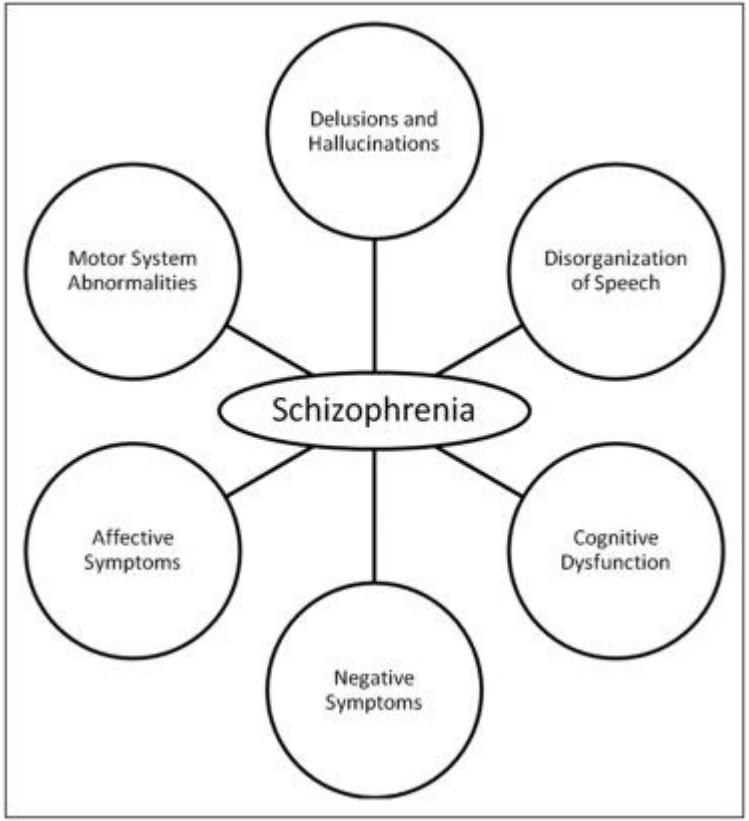
Schizo-Media

Quantifying Sentiment in Social Media Interactions with Schizophrenics

Introduction to Schizophrenia

- 1 in 100 are diagnosed with schizophrenia
- Psychotic features typically emerging mid teens to mid-30s
- Psychotic disorder with hallmark symptoms being hallucinatory.



Baggett, Travis., et al. “Schizophrenia for Primary Care Providers: How to Contribute to the Care of a Vulnerable Patient Population” *The American Journal of Medicine*

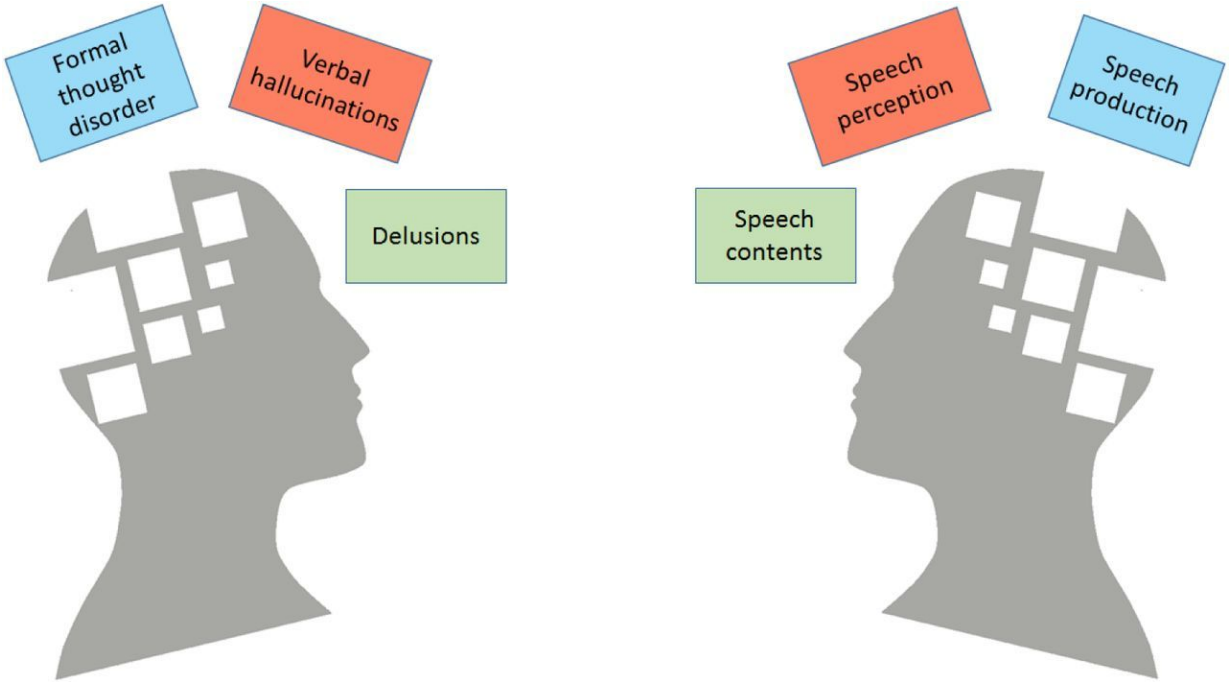


Image Source: Benítez-Burraco, Antonio, and Murphy, Elliot “Bridging the Gap Between Genes and Language deficits in Schizophrenia: an Oscillopathic Approach”

Prior Research

“Quantifying the Language of Schizophrenia on Social Media” by Margaret Mitchell, Kristy Hollingshead, and Glen Coppersmith.

Findings

- Topics such as Death, Health, and Cognitive Mechanisms
- Negated Words (e.g., won't, don't, didn't)
- Irrealis Moods (e.g., I guess, I think, I believe)

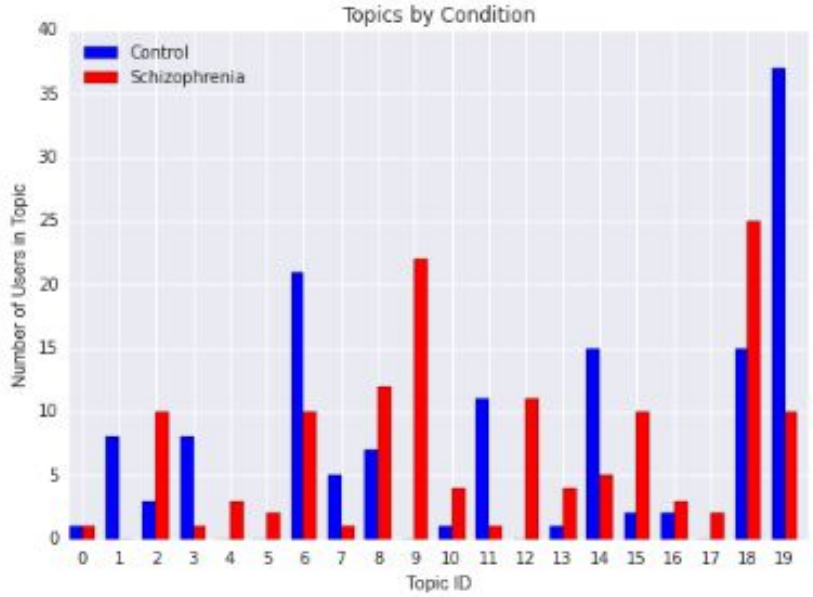


Image Source: Mitchell, Margaret., et al. "Quantifying the Language of Schizophrenia in Social Media." *Proceedings of the 2nd Workshop on Computational Linguistics and Clinical Psychology: From Linguistic Signal to Clinical Reality.*

Quantifying Sentiment of Third Parties

Image Source: https://help.twitter.com/en/using-twitter/advanced-twitter-mute-options

Is there any differing sentiment in responses to those with schizophrenia and those without? Could it be attributed to the difference in language used?

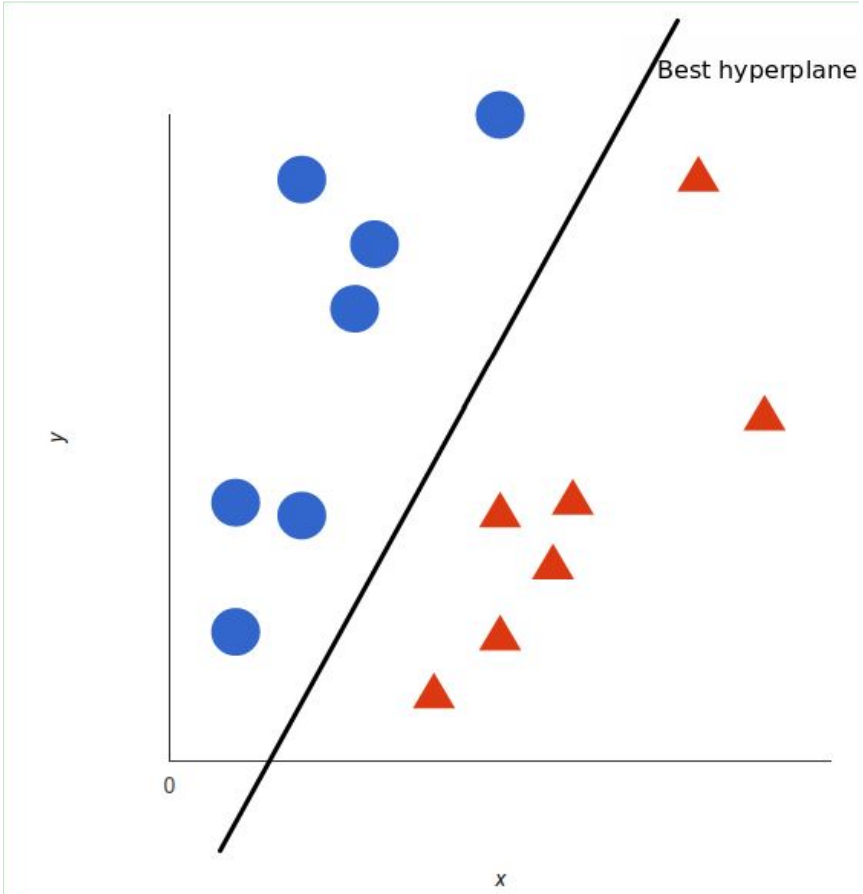
Methodology

Searching for Schizophrenia on Twitter

Aforementioned research relies completely on self admission of schizophrenia in the data collected.

What is an SVM?

- Encodes training data.
- Finds a Hyperplane between different classes of data.
- All future data is encoded and depending which side of the hyperplane it falls on, is deemed to be that class.



Multi-Class Hybrid SVM

"SeNTU: Sentiment Analysis of Tweets by Combining a Rule-based Classifier with Supervised Learning" by Prerna Chikersal, Soujanya Poria, and Erik Cambria

- Multiple feature vectors.
- Positive, Neutral, Negative classes.
- Emoji rule based algorithm.

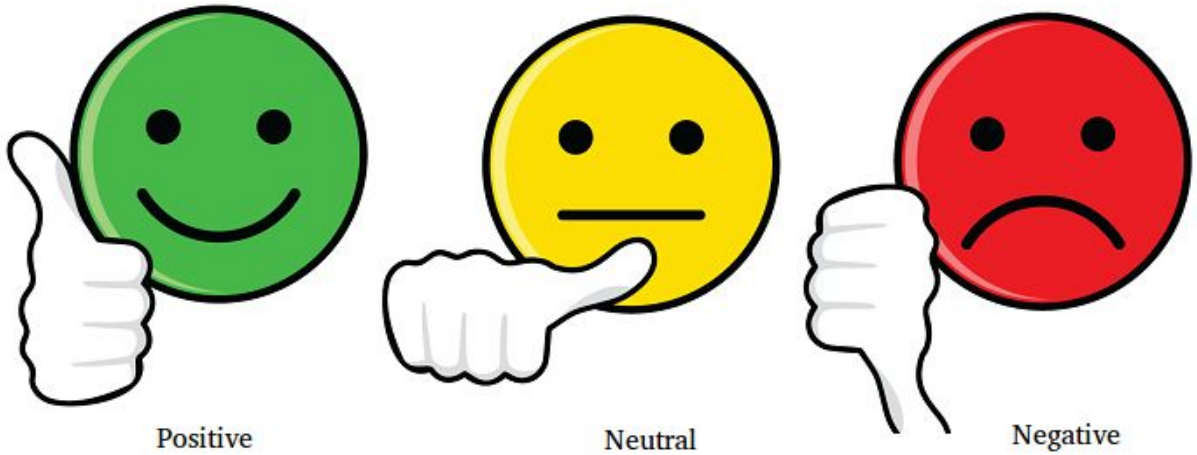


Image Source: Reddy, Vasista "Sentiment Analysis Using SVM". Medium. https://medium.com/@vasista/sentiment-analysis-using-svm-338d418e3ff1. Accessed 19 Feb. 2021.

Image Source: Williams, Demetrius. “How Machine Translation can Support Multilingual Sentiment Analysis Projects” https://www.translatemedia.com/us/blog-usa/machine-translation-multilingual-sentiment-analysis-projects/. Accessed 22 April 2021.

Purpose of SVM

- Polarity of words.
- Classifying the sentiment of responses to schizophrenic group vs control group.

	precision	recall	f-score
Negative	71%	67%	69%
Neutral	89%	95%	92%
Positive	70%	70%	70%

Overall Accuracy: 77%

Accuracy

- Precision:

  (True Positive) / (True Positive + False Positive)

- Recall:
  (True Positive) / (True Positive + False Negative)

- F-Score:

  (2 * Precision * Recall) / (Precision + Recall)

Goals

- Understanding the differences in interactions if any.

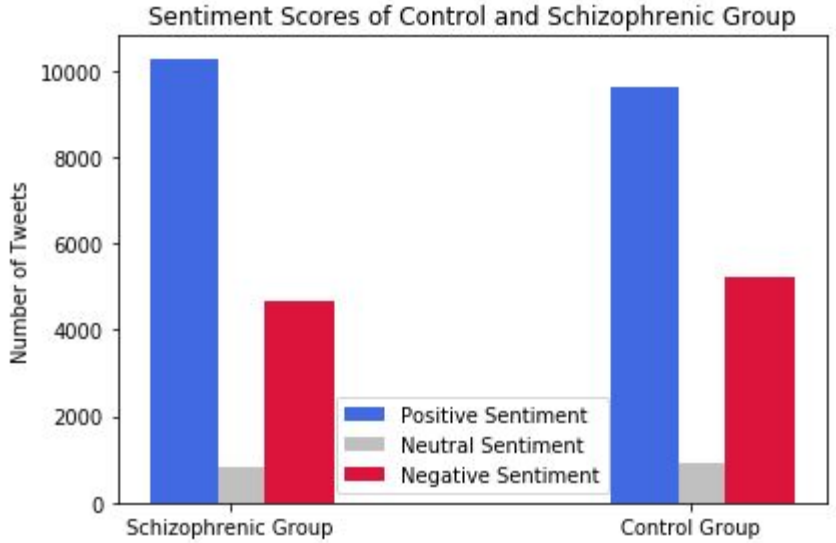
- Understanding the causes.

- “The Future of Mental Healthcare: Peer-to-Peer Support and Social Media” by J. A. Naslund et al.

Results

SVM Results

- SVM Results show inconsequential differences
- Majority positive sentiment responses between both groups

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Positive Responses Schizophrenic Group: 10288
Neutral Responses Schizophrenic Group: 841
Negative Responses Schizophrenic Group: 4650

Positive Responses Control Group: 9631
Neutral Responses Control Group: 917
Negative Responses Control Group: 5231
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Word Frequency Results

- Trimmed Stop Words (e.g., “the”)
- “feel”, “think”, “like”, and “hope”
- Similar word occurrences

word	schizo	control
like	820	574
get	567	467
I'm	526	300
people	467	211
know	466	358
would	448	229
one	446	344
Thank	423	204
think	421	256
good	405	267

hope	206	
😂	206	304
back	204	191
also	200	
way	200	133
you.	197	
great	195	
many	195	
look	195	144
going	194	183
-	194	
lol	194	314
it's	193	240
don't	191	177
thank	189	172
say	184	143
u	183	360
feel	183	

LDA Clustering

- Latent Dirichlet Allocation Clustering
- Clusters words based upon the theme they appear in
- Similar to a contextualized Word Frequency

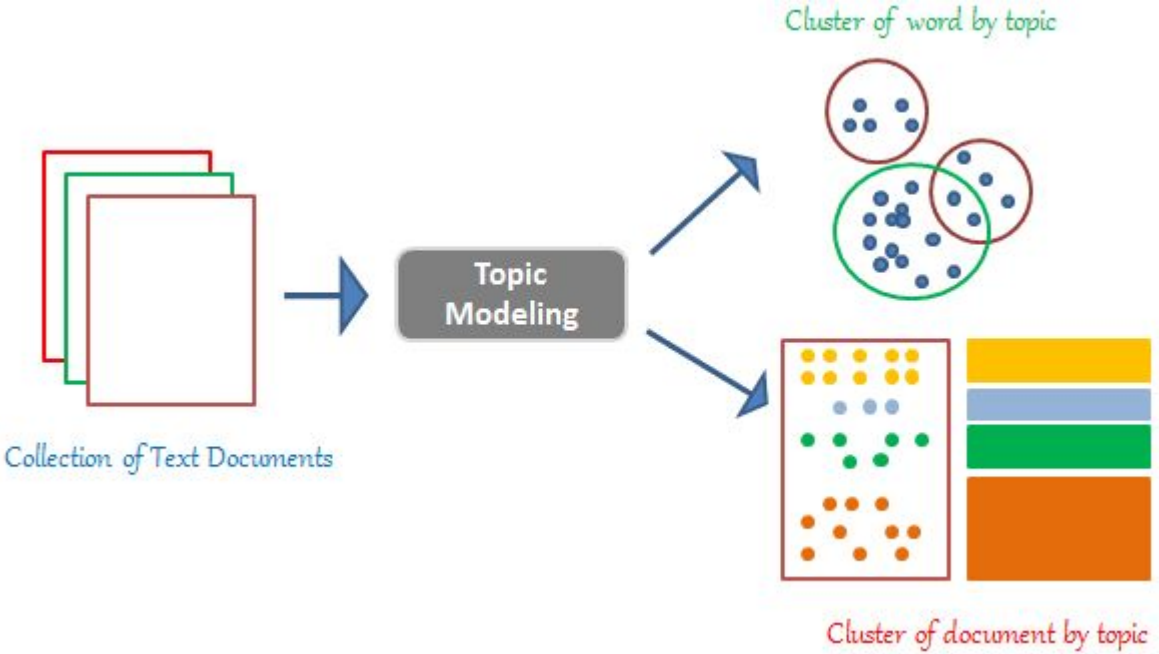
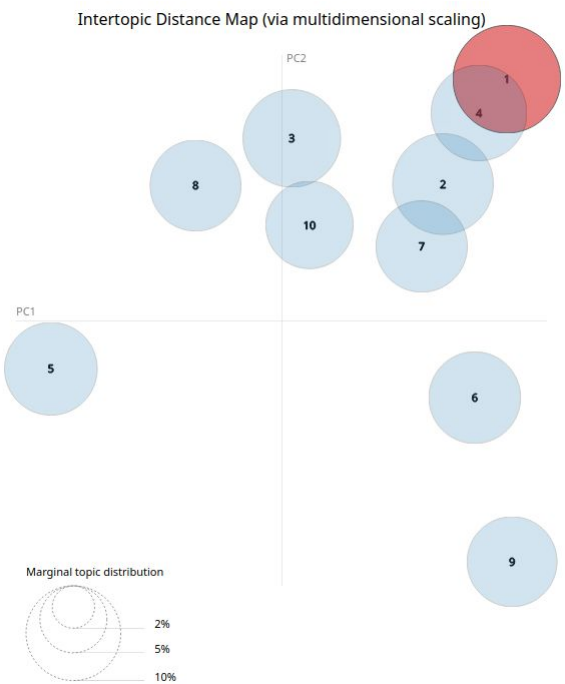


Image Source: https://thinkinfi.com/latent-dirichlet-allocation-for-beginners-a-high-level-overview/

LDA Results

- Schizophrenia Response Group (Left) shows more sparsity
- “God”, “support”, “love”, “talk”, and “different” appear in most populated theme of Schizophrenia Response Group
- “Phone”, “call”, “hope”, “damn” appear in most populated theme of Control Response Group (Right)



Conclusions

Conclusions

- Inconsequential differences suggest a form of equality in treatment online.

- LDA themes suggest a population of support for those living with this disorder.

- Social media being an accessible way for those with schizophrenia to socialize and maintain a support system.

Works Cited

Chickersal, Prerna., et al. “SeNTU: Sentiment Analysis of Tweets by Combining a Rule-based Classifier with Supervised Learning” *Proceedings of the 9th International Workshop on Semantic Evaluation (SemEval 2015).*

Mitchell, Margaret., et al. “Quantifying the Language of Schizophrenia in Social Media.” *Proceedings of the 2nd Workshop on Computational Linguistics and Clinical Psychology: From Linguistic Signal to Clinical Reality.*

Naslund, J. A., et al. “The Future of Mental Health Care: Peer-to-Peer Support and Social Media.” *Epidemiology and Psychiatric Sciences*, vol. 25, no. 2, 2016, pp. 113–122., doi:10.1017/S2045796015001067.

Thank you for your time.