



# Outline

Introduction

Methods

Results

# Goal

- ▶ global goal : Analyze drug misuses in internet forums
- ▶ today's presentation : How we classified drug misuses in a typology & the contents of our typology

# Goal

Typology : systematic classification of the types of something according to their common characteristics

A classification into categories of the different kinds of drug misuses we encountered in internet forums

## Goal

Misuse definition for our purpose (different from the WHO definition) :

Use of a prescription drug for a purpose or in a fashion not consistent with medical guidelines



## Related work

### Drug use in social media

[O'Connor et al., 2014] Adverse drug reactions on *Twitter*

[Yang et al., 2015] Unsupervised mining of ADR from *Medhelp*

[Sarker et al., 2015] Review of ADR monitoring with social media

### Drug misuse in social media

[Kalyanam et al., 2017] Non medical use of opioids on *Twitter*

[Cameron et al., 2013] Semantic platform for drug abuse epidemiology in social media

# Corpus

- ▶ From French health forum *Doctissimo*
- ▶ Must contain a drug
- ▶ Must be less than 2,500 characters long
- ▶ 1,900 messages
  - ▶ 1,400 messages randomly selected
  - ▶ 500 messages with various drugs



## Manual annotation

Categories :

- ▶ **No use** "Can someone share their experience with xanax?"
- ▶ **Normal use** "I took a xanax I feel better already"
- ▶ **Misuse** "I just took an entire box of xanax do you think it will be enough?"

2 annotators including 1 pharmacologist

## Results of annotation

Kappa : 0.46 moderate agreement

No use	53%	999 messages
Normal use	30%	746 messages
Misuse	8%	155 messages

## Resulting typology

- ▶ Non intentional (27 messages)
  - ▶ Contraindication (10 messages)
  - ▶ Drug intake mistake (dosage, missed intake...) (17 messages)
- ▶ Intentional (94 messages)

## Resulting typology

- ▶ Intentional (94 messages)
  - ▶ Fear of adverse event (15 messages)
  - ▶ Modulate effect (ex :stopping antibiotics because one feels better) (18 messages)
  - ▶ Self-medication (3 messages)
  - ▶ Searching effect (psychotropic effect, weight loss, suicide) (15 messages)
  - ▶ Addiction / habituation (43 messages)

## Conclusion

### Conclusion

- ▶ Various situations of misuse
- ▶ Some are related to drug family

### Future work

- ▶ Larger and more varied corpus
- ▶ Use the annotated corpus for automatic classification

Thank you

Questions?



Cameron, D., Smith, G. A., Daniulaityte, R., Sheth, A. P., Dave, D., Chen, L., Anand, G., Carlson, R., Watkins, K. Z., and Falck, R. (2013). PREDOSE: a semantic web platform for drug abuse epidemiology using social media. *46(6):985–997.*



Kalyanam, J., Katsuki, T., Lanckriet, G. R. G., and Mackey, T. K. (2017). Exploring trends of nonmedical use of prescription drugs and polydrug abuse in the twittersphere using unsupervised machine learning. *65:289–295.*



O'Connor, K., Pimpalkhute, P., Nikfarjam, A., Ginn, R., Smith, K. L., and Gonzalez, G. (2014). Pharmacovigilance on twitter? mining tweets for adverse drug reactions. *pages 924–933.*



Sarker, A., Ginn, R., Nikfarjam, A., O'Connor, K., Smith, K., Jayaraman, S., Upadhaya, T., and Gonzalez, G. (2015).

Utilizing social media data for pharmacovigilance: a review.

*Journal of Biomedical Informatics.*



Yang, M., Kiang, M., and Shang, W. (2015).

Filtering big data from social media—building an early warning system for adverse drug reactions.

*Journal of Biomedical Informatics.*