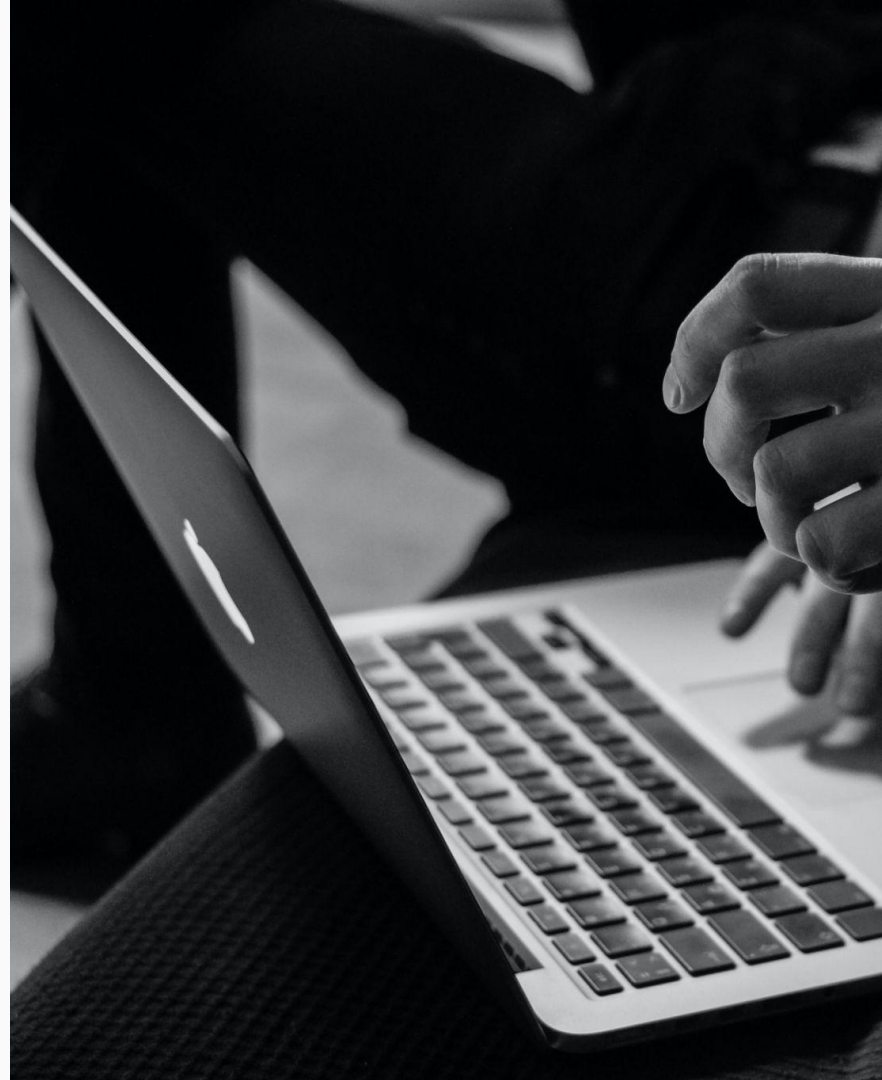# Conceptualizing Online Support Networks

For Neurodevelopmental Disorders

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Recap

Analyzing r/ADHD subreddit, a peer-support forum for people with ADHD.

How does the structure of this community and conversation trends reflect support group dynamics and varied perceptions of ADHD?

Finding 1

The network structure has several key opinion leaders with high degree centrality and high betweenness centrality

Finding 2

Submissions and especially comments are skewed toward positive sentiment

Hypotheses

H1 The subreddit will show distinct subgroups

H2 Submissions and comments will differ in terms of subjectivity

H3 Prominent topics will be work, sleep, and medication

H4 Users within the same submission will share similar sentiments

A. D. Kramer, J. E. Guillory, and J. T. Hancock. Experimental evidence of massive-scale emotional contagion through social networks. Proceedings of the National Academy of Sciences, page 201320040, 2014.

A. Park, M. Conway, and A. T. Chen. Examining thematic similarity, difference, and membership in three online mental health communities from reddit: A text mining and visualization approach. Computers in human behavior, vol. 78, pp. 98–112, 2018.

I. Himelboim, X. Xiao, D. K. L. Lee, M. Y. Wang, and P. Borah. A Social Networks Approach to Understanding Vaccine Conversations on Twitter: Network Clusters, Sentiment, and Certainty in HPV Social Networks. Health communication, vol. 35, no. 5, pp. 607–615, 2020.

J. Tang, G. Yu, and X. Yao. Emotional contagion in the online depression community. Healthcare (Basel), vol. 9, no. 12, pp. 1609-, 2021.

M. Yoo, S. Lee, and T. Ha. Semantic network analysis for understanding user experiences of bipolar and depressive disorders on Reddit. Information processing & management, vol. 56, no. 4, pp. 1565–1575, 2019.

Dataset

2023-10-10 to 2023-10-16

Submissions: 993 x 13
Comments: 10486 x 13

. . . .

2023-10-10 to 2023-11-15

Submissions: 3064 x 13
Comments: 43764 x 13

More than 3x submissions and more than 4x comments

Network Analysis

Constructing the Network

Network Metrics and Analysis

Visualization of the Communities

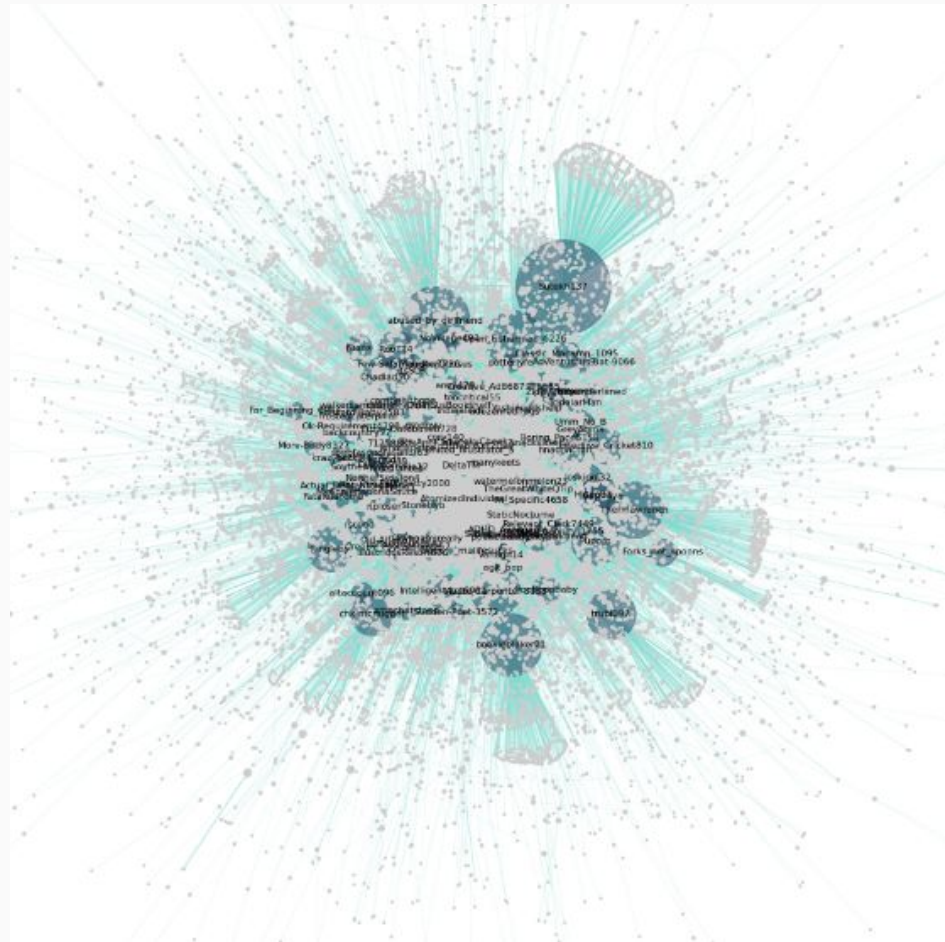**Potential Discussions**

H1 The subreddit will show distinct subgroups

Constructing the Network

Number of nodes (users): 18,096

Number of edges (interactions): 32,045

Network Metrics and Analysis

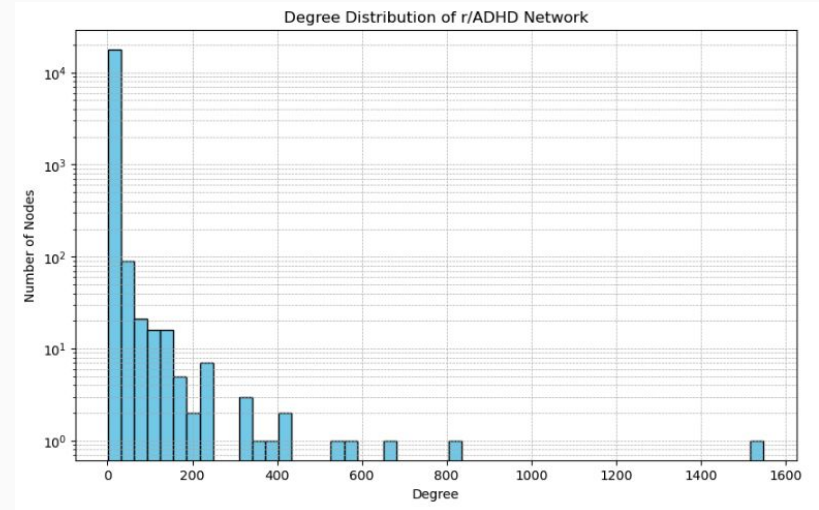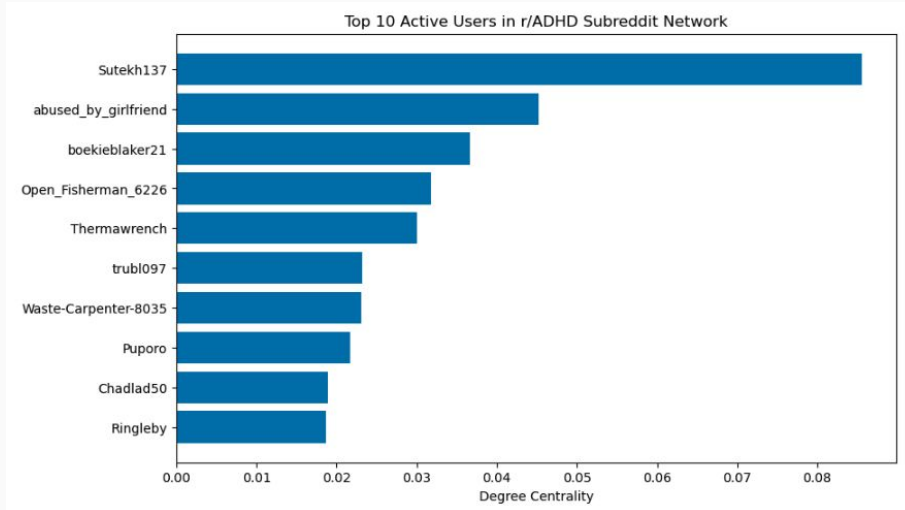Network density

Degree distribution

Centrality measures：degree centrality

Network components：number and size of connected components

```
# Calculate network density
network_density = nx.density(G)

network_density
```

9.786312977802339e-05

Top 10 Active Users in r/ADHD Subreddit Network

Degree Distribution of r/ADHD Network

Network Components

Number of Connect Components (user interactions): 221

221 groups of users who are all connected through a series of replies or interactions

Size of Largest Component: 17,605

the number of nodes (users) in the largest connected group in the network

```python
import networkx as nx
import pandas as pd

data = pd.read_csv('comm557_network_df.csv')

# Create a graph from the data
G = nx.from_pandas_edgelist(data, 'source', 'target')
G_undirected = G.to_undirected()

# Find connected components
connected_components = list(nx.connected_components(G_undirected))
num_connected_components = len(connected_components)
largest_component = max(connected_components, key=len)
size_largest_component = len(largest_component)

# Results
print("Number of Connected Components:", num_connected_components)
print("Size of Largest Component:", size_largest_component)
```
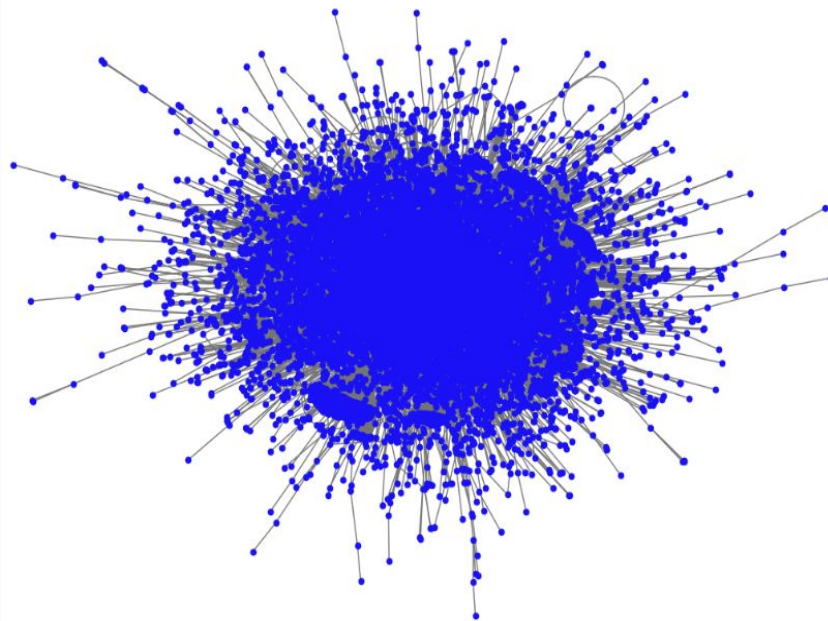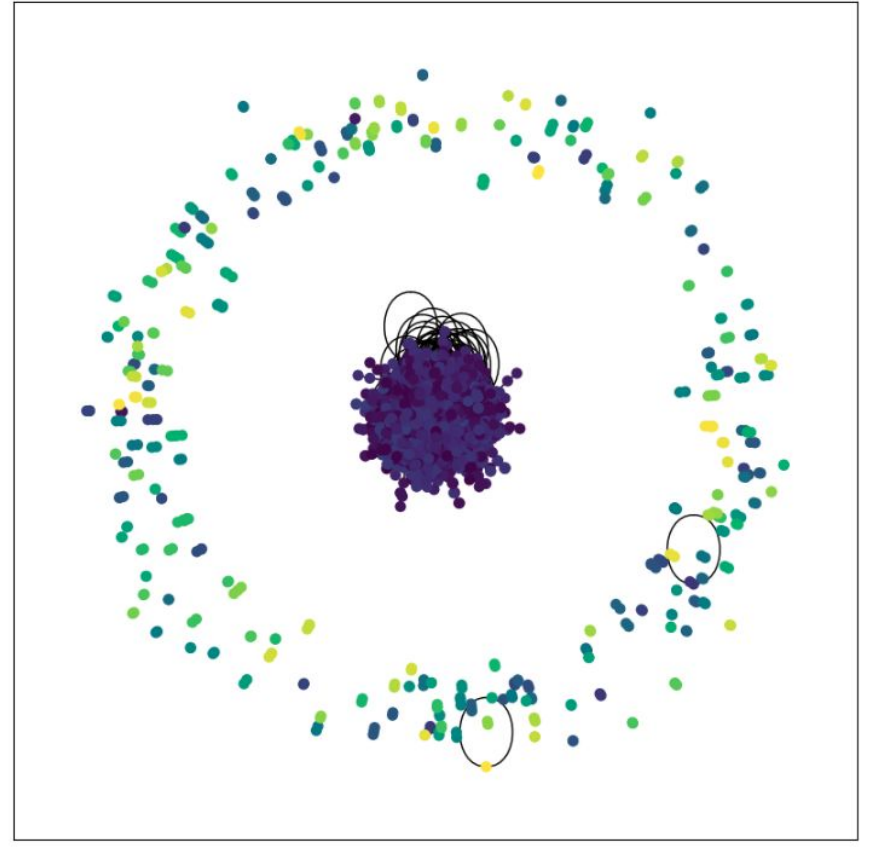
```
Number of Connected Components: 221
Size of Largest Component: 17605
```


Visualization of the Largest Connected Component in the Network

Visualization of the Communities

- A community is a group of nodes (users) that have denser connections amongst themselves compared to the rest of the network

- These dense connections often indicate shared interests or topics of discussion

Potential Topics of Discussion

Within this month:
2,305 Comments
10,800 Upvotes

Posted by u/BigBeautifulLlama 4 days ago 🔒
1.6k
Questions/Advice Is "starting over" several times in your life an ADHD thing?

Posted by u/chk-mcnugget 15 days ago 🔒
1.9k
Questions/Advice What's the worst thing a therapist has ever said to you?

I'll go first, this was my therapist before I got diagnosed by a psychiatrist

Posted by u/aspookygiraffe 11 days ago
2.1k
Articles/Information ADHD and Autistic students are 4x more likely to be arrested in schools.(US)

https://www.cbsnews.com/news/school-arrest-children-new-data/

Posted by u/Ill_Foot7693 4 days ago
2.2k
Questions/Advice My professor asked me if I had a traumatic brain injury or was in a car accident as a child. I have ADHD.

One day after class I was talking to my professor and she asked me if I had a TBI as a

Posted by u/Higgo91 24 days ago
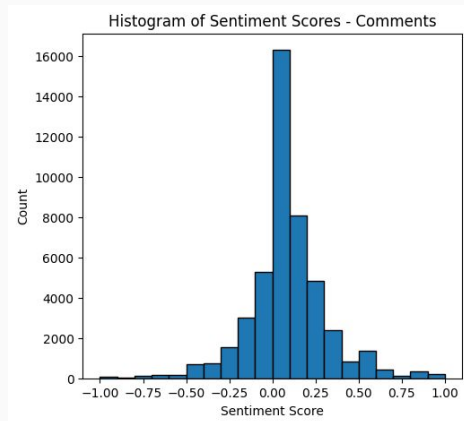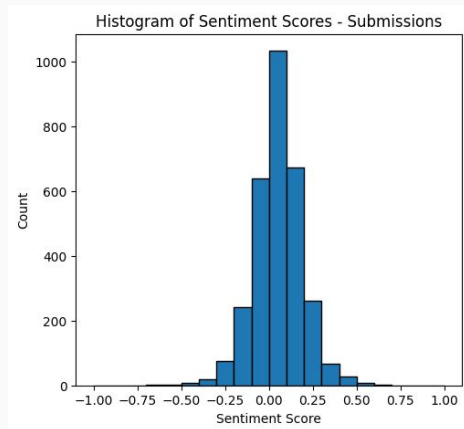3.0k
Seeking Empathy ADHD is a disability

and I'd really like this to be widely accepted by people in terms of perception. There is a lot of ableism, the idea about ADHD is confused and its very frustrating sometimes, I tend not to disclose this part of me with people, especially older people. I don't really want to make a point, just rant a little

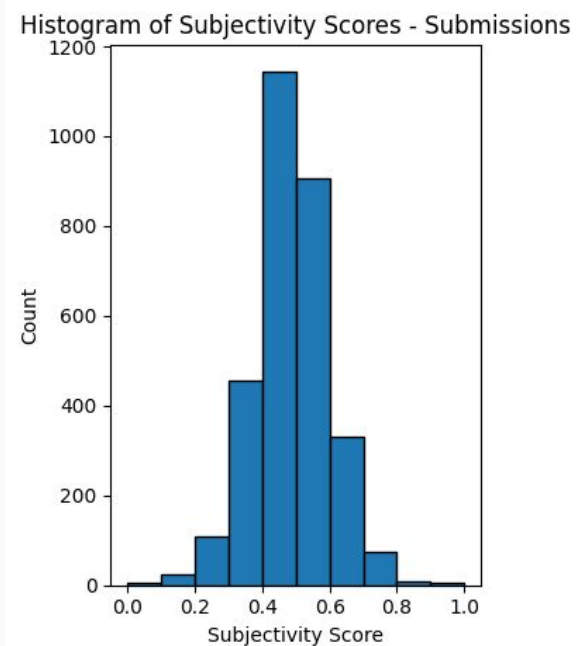Update: lmao this post blew up, it's clear that I spoke (almost) everyone's mind

💬 827 Comments   ↗ Share   🔖 Save   ...
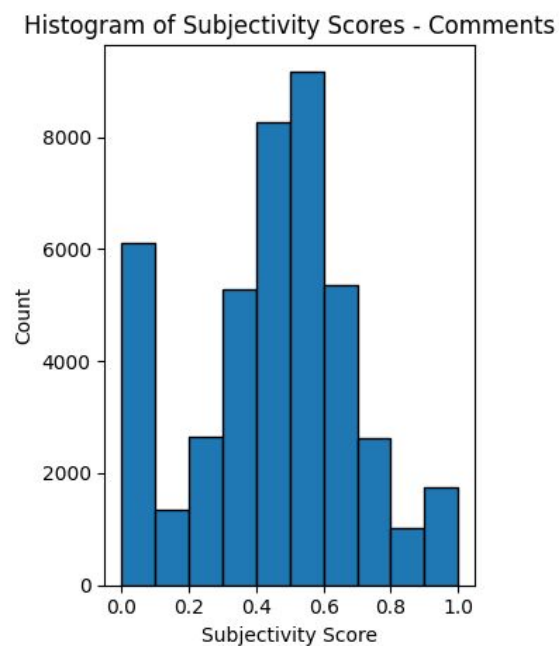
Previous Sentiment Analysis Takeaways Remain

1 Overall, among submissions and comments, sentiments are primarily positive, followed by negative then neutral

2 Average sentiment slightly positive for both, but higher for comments than submissions

3 Comments show more extreme sentiment (higher positives and lower negatives) than submissions

4 Comments are much more likely to be neutral than submissions

Histogram of Sentiment Scores - Submissions

Histogram of Sentiment Scores - Comments

Subjectivity

Histogram of Subjectivity Scores - Submissions

Avg Subjectivity: 0.49

Histogram of Subjectivity Scores - Comments
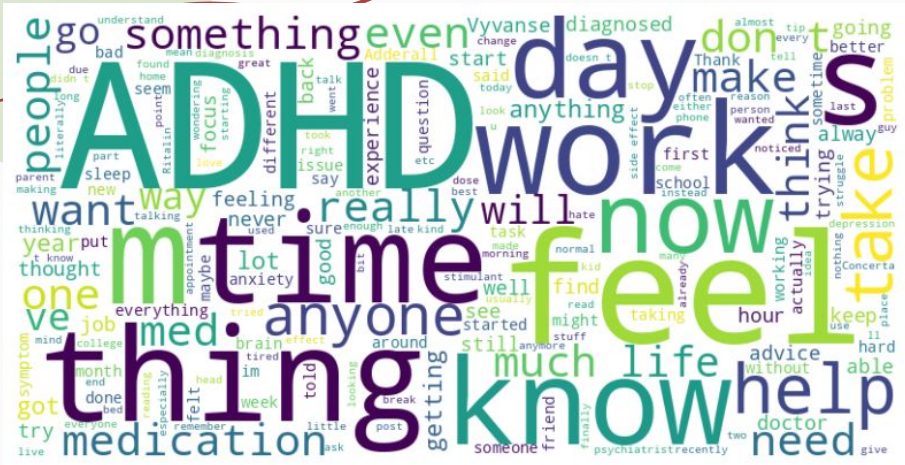
Avg Subjectivity: 0.44

H2 Submissions and comments will differ in terms of subjectivity

Submissions

Comments

H3 Prominent topics will be work, sleep, and medication

Top 3 Non-Trivial Words After "ADHD"

Submissions

1   feel: 0.86

2   work: 0.59

3   time: 0.58

Comments

1   time: 0.67

2   work: 0.67

3   feel: 0.51

- No noteworthy correlations with sentiment
- The 0.86 vs. 0.51 frequency of "feel" contributes to how comments are more likely to be neutral and tend to be lower in subjectivity
- People are more able to be neutral and objective about other's experiences than their own
- Relates to psychological principles: selective attention, self-serving bias, etc.

Opportunity for Increased Satisfaction with Medications

Medication	Avg Sentiment Score*
Vyvanse	0.036
Concerta	0.029
Adderall	0.023
Ritalin	0.023
Guanfacine	0.018
Dexedrine	0.001
Atomoxetine	-0.01
Clonidine	-0.012

*for sentences within submissions that contain said medication. Compare to 0.052 average sentiment for submissions overall
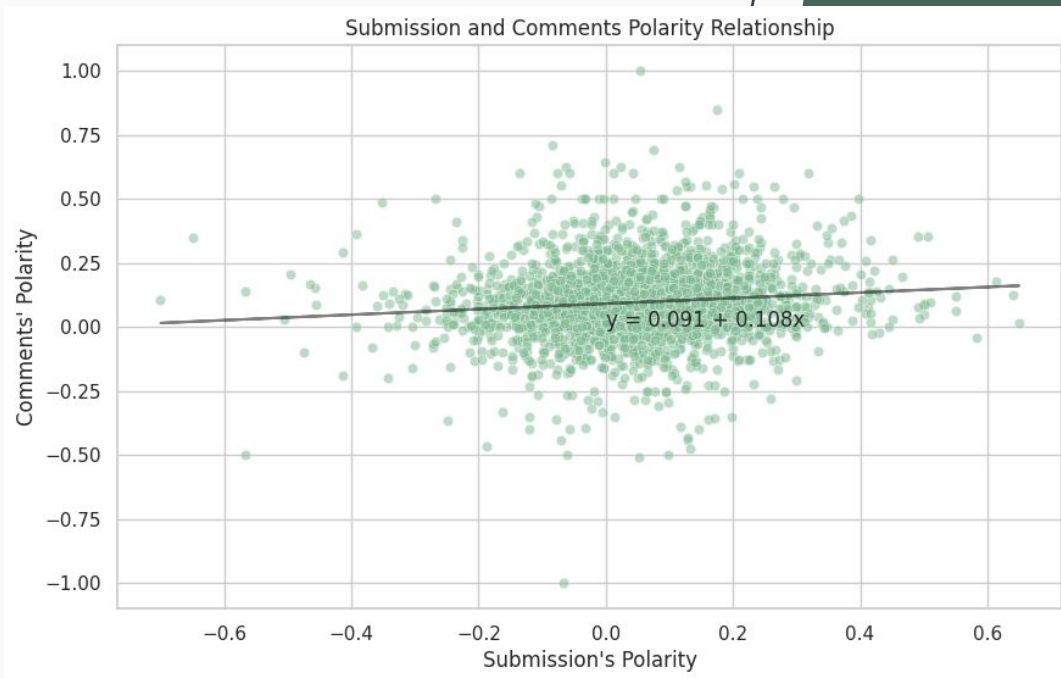
Emotional Contagion

Submissions and comments
Pearson's R: 0.108

Comments and comments
t-statistic: 0

- Weak, positive relationship
- If there is a positive tone in submissions or comments, then there also tends to be a positive tone in the comments

Submission and Comments Polarity Relationship

$y = 0.091 + 0.108x$

H4 Users within the same submission will share similar sentiments

Key Insights

People are more objective about other's experiences than their own, relating to psychological theories (selective attention, self-serving bias)

People in r/ADHD demonstrate empathy (Brown, 2011) & are willing to meet others in their emotions

Structure

Subjectivity

Medication

Emotion

People find connection within larger communities through subgroups

There is need for improvement in ADHD medication options

Thank you!

Questions?