

## INTRODUCTION

### BACKGROUND

- In the 1990s, while doctors were prescribing opioids to treat chronic pain, pharmaceutical companies falsely marketed them as safe and not addictive.
- This initiated a widespread exploitation of opioids, including prescription and heroin.
- The opioid epidemic was declared a “national public health emergency” by President Trump.

CAUSES OF ACCIDENTAL DEATHS

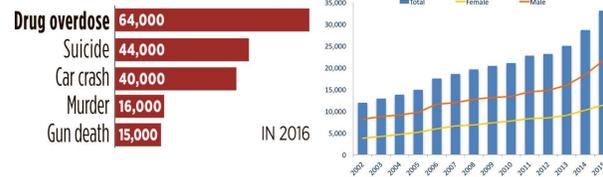


Figure 1: Graph displaying causes of accidental deaths in 2016; Figure 2: Graph displaying patterns of overdose deaths (CDC).

- Social media has allowed people to freely share hardships regarding their addiction.
- Reddit is a “discussion website” where users upload posts and comments, which are given scores (likes) by others.
- Activity in subreddits related to the opioid epidemic continues to increase.
- Analysis of data derived from social media provides insight to psychological aspects of opioid addictions.
- Factors that affect social support from users can also be examined.

Analyzing opioid-related social media posts has the potential to reveal **patterns** of opioid abuse at a **national** scale, and understand **opinions** of the **public**, thus provide **insights** to support **prevention, treatment, recovery and enforcement**.

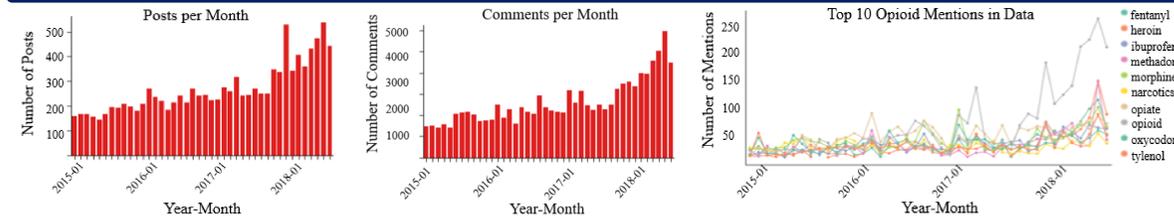
### OBJECTIVES

- To understand the major topics discussed and present trends.
- To analyze the psychological components of the major topics of discussion in the dataset.
- Examine what factors can impact social support for a certain user from others.

## METHODS

- The data was extracted from Reddit using the Python package PRAW (Python Reddit API Wrapper).
- Data was collected from the subreddit r/ChronicPain from January 2015 to June 2018. This dataset included 11,230 posts and 110,296 comments from different users.
- The Linguistic Inquiry and Word Count (LIWC) dictionary was used to obtain the 100 most frequent unigrams under the psychological categories present in the content.
- In order to explore the major topics of discussion in the data, the Latent Dirichlet Allocation (LDA) topic modeling obtained from the Gensim Python package was used.
- Factors influencing social support from users were discovered through the scores of posts as well as the quantities of comments using RStudio.

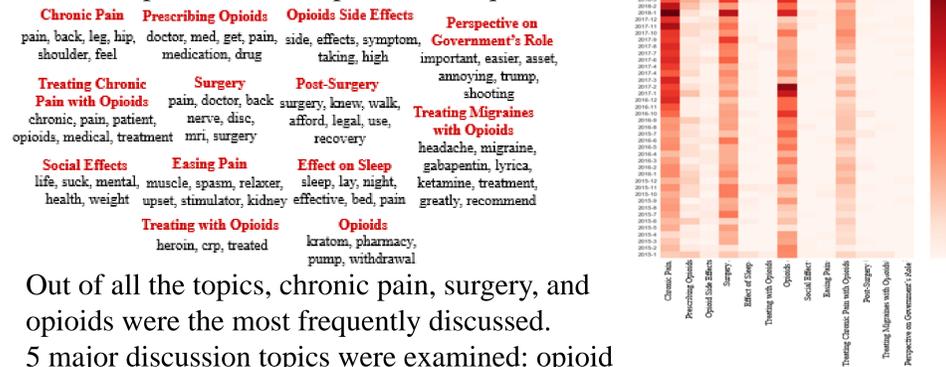
## RESULTS



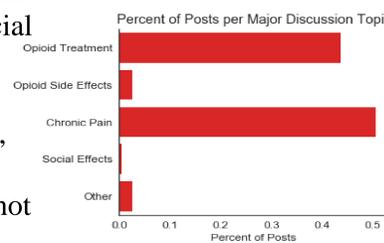
- The number of posts and comments per month generally increased over time; activity in the subreddit r/ChronicPain has increased a lot recently.
- The Top 10 opioid-related words mentioned: opioid, opiate, morphine, fentanyl, ibuprofen, oxycodone, methadone, heroin, tylenol, narcotics.

## TOPIC MODELING

- From 15 topics, 13 clear topics were acquired.



- Out of all the topics, chronic pain, surgery, and opioids were the most frequently discussed.
- 5 major discussion topics were examined: opioid treatment, opioid side effects, chronic pain, social effects, other.
- Mostly, users talked about their chronic pain experiences or treating their pain using opioids, usually prescribed by a doctor.
- Side effects of opioids and social effects were not talked about as often.



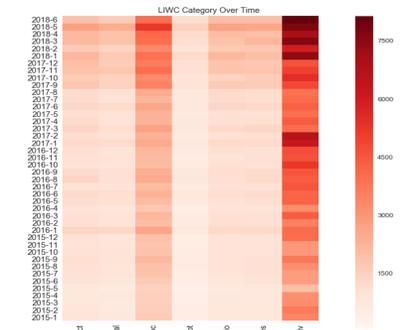
## SOCIAL SUPPORT

Score of Posts					Number of Comments				
Intercept	Estimate	Std. Error	Z-score	Significance	Intercept	Estimate	Std. Error	Z-score	Significance
sexual	0.051	0.030	1.671	***	family	-0.044	0.021	-2.126	***
certain	-0.042	0.012	-3.536	***	she/he	-0.043	0.022	-1.987	***
insight	-0.037	0.010	-3.726	***	friend	-0.028	0.021	-1.382	***
discrep	-0.036	0.009	-3.853	***	female	0.024	0.021	1.128	***
bro	-0.035	0.018	-1.907	***	jiffier	-0.023	0.006	-3.731	***
cause	-0.034	0.011	-3.182	***	hear	0.023	0.018	1.307	***
coprocc	0.033	0.009	3.915	***	certain	-0.023	0.009	-2.612	***
differ	-0.032	0.009	-3.686	***	male	0.023	0.020	1.121	***
reward	0.031	0.014	2.172	***	risk	0.023	0.014	1.617	***
see	-0.031	0.021	-1.442	***	death	0.021	0.019	1.132	***
affiliation	0.030	0.016	1.866	***	coprocc	0.020	0.006	3.185	***
family	-0.029	0.028	-1.017	***	anger	-0.018	0.013	-1.380	***
body	0.029	0.018	1.585	***	see	0.017	0.016	1.081	***
risk	0.028	0.019	1.458	***	percept	-0.016	0.014	-1.201	***
we	-0.028	0.019	-1.477	***	discrep	-0.016	0.007	-2.343	***
health	-0.027	0.018	-1.476	***	power	0.016	0.010	1.608	***
time	0.025	0.014	1.787	***	cause	-0.016	0.008	-1.978	***
ingest	0.024	0.019	1.282	***	insight	-0.015	0.007	-2.104	***
and	0.024	0.017	1.431	***	we	-0.015	0.011	-1.371	***

- Posts regarding sexuality have the highest scores and posts that refer to female figures receive the greatest amount of comments.
- Posts about certainty obtain the lowest scores while posts about family acquire the least amount of comments.
- Users who share their thoughts receive both high scores and comments, therefore gaining the most support.

## MAJOR PSYCHOLOGICAL CATEGORIES

Major Psychological Category	Percent of Words	Identified Unigrams (84) from the Top 100 Unigrams
Relativity	22.53%	'back', 'time', 'day', 'years', 'going', 'go', 'right', 'last', 'still', 'days', 'long', 'year', 'months', 'week', 'ago', 'started', 'new', 'went', 'way', 'around', 'left', 'today', 'weeks', 'point', 'side', 'hours', 'little'
Cognitive Processes	12.49%	'know', 'feel', 'would', 'really', 'want', 'could', 'since', 'need', 'something', 'think', 'anything', 'make', 'ever', 'never', 'try', 'lot', 'nothing', 'else', 'trying', 'find', 'without', 'feeling', 'always'
Social	5.59%	'help', 'anyone', 'people', 'said', 'told', 'everything', 'say'
Drives	6.21%	'get', 'work', 'take', 'got', 'getting', 'first', 'able', 'tried', 'taking'
Affect	6.48%	'pain', 'bad', 'well', 'worse', 'good', 'better', 'sure'
Biological Processes	6.14%	'doctor', 'chronic', 'life', 'doctors', 'surgery', 'nerve', 'body', 'neck', 'medication'
Percept	3.56%	'see', 'hard'



- 84 out of 100 unigrams were identified by the LIWC dictionary under the major psychological categories: Relativity, Cognitive Processes, Social, Drives, Affect, Biological Processes, Percept.
- Relativity, unigrams related to time, and Cognitive Processes, unigrams related to the users' thoughts were the two most common LIWC categories over time.

## CONCLUSION/FUTURE WORK

- In order to thoroughly examine the opioid epidemic, a large-scale dataset must be present. Using Reddit, a community based social media, to understand this nationwide crisis provides extensive data that can be used to reveal the psychology behind users as well as the opinions of the public through the analysis of major topic discussions in the content and factors that influence social support from others.
- Exploring data from different social media platforms assiduously can augment the psychological knowledge available on the opioid epidemic and possibly widen views as to how to fight the epidemic.

## REFERENCES

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