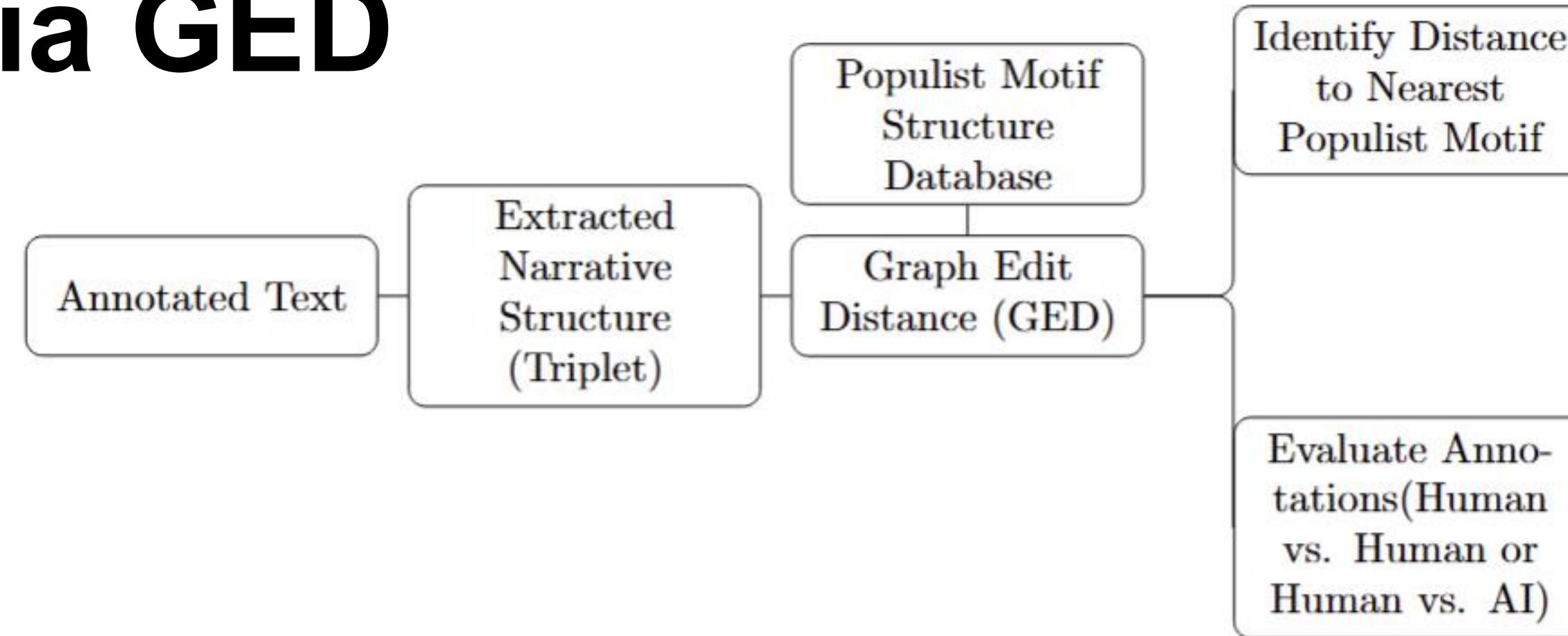
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- **Distance Calculation:** **Penalizes significant shifts** in actors, targets, or valence

Matching Extracted Structures to Populist Motifs via GED



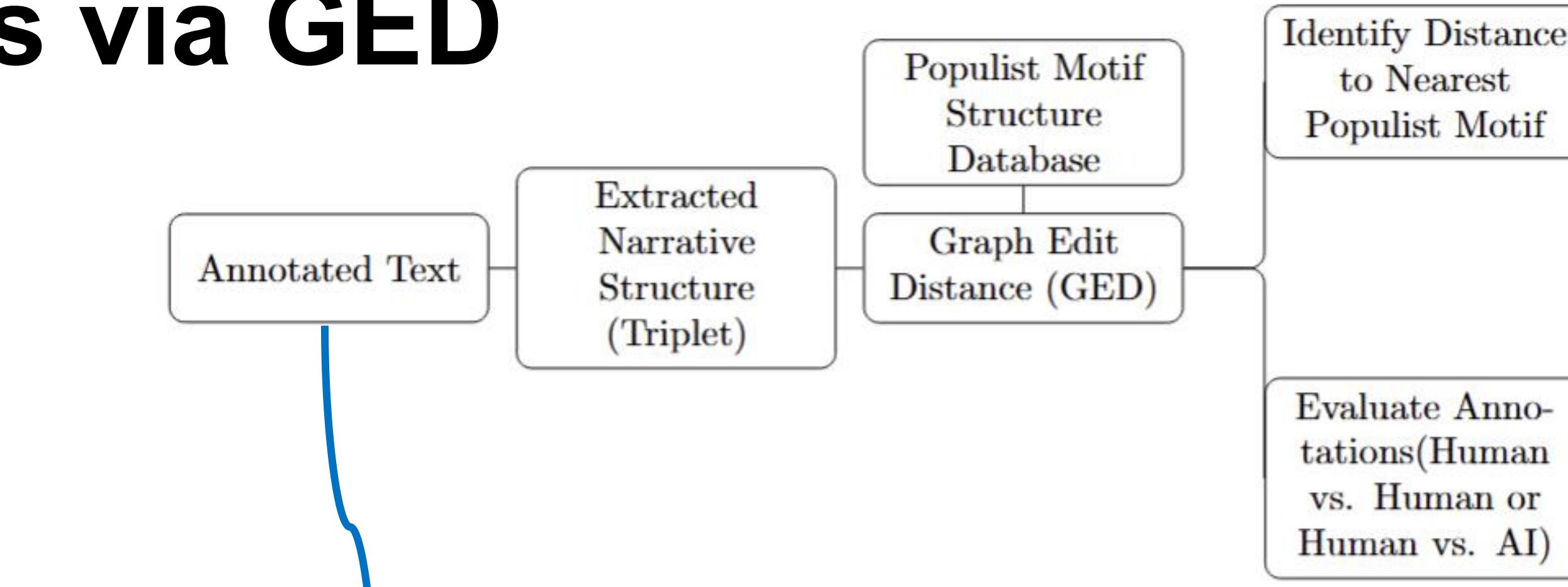
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Sentence Example

Empowerment Reference: “*We will bring back our borders*”

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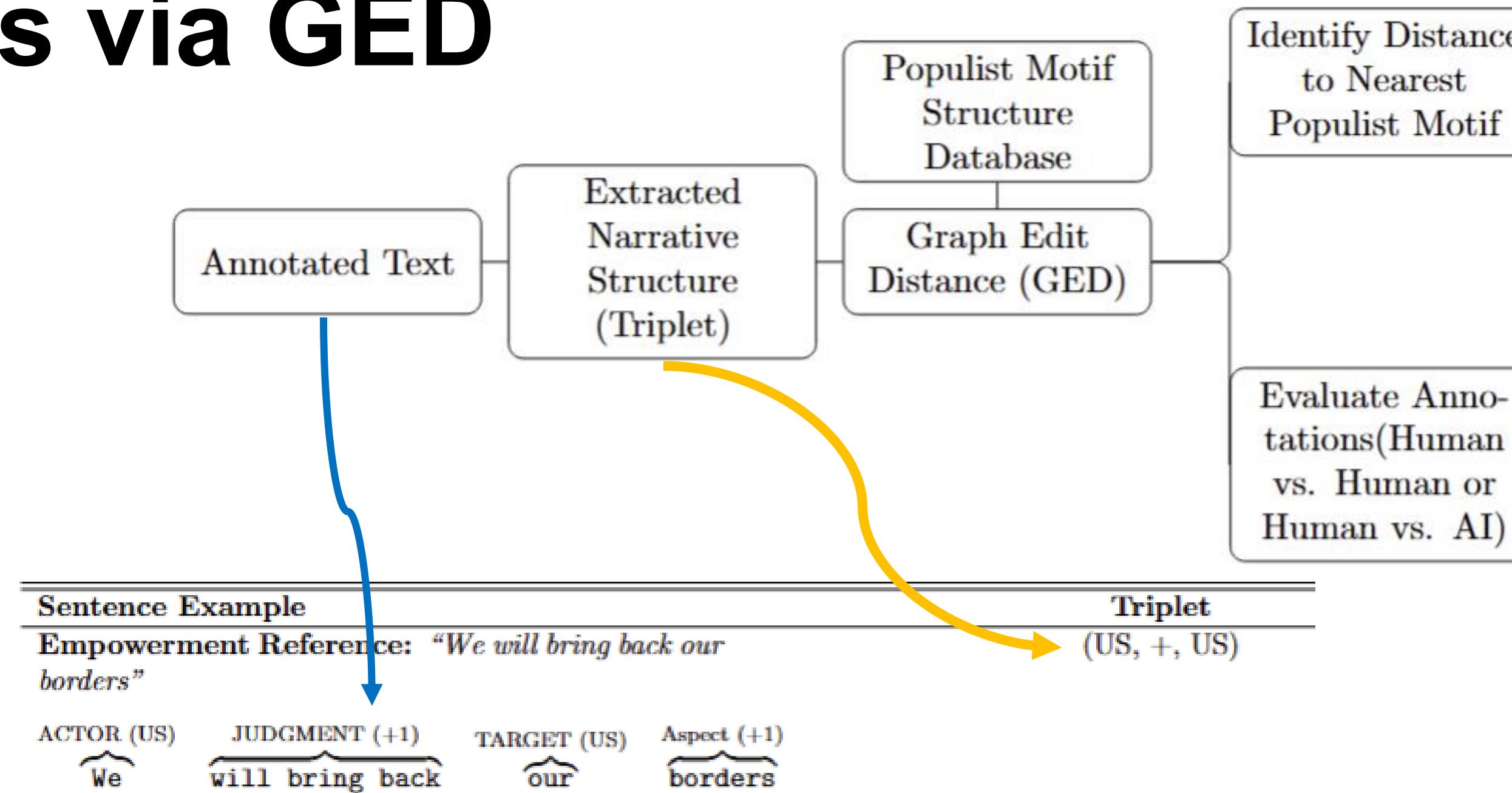


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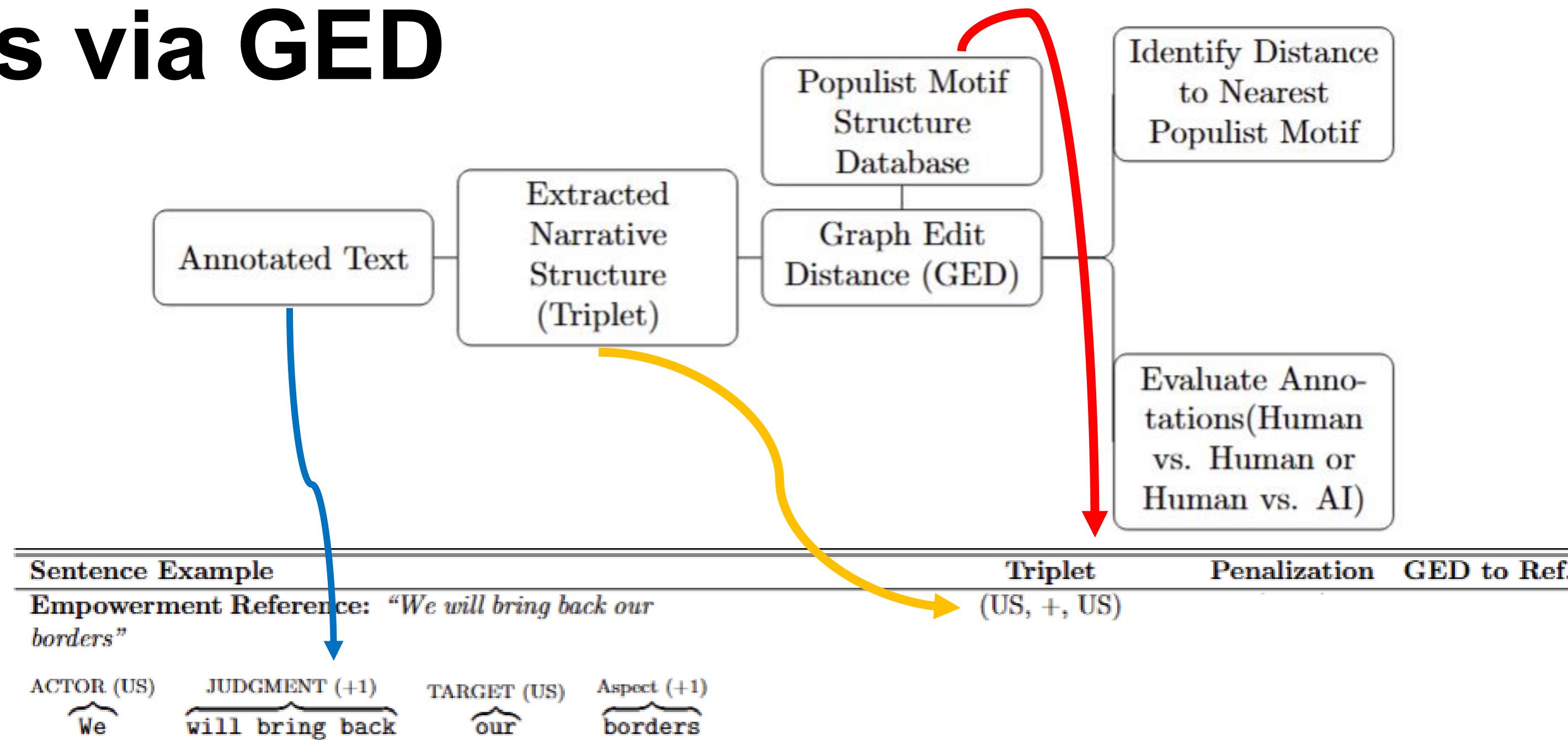
Empowerment Reference: “*We will bring back our borders*”

ACTOR (US) JUDGMENT (+1) TARGET (US) Aspect (+1)
 We will bring back our borders

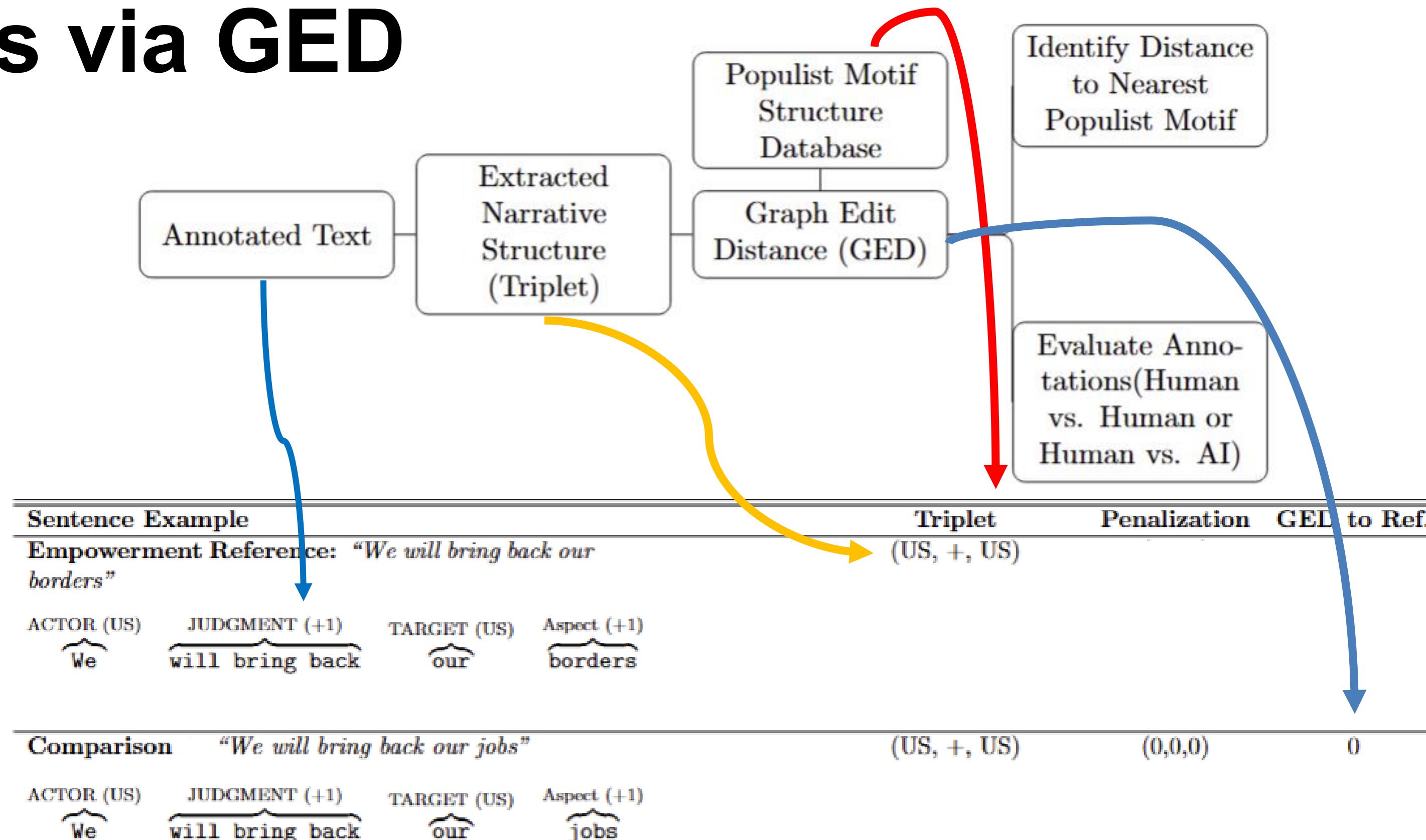
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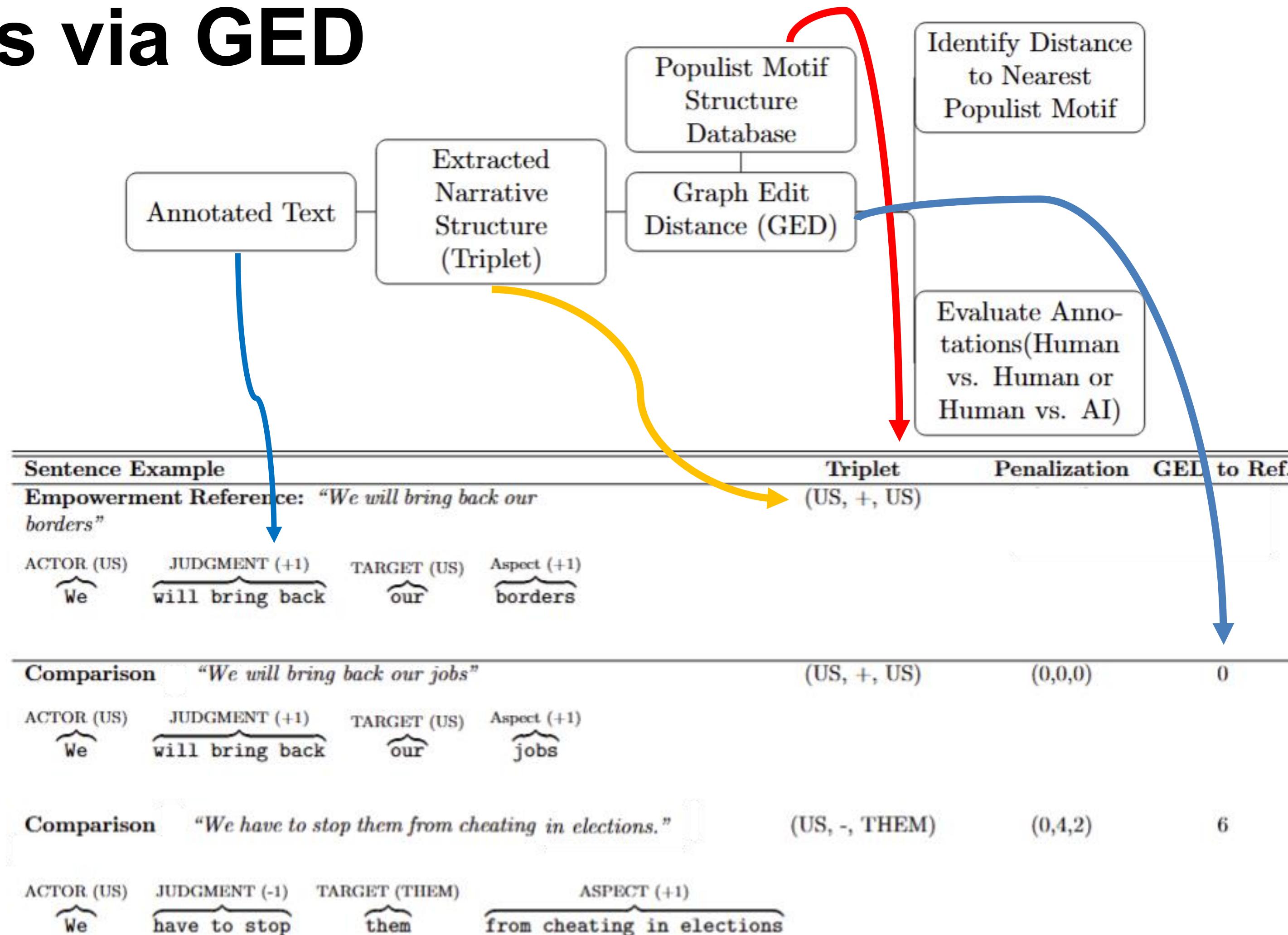
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GED Penalization System

Formally,

$$GED_{ij}: (G_i, G_j) \rightarrow d_{ij}, d_{ij} \in \mathbb{Z}^+$$

where **GED** maps the structure of two graphs G_i and G_j into a scalar distance.

Within the speaker's perspective:

Penalty Value	Explanation
0	No change: Actor, valence, and target match exactly.
1	Minor ambiguity: Explicit actor replaced by ambiguous actor (Residual).
2	Actor/Target substitution: Switching between US and THEM roles.
4	Valence reversal: Changing polarity from positive to negative or vice versa.

GED In Practice

“We will bring back our border” → Speaker (Us, +, Us)

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Victimization

Speaker(Them, -, Us)

Empowerment

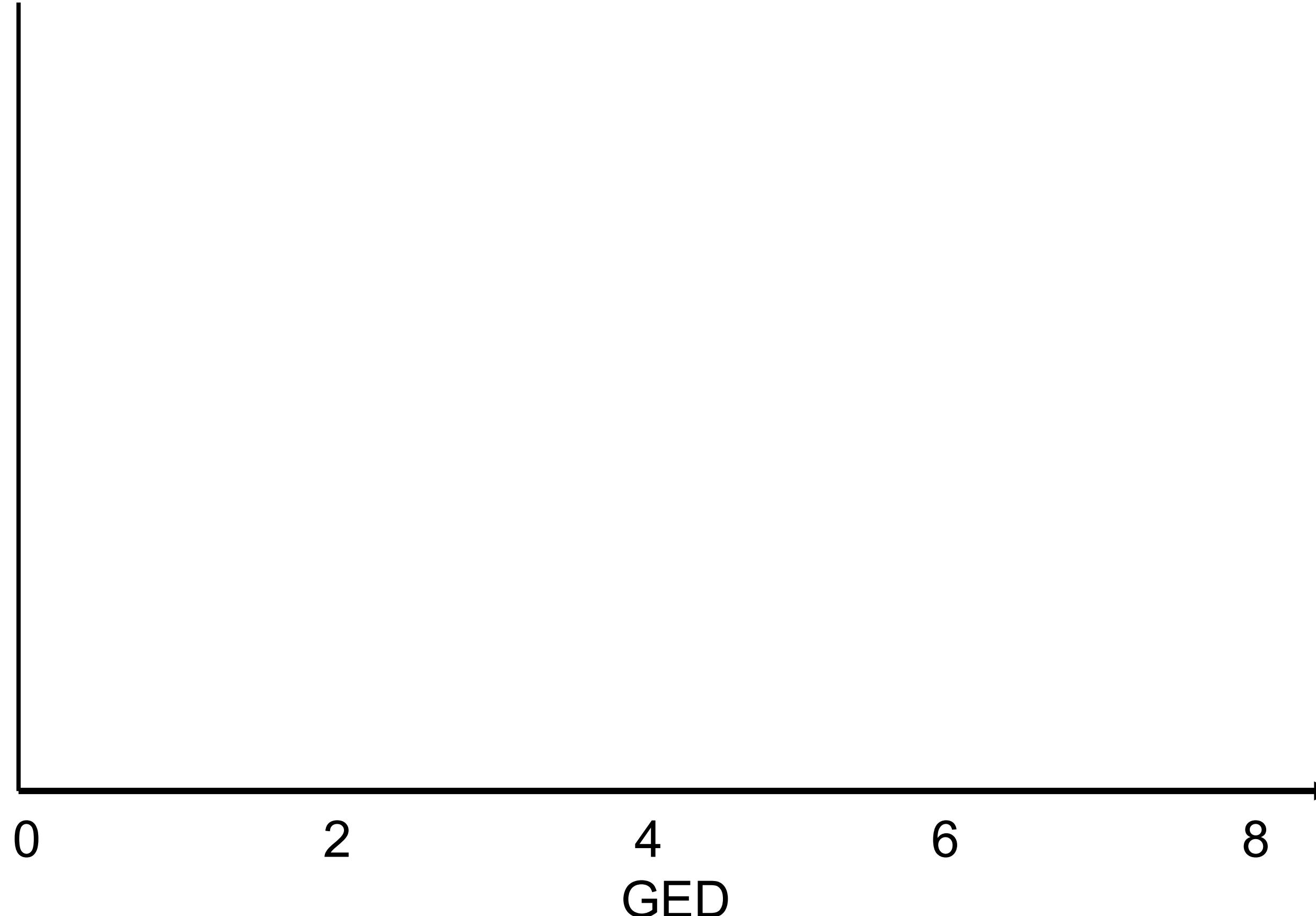
Speaker(Us, +, Us)

Elite Conspiracy

Speaker(Them, +, Them)

Resistance

Speaker(Us, -, Them)



GED In Practice

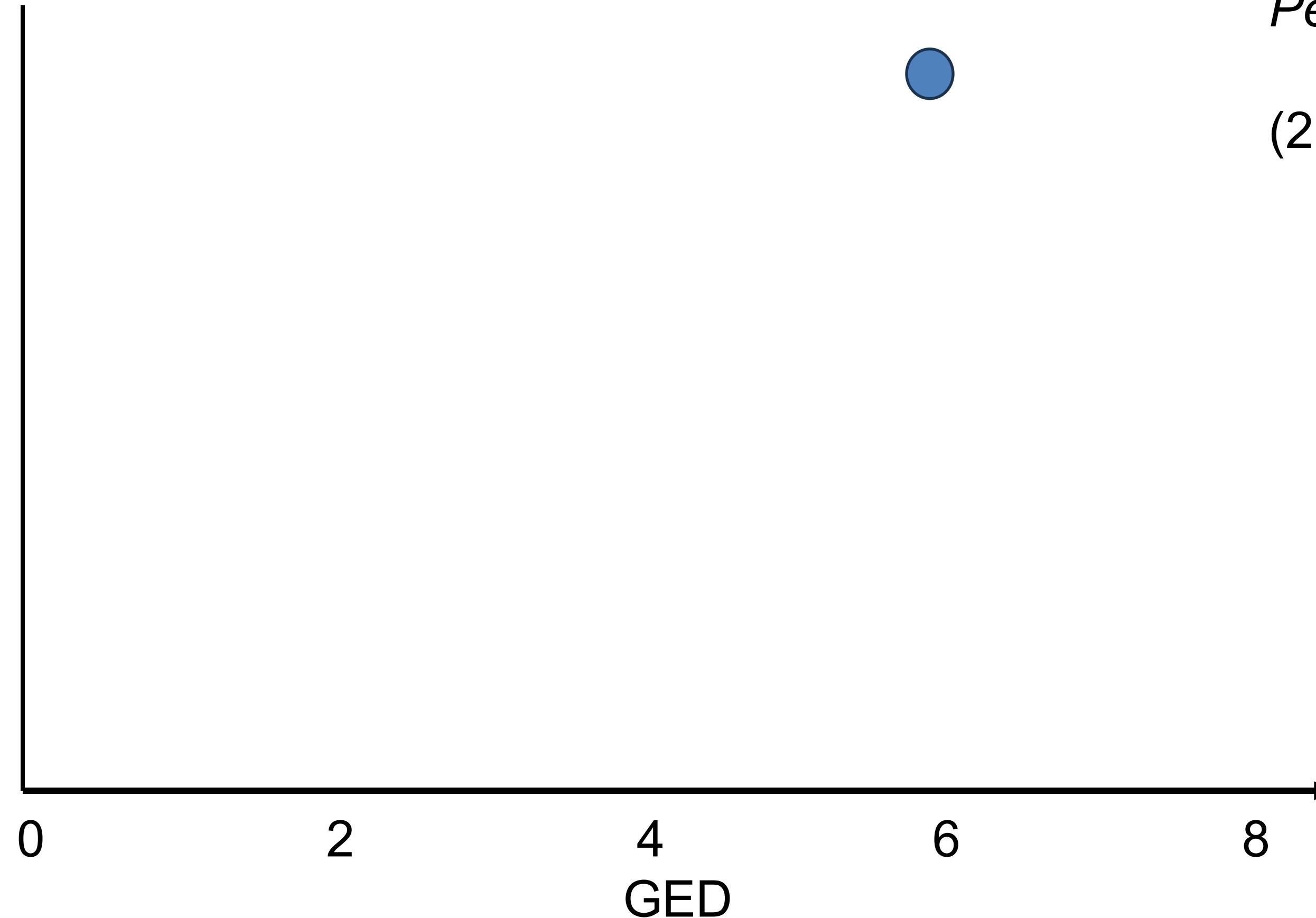
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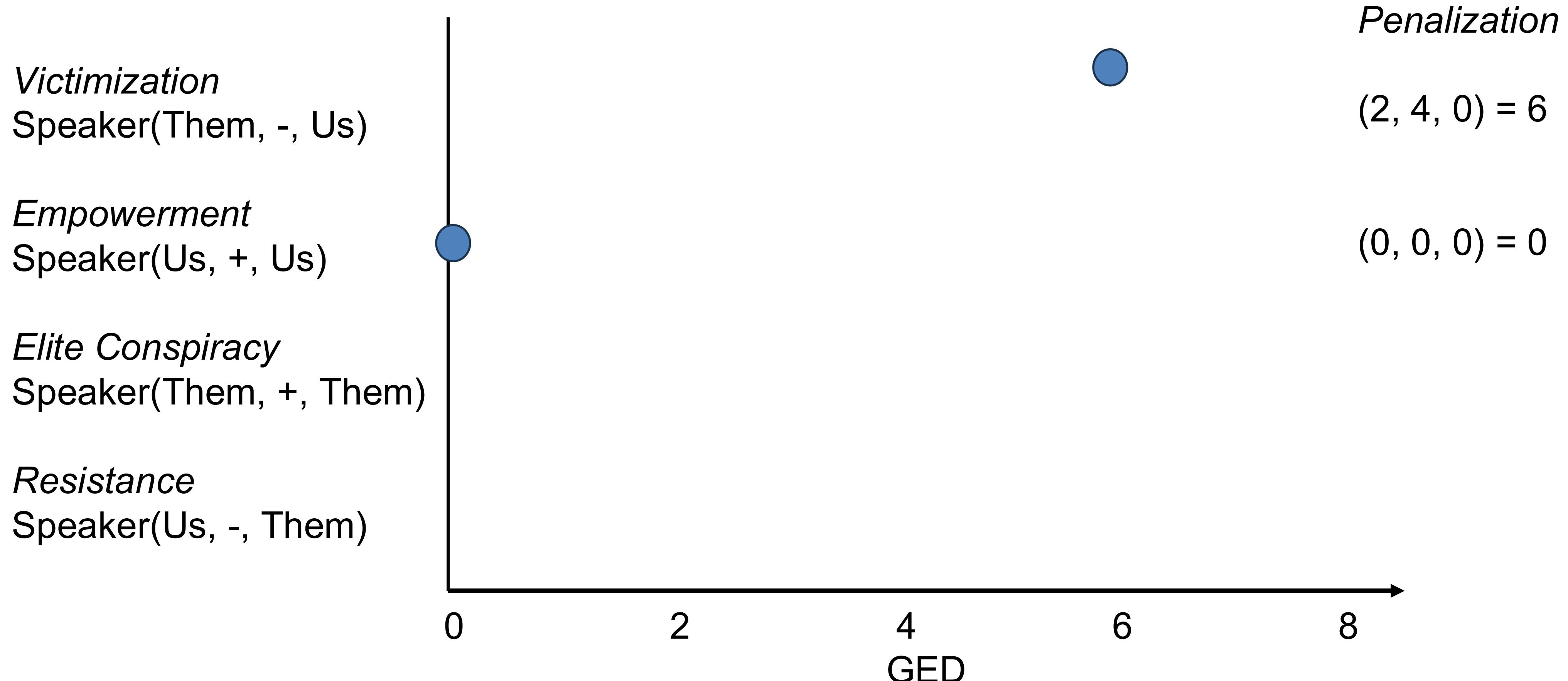
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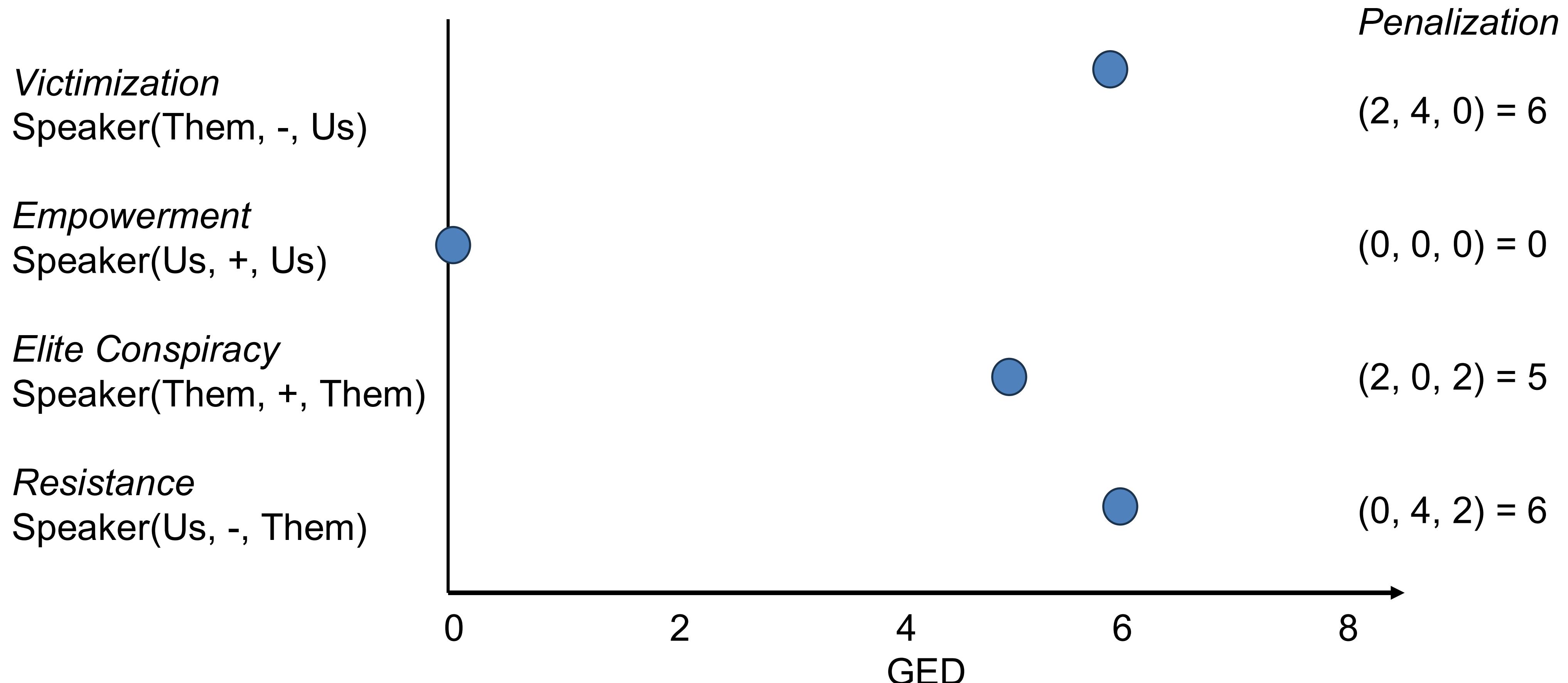
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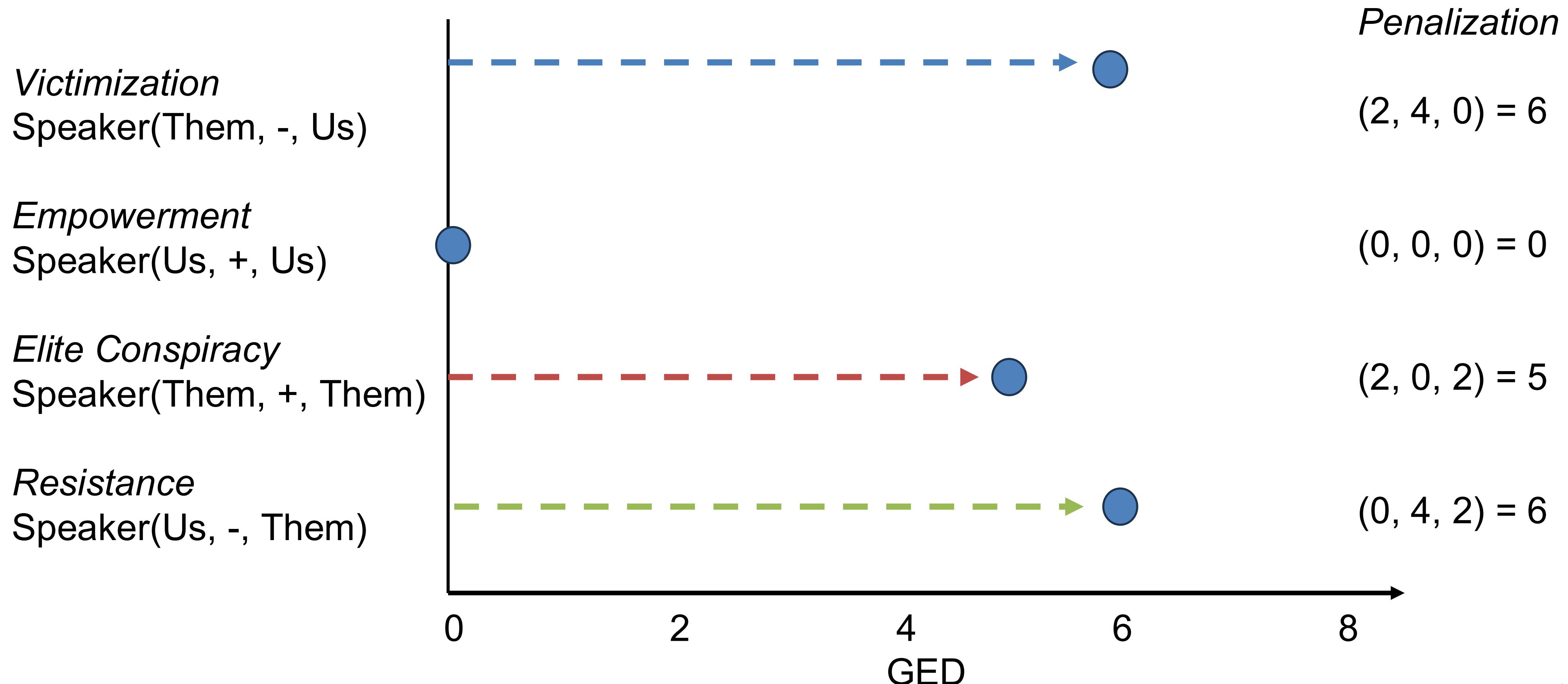
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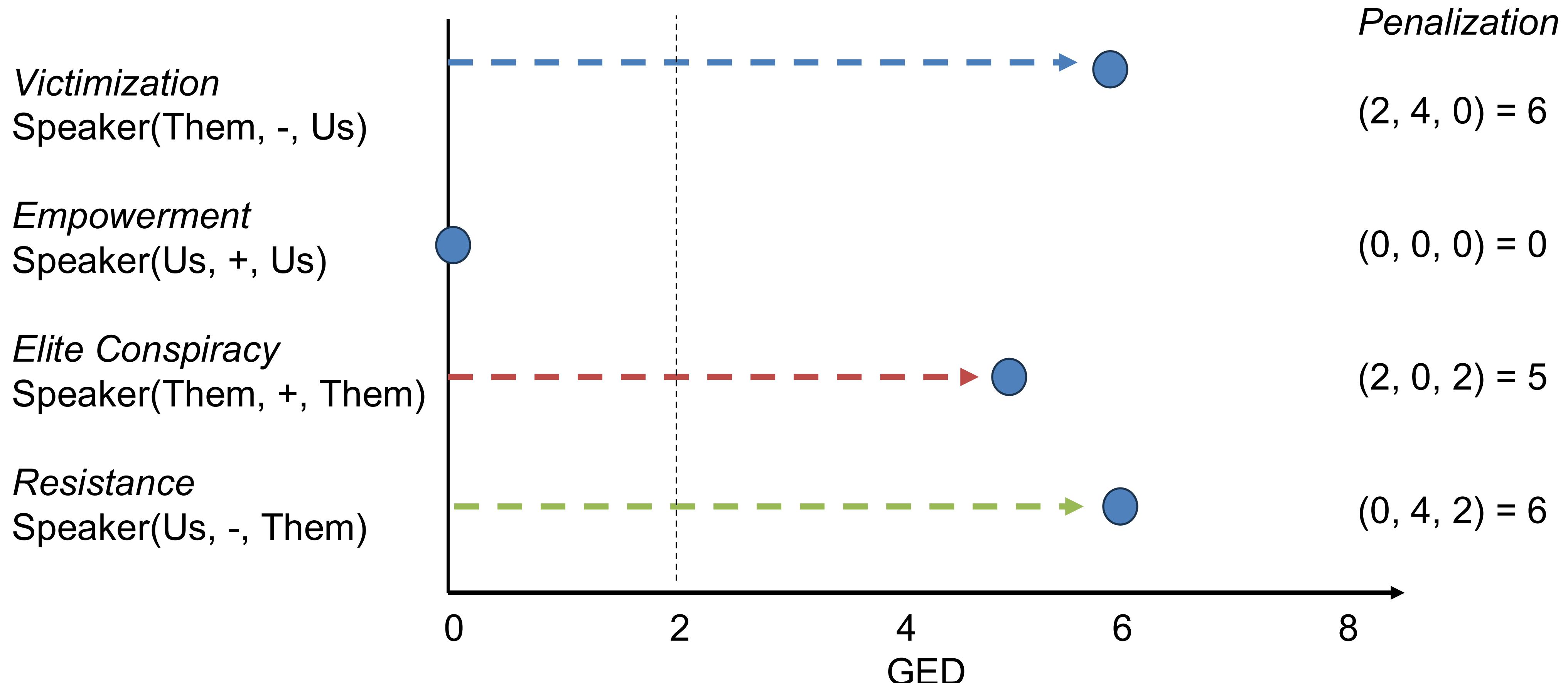
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GED In Practice

“We will bring back our border” → Speaker (Us, +, Us) → **Empowerment**



Our Approach: Making Populist-PULSAR Accessible at Scale

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- **Challenge:** Manual annotation costly at large scale

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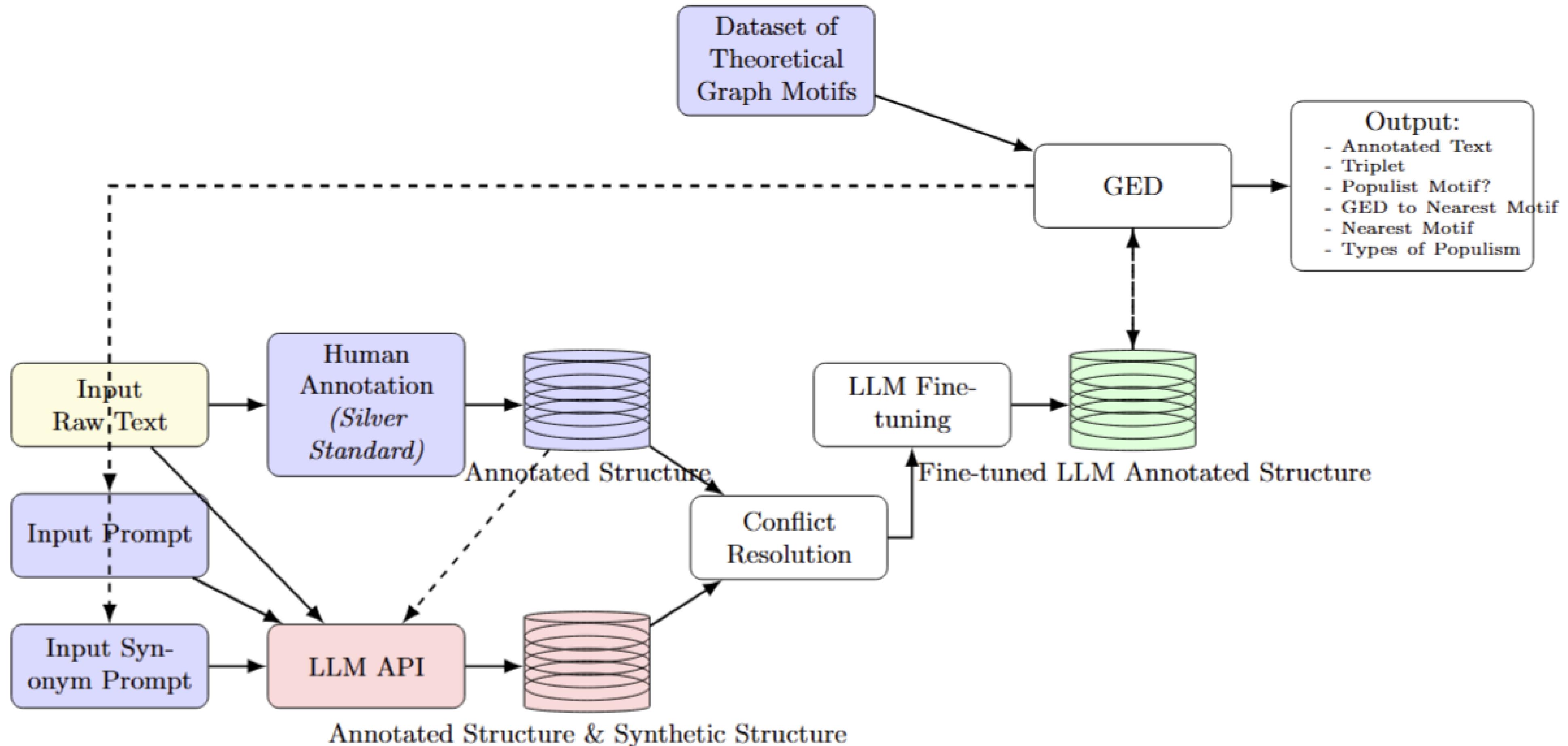
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 - Prompt-based annotations via LLMs
 - Synthetic data generation

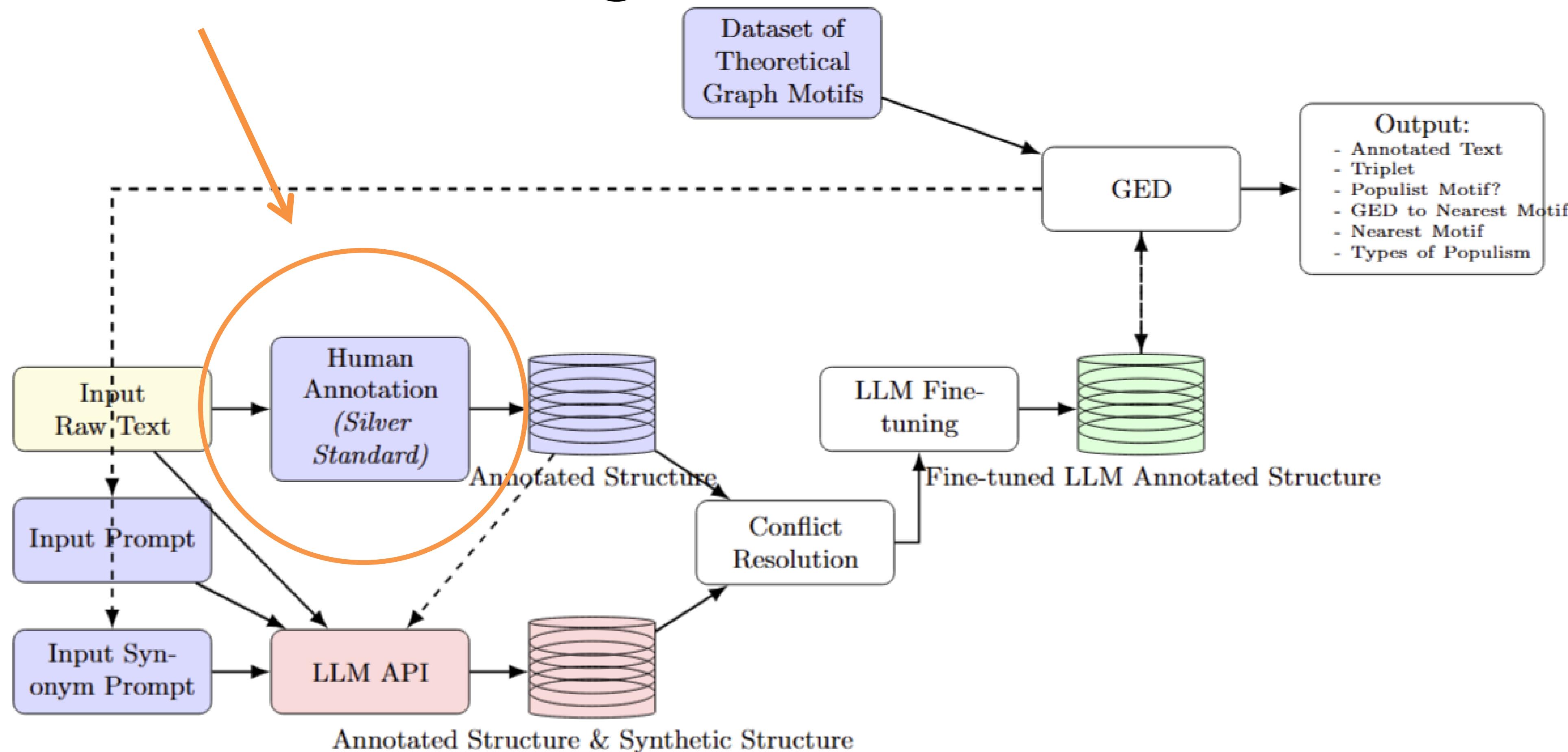
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 - Synthetic data generation
- **Data Scope:** U.S. political speeches (2008-present)

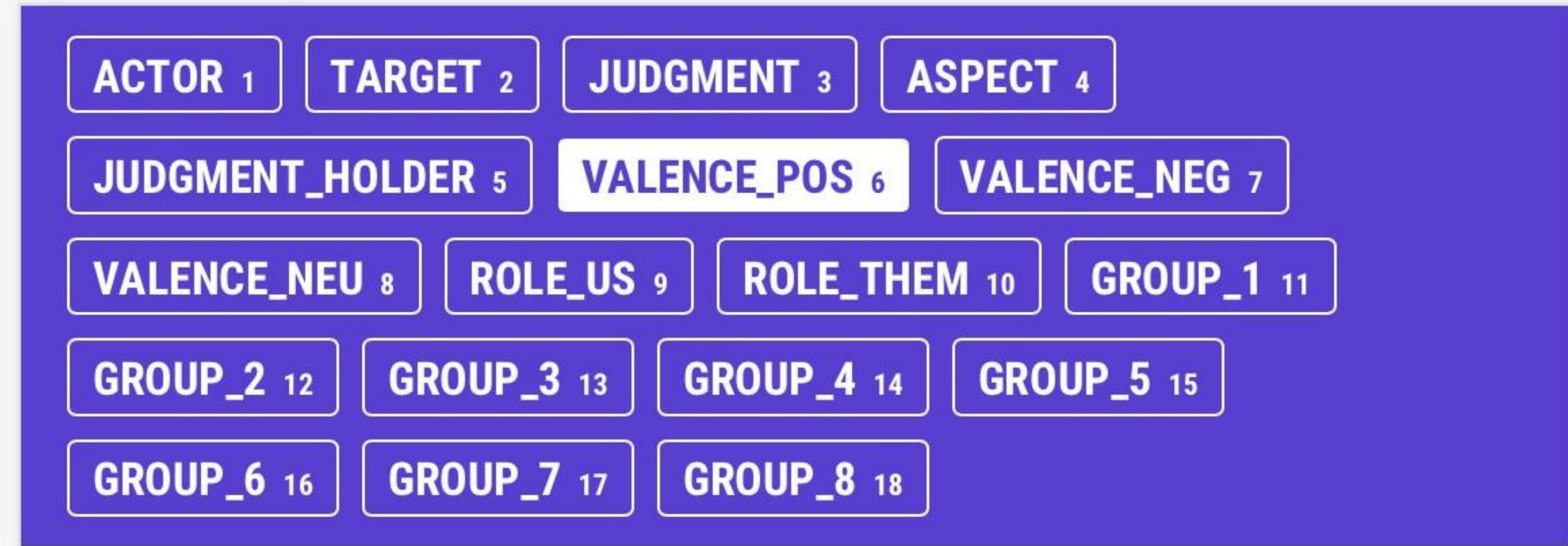
The Computational Steps from Unannotated Texts to Extracting Narrative Structure



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Hand-annotate using Prodigy system



For the last eight years, President Trump has given everything he has



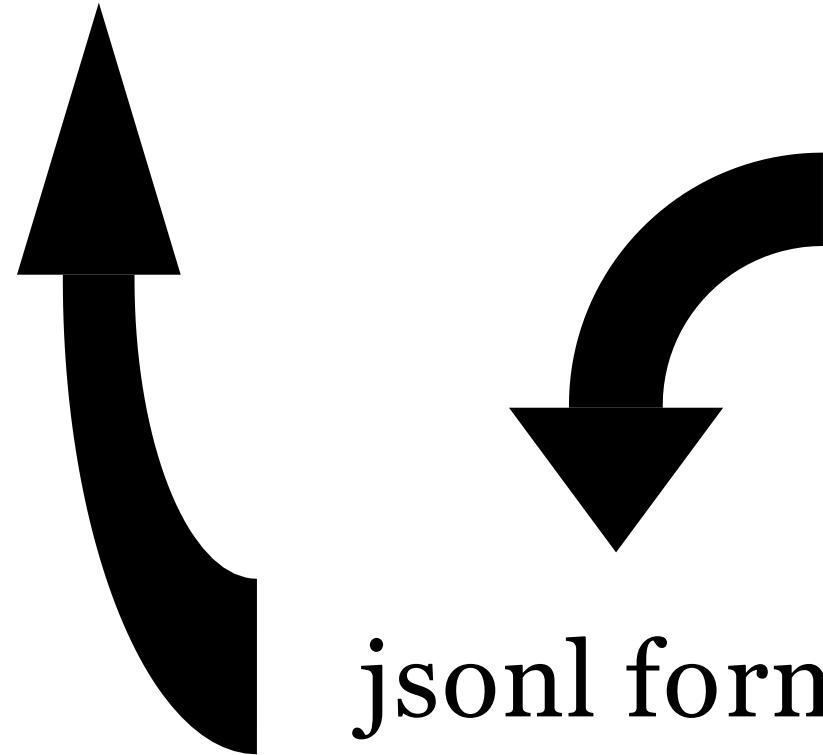
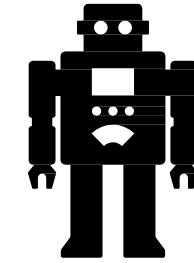
to fight for the people of our country.



SOURCE: Vance_RNC_2024 POPVAL: 1

Hand-annotate using Prodigy system

Input to few-shot
LLM to label



ACTOR 1	TARGET 2	JUDGMENT 3	ASPECT 4
JUDGMENT HOLDER 5	VALENCE_POS 6	VALENCE_NEG 7	
VALENCE_NEU 8	ROLE_US 9	ROLE_THEM 10	GROUP_1 11
GROUP_2 12	GROUP_3 13	GROUP_4 14	GROUP_5 15
GROUP_6 16	GROUP_7 17	GROUP_8 18	

For the last eight years, President Trump has given everything he has to fight for the people of our country.

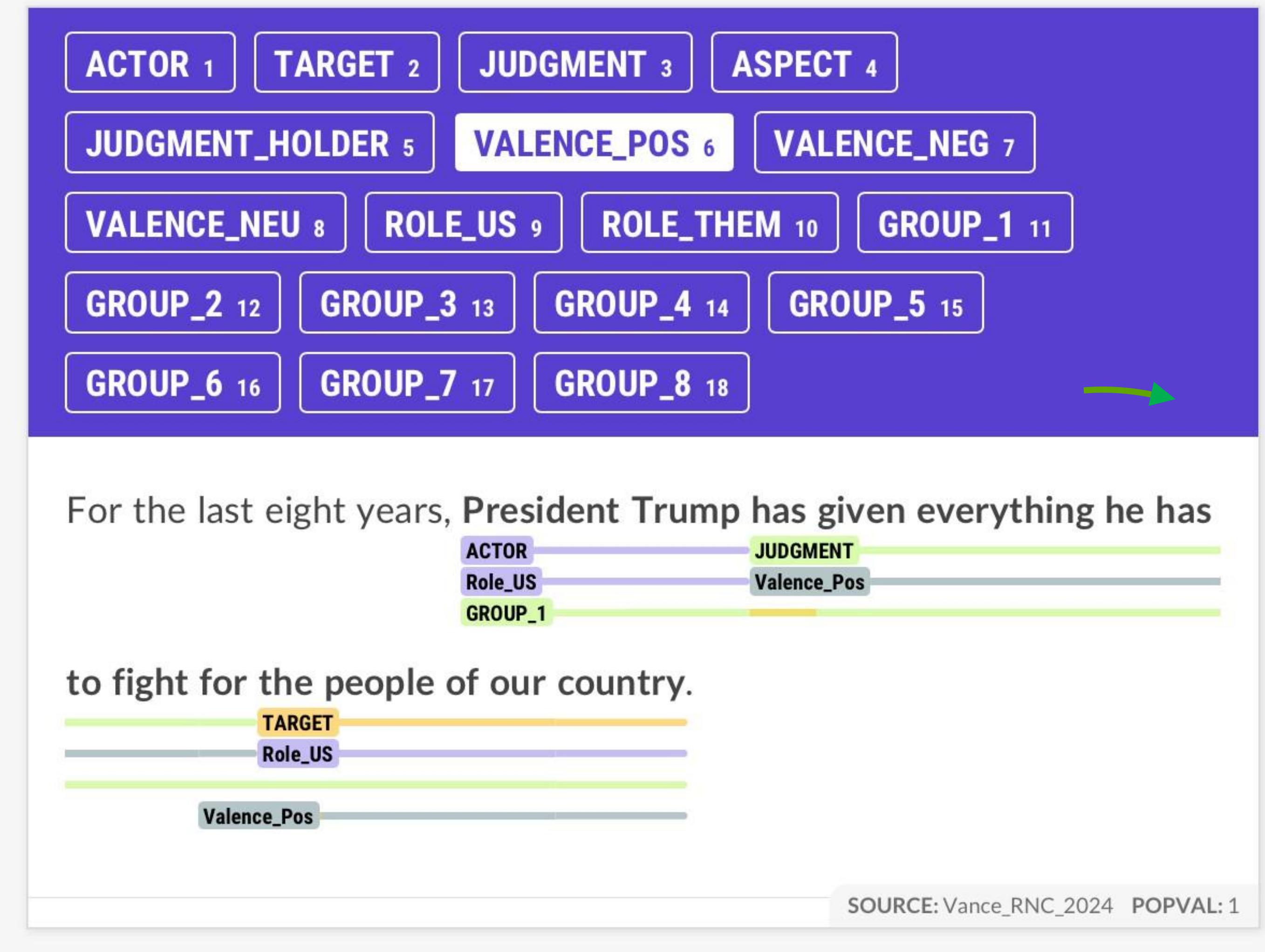
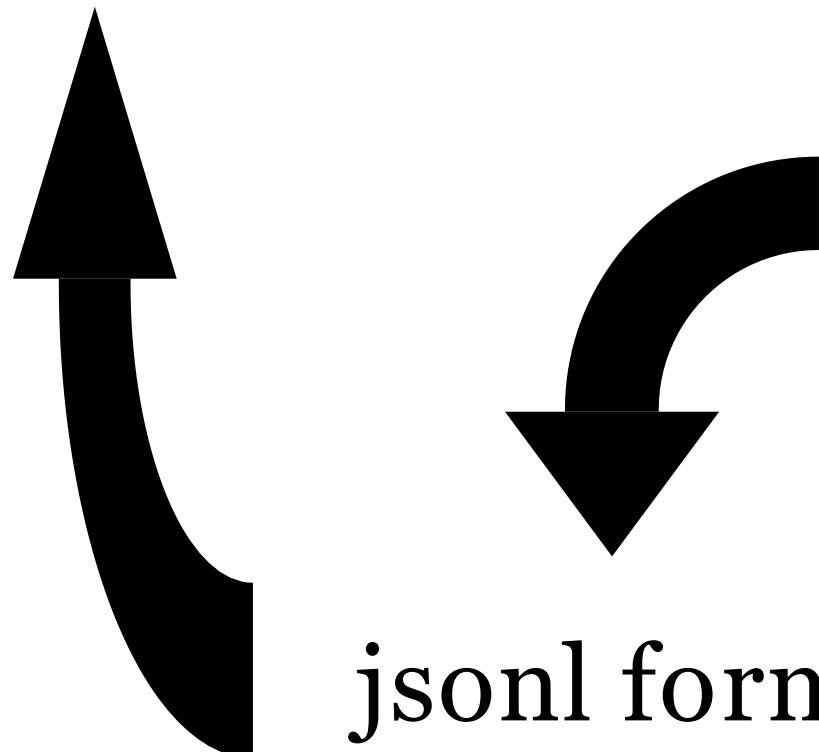
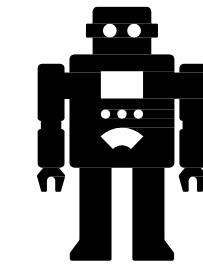
ACTOR ————— JUDGMENT
Role_US ————— Valence_Pos
GROUP_1 —————

TARGET —————
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The Prodigy interface shows a grid of entity types and their corresponding IDs:

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Below the grid, a sentence is annotated:

For the last eight years, President Trump has given everything he has to fight for the people of our country.

Annotations for the first part of the sentence:

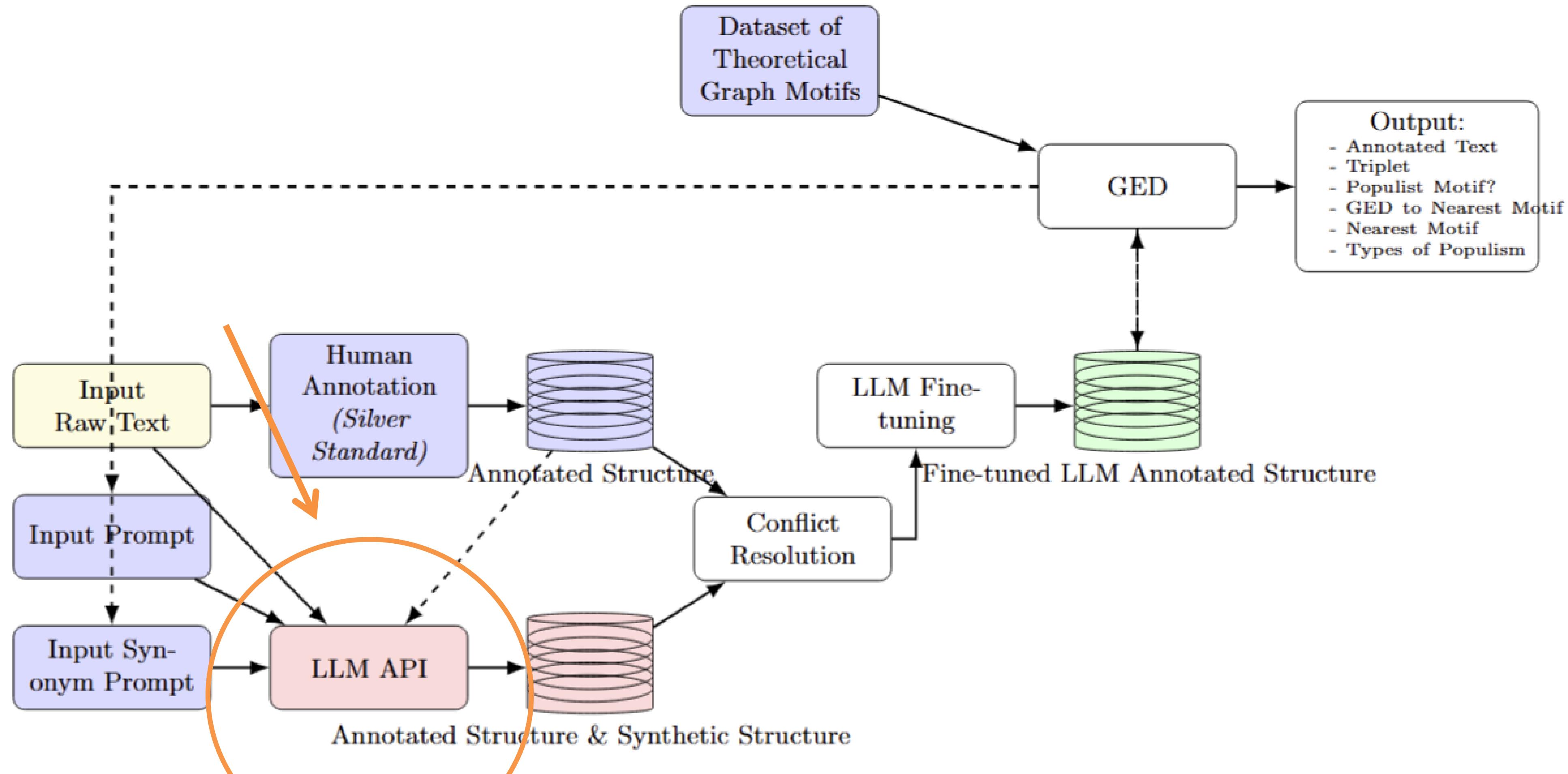
- Actor: President Trump (highlighted in purple)
- Judgment: has given everything he has (highlighted in green)
- Role_US: he has (highlighted in purple)
- Valence_Pos: has (highlighted in grey)
- Group_1: everything (highlighted in green)

Annotations for the second part of the sentence:

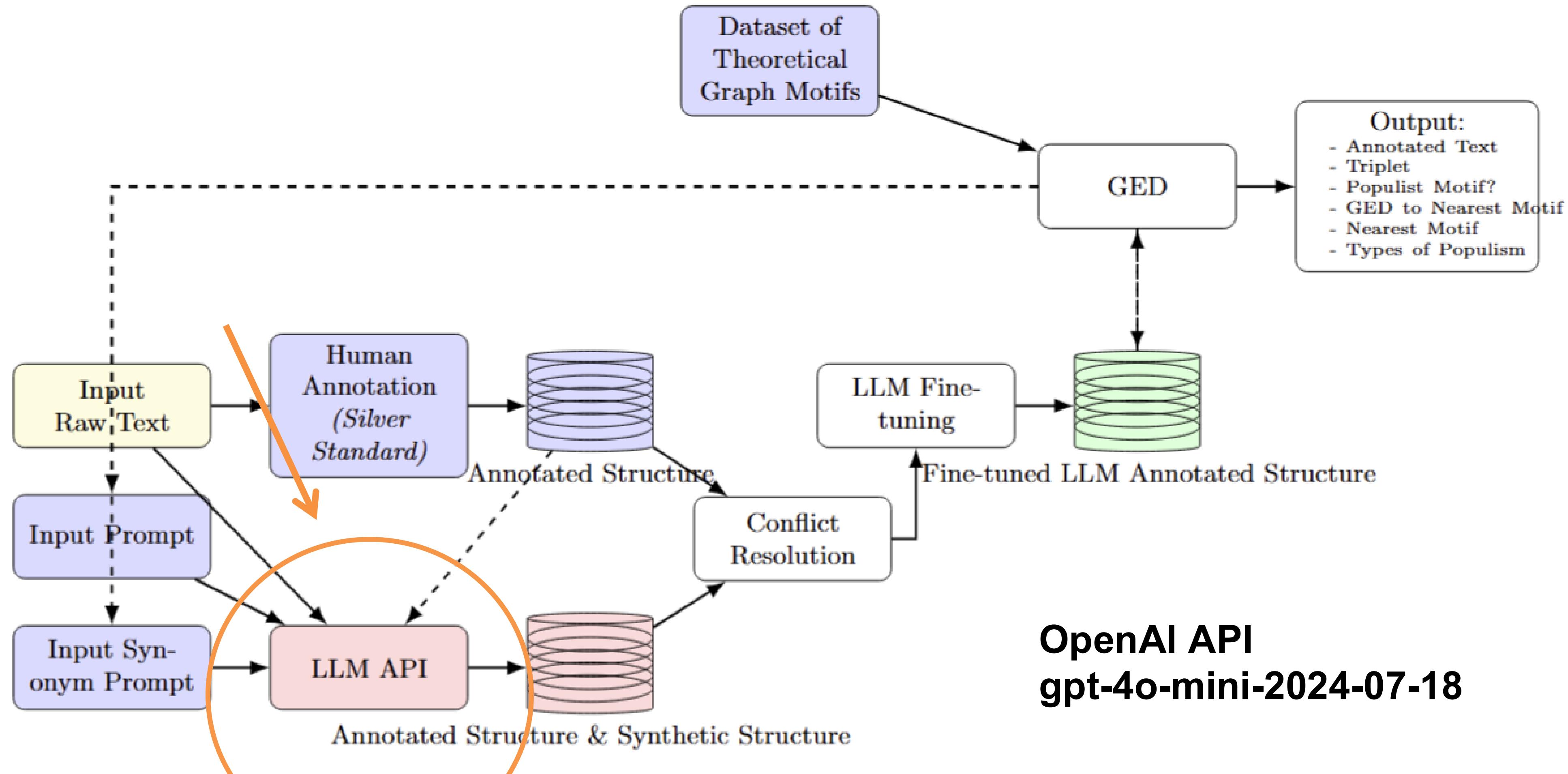
- Target: people of our country (highlighted in orange)
- Role_US: people of our country (highlighted in purple)
- Valence_Pos: people of our country (highlighted in grey)

SOURCE: Vance_RNC_2024 POPVAL: 1

The Computational Steps from Unannotated Texts to Extracting Narrative Structure



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OpenAI API
gpt-4o-mini-2024-07-18

Prompt Engineering for Populist Motif Detection

Approach

- **Few-shot prompting** with curated examples to improve generalization.
- **Modular decomposition**: split annotation into subtasks.

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Implementation

- **OpenAI API** (gpt-4o-mini-2024-07-18).
- Each call included:
 - User message*: task instructions + examples.
 - Set **temperature = 0** for reproducible results.

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Prompt Refinement

- Iterative self-refinement inspired by *Self-Refine prompting* (Madaan et al., 2023).
- **Human critique with model suggestions** — LLM as annotator *and* co-designer.

Prompt Examples

```
"Sentence: \"And we've seen over the last 4 years, the status quo in Washington, they are powerful and they have fought us every step of the way.\n\n"
"{
"  'judgment_relations': [\n    {
      'ACTOR': {'text': 'they', 'start': 68, 'end': 72, 'role': 'THEM'},\n      'JUDGMENT': {'text': 'are powerful', 'start': 73, 'end': 85, 'valence': 1},\n      'ASPECT': {'text': 'the status quo in Washington', 'start': 38, 'end': 66, 'valence': -1},\n      'TARGET': {'text': 'us', 'start': 107, 'end': 109, 'role': 'US'}\n    },\n    {
      'ACTOR': {'text': 'they', 'start': 68, 'end': 72, 'role': 'THEM'},\n      'JUDGMENT': {'text': 'have fought', 'start': 90, 'end': 101, 'valence': -1},\n      'ASPECT': {'text': 'us every step of the way', 'start': 102, 'end': 126, 'valence': 1},\n      'TARGET': {'text': 'us', 'start': 102, 'end': 104, 'role': 'US'}\n    }
  ],\n  [
    {
      'text': 'And we\'ve seen over the last 4 years, the status quo in Washington, they are powerful and they have fought us every step of the way.'
    }
  ]
}
```

Prompt-Based Data Augmentation for Annotation Efficiency

- Generate **semantically equivalent** paraphrases for annotated sentence using an LLM.
- Substitute key phrases with context-appropriate synonyms for: **actor, target, judgment, aspect**.
- Keep grammaticality, meaning, and the original labels.

Why it helps

- Expands the training set and adds linguistic variety (e.g., “corrupt elite” → “out-of-touch establishment”).
- Helps address class imbalance by adding more positive examples.
- E.g generating **5 synonyms** for each component yields **$5 \times 5 \times 5 \times 5 = 625$** unique sentences.

Prompt-Based Data Augmentation - Example

"The insiders wrote the rules of the game to keep themselves in power and in the money."

Raw response: {

```
"ACTOR": ["The elites", "The establishment", "The powerful", "The decision-makers", "The ruling class"],  
"JUDGMENT": ["to maintain", "to preserve", "to secure", "to uphold", "to safeguard"],  
"ASPECT": ["authority and wealth", "influence and financial gain", "dominance and prosperity",  
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"TARGET": ["themselves", "their own interests", "their position", "their status", "their benefits"]  
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```

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```

1. "The **elites** wrote the rules of the game to keep themselves in power and in the money."

Prompt-Based Data Augmentation - Example

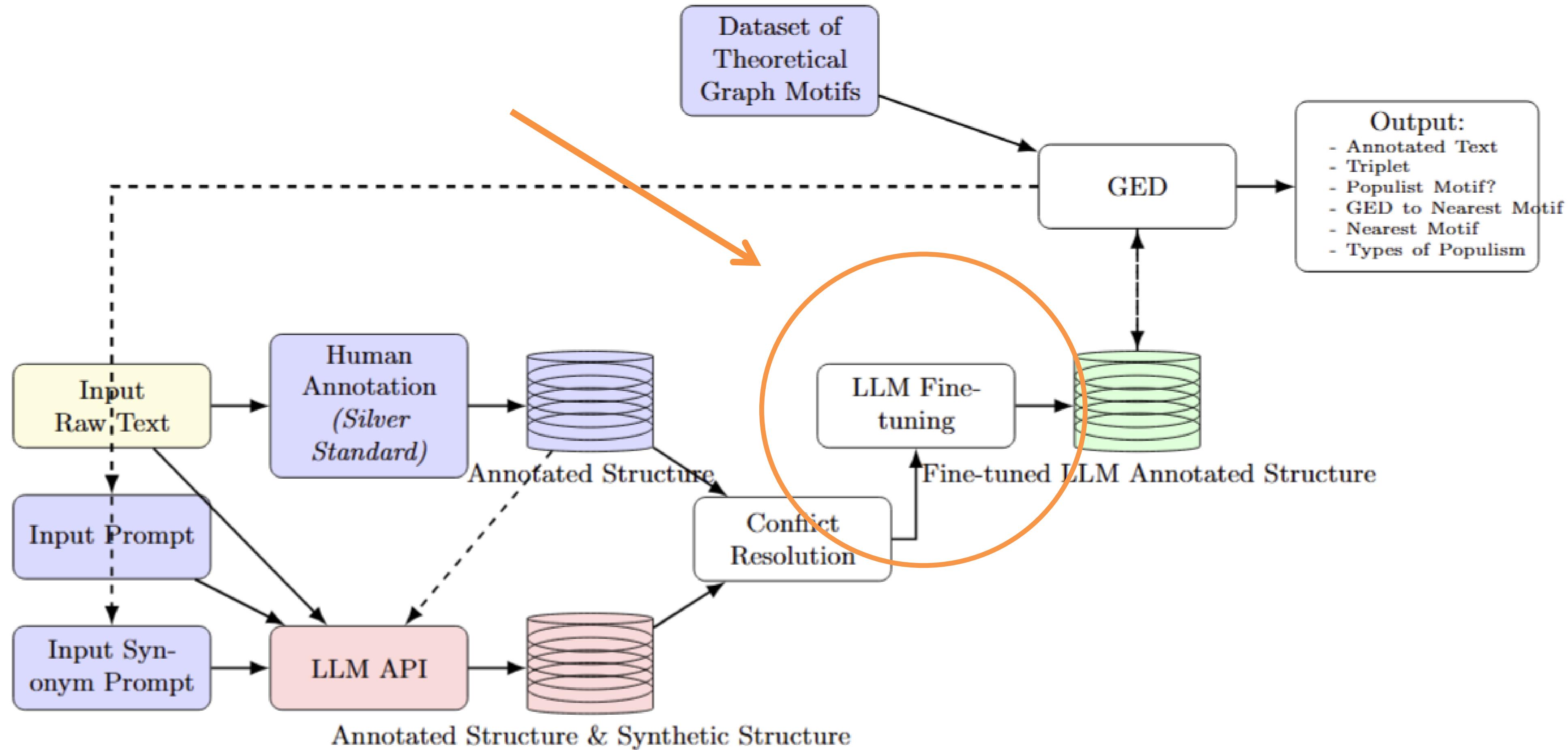
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1. "The elites wrote the rules of the game to keep themselves in power and in the money."
2. "The establishment wrote the rules of the game to keep themselves in power and in the money."
3. "The insiders wrote the rules of the game to uphold power and in the money."
4. "The insiders wrote the rules of the game to keep themselves in control and resources."
5. "The insiders wrote the rules of the game to keep their status in power and in the money."

The Computational Steps from Unannotated Texts to Extracting Narrative Structure



Fine-tunning Our Models - PyTorch

Sentence-Level Approach

Token-Level Approach

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Sentence-Level Approach

- DistilBERT multi-task fine-tuning
- Binary classification for each label
- Joint optimization

Token-Level Approach

- Separate BERT models for BIO tagging
- Identifies precise token spans
- Fine-tuned individually per component

Fine-tuning Our Models - PyTorch

Sentence-Level Approach

- DistilBERT multi-task fine-tuning
- Binary classification for each label
- Joint optimization

Label	Attribute	Precision	Recall	F1
Actor	Them	0.86	0.86	0.86
	Residual	0.91	0.91	0.91
	Us	0.93	0.93	0.93
Target	Them	1.00	0.90	0.95
	Residual	1.00	0.83	0.91
	Us	0.88	1.00	0.93
Judgment	-1	0.93	0.87	0.90
	+1	0.89	0.96	0.93
Aspect	-1	0.86	0.55	0.67
	+1	0.59	0.89	0.71

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Token-Level Approach

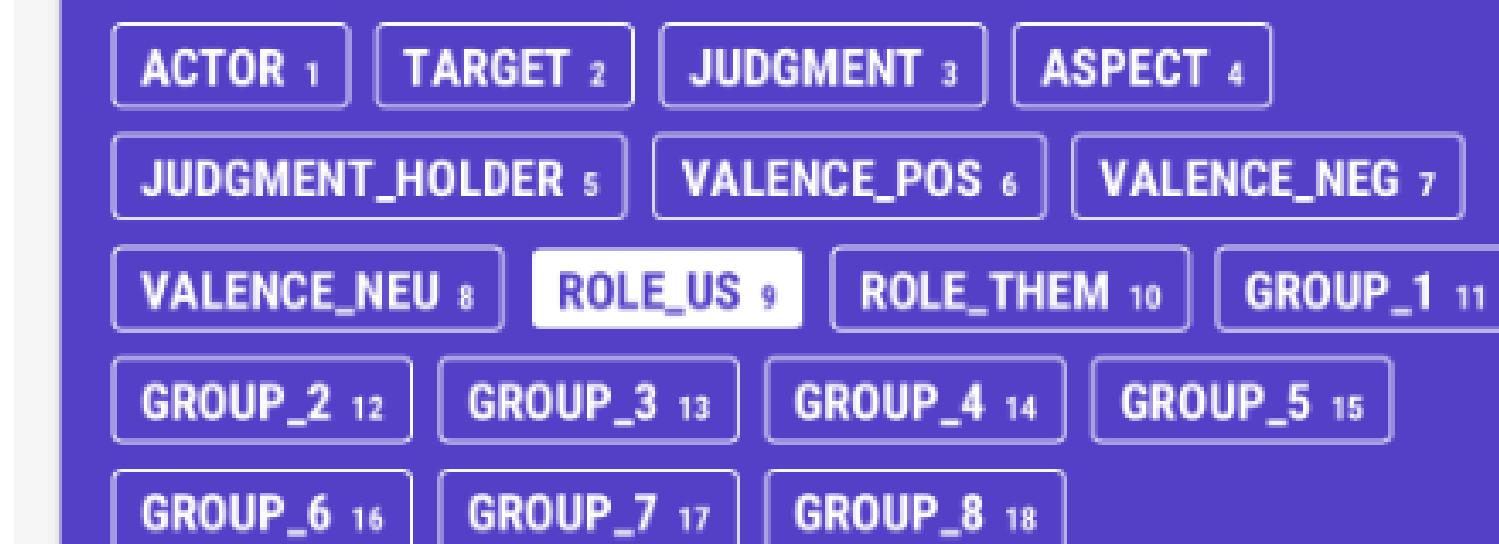
- Separate BERT models for BIO tagging
- Identifies precise token spans
- Fine-tuned individually per component

We continue to improve the system and add more training data!

Identifying Actor-Aspect-Target Groups

Each sentence may contain multiple aspects (issues or policy topics), and each aspect can be linked to one or more actors or targets.

We aim to detect these groups



When I was a sophomore in high school, that same career politician



named Joe Biden gave China a sweetheart trade deal that destroyed



even more good American middle-class manufacturing jobs..



SOURCE: Vance_RNC_2024 POPVAL: 1

Identifying Actor-Aspect-Target Groups

Each sentence may contain multiple aspects (issues or policy topics), and each aspect can be linked to one or more *actors* or *targets*.

We aim to detect these groups

Planned Approaches

- Multi-label **Supervised Model**
- **LLM** prompt-based
- **Relation Extraction with Pre-trained Models.**
(e.g., GLiNER, REBEL, T5-based relation extraction).

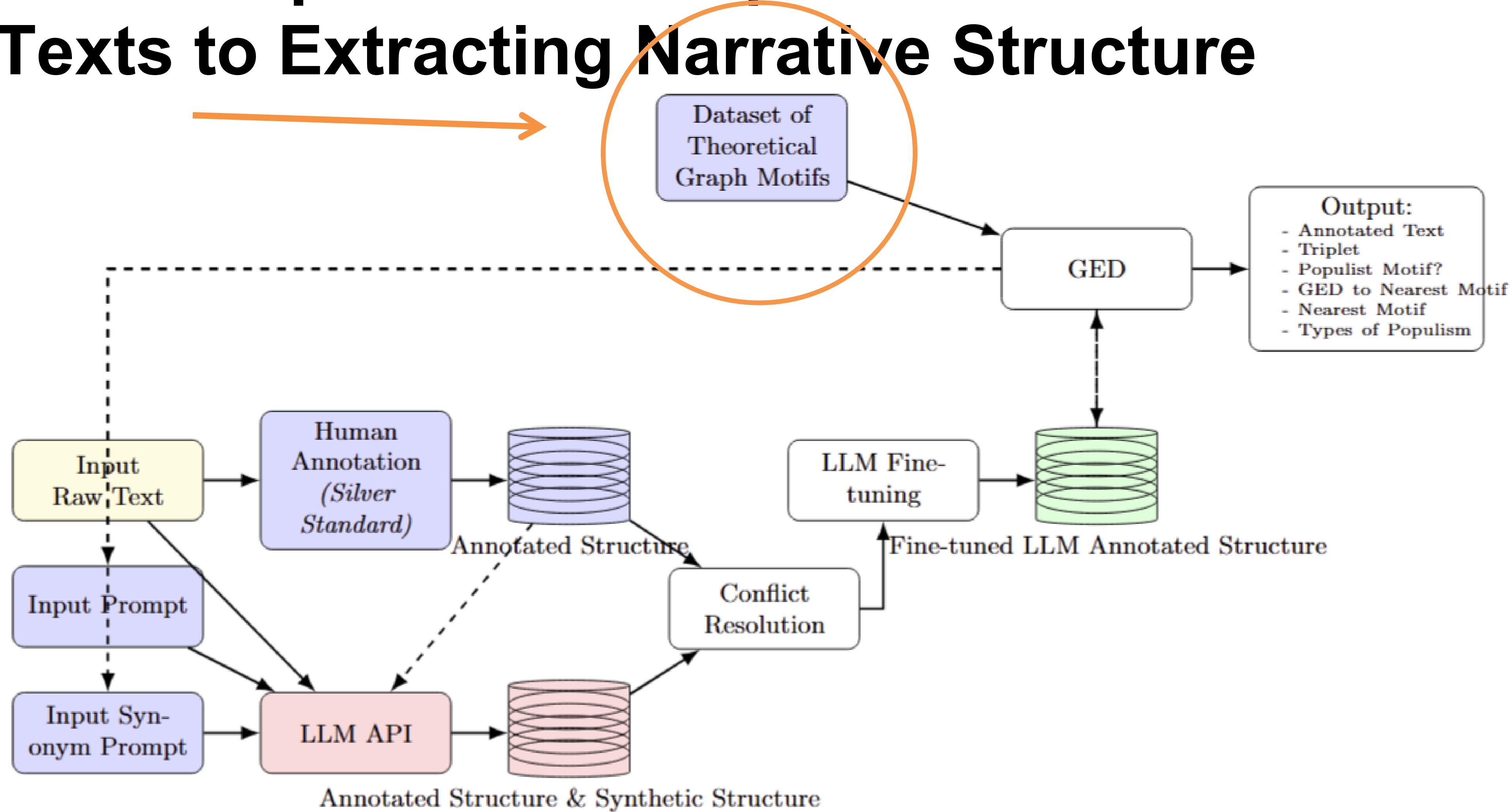


When I was a sophomore in high school, that same career politician



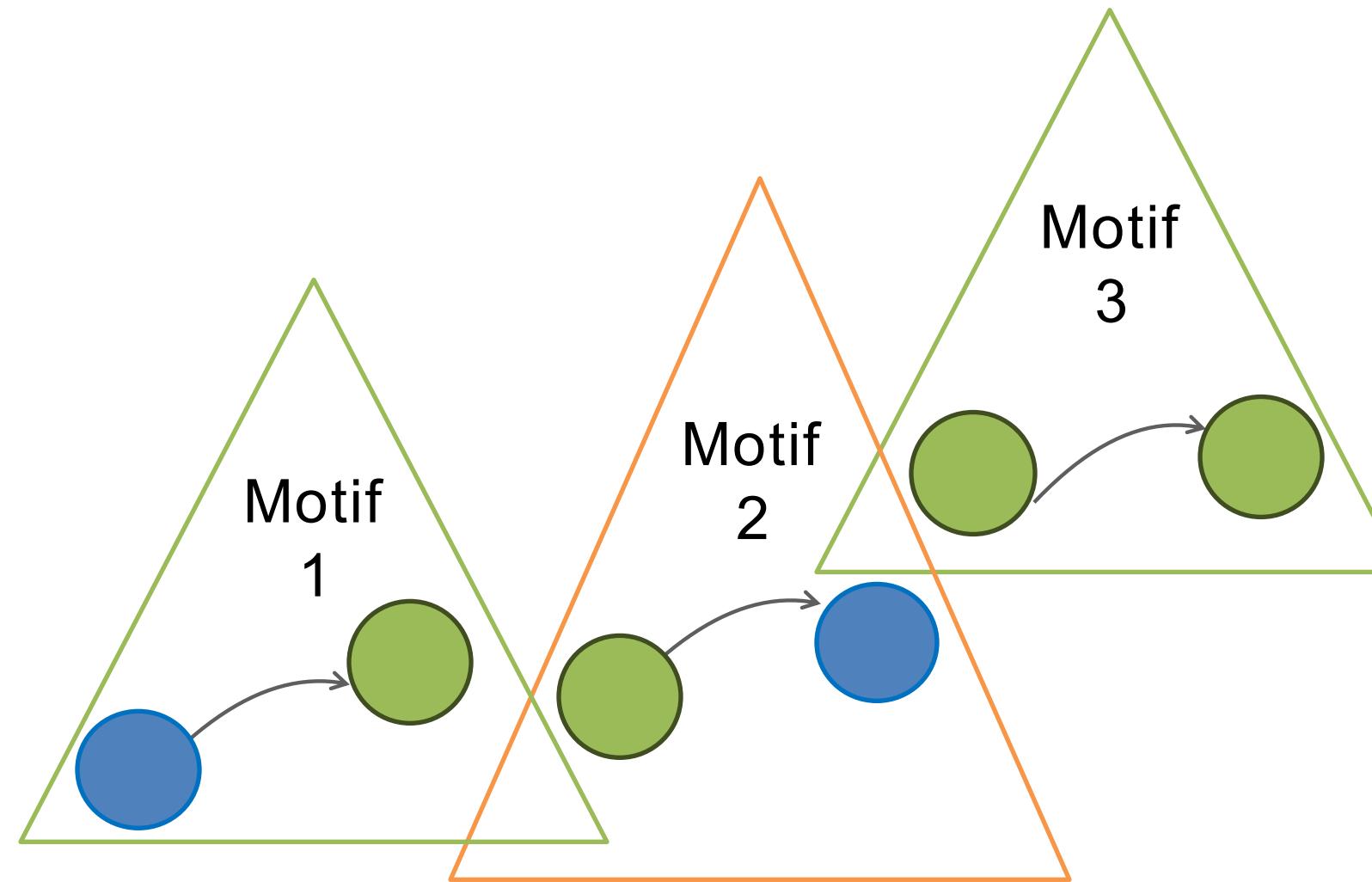
SOURCE: Vance_RNC_2024 POPVAL: 1

The Computational Steps from Unannotated Texts to Extracting Narrative Structure



Populist Narrative Structure

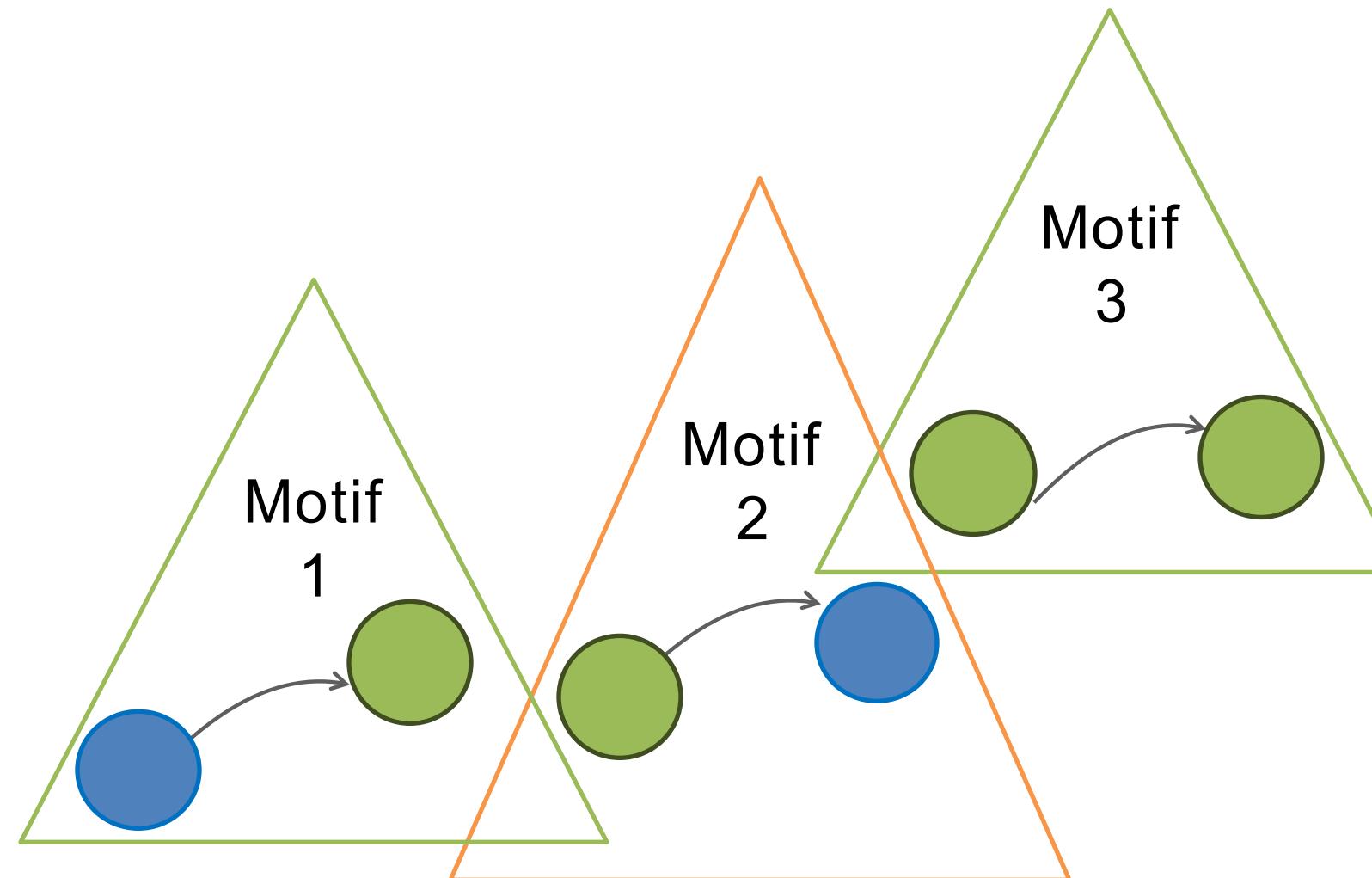
Cast THEORETICAL populist narrative types as network motifs



... Many, more

Populist Narrative Structure

Cast THEORETICAL populist narrative types as network motifs

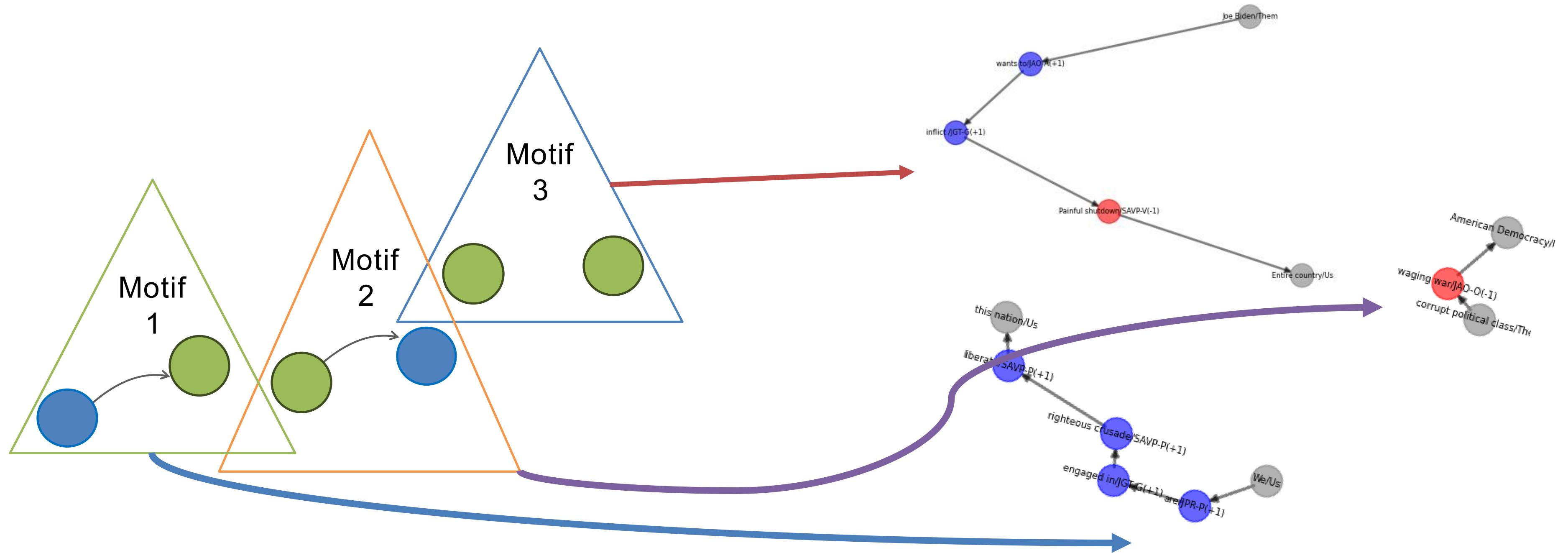


These come from concept of
thin-centered populism, not data

... Many, more

Populist Narrative Structure

Cast THEORETICAL populist narrative types as network motifs

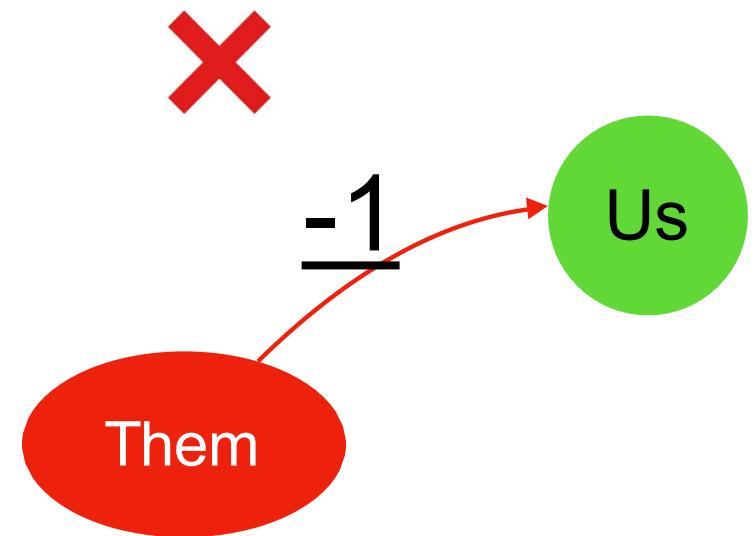


Then we compare theoretical
motifs with extracted graphs

... Many, more

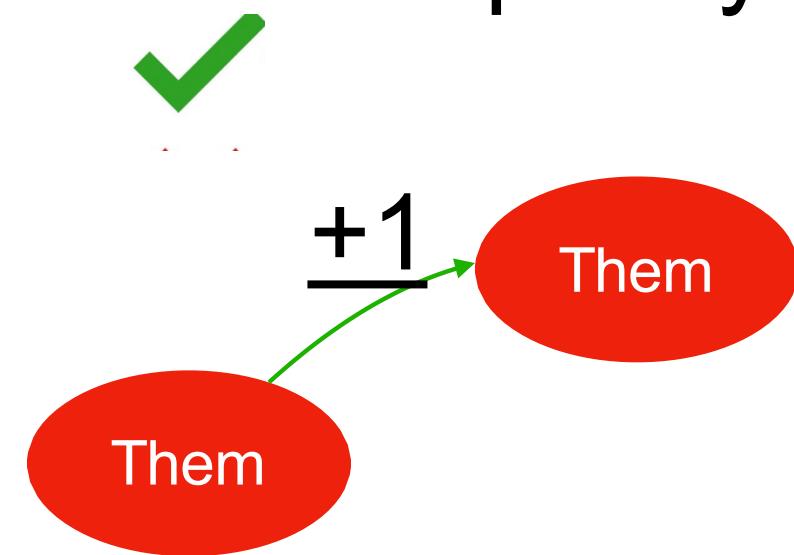
Populist Sentence Level Motifs

Victimization



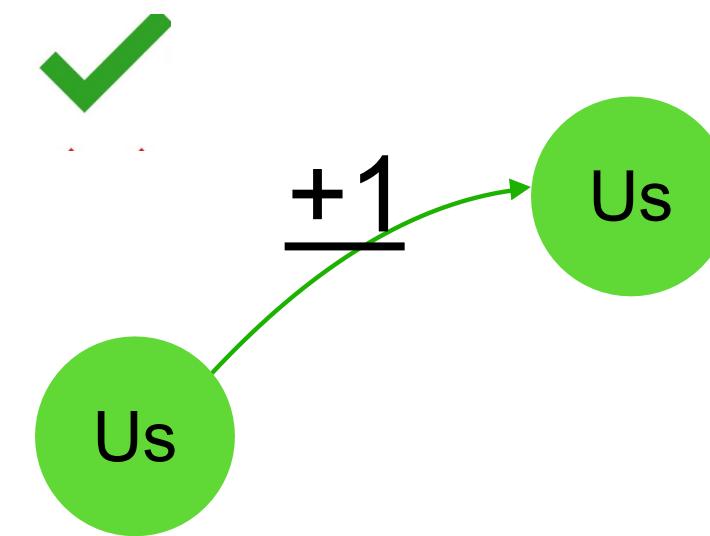
They hurt us

Elite Conspiracy



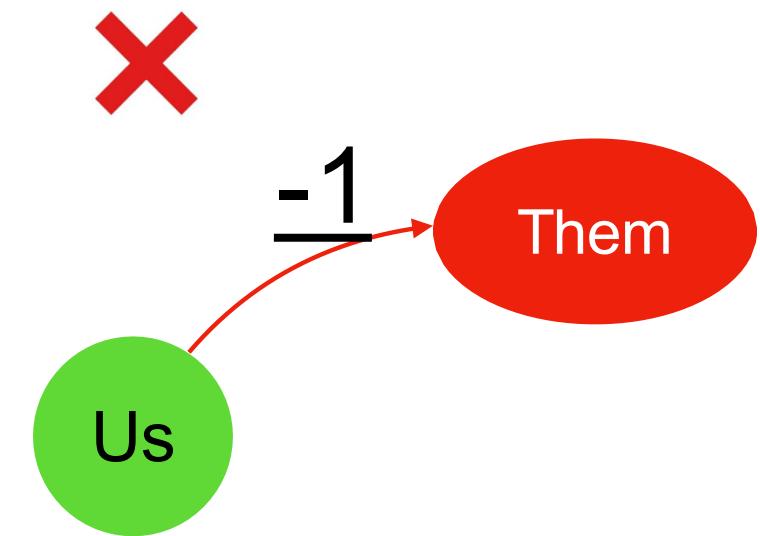
They help themselves

Empowerment



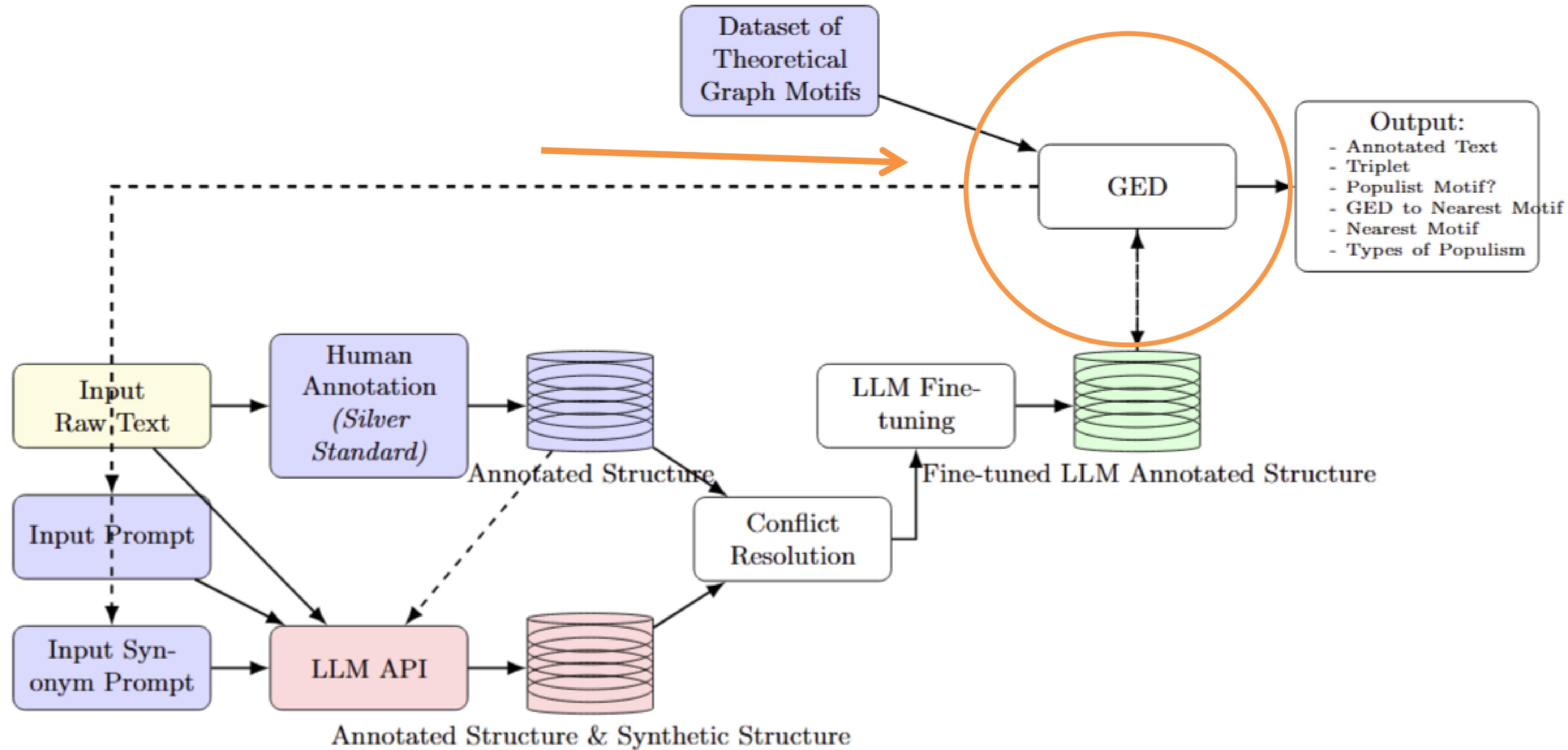
We help you/us

Resistance



We hurt them

The Computational Steps from Unannotated Texts to Extracting Narrative Structure

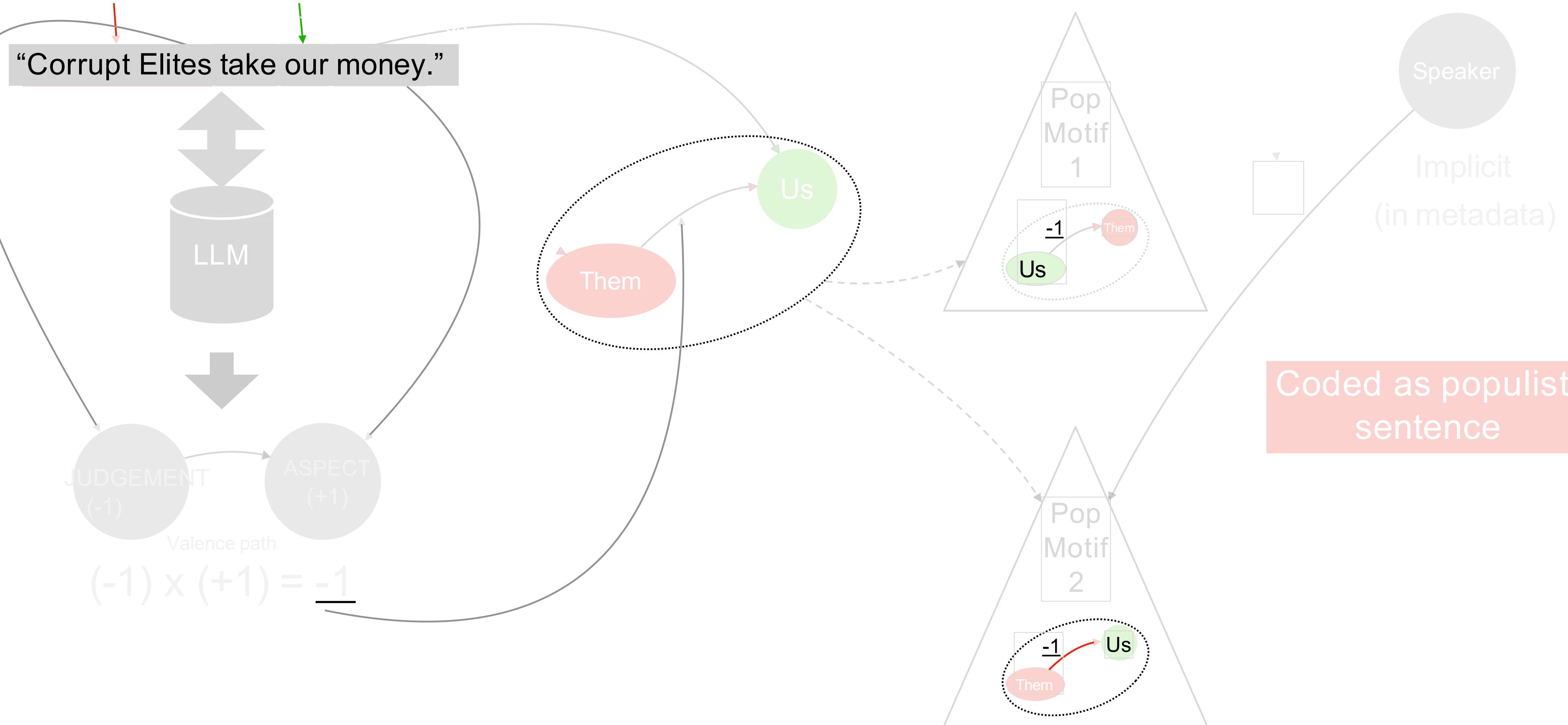


Annotate text

Structure Graph
Motif

GED: Search for motif
match in subgraphs

Final Data

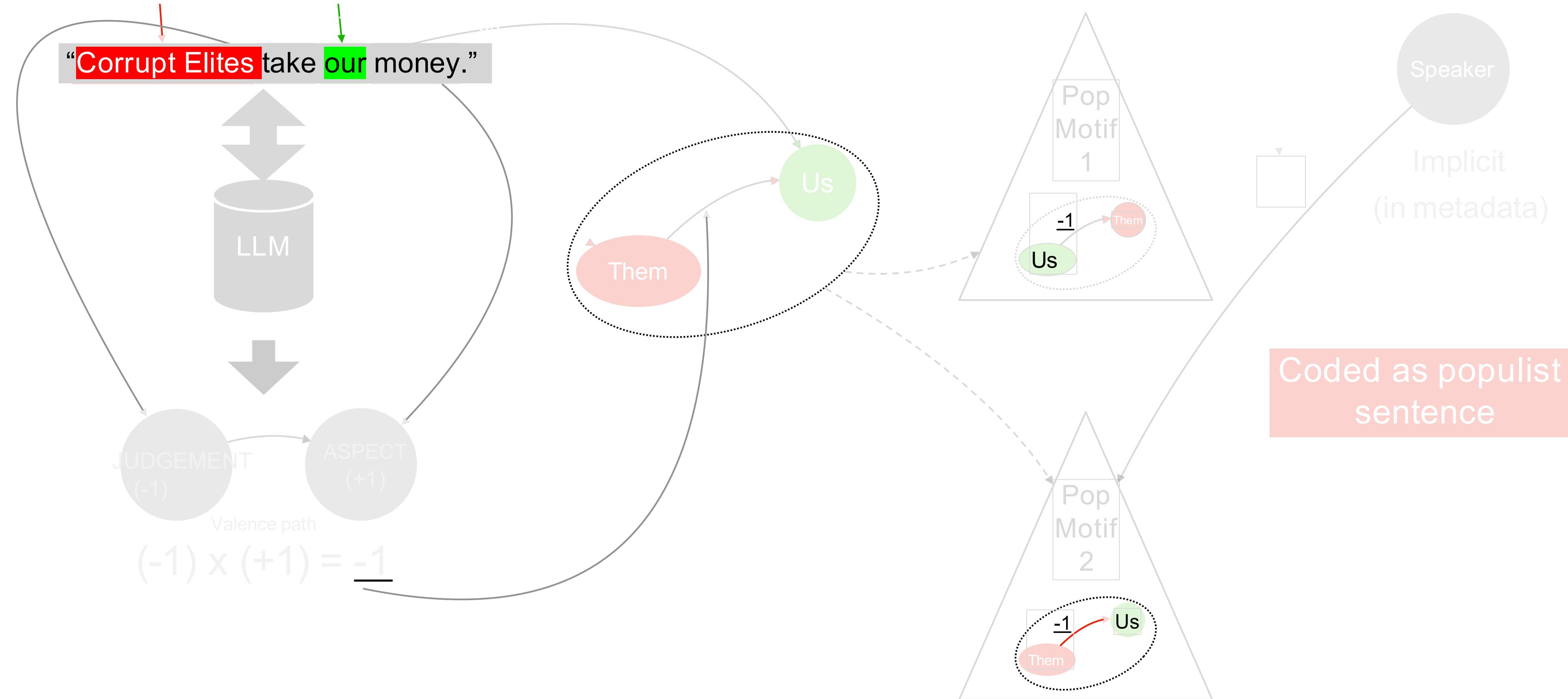


Annotate text

Structure Graph
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Final Data



Annotate text

Structure Graph Motif

GED: Search for motif match in subgraphs

Final Data

ACTOR: Them
TARGET: US
"Corrupt Elites take our money."



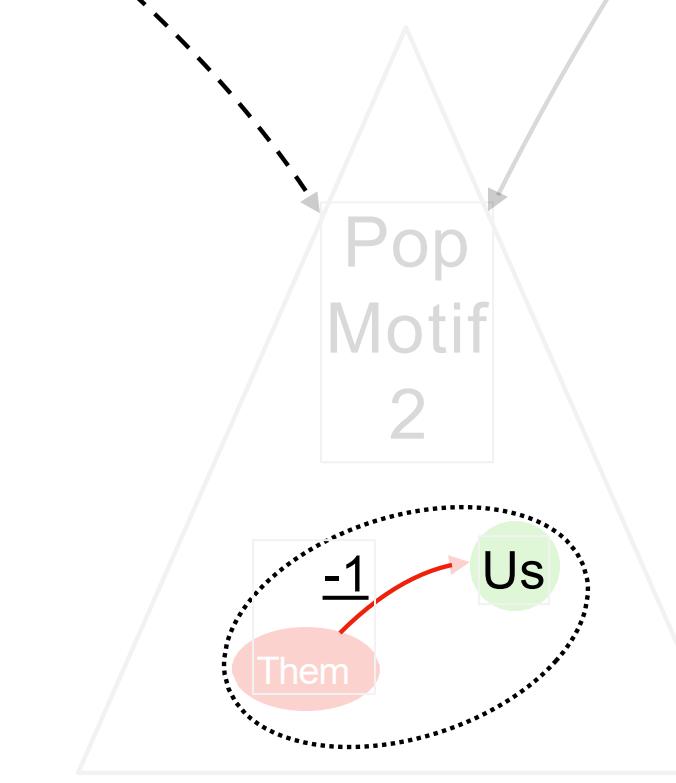
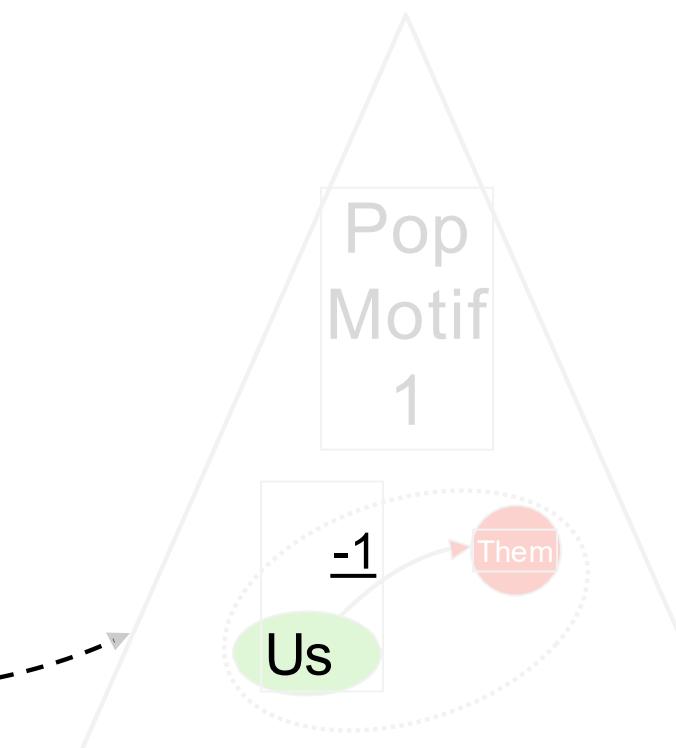
JUDGEMENT
(-1)

ASPECT
(+1)

$$(-1) \times (+1) = -1$$

Them

Us



Coded as populist sentence

Speaker

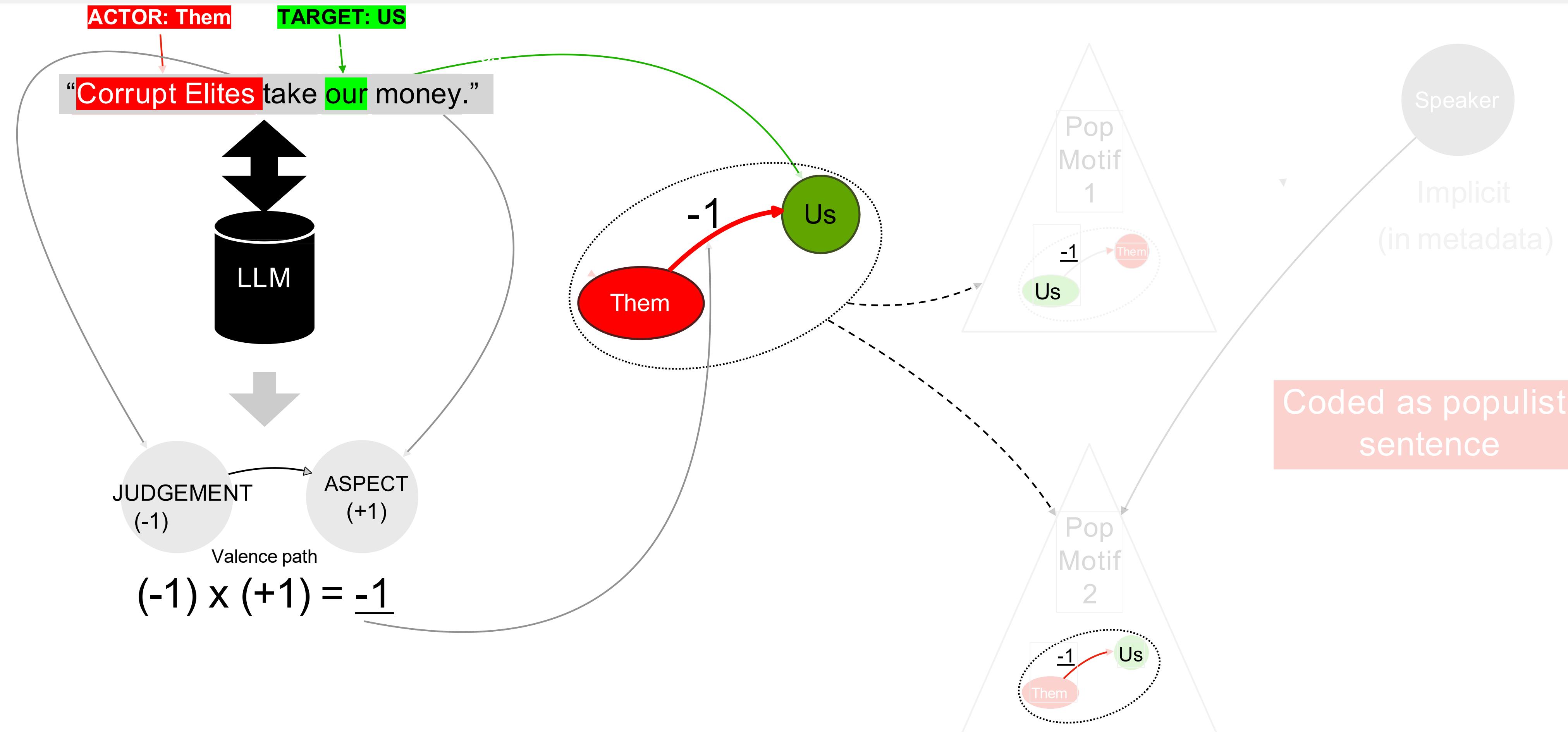
Implicit
(in metadata)

Annotate text

Structure Graph Motif

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Final Data



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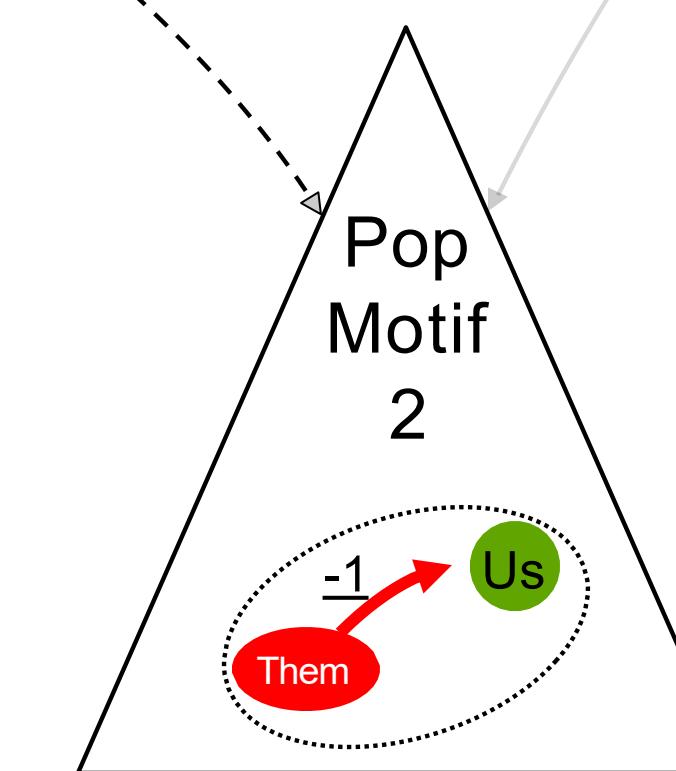
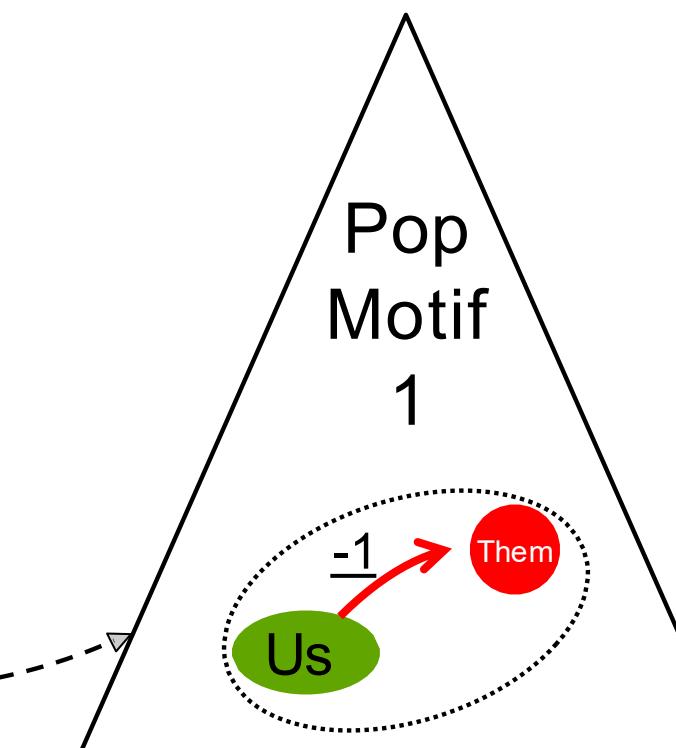
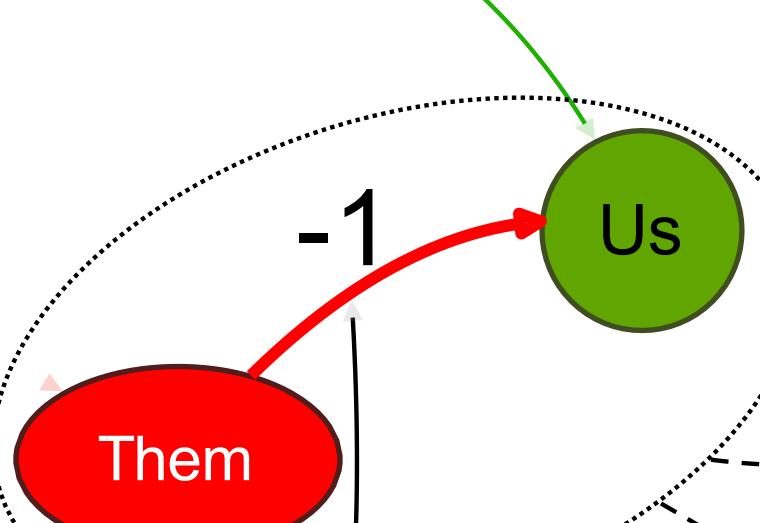


JUDGEMENT
(-1)

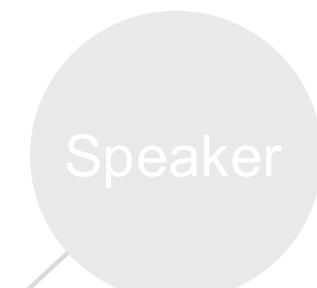
ASPECT
(+1)

Valence path

$$(-1) \times (+1) = -1$$



Coded as populist sentence



Implicit
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Annotate text

Structure Graph Motif

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Final Data

ACTOR: Them
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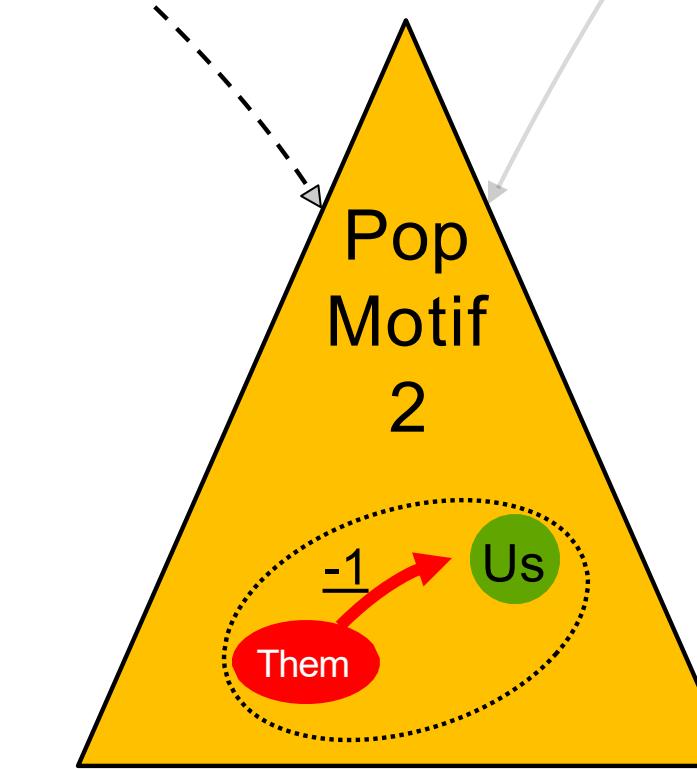
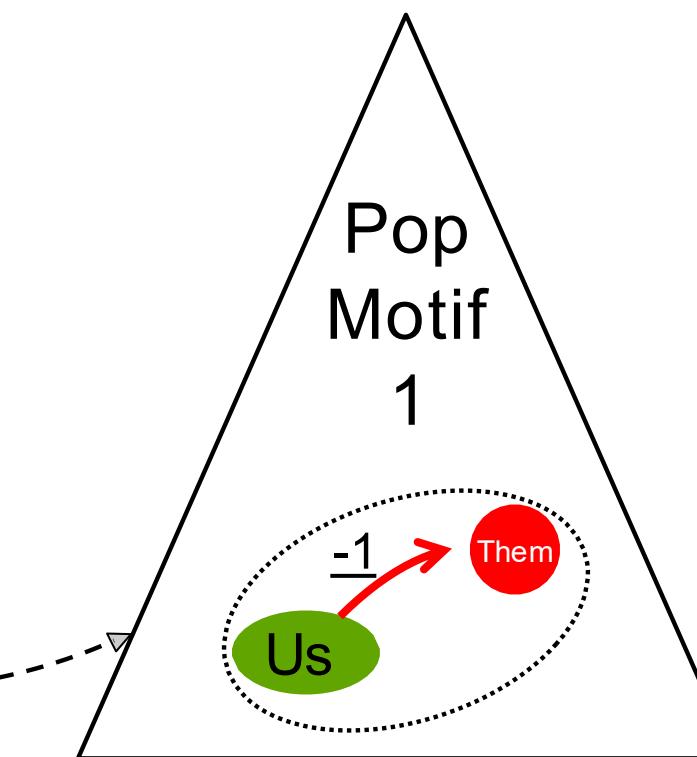
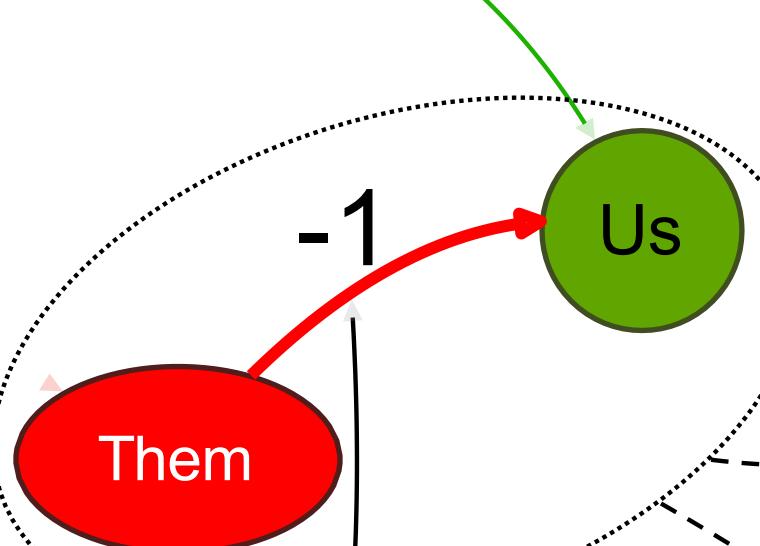


JUDGEMENT
(-1)

ASPECT
(+1)

Valence path

$$(-1) \times (+1) = -1$$



Speaker

Implicit
(in metadata)

Coded as populist sentence

Annotate text

Structure Graph Motif

GED: Search for motif match in subgraphs

Final Data

ACTOR: Them
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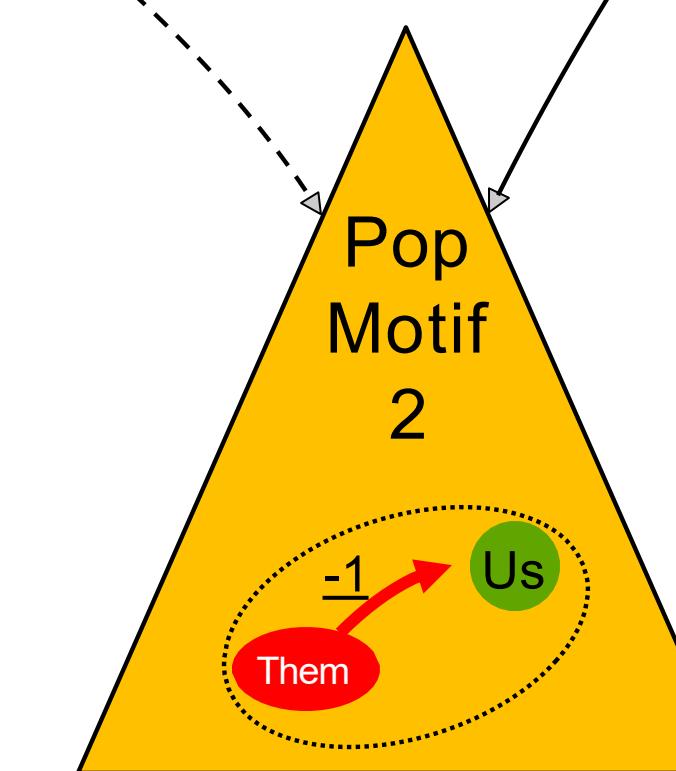
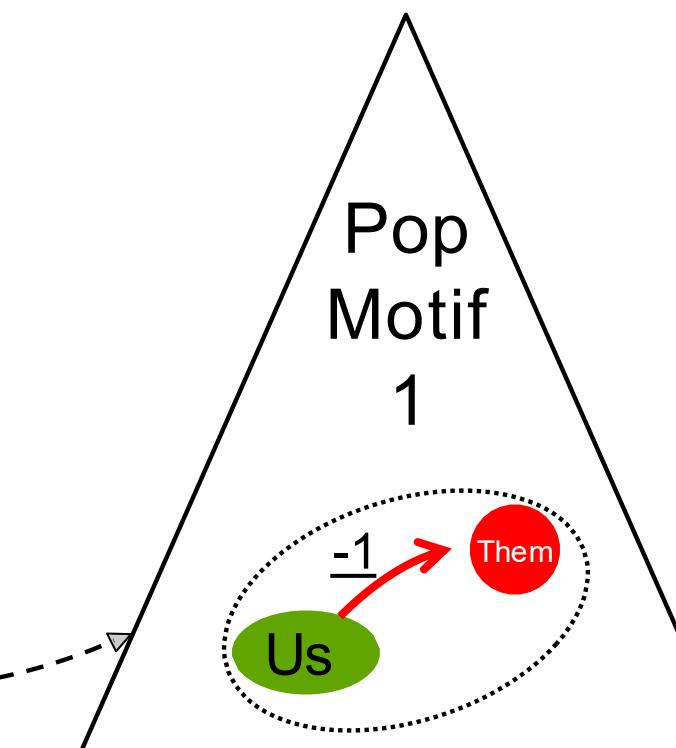
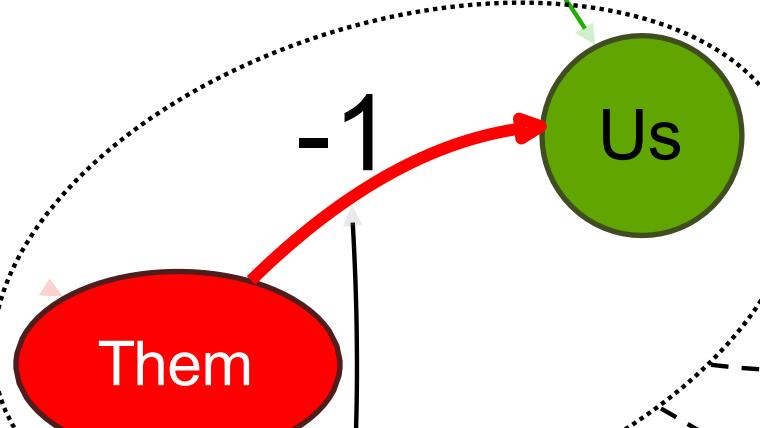


JUDGEMENT
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Coded as populist sentence

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Structure Graph Motif

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Final Data

ACTOR: Them
TARGET: US
"Corrupt Elites take our money."



JUDGEMENT
(-1)

ASPECT
(+1)

Valence path

$$(-1) \times (+1) = -1$$

-1

Them

Us

Pop Motif 1

Us

Pop Motif 2

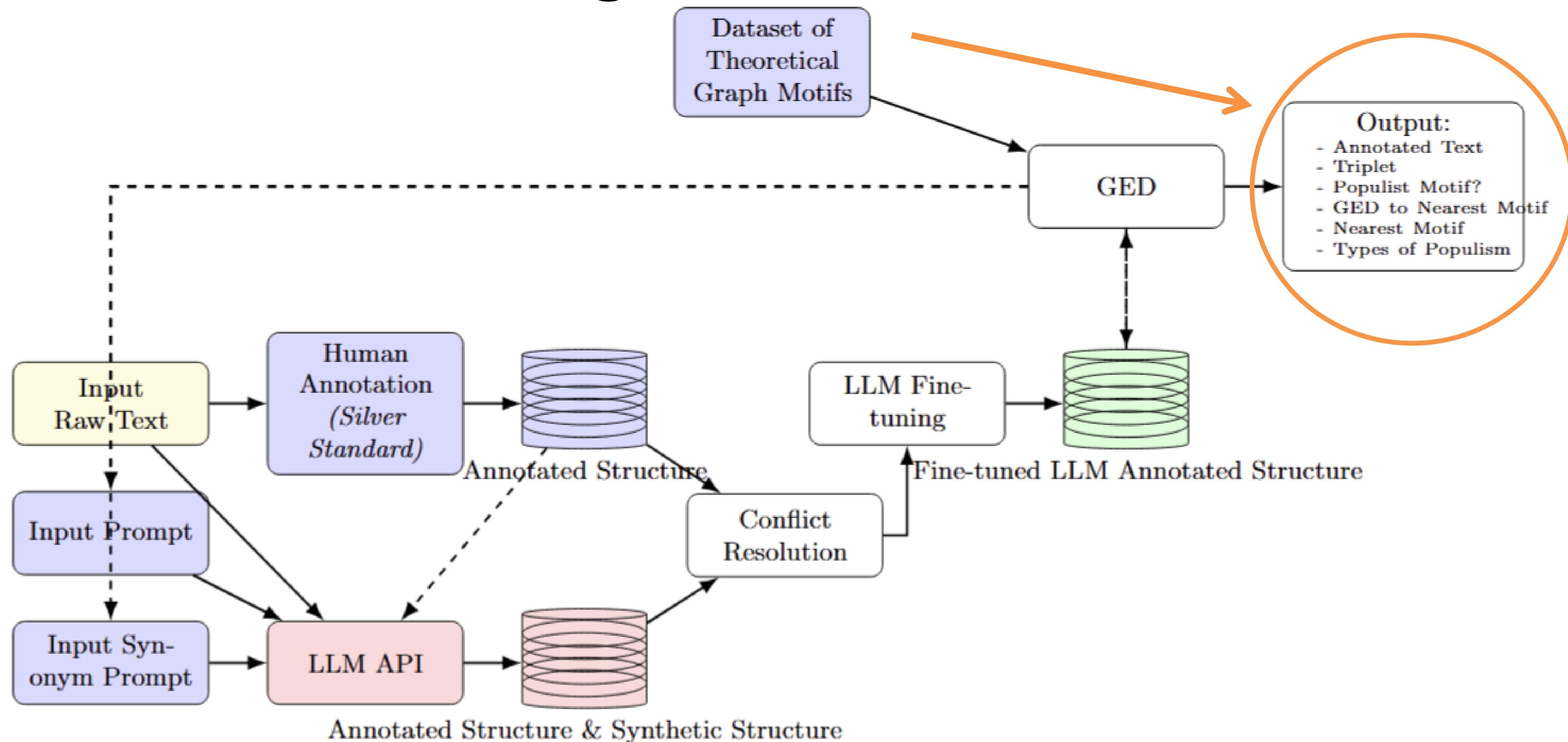
Them

Speaker

Implicit
(in metadata)

Coded as populist sentence

The Computational Steps from Unannotated Texts to Extracting Narrative Structure



Our Approach in Action

Strategic Usage of Populism: Trump's 2016 Campaign

- **Data:** 89 **Trump rally speeches** from 2016 General Election
 - Replication data **Gonzalez-Rostani (2025)**: Presidential Project & YouTube

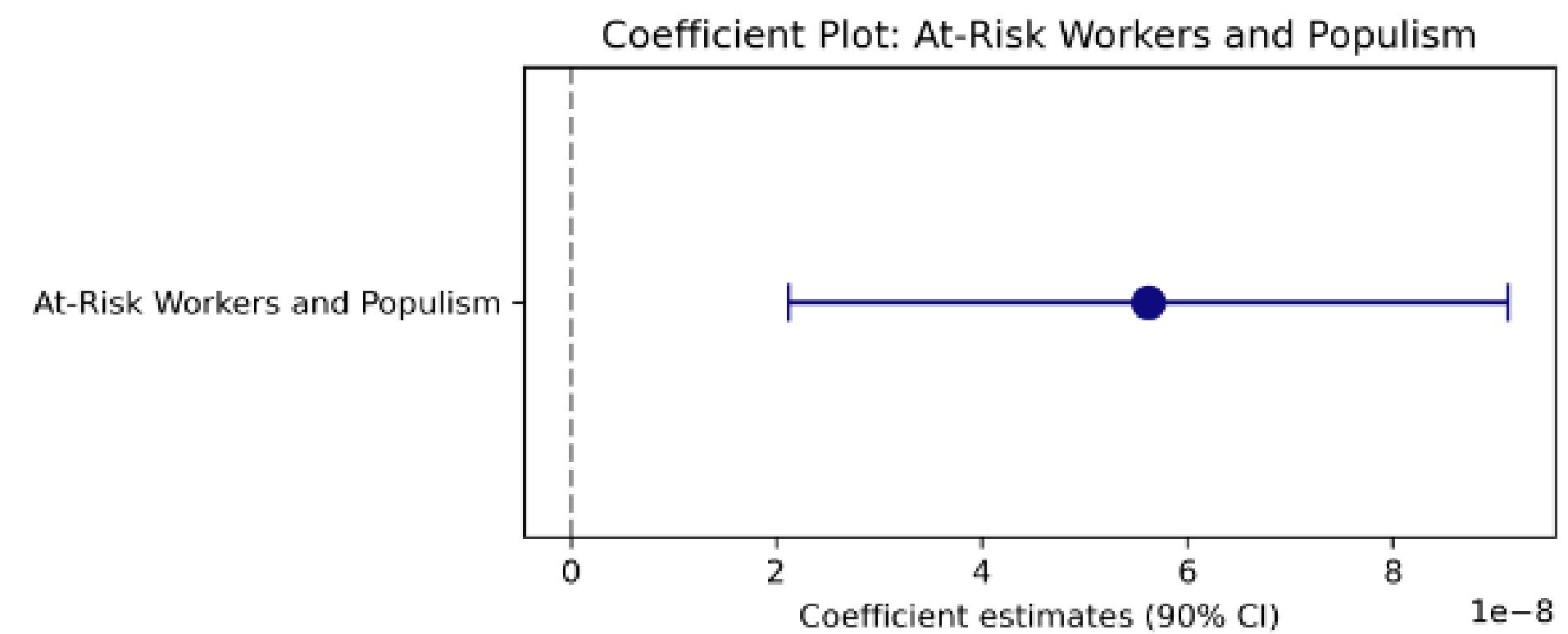
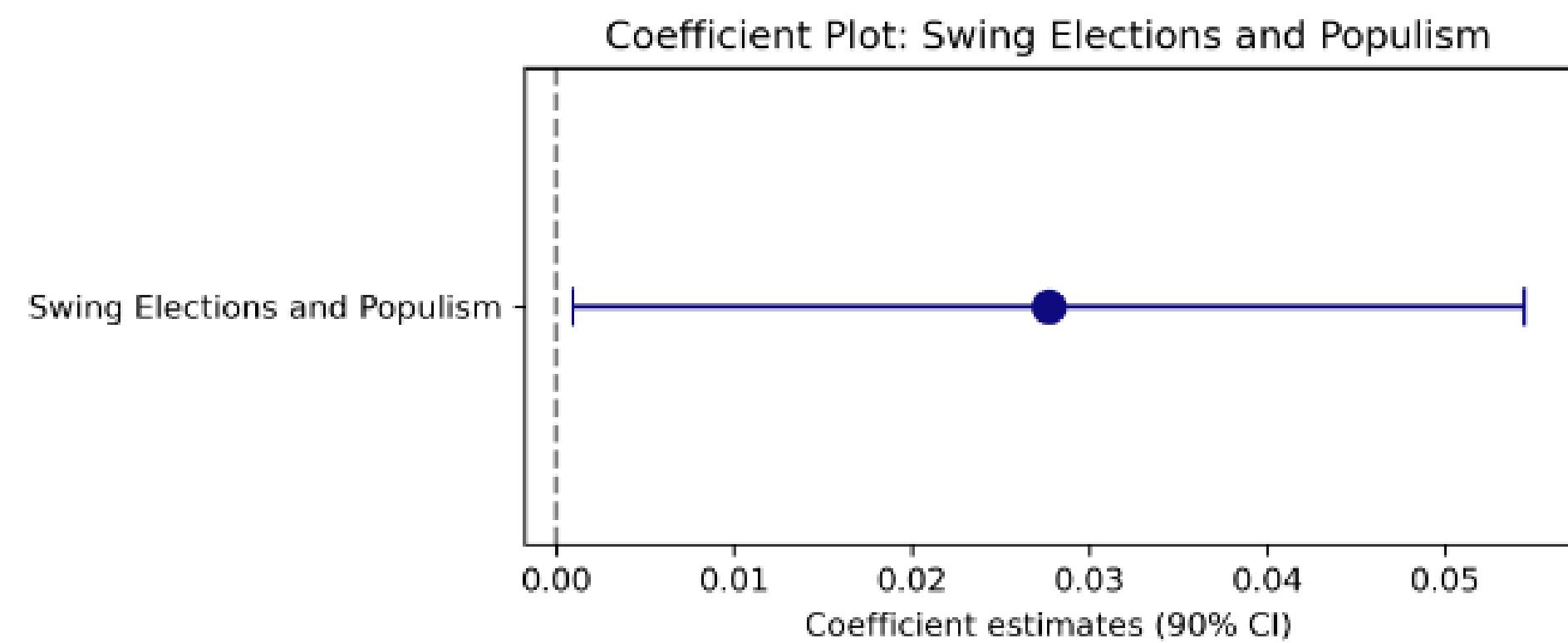
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- **Method:** AI-based annotation with populist motif detection (GED=0)

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- **Data:** 89 **Trump rally speeches** from 2016 General Election
 - Replication data **Gonzalez-Rostani (2025)**: Presidential Project & YouTube
- **Method:** AI-based annotation with populist motif detection ($GED=0$)
- **Validation:** Confirmed by dictionary-based populism measures
- **New questions can be answered**
 - Temporal Dynamics
 - Geographic Focus: Competitive Elections & Target Vulnerable Workers

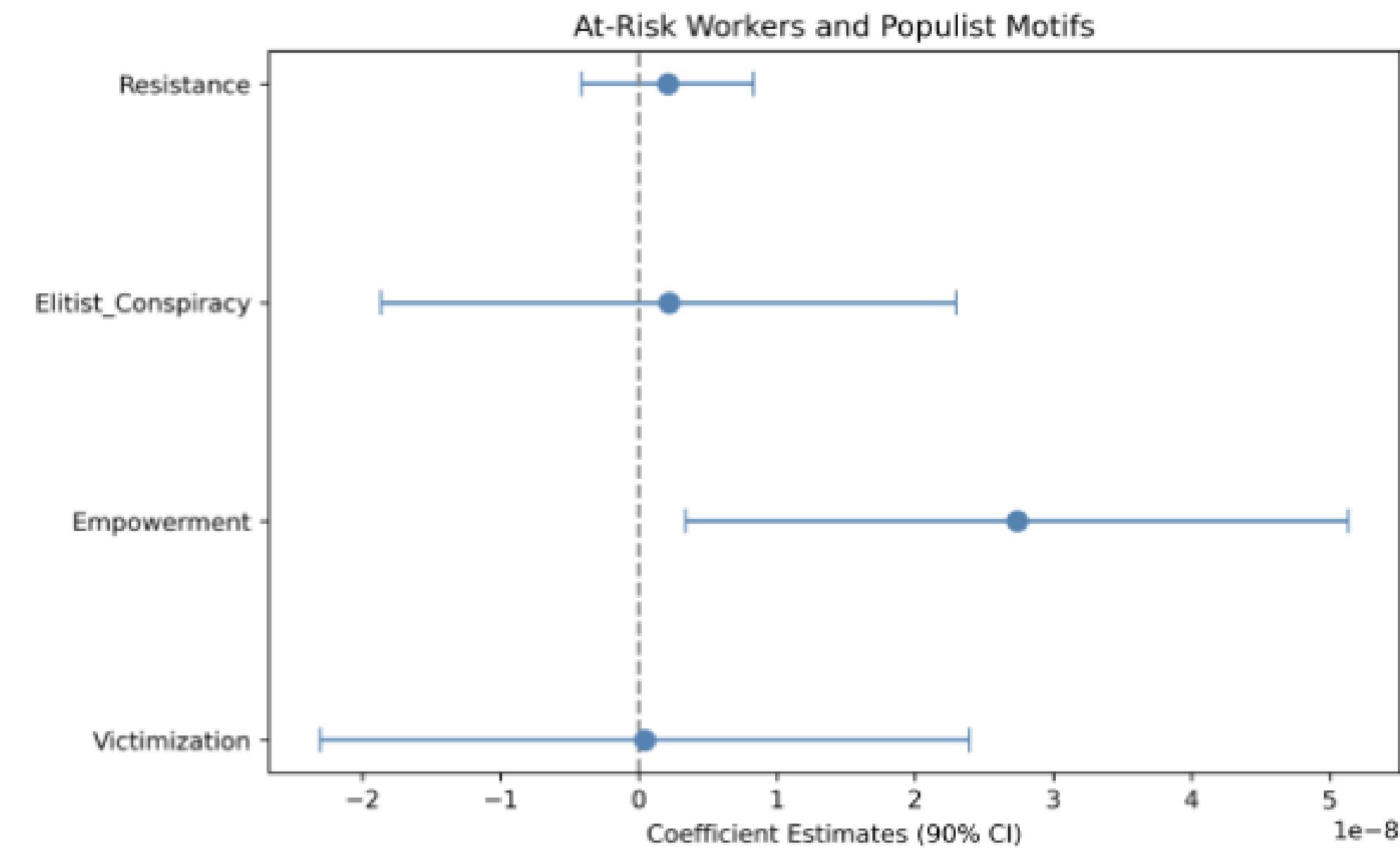
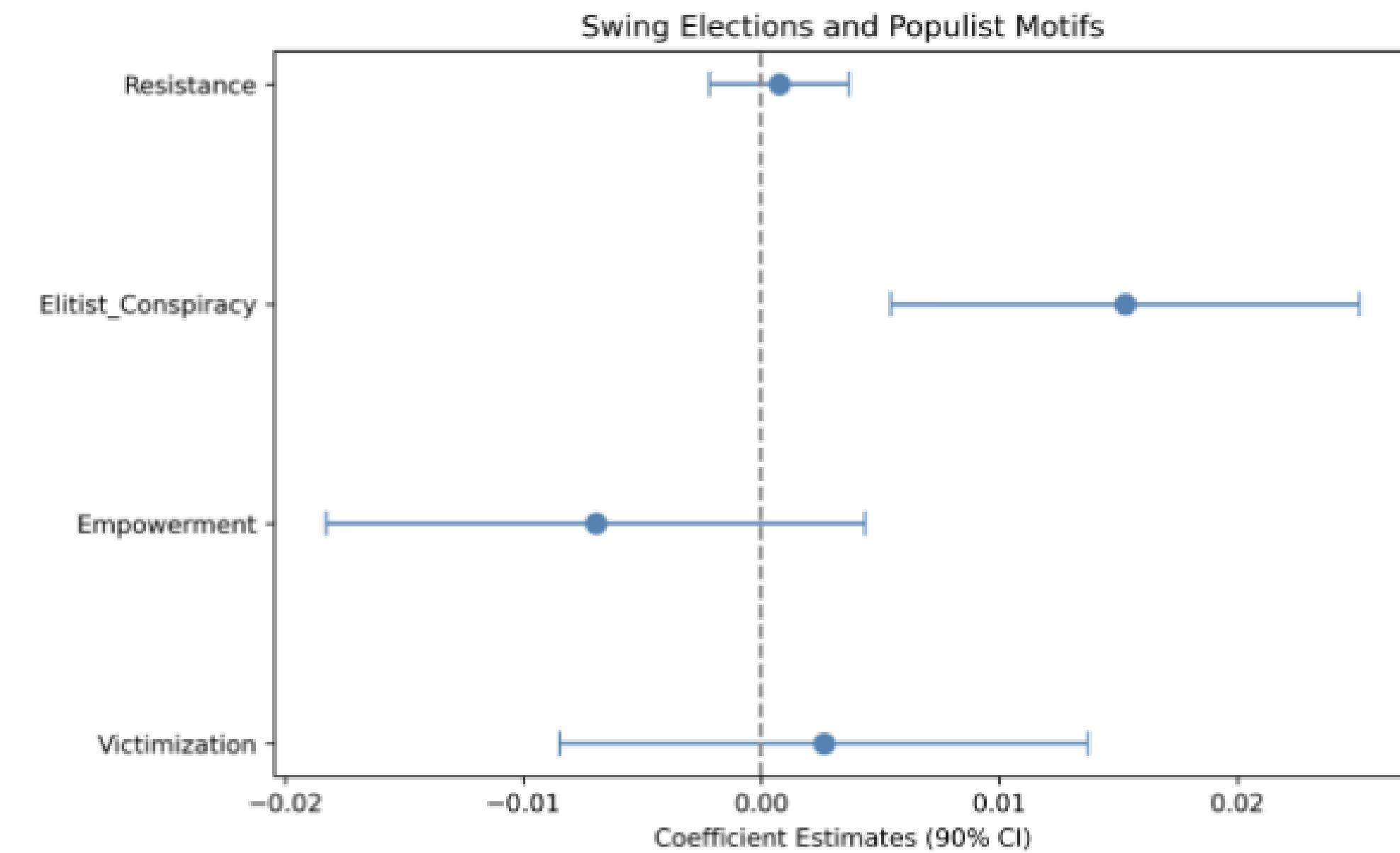
Strategic Usage of Populism: Trump's 2016 Campaign



Geographic Focus:
Greater **populist** usage in **swing** states

Economic Context:
Greater **populist** usage in **automation** vulnerable regions

Strategic Usage of Populism: Trump's 2016 Campaign Which Type?



Geographic Focus:
Greater use of **Elite Conspiracy** frame in
swing states

Economic Context:
Greater use of **Empowerment** frame in
automation vulnerable regions

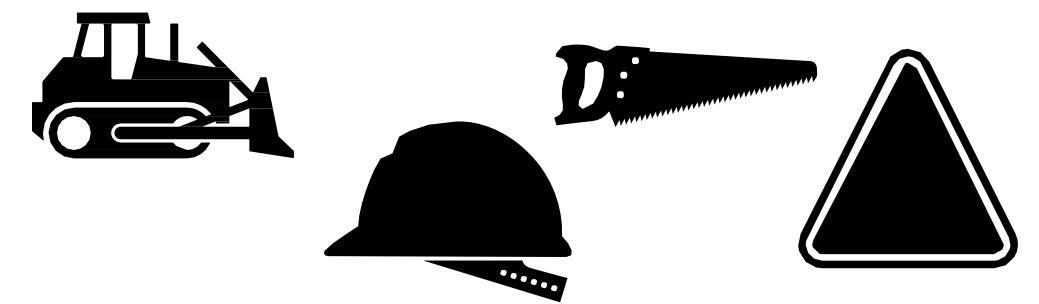
Final Remarks

- Our **Fine-Grained approach allows to answers new questions:**
Selective use, timing, and context-dependence of populist rhetoric

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Selective use, timing, and context-dependence of populist rhetoric

Much more work to do...

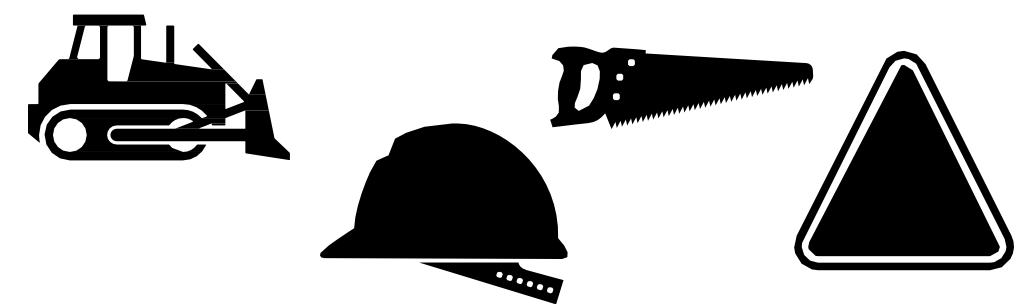


- Improve supervised learning and labeling of tokens with attributes
- Extend motif extraction across sentences and paragraphs: co-reference resolution
- Validate and adapt framework for comparative international research

Final Remarks

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Much more work to do...



- Improve supervised learning and labeling of tokens with attributes
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- Validate and adapt framework for comparative international research

Thank you!

gonzalez.rostani@usc.edu | gonzalez-rostani.com

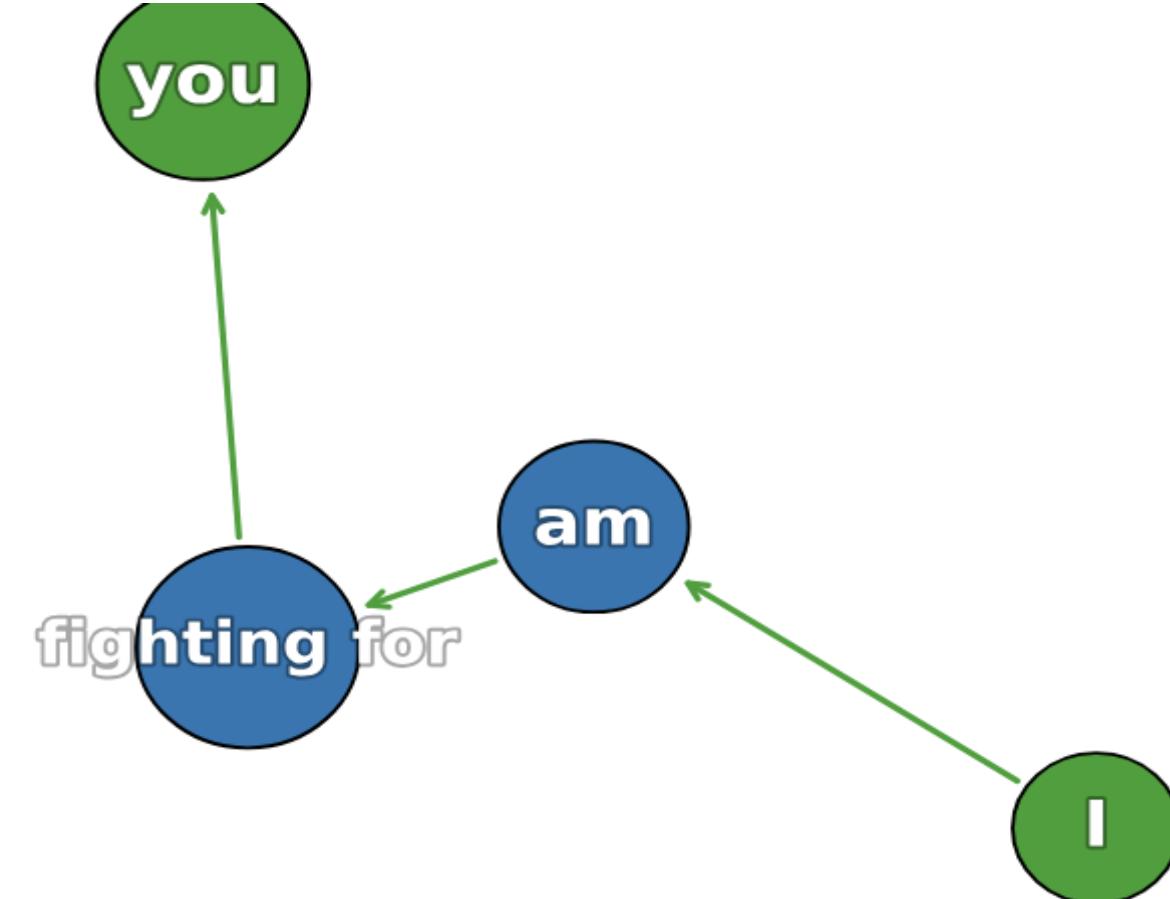
Supplementary Slides

Supplementary Slides

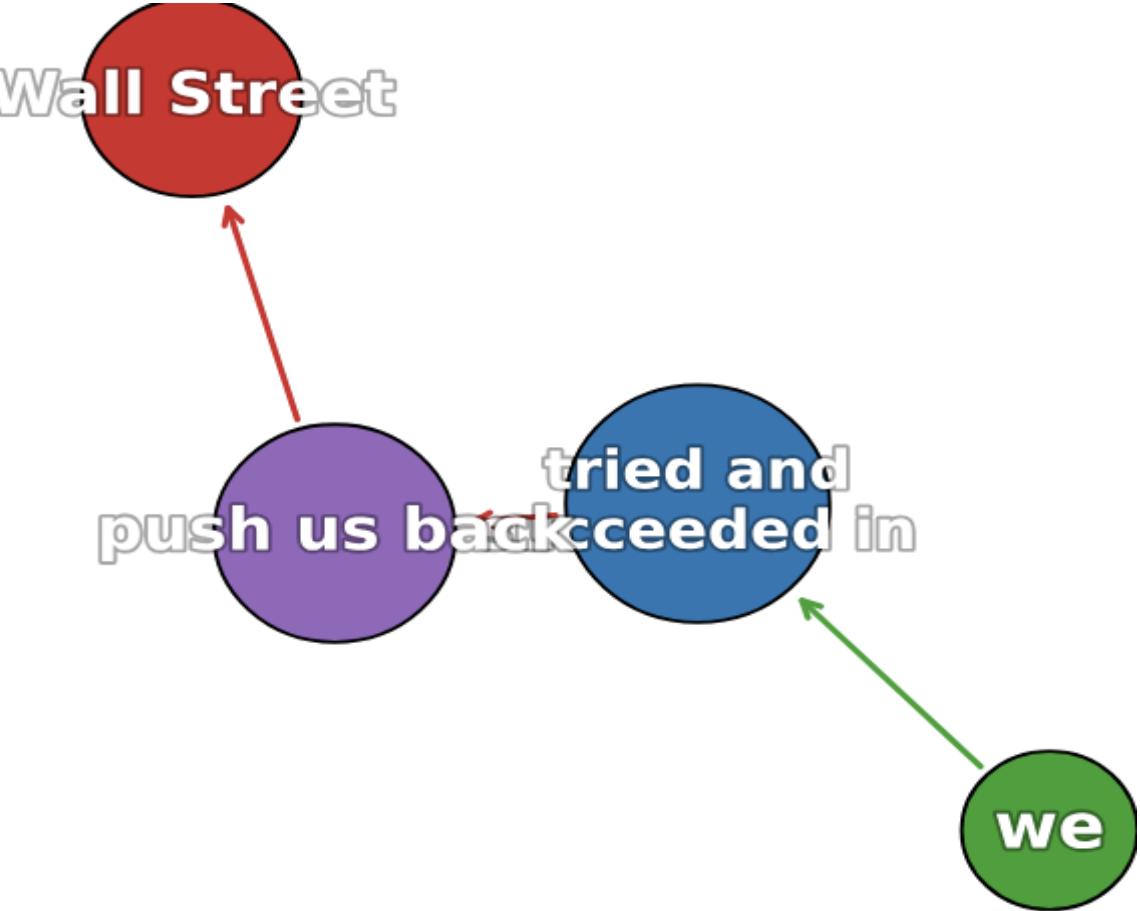
- [Existing Measures](#)
- [Ontology](#)
- [Scale up- token level model](#)
- Examples: [all 1, 2, 3, 4](#)
- Example [Motifs with Graph](#)
- Complex cases: [Nested](#), [Non-Speaker](#)
- LLM: [Token-level validation](#) and [metrics](#), [Synthetic data](#)
- [GED definition](#)
- Identifying [groups](#)
- Our Approach in action: [Share](#), [Paragraph Trump](#), [Paragraph Obama](#),
[Populist using non-pop.](#)

Back: [Title](#), [Thin-Centered](#), [Aggregation Problem](#), [Contribution](#), [Our Approach](#), [Components](#), [Structure](#), [Motif](#), [Motif Example](#), [Example 1](#), [GED](#), [GED example](#), [Scale up](#), [Steps](#), [Human annotations](#), [LLM](#), [Fine-tuning](#), [Motif visualization](#), [Full example](#), [Application](#), [temporal dynamics](#), [geographic dynamics 1](#), [geographic dynamics 2](#), [Final Remarks](#)

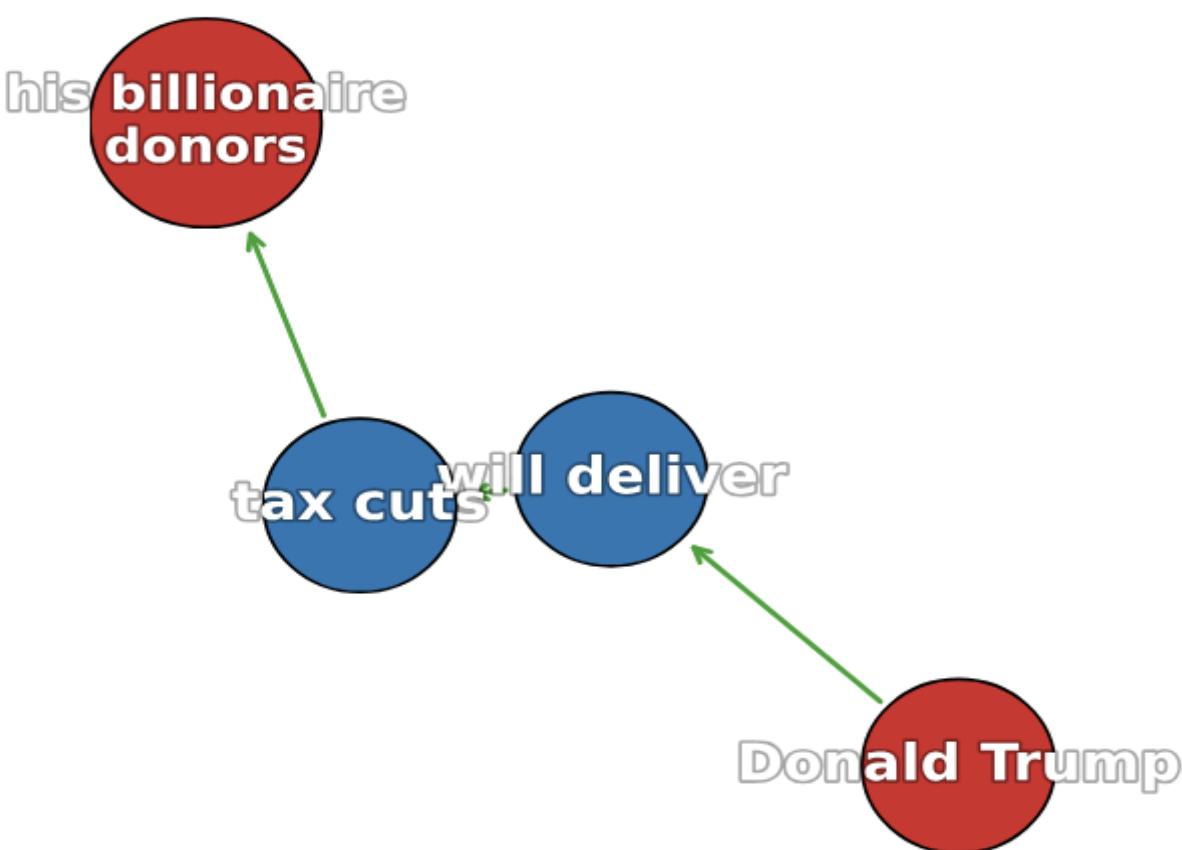
Populist Motifs



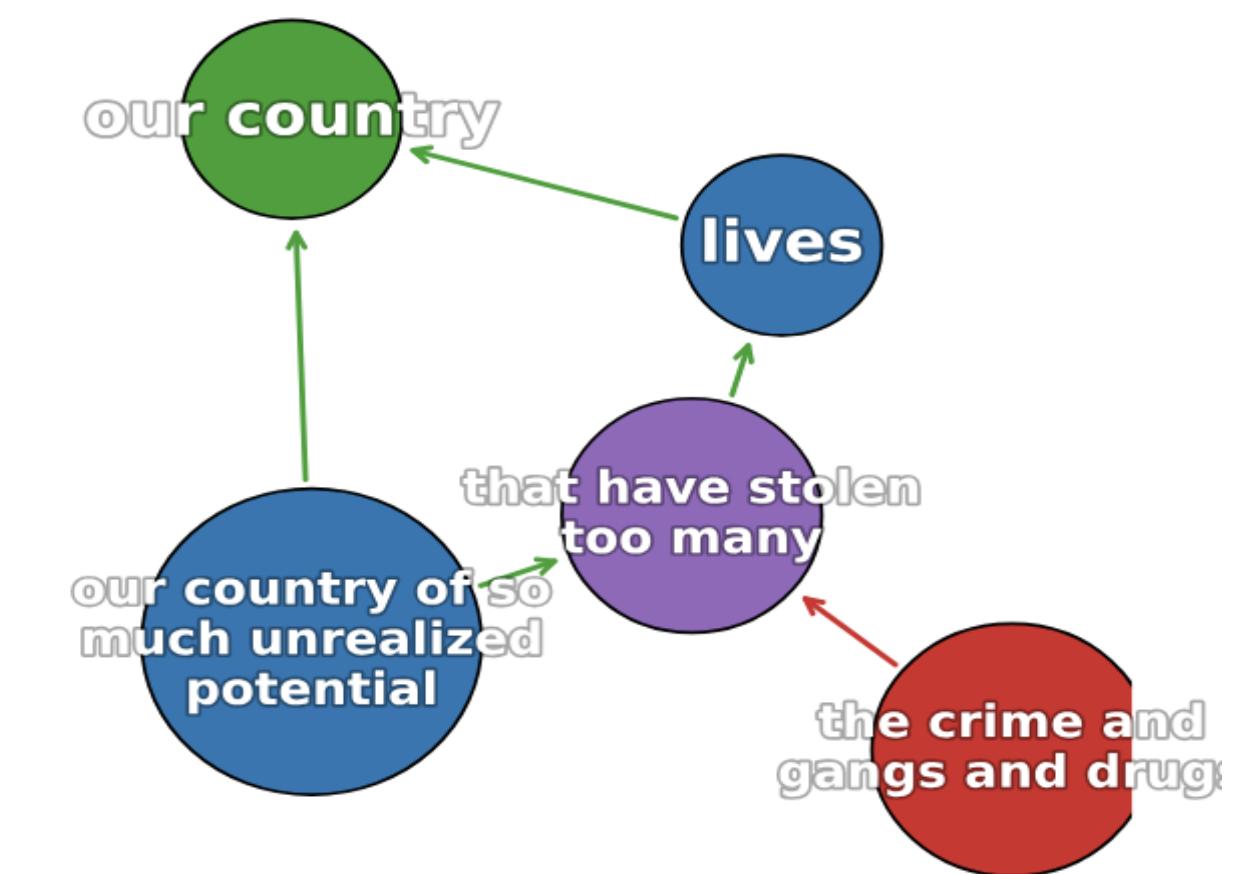
(a) Empowerment (US, +, US,)
I am fighting for you.



(b) Resistance (US, -, THEM,)
We tried and succeeded in reforming Wall Street.

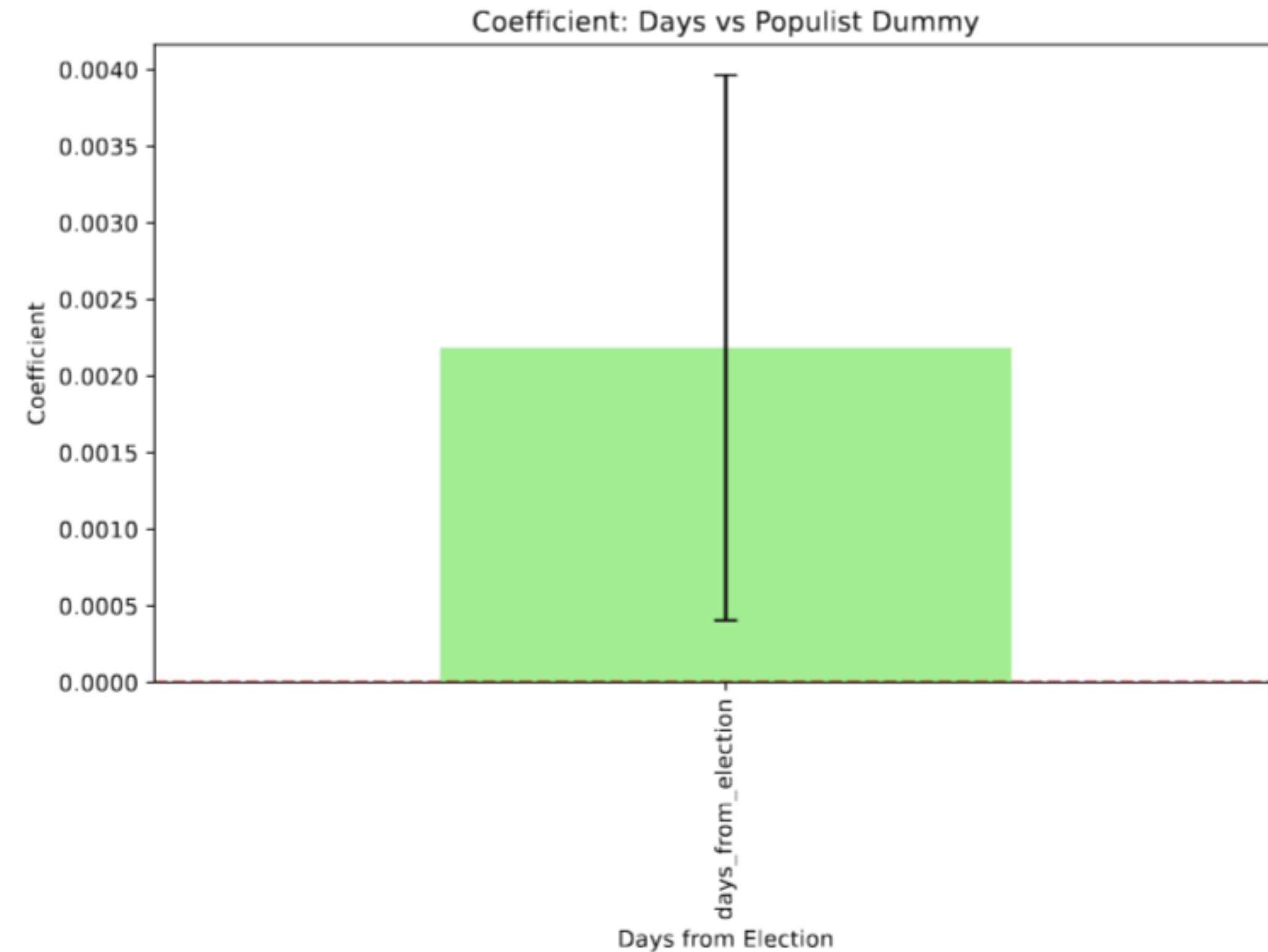


(c) Elite Conspiracy (THEM, +, THEM,)
Donald Trump will deliver tax cuts to his billionaire donors.



(d) Victimization (THEM, -, US,)
The crime and gangs and drugs that have stolen too many lives and robbed our country of so much unrealized potential.

Strategic Usage of Populism: Trump's 2016 Campaign



Temporal Dynamics: Increased populist rhetoric closer to election day

Previous Works

Overview of Measurement Strategies

Expert Surveys:

- Chapel Hill Expert Survey (2017)
- POPPA Survey (2018)
- Global Party Survey (GPS)

Textual Data Analysis:

- Dictionary-based methods (Jagers, Hawkins, Casiraghi, etc.)

Limitations of Existing Approaches

Coarse Granularity:

- Binary labels for parties or large text segments
- Fails to capture nuanced, "thin-centered" definitions (Mudde, 2007)
- Ignores rhetorical variation within parties, speeches, and individuals
- Cannot identify shifts in rhetoric across contexts or topics

Nuance in Populist Discourse

- Current methods miss interactions between populism and other discourses (nationalism, anti-globalism, technoskepticism)
- Difficulty distinguishing left vs. right populism

Human Costs and Adaptability Tradeoffs

Manual annotation methods:

- High resource costs, extensive training
- Difficult to scale

Dictionary-based methods:

- Efficient but context-specific
- Require extensive adaptation across languages and political contexts
- Risk of misinterpretation when decontextualized (Schaffer, 2000)

The Populist-PULSAR Ontology

- **Foundation:** Extends PULSAR framework (Park et al., 2018)
- **Structure of Annotations:**
 - **Labels** encode populist narrative components and their connections
 - Applied to **sentence-level tokens**, preserving context and positional information
- **Data Representations:**
 - **Graph-based** (nodes: Actors, Targets, Judgments; edges: dependencies)
- **Advantage over Dictionary-based Approaches:**
 - Context-aware labeling
 - Precise location tracking within text

Fine-tuning Our Models - PyTorch

Label	Attribute	Precision	Recall	F1	Accuracy
Actor	Them	0.46	0.46	0.46	0.9345
	Residual	0.20	0.27	0.23	
	Us	0.67	0.72	0.70	
Target	Them	0.27	0.33	0.30	0.9035
	Residual	0.00	0.00	0.00	
	Us	0.33	0.30	0.31	
Judgment					0.8595
	NEG (-1)	0.05	0.04	0.05	
	POS (+1)	0.15	0.18	0.16	
Aspect					0.6901
	NEG (-1)	0.08	0.11	0.10	
	POS (+1)	0.13	0.16	0.14	

Token-Level Approach

- Separate BERT models for BIO tagging
- Identifies precise token spans
- Fine-tuned individually per component

Synthetic Sentences

Synthetic Variants of Political Speech Sentence

1. Every real American is entitled to liberty.
 2. Each true American is entitled to liberty.
 3. All genuine Americans are entitled to liberty.
 4. Every authentic American has the right to liberty.
 5. Each legitimate American deserves liberty.
 6. All real patriots have a right to liberty.
-

Table A.2: Synthetic variants preserving the meaning of a sentence while introducing syntactic and lexical diversity.

Note: Original sentence was “*Every real American deserves freedom.*”

Definition of GED:

- GED measures differences between two narrative structures (graphs), expressed as a numerical distance.
- Formally: $\text{GED}(G_i, G_j) \rightarrow d_{ij}$, with d_{ij} as a positive real number.

Distance Calculation Rules:

- Maximum single-edit distance is 4 (changing valence from positive to negative or vice versa).
- Changing "US" to "THEM" in either the Actor or Target role has a distance of 2 per edit.
- Distances from multiple edits are additive (e.g., changing Actor-US to Actor-THEM and Target-THEM to Target-US totals a distance of 4).
- The smallest non-zero distance is 1, applicable when changing from specified roles (US or THEM) to residual (unspecified) roles.

Analogy:

- Similar to Manhattan distance, calculating distances independently for each dimension

Conceptual Explanation of GED Penalization System

Penalty Value	Explanation
0	No change: Actor, valence, and target match exactly.
1	Minor ambiguity: Explicit actor replaced by ambiguous actor (Residual).
2	Actor/Target substitution: Switching between US and THEM roles.
4	Valence reversal: Changing polarity from positive to negative or vice versa.

Evaluating LLM Performance Token Annotation

Objective:

Measure if iterative improvements in prompts enhanced model accuracy.

Method:

- GED-based metric.
- Compared LLM-generated annotations to human annotations (our silver standard).
- More robust evaluation than token-level accuracy.
- Follows recommended practices for tailored benchmarks in prompt engineering research (Schulhoff, 2025).

Acceptance Criteria (GED Scores):

- Acceptable if **GED = 0 or 1** (minor differences).
- Also acceptable if GED = 2 or 3, provided misclassifications involve minor roles only (e.g., labeling "Residual" instead of "US"/"THEM"), without polarity reversals.

LLM Performance

Overall Performance:

- **76.2%** of classifications were acceptable.

Detailed Breakdown:

- **27.4%** Exact matches (GED = 0):
Perfect alignment with human annotations.
- **40.5%** Minimal differences (GED = 1):
Minor misclassification between known groups and "Residual."

Implications:

- Most discrepancies minor, preserving key structural elements.
- Highlights effectiveness of refining prompts to improve LLM annotation quality.

Examples 1

“Joe Biden wants to inflict a painful shutdown on our entire country”

“Joe Biden wants to inflict a painful shutdown on our entire country”

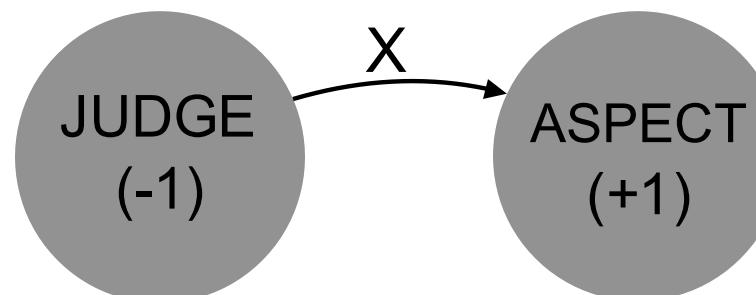


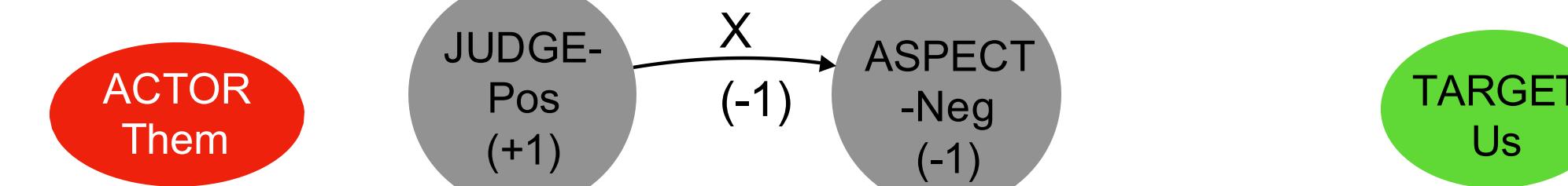
Is an “Us” or “Them” mentioned in the ACTOR or TARGET?

What aspect is mentioned and is it positive or negative (or neutral)?

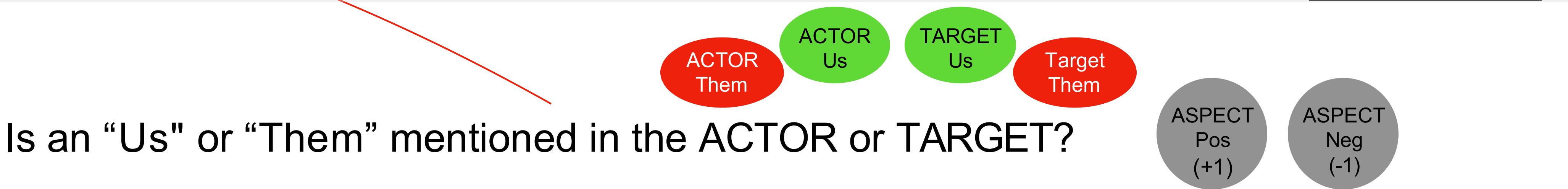
What judgment is communicated about whether the aspect is added, subtracted or neutral?

What is the calculated valence?





“Joe Biden wants to inflict a painful shutdown on our entire country”

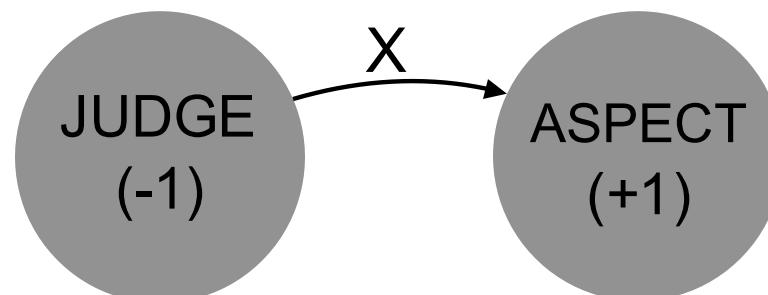


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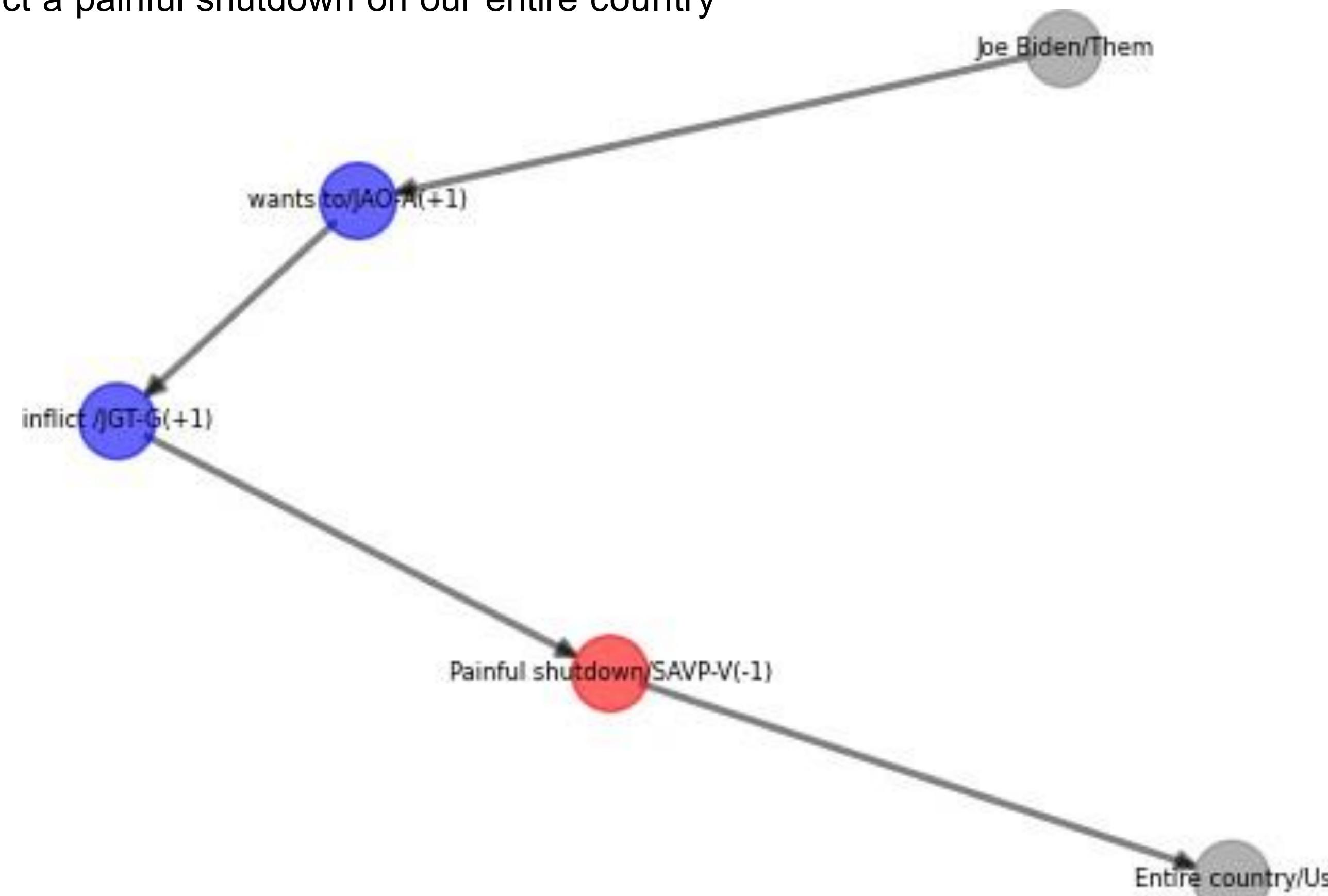
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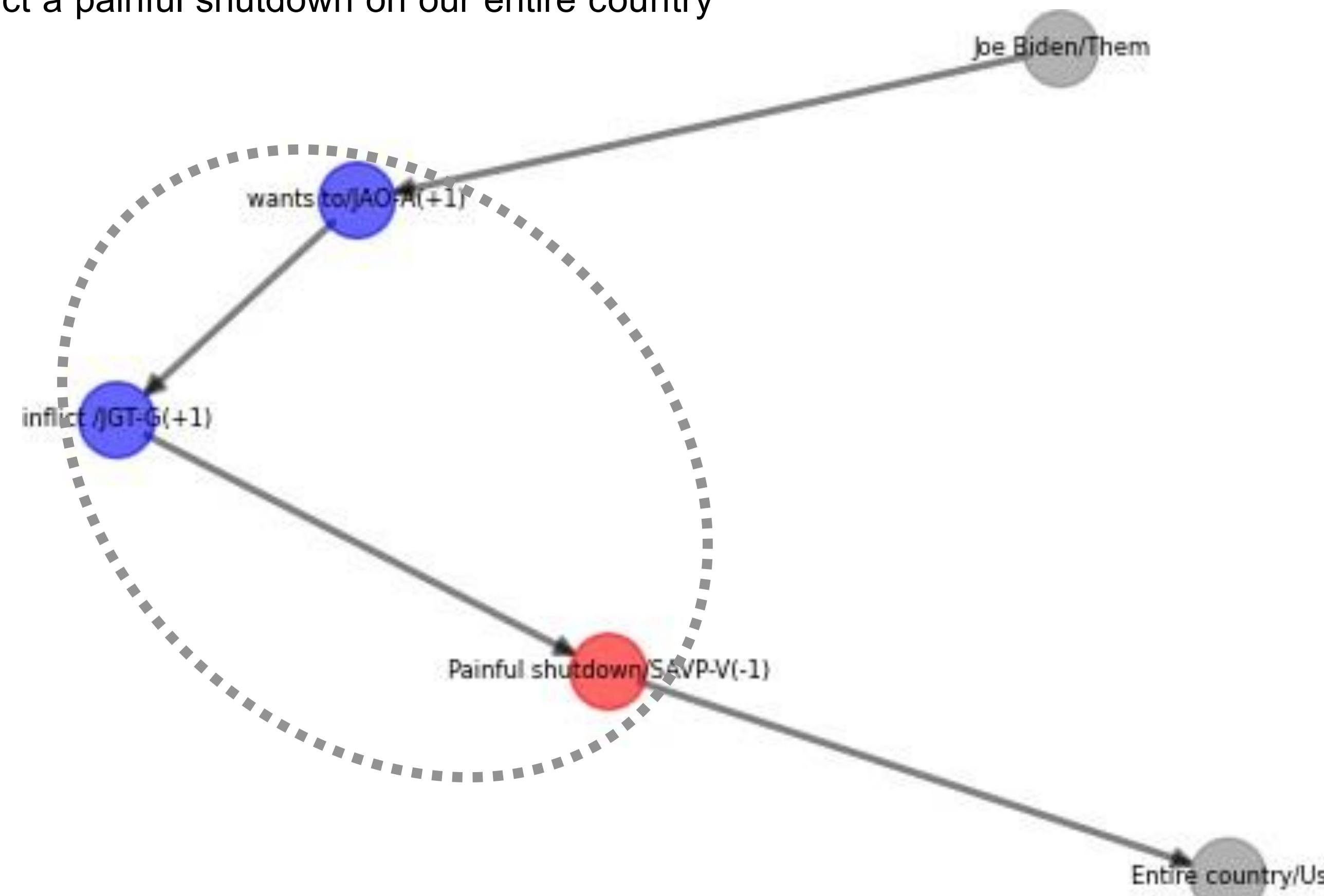
Full Valence Graph With Labels

“Joe Biden wants to inflict a painful shutdown on our entire country”

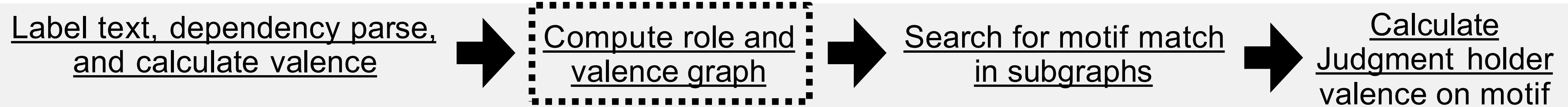


Follow Valence Path, where path can be thought of as part of a hypergraph

“Joe Biden wants to inflict a painful shutdown on our entire country”

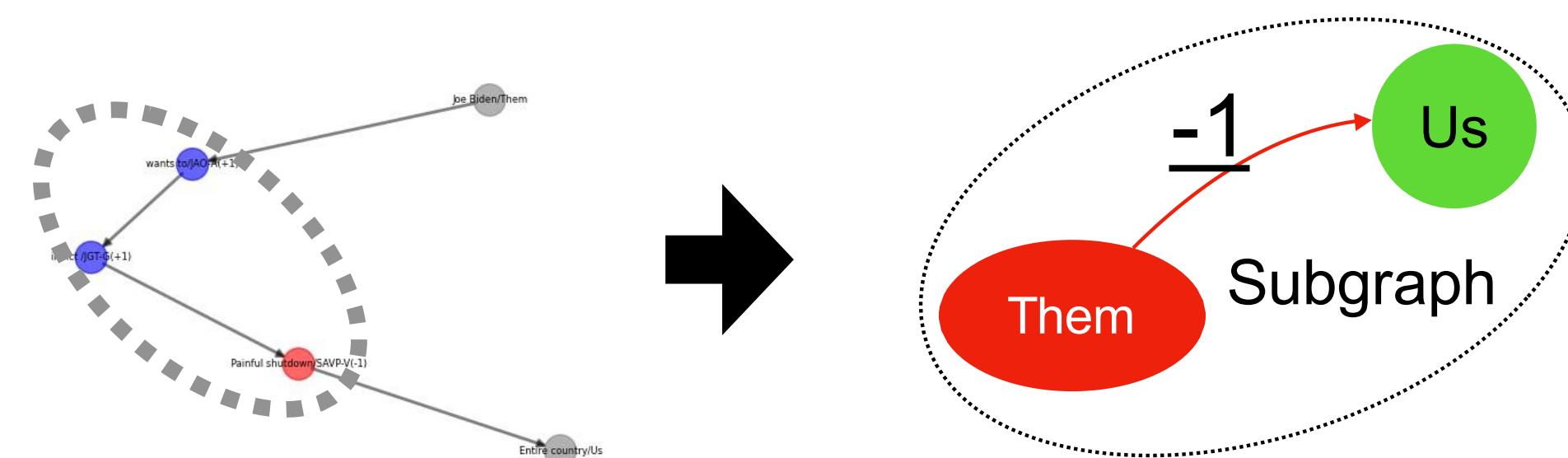


“Joe Biden wants to inflict a painful shutdown on our entire country”



What was the role of the perpetrator/protector (“Us” or “Them” or “Neither”) or victim/beneficiary? (Monism aspect of populism)

Was the valence of the action positive (a good thing) or negative (a bad thing)? (Moralism aspect of populism)



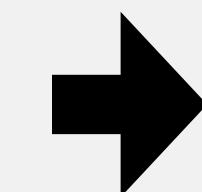
“Joe Biden wants to inflict a painful shutdown on our entire country”

Reduce path/hyper-edge to simple edge and use labels



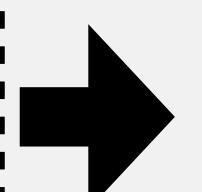
“Joe Biden wants to inflict a painful shutdown on our entire country”

Label text, dependency parse,
and calculate valence



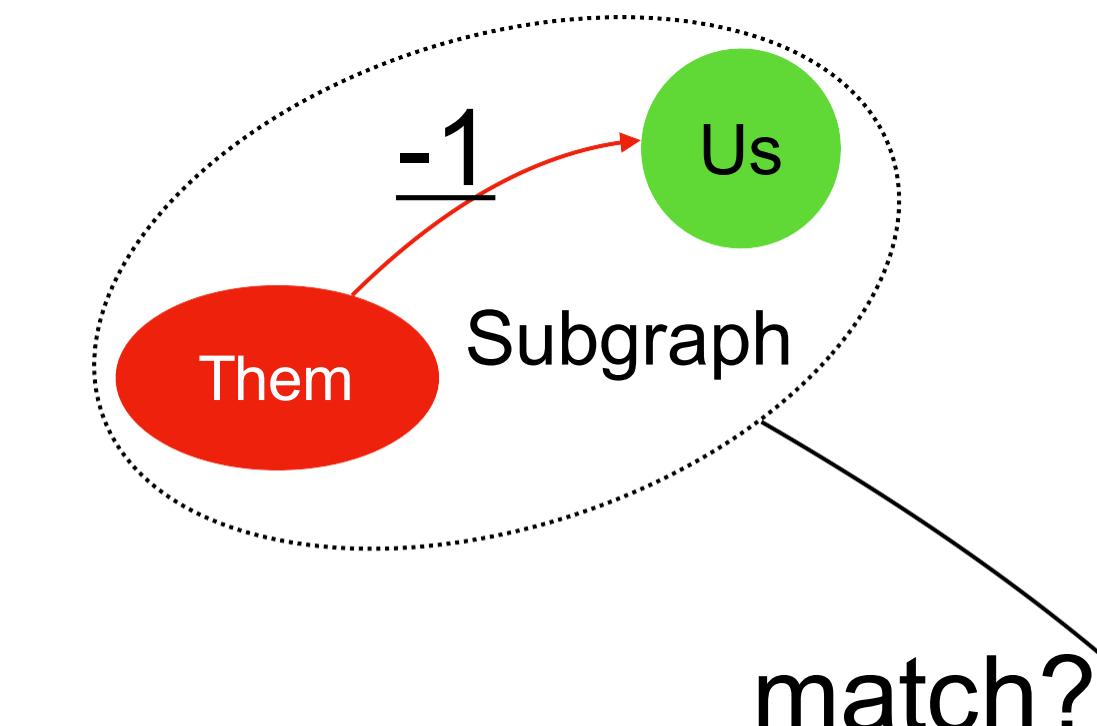
Compute role and
valence graph

Search for motif match
in subgraphs

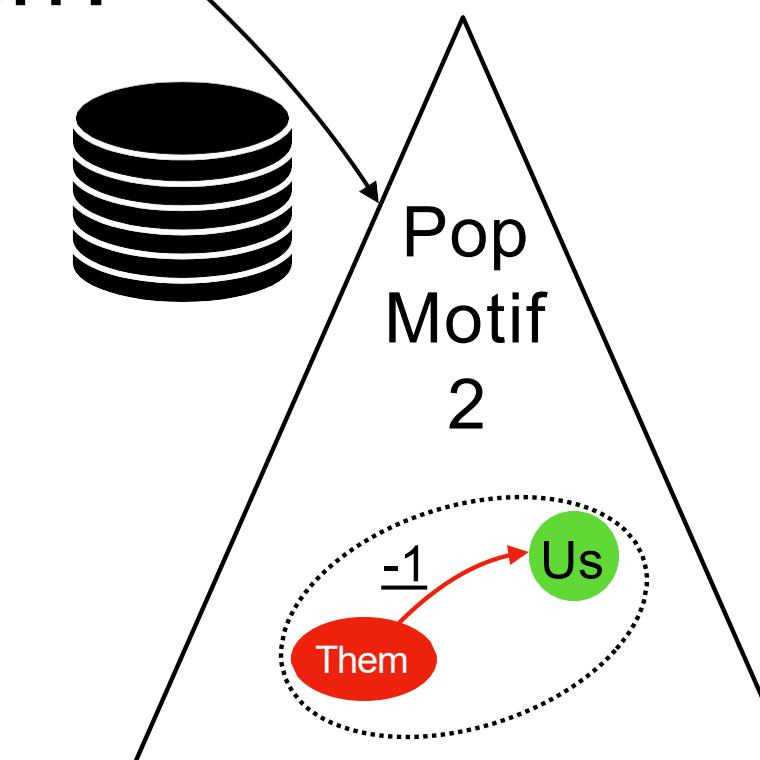


Calculate
Judgment holder
valence on motif

Does any pre-defined populist
motif match any part of the role
and valence graph?



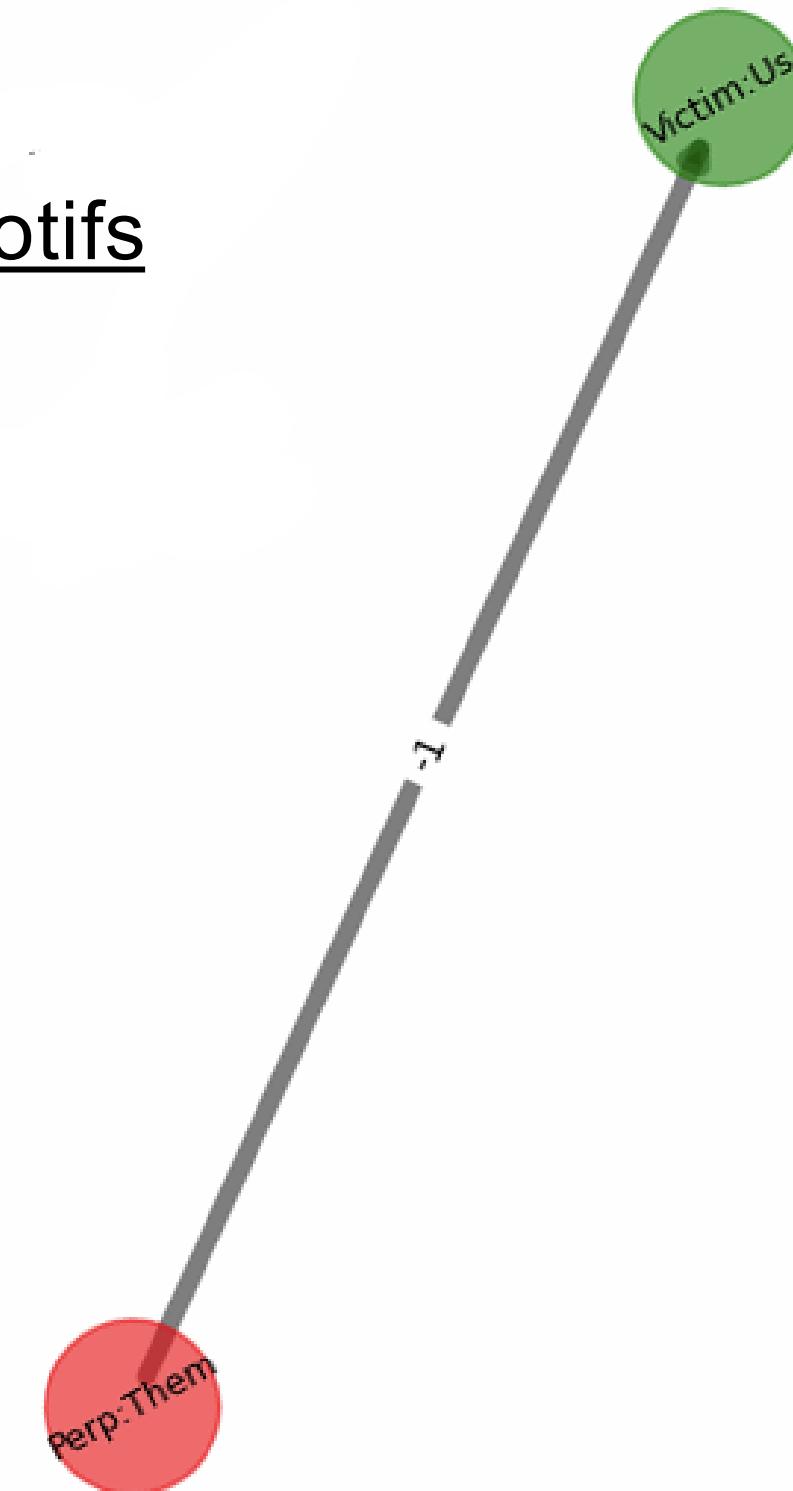
match?



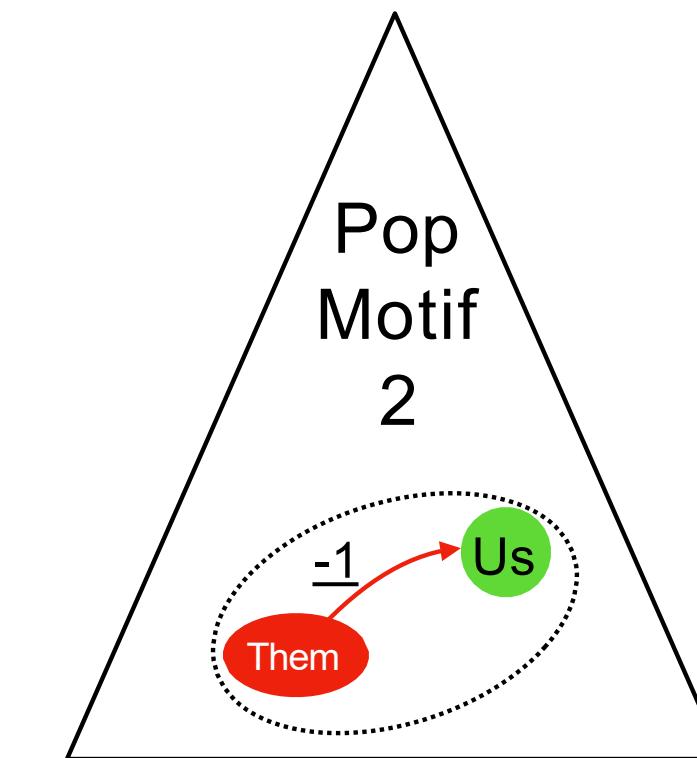
Use Graph Edit Distance with
curated distances between
attributes of nodes and edges,
including missing attributes

“Joe Biden wants to inflict a painful shutdown on our entire country”

Check for Matches among populist motifs



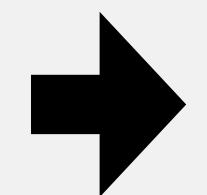
Matches
Populist Motif



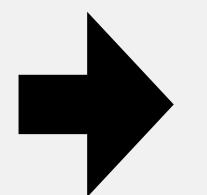
Coded as populist
sentence

“Joe Biden wants to inflict a painful shutdown on our entire country”

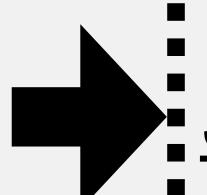
Label text, dependency parse,
and calculate valence



Compute role and
valence graph



Search for motif match
in subgraphs



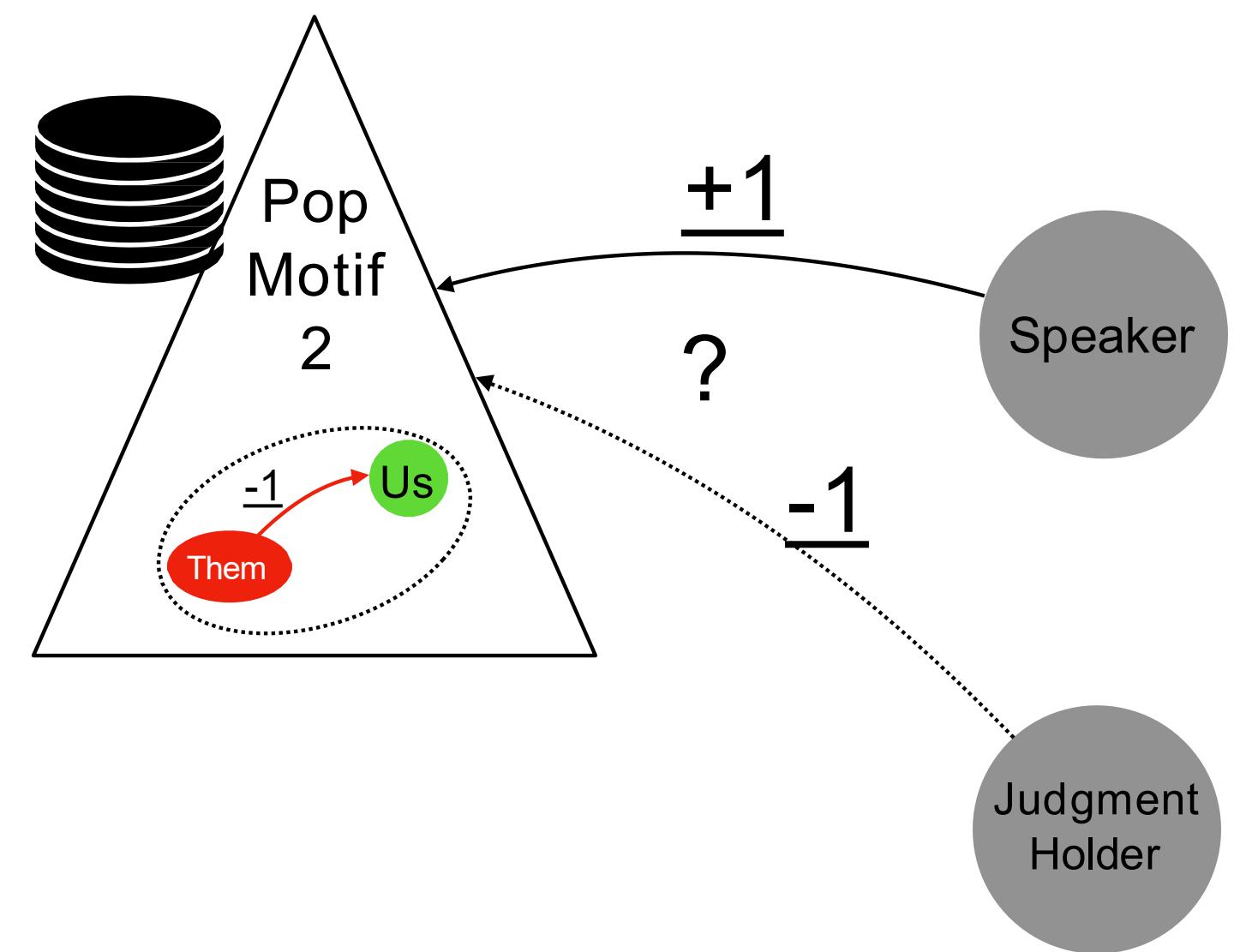
Calculate
Judgment holder
valence on motif

Is the speaker expressing a direct judgment in the valence?

Is the speaker taking a position (positive or negative valence) on the valence?

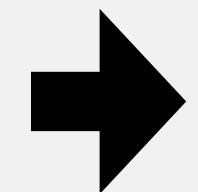
Is the speaker expressing an indirect position, such that they are talking about someone else's position?

Is the speaker taking a position on an indirect position?

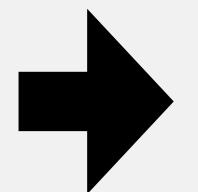


“Joe Biden wants to inflict a painful shutdown on our entire country”

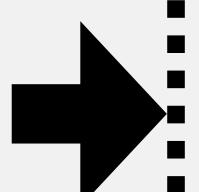
Label text, dependency parse,
and calculate valence



Compute role and
valence graph



Search for motif match
in subgraphs



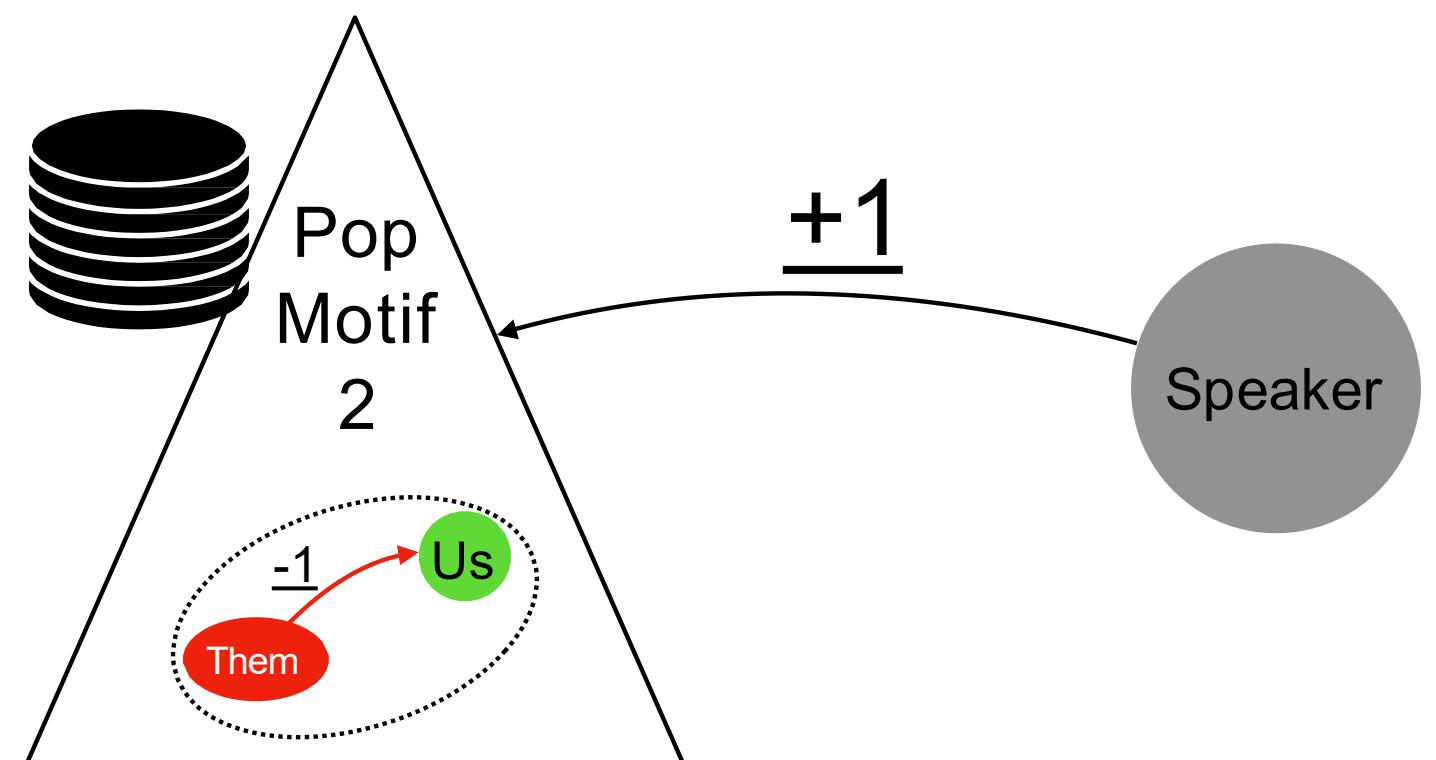
Calculate
Judgment holder
valence on motif

Is the speaker expressing a direct judgment in the valence?

Is the speaker taking a position (positive or negative valence) on the valence?

Is the speaker expressing an indirect position, such that they are talking about someone else's position?

Is the speaker taking a position on an indirect position?

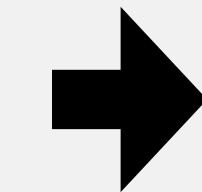


Example 2

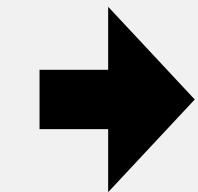
“We are engaged in a righteous crusade to liberate this nation from a corrupt political class that is waging war on American democracy”

“We are engaged in a righteous crusade to liberate this nation from a corrupt political class that is waging war on American democracy”

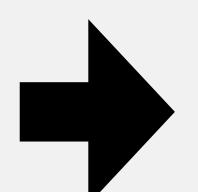
Label text, dependency parse,
and calculate valence



Compute role and
valence graph



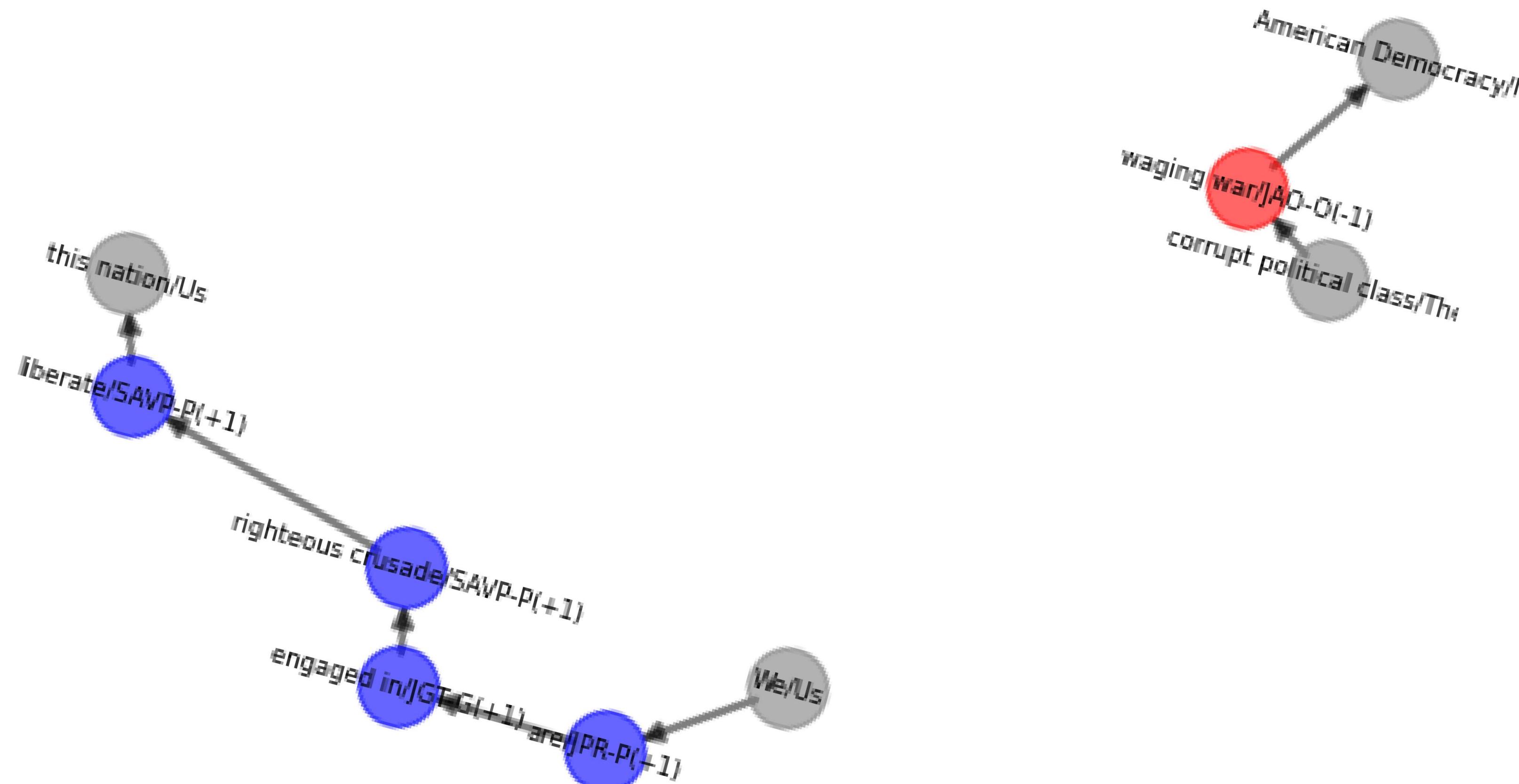
Search for motif match
in subgraphs



Calculate
Judgment holder
valence on motif

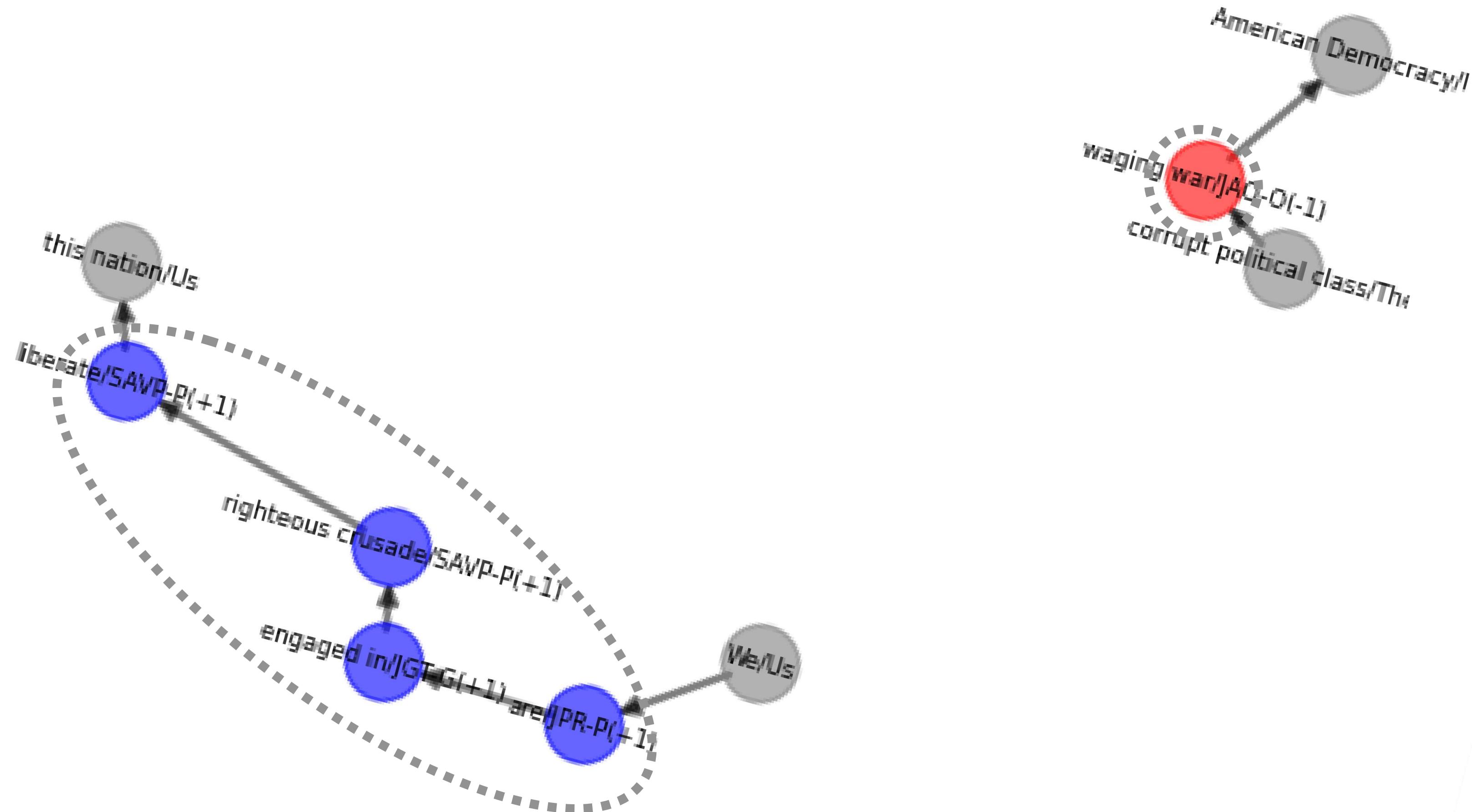
Full Valence Graph With Labels

“We are engaged in a righteous crusade to liberate this nation from a corrupt political class that is waging war on American democracy”



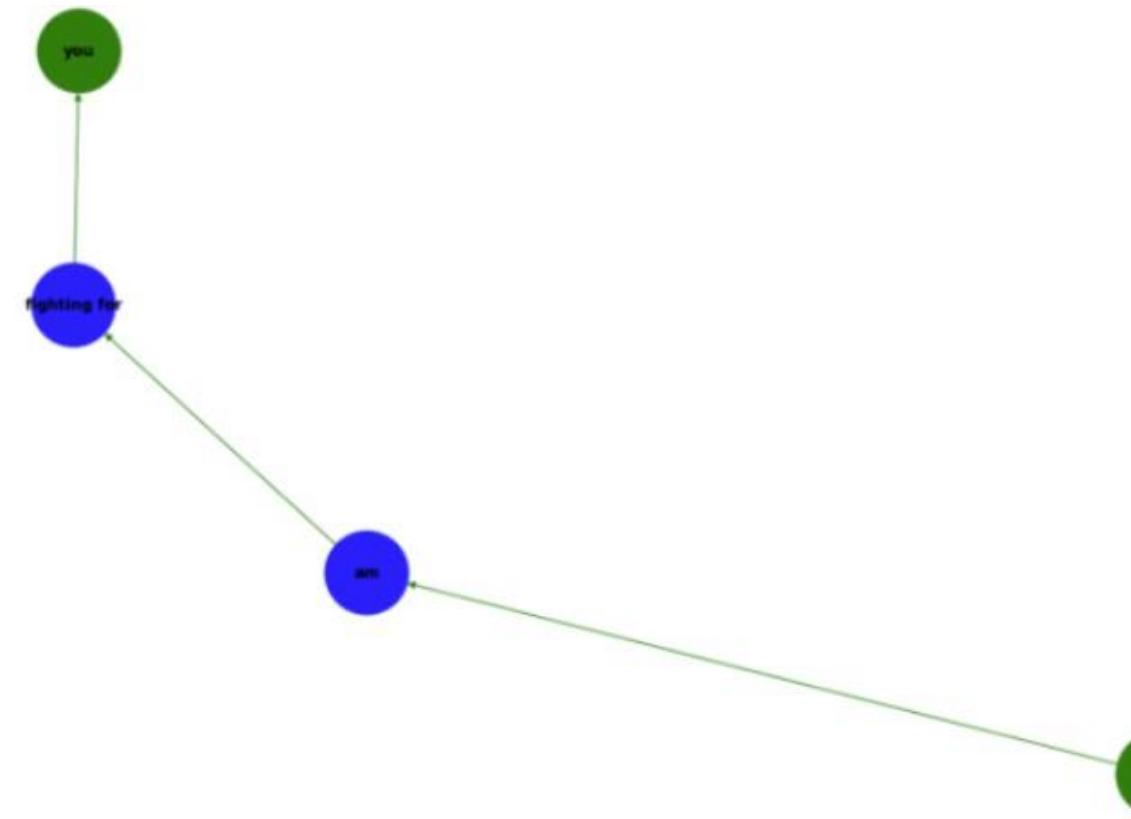
Follow Valence Path, where path can be thought of as part of a hypergraph

“We are engaged in a righteous crusade to liberate this nation from a corrupt political class that is waging war on American democracy”

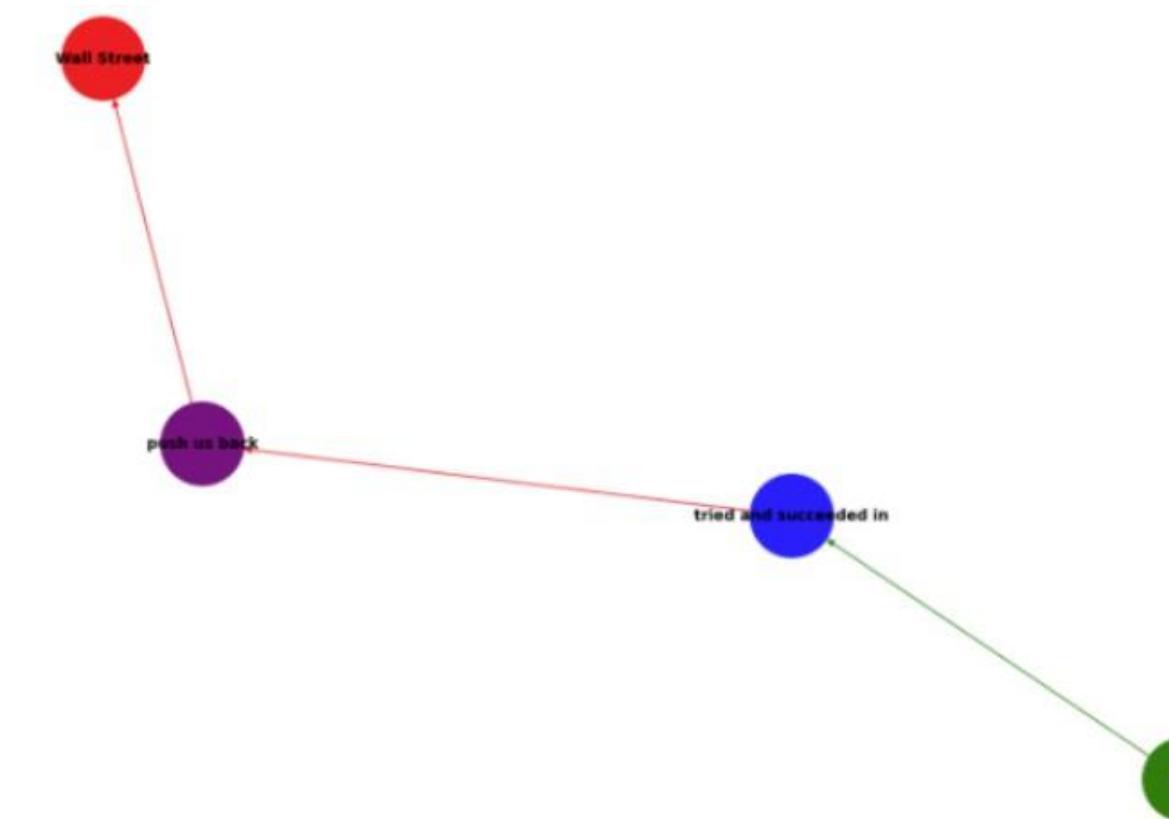


Motifs with Graphs

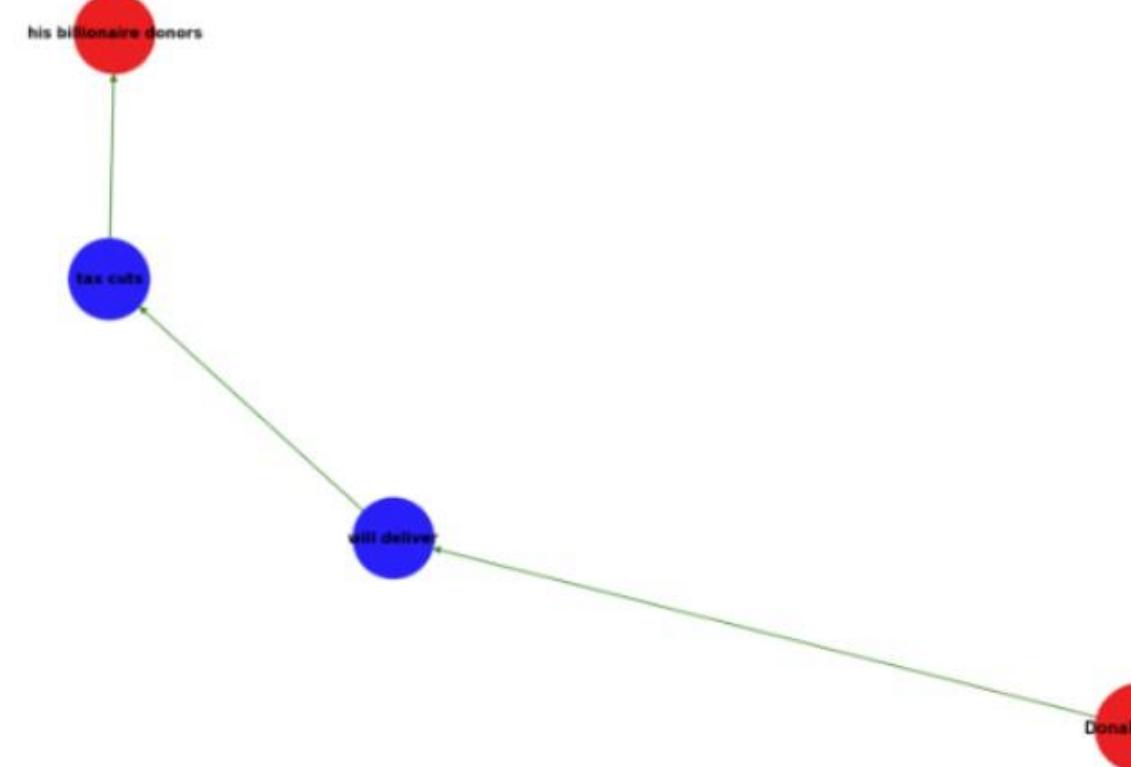
Example Motifs with Text



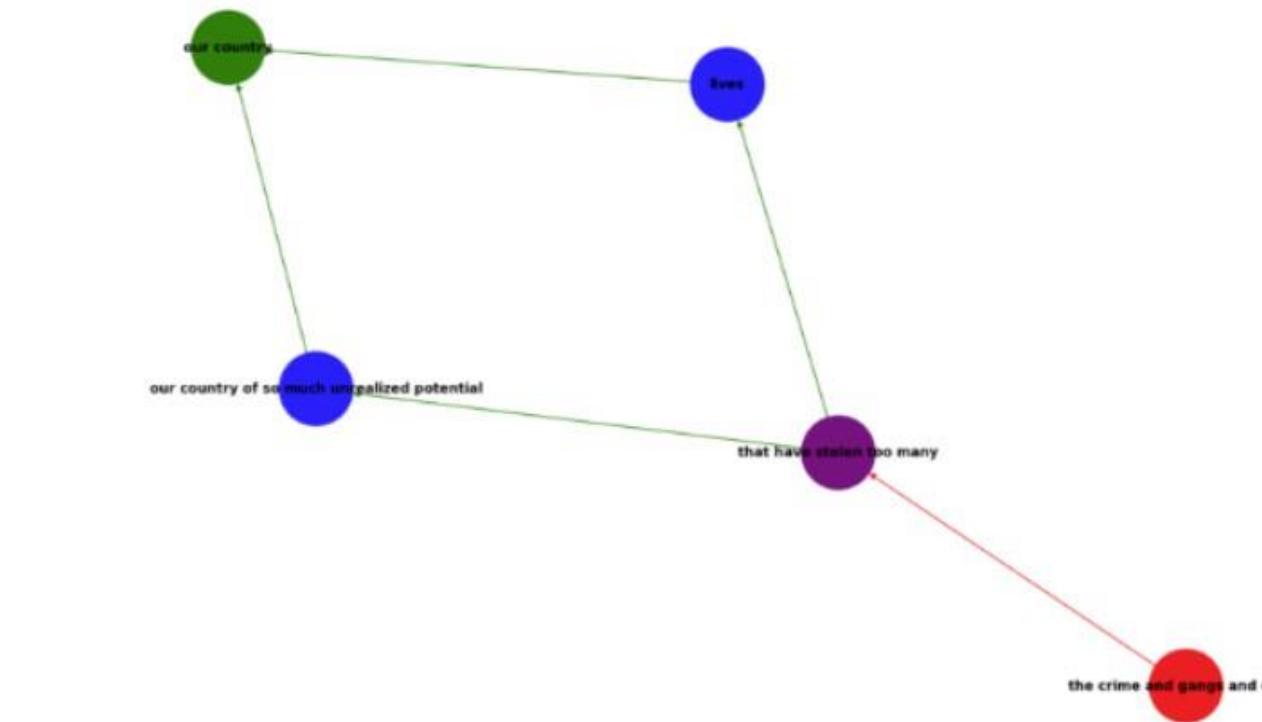
(a) (US, +, US,
We will bring back our jobs.



(b) (US, -, THEM,
We tried and succeeded in reforming Wall Street.



(c) (THEM, +, THEM,
Donald Trump will deliver tax cuts to his billionaire
donors.



(d) (THEM, -, US,
The crime and gangs and drugs that have stolen
too many lives and robbed our country of so much
unrealized potential.

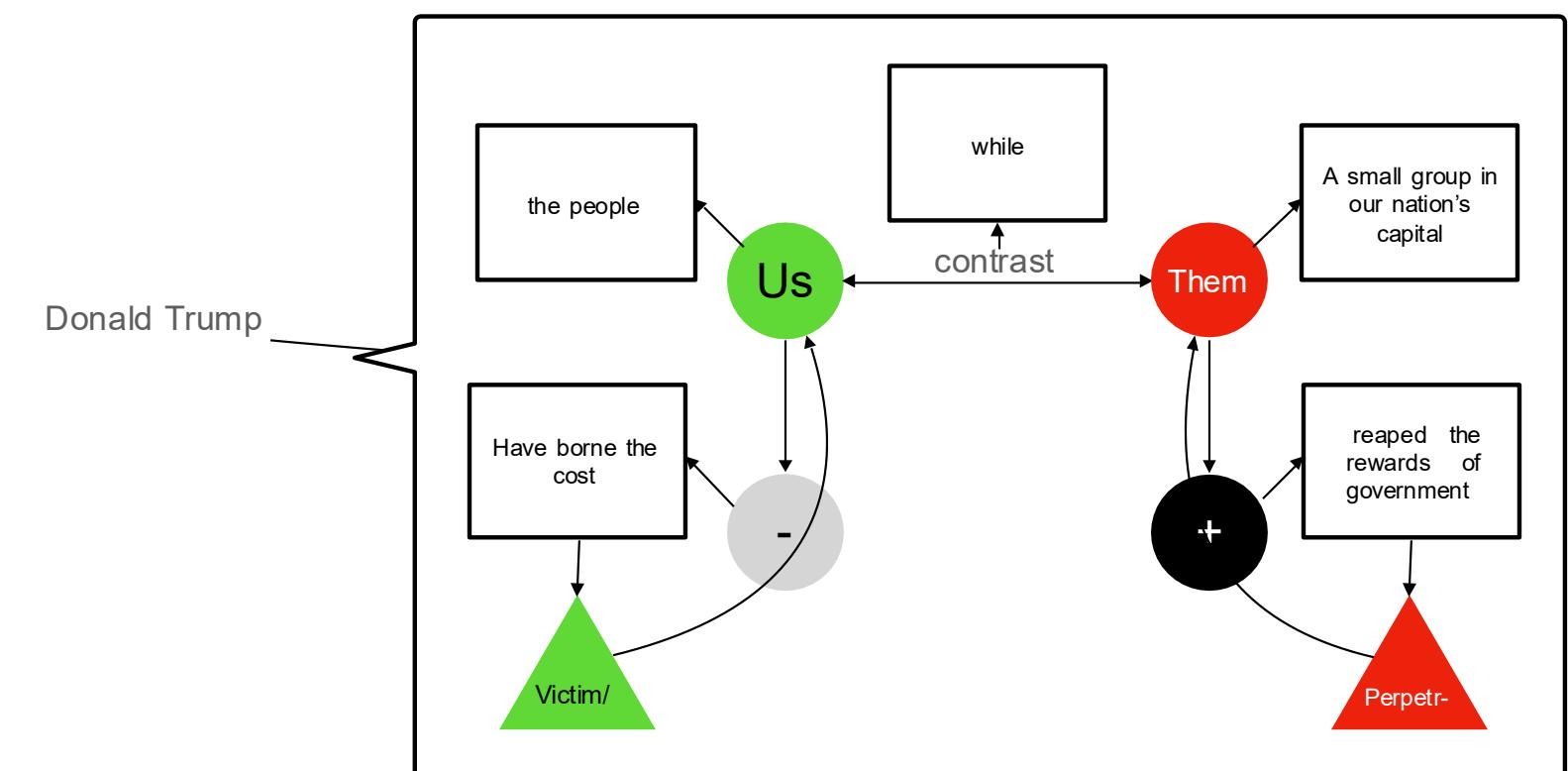
Example 3

From Labels to Network

Solution: Step 1

Cast text into a network

“A small group in our nation’s capital reaped the rewards of government,
while the people have borne the cost”- Donald Trump



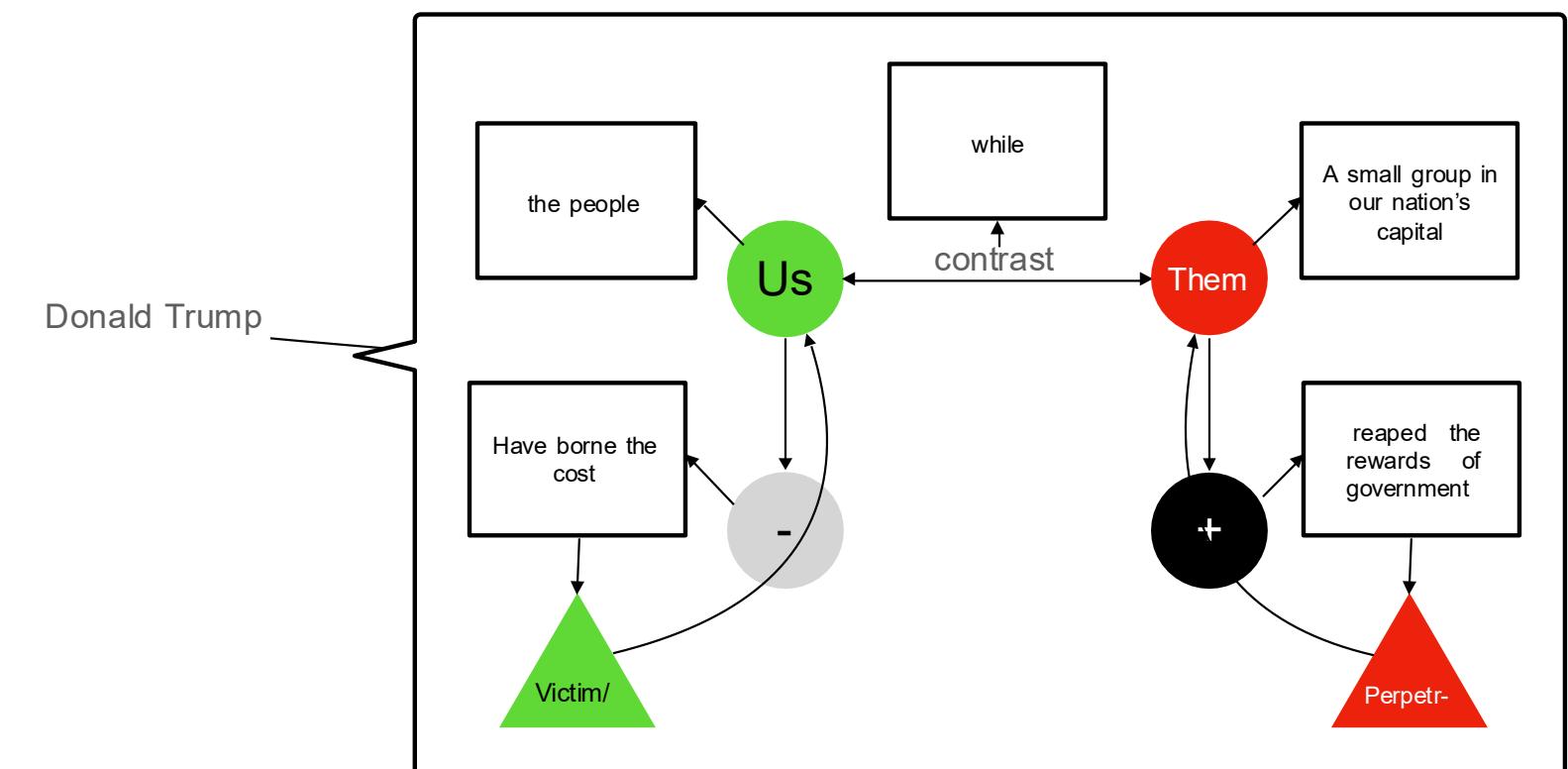
Solution: Step 1

Cast text into a network

Tokens as nodes,
relations as edges

“A small group in our nation’s capital reaped the rewards of government,
while the people have borne the cost”- Donald Trump

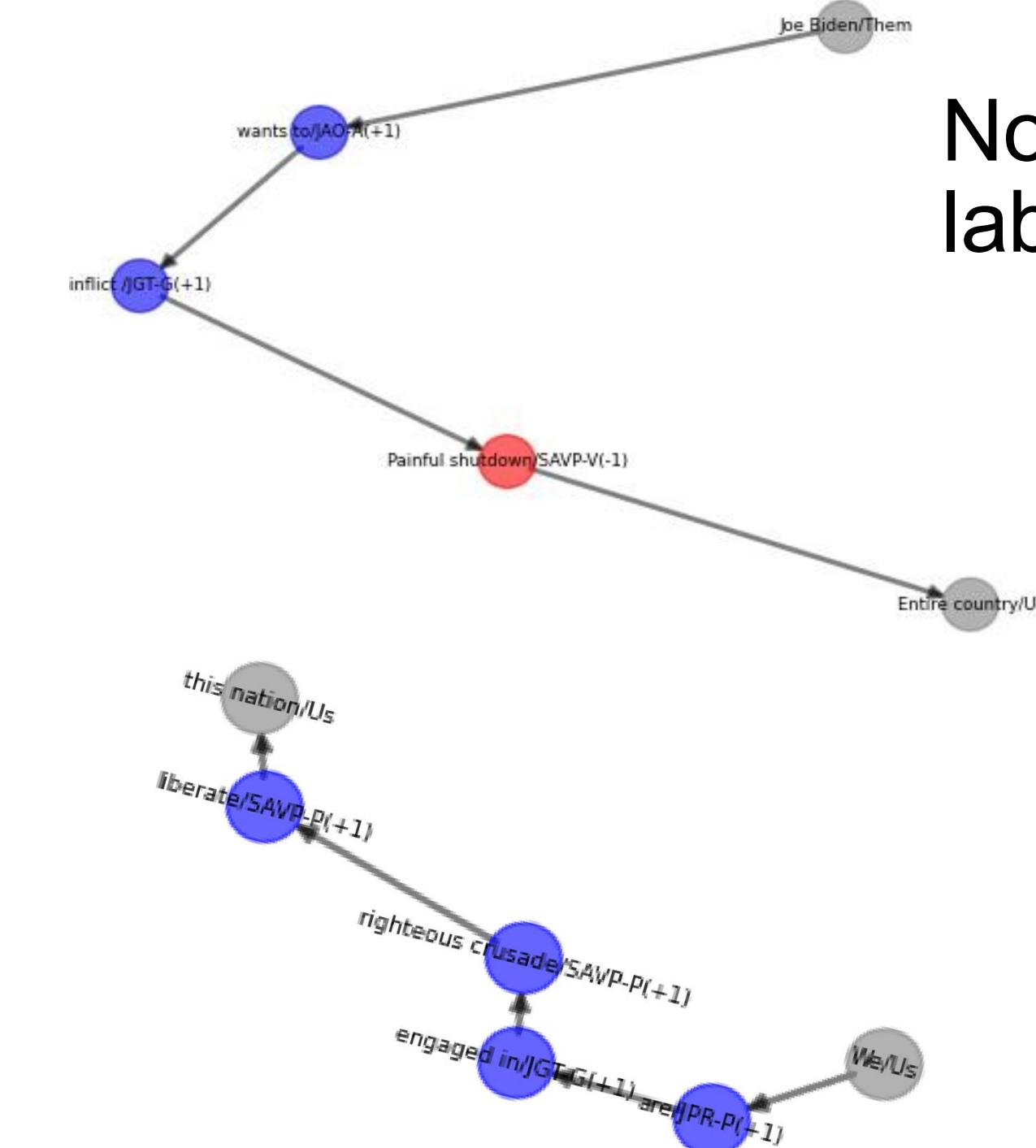
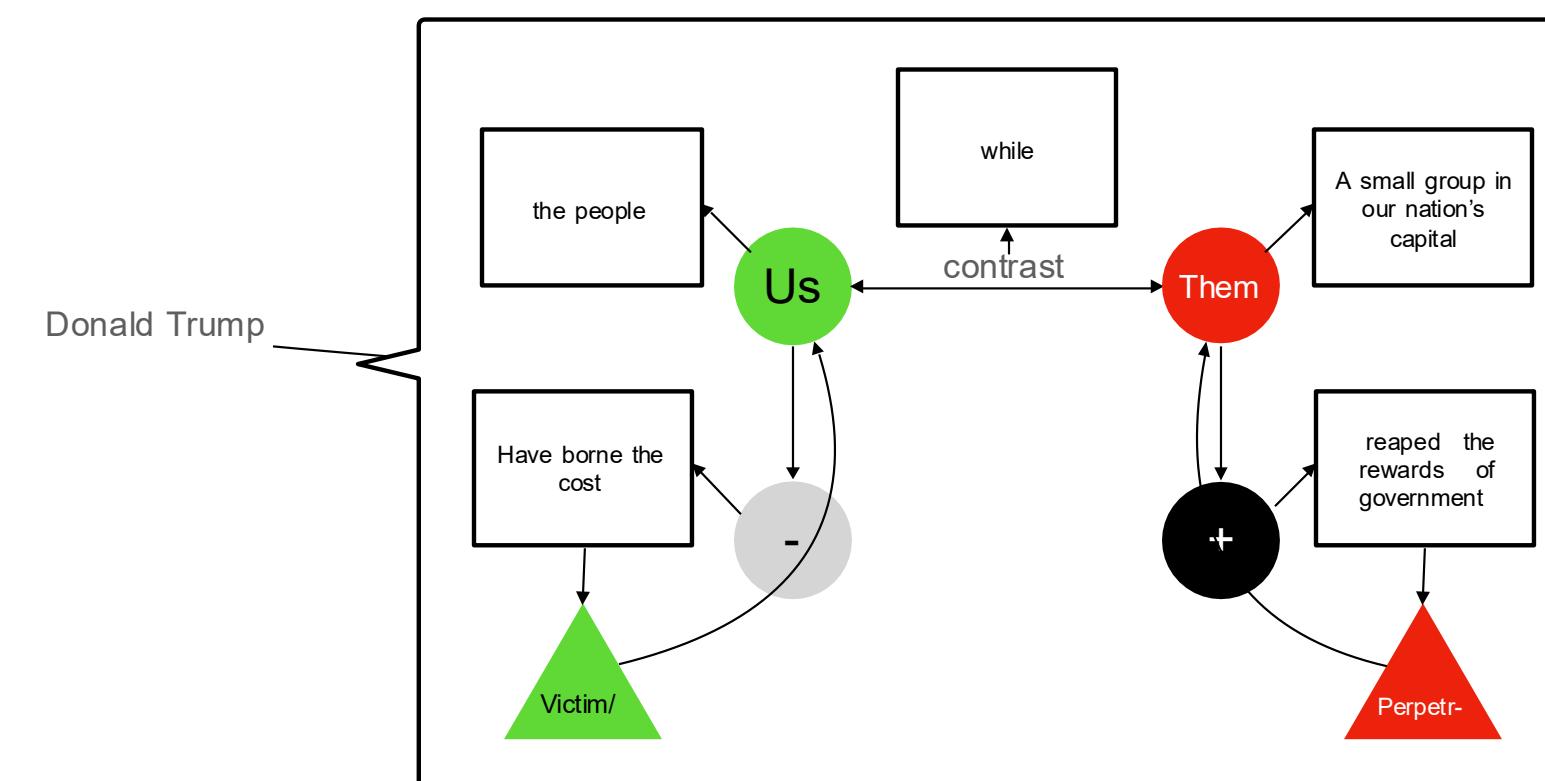
Nodes and edges have
labels/attributes



Solution: Step 1

Cast text into a network

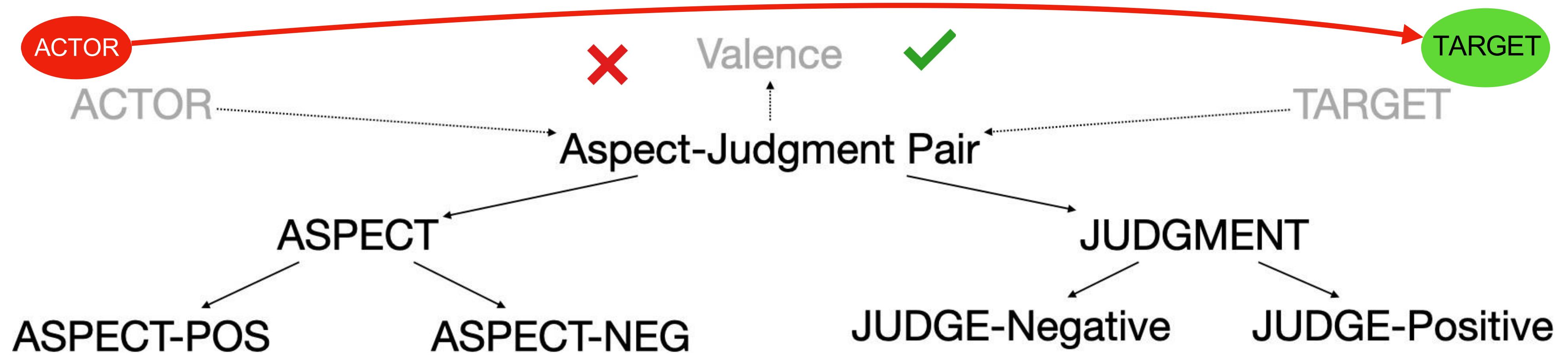
"A small group in our nation's capital reaped the rewards of government, while the people have borne the cost"- Donald Trump



Tokens as nodes,
relations as edges

Nodes and edges have
labels/attributes

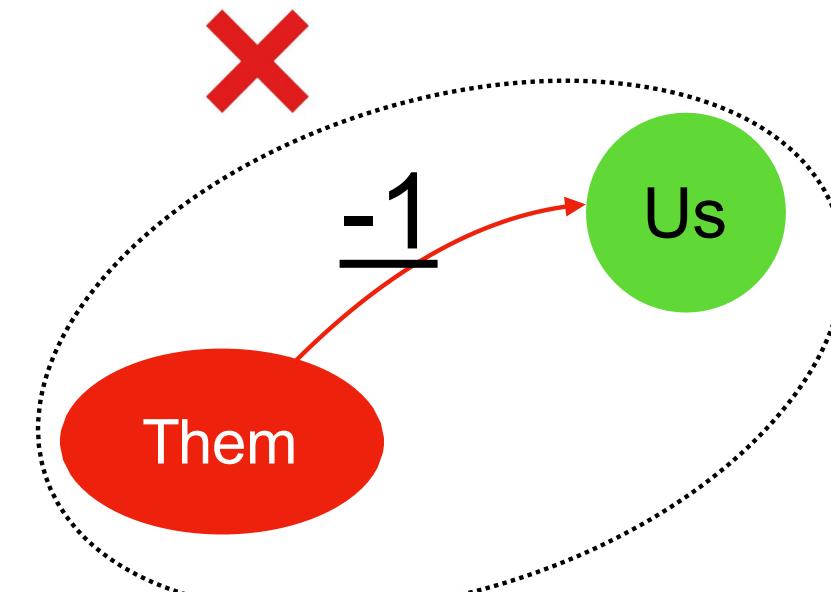
Components



Populist Motifs

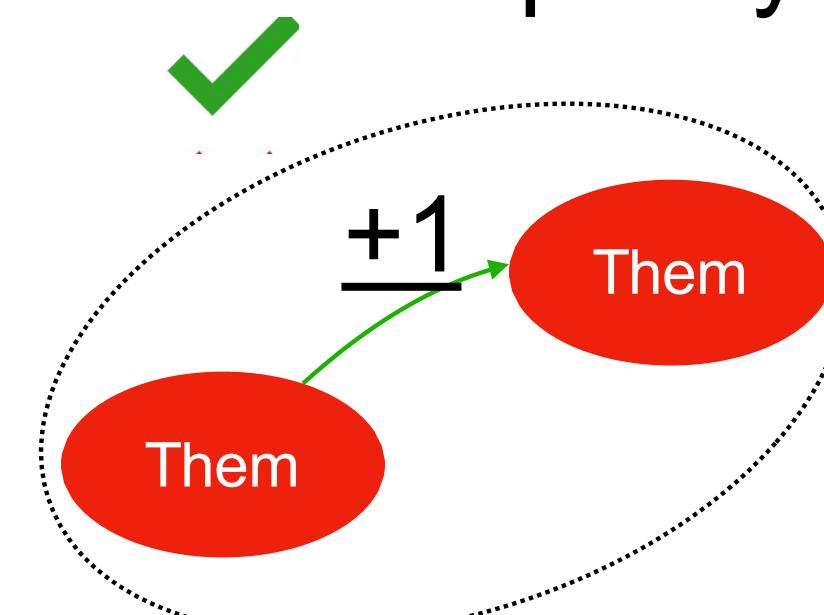
Populist Sentence Level Motifs

Victimization



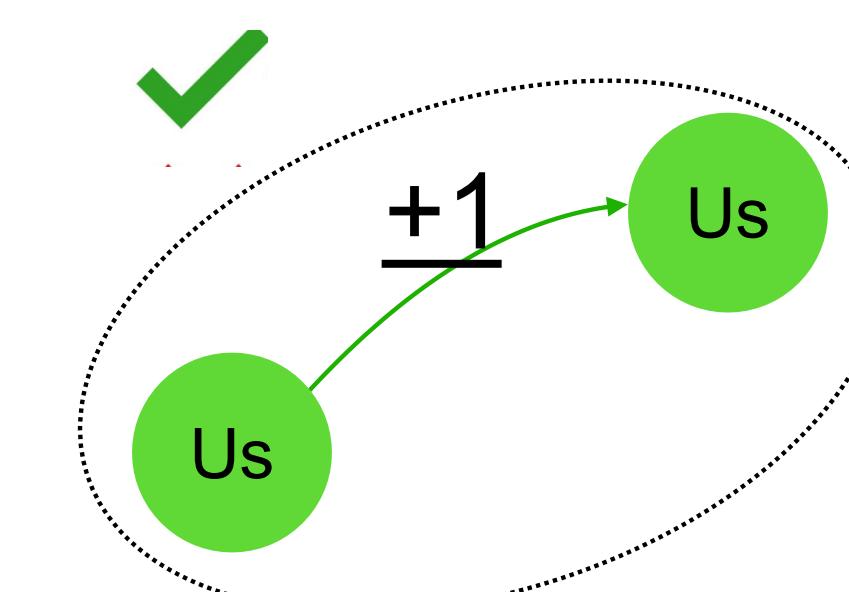
They hurt us

Elite Conspiracy



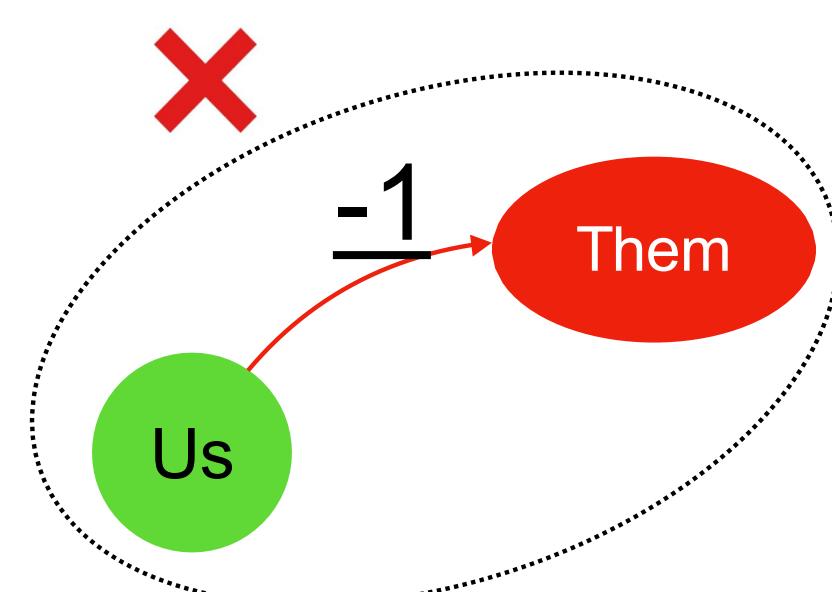
They help themselves

Empowerment

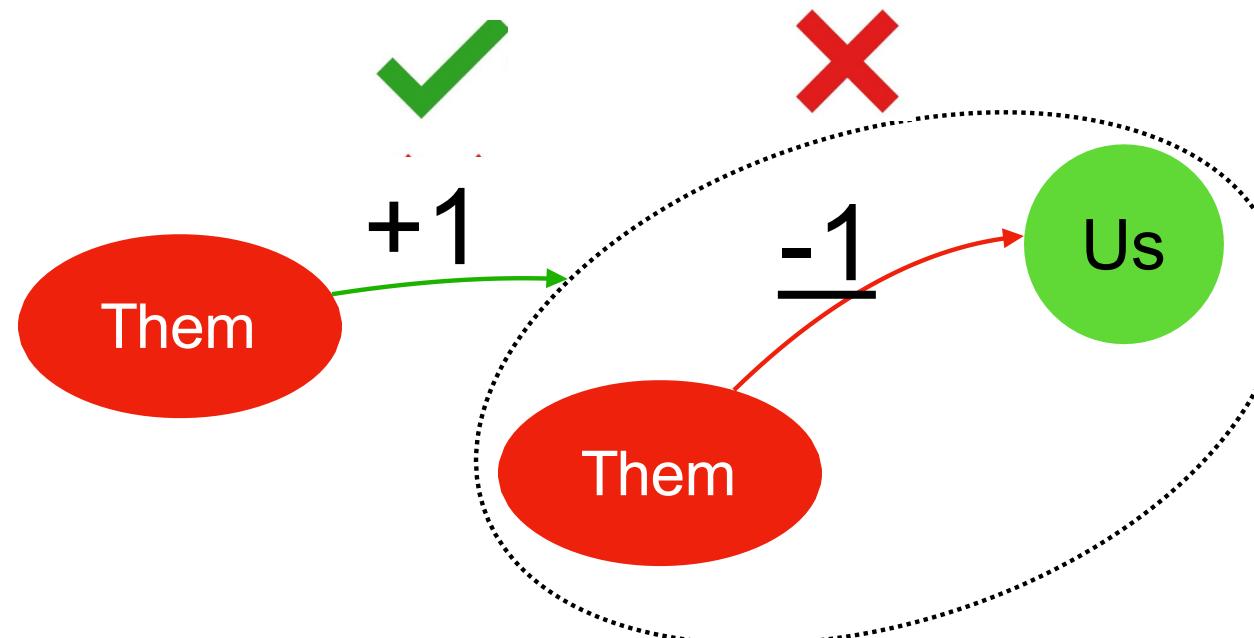


We help you/us

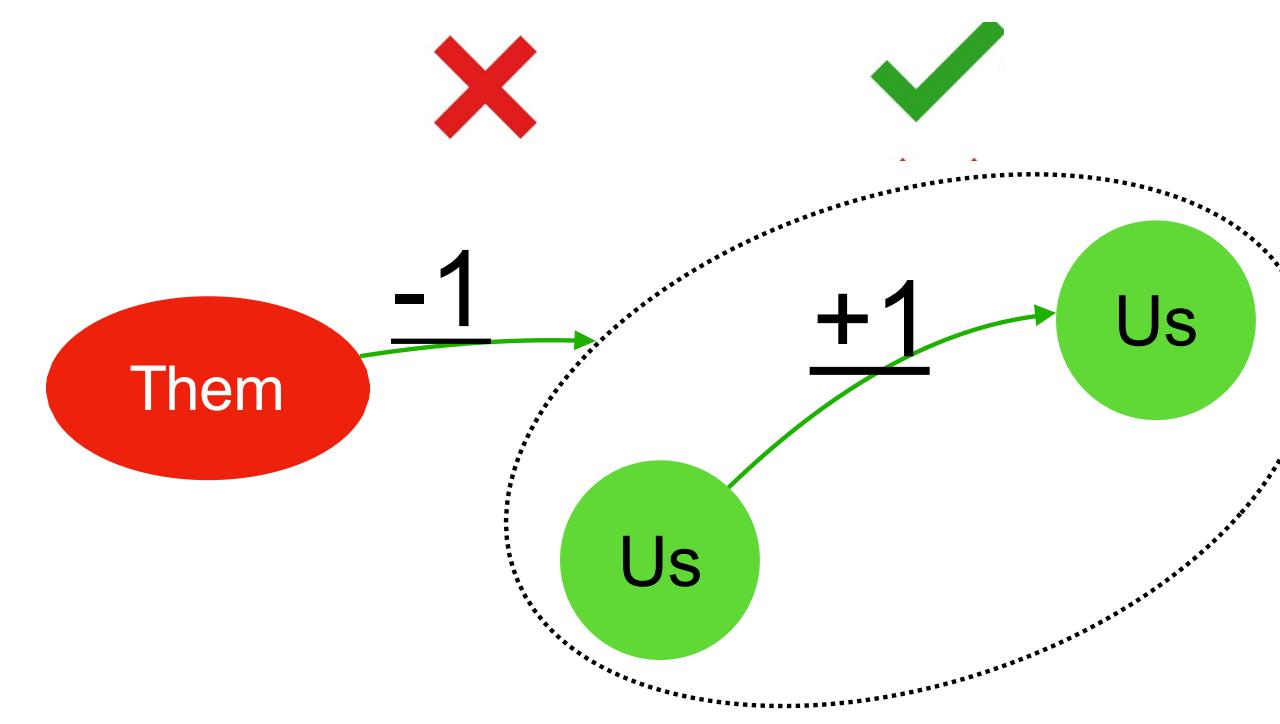
Resistance



We hurt them



They support them, and hurt us



They oppose you, we help you

Our Approach in Action

Motif Name	Triplet	Populism Share	Republican Example	Democrat Example
Victimization Narrative	(THEM, -, US,)	0.75	For too long, a small group in our nation's Capital has reaped the rewards of government while the people have borne the cost. (Trump)	And we've seen over the last 4 years, the status quo in Washington, they are powerful and they have fought us every step of the way. (Sanders)
Empowerment Narrative	(US, +, US,)	0.73	We will bring back our jobs. (Trump)	This great nation and its government belong to all of the people, and not to a handful of billionaires, their Super-PACs and their lobbyists. (Sanders)
Elite Conspiracy Narrative	(THEM, +, THEM,)	1.00	Insiders fighting for insiders. (Trump)	Donald Trump's answer to you is the same as before: another trillion dollars in tax cuts for billionaires and big corporations. (Hillary)
Resistance Narrative	(US, -, THEM,)	1.00	We are transferring power from Washington, D.C. and giving it back to you, the American People. (Trump)	When we tried and succeeded in reforming Wall Street, they spent millions to push us back. (Obama)

Sentence-level Precision in US Speech Sample

The Aggregation Problem in Computational Measurement of Populist Speech

Change is coming. All the people who've rigged the system for their own personal benefit are trying to stop our change campaign because they know that their gravy train has reached its last stop. It's your turn now. This is your time. The fact that so many encrusted old political insiders oppose our campaign is the best proof you will ever need that we are fighting for real change not partisan change.

We are fighting for all Americans Democrats, Republicans, Independents, Conservatives, Liberals who've been failed by this corrupt system. We're fighting for everyone who doesn't have a voice. We're also fighting for every region of this country. For every part of Florida, and every part of America. From Pensacola to Pittsburgh, from Baltimore to Baton Rouge, we are fighting for every last city and every last person in this country. Hillary Clinton is the candidate of the past. Ours is the campaign of the future.

In this future, we are going to pursue new trade policies that put American workers first and that keep jobs in our country. All the people who got NAFTA wrong, and China wrong, and who are trying to give us the Trans-Pacific Partnership are the same failed voices pushing for Hillary Clinton. Our trade deficit with the world is now nearly \$800 billion dollars. We've lost one-third of our manufacturing jobs since Bill and Hillary Clinton gave us NAFTA. China is manipulating its currency and taking our jobs. We are going to stop companies from leaving our country and keep those jobs right here in America. The era of economic surrender is over.

The Aggregation Problem in Computational Measurement of Populist Speech

Change is coming. All the people who've rigged the system for their own personal benefit are trying to stop our change campaign because they know that their gravy train has reached its last stop. It's your turn now. This is your time. The fact that so many encrusted old political insiders oppose our campaign is the best proof you will ever need that we are fighting for real change not partisan change.

We are fighting for all Americans Democrats, Republicans, Independents, Conservatives, Liberals who've been failed by this corrupt system. We're fighting for everyone who doesn't have a voice. We're also fighting for every region of this country. For every part of Florida, and every part of America. From Pensacola to Pittsburgh, from Baltimore to Baton Rouge, we are fighting for every last city and every last person in this country. Hillary Clinton is the candidate of the past. Ours is the campaign of the future.

In this future, we are going to pursue new trade policies that put American workers first and that keep jobs in our country. All the people who got NAFTA wrong, and China wrong, and who are trying to give us the Trans-Pacific Partnership are the same failed voices pushing for Hillary Clinton. Our trade deficit with the world is now nearly \$800 billion dollars. We've lost one-third of our manufacturing jobs since Bill and Hillary Clinton gave us NAFTA. China is manipulating its currency and taking our jobs. We are going to stop companies from leaving our country and keep those jobs right here in America. The era of economic surrender is over.

Triplet	Example (Speaker)
Populist Leaders Using Non-Populist Motifs	
[Residual, +, US]	<p>I will declare a national emergency at our southern border. (Trump) At its most basic, this election is about preserving our democracy. (Sanders) Climate change is real. It is caused by human activity and it is already causing devastating problems in the United States and around the world. (Sanders)</p>
[Residual, -, US]	<p>Mothers and children trapped in poverty in our inner cities. (Trump) We're facing the worst public health crisis in 100 years and the worst economic collapse since the great depression. (Sanders)</p>
[US, +, Residual]	<p>Here, we memorialize the brave men and women who struggled to sacrifice, and sacrificed so much so that others might live in freedom.(Trump) We are confronting systemic racism and the enormous threat to our planet of climate change. (Sanders) This election is the most important in the modern history of this country. (Sanders)</p>
[Residual, +, Residual]	<p>My proudest legacy will be that of a peacemaker and unifier. (Trump) The scientific community has spoken in a virtually unanimous voice. (Sanders)</p>
Non-Populist Leaders Using Populist Motifs	
[US, +, US]	<p>This generation was given the gift of the best education in American history. (Bush)</p>
[THEM, -, US]	<p>And we've seen over the last 4 years, the status quo in Washington, they are powerful, and they have fought us every step of the way. (Obama) That's surrender to the same forces of the status quo that has squeezed middle class families for way too long. (Obama)</p>

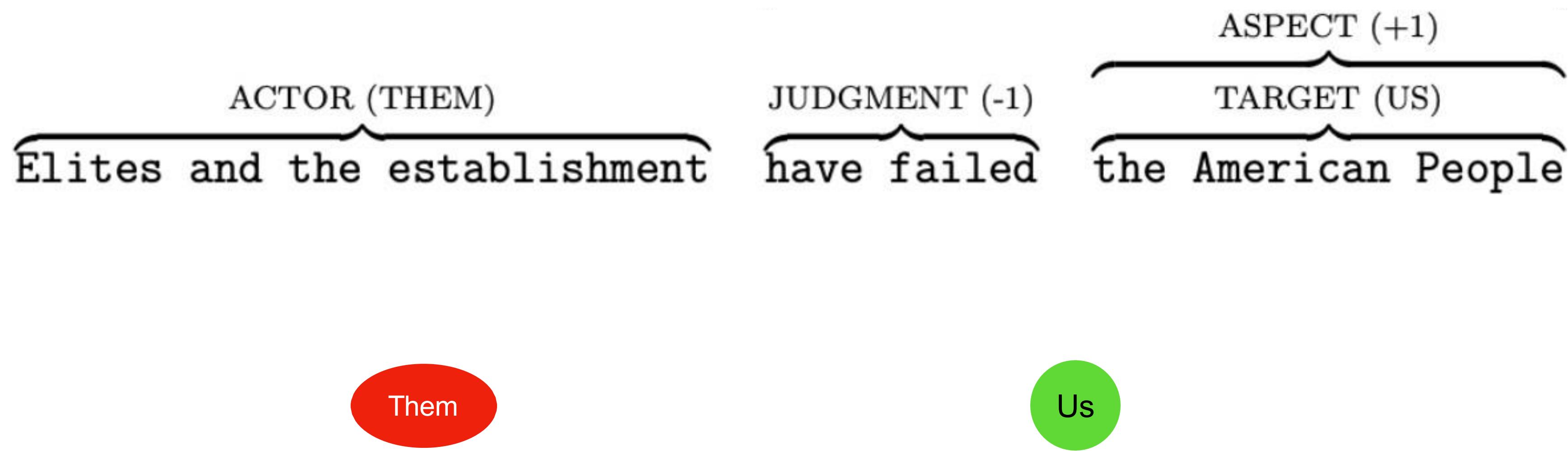
Table 6: Examples of Discourse-Speaker Mismatch in Populist Motifs

A.7.3 Obama 8/2024, Chicago

At a time when millions of our fellow citizens were sick and dying, we needed a leader with the character to put politics aside and do what was right. At a time when our economy was reeling, we needed a leader with the determination to drive what would become the world's strongest recovery—15 million jobs, higher wages, lower health care costs. And at a time when the other party had turned into a cult of personality, we needed a leader who was steady, and brought people together, and was selfless enough to do the rarest thing there is in politics: putting his own ambition aside for the sake of the country. History will remember Joe Biden as an outstanding president who defended democracy at a moment of great danger. I am proud to call him my president, but I am even prouder to call him my friend. Now the torch has been passed. Now it's up to all of us to fight for the America we believe in. And make no mistake: it will be a fight. For all the incredible energy we've been able to generate over the last few weeks, for all the rallies and the memes, this will still be a tight race in a closely divided country—a country where too many Americans are still struggling. Where a lot of Americans don't believe government can help.

Example 4

'Elites and the establishment' 'have failed' 'the American People'



Valence = -1

ASPECT (+1)

TARGET (US)

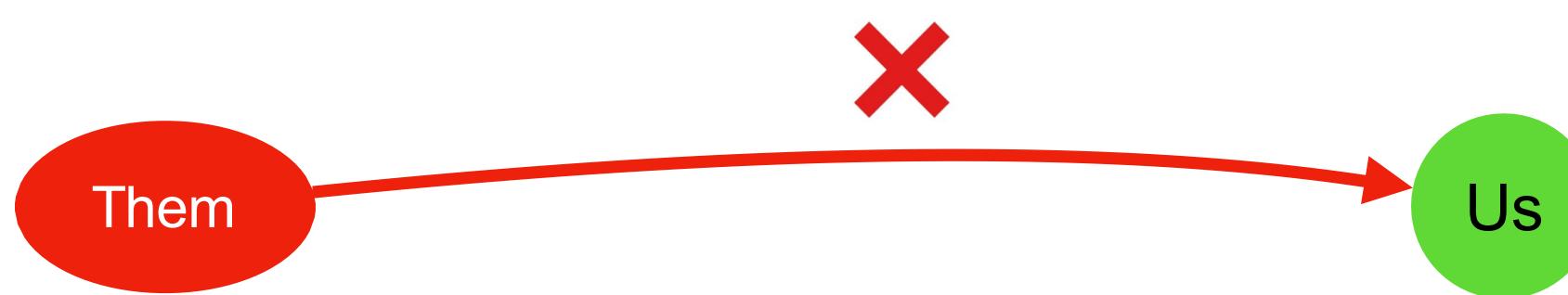
ACTOR (THEM)

JUDGMENT (-1)

Elites and the establishment

have failed

the American People



Group, (THEM, -1, US)

Valence = -1

ASPECT (+1)

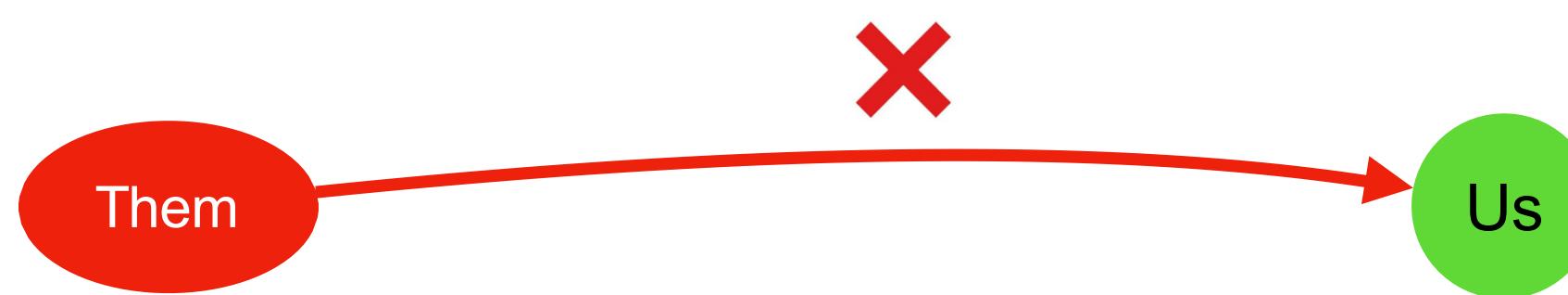
TARGET (US)

Actor (THEM)

JUDGMENT (-1)

Target (US)

Elites and the establishment have failed the American People



(Elites and the establishment, -1, the American People)

Aspect-Based Clustering for Political Text Analysis

→ Train a model to identify **aspect-based clusters** within political sentences.

Task as Token-Level Clustering:

→ Assign each token to an **aspect-defined cluster**, reframing the problem as an **n-ary relation extraction** challenge:

- Each ASPECT defines a unique cluster.
- Each cluster groups ACTOR, TARGET, and JUDGMENT entities around the ASPECT.
- Tokens without entity annotations form a "none" group.

Methodology and Implementation

- **Why N-ary Relation Extraction?**

- Relations involve multiple interconnected entities (more than pairs).
- Allows capturing multidimensional political narratives.

- **Approach:**

1. Convert **character-indexed annotations** → **token-level labels**.
2. Preprocess annotated sentences into a format compatible with transformer-based models (e.g., BERT).
3. Train transformer models for accurate aspect-cluster predictions.

- **Tools & Dependencies:**

- Python Libraries:

- torch, transformers (BERT)

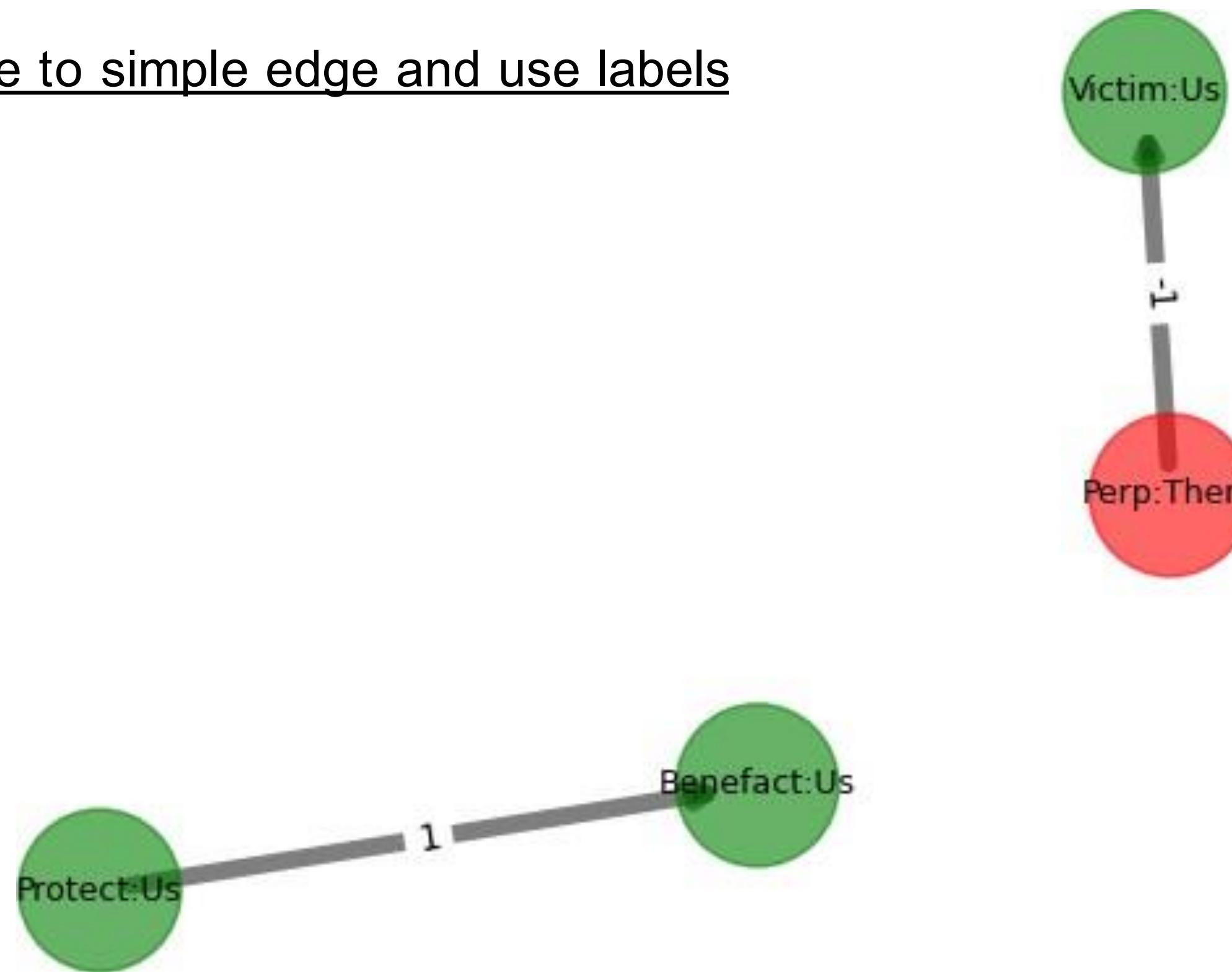
- Data: Annotated sentences in JSON format (processed_annotations.json).

“We are engaged in a righteous crusade to liberate this nation from a corrupt political class that is waging war on American democracy”

"We are engaged in a righteous crusade to liberate this nation from a corrupt political class that is waging war on American democracy"

"We are engaged in a righteous crusade to liberate this nation from a corrupt political class that is waging war on American democracy"

Reduce path/hyper-edge to simple edge and use labels



"We are engaged in a righteous crusade to liberate this nation from a corrupt political class that is waging war on American democracy"

Check for Matches among populist motifs

