

Predicting Sentiment Toward Birth Control Methods

A project to help Pfizer learn from the online conversation about
birth control methods

Background

many birth
control methods
to choose from



Background



conversations are happening online

Project Goal

to help Pfizer understand public sentiment toward various birth control methods in order to develop and market their products accordingly

Data

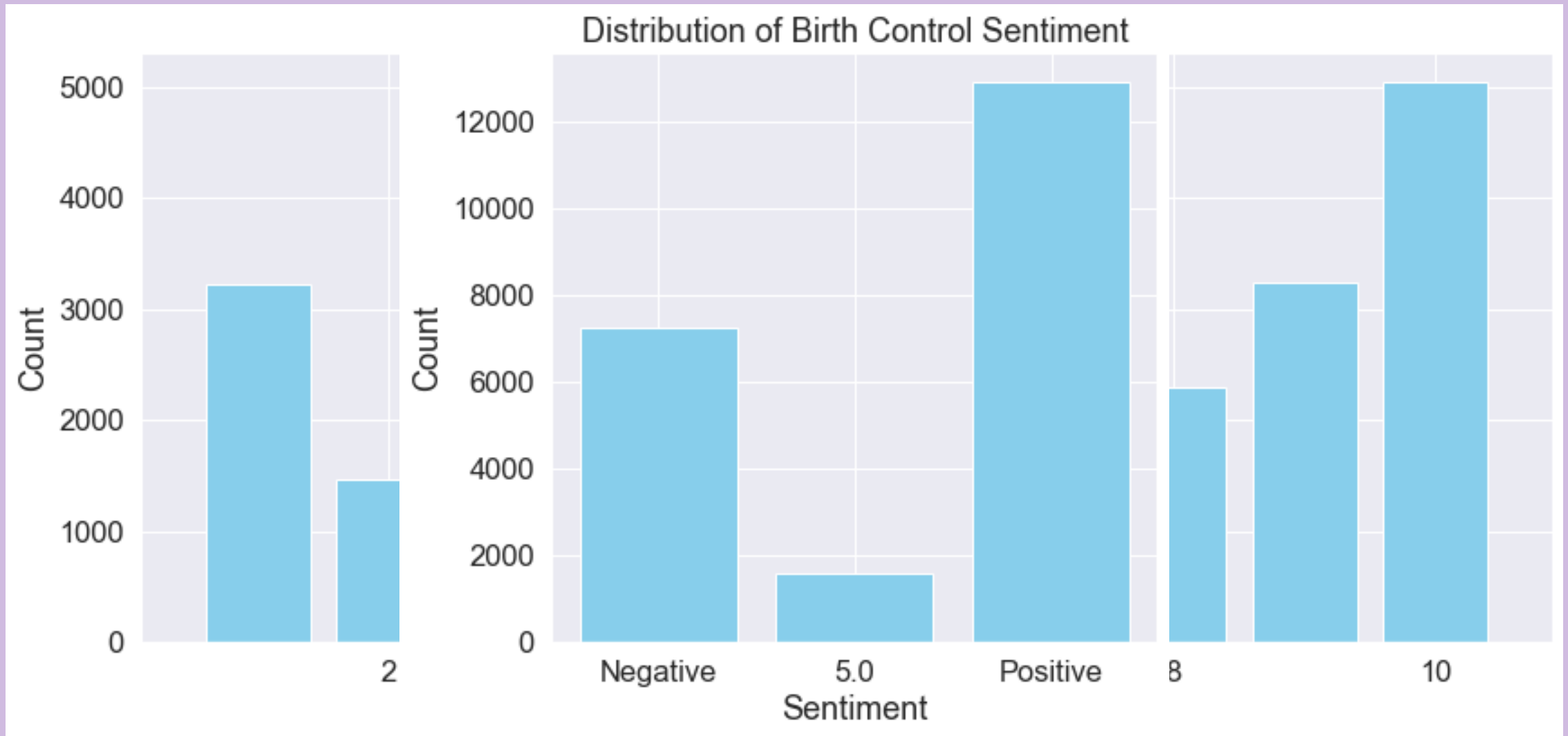
~20,000 reviews from 2008-2017

acquired from drugs.com by researchers at UC Irvine

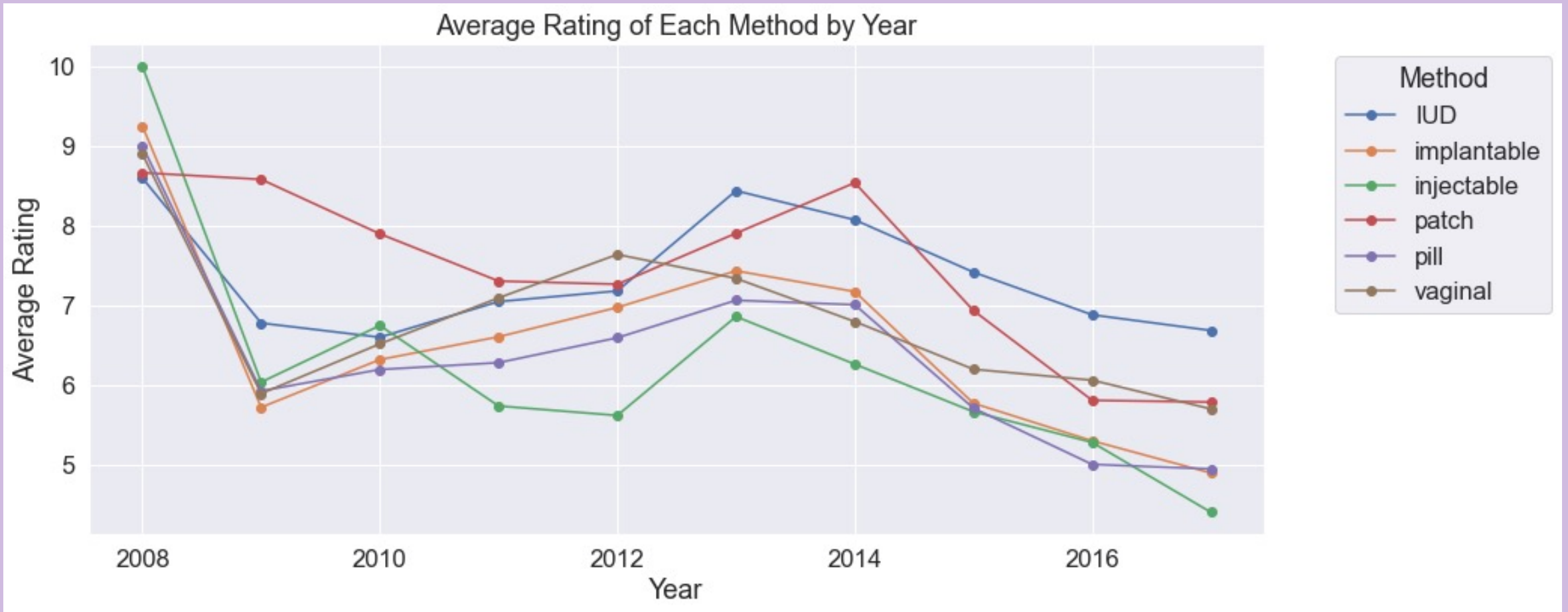
1-10 rating

7 different birth control methods

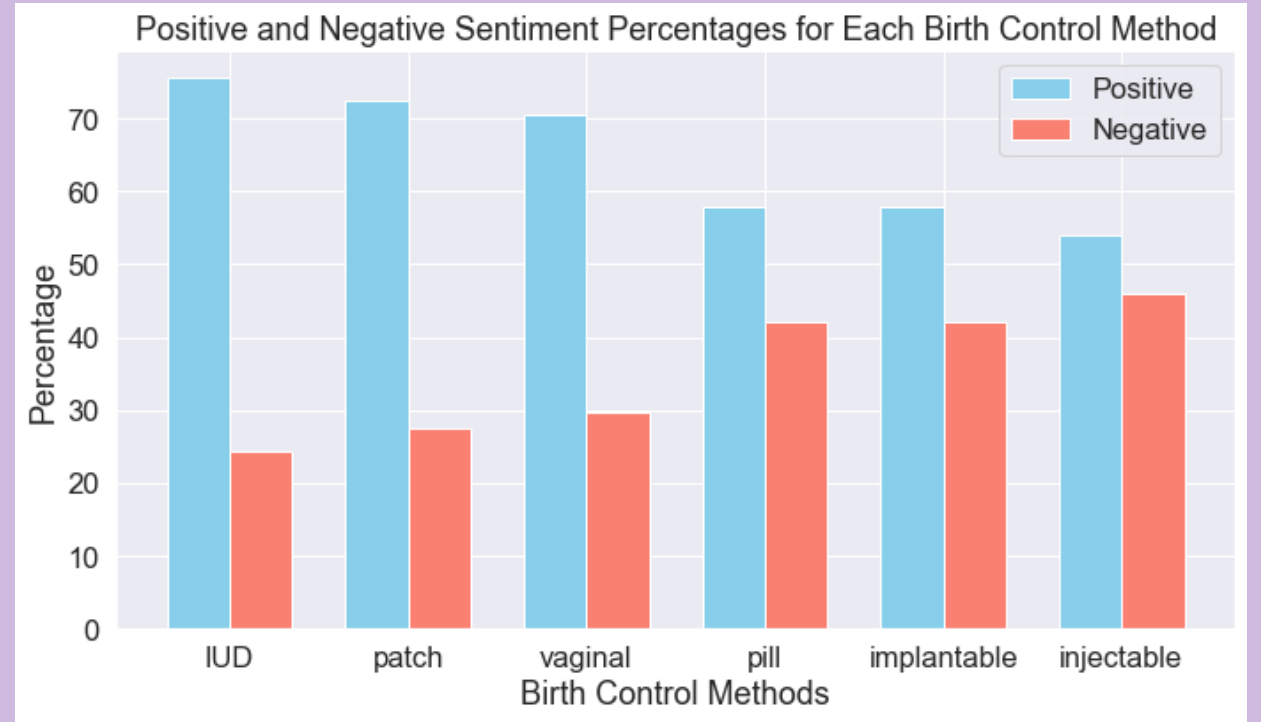
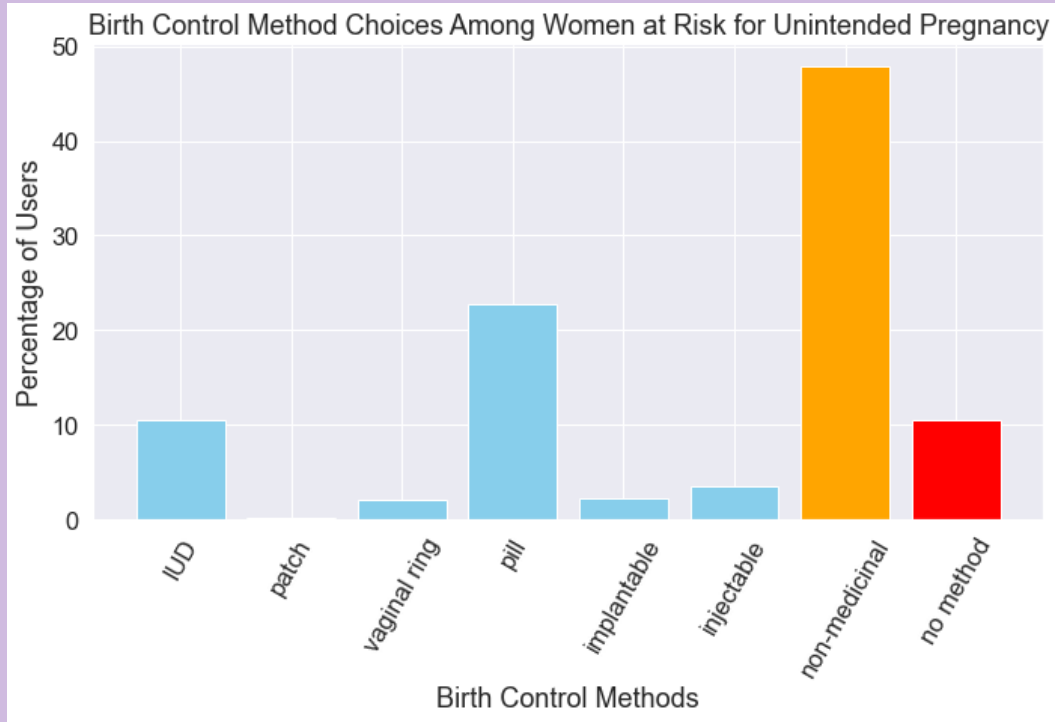
not provided in original data set



ratings merged to BINARY sentiment



sentiment changes over time

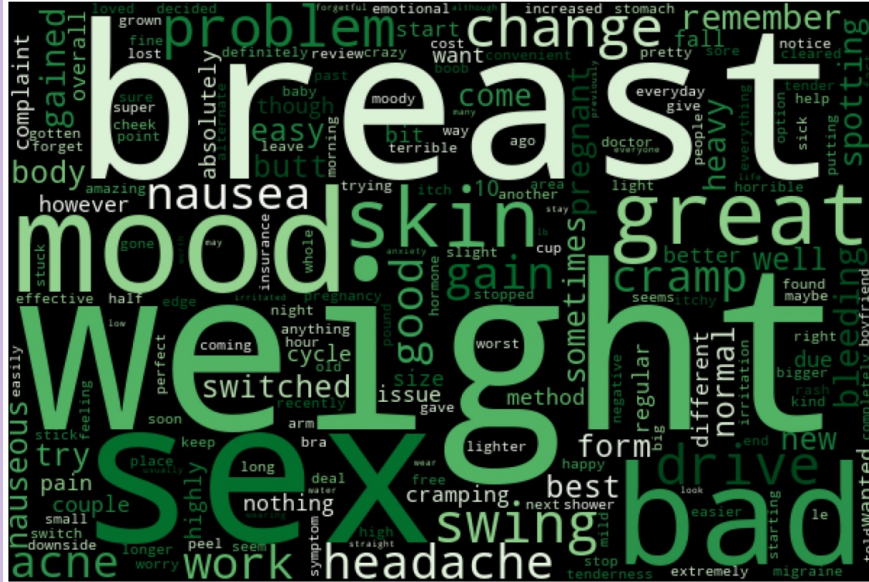


this data from the Guttmacher Institute, 2014

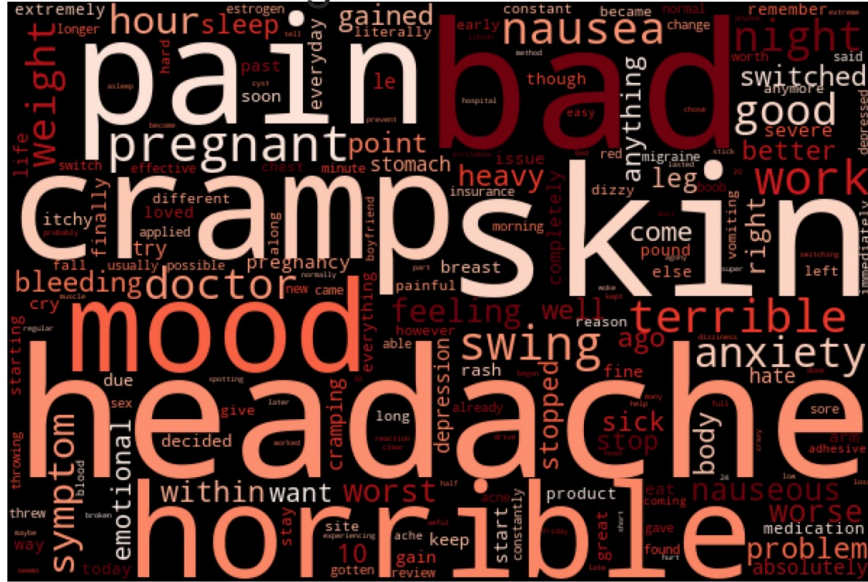
patch viewed more favorably
despite little use

word clouds for **patch** reviews

Positive Reviews



Negative Reviews



Review #163 | Method: patch | Rating: 10.0 | Upvotes: 115

This is absolutely the best birth control I have ever used. I switched from Nexplanon to Ortho Evra, and if you are thinking of doing the same, I highly recommend it. Let me list the reasons why:

1. Weight loss. I have lost 5lbs in one month, without even trying! I am back to the weight I was before I started birth control...but my breasts are still birth control sized.

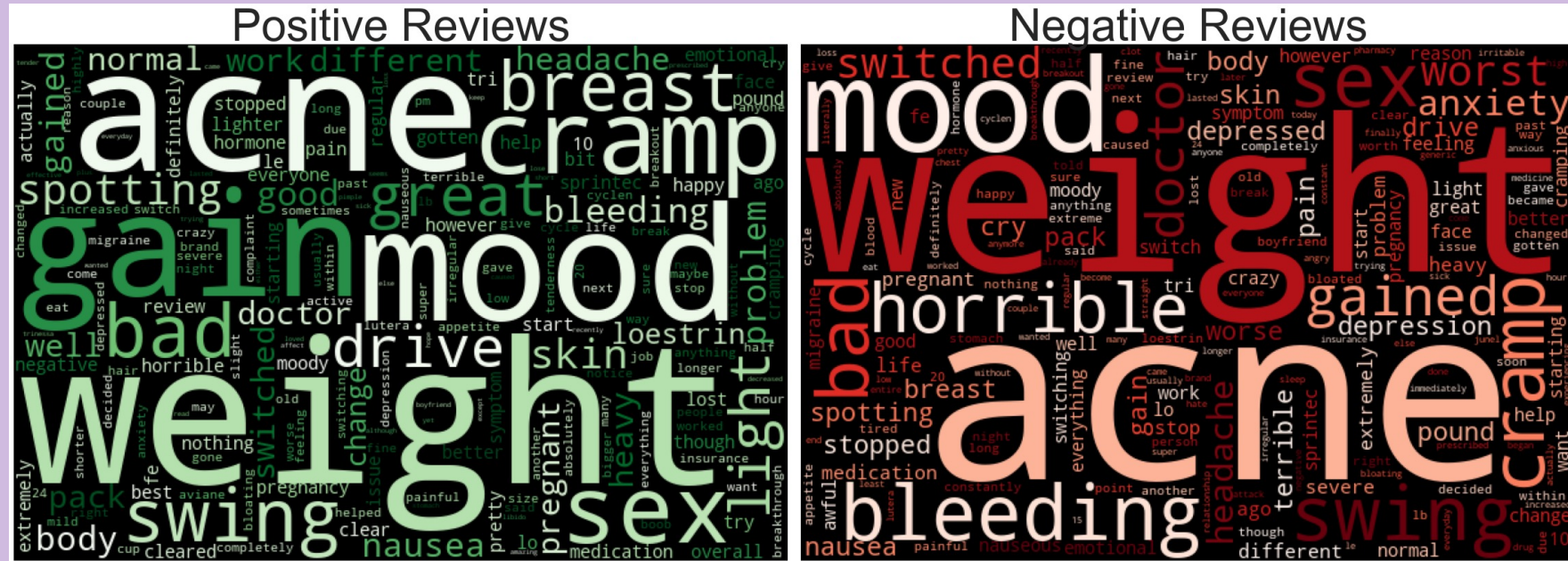
2. Sex drive. Mine had been non-existent since I went on Nexplanon in September. Now, stronger than ever. That might be a downside though, now that I think about it.

3. Skin- no acne!

4. Predictable cycle. (On Nexplanon, I never knew when I was going to menstruate, which was about 90% of the time). Now, a non issue.

5. Do not have to remember everyday.

word clouds for pill reviews



Review #70814 | Method: pill | Rating: 3.0 | Upvotes: 56

This birth control did prevent me from getting pregnant which is the main concern. However, I have never bled so much in my life. I am someone that has always had perfect periods without birth control. I went from that to bleeding three weeks out of the month and it never would stop. It was not necessarily heavy bleeding, but it is very aggravating to bleed constantly. This medicine also made me have acne and I normally have very clear skin. It made me have mood swings that my husband noticed. He even asked me when his nice wife was coming back. I decided after giving this is three months to go to a permanent birth control method.

Methods

feature creation, e.g. readability scores

ChatGPT3 helped with brand categorization

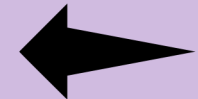
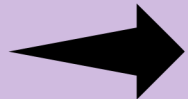
metrics: **F1-macro** for method prediction & **ROC-AUC** for sentiment prediction

ML classifiers: Decision Tree, Random Forest, Logistic Regression*

* final model for both predictions

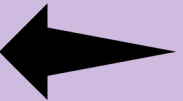
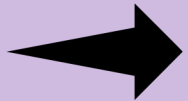
Model results – METHOD prediction

model	F1-macro	accuracy
Dummy Classifier (BASELINE)	0.14	28.2%
Random Forest	0.59	83.3%
... with hyperparameter tuning	0.59	83.3%
Logistic Regression	0.87	92.1%
... with hyperparameter tuning	0.90	94.2%



Model results – SENTIMENT prediction

model	ROC-AUC	recall	accuracy
Dummy Classifier (BASELINE)	0.48	37.9%	54.0%
Random Forest	0.92	61.3%	82.4%
... with hyperparameter tuning	0.93	63.0%	83.1%
Logistic Regression	0.93	96.0%	77.2%
... with hyperparameter tuning	0.95	91.3%	86.3%



Recommendations

abandon injectable

patch as pill alternative

promote that patch has favorable weight and body image effects

apply method and sentiment prediction models to online spaces

Further Inquiry

incorporate upvotes

recommendation algorithm

evidence of reviewers switching brands or methods

Thank you

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