Online drug forum sentiment analysis

4-FA in the Netherlands

Dr. Matthijs Blankers

Trimbos institute, the Netherlands institute of mental health and addiction, Utrecht
Arkin Mental Health Care / Jellinek, Amsterdam,
Academic Medical Center, Department of Psychiatry - University of Amsterdam
The Netherlands

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Conflict of interest statement

I have no conflict of interest to declare
New Psychoactive Substances (NPS) have become a growing global phenomenon (UNODC, 2016)

In the Netherlands, substantial increase acute emergencies due to the NPS 4-fluoroamphetamine (4-FA / 4-FMP), incl. media coverage

Monitoring data indicates increase in use of 4-FA during last years

Sale and exchange of information about NPS increasingly online (e.g. dark web, drug users online fora)

Online data can be accessed, scraped and analysed using statistical / data science software (e.g. R, Python)
Research questions

1. Can changes in the number of 4-FA related forum posts be observed?
   - Around the time 4-FA was increasingly found by monitoring services

2. Can changes in the sentiment of these posts be observed?
   - between 2012 and 2017
   - do changes coincide with media coverage of 4-FA health incidents?
Methods

- Using *R*selinium and *PhantomJS* browser, web forums (drugsforum.nl, drugsforum.info) accessed
- Search function of fora used to find relevant posts
  - Containing words associated with 4-FA, cocaine, ecstasy, and a neutral word (forum)
- Content of these posts (with meta-data) downloaded and stored as data objects in R
- Content of posts semantically analysed using *pattern.nlp* (Python)
Methods: search forum posts

```r
# search example #
removeScreenshot(display=TRUE)
removeNavigate("http://drugsforum.info/search.php")
removeScreenshot(display=TRUE)
searchTerms <- remDr$findElement("id", "keywords")
searchTerms$sendKeysToElement(list("4FA + 4Fmp"))
searchAny <- remDr$findElement("id", "terms2")
searchAny$clickElement()
removeScreenshot(display=TRUE)
searchnow <- remDr$findElement("name", "submit")
searchnow$clickElement()
removeScreenshot(display=TRUE)
```
Methods: sentiment analysis

```r
# sentiment analysis example #

# This is good!
pattern_sentiment("This is very good!")

# This is mediocre
pattern_sentiment("This is mediocre")

# This is less well than it should be
pattern_sentiment("This is less well than it should be")

# This is the truth
pattern_sentiment("This is the truth")

## end.
```
Results

4-FA increasingly seen at first aid of dance events

4-FA illegal May 25, 2017

Number of posts

<table>
<thead>
<tr>
<th>Year</th>
<th>4FA</th>
<th>Cocaine</th>
<th>Forum</th>
<th>XTC</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>36  (3.0%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td>67  (4.4%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2014</td>
<td>194 (10.7%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td>175 (12.9%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2016</td>
<td>136 (13.0%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2017</td>
<td>41  (10.7%)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

May 25, 2017
Results

4-FA increasingly seen at first aid of dance events

4-FA illegal
May 25, 2017
Conclusion

- It is feasible to monitor (anonymous) online drug discussion forums using statistical software.

- Trends in the number of posts and polarity were observed in comparison to other substances and neutral words between 2012-2017.

- Trends observed in Dutch online 4-FA discussions forums correspond with trends in reported health incidents and associated media coverage.
  - Earlier than first aid reports?
Discussion themes

- Research ethics!
- Stable availability of data
- Response forums on monitoring activities
Thank you!

Dr. Matthijs Blankers (mblankers@trimbos.nl)

In collaboration with:
Daan van der Gouwe; Peggy van der Pol; Margriet van Laar