

# Signs of Bipolar Disorder in Social Media Text

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# Motivation

How does everyday language reflect basic social and personality processes?

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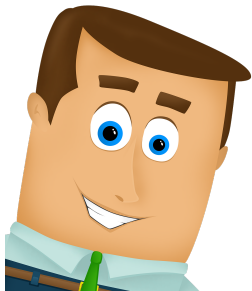
How does everyday language reflect our mental health?

## Meet Fynn



- In a bad mood, stays in bed the whole weekend

## Meet Fynn



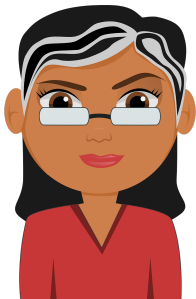
- In a bad mood, stays in bed the whole weekend
- Goes out with friends next week

## Meet Fynn



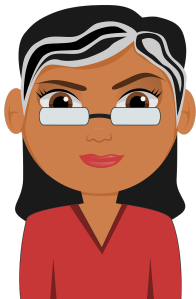
- In a bad mood, stays in bed the whole weekend
- Goes out with friends next week
- Relatable?

## Meet Sophie



- Struggling to get out of bed for months

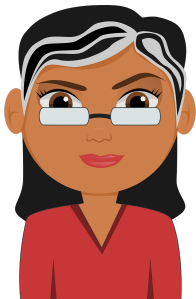
## Meet Sophie



- Struggling to get out of bed for months
- Diagnosed with depression

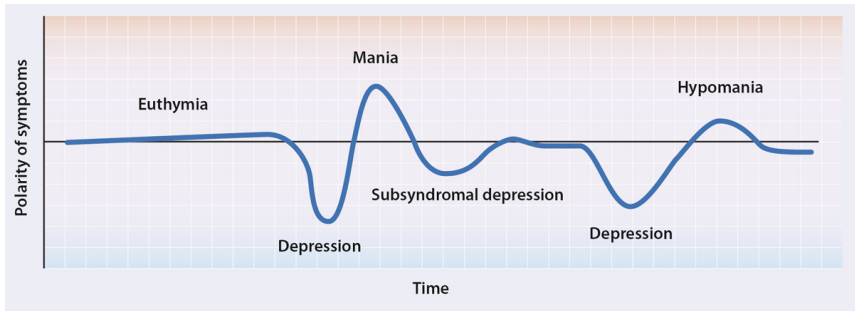


## Meet Sophie



- Struggling to get out of bed for months
- Diagnosed with depression
- 10 days of sleep deprivation, unease, traveling and money spending

# Bipolar disorder



- Recurrent manic and depressive episodes
- Affects 60M people worldwide, 6% suicide rate

## Where is NLP?

Imagine Sophie and Fynn write **blogs**, or they **tweet**, or are active **Redditors**



## How can NLP help?

- Early detection
  - Discover potential disorder from author's text
  - Timely reaction → Suicide prevention

## How can NLP help?

- Early detection
  - Discover potential disorder from author's text
  - Timely reaction → Suicide prevention
- Understand how illnesses manifest in language
  - Evaluate contemporary psychological theories
  - Make large-scale text analysis available to psychologists
    - **3.5k Reddit users with bipolar disorder**

## Fynn's language vs Sophie's language

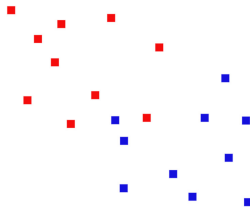
Compared to control group, authors with bipolar disorder tend differ in:

- *I-talk* – in line with research on depression
- *affect* – increased usage of affect-related words
- *health* – talk more about health-related topics
- *pronoun usage* – reflects standings in social hierarchies
- ...

# Bipolar disorder prediction



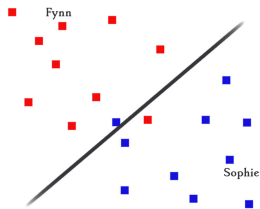
Feature extraction



# Bipolar disorder prediction



Feature extraction



Binary classification task: **86% accuracy**

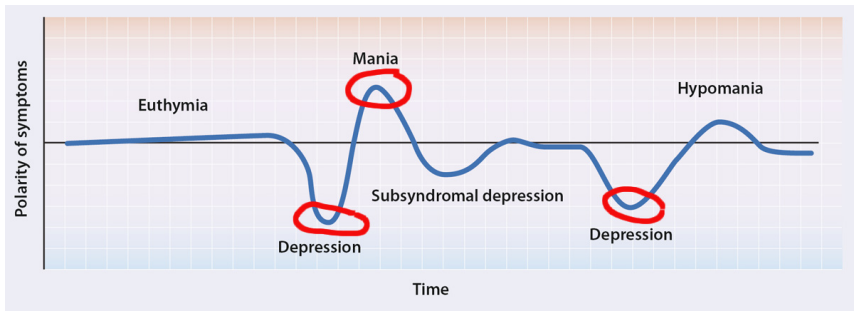


## Time component

- By aggregating all of user's text, we can't understand how bipolar disorder progresses in time

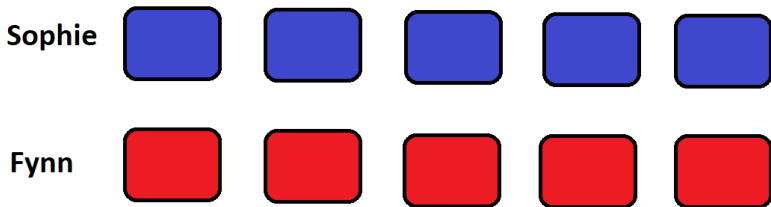
## Time component

- By aggregating all of user's text, we can't understand how bipolar disorder progresses in time
- Goal: detect when manic and depressive episodes occur



## Progression through time

Group comments by day, week, or month



Higher **variance** of emotion-related features in bipolar group:

- **affect, positive emotions, negative emotions, anxiety, sadness**

## Work in progress

- Supervised classification: **Time-aware** vs **time-agnostic** models
- Detecting manic and depressive episodes
  - Semi-supervised: One-class classification
  - Unsupervised: autoencoders for time-series

Thank you!