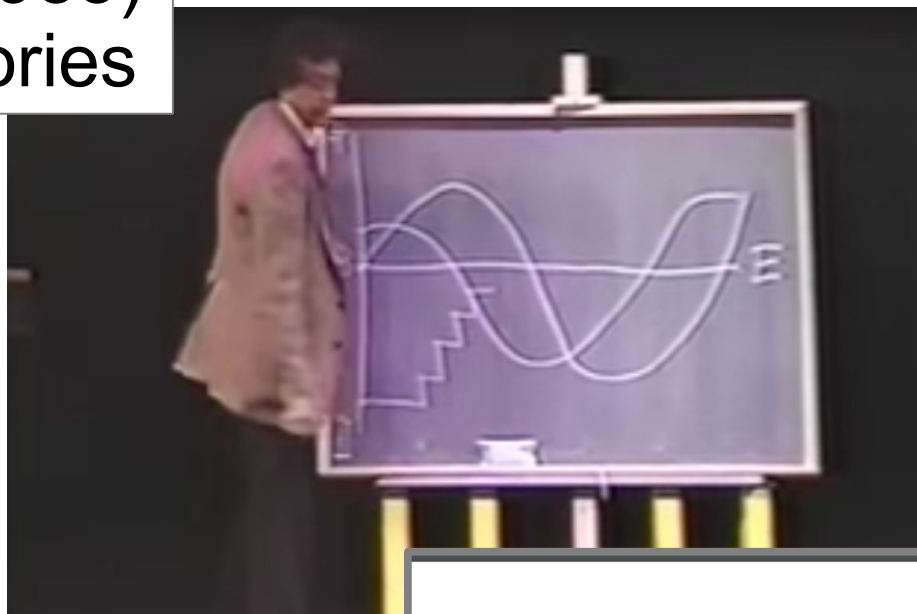
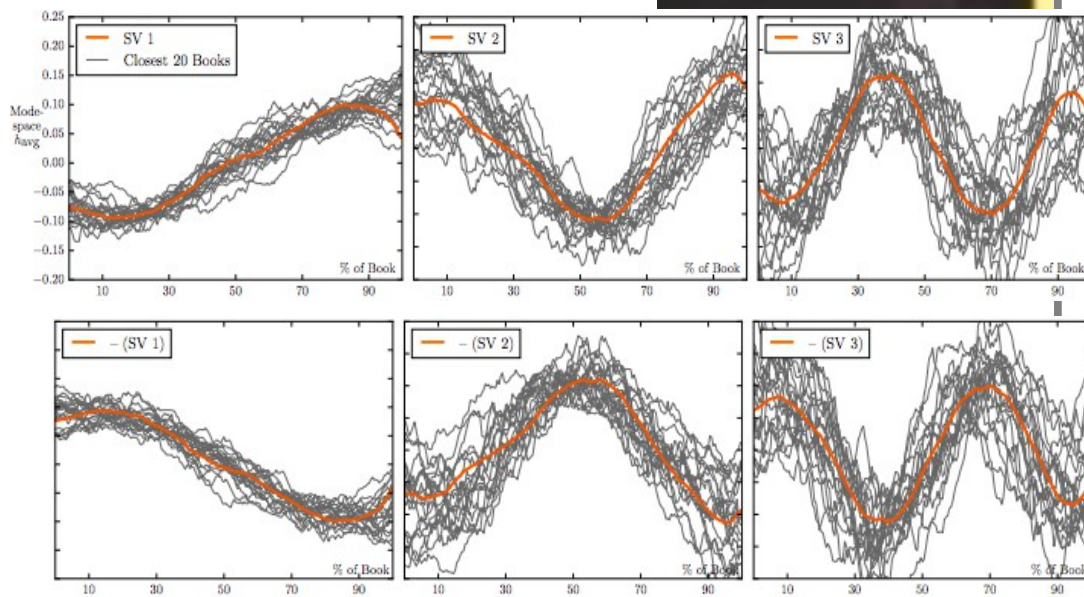


# Kurt Vonnegut (1985) The Shape of Stories



July 2016



## The emotional arcs of stories are dominated by six basic shapes

Andrew J. Reagan,<sup>1</sup> Lewis Mitchell,<sup>2</sup> Dilan Kiley,<sup>1</sup> Christopher M. Danforth,<sup>1</sup> and Peter Sheridan Dodds<sup>1</sup>

<sup>1</sup>Department of Mathematics & Statistics, Vermont Complex Systems Center, Computational Story Lab, & the Vermont Advanced Computing Core, The University of Vermont, Burlington, VT 05401

<sup>2</sup>School of Mathematical Sciences, The University of Adelaide, SA 5005 Australia  
(Dated: July 8, 2016)

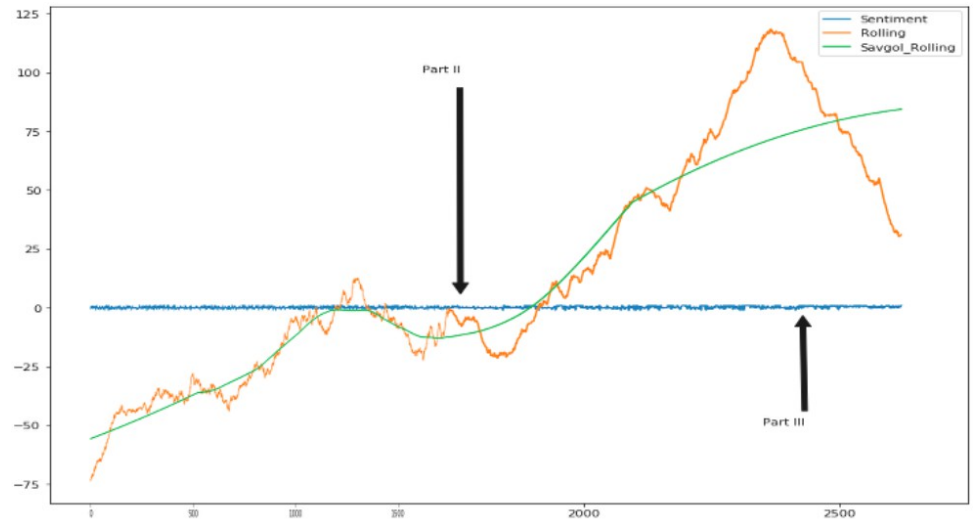
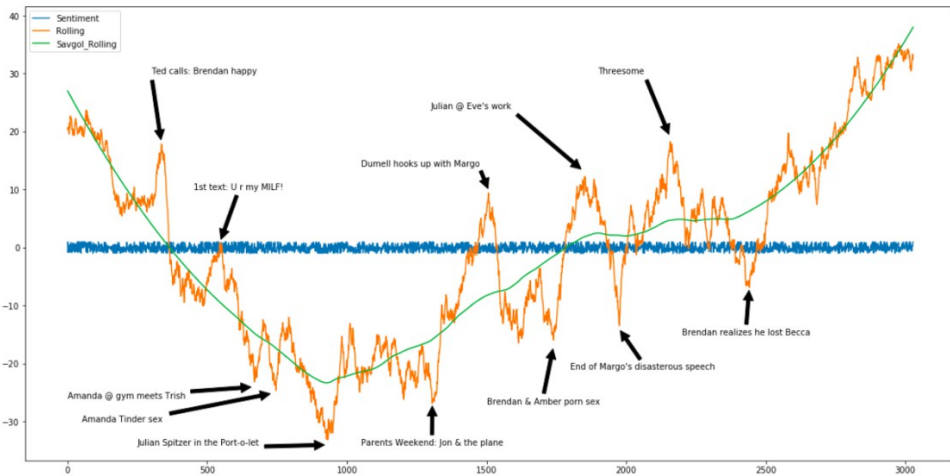
Advances in computing power, natural language processing, and digitization of text now make it possible to study our a culture's evolution through its texts using a "big data" lens. Our ability to communicate relies in part upon a shared emotional experience, with stories often following distinct emotional trajectories, forming patterns that are meaningful to us. Here, by classifying the emotional arcs for a filtered subset of 1,737 stories from Project Gutenberg's fiction collection, we find a set of six core trajectories which form the building blocks of complex narratives. We strengthen our findings by separately applying optimization, linear decomposition, supervised learning, and unsupervised learning. For each of these six core emotional arcs, we examine the closest characteristic stories in publication today and find that particular emotional arcs enjoy greater success, as measured by downloads.

## I. INTRODUCTION

The power of stories to transfer information and define our own existence has been shown time and again [1–5]. We are fundamentally driven to find and tell stories, likened to *Pan Narrans* or *Homo Narrativus*. Stories are encoded in art, language, and even in the mathematics of physics. We use equations to represent both simple and

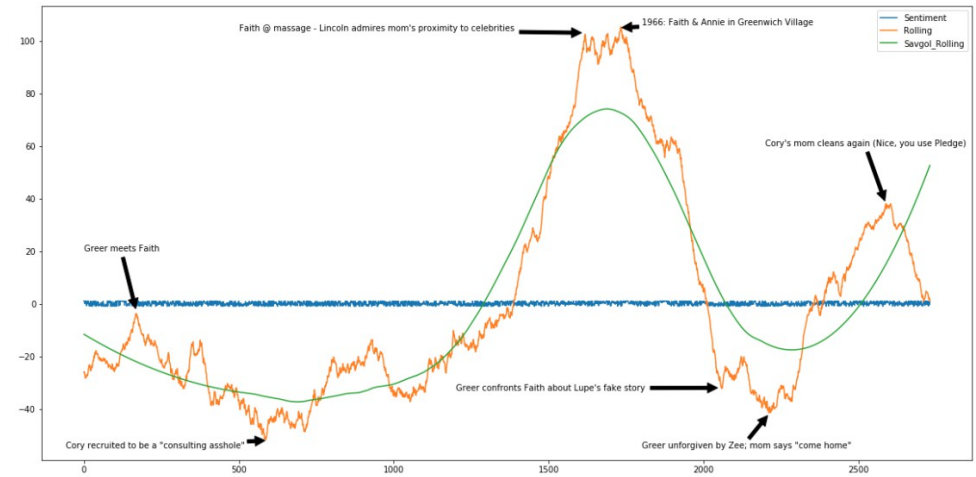
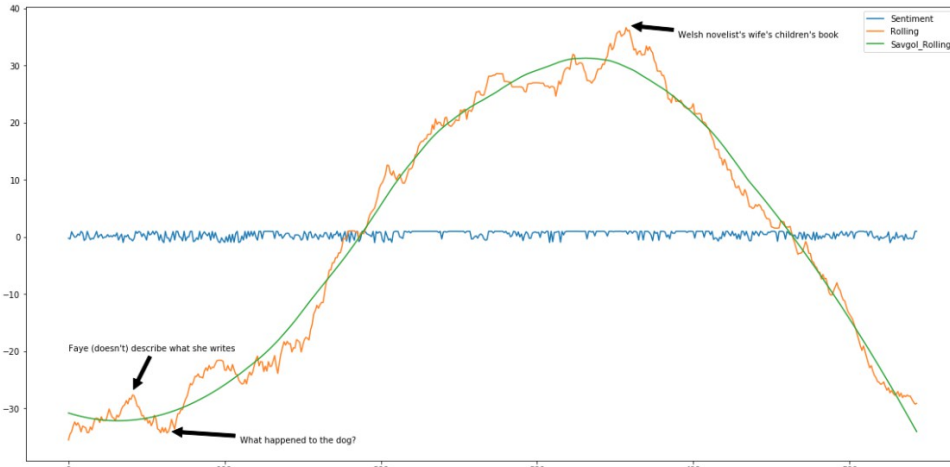
three before concluding with a final resolution. While the plot captures the mechanics of a narrative and the structure encodes their delivery, in the present work we examine the emotional arc that is invoked through the words used. The emotional arc of a story does not give us direct information about the plot or the intended meaning of the story, but rather exists as part of the whole narrative. This distinction between the emotional arc

## Mrs. Fletcher – Tom Perrotta (2017)

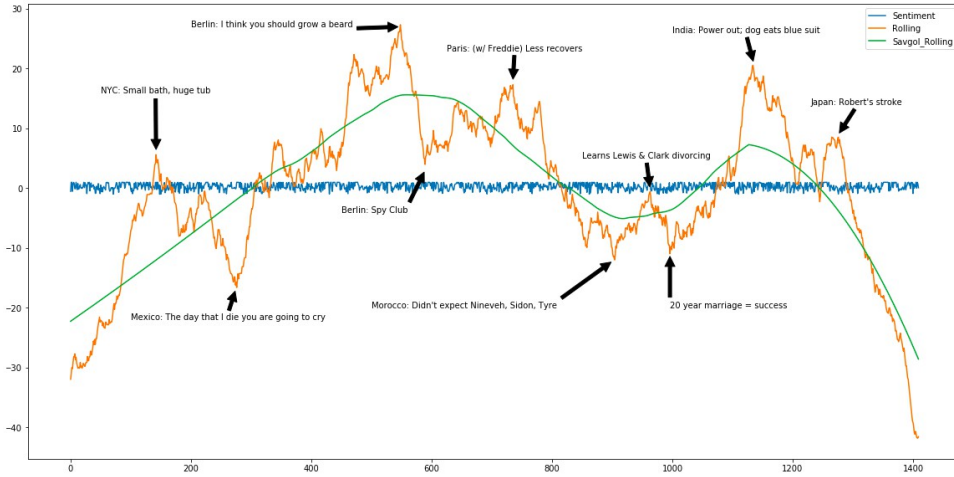


## Asymmetry – Lisa Halliday (2018)

## Kudos – Rachel Cusk (2018)

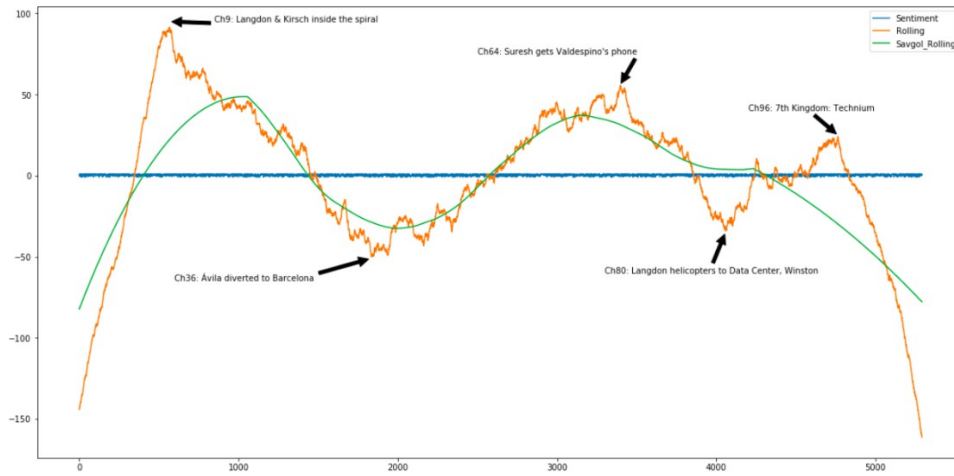
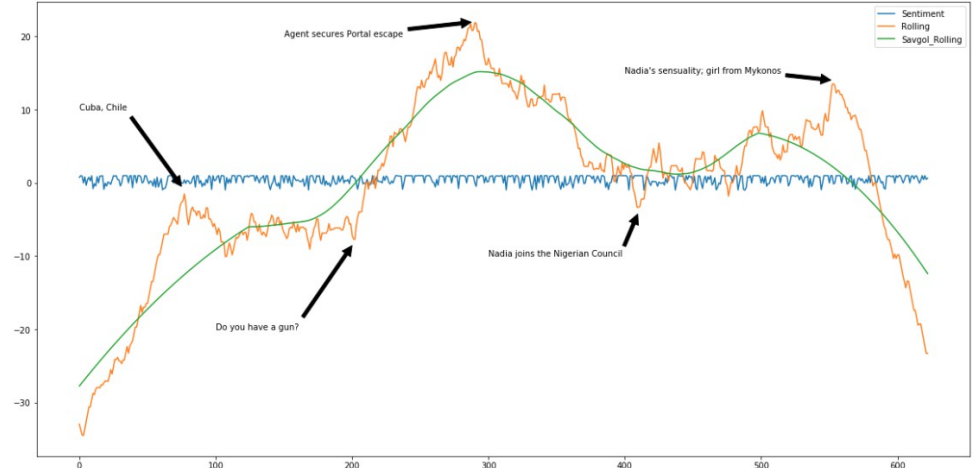


## The Female Persuasion – Meg Wolitzer (2017)



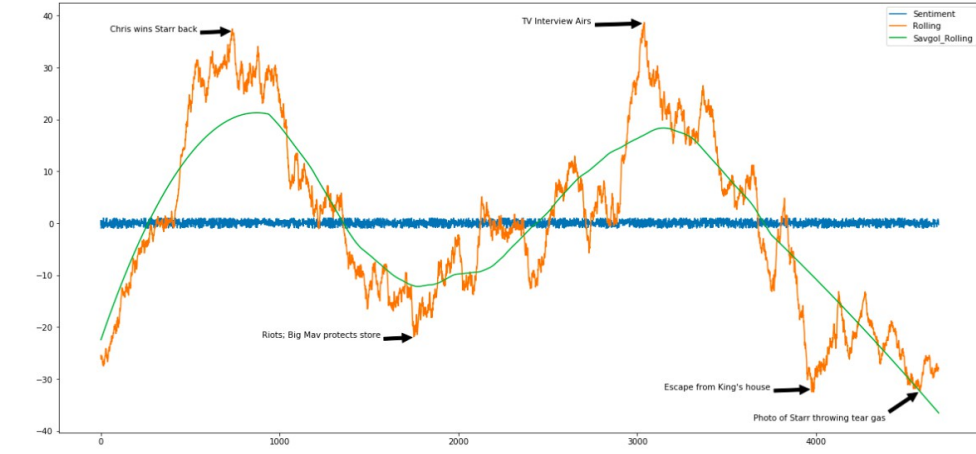
**Less – Andrew Sean Greer (2017)**

**Exit West – Mohsin Hamid (2018)**



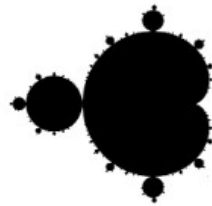
**Origin – Dan Brown (2017)**

**The Hate U Give – Angie Thomas (2017)**



## Two text files:

- 1) Paragraphs
- 2) Chapter/Section Titles



TextBlob

TextBlob: Simplified Text  
Processing v. 0.15.2

Jupyter Lab, Python,  
Pandas, SciPy,  
Matplotlib

```
from textblob import TextBlob
from textblob.sentiments import NaiveBayesAnalyzer

def rate_sentiment(row):
    para = row['Paragraph']
    blob = TextBlob( para, analyzer=NaiveBayesAnalyzer() )
    ## Convert (0 1) range to (-1 +1)
    return 2*(blob.sentiment.p_pos - .5)

df['Sentiment'] = df.apply(rate_sentiment, axis=1)
```

```
from scipy import signal

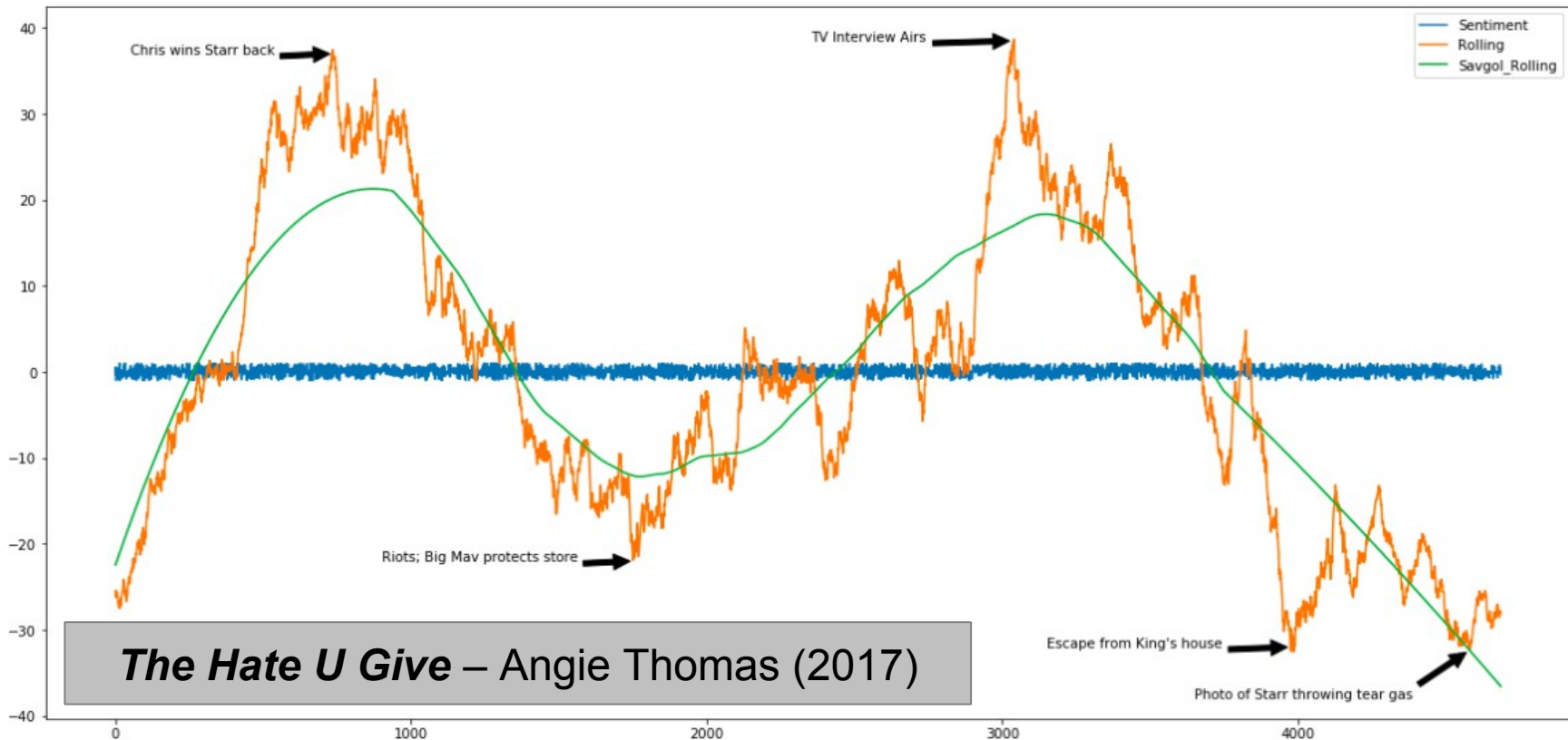
# Size the window (20% works well)
rolling_x = int( df.shape[0] * .2 )

# Rolling sentiment sum
df['Rolling'] = df['Sentiment'].rolling( window = rolling_x, min_periods = 15, center=True).sum()

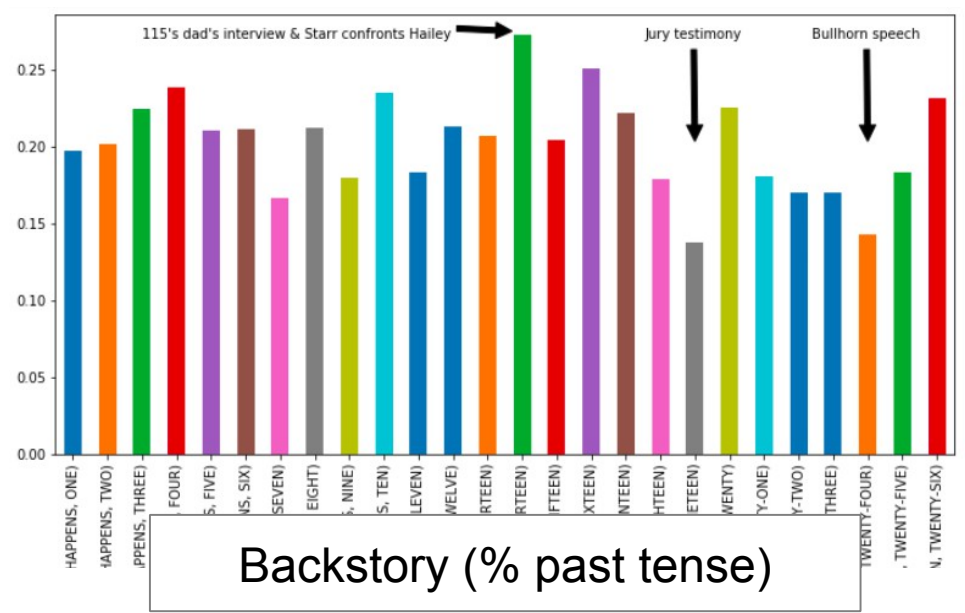
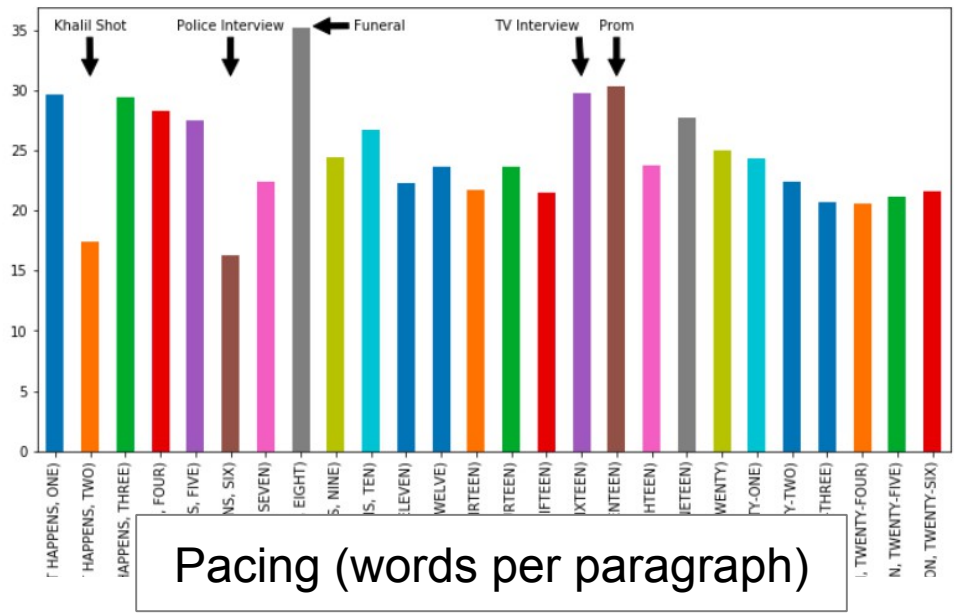
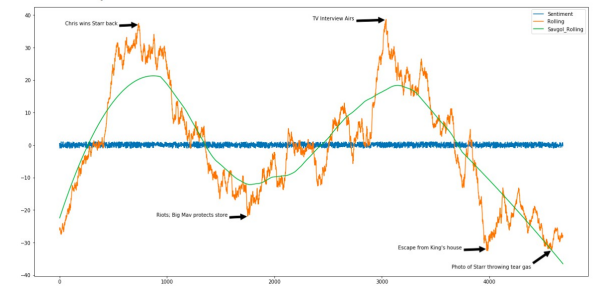
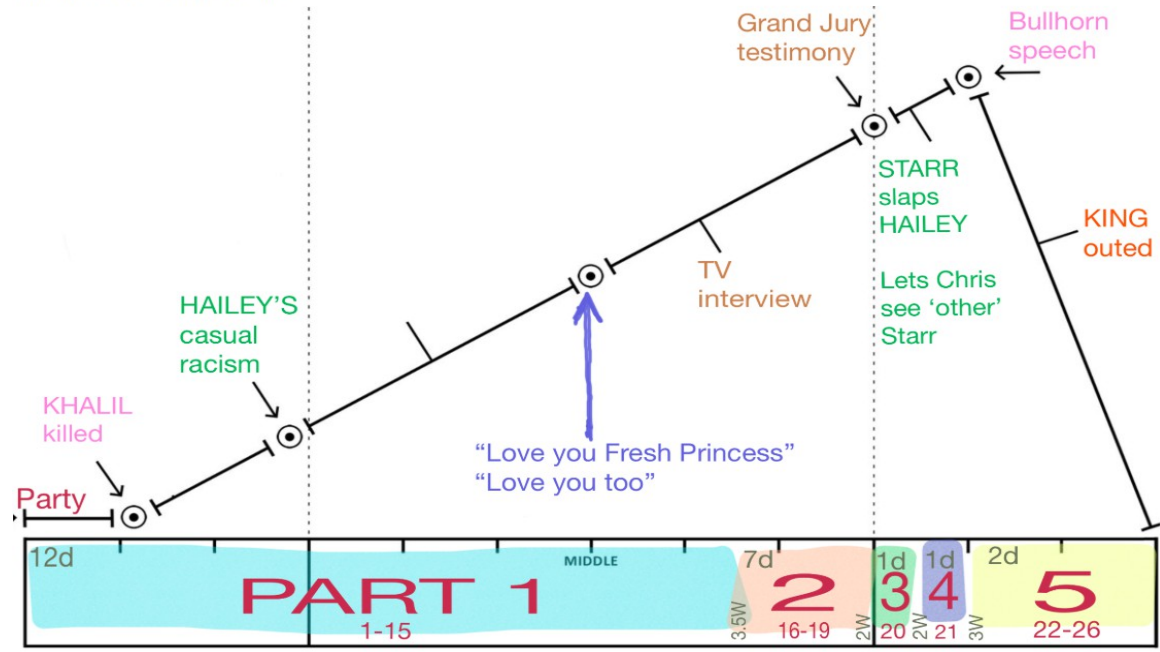
# Apply a Savitzky-Golay filter
df['Savgol_Rolling'] = signal.savgol_filter(df['Rolling'], (rolling_x * 2)+1, 2)

# Adjust line so that the mean is zero
zero_line = df['Rolling'].mean()
df['Rolling'] = df['Rolling'] - (zero_line)
df['Savgol_Rolling'] = df['Savgol_Rolling'] - (zero_line)
```

	Section	Chapter	Paragraph	Sentiment	Rolling	Savgol_Rolling	Word_Count
0	PART 1: WHEN IT HAPPENS	ONE	I shouldn't have come to this party.	-0.26105086541152644	-25.469119449610808	-22.451881414465124	9
1	PART 1: WHEN IT HAPPENS	ONE	I'm not even sure I belong at this party. That's not on some bc	0.5602659896667985	-25.419273556798952	-22.351554750289672	50
2	PART 1: WHEN IT HAPPENS	ONE	I squeeze through sweaty bodies and follow Kenya, her curls	-0.9811657093104336	-26.22649799536031	-22.25134327668779	91
3	PART 1: WHEN IT HAPPENS	ONE	We break out the crowd. Big D's house is packed wall-to-wall.	-0.9050851211411015	-25.659230571212177	-22.151246993659473	147
4	PART 1: WHEN IT HAPPENS	ONE	"Stop following me and go dance, Starr," Kenya says. "People	0.16217814520411178	-25.535470953336024	-22.051265901204726	21
5	PART 1: WHEN IT HAPPENS	ONE	"I didn't know so many mind readers lived in Garden Heights."	-0.4733166861283059	-25.759666493731178	-21.95139999932354	98
6	PART 1: WHEN IT HAPPENS	ONE	"Hey, I'm just saying. You act like you don't know nobody 'cau	-0.5641491053845393	-25.90716657398259	-21.851649288015928	24
7	PART 1: WHEN IT HAPPENS	ONE	I've been hearing that for six years, ever since my parents pu	0.4549585941917811	-25.98583781512826	-21.752013767281877	23
8	PART 1: WHEN IT HAPPENS	ONE	"And it wouldn't kill you to not dress like . . ." She turns up her	-0.7753532972045913	-26.375141344460417	-21.652493437121397	40
9	PART 1: WHEN IT HAPPENS	ONE	Our brother's hoodie. Kenya and I share an older brother, Sev	0.21736438967221883	-26.826188072361592	-21.553088297534483	46
10	PART 1: WHEN IT HAPPENS	ONE	"Figures. You know what else people saying too. Got folks thi	-0.6543011138447086	-26.63564432571778	-21.453798348521133	18
11							11



# The Hate U Give – Angie Thomas (2017)



The New York Times

BOOKS NEWS

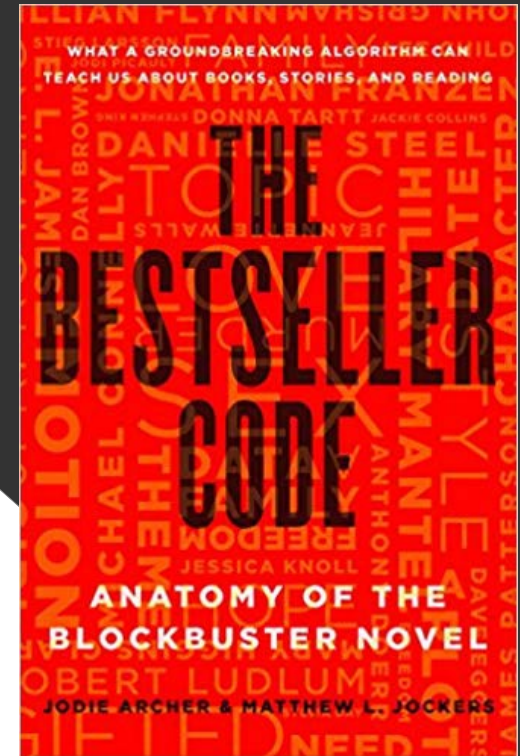
# Wattpad, the Storytelling App, Will Launch a Publishing Division

By Concepción de León

Jan. 24, 2019



Wattpad CEO and co-founder Allen Lau. Chris Young for The New York Times



# Thank You!

## BOULDER BOOK CLUB FOR WRITERS

1ST WEDNESDAYS AT 6 P.M.

2019

- **January 2:** *Exit West* – Mohsin Hamid (2017) @ Main Boulder Library
- **February 10:** *The Female Persuasion* – Meg Wolitzer (2018) @ Main Boulder Library
- **March 4:** *Kudos* – Rachel Cusk (2018) @ Main Boulder Library
- **April 3:** *There There* – Tommy Orange (2018) @ Main Boulder Library

2018

- **August 1:** *The Hate U Give* – Angie Thomas (2017) @ Boulder Book Store
- **September 5:** *Less* – Andrew Sean Greer (2017) @ Boulder Book Store
- **October 3:** *Mrs. Fletcher* – Tom Perotta (2017) @ Boulder Book Store
- **November 7:** *Origin* – Dan Brown (2017) @ Boulder Book Store
- **December 5:** *Asymmetry* – Lisa Halliday (2018) @ Colorado Building



<http://GaryAlanMcBride.com>