

Braver Angels “Why I Joined” Preliminary Topic Modeling Analyses

Tori Ellison, Junseok Yang

Topic Modeling Techniques

- **Nonnegative Matrix Factorization (NMF) of the TF-IDF Matrix with t-SNE Plots**

- Pros

- *Explainability*
 - *Visual Clustering Structure Detected*
 - *Consistent, “Nested” Topic Discovered*

- Potential Cons

- *Favors Non-Complex Topic Discovery*

- **Latent Dirichlet Allocation (LDA)**

- Pros

- *More sophisticated probabilistic topic modeling technique, which can detect more complex topics*

- Observed Cons

- *Less consistent, “nested” topics discovered*
 - *Less explainable*

Dataset

| | zip_code | Why I joined | Master Partisanship | Engagement Code | Membership Start Date |
|------|------------|---|---------------------|-----------------|-----------------------|
| 0 | 94025 | Sick of seeing the country torn apart. | Blue | NaN | 2022-07-06 |
| 1 | 94086 | My daughter became interested in it and I've a... | Blue | NaN | 2020-05-29 |
| 2 | 87301 | To do all I can to improve my communication wi... | Blue | NaN | 2019-11-11 |
| 3 | 95462 | Listened to recent podcast, saw article in z B... | Blue | NaN | 2022-07-24 |
| 4 | 28411 | Allen Quigley invited me to initial chapter me... | Blue | NaN | 2020-07-28 |
| ... | ... | ... | ... | ... | ... |
| 7216 | 49445 | Moni's speech at the Calvin College January Se... | Red | NaN | 2023-02-08 |
| 7217 | 29928 | I see the need to reduce divisiveness and pola... | Blue | NaN | 2023-02-08 |
| 7218 | 37803 | Church discussion | Blue | NaN | 2023-03-20 |
| 7219 | 80216-3533 | I heard the founder speak on a podcast and was... | Red | NaN | 2023-03-22 |
| 7220 | 97330 | Watched video and talked to a friend that just... | Blue | NaN | 2023-04-22 |

7221 rows × 5 columns

- Only 7221 of the original 10261 participants gave a reason.

TF-IDF Matrix (“X”)

| | sick | country | daughter | interested | attend | debate | ability | able | abortion | absolutely | ... |
|---|---------|---------|-----------|------------|----------|----------|---------|------|----------|------------|-----|
| Why I joined | | | | | | | | | | | |
| Sick of seeing the country torn apart. | 0.92369 | 0.38314 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.0 | 0.0 | 0.0 | 0.0 | ... |
| My daughter became interested in it and I've attended several debates. | 0.00000 | 0.00000 | 0.6666393 | 0.411925 | 0.422878 | 0.455425 | 0.0 | 0.0 | 0.0 | 0.0 | ... |
| ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| I heard the founder speak on a podcast and was impressed. | 0.00000 | 0.00000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.0 | 0.0 | 0.0 | 0.0 | ... |
| Watched video and talked to a friend that just joined also. Very inspiring and hopeful. | 0.00000 | 0.00000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.0 | 0.0 | 0.0 | 0.0 | ... |

7221 rows × 1186 columns

Term Frequency-Inverse Document Frequency (TF-IDF) Matrix:

$$X_{dw} = tf(w, d) \cdot idf(w), \text{ where}$$

- $tf(w, d) = \frac{\text{number of times word } w \text{ appears in document } d}{\text{total number of words in document } d}$
- $idf(w) = \log\left(\frac{\text{number of documents in the text corpora}}{\text{number of documents in the text corpora in which the word } w \text{ appears}}\right)$

The tf-idf of a word and document measures how important a word is to a document in a text corpora.

NMF Explainability

Goal: Try to come up with a W and H matrix such that $X \approx W \cdot H$

| | sick | country | daughter | interested | attend | debate | ability | able | abortion | absolutely | ... |
|---|---------|---------|----------|------------|----------|----------|---------|------|----------|------------|-----|
| Why I joined | | | | | | | | | | | |
| Sick of seeing the country torn apart. | 0.92369 | 0.38314 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.0 | 0.0 | 0.0 | 0.0 | ... |
| My daughter became interested in it and I've attended several debates. | 0.00000 | 0.00000 | 0.666393 | 0.411925 | 0.422878 | 0.455425 | 0.0 | 0.0 | 0.0 | 0.0 | ... |
| ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| I heard the founder speak on a podcast and was impressed. | 0.00000 | 0.00000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.0 | 0.0 | 0.0 | 0.0 | ... |
| Watched video and talked to a friend that just joined also. Very inspiring and hopeful. | 0.00000 | 0.00000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.0 | 0.0 | 0.0 | 0.0 | ... |

2

| | topic_0 | topic_1 |
|---|----------|----------|
| Why I joined | | |
| Sick of seeing the country torn apart. | 0.036337 | 0.000000 |
| My daughter became interested in it and I've attended several debates. | 0.013701 | 0.008992 |
| ... | ... | ... |
| I heard the founder speak on a podcast and was impressed. | 0.010300 | 0.012336 |
| Watched video and talked to a friend that just joined also. Very inspiring and hopeful. | 0.007422 | 0.102740 |

H

| | sick | country | daughter | interested | attend | debate | ability | able | abortion | absolutely | ... |
|---------|----------|----------|----------|------------|----------|----------|----------|----------|----------|------------|-----|
| topic_0 | 0.026367 | 1.325318 | 0.013818 | 0.207274 | 0.137403 | 0.124484 | 0.060471 | 0.183156 | 0.010594 | 0.017037 | ... |
| topic_1 | 0.004674 | 0.000000 | 0.005777 | 0.031004 | 0.111459 | 0.024079 | 0.000000 | 0.033290 | 0.000805 | 0.001714 | ... |

NMF Explainability

Goal: Try to come up with a W and H matrix such that $X \approx W \cdot H$

X

| Why I joined | sick | country | daughter | interested | attend | debate | ability | able | abortion | absolutely | ... |
|---|---------|---------|----------|------------|----------|----------|---------|------|----------|------------|-----|
| Sick of seeing the country torn apart. | 0.92369 | 0.38314 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.0 | 0.0 | 0.0 | 0.0 | ... |
| My daughter became interested in it and I've attended several debates. | 0.00000 | 0.00000 | 0.666393 | 0.411925 | 0.422878 | 0.455425 | 0.0 | 0.0 | 0.0 | 0.0 | ... |
| I heard the founder speak on a podcast and was impressed. | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.0 | 0.0 | 0.0 | 0.0 | ... |
| Watched video and talked to a friend that just joined also. Very inspiring and hopeful. | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.0 | 0.0 | 0.0 | 0.0 | ... |

7221 rows × 1186 columns

$W =$

- New set of coordinates for the join reasons.
- To what extent does each join reason belong to each topic.

W

≈

| | topic_0 | topic_1 |
|---|----------|----------|
| Why I joined | | |
| Sick of seeing the country torn apart. | 0.036337 | 0.000000 |
| My daughter became interested in it and I've attended several debates. | 0.013701 | 0.008992 |
| ... | ... | ... |
| I heard the founder speak on a podcast and was impressed. | 0.010300 | 0.012336 |
| Watched video and talked to a friend that just joined also. Very inspiring and hopeful. | 0.007422 | 0.102740 |
| 7221 rows × 2 columns | | |

H

| | sick | country | daughter | interested | attend | debate | ability | able | abortion | absolutely | ... |
|-----------------------|----------|----------|----------|------------|----------|----------|----------|----------|----------|------------|-----|
| topic_0 | 0.026367 | 1.325318 | 0.013818 | 0.207274 | 0.137403 | 0.124484 | 0.060471 | 0.183156 | 0.010594 | 0.017037 | ... |
| topic_1 | 0.004674 | 0.000000 | 0.005777 | 0.031004 | 0.111459 | 0.024079 | 0.000000 | 0.033290 | 0.000805 | 0.001714 | ... |
| 2 rows × 1186 columns | | | | | | | | | | | |

Row of H = Word profile that corresponds to each of the coordinates/topics.

NMF Explainability

Goal: Try to come up with a W and H matrix such that $X \approx W \cdot H$

X_1

| | sick | country | daughter | interested | attend | debate | ability | able | abortion | absolutely | ... |
|--|---------|---------|----------|------------|----------|--------|---------|------|----------|------------|-----|
| Why I joined | | | | | | | | | | | |
| Sick of seeing the country torn apart. | 0.92369 | 0.38314 | 0.000000 | 0.000000 | 0.000000 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | ... |

Coordinates in

W_1

\approx

0.036^* [
 $+0^*$ [

H

| | sick | country | daughter | interested | attend | debate | ability | able | abortion | absolutely | ... |
|---------|----------|----------|----------|------------|----------|----------|----------|----------|----------|------------|-----|
| topic_0 | 0.026367 | 1.325318 | 0.013818 | 0.207274 | 0.137403 | 0.124484 | 0.060471 | 0.183156 | 0.010594 | 0.017037 | ... |
| topic_1 | 0.004674 | 0.000000 | 0.005777 | 0.031004 | 0.111459 | 0.024079 | 0.000000 | 0.033290 | 0.000805 | 0.001714 | ... |

2 rows \times 1186 columns

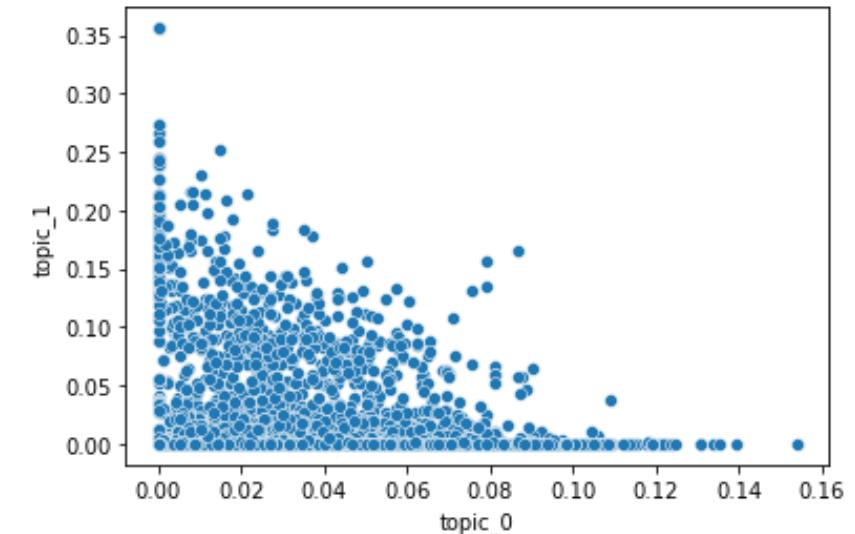
NMF – Analyses

- K=2 topics
- K=5 topics
- K=10 topics
- K=20 topics

NMF k=2 Topics

W

| | topic_0 | topic_1 |
|---|----------|----------|
| Why I joined | | |
| Sick of seeing the country torn apart. | 0.036337 | 0.000000 |
| My daughter became interested in it and I've attended several debates. | 0.013701 | 0.008992 |
| ... | ... | ... |
| I heard the founder speak on a podcast and was impressed. | 0.010300 | 0.012336 |
| Watched video and talked to a friend that just joined also. Very inspiring and hopeful. | 0.007422 | 0.102740 |



H

| | ability | able | abortion | absolutely | academic | accept | access | accomplish | achieve | act | ... |
|---------|----------|----------|----------|------------|----------|----------|----------|------------|----------|----------|-----|
| topic_0 | 0.060471 | 0.183156 | 0.010594 | 0.017037 | 0.008593 | 0.035665 | 0.010109 | 0.021122 | 0.019638 | 0.013284 | ... |
| topic_1 | 0.000000 | 0.033290 | 0.000805 | 0.001714 | 0.000000 | 0.000000 | 0.000833 | 0.001190 | 0.001150 | 0.003560 | ... |

Topic 0

topic_0

Top Topic Words

```
{'want': 1.387, 'country': 1.325, 'divide': 0.895, 'people': 0.879, 'help': 0.808, 'political': 0.743, 'polarization': 0.729, 'work': 0.68, 'learn': 0.66, 'need': 0.647, 'way': 0.518, 'believe': 0.515, 'understand': 0.498, 'conversation': 0.444, 'concern': 0.417, 'angel': 0.394, 'heal': 0.385, 'view': 0.382, 'community': 0.356, 'division': 0.352, 'bridge': 0.349, 'think': 0.349, 'talk': 0.347, 'bring': 0.339, 'listen': 0.338, 'different': 0.333, 'feel': 0.327, 'desire': 0.308, 'organization': 0.286, 'democracy': 0.282, 'issue': 0.279, 'solution': 0.274, 'hear': 0.259, 'family': 0.258, 'support': 0.233, 'love': 0.232, 'politic': 0.231, 'nation': 0.23, 'concerned': 0.22, 'dialogue': 0.218}
```

Top Weighted Reasons for this Topic

to better understand people of opposing views
i think it's important to try and understand people that are different than myself
i want to understand other people's thinking
i want to understand what motivates people whose views are different from mine
we need to listen to each other i want to try to understand people's whose views i do not share
to make our country better to understand better people with opposing views
most people want this
i want to better understand people with differing political views to find common ground
i'd like to learn how to debate with people who have different views than mine
trying to understand different points of view
the desire to talk with people i disagree with politically in a safe environment with people interested in listening and trying to understand each other i live in a bubble of people who agree with me i'm around people who disagree but there is never a good context
i believe we need more dialogue between people with different points of view
i want to get better at having difficult conversations and understanding other people's points of view
wanted to find a way to have civil conversations with people of different views
trying to understand why people think differently than i do politically
a desire to connect and work with people who see people over politics
i love america and i feel we're at a crossroads to keep this country democratic and free i recognize that most people to love this country we just have different takes on what should be done i want to understand the other side and i want other people to understand also
getting better understanding of red leaning people
i want to connect with more people from the other side i want to be better at listening to and understanding the views and feelings of people who have different political perspectives than me
desire to help bring people together for understanding

Topic 1

topic_1

Top Topic Words

```
{'friend': 2.433, 'recommend': 0.377, 'family': 0.365, 'tell': 0.352, 'member': 0.328, 'recommendation': 0.246, 'hear': 0.188, 'angel': 0.176, 'group': 0.151, 'good': 0.135, 'join': 0.124, 'workshop': 0.119, 'attend': 0.111, 'involve': 0.109, 'organization': 0.106, 'talk': 0.102, 'invite': 0.089, 'conservative': 0.088, 'refer': 0.083, 'politic': 0.075, 'red': 0.074, 'liberal': 0.073, 'lean': 0.071, 'political': 0.065, 'volunteer': 0.062, 'year': 0.061, 'blue': 0.058, 'encourage': 0.057, 'discussion': 0.054, 'event': 0.053, 'suggest': 0.052, 'speak': 0.051, 'conversation': 0.05, 'belief': 0.043, 'read': 0.042, 'lose': 0.042, 'colleague': 0.042, 'close': 0.042, 'dear': 0.041, 'invitation': 0.041}
```

Top Weighted Reasons for this Topic

a **friend**

my **friend** john rymers

encouragement from a **friend**

a **friend**

a **friend**

a **friend**

my **friend** at lwvsfc

friend

nancy cunningham is a **member** and **friend**

friends

friends

a **friend**

a **friend**

a **friend**

referral from a **friend**

friend

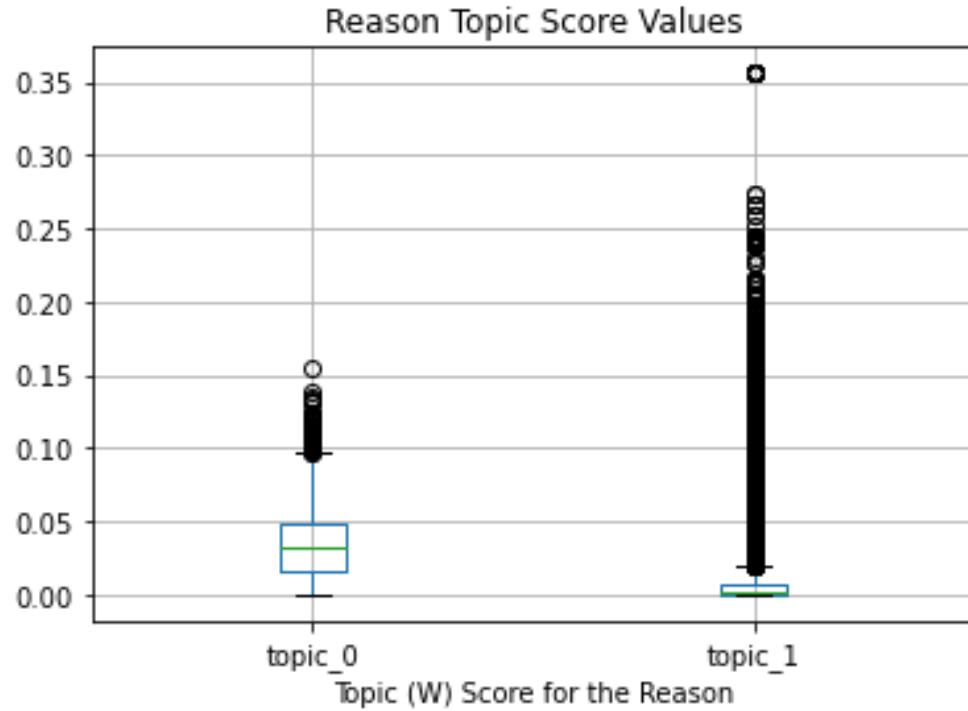
a **friend**

friend

friends at my church kirk of kildaire presbyterian church in cary nc

friend

Topic Uniqueness

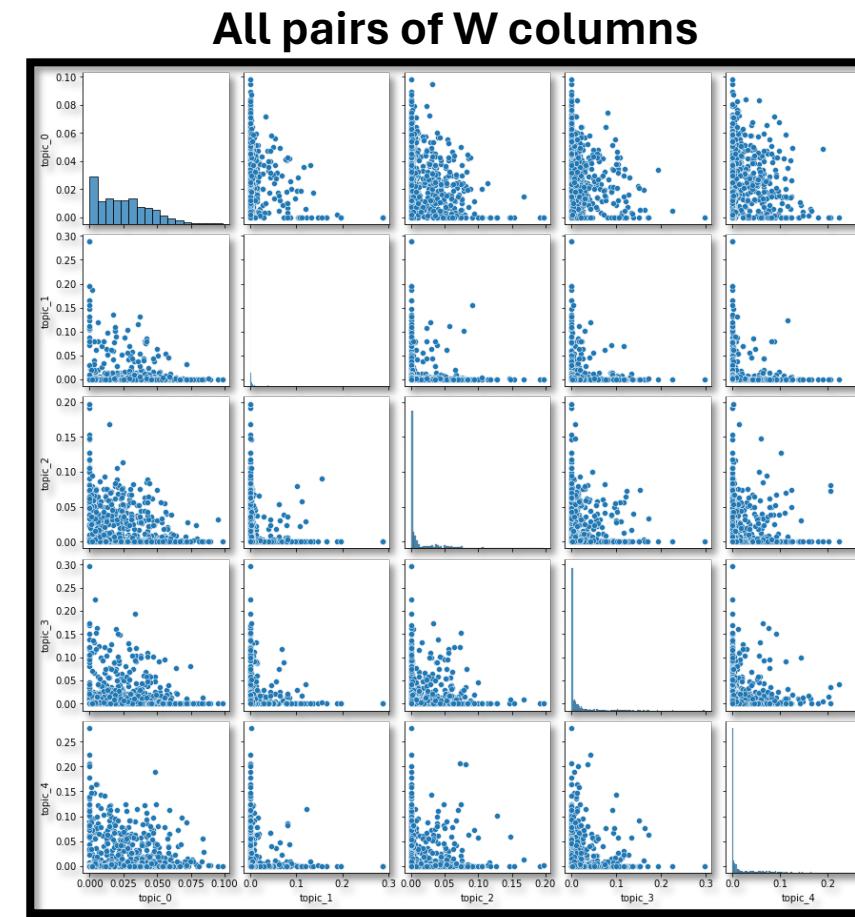


- **General Topic 0:** Most reasons have some topic 0 score.
- **Most Unique Non-General Topic 1:** Most reasons, except for a few, have a very low topic 1 score.

NMF k=5 Topics

W

| | topic_0 | topic_1 | topic_2 | topic_3 | topic_4 |
|------|----------|----------|----------|----------|----------|
| 0 | 0.000000 | 0.000000 | 0.078755 | 0.000000 | 0.000332 |
| 1 | 0.024969 | 0.000000 | 0.000000 | 0.001976 | 0.000000 |
| 2 | 0.020892 | 0.020882 | 0.007337 | 0.012981 | 0.001099 |
| 3 | 0.020938 | 0.013017 | 0.000087 | 0.009794 | 0.000000 |
| 4 | 0.020486 | 0.006341 | 0.000000 | 0.000000 | 0.000000 |
| ... | ... | ... | ... | ... | ... |
| 7216 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 |
| 7217 | 0.025977 | 0.012577 | 0.032373 | 0.007716 | 0.000000 |
| 7218 | 0.018058 | 0.001068 | 0.000000 | 0.002670 | 0.000000 |
| 7219 | 0.020213 | 0.003366 | 0.000000 | 0.000000 | 0.000000 |
| 7220 | 0.018079 | 0.077536 | 0.000000 | 0.000000 | 0.000000 |



Does W have a clustering structure?

H

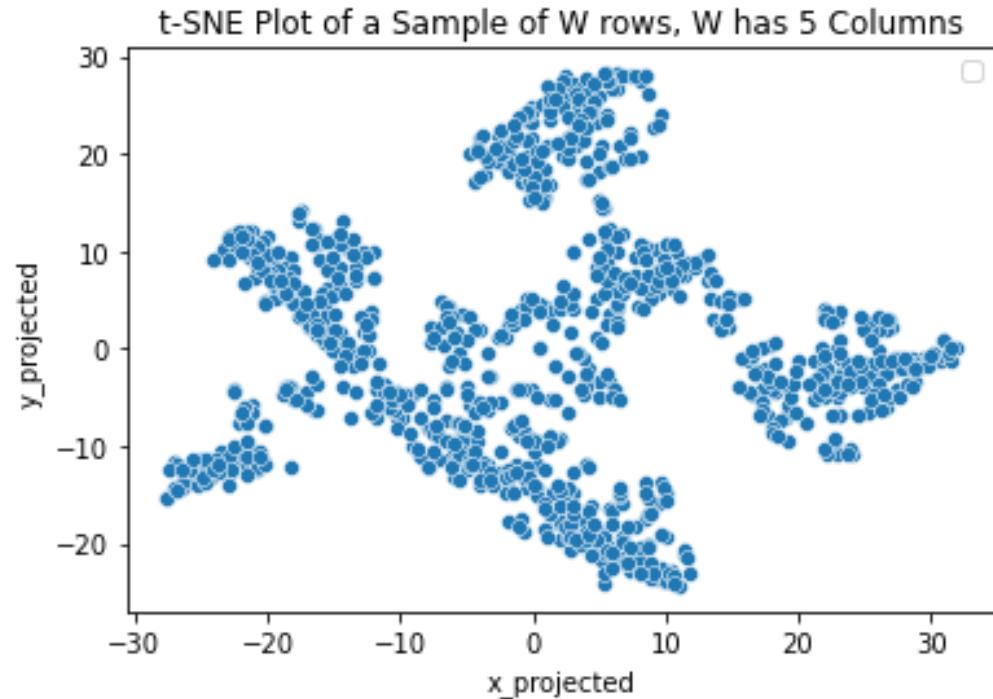
| | ability | able | abortion | absolutely | academic | accept | access | accomplish | achieve | act |
|---------|----------|----------|----------|------------|----------|----------|----------|------------|----------|----------|
| topic_0 | 0.066664 | 0.210437 | 0.016900 | 0.025226 | 0.013496 | 0.024869 | 0.014899 | 0.042229 | 0.028912 | 0.015285 |
| topic_1 | 0.000000 | 0.034032 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.002771 |
| topic_2 | 0.037478 | 0.000000 | 0.001345 | 0.000000 | 0.000000 | 0.004787 | 0.000000 | 0.000000 | 0.004407 | 0.014720 |
| topic_3 | 0.000000 | 0.000000 | 0.001504 | 0.010739 | 0.000000 | 0.000000 | 0.002281 | 0.000000 | 0.000000 | 0.000000 |
| topic_4 | 0.002716 | 0.114899 | 0.000000 | 0.000000 | 0.001960 | 0.031885 | 0.001850 | 0.000000 | 0.001718 | 0.000000 |

T-SNE Plot of W Matrix

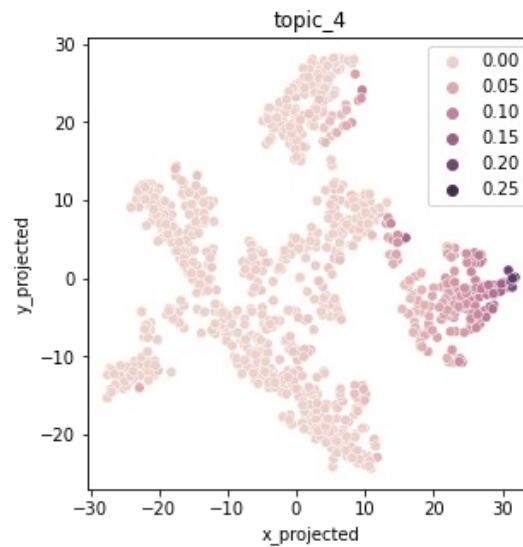
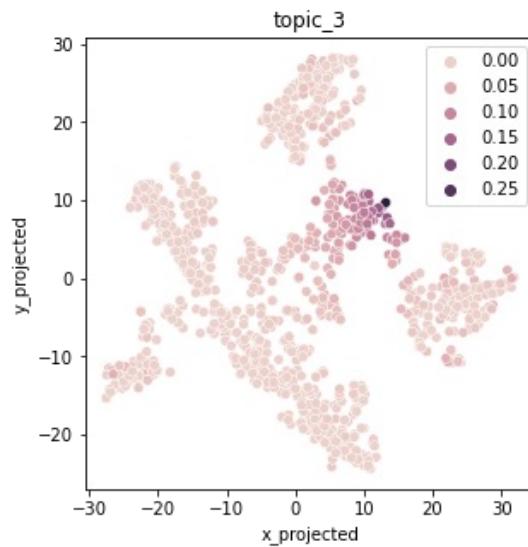
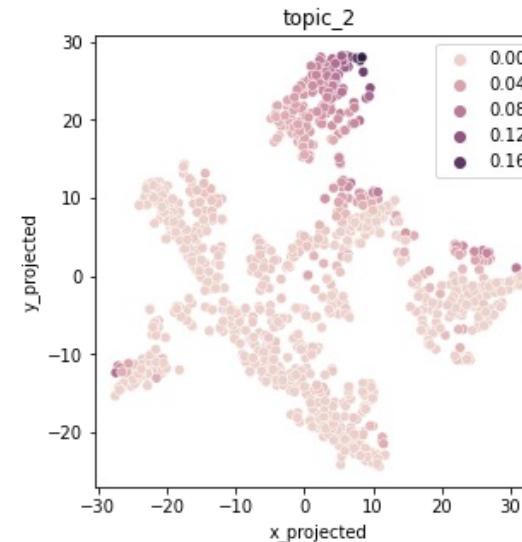
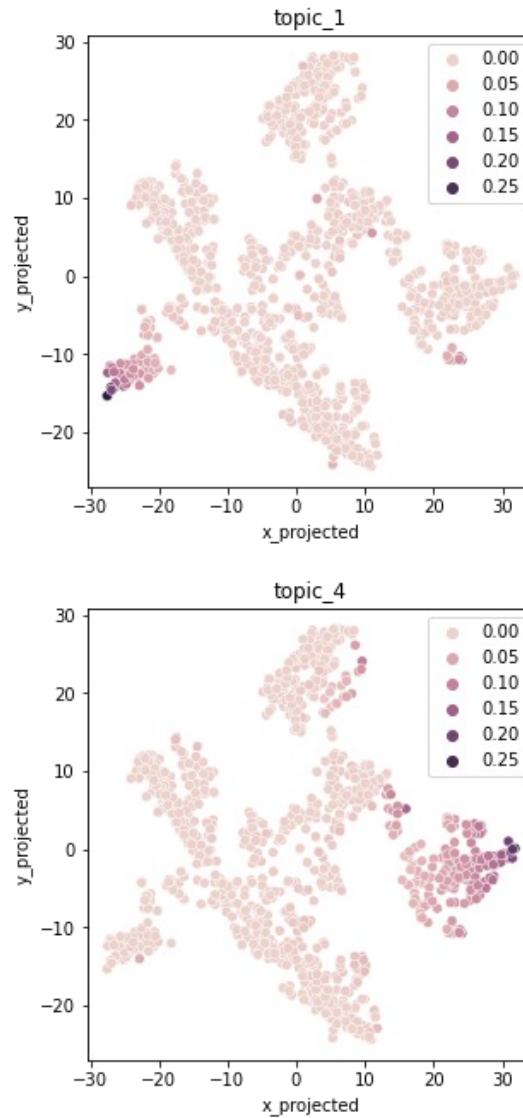
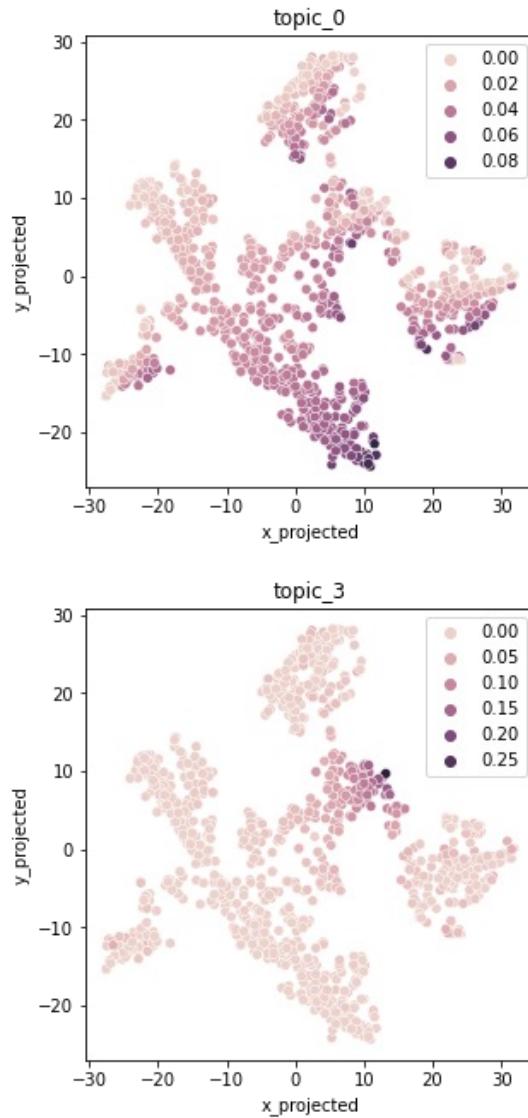
W

| | topic_0 | topic_1 | topic_2 | topic_3 | topic_4 |
|------|------------------|----------|----------|----------|----------|
| 0 | 0.000000 | 0.000000 | 0.078755 | 0.000000 | 0.000332 |
| 1 | 0.024969 | 0.000000 | 0.000000 | 0.001976 | 0.000000 |
| 2 | 0.020892 | 0.020882 | 0.007337 | 0.012981 | 0.001099 |
| 3 | 0.020938 | 0.013017 | 0.000087 | 0.009794 | 0.000000 |
| 4 | 0.020486 | 0.006341 | 0.000000 | 0.000000 | 0.000000 |
| ... | ... | ... | ... | ... | ... |
| 7216 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 |
| 7217 | 0.025977 | 0.012577 | 0.032373 | 0.007716 | 0.000000 |
| 7218 | 0.018058 | 0.001068 | 0.000000 | 0.002670 | 0.000000 |
| 7219 | 0.020213 | 0.003366 | 0.000000 | 0.000000 | 0.000000 |
| 7220 | 0.018079 | 0.077536 | 0.000000 | 0.000000 | 0.000000 |
| 7221 | rows × 5 columns | | | | |

*2-d representation
of W that preserves
the clustering
structure of W*



T-SNE Plot of W Matrix



- **General Topic 0:** Most reasons have some topic 0 score.
- **Unique Topic 1(2,3,4):** Some reasons have a high topic 1(2,3,4) score, but low/0 scores for all other topics. This forms a cluster seen in the t-SNE plot.

Topic 0

topic_0

```
{'people': 1.315, 'work': 1.286, 'need': 1.024, 'learn': 0.866, 'angel': 0.862, 'believe': 0.853, 'way': 0.738, 'conversation': 0.632, 'talk': 0.609, 'listen': 0.569, 'hear': 0.565, 'view': 0.56, 'organization': 0.546, 'think': 0.527, 'different': 0.507, 'workshop': 0.477, 'feel': 0.466, 'understand': 0.436, 'mission': 0.421, 'issue': 0.394, 'attend': 0.389, 'political': 0.384, 'good': 0.379, 'community': 0.368, 'member': 0.361, 'bring': 0.36, 'year': 0.36, 'important': 0.356, 'discussion': 0.35, 'interested': 0.323, 'know': 0.316, 'love': 0.314, 'time': 0.307, 'group': 0.299, 'dialogue': 0.294, 'politician': 0.29, 'join': 0.27, 'try': 0.268, 'support': 0.265, 'red': 0.255}
```

i believe people need to learn to listen and talk respectfully with love

i need to get better at trying to work talk with people who don t agree with me

i believe we need more dialogue between people with different points of view

i believe in the goodness of people both red and blue i have a knack for talking to people in a non confrontational way i see a real need for people of all persuasions to work together to strengthen our democracy in the coming years

i would like to be part of an organization that works to move us away from political polarization and violence and towards greater understanding and peace in 2017 i was trying to think about how to bring people with political differences together and find common ground i often have thought about how our country could be healed and how to help people forgive one another and move forward together it seems that braver angels is doing many of these things and is full of people who know more about it than me so i am interested in joining and learning more

learned about braver angels from an interview with one of your people on the nation speaks show on ntd tv i liked what i heard and would like to learn how to communicate better in a way that is understanding of people

i believe this work of depolarization and learning how to listen and empathize with people who have different opinions then yourself is one of the most critical areas of civic work needed in our society right now i firmly believe in what i understand the guiding principles of braver angels are and have experience skill and interest in contributing to this work

i believe working together is the way to move forward

i ve honestly seen the most anyone can take in our nation it s very heartbreaking to witness our nation and it s people pitted against one another on voting measures bills that are designed to support all americans i feel and know it s my duty to make a change not for me but for all including myself i m listening and feel obligated to give back to the people their country they ve worked so hard for i ve wasted enough time already and was so blinded by my own prejudices and fears i know nothing can happen overnight and it s going to take the fight of my life to earn back the trust from the voters but i ve turned the page and this volunteer opportunity found me at the right time i ve been up pleading and praying to god to please just direct me where to go and start i like to still believe in miracles and have always relied on my feelings to make important governing decisions that is the fabric of our communities i sincerely agree that it s selfish to not take a serious look at these issues with further depth and to know basic american civics to make sound and educated and responsible decisions that are serious to the people i don t have all the answers and have seemed to have lost my way because life isn t always so kind i m at this point where i just give up trying to control everything in my own way which is self serving i m willing and have decided to listen even if i hate it i will attend workshops courses and training seminars to educate and refresh my so fragile

Topic 1

```
topic_1
{'friend': 3.126, 'recommend': 0.478, 'family': 0.475, 'tell': 0.424, 'recommendation': 0.322, 'member': 0.317, 'group': 0.1
42, 'good': 0.131, 'hear': 0.12, 'involve': 0.114, 'refer': 0.105, 'join': 0.104, 'invite': 0.103, 'conservative': 0.101, 'p
olitical': 0.094, 'liberal': 0.087, 'politic': 0.082, 'talk': 0.077, 'lean': 0.075, 'volunteer': 0.06, 'suggest': 0.06, 'tir
ed': 0.059, 'encourage': 0.059, 'organization': 0.054, 'angel': 0.054, 'red': 0.054, 'lose': 0.053, 'close': 0.052, 'invitat
ion': 0.052, 'dear': 0.051, 'division': 0.048, 'argument': 0.048, 'belief': 0.047, 'neighbor': 0.045, 'colleague': 0.045, 's
pectrum': 0.042, 'state': 0.041, 'experience': 0.035, 'discussion': 0.035, 'share': 0.035}

-----
a friend was transformed via a ba book study in california
-----
friend
-----
my friend john rymers
-----
a friend
-----
my friend at lwvsfc
-----
encouragement from a friend
-----
referral from a friend
-----
friend
-----
friend
-----
friends at my church kirk of kildaire presbyterian church in cary nc
-----
friends
-----
a friend
```

Topic 2

```
topic_2
{'country': 2.365, 'polarization': 1.928, 'concern': 1.159, 'division': 0.628, 'concerned': 0.318, 'political': 0.284, 'democracy': 0.264, 'increase': 0.256, 'need': 0.207, 'tired': 0.182, 'heal': 0.171, 'future': 0.166, 'extreme': 0.151, 'desire': 0.146, 'problem': 0.131, 'divisiveness': 0.131, 'state': 0.13, 'reduce': 0.122, 'deep': 0.12, 'fear': 0.116, 'politic': 0.111, 'help': 0.104, 'make': 0.1, 'deeply': 0.099, 'current': 0.098, 'frustration': 0.097, 'worry': 0.095, 'family': 0.093, 'solution': 0.093, 'lack': 0.086, 'dangerous': 0.083, 'polarize': 0.082, 'violence': 0.08, 'address': 0.079, 'believe': 0.078, 'world': 0.075, 'feel': 0.074, 'grow': 0.074, 'apart': 0.073, 'face': 0.072}

-----
polarization in our country
-----
frightened by the worsening polarization in our country
-----
the polarization in our country
-----
i am concerned about the polarization of the country
-----
concern about political polarization in our country
-----
i am very concerned about the polarization of our country and i want to do something about it
-----
concern about the current polarization in or country
-----
hyperpolarization of the country
-----
discord in the country
-----
existential angst about our country
-----
the mess our country is in
-----
get this country back together
-----
```

Topic 3

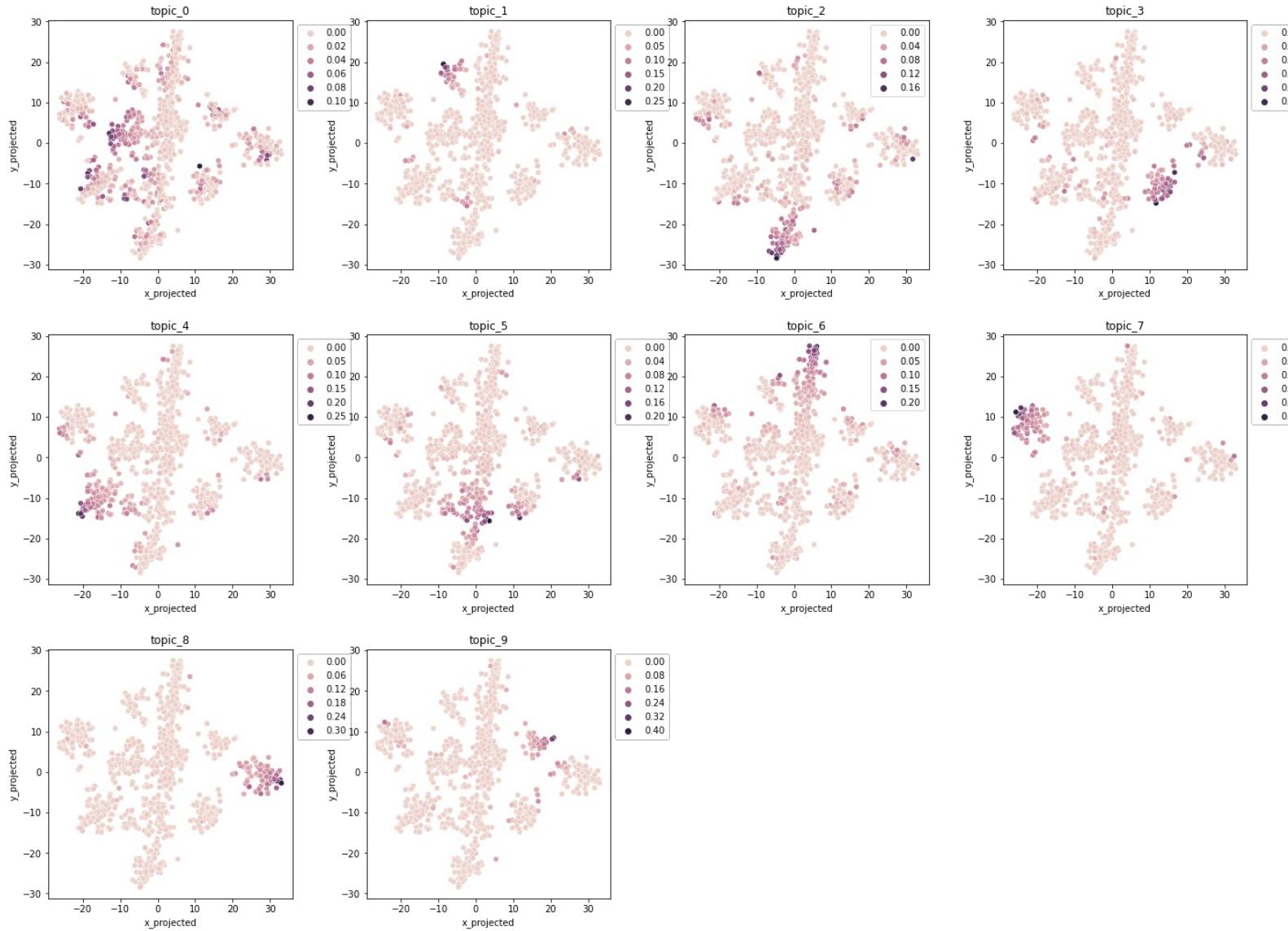
```
topic_3

{'divide': 2.277, 'bridge': 0.965, 'political': 0.77, 'help': 0.414, 'family': 0.289, 'heal': 0.276, 'desire': 0.217, 'nation': 0.187, 'community': 0.156, 'country': 0.142, 'partisan': 0.141, 'way': 0.132, 'unite': 0.1, 'interested': 0.097, 'look': 0.09, 'gap': 0.089, 'deep': 0.085, 'bridging': 0.081, 'current': 0.078, 'democracy': 0.062, 'try': 0.062, 'great': 0.061, 'concerned': 0.06, 'cultural': 0.059, 'grow': 0.056, 'deeply': 0.054, 'skill': 0.054, 'party': 0.052, 'discourse': 0.052, 'belief': 0.047, 'focus': 0.047, 'difference': 0.046, 'spectrum': 0.045, 'politically': 0.045, 'seek': 0.043, 'church': 0.042, 'blue': 0.041, 'dangerous': 0.04, 'build': 0.04, 'common': 0.037}
-----
our national divide
-----
bridge the divide
-----
kare 11 divided usa
-----
to do my part to bridge the divide
-----
bridge the divide
-----
we are too divided to last
-----
bridging the political divide
-----
the political divide
-----
i hope to help bridge the political divide in the us
-----
desire to bridge the divides
-----
bridging the divide
-----
desire to bridge divides
-----
desire to bridge divides
-----
```

Topic 4

```
topic_4
{'want': 2.486, 'help': 0.801, 'understand': 0.432, 'solution': 0.334, 'learn': 0.293, 'heal': 0.289, 'people': 0.194, 'conversation': 0.174, 'depolarize': 0.151, 'support': 0.146, 'country': 0.141, 'bring': 0.125, 'view': 0.117, 'able': 0.115, 'problem': 0.095, 'contribute': 0.093, 'different': 0.093, 'world': 0.078, 'reduce': 0.075, 'community': 0.072, 'nation': 0.07, 'communicate': 0.064, 'perspective': 0.063, 'democracy': 0.062, 'participate': 0.06, 'dialogue': 0.057, 'civil': 0.054, 'respect': 0.053, 'differently': 0.053, 'tired': 0.053, 'thing': 0.052, 'involve': 0.051, 'think': 0.05, 'skill': 0.046, 'divisiveness': 0.045, 'listen': 0.044, 'know': 0.042, 'effort': 0.041, 'come': 0.041, 'depolarization': 0.039}
-----
i want to one america
-----
i want to make a difference
-----
i want to understand the other side and i want to help others do the same
-----
want to help de-polalarize america
-----
i want what braver angels wants
-----
i just want to understand and i want to e part of the solution not part of the problem
-----
i want to do something to help our country
-----
i want to understand the other side better
-----
i want to understand the other side better
-----
want to better understand politics in american culture
-----
most people want this
-----
want to see our country move forward
-----
i want our country to do better
-----
i want to help heal the divid
-----
i don t want to be angry i want to do something
-----
```

NMF 10 Topics



T-SNE Plot of the W Matrix

- Many specific topics (1, 4, 7, 8, 9)
- Some more general topics (0)

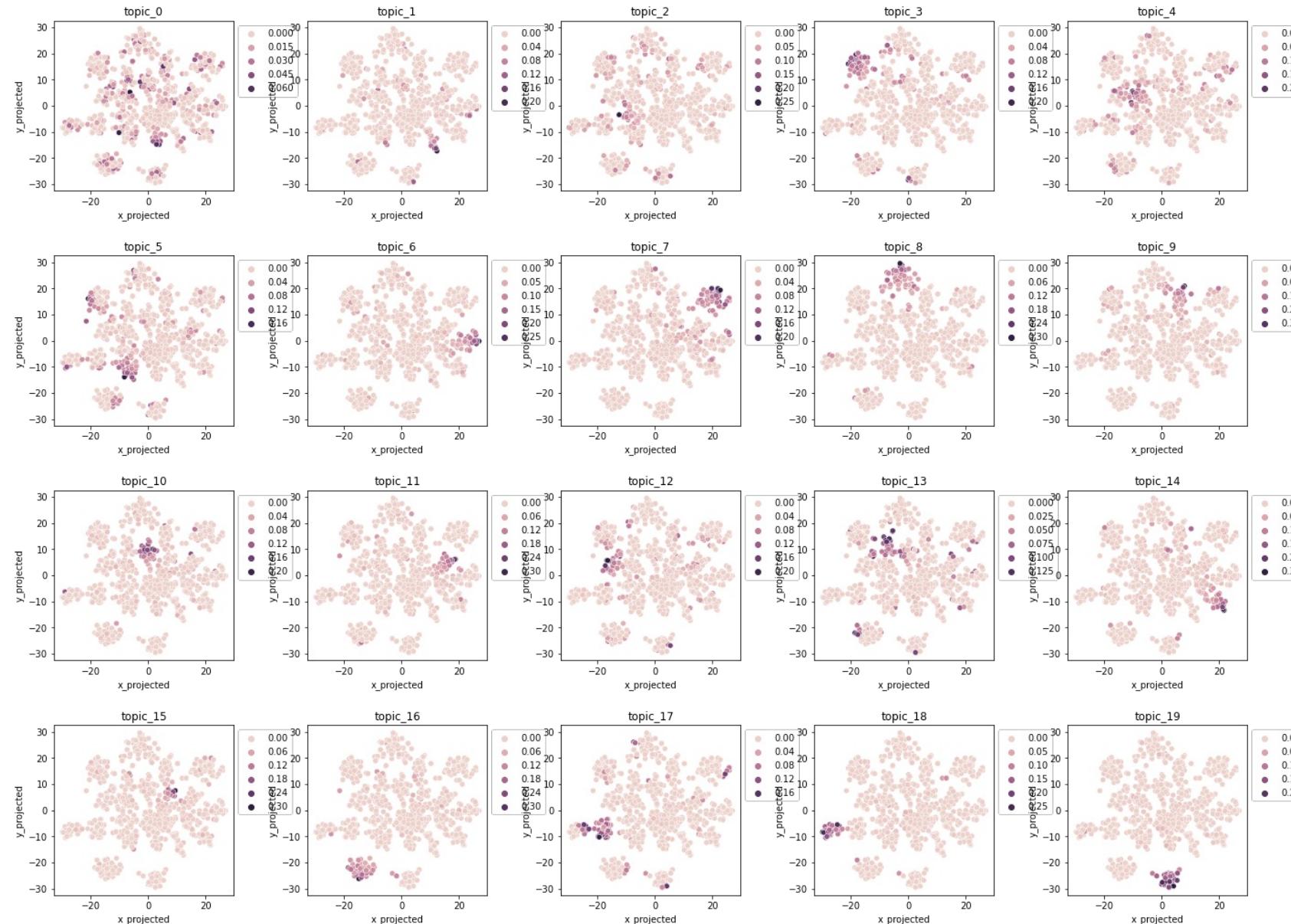
Topic Descriptions

**Saw topics
with these
top general
words in NMF
with 5 topics**

New
topics

```
-----  
topic_0  
{'people': 2.635, 'learn': 1.916, 'view': 1.247, 'conversation': 1.236, 'understand': 1.115, 'different': 1.11, 'talk': 1.08  
4, 'listen': 0.971, 'way': 0.864, 'think': 0.669}  
-----  
topic_1  
{'friend': 3.367, 'recommend': 0.505, 'family': 0.472, 'tell': 0.453, 'recommendation': 0.349, 'member': 0.23, 'good': 0.15  
9, 'group': 0.133, 'involve': 0.115, 'conservative': 0.112}  
-----  
topic_2  
{'country': 2.329, 'polarization': 2.171, 'concern': 1.22, 'division': 0.436, 'concerned': 0.321, 'increase': 0.284, 'democr  
acy': 0.203, 'future': 0.15, 'extreme': 0.148, 'politic': 0.128}  
-----  
topic_3  
{'divide': 2.484, 'bridge': 1.063, 'help': 0.41, 'heal': 0.301, 'country': 0.273, 'way': 0.201, 'family': 0.197, 'nation':  
0.165, 'partisan': 0.159, 'community': 0.15}  
-----  
topic_4  
{'want': 2.733, 'help': 0.92, 'solution': 0.38, 'heal': 0.324, 'understand': 0.262, 'support': 0.183, 'depolarize': 0.174,  
'country': 0.155, 'problem': 0.127, 'contribute': 0.11}  
-----  
topic_5  
{'political': 2.341, 'desire': 0.614, 'current': 0.465, 'division': 0.462, 'discourse': 0.357, 'family': 0.34, 'climate': 0.  
266, 'dialogue': 0.251, 'issue': 0.242, 'tired': 0.234}  
-----  
topic_6  
{'workshop': 1.402, 'angel': 1.227, 'attend': 1.101, 'hear': 0.634, 'member': 0.617, 'participate': 0.42, 'event': 0.397, 'j  
oin': 0.338, 'blue': 0.337, 'organization': 0.323}  
-----  
topic_7  
{'work': 2.349, 'important': 0.303, 'organization': 0.214, 'support': 0.179, 'good': 0.178, 'community': 0.171, 'love': 0.16  
6, 'year': 0.149, 'way': 0.127, 'great': 0.126}  
-----  
topic_8  
{'need': 2.785, 'country': 0.305, 'heal': 0.253, 'dialogue': 0.25, 'feel': 0.205, 'nation': 0.166, 'listen': 0.122, 'great':  
0.12, 'believe': 0.11, 'change': 0.107}  
-----  
topic_9  
{'mission': 1.739, 'believe': 1.627, 'organization': 0.184, 'strongly': 0.126, 'agree': 0.114, 'angel': 0.103, 'democracy':  
0.087, 'depolarize': 0.079, 'support': 0.076, 'way': 0.064}
```

NMF 20 Topics



T-SNE Plot of the W Matrix

- Some general topics (ex: 0)
- More specific topics (ex: 3)

Topic Descriptions

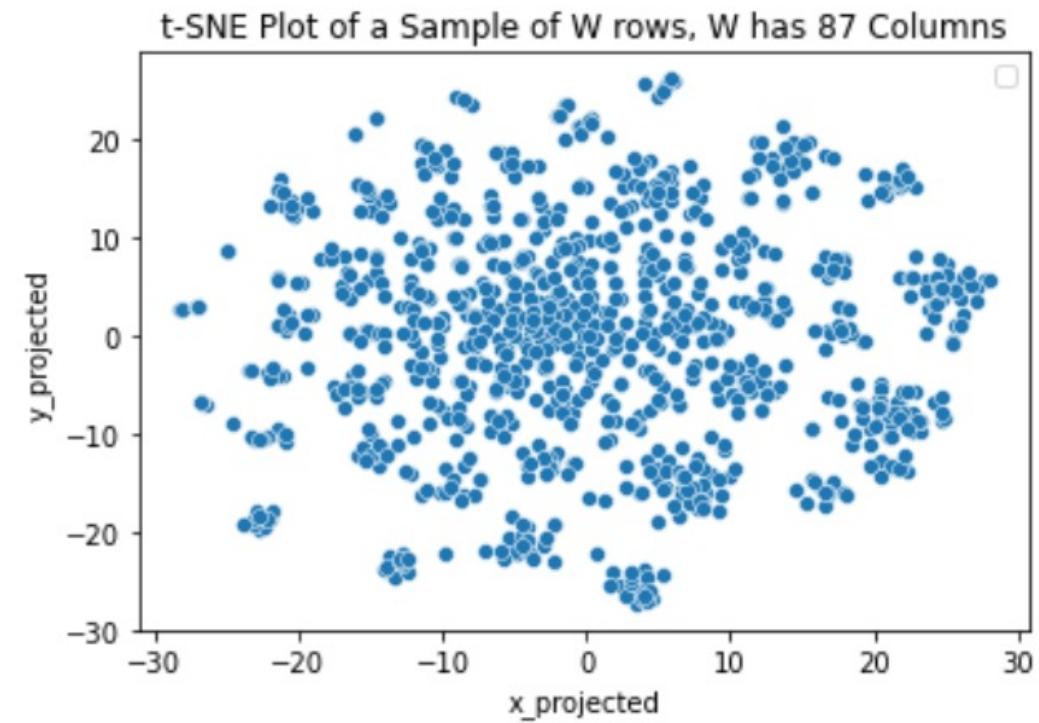
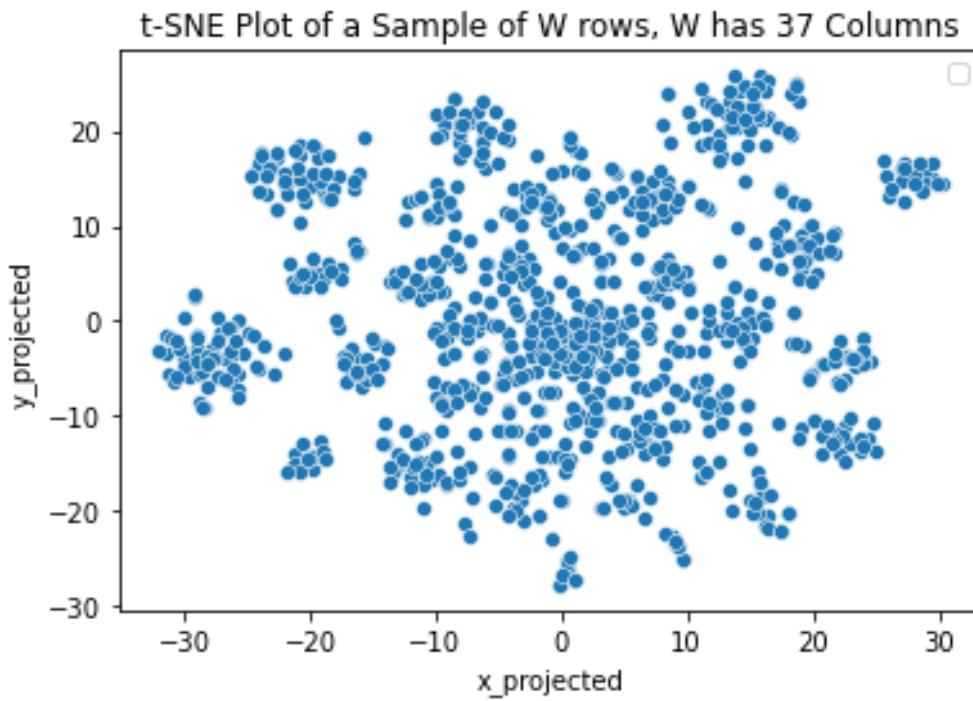
Saw topics in
bold with same
top general
words in NMF
with 10 topics

New topics

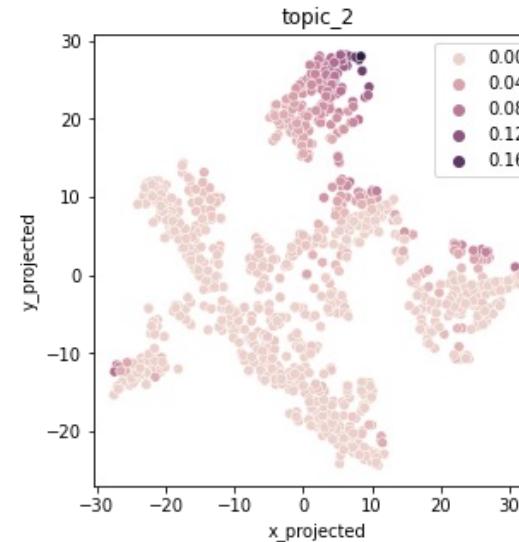
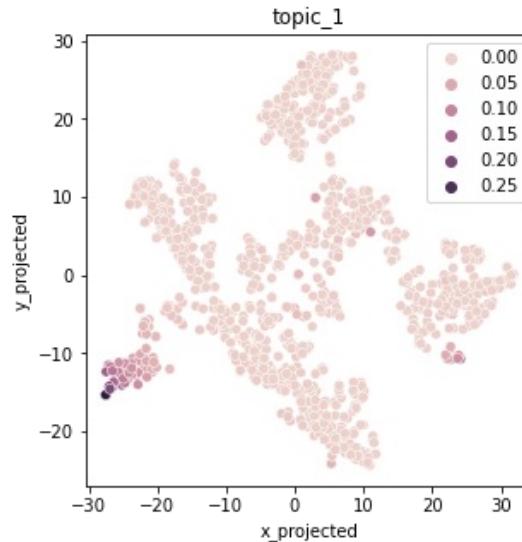
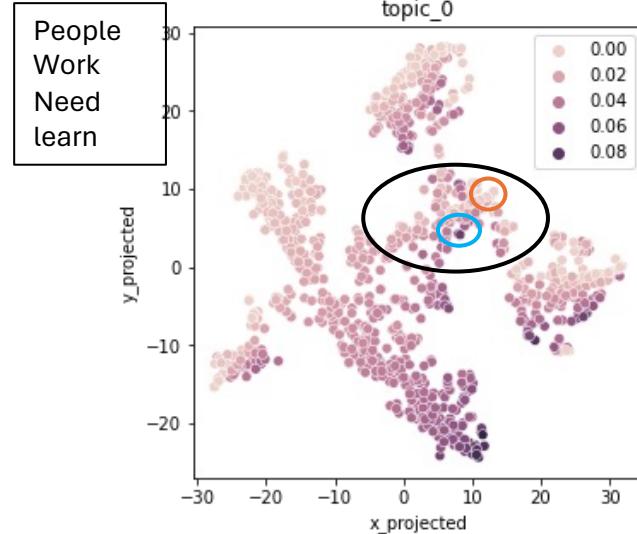
topic_0 {'people': 5.36, 'understand': 2.524, 'view': 2.233, 'different': 1.894, 'think': 1.116, 'bring': 1.075}
topic_1 {'friend': 4.164, 'recommend': 0.614, 'tell': 0.57, 'recommendation': 0.436, 'family': 0.395, 'good': 0.195}
topic_2 {'country': 3.54, 'division': 0.887, 'concerned': 0.242, 'future': 0.182, 'heal': 0.155, 'solution': 0.152}
topic_3 {'divide': 2.714, 'bridge': 1.166, 'family': 0.211, 'partisan': 0.168, 'nation': 0.146, 'way': 0.137}
topic_4 {'want': 3.263, 'solution': 0.452, 'understand': 0.232, 'support': 0.224, 'problem': 0.154, 'contribute': 0.123}
topic_5 {'political': 3.163, 'current': 0.586, 'discourse': 0.442, 'division': 0.384, 'climate': 0.34, 'issue': 0.333}
topic_6 {'workshop': 2.131, 'attend': 1.573, 'angel': 0.688, 'blue': 0.492, 'event': 0.445, 'red': 0.437}
topic_7 {'work': 2.605, 'important': 0.334, 'organization': 0.217, 'support': 0.205, 'angel': 0.204, 'community': 0.187}
topic_8 {'need': 3.137, 'dialogue': 0.307, 'feel': 0.232, 'nation': 0.176, 'heal': 0.14, 'great': 0.136}
topic_9 {'mission': 1.849, 'believe': 1.716, 'angel': 0.17, 'organization': 0.166, 'strongly': 0.132, 'agree': 0.117}
topic_10 {'talk': 2.654, 'listen': 0.6, 'politic': 0.565, 'able': 0.235, 'way': 0.233, 'right': 0.203}
topic_11 {'member': 2.632, 'family': 0.781, 'community': 0.385, 'angel': 0.307, 'church': 0.21, 'join': 0.166}
topic_12 {'help': 3.118, 'heal': 1.207, 'depolarize': 0.408, 'community': 0.261, 'democracy': 0.23, 'nation': 0.227}
topic_13 {'learn': 3.258, 'listen': 0.557, 'skill': 0.272, 'organization': 0.266, 'different': 0.205, 'view': 0.187}
topic_14 {'hear': 2.589, 'angel': 0.637, 'podcast': 0.608, 'organization': 0.541, 'speak': 0.397, 'interview': 0.218}
topic_15 {'article': 2.562, 'read': 0.938, 'way': 0.734, 'book': 0.307, 'newspaper': 0.286, 'group': 0.193}
topic_16 {'conversation': 2.585, 'civil': 0.318, 'difficult': 0.2, 'productive': 0.194, 'interested': 0.18, 'facilitate': 0.174}
topic_17 {'polarization': 3.305, 'increase': 0.323, 'tired': 0.265, 'concerned': 0.258, 'reduce': 0.24, 'problem': 0.13}
topic_18 {'concern': 2.784, 'democracy': 0.447, 'politic': 0.243, 'nation': 0.166, 'deep': 0.144, 'grow': 0.13}
topic_19 {'desire': 2.524, 'understand': 0.267, 'dialogue': 0.205, 'strong': 0.198, 'promote': 0.142, 'difference': 0.123}

How many clusters?

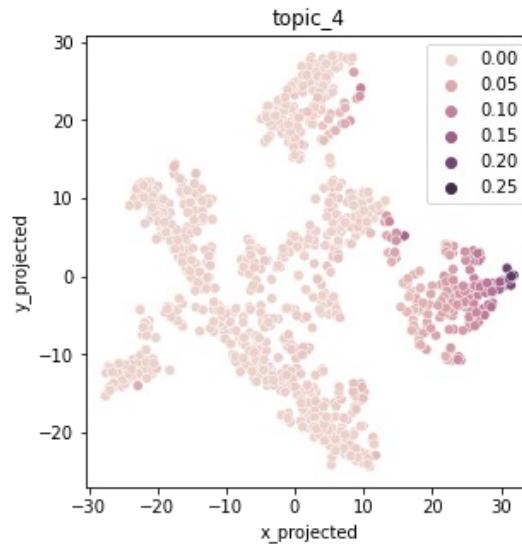
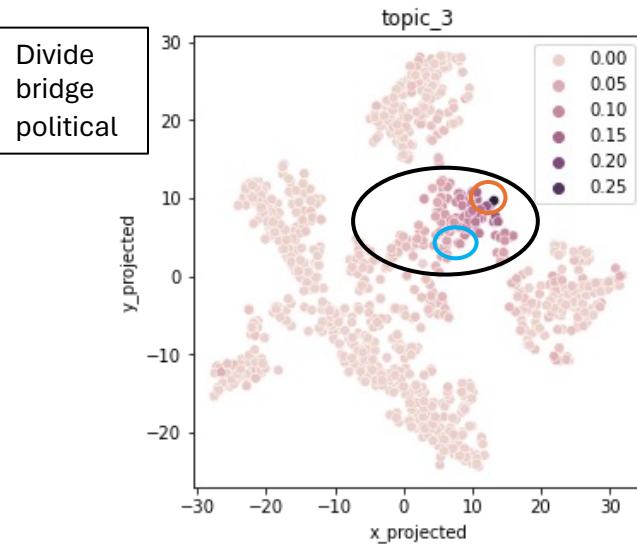
- As you increase the number of topics in NMF, the number of observed clusters in the W t-SNE plot increases. Some of these clusters have fewer observations assigned to them.
- Did you want to look for more than 20? Would it be useful?



Learn more about the clusters?



- Some clusters of reasons have observations that are comprised of multiple topics.
- **Orange point:** probably just about “bridging the political divide”



- **Blue point:** probably BOTH talks about “bridging the political divide” and “people needing to work together”.

TF-IDF vs. BERT

- **On one hand:**

- Do we want/need to use BERT embeddings? May yield more sophisticated topic identification.
- Could use BERT AND these techniques.

- **On the other hand:**

- A lot of the responses to “Why I joined” are
 - short (median 17 words)
 - non-complex, and
 - seems to be described pretty well by their high scoring topic words.

```
age . 0.050, learn . 0.055, build . 0.054}
-----
bridge the divide
-----
to do my part to bridge the divide
-----
bridge the divide
-----
our national divide
-----
we are too divided to last
-----
kare 11 divided usa
-----
desire to bridge divides
-----
desire to bridge divides
-----
desire to bridge the divides
-----
bridging the divide
-----
bridging the divide
-----
being part of helping to bridge the divide
-----
i want to bridge the divide
-----
bridging the political divide
-----
the terrible divide in the country
-----
the terrible divide in our country
-----
i hope to help bridge the political divide in the us
-----
the need to bridge the divide
-----
i want to help bridge the divide
```

LDA Results – k=2 Topics

| alpha | beta | Topic_1_Words | Topic_2_Words |
|-------|------|---|--|
| 0.1 | 0.1 | <p>[‘desire’, ‘view’, ‘mission’, ‘different’, ‘bring’, ‘discussion’, ‘skill’, ‘great’, ‘event’, ‘depolarize’, ‘civil’, ‘communicate’, ‘podcast’, ‘recommend’, ‘church’, ‘point’, ‘civil discourse’, ‘really’, ‘agree’, ‘idea’, ‘share’, ‘deeply’, ‘discuss’, ‘lean’, ‘common ground’, ‘engage’, ‘book’, ‘perspective’, ‘improve’, ‘strong’, ‘respectful’, ‘relationship’, ‘meet’, ‘unity’, ‘seek’, ‘hold’, ‘depolarization’, ‘solve’, ‘use’, ‘unite’]</p> | <p>[‘citizen’, ‘interview’, ‘frustration’, ‘anger’, ‘morning’, ‘place’, ‘differently’, ‘membership’, ‘active’, ‘folk’, ‘environment’, ‘project’, ‘culture’, ‘hatred’, ‘government’, ‘cbs sunday’, ‘real’, ‘class’, ‘dangerous’, ‘colleague’, ‘child’, ‘present’, ‘refer’, ‘united state’, ‘day’, ‘rhetoric’, ‘renew’, ‘run’, ‘couple’, ‘news’, ‘email’, ‘moderate’, ‘rancor’, ‘lobby’, ‘invitation’, ‘diversity’, ‘overcome’, ‘college’, ‘animosity’, ‘cultural’]</p> |
| | | <p>The first set of words seems to focus on constructive actions and the promotion of dialogue and understanding to depolarize or reduce polarization. Words like "desire," "mission," "discussion," "depolarize," "civil," "communicate," "civil discourse," "agree," "common ground," "engage," and "unity" suggest a proactive approach to addressing differences and fostering a respectful and collaborative environment.</p> | <p>On the other hand, the second set of words appears to describe a more reactive or negative state of affairs in relation to polarization. Words such as "frustration," "anger," "hatred," "dangerous," "rhetoric," "rancor," "animosity," and "cultural" indicate the presence of strong negative emotions and potentially divisive societal issues. This set also includes words like "interview," "membership," "government," "cbs sunday," which might suggest a context where these sentiments are being expressed or addressed, possibly in media or organizational settings.</p> |

LDA – k=8 Topics

| Topic 1 | Topic 2 | Topic 3 | Topic 4 | Topic 5 | Topic 6 | Topic 7 | Topic 8 |
|---|---|--|---|--|---|---|--|
| ['civil discourse', 'morning', 'approach', 'focus', 'student', 'project', 'cbs sunday', 'similar', 'moderator', 'dangerous', 'truly', 'present', 'refer', 'united state', 'offer', 'threat', 'train', 'effective', 'ba', 'john wood', 'sad', 'org', 'facilitator', 'course', 'resource', 'mediator', 'foster', 'compassionate', 'crisis', 'commitment', 'regardless', 'facilitation', 'distress', 'advocate', 'quite', 'method', 'diversity', 'background', 'express', 'son'] | ['meet', 'enjoy', 'online', 'divisive', 'strongly', 'healing', 'exist', 'diverse', 'individual', 'cultural', 'empathy', 'host', 'progress', 'disturb', 'belong', 'sound', 'accept', 'faith', 'justice', 'curious', 'building', 'personally', 'away', 'search', 'reality', 'vision', 'progressive', 'fix', 'desperately', 'peaceful', 'motivation', 'commonality', 'service', 'hopeful', 'potential', 'behavior', 'racism', 'human being', 'tolerance', 'interesting'] | ['recommend', 'solve', 'address', 'recommendation', 'positive', 'differently', 'stop', 'session', 'fellow', 'zoom', 'commit', 'rhetoric', 'conference', 'impact', 'politician', 'demonize', 'sister', 'decrease', 'sponsor', 'huge', 'daughter', 'large', 'bipartisan', 'unable', 'attempt', 'involvement', 'various', 'ideological', 'happier podcast', 'admire', 'unify', 'accomplish', 'trouble', 'hateful', 'destructive', 'week', 'damage', 'team', 'wide', 'resonate', 'pandemic', 'participant', 'require'] | ['tell', 'podcast', 'invite', 'membership', 'colleague', 'husband', 'renew', 'documentary', 'ask', 'alliance', 'little', 'retire', 'newspaper', 'voter', 'message', 'fit', 'music', 'non', 'struggle', 'home', 'founder', 'demonization', 'send', 'undivided attention', 'motivated', 'old', 'excite', 'contribution', 'identify', 'convention', 'figure', 'affiliation', 'marriage', 'wife', 'dear', 'draw', 'resonate', 'pandemic', 'participant', 'require'] | ['oppose', 'training', 'apart', 'violence', 'worry', 'one another', 'hatred', 'meaningful', 'inability', 'destroy', 'direction', 'news', 'effectively', 'rancor', 'lobby', 'overcome', 'animosity', 'citizens climate', 'respectfully', 'far', 'willing', 'race', 'hostility', 'tear', 'enemy', 'compassion', 'building bridge', 'move forward', 'sick', 'involved', 'polarizing', 'aisle', 'survive', 'strengthen', 'sit', 'reconciliation', 'hurt', 'essential', 'manner', 'peacemaker'] | ['article', 'story', 'past', 'invitation', 'label', 'despair', 'monica guzman', 'deal', 'allow', 'civil war', 'preserve', 'law', 'teacher', 'discourage', 'completely', 'webinar', 'language', 'magazine', 'reference', 'function', 'republic', 'helpful', 'youtube', 'weekend', 'newsletter', 'civilized', 'dominate', 'wing', 'diminish', 'tv', 'rebuild', 'mother', 'perfect', 'incredibly', 'monthly', 'civic engagement', 'governance', 'resolution', 'earth', 'lifelong'] | ['divisiveness', 'agree', 'frustration', 'gap', 'fact', 'dialog', 'social media', 'space', 'role', 'disagreement', 'church', 'interview', 'topic', 'new', 'healthy', 'civic', 'child', 'passionate', 'write', 'consider', 'rural', 'research', 'relative', 'misinformation', 'tend', 'thinking', 'town', 'clear', 'white', 'nature', 'key', 'avoid', 'congregation', 'upset', 'campaign', 'lie', 'danger', 'useful', 'religious', 'remain', 'specifically', 'ground', 'david blankenhorn', 'reform', 'fearful'] | ['church', 'interview', 'topic', 'new', 'healthy', 'civic', 'child', 'passionate', 'write', 'consider', 'rural', 'introduce', 'generation', 'gain', 'polarity', 'general', 'passion', 'actively', 'ten percent', 'rotary', 'subject', 'free', 'result', 'fan', 'club', 'ideal', 'education', 'song', 'excited', 'receive', 'rational', 'ideology', 'plan', 'discover', 'kid', 'board', 'renewal', 'self', 'coach', 'pastor'] |
| Topic 1: Educational Initiatives and Discourse This topic focuses on structured discourse and education as a means to tackle political polarization. It includes terms related to academic settings, training, and fostering understanding through civil discourse and mediation, suggesting a formal or institutional approach to depolarization efforts. | Topic 2: Inclusive Community Building Words in this topic point towards creating inclusive, healing, and empathetic community environments. It emphasizes the importance of unity, tolerance, and diverse cultural appreciation, aiming to build a more harmonious society through positive personal interactions. | Topic 3: Political Engagement and Bipartisanship This topic seems to center around the political process, engagement, and the search for bipartisan solutions. It suggests a pragmatic approach to politics, with an emphasis on recommendations, addressing ideological divides, and creating impactful changes through collaboration. | Topic 4: Personal Stories and Media The fourth topic incorporates personal outreach and storytelling, possibly through various media like podcasts, documentaries, and newspapers. It underscores the role of personal narratives and media in changing perceptions and fostering a broader understanding of societal issues. | Topic 5: Conflict Resolution and Reconciliation This set of words relates to addressing direct conflict, overcoming animosity, and promoting reconciliation. It includes a focus on training and education to navigate and resolve interpersonal and societal conflicts, aiming for a more peaceful coexistence. | Topic 6: Information Dissemination and Historical Context The sixth topic is about sharing information and understanding historical contexts. It features words related to communication mediums like articles and webinars, and suggests a reflective approach, looking at past events and promoting civic engagement and governance to inform current practices. | Topic 7: Dialogue and Social Media Here, the emphasis is on dialogue, particularly in the digital space, to bridge gaps and counteract divisiveness. The presence of terms like "social media," "dialog," and "collaboration" points towards leveraging online platforms to facilitate discussions and reduce misunderstandings. | Topic 8: Community and Faith-Based Initiatives The final topic suggests a focus on faith-based and rural community initiatives, possibly linking religious values with civic actions. Words like "church," "pastor," and "faith" imply that spiritual communities might play a role in promoting unity and addressing polarization. |