

# Expressively Vulgar

The socio-dynamics of vulgarity and its effects on sentiment analysis in social media

Isabel Cachola, Eric Holgate, Daniel Preotiuc-Pietro, Junyi Jessy Li



**Eric Holgate**

@eholgate



Can't wait to hear more kickass talks today  
at [#coling2018](#) in beautiful [#santafe!](#)  
[#expressivelyvulgar](#)

7:07 AM - 23 Aug 2018




# Motivation

1 Vulgarity is prevalent in daily communication

2 Vulgarity is employed purposefully

3 Vulgarity is used for different goals

# Motivation

 **Positive**  
@vulgar1

today is a good ass day



2:48 PM - 6 May 2015

 **Negative**  
@vulgar2

Luicious is gonna get his ass handed to him tonight



5:19 PM - 22 Feb 2016

 **Neutral**  
@vulgar3

[URL] volunteering at the big ass indie art craft fair



2:48 PM - 6 May 2015

# Research Questions

Do demographic factors impact the expression of vulgarity?

1

Does vulgarity impact perception of sentiment?

2

Does modeling vulgarity explicitly help sentiment prediction?

3

# Agenda

- Data
- Demographic Analysis
- Perception of Vulgarity
- Modeling

# Data

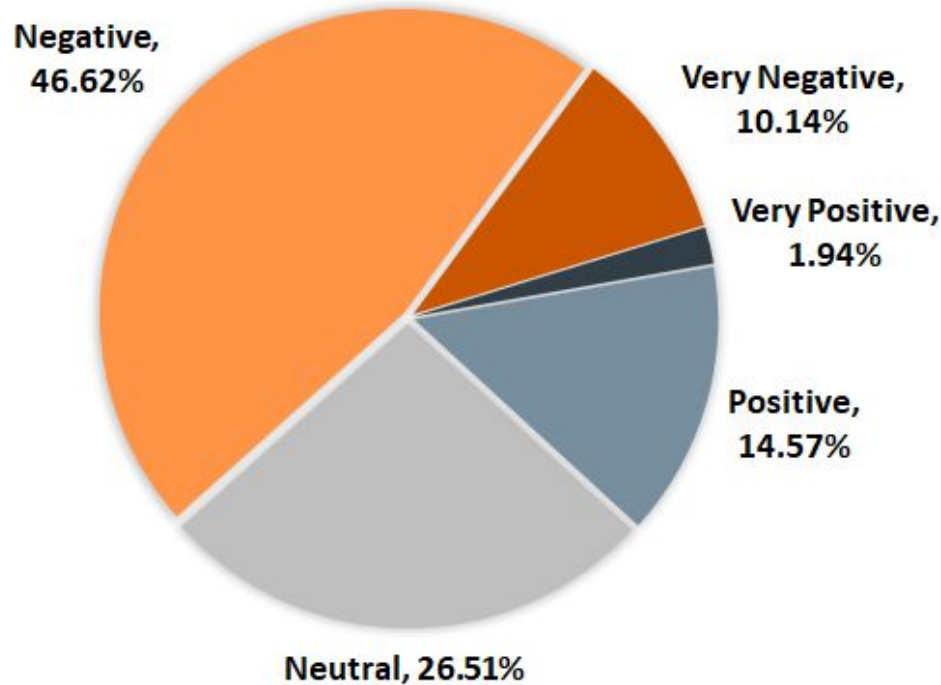
- We introduce a corpus of 6,800 vulgar tweets annotated for sentiment
  - Sourced from 4,132 users with demographic info (Preotiuc-Pietro et al., 2017)
    - Gender, age, education, income level, faith, political ideology
  - Vulgarity defined with a list from [www.noswearing.com](http://www.noswearing.com)
    - Regular expressions include spelling variation and self-censorship e.g., *damnnnnn* or *a\$\$*

# Data

- Annotated for sentiment
  - MTurk: each tweet rated by 9 annotators
  - 5 point scale + Not Applicable
  - Annotators with agreement  $< 0.3$  excluded
  - Tweets with  $< 5$  annotations excluded
- Available at: <https://github.com/ericholgate/vulgartwitter>



# Sentiment Distribution



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# Demographic Analysis

## Partial Pearson correlation

- Dependent variable: vulgar frequency (per user)
- Control for age & gender (e.g., Schwartz et al., 2013)

Demographic Trait	Pearson r	p-value
Gender	-0.077	$1.61^{-4}$
Age	-0.233	$6.64^{-31}$
Education	-0.100	$7.62^{-07}$
Income	-0.087	$1.73^{-05}$
Faith	-0.187	$2.74^{-20}$
Political Ideology	0.124	$8.69^{-10}$

# Demographic Analysis

## Results

- Females are less likely to post vulgar tweets than males
- Younger users and political liberals are more likely to post vulgar tweets
- Higher education, income, and faith are anti-correlated with usage of vulgarity

Demographic Trait	Pearson r	p-value
Gender	-0.077	$1.61^{-4}$
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Political Ideology	0.124	$8.69^{-10}$

# Research Questions

Do  
demographic  
factors impact  
the expression  
of vulgarity?

1

Yes!

# Research Questions

Do  
demographic  
factors impact  
the expression  
of vulgarity?

1

Does vulgarity  
impact  
perception of  
sentiment?

2

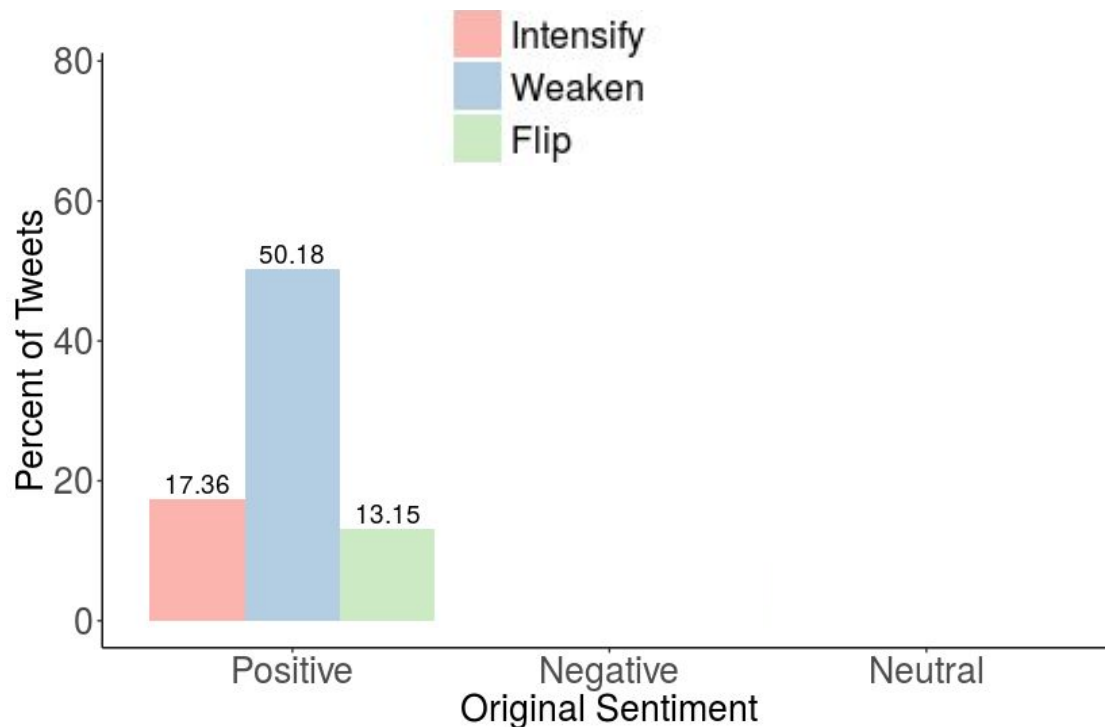
Does modeling  
vulgarity  
explicitly help  
sentiment  
prediction?

3

# Perception of Vulgarity

- Subset of 5,681 tweets were censored and re-annotated for sentiment along the same guidelines
- Example
  - Original: mixing all the flavors together at the drink fountain was a good idea when i was 8 now it just makes a shitty drink
  - Censored: mixing all the flavors together at the drink fountain was a good idea when i was 8 now it just makes a \_\_\_\_\_ drink

# Perception of Vulgarity





# Research Questions

Does vulgarity  
impact  
perception of  
sentiment?

2

**Yes!**

# Research Questions

Do demographic factors impact the expression of vulgarity?

1

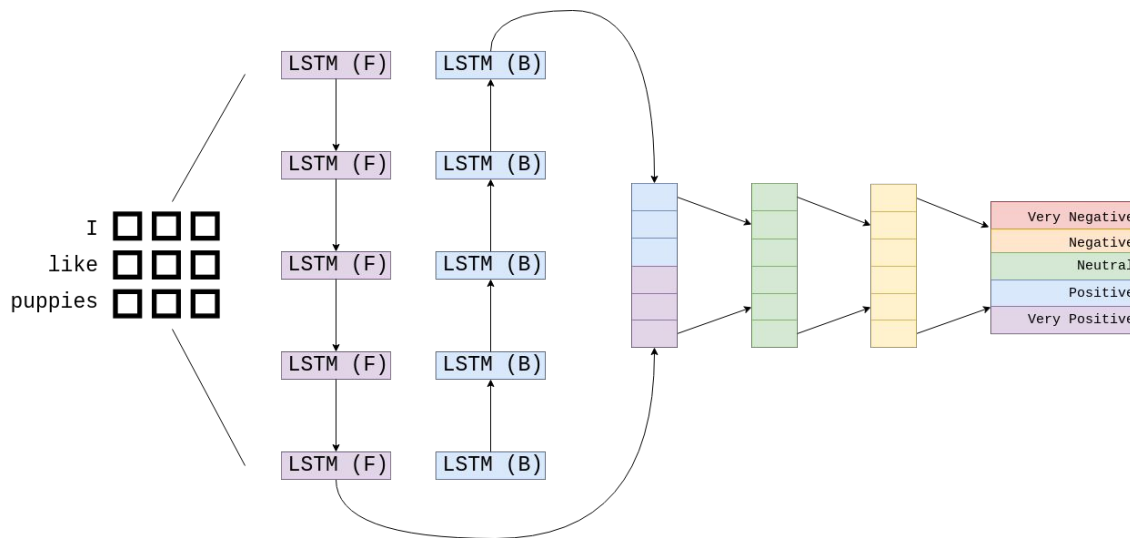
Does vulgarity impact perception of sentiment?

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Does modeling vulgarity explicitly help sentiment prediction?

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# Modeling



## Baseline Architecture: Bidirectional LSTM

# Modeling

1

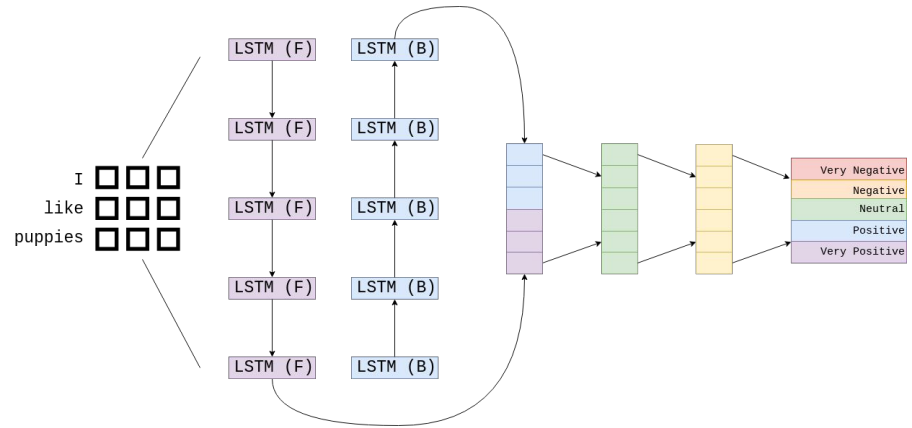
**Masking:** This is the <VG>.

2

**Insertion:** This is the shit <VG>.

3

**Concatenation:** This is the shit → 1



# Modeling: Vulgar Twitter Results

Model	Bi-LSTM	Insertion	Concatenation	Masking
Error	0.791	<b>0.759</b>	<b>0.761</b>	0.898

Lower is better.

# Modeling Examples

Text	True Label	Baseline Prediction	Insertion Prediction	Concat Prediction
welcome to my personal hell	<b>Negative</b>	Neutral	<b>Negative</b>	<b>Negative</b>
so fucking excited	<b>Very Positive</b>	Neutral	Negative	Negative

# Modeling: SemEval 2017 Task 4 Results

Model	Bi-LSTM	Insertion	Concatenation	Masking
Error	1.320	<b>1.068</b>	<b>1.148</b>	1.666

Lower is better.

# Research Questions

Does modeling  
vulgarity  
explicitly help  
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3

**Yes!**



# Take Aways

- Vulgarity is intentional
  - It serves many pragmatic functions
  - The use of vulgarity impacts sentiment perception
- Vulgar frequency correlates with sociodemographic factors
- Modeling vulgarity is useful for NLP

# Future Work

- Can we explicitly categorize and model pragmatic functions of vulgar words?

# Spoiler Alert: Yes!

- EMNLP 2018:  
Why Swear? Analyzing and Inferring the Intentions of Vulgar Expressions  
Eric Holgate, Isabel Cachola, Daniel Preotiuc-Pietro, Junyi Jessy Li
- Categorize, annotate, and predict vulgar functions
  - Aggression
  - Emotion
  - Emphasis
  - Auxiliary
  - Signal Group Identity
  - Non-Vulgar Use
- Vulgar functions are useful downstream

# Thank You!

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