

# MentSum: A Resource for Exploring Summarization of Mental Health Online Posts

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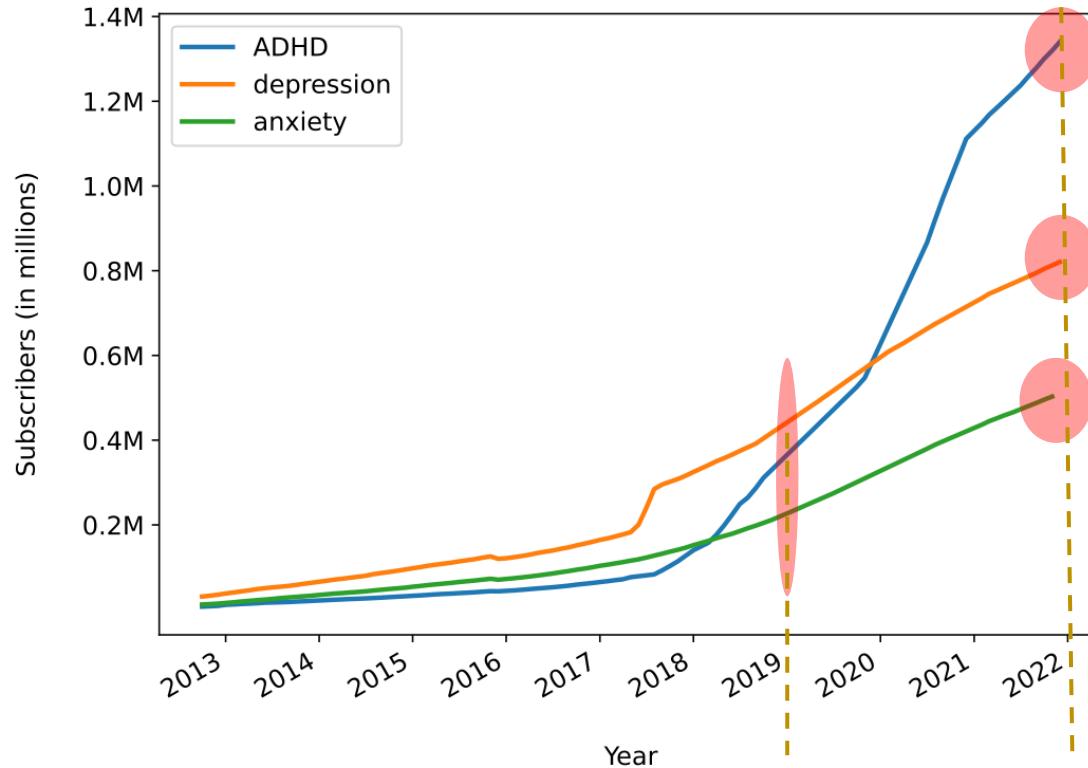
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GEORGETOWN UNIVERSITY

# Mental Health; a global challenge for many years...





## What a user's mental health post addresses?

It may address issues of concerns or an elaboration of the user on the situation



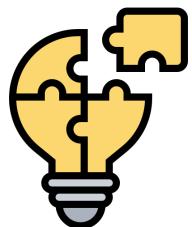
## Reading time?

Longer posts take more time from counselors to read, leading to fatigue or delay in response

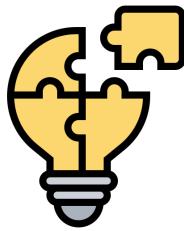


## What a mental health post summary offers?

A short yet informative summary of user's post provides the counselors with the important information before reading the details.



Can we create an informative and concise summary of mental health posts?



# Can we create an informative and concise summary of mental health posts?

## User's Post

Out of all the time I've been on this earth which isn't very long considering the fact that I'm a teen **I've always been an over achiever.** [REDACTED]

[REDACTED]  
[REDACTED]  
[REDACTED]

[REDACTED] School has been stressing me out so much lately to the point where those expectations for myself have gotten even higher. I want to rip my hair out everytime I **see my grades and my mind immediately jumps to suicide.** I know it's a stupid thing to **get suicidal** over but I just can't help it. [REDACTED]

[REDACTED] and they've all told me to stop being so hard on myself and that it isn't the end of the world if I get a few low grades but to me it quite literally is the end of the world.



## Generated TLDR Summary

been an **over achiever** and i'm constantly **failing at school** and **it's making me want to kill myself.**

**Goal:**  
**Reducing counselor's reading time**

**Need Dataset with Gold:**

**I just feel so invalid and inadequate all the time because of my grades** and it sucks [REDACTED]

[REDACTED] but none of them seem to get it . I legit can't help it .  
**[Missing: Suicide thoughts]**



reddit



The data comes from Reddit's mental health discussion forums



Using Pushshift repository to download Reddit's data dumps



Filtering them to include mental health-related posts

➤ Separating user's post and summary based off **TLDR-style keywords**.

➤ Regular expression beginning with uncased “TL”, ending with uncased “DR”, and up to 3 chars in-between.

### User's Post

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**TLDR-style keywords**

...  
TLDR  
tl-dr  
**TL;DR**  
TL;Dr  
tl;;dr  
...



### Post's Summary

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# MentSum dataset statistics

(Users' posts and human written summaries)

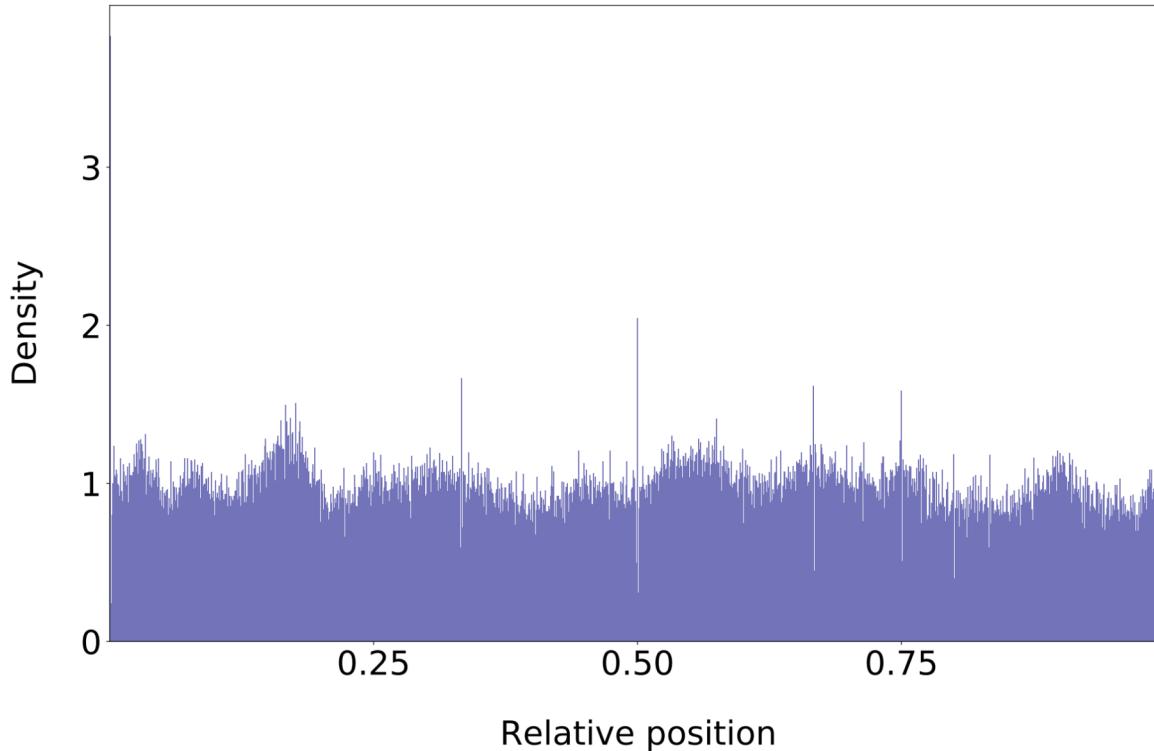
Dataset size	24,119 posts
Training set size	21,695 posts
Subreddit coverage	43 subreddits
<hr/>	
Average post length (word/sent.)	327.5 / 16.9
Min post length (word/sent.)	50 / 1
Max post length (word/sent.)	2,979 / 192
Median post length (word/sent.)	267.0 / 14.0
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Average TLDR length (word/sent.)	43.5 / 2.6
Min TLDR length (word/sent.)	15 / 1
Max TLDR length (word/sent.)	596 / 36
Median TLDR length (word/sent.)	35.0 / 2.0
<hr/>	
Average sentence length (post/TLDR)	19.4 / 18.3 words
Median sentence length (post/TLDR)	17.0 / 16.0 words
<hr/>	
Compression ratio (average)	7.5

Total vocabulary size	76,411 words
Occurring 10+ times	17,486 words
Training vocabulary size	49,037 words
Validation vocabulary size	13,609 words
Test vocabulary size	13,765 words
Training/Test vocabulary overlap	91.4%

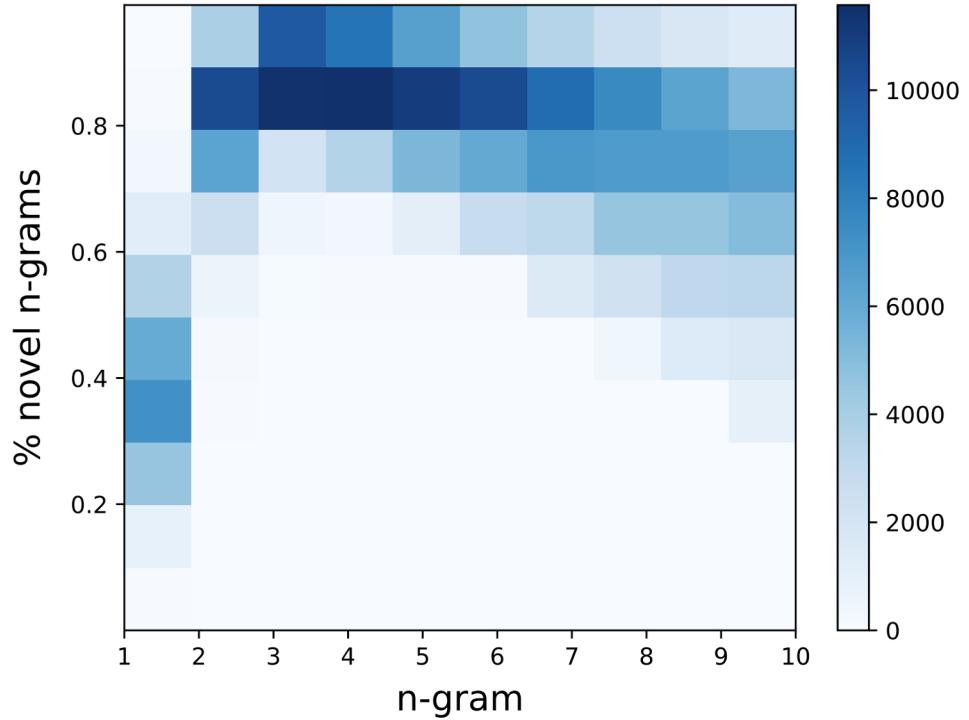
Vocabulary statistics over distinct uncased terms.



**Data will be available for research  
using Data Usage Agreement!**

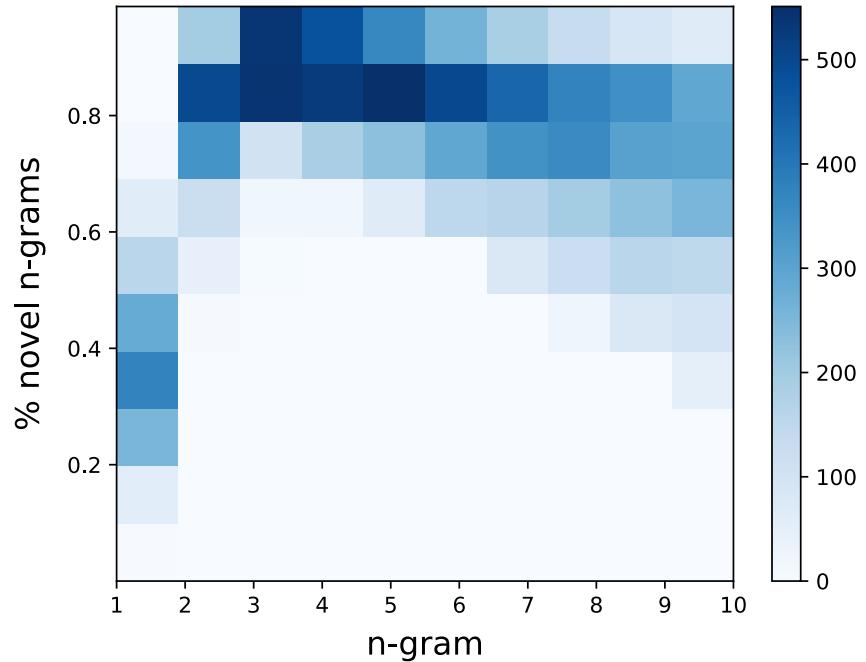


The relative position of word bigrams of the Human-TLDR  
across users' post in MentSum dataset

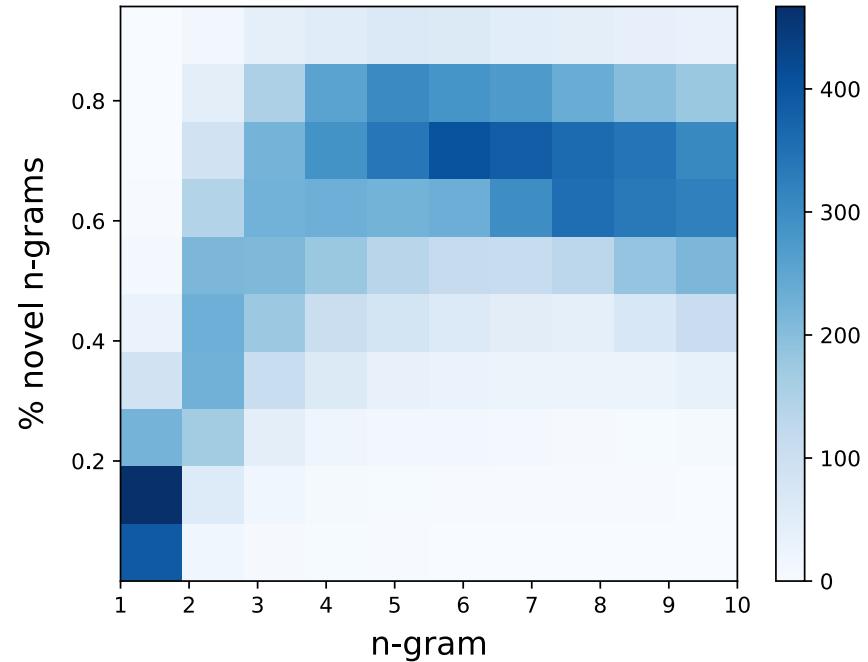


Percentage of novel n-grams in User-written TLDR in  
respect to users' posts

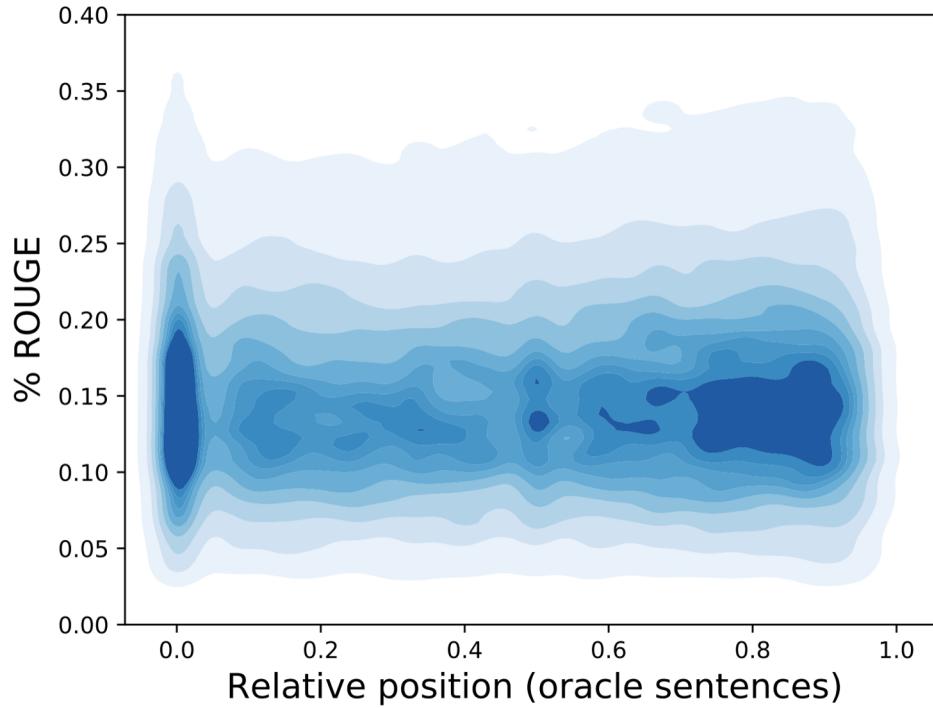
# % of novel n-gram in TLDR summary (test set)



User-written TLDRs



System-generated TLDRs



Kernel density estimation diagram of oracle sentences' relative position and the respective Rouge score of oracle sentences.

# Baseline Results

Method	RG-1	RG-2	RG-L
LEAD-2	20.09	3.57	13.70
ORACLEEXT	35.98	11.59	23.21
LSA (Steinberger and Ježek, 2004)	22.96	3.98	14.50
LEXRANK (Erkan and Radev, 2004)	23.21	4.42	15.19
BERTSUMEXT (Liu and Lapata, 2019)	24.64	5.83	16.66
MATCHSUM (Zhong et al., 2020)	26.29	6.32	17.12
BERTSUMABS (Liu and Lapata, 2019)	25.35	6.49	17.11
BERTSUMEXTABS (Liu and Lapata, 2019)	25.75	6.80	17.48
BART (Lewis et al., 2020)	<b>29.13</b>	<b>7.98</b>	<b>20.27</b>

# Qualitative analysis



## Fluency

Is the summary well-written and easy to understand?



## Informativeness

Does the TLDR summary provide useful information (i.e., the most important information) about user's post?



## Conciseness

Does the summary briefly provide comprehensive information (i.e., majority of important information) about user's post?

- 100 randomly picked from test set
- 2 annotators (3<sup>rd</sup> to break a tie) to score (1=worst, 5=best) cases

System	Fluency	Info.	Conc.
BART	<b>4.60</b>	<b>3.65</b>	<b>3.51</b>
User	4.28	3.46	3.15

Evaluation scores (average)

System	Fluency	Info.	Conc.
BART	17.4%	28.2%	28.0%
User	19.5%	25.2%	24.6%

Agreement rate: moderate

System	Win rate	Fluency	Info.	Conc.
BART	59%	17%	64%	19%
User	41%	8%	81%	11%

Distribution of leading criteria for summary selection in evaluation process:

# Sample System-generated Short Summaries, TL;DR

- ✓ been an **over achiever** and i'm constantly **failing at school** and **it's making me want to kill myself.**
  
- ✓ **my friends are ignoring me** for **being closed off and depressed** and i don't know what to do, **i'm on medication** and going to therapy, nothing has worked so far. i've been struggling with a lot of other shit too like **add, adhd, and** [REDACTED]
  
- ✗ **i can't** function normally during the day because my head is clear and i'm "out" my mind, but once it gets dark out my brain turns into a **constant internal struggle**
  
- ✗ i think it's better to **not** have a child now than **never having one.**

# Challenges of baseline...

## Fluency

- (-) Complex structure
- (-) Repetition

## Informativeness

- (-) Inference

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I got a scar on my face from a fight **and** people judgment me because of it **and** I can't take it **and** it embarrasses me in public **and** I don't know what to do. (complex structure)

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I'm having massive **mood swings** and **mood swings**, I grind my teeth and clench muscles, and i am very snappy and moody during these times. how can I get back to feeling normal? (repetition)

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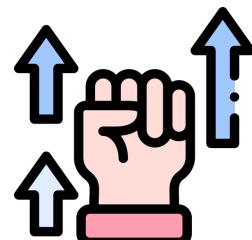
### User-written TLDR

was diagnosed with anxiety

██████████ Happy hopeful noises

### System-generated TLDR

diagnosed with anxiety, gad and agoraphobia 7 years ago, been on meds and seeing a psych for a while, now finally going to the dr for help.



Encouraging to improve the baselines!