

The Heartbeat of Employment Relationship: How Employees' Attitudes Toward Managers Change Over Time

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Introduction

As a novel form of communication, social media and its effects on interpersonal relationships have sparked numerous discussions in related social science disciplines. In particular, social media has made employee behavior become more visible to a wide audience, which has led to growing considerations about how social media within the workplace changes organizations and the individuals who work in them (Leonardi and Vaast 2017; Colbert et al. 2016). Recently, the microblogging platform Twitter has become the most popular channel to disseminate work-related content (van Zoonen et al. 2016; Verhoeven 2012). People are utilizing this new channel of voice to express their feelings about colleagues, companies, and industries.

Like other social media platforms, Twitter does not differ in the diversity of its content. In a typology of work-related tweets, van Zoonen et al. (2016) outlined several key categorizations of tweets, including work-related, profession-related, organization-related, employee-public, persuasive and in-group communication. While van Zoonen's study paid particular attention to classifying and defining different tweet types, the underlying sentiment of these types of tweets is rarely discussed. Moreover, the sentiment of work-related tweets has been considered a fixed characteristic in van Zoonen's study. Research has found that employees use Twitter strategically and self-censor inappropriate information, producing mostly neutral or positive rather than negative tweets as a result (van Zoonen et al. 2014; Gibbs et al. 2013; Marwick and Boyd, 2010).

However, while many working professionals engage in self-censorship, a persistent stream of negativity is still a feature of everyday tweet feeds. Unlike other channels, Twitter is becoming a new way for employees to voice their opinions in public. For example, employees with negative experiences in the workplace tend to share their frustration and disappointment through social media (Lee 2020; Krishna and Kim 2015; Ravazzani and Mazzei 2018).

Who is causing these frustrations and disappointments? Conway et al. (2019) found that employees' relationship with their boss is positively and significantly related to job dissatisfaction among different job features. Therefore, it is likely that tweets related to managers can give a clearer look at how negativity escapes the constraints of self-censorship. For that reason, I take a people-oriented approach in forming my research question: do employees' attitudes toward managers change drastically over time?

Here, I propose that attitude can be defined as the composition of the patterns of different sentiments. Instead of exploring the dynamics embedded in personal interactions, this paper aims to give a holistic view of the nature of employment relationships in the public eye. By looking closely at manager-related tweets, I find distinctive patterns of sentiments in the corpus. Despite their descriptive feature of exposing working professionals' fluctuating emotional behaviors, I believe it can also serve as a barometer of work culture at a large scale. First, I conceptualize the two waves of tweets that influence the emotional sentiment of tweets as harmful and harmless. Then, I explain several possible determinants behind this phenomenon. Finally, I discuss the possible impacts of the phenomenon on employees and organizations and point to potential avenues for future research.

Research Question

When employees use social media platforms like Twitter, they have the power to reach a wide audience through the public-by-default feature. That is, tweets are public by default unless the poster's account is private. Organizations fear its potential to impact and even destroy brand image and reputation, despite the fact that employees typically seek to contribute to their employers' positive reputation by displaying norm-congruent behavior (Schaarschmidt and Könsgen 2020). However, online venting has not disappeared, is not forbidden, and can cause damage to organizational reputations (Opitz et al. 2018). With that said, it is important to find out how venting takes place in spite of various concerns. To unweave the complexity of emotional patterns of manager-related tweets, several hypotheses have been developed based on my research question:

Hypothesis 1: The sentiment of self-generated manager-related tweets has distinctive patterns.

Hypothesis 2: Even when tweet frequency increases, the patterns remain stable.

Hypothesis 3: There are two contrasting waves of manager-related tweets: one is harmless and the other is harmful. Positive/neutral tweets are harmless, and negative tweets are harmful. The harmful wave is more consistent than the harmless wave.

While hypothesis 1 is an assumption of a phenomenon that guides the original research question, hypothesis 2 states a possible mechanism of the phenomenon. Hypothesis 3 is a further theoretical extension of hypothesis 2, which provides a base for future exploratory research.

Background

Since its launch in 2006, Twitter has become one of the most popular social media platforms. Many internet users shifted from traditional communication tools to microblogging services out of convenience (Pak and Paroubek 2010). Since it serves personal and individualistic needs, it might be considered “a new form of employee voice that focuses on individual agency” (Conway et al. 2019). While Twitter is more catered to personal use, it is a “microphone of the masses” (Murthy 2011). It provides a public space for working professionals to network and exchange information outside of corporate settings. In a large-scale quantitative analysis, van Zoonen et al. (2019) discover that the conversational nature of work-related tweets is different than that of related fields, such as political communication. Still, depending on how one uses social media, it “can be beneficial or detrimental to both the organization and employees” (van Zoonen et al. 2016). Another study by Miles and Mangold (2014) also suggests that employee voices can be either an untapped resource or a time bomb depending on guidance and management. To guide the theoretical framework of this paper, I give an overview of how current research explains the motives and drivers behind a wide range of work-related content on Twitter under the guise of being harmful or harmless to employers.

Harmless

While how many benefits can be obtained from tweeting remains debatable, these tweets can be seen as harmless to their employers’ reputations. A number of scholarly works focusing on how employees use Twitter strategically to gain beneficial results will be discussed in the following paragraphs. The strategic utilization of Twitter broadly belongs to two genres: informational and

networking. Information, either sharing or gaining, is an important part of professional online activity. The exchange of work-related information broadens one's view on career and further promotes innovation within the industry. Positive benefits of the use of social technologies in knowledge sharing have been highlighted in several empirical articles (Ouiridi et al. 2015).

Networking is another mainstream use of Twitter. On Twitter, employees interact with coworkers, supervisors, and other professional contacts in a social space that can be either professional or personal (Ollier-Malaterre et al. 2013).

Often overlapping and compounding, both information exchange and networking are beneficial in providing opportunities to enhance users' social and informational capital and constitute most of the positive and neutral work-related tweets. Various reasons are provided to explain why most employees try to convey positive images online. Two important aspects of Twitter—self-presentation and self-affirmation— promote the usage of positive phrases (Murthy 2012, 2018). Another related concept is that employees with a high perceived external reputation (PER), i.g. industry celebrities display supportive behavior in social media (SBSM) and subsequently in organizational citizenship behavior (Schaarschmidt and Könsgen 2020).

In general, employees' use of Twitter aligns with employers' strategic goals, which is to protect their online reputation. When conducting these types of online activities, employees hardly use any negative phrases in their tweets and often engage with Twitter in a positive manner. Thus, in the context of this paper, positive and neutral manager-related tweets are considered harmless tweets.

Harmful

In comparison, less research has been conducted on work-related content that displays a negative nature. Social media might be a form of justice-oriented voice and used as revenge, but there is limited evidence for this (Conway et al. 2019; Klaas et al. 2012:337). Since work-related tweets are rarely negative, much more effort was spent to discover why employees refrain from posting such content. It is suggested that negative utterances related to professional life are usually considered inappropriate and incongruent with self-views (Conway et al. 2019; Marwick and Boyd 2011). Moreover, cybervetting can pose threats to one's career: some organizational representatives now screen job seekers' social media websites to assess employability (Zhang et al. 2020), which further discourages people from being risk-takers online. Although Twitter provides opportunities to discuss workplace problems, its public accessibility remains a serious concern for many users who want to secure a job. Therefore, for most people, online venting is risky.

However, as previously mentioned, Twitter is still largely unmonitored and unregulated (van Zoonen et al. 2016; Miles and Mangold 2014). Its real-time nature made management difficult to negate the reach and immediacy of critical feedback (Holland et al. 2016). As a form of coping mechanism, social media can result in public complaints about work to release emotional stress (Zhao and Rosson, 2009). Complaints can be related to stressful environments, unreasonable schedules, and poor managers. When a manager-related tweet has a high score on negative sentiment, it communicates a bad employment relationship to outside audiences. Therefore, it is more likely to be harmful to the employer's reputation.

In summary, employers' reputation is the main concern in considering the impact of emotionally charged tweets, thus positive and neutral tweets are harmless while negative tweets are harmful.

Methods

Sentiment analysis is a fitting way to explore how harmless (positive/neutral) and harmful (negative) tweets emerge in the context of online manager-employee relationships. This study will utilize NLPK-VADER to conduct sentiment analysis on self-generated tweets with related keywords. VADER has been widely used in many social science disciplines to analyze emotions and attitudes of large-scale textual data. It is particularly useful in this study for its ability to provide numeric sentiment scores. Using these scores, I am able to generate detailed visualization to illustrate the distinctive patterns of emotion.

Data Collection

Among other social media platforms, Twitter is a suitable data source for this research topic. The textual data of tweets are short, informal, and immense. For each tweet, the posting time is accurately measured to seconds. It provides a time-lapsed view of public sentiment and has a great advantage in discovering time-based patterns.

Twitter data was made accessible through Twitter API. To generate cleaner and more readable data, I utilize the tweepy package in Python. My query in searching was “my boss” or “my manager”, filtering retweets and restricting time to a 24-hour interval. The keyword “my” is in place to ensure that the content is personal rather than general statements. The keyword “boss” is added as an alternative to “manager” in an effort to capture more informal conversations. Adding

“boss” as a keyword also avoids biased collection on tweets referencing line managers, supervisors, and team leaders. Filtering retweets is to restrict the scope of analysis on self-generated content.

For each tweet, full text and publish date (in UTC) are collected and stored in CSV files. A text cleaning procedure has been incorporated in the process to filter noises in textual analysis. The whole process is repeated seven times to obtain data within a week.

Calculation

The calculation of the average negative score was done by running a sentiment analyzer on each tweet to generate individual sentiment scores. Then, all negative scores of tweets within one-hour intervals were averaged to provide a negative score of the corresponding hour (ANS). Other average sentimental scores were conducted in the same manner. The number of tweets per hour was taken to provide the tweet frequency of the corresponding hour.

Results

First, descriptive statistics and visualization are provided to illustrate the basic characteristics of the dataset. Then, general visualizations of score patterns and tweet frequency will be shown.

	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Overall
neg_mean	0.1119	0.1107	0.1084	0.1097	0.1051	0.1038	0.0979	0.11
neu_mean	0.7283	0.7248	0.7248	0.7196	0.7223	0.7291	0.7334	0.73
pos_mean	0.1598	0.1644	0.1667	0.1707	0.1725	0.1669	0.1687	0.17
# of tweets	6166	6602	6616	6771	7174	4503	4097	5989.86

Figure 1

(neg_mean = average negative score; neu_mean = average neutral score; pos_mean = average positive score)

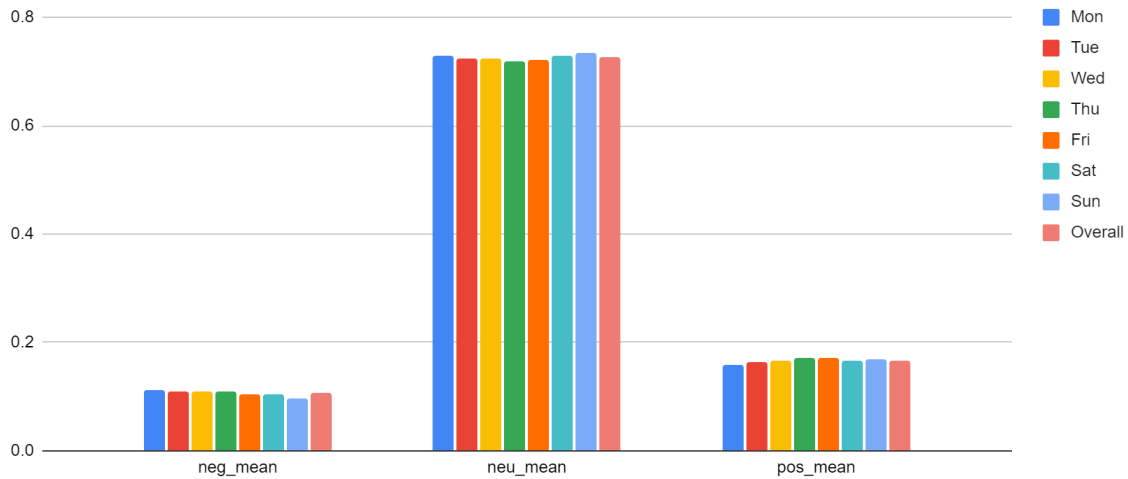


Figure 2

Figure 1 and Figure 2 show that daily sentiment scores fall into similar numeric ranges. The score distribution aligns with previous research, displaying a mostly neutral and positive nature. One interesting finding is that the number of tweets and ANS drop during the weekends, which illustrates the possible impact of weekdays on work-related tweets. Among the seven days, Friday has the highest positive score and Monday has the highest negative score. In contrast, Saturday has the lowest negative score and Monday has the lowest positive score. It can be speculated that labor resistance and the disturbance of work-life balance affect the sentiment of manager-related tweets.

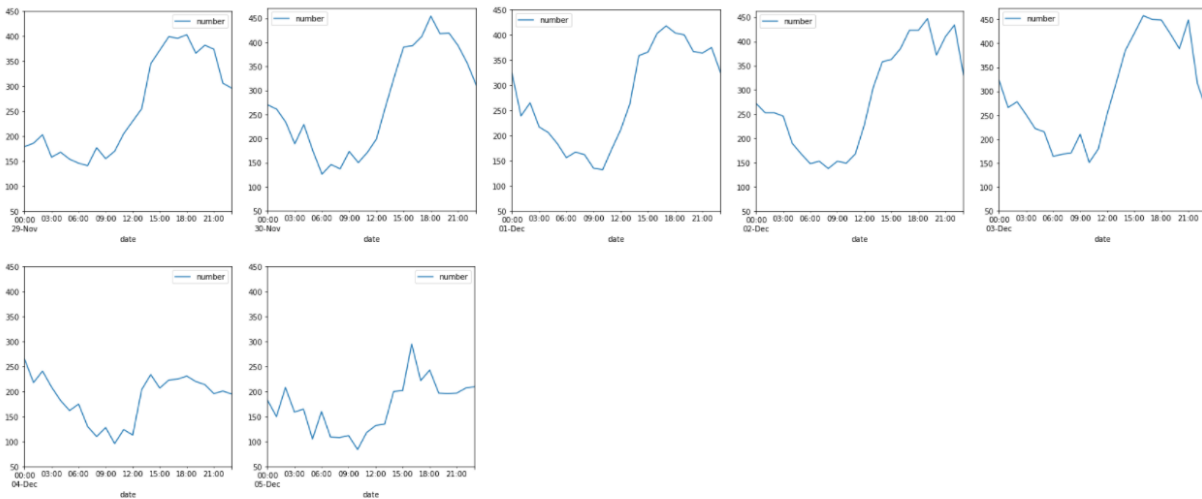


Figure 3

Figure 3 illustrates the number of tweets per hour from Monday to Friday. For each weekday, the number of tweets starts to increase around 12:00 and reaches its peak between 15:00 - 18:00, then slowly falls back to the pre-rise level. The same peak is much less prominent during the weekends. Since Twitter has 77.75 million American users according to Statista's 2021 survey, it is unsurprising that the number of tweets starts to rise when most Americans start working, which is from 11 AM in UTC (9 AM in PST) to 14 AM in UTC (9 AM in EST). However, it should be noted that not only Americans are tweeting in English, and employees often post work-related tweets outside of regular work hours (van Zoonen et al. 2016). Thus, Figure 3 alone does not represent a holistic picture of who is posting manager-related tweets during or after work.

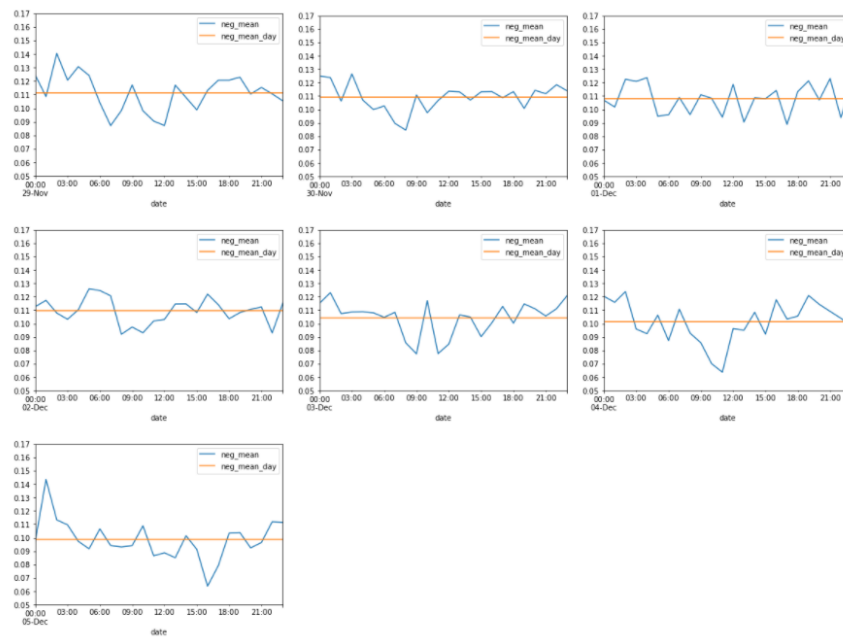


Figure 4

Figure 4 displays the pattern of the average negative score (ANS). The blue line is a plotline of the average negative score per hour and the yellow line shows the daily average of the negative score. The variance between ANS from different time intervals is relatively small, and the consistency of small variance is maintained throughout weekdays and weekends. We can also see that weekends have a slightly lower daily average than weekdays. We do not see the weekday spikes present in Figure 3, which confirms hypothesis 2.

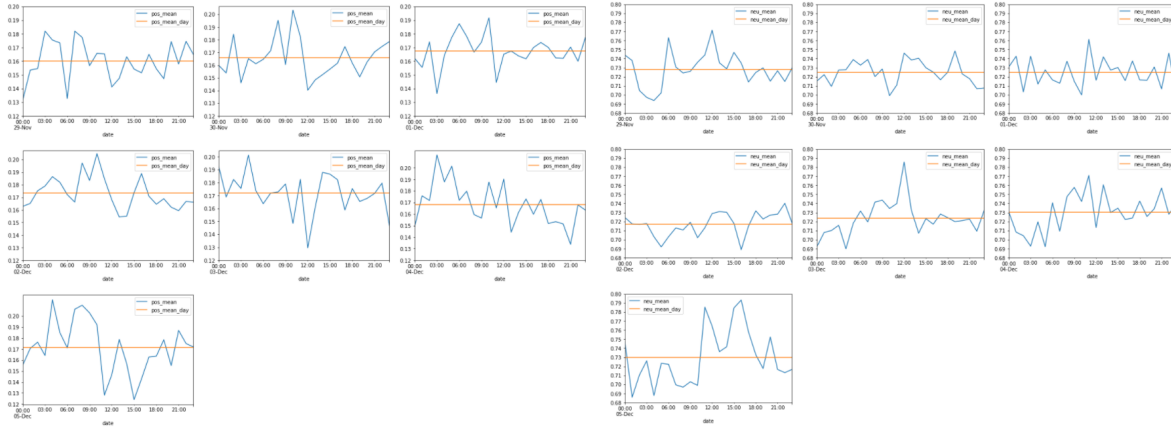


Figure 5

To further highlight the unusual stability of the ANS pattern, the pattern of the positive score (left of Figure 5) and neutral score (right of Figure 5) are shown. A comparison between Figure 4 and Figure 5 is supportive of hypotheses 1 and 3. Although the scores differ in numeric range, the scale and relative range of the y-axis are the same in Figure 4 and Figure 5. The plotlines in Figure 5 have more fluctuations in general, and it seems that the patterns of positive scores have the sharpest increases and decreases among all three sentimental scores. Neutral scores are more stable than positive scores, but significant data points can still be observed at the upper part of the visualization. In summary, both Figure 4 and Figure 5 show that all three sentiments are more dynamic than the concluded sentiment characteristics in previous studies (e.g. van Zoonen et al. 2016). These visualizations are similar to electrocardiography, which is the electrogram of heartbeat. In this case, Figure 4 and Figure 5 indicate the heartbeat of twitter users' employment relationship.

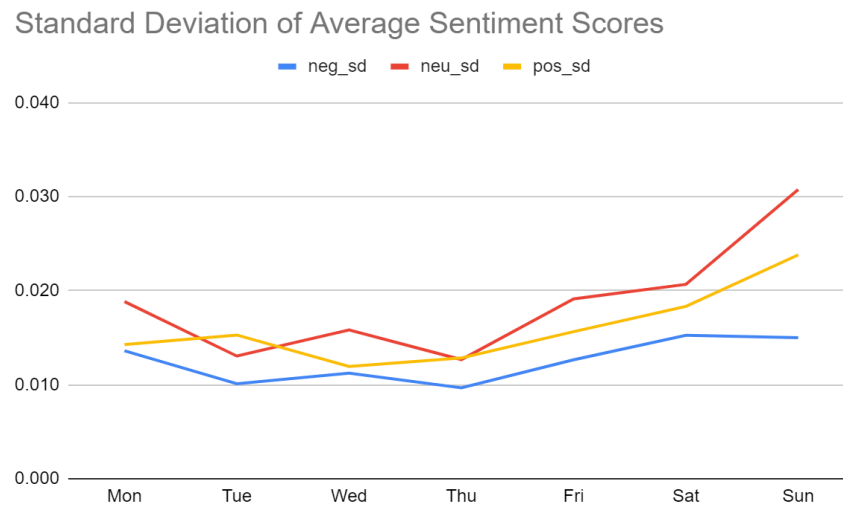


Figure 6

The standard deviation of the average of different sentiment scores by hour is illustrated in Figure 6. In this calculation, the absolute range variance of scores is mediated by examining the difference in averages. The neutral sentiment has the highest standard deviation and negative again at the lowest in both value and variance. Neutral and positive sentiment both have an obvious curve towards the weekend, but negative sentiment is inconsistent with its growth.

Overall, I find that while negative sentiment is the least presented score in the three sentiments, it also displays less variance in the overall pattern. Moreover, the patterns of these sentiments are not affected by the volume of tweets being posted.

Discussion and Conclusion

In data collected from seven consecutive days, we can see that each sentiment has a pattern of specific characteristics. Hypothesis 1, 2, and 3 are consistent with my findings. Negative, or the

harmful wave, has a more stable pattern compared to other harmless sentiments, and that pattern is unaffected by the increase in tweet frequency. The discovery of these patterns provides an indirect measure of employee voices on social media, helps researchers and organization managers to further determine the impact of employees' online activities. However, the above analysis leaves a gap in proving the causal relationship behind these hypotheses. The findings illustrate how employees' attitudes toward managers change over time, but cannot answer why employees' attitudes toward managers change over time. What stabilized negative sentiment and vice versa? While I do not have evidence to support the following claims, I will provide several possible explanations of the determinants.

The first explanation takes an organizational lens. While interactions and expressions on social media can be honest and sincere, they can also be trained and controlled. In other words, personal behavior and individual choices could be largely affected by organizational efforts. The efforts may result in collective actions and those collective actions could lead to a sudden spike in positive sentiments in a specific time frame. The next issue to consider is how and when those organizational efforts take place. Some countermeasures have been discussed in management literature. Yokoyama (2016) and Lenk et al. (2019) suggest that corporations and human resources professionals monitor and develop policies to govern social platforms as a part of risk management. However, more data on the impact of risk management policies are needed. The second explanation brings attention to people's psychological mechanisms. Studies have shown that happiness is only temporarily stable and is not long-lasting (Veenhoven 1994). While a toxic work environment can cause chronic stress, a comfortable environment does not necessarily yield persistent happiness, which makes the positive tweets—praise, promotion,

patronization—to be more randomly scattered along the timeline. The third is to consider the frequency of the actual events occurring during work that can become emotional triggers.

Research about workplace aggression generally regards frequency and persistence as distinguishing characteristics (Hershcovis 2011). Among different kinds of mistreatment, Hershcovis finds bullying to be a persistent and sustained action that is generally caused by a power imbalance. Since the study collects manager-related tweets, power imbalance, and, consequently, bullying is likely to contribute to the persistence of negative sentiments.

Although I was successful in uncovering hidden patterns, the findings have a number of limitations. The first is the limitations posed by the data source. Twitter data may not be representative of the general population. Although Twitter's audience comes from different social and interest groups (Pak and Paroubek 2010), Twitter users are more likely to be young, male and professional (Conway et al. 2019; Mislove et al. 2011; Sloan et al. 2015). The second challenge comes from the methodology. Since NLPK-VADER is a dictionary-based sentiment analyzer, it may not be able to decipher possible nuances and sarcastic phrases. For example, the sentiment analyzer failed to capture “texts [from] boss [I] got work 😭” as a negative tweet. While no negative word appeared in this tweet, this tweet demonstrates negative sentiment by using a crying emoji. This poses a threat to the accurate measurement of the paper’s binary categorization of harmless and harmful tweets. Third, the analysis is conducted mostly based on hour average, which could miss the more subtle changes in negative scores. Lastly, the data in this paper are restricted by the author’s limited authorization to Twitter API, which only allows access to seven days of historical data on Twitter. It is the largest limitation related to the reliability of this study.

For next steps, I plan to gather more data to complement the current findings. Most efforts will be spent to confirm the robustness of the pattern. Currently, the stability and variance are largely found by looking at the visualization. When more data is available, I will conduct statistical analysis, such as time-series analysis, to give a more concrete description of the pattern difference. Furthermore, cultural aversion can be insightful for future research. Since this study was conducted on English tweets, I will also explore whether relevant research has been conducted using targeted surveys or interviews in different English-speaking countries to explore the existence of organizational efforts in regulating social media usage and if that effort has any impact on people's online behavior. With surveys and interviews, another possible trajectory is to find out if employees in certain industries are more likely to complain about their management teams online. For example, Schaarschmidt and Könsgen point out that employees or reputable organizations are always seeking to enhance that reputation to safeguard their organizational environment. Thus, it would be helpful to research how well-regarded companies like Apple design and implement their social media policies, which in turn affect how employee relationships are portrayed online. Demographic characteristics may also play a role in the likelihood of displaying negative attitudes towards managers on social media platforms. Holland et al. (2016) found that Millennials are the most likely to use social media to voice concerns related to work when they are unsatisfied with their jobs.

Considering the complex nature of social media, it takes a substantial effort to utilize it as an effective data source. However, it made the impossible task of collecting thousands of unreactive data achievable. This paper is inspired by current research in the field of human behavior and new technology to uncover the emotional currents of employment relationships. To the author's

best knowledge, this paper is the first in using the metaphor of heartbeats to give an anatomy of the dynamic nature of employee sentiment. The sentiment of work-related tweets is no longer flattened to a generalized ratio of positive, negative, and neutral. It not only contributes to a growing body of research utilizing sentiment analysis but also provides a novel approach in the management literature. As technology becomes more integrated into daily life, it is hoped that this study is insightful for both researchers and practitioners in building a better work environment.

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