



#metoo Through the Lens of Social Media

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Abstract. Sexual abuse – a highly stigmatized topic in the society has spurred a revolution in the recent days especially through the shared posts on social media platforms via attaching the hashtag #metoo. Individuals from different backgrounds and ethnicities began sharing on the online venues about their personal experiences of getting sexually assaulted. This paper makes an initial attempt to assess the public reactions and emotions by utilizing the publicly shared #metoo posts by performing a comparative analysis of the tweets shared on Twitter as well as on Reddit. Though nearly equal ratios of negative and positive posts are shared on both platforms, Reddit posts are focused on the sexual assaults within families and workplaces while Twitter posts are on showing empathy and encouraging others to continue the #metoo movement. The data collected in this research helps in the preliminary analysis of the user engagement, discussion topics, word connotations and sentiment with respect to the #metoo movement.

1 Introduction

Sexual abuse has been traditionally buried due to the fear of shame, retribution and retaliation. Sexual abuse, and abuse in general is a very difficult topic for individuals to talk about, irrespective of an online or an offline setting [9, 10]. In United States itself, on an average there are 321,500 victims (age 12 or older) of rape and sexual assault each year where, ages 12–34 are the highest risk years. The trauma of the sexual abuse has resulted in the long-term negative impacts such as anxiety, suicidal behavior, PTSD, panic disorder, mood and behavioral disorder problems [3].

This Stigmatized topic – sexual abuse, has gained a lot of attention recently especially with individuals self-disclosing their personal experiences on online social media platforms. While many personal stories have gained attention from the media and general public as the #metoo movement¹ where, most of the reports that gained attention were only the experiences of few people. With the online venues enabling individuals to maintain privacy and to self-disclose

¹ Although the term #metoo was originally coined in 2006 by social activists to raise awareness about sexual abuse, it became viral in October 2017, following the alleged sexual misconduct in the Hollywood.

their true feelings [5–8], numerous individuals joined this movement through sharing their personal experiences and opinions about sexual abuse. The shared posts include different types of experiences related to sexual abuse as well as the opinions about how to bring awareness in the society to combat such issues. It is not very clear what the individuals are sharing through these posts as majority of the media coverages are about few individuals who are popular. Through a comparative analysis of posts shared on Twitter and Reddit, this paper provides a preliminary analysis on the demographics, user engagement, discussion topics, word connotations and sentiment.

2 Data

We obtained two sets of data from Twitter and Reddit using their corresponding python APIs – <https://goo.gl/P6GoFy> and <https://goo.gl/F3981i> respectively. We collect 620,348 posts from 205,489 users on Twitter and 190 posts from 70 users on Reddit. On Twitter, we crawl the public posts (from October 2017 to January 2018) that are attached with the #metoo hashtag where as for Reddit, we crawl all the self posts shared on */r/metoo* subreddit. The data includes all the meta-data associated with the post.

3 Social Engagement

Due to the sensitivity of the topic and specifically the viral nature of the #metoo hashtag, we first want to investigate how the tweets shared on this topic engage other users on Twitter. We compute statistics about the engagement attributes that include – number of favorites these tweets received, number of times a tweet is retweeted, number of mentions in the tweets and the number of hashtags attached to these tweets. Table 1 shows that on an average these tweets receive atleast 5 favorites and 2 retweets which is relatively more engaging compared to general tweets [12]. This might be due to other users endorsing the tweets. On the other hand, it is surprising to see that users tend to engage in conversations with other users or atleast mention them more prominently.

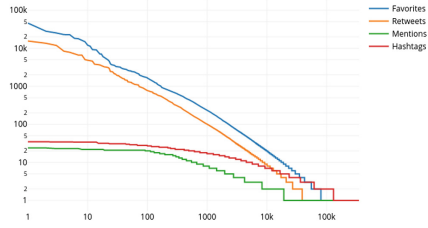
Table 1. Statistics about the engagement attributes

Eng. Att.	Mean	Min	Max	Std
Favorites	5.69	0	104464	229.14
Retweets	2.38	0	22893	71.79
Mentions	1.13	1	25	0.81
Hashtags	1.93	1	36	2.12

Figure 1 shows the log-log plot of these engagement attributes shedding light on the favorites and retweets received by these posts. All the engagement attributes follow a power-law distribution showing that there exist few posts which are very highly engaging relative to the majority of the remaining posts. Complementing these observations, Reddit posts which can receive both up votes and down votes, receive 2.26 up votes (standard deviation = 2.03) on an average. None of the *self* posts shared on #metoo subreddit received down votes suggesting that posts shared on Reddit are positively engaging.

4 Linguistic Themes to Understand the Content

Since #metoo related posts are socially engaging, it is important to understand the content of these posts. We first extract the latent topics present in these posts and then focus on how users label sexual abuse through their vocabulary usage.



4.1 Latent Topic Extraction

We extract the latent topics from the corpus containing all the *self* posts shared on #metoo subreddit as well as the corpus of all posts attached with the #metoo hashtag on Twitter. Topic analysis helps us understand the aspects of sexual abuse that the individuals are focusing on the two platforms. We use LDA (Latent Dirichlet Allocation) topic modeling technique [1] to extract the latent topics shown in Table 2.a and .b for Reddit and Twitter respectively.

On both these platforms, people share their experiences of getting assaulted (topic 0 in Reddit and topic 2 in Twitter). Users also encourage each other to be strong and fight against harassment by contributing to the movement (topic 2 in Reddit and topic 0 in Twitter). However, we notice two significant differences in

Fig. 1. Log-Log plot for engagement attributes on Twitter

Table 2. Topic vocabulary.

(a) Reddit		(b) Twitter	
Topic	Top words	Topic	Top words
0	[Experience and memory, emotions] emotional, response, attacker, unwelcome, crime, severe, mugged, notmeanymore, starting, threat	0	[Fight against harassment] #metoo, harassment, movement, assault, campaign, silence, violence, teaching, abuse, business, #timesup, schools, workplace
1	[Story Details] date, shoulder, apartment, squad, strange, morning, van, club, escape, partner	1	[Sharing news] stories, weinstein, damon, harvey, share, backlash, mcgowan, allegations, news, misconduct, hollywood, accused, pbs
2	[Fight against harassment, being strong] movement, victims, survivor, abused, metooers, damage, accusations, battle, strength, suffer, wounds, trigger	2	[Sharing support by posting hashtags] #metoo, #timesup, #goldenglobes, black, #oprah, #resist, winfrey, #oprah2020, hollywood, president, #millennials, #veterans
3	[Story Details] home, remember, hell, car, boyfriend, hotel, officer, realtor, banker, fuck, weekend, conversation	3	[Real story sharing] lewinsky, bill, clinton, monica, #trump, accuser, video, #feminism, #rape, black, #maga, simmons, russell
4	[Offenders affiliation] head, older, house, attorney, military, hand, working, sally, face, army, black	4	[Discussing news] witch, hunt, social, campaign, harassment, world, woody, allen, reckoning

the types of posts shared on Reddit and Twitter. On Reddit, survivors mainly share the details of the story (e.g. how and when that happened to them) and how they were hurt emotionally (topics 0, 1 and 3). They also mention the affiliation of offenders (topic 4). While On Twitter, people do not expose the details and mainly focus on supporting victims of sexual violence by just posting relevant hashtags (topic 2 summarizes the mostly used hashtag during the movement), sharing relevant news (topic 1 and 3) and urls of related news articles (topic 4). On Twitter, users share their stories of being harassed at workplace and how they fear being retaliated for complaining about the harassment (topic 0). These differences in terms of being descriptive between Reddit and Twitter might be because of the character limit enforced by these platforms. In particular, Reddit has allowed users to share more details and thus users might be able to reveal their true feelings easier than Twitter. But it is interesting to see that this movement became viral due to the posts shared on Twitter².

4.2 Labeling Sexual Abuse

***n*-gram Analysis.** To obtain a basic understanding of the content shared, we extract *n*-grams. Table 3 shows the *bi*-grams and *uni*-grams extracted from Twitter and Reddit posts. Bigrams show that majority of the Reddit posts focus on individual experiences about sexual harassment for example: *years old*, *Im sorry*, *one day*, etc., where as Twitter posts focus on the existing sexual assault stories and opinions about how to address these issues (*metoo movement*, *say metoo*, *social media*, etc.). Unigrams also highlight similar set of observations. Using the most frequently occurring keywords in these text corpuses, we dig a little deeper to understand how users label sexual abuse through the words associated with these keywords.

Table 3. Top-10 *uni*-grams and *bi*-grams

Twitter bigrams	metoo movement; sexual harassment; metoo timesup; metoo campaign; metoo moment; say metoo; metoo story; social media; witch hunt; sexual misconduct
Reddit bigrams	sexual harassment; dont want; sexual assault; years old; dont think; Im sorry; one day; metoo movement; first time; will never
Twitter unigrams	metoo; women; movement; sexual; men; harassment; now; assault; time; hollywood
Reddit unigrams	men; like; me; im; women; dont; people; know; time; sexual

Considering Syntactic as Well as Semantic Relationships. To ensure that both the syntactic and semantic relationships are captured, we represent the vocabulary of the corpus in a Word2Vec space and measure their similarities [4]. Through the pairwise word relationships shown in Table 4, the most frequently occurring keywords suggest that some of the terms such as *men* is associated with *aggressive* and *violate certain aspects* where as, *woman* is associated with *humiliated publicly* and *intimidated*. Whenever users mention their personal experiences (for example the term *story*), it is highly correlated with words such as *heartbreaking*, *frightening*, *terrifying*, *horrifying*, *awful*, etc. Alongside, most of the other keywords (such as *sex*, *rape*, *victims*, etc.) are similarly

² <http://time.com/5051822/time-person-year-alyssa-milano-tarana-burke/>.

Table 4. Semantic and syntactic co-occurrence patterns from tweets. Keywords are the 12 most frequent words. The right column shows the most co-occurred words associated with left.

Keyword	Most co-occurring words
<i>men</i>	aggressive, pigs, socialized, violate, proclaim, educated
<i>story</i>	heartbreaking, frightening, terrifying, horrifying, awful, painful, triggering, insightful
<i>assault</i>	prevention, policing, devaluing, mishandling, payouts, regrettable
<i>sex</i>	perform, oral, consensual, date, violent, nonconsensual
<i>harassment</i>	misconduct, rampant, ubiquity, experiencing, assaults, secrecy
<i>#metoo</i>	#spite, #mentalhealth, #gossip, #sexpredator, #activism, investigative
<i>movement</i>	travesty, witchhunt, hysterical, concerns, nonsense, ridiculously, damaging
<i>timesup</i>	oprahs, deathknell, globes, gowns, attendees, #golden, staged
<i>woman</i>	single, unconscious, humiliated, dragged, publicly, qualified, intimidated, backed
<i>abuse</i>	exploitation, stigma, secrecy, psychological, admitting, harassment, severity
<i>victims</i>	survivors, condemning, offenders, assistance, minimize, pedophiles, bystanders, prevent, suffering
<i>rape</i>	attempted, kits, marital, molestation, hookup, aggression, shame

associated with a vocabulary that is mostly negative. However, the users are also recognizing that these issues should be addressed immediately (see keyword *timesup*) and is slightly on an encouraging side compared to other keyword relationships. Words such as *movement* is co-occurring with words such as *hysterical*, *nonsense* and it is not very clear if users are mocking the *#metoo* movement that may require further analysis. Due to the limited set of posts crawled from Reddit, we didn't find any significant co-occurring patterns.

5 Individual Emotions Through Linguistic Markers

5.1 Emotion Attributes

We use psycholinguistic lexicon LIWC³ to characterize and compare the type of emotions expressed on both the platforms. We obtain measures of the attributes related to user behavior: emotionality (how people are reacting that includes *sad*, *anger*, *anxiety*, *positive* and *negative* emotions), social relationships (*family*), and individual differences (*work*, *bio*,

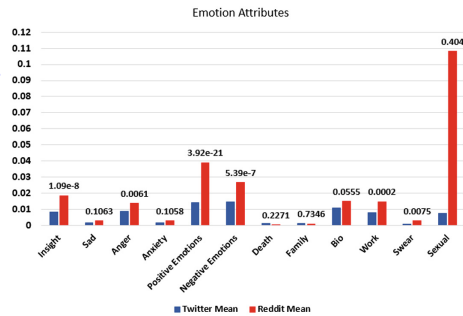


Fig. 2. Emotion attributes for Reddit and Twitter posts. Numbers on the bar show the p-value.

³ <http://liwc.wpengine.com/>.

death, swear, sexual). For each attribute, we use the statistical t -test to check if the Twitter distribution is not significantly different from those of Reddit. Null hypothesis is rejected if p -value ≤ 0.05 .

Figure 2 shows that the distribution of insight, anger, work, swear and positive and negative emotions attributes in Twitter are significantly different from those of Reddit. In contrast, posts on both platforms have the same distribution for *sadness* and *anxiety* attributes.

5.2 Sentiment Extraction

To measure the type of sentiment on both platforms, we use Vader [2] – a sentiment analysis tool designed specifically to extract sentiments from social media posts. Results are shown in Fig. 3 with the following observations. Reddit posts are generally more negative than Twitter posts. This might be because people have no limitation on their posts lengths and thus can easily share their feelings about their stories. However, few posts on Reddit express positive sentiment emphasizing to support the movement. Considering these platforms exclusively, the ratio of positive to negative posts on these platforms are equal to each other showcasing the presence of positivity towards the movement.

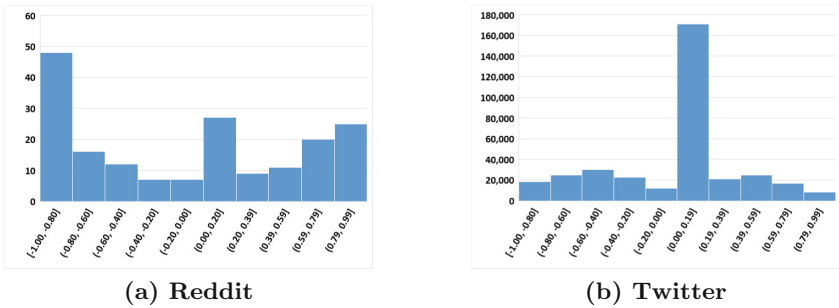


Fig. 3. Sentiment distribution for Reddit and Twitter posts

6 Conclusions

In this paper, we focus on the shared posts of users attached with the #metoo hashtag on these platforms (i.e. Reddit and Twitter). The insights obtained from this research reveal the fundamental differences in the behaviors of individuals on these two platforms. Some of the key findings are: (1) users share their personal stories in details on Reddit while on Twitter, they tend to pursue other users to continue the #metoo movement; (2) Reddit posts are more negative while positive posts on Twitter showcase the presence of positivity towards the movement. These differences show that Twitter is a venue for sparking the movement while Reddit provides the chance for the people to share personal moments. We hope

that our findings shed light on the important aspects associated with the sexual abuse which could initiate discussions between the individuals in the society as well as researchers and lawmakers.

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