Business Help From Yelp

Insights into Yelp's Open Dataset

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Github.com/yuchild/business_help_from_yelp

Data Source: Yelp Open Dataset

6,685,900 reviews

192,609 businesses

200,000 pictures

10 metropolitan areas

1,223,094 tips by 1,637,138 users
Over 1.2 million business attributes like hours, parking, availability, and ambience
Aggregated check-ins over time for each of the 192,609 businesses

Source: yelp.com/dataset

Executive Summary

1. Elite users have **different** user engagements
2. Funny Feedback = Cool Feedback
3. There is a 10am Slump in ratings and review words dip

Summary Yelp Open Dataset Used:

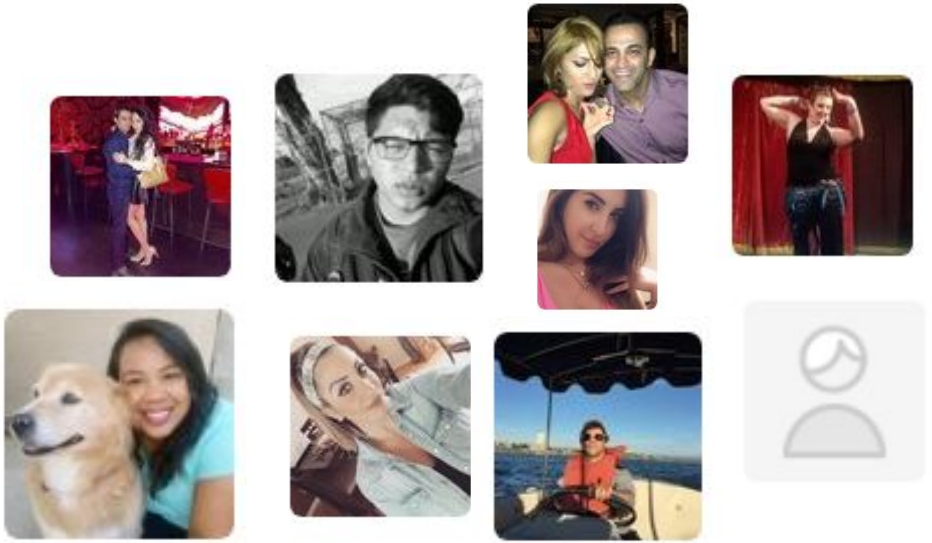
File Name	Number of Entries	Attributes
business.json	192609	names, stars, reviews_count, city, state, attributes, categories
checkin.json	161950	business_id, dates
photo.json	200000	caption, label
review.json	5376719	review_id, user_id, business_id, stars, useful, funny, cool, text, date
tip.json	1223094	text, date, compliment_count
user.json	1637138	review_count, useful, funny, cool, fans, avg_stars, compliment_hot ...

Users Are Important

Dataset **users.json** contains **1.6 Million** Entries

Users write ***reviews*** and give ***compliments***

But they don't do both all the time!



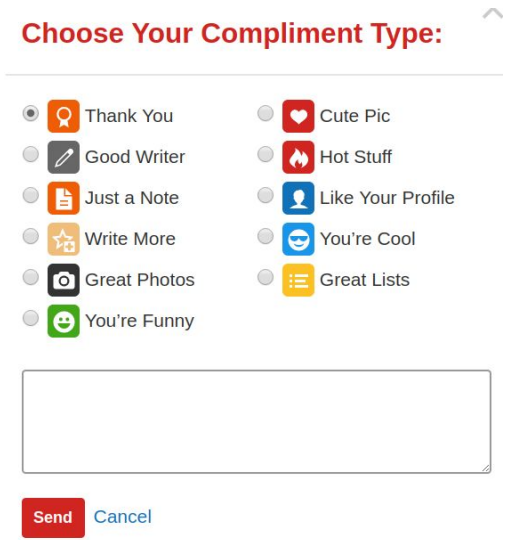
Users Are Important

Most people do combinations of feedbacks...

Elite users are yearly qualified professional promoters

They generate **send** reviews and

receive compliments



Users Activities: Sent

From **user.json**, user sent attributes are ***sum*** of..

Written reviews Count

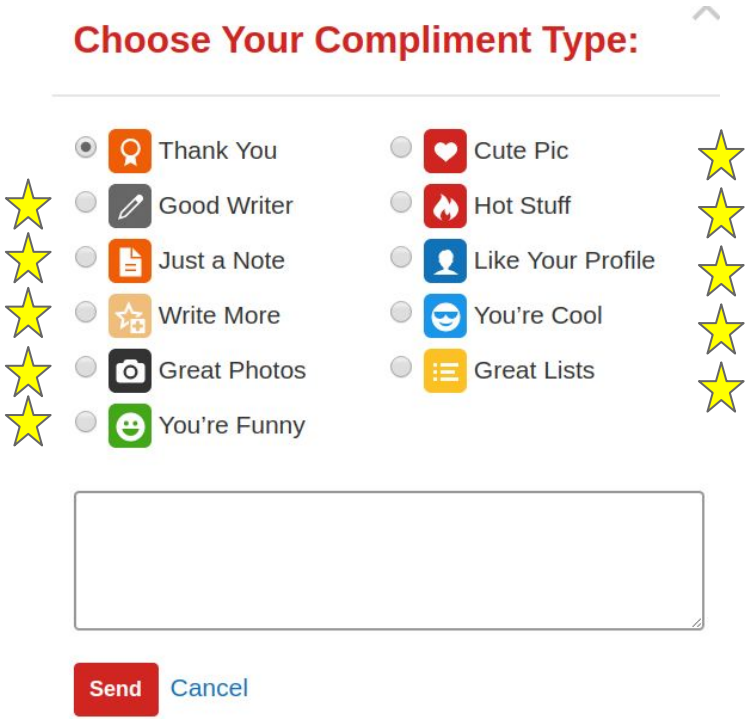
Useful

Funny

Cool

Users Activites: Received

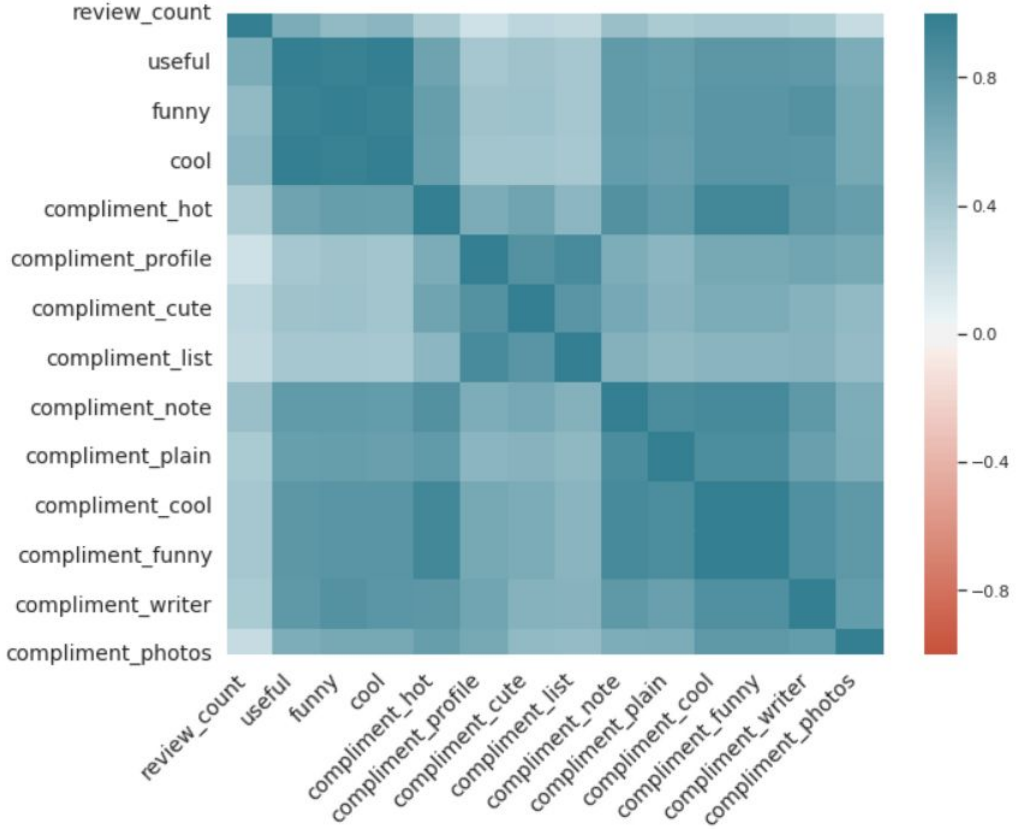
User **received** attributes are ***sum*** of compliments (stared):



Pearson Correlation:

Sent:

Received:



Take away:
Sent and Received are positively correlated

How Elite Are You?

Assume user ***engagement*** is measured by ***difference***

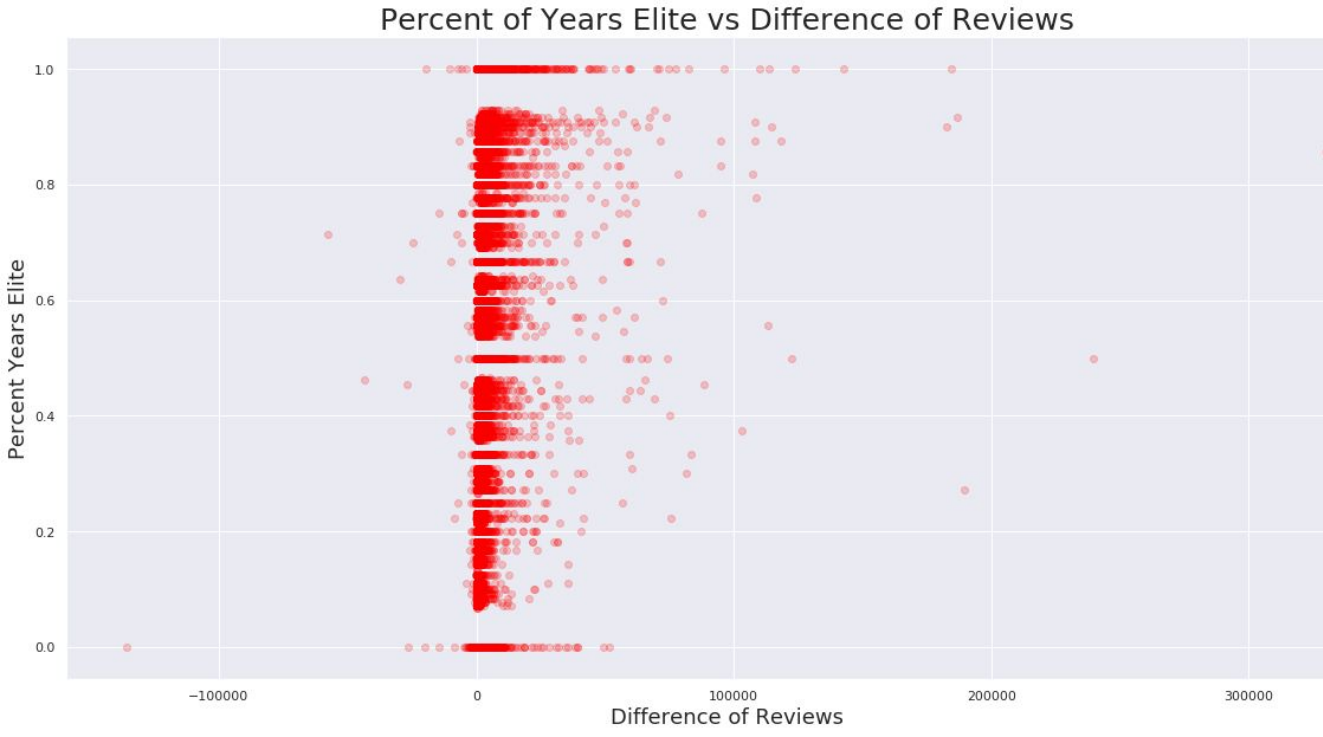
of *reviews* and

compliments.

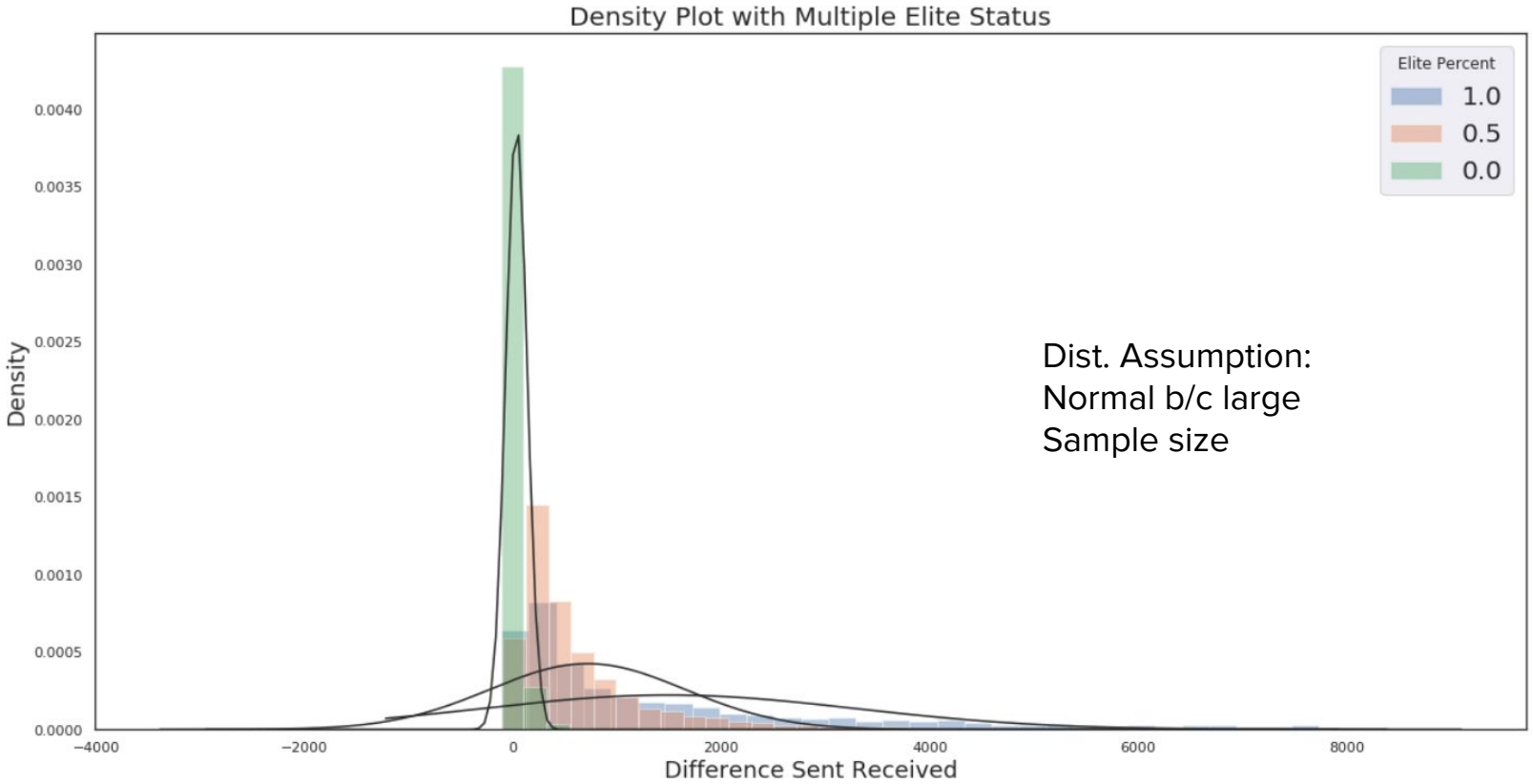
Is there a ***difference***

amongst

percent elites?



How Elite Are You?



Dist. Assumption:
Normal b/c large
Sample size

Hypothesis: Elite vs Half Elite

Null

$$H0: \mu_{\text{Elite}} = \mu_{\text{Half Elite}}$$

Alternative

$$HA: \mu_{\text{Elite}} \neq \mu_{\text{Half Elite}}$$

Results:

```
z statistic: -1.9168
p-value: 0.0553

DO NOT REJECT H0. Means are
statistically similar.
```

Warning: Conclusion subject to Type I error because p-value is close to alpha set to 0.05

Hypothesis: Elite vs Not Elite

Null

H0: $\mu_{\text{Elite}} = \mu_{\text{Not Elite}}$

Alternative

HA: $\mu_{\text{Elite}} \neq \mu_{\text{Not Elite}}$

Results:

```
z statistic: 11.2716
p-value: 0.0000

REJECT H0. Means are
statistically different.
```

Hypothesis: Half Elite vs Not Elite

Null

H0: $\mu_{\text{Half Elite}} = \mu_{\text{Not Elite}}$

Alternative

HA: $\mu_{\text{Half Elite}} \neq \mu_{\text{Not Elite}}$

Results:

```
z statistic: 17.9632
p-value: 0.0000

REJECT H0. Means are
statistically different.
```

Proportion z Hyp. Testing

Null

H0: $p_{Funny} = p_{Cool}$

Alternative

HA: $p_{Funny} \neq p_{Cool}$

Results:

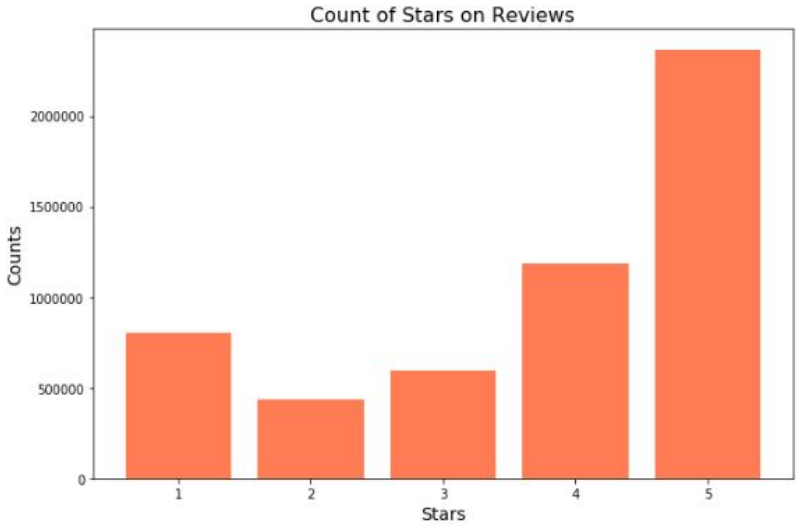
```
z statistic: -1.1642
p-value: 0.2443

DO NOT REJECT H0. Proportions
are statistically similar.
```

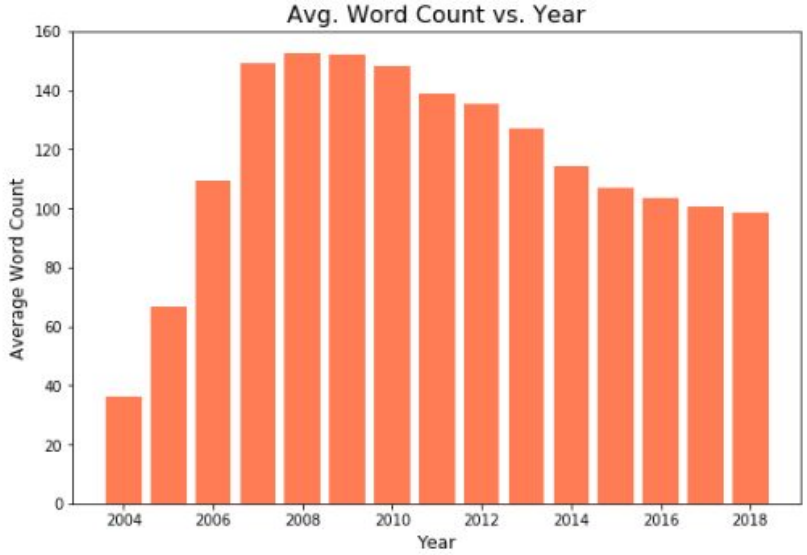
Conclusion:
Average Proportions of Funny and Cool sent are similar.

Reviews Star Struck?

The **review.json** file has 5.4 Million entries

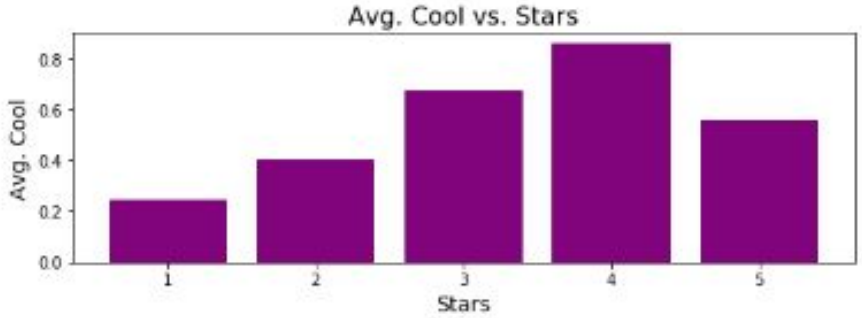
Here we will focus on stars and time stamp given on reviews

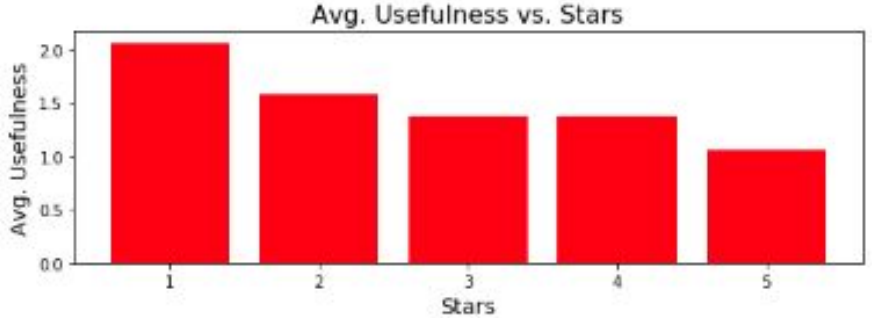


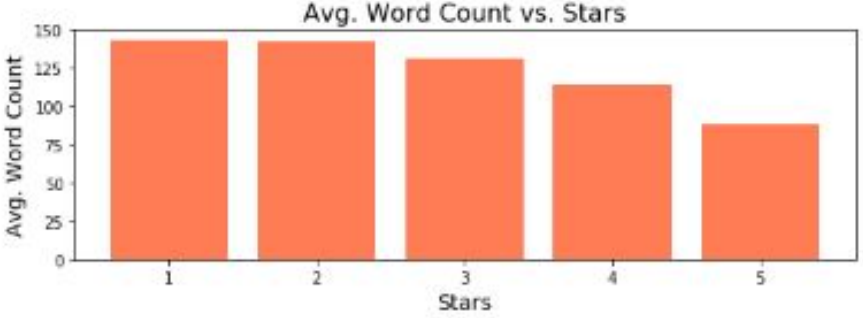


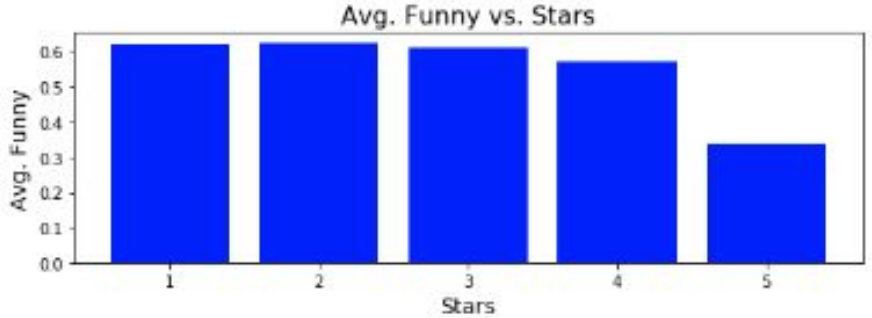
Reviews Star Struck?

See any ***patterns***?



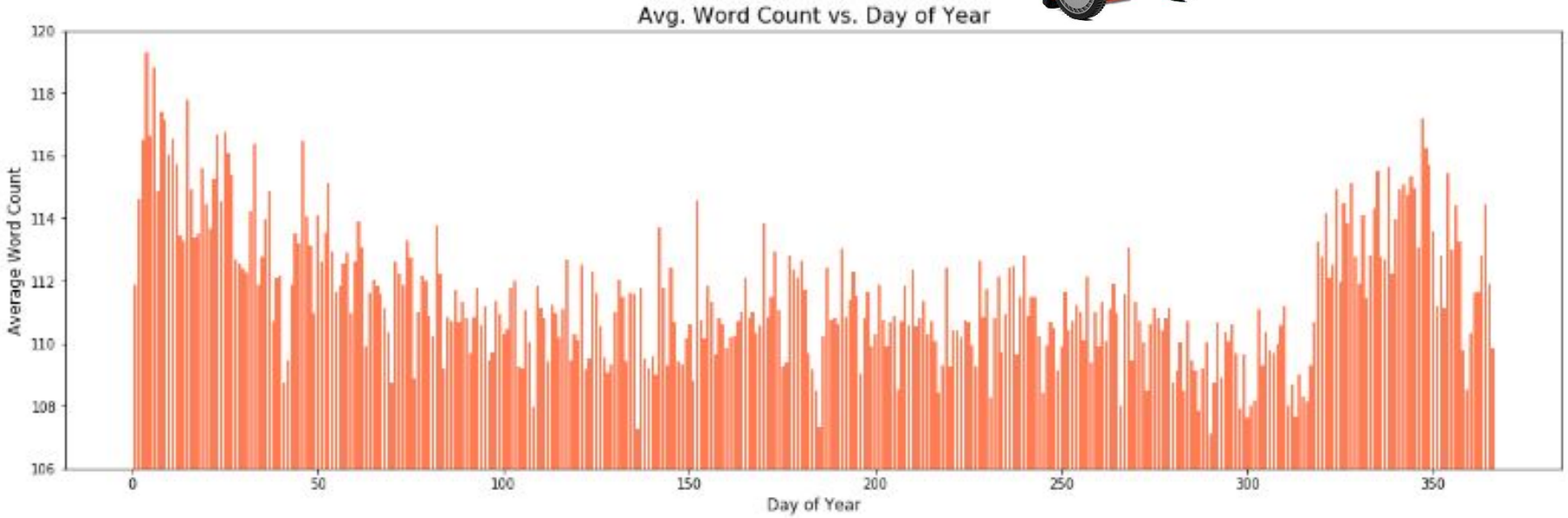






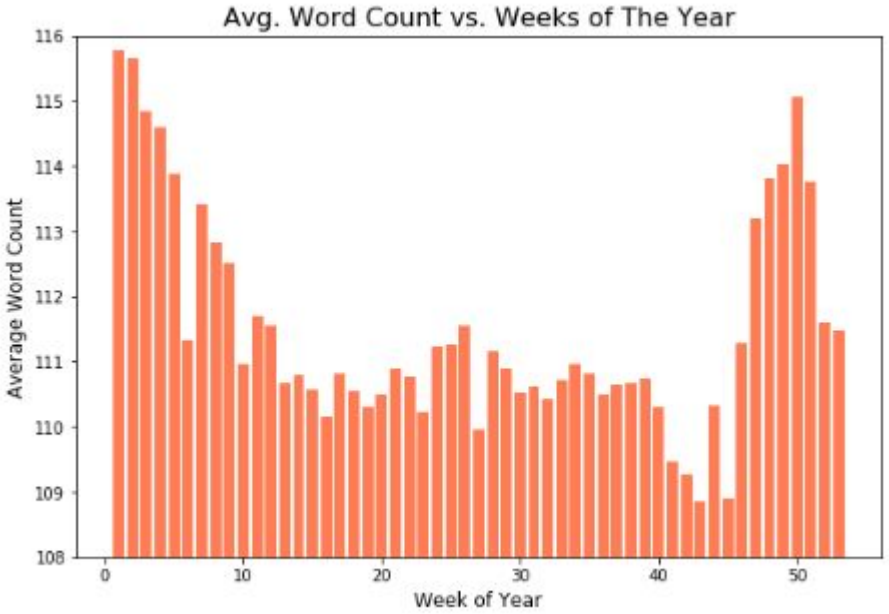
Word Count and Time

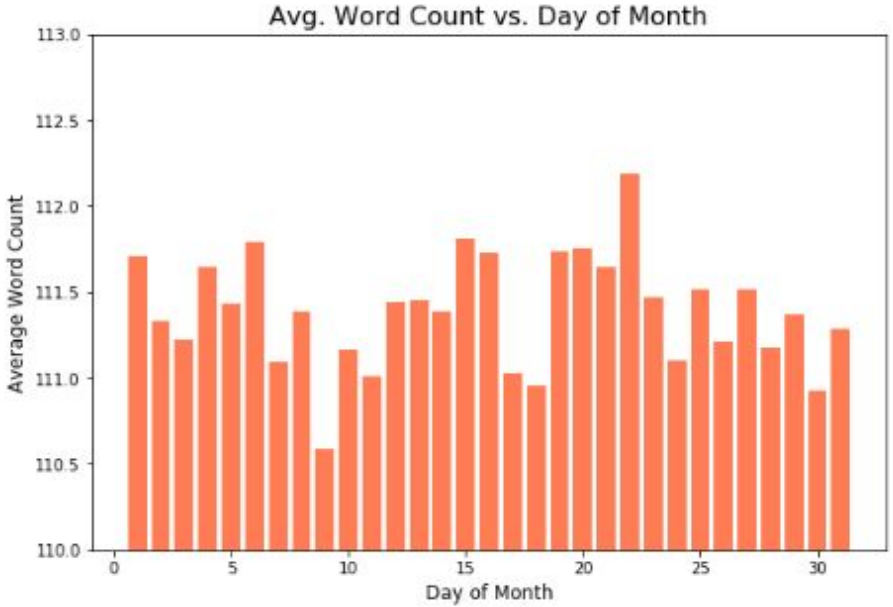
Time to trim some counts!



Marginal Avg. Word Count

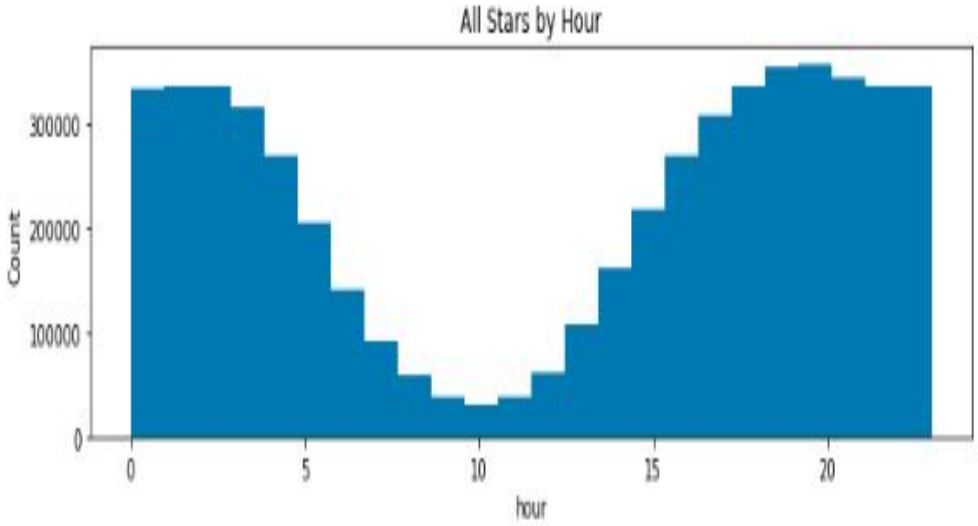
Notice the y-axis!

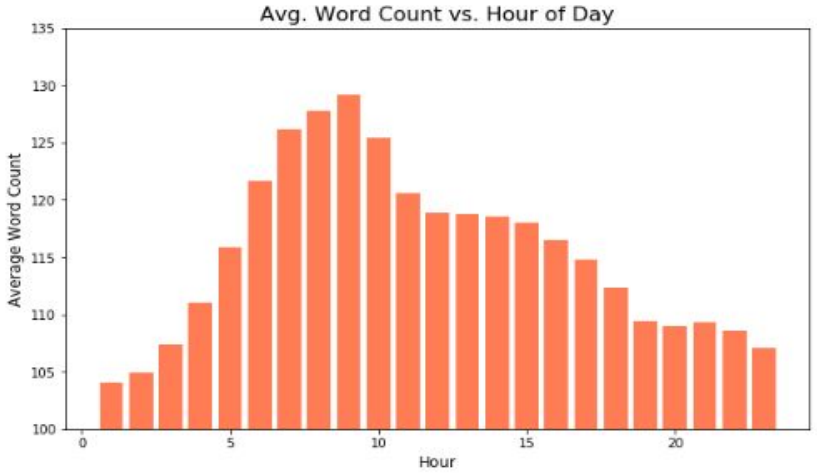




Word Count and Time

Hour of the day is important! See the 10am slump?





Chi Square Hyp. Testing

Null

H0: **NO** statistical relationship exist between ***star count*** and ***hour of the day***

Alternative

HA: Statistical relationship **exists**

Results:

```
Chi Sqaure Statistics: 10051.1773
Critical Value: 1232.0735
p-value: 0.0000

Reject H0. There is A relationship
between the two categorical variables
```

Conclusion:
Statistical relationship exists between star count and hour of the day

Chi Square Hyp. Testing

Null

H0: **NO** statistical relationship

exist between ***STAR*** count

and ***MINUTE*** in the hour

Alternative

HA: Statistical relationship **exists**

Results:

```
Chi Sqaure Statistics: 238.3721
Critical Value: 1232.0735
p-value: 1.0000


Cannot Reject H0. There is NO
relationship between the two catgorical variables
```

Conclusion:
No statistical relationship exist between star count and minute in the hour

Conclusion:

1. Elite users have **different** user engagements
2. Proportion of Funny Feedback = Proportion of Cool Feedback
3. There is a 10am Slump in ratings and review word dip