

Analyzing Twitter Data to Understand Stigmatization of Schizophrenia Before and After Elon Musk

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ABSTRACT

Stigmatization of mental health has become an increasingly prevalent issue in recent years, particularly on social media. The perpetuation of online stigma has significant negative impact on those with schizophrenia, affecting their social lives, self-esteem, ability to succeed in treatment, and more. One major factor that may affect stigmatization on social media is how content moderation is perceived by the users of the platform, as well as the social norms surrounding acceptable discussions on said platform. This relationship has not yet been examined in the context of schizophrenia stigma on Twitter. Elon Musk's recent acquisition of Twitter has provided an opportunity to do just this, as his public statements and goals for the platform have suggested increased "freedom of speech" and decreased restrictions on content posted, changing how Twitter users perceive allowed conversations. The current study analyzed discussions of schizophrenia on Twitter before and after Elon Musk's acquisition, coding individual Tweets based on the extent to which they indicated a stigmatizing attitude towards schizophrenia. Main findings include a marginally significant positive association between schizophrenia stigmatization and Musk's acquisition of Twitter, with an increase in stigmatizing attitudes. Further, in agreement with previous literature on this topic, this study reveals that the stigma of schizophrenia is widespread on Twitter both prior and following Musk's acquisition. The results of the study may be useful in guiding social networking companies and advocacy efforts to create programs or restrictions that counters stigmatization and further protects those with schizophrenia.

Introduction

Schizophrenia

Schizophrenia is defined as a complex, chronic mental health disorder characterized by an array of symptoms, including delusions, hallucinations, disorganized speech or behavior, and impaired cognitive ability (Patel et al., 2014). Schizophrenia afflicts approximately 24 million people worldwide and is a debilitating disorder for both individuals with this condition and for their families, due to its chronic course and early onset age (Patel et al., 2014; World Health Organization, 2022). Disabilities are frequently associated with schizophrenia, as its symptoms may cause hindrance in social, educational, occupational, and other important areas of life (Nuño et al., 2019). Schizophrenia is a serious illness and an important point of focus in the field of mental health.

Stigma

Stigma is defined as a process that distinguishes people based on social statuses and subsequently socially devalues, discredits, and excludes individuals with those statuses (Earnshaw et al., 2022). Public stigma places focus on the perpetuation of stigma by the general public, often including negative attitudes and beliefs that lead to people fearing, rejecting, avoiding, and discriminating against certain groups (Parcesepe & Cabassa, 2013). In the context of mental

health, public stigma often includes spreading misinformation or holding fearful, exclusionary, negative, or discriminatory attitudes towards those with mental health disorders (Santos et al., 2016).

Schizophrenia Stigma

People with schizophrenia face a large amount of stigma on a daily basis, perpetuated by public, societal, and internal forces (Passerello et al., 2019). Stigma levels regarding schizophrenia have been observed to be stagnant or increasing in recent years (Pescosolido et al., 2021). This stigmatization negatively affects those with schizophrenia, hindering their social life, occupations, self-esteem, happiness and ability to seek help and succeed with treatment (Passerello et al., 2019). High levels of stigma surrounding schizophrenia may divert those with schizophrenia from seeking help, as they may be concerned that their reputations or livelihoods would be harmed (Dockery et al., 2015). Further, feelings resulting from experiences of stigma often involve anger, depression, fear, anxiety, isolation, and embarrassment (van Zelst, 2008). Stigma associated with schizophrenia can also precipitate episodes of psychosis, trigger relapses, and lead to worsening symptoms (van Zelst, 2008). As a whole, stigmatization around schizophrenia may hold huge detriment to those with the disorder, on a physical, emotional, personal, and social level, establishing stigmatization as an important and prevalent social issue.

Stigma in the Context of Social Media

The use of social media has experienced exponential growth in recent years, attracting users of all ages from all across the world. Individuals may turn to social media for a plethora of reasons, including entertainment, communication, and information (Ostic et al., 2021). Many may also utilize social media to discuss issues pertaining to mental health. Often, social media is a floor for discussions, sharing opinions, and obtaining information about mental illness (Passerello et al., 2019). However, social media also allows for the promotion of stigmatizing attitudes towards mental health and those with mental health issues (Jansli et al., 2022). One such social media site is Twitter, a popular microblogging platform where users create short posts that are less than 280 characters. Twitter use has experienced consistent growth in recent years, with 237.8 million active users in 2022, and a predicted 457.63 million users in 2027 (Degenhard, 2023). Aligned with this upwards trend in users, researchers have increasingly entailed the use of Twitter as a research site to observe public behavior, studying issues within the fields of sciences, politics, policymaking, and more (Chen et al., 2022).

Previous research has utilized Twitter as a tool to assess stigmatizing attitudes towards schizophrenia in attempts to better understand the information being shared and discussed surrounding this mental disorder. Understanding stigmatization's presence on social media can be useful in identifying measures that may need to be taken to decrease stigmatization and protect those with schizophrenia, both on social media and in the general public (van Zelst, 2008). Robinson et al. (2019) identified schizophrenia to be more stigmatized than other mental and psychical disorders, including depression, depression, autism, asthma, diabetes, HIV/AIDS, cancer and epilepsy (Robinson et al., 2019). Many studies have agreed with this idea that stigma around schizophrenia is present on Twitter through the use of a variety of methodologies, including machine learning, manual coding, and qualitative thematic analysis (Joseph et al., 2015; Reavley & Pilkington, 2014; Robinson et al., 2019). Each study identified varying degrees of schizophrenia stigma on Twitter, synthesizing the notion that Twitter can serve as a useful tool to evaluate stigmatization levels, as well as the idea that stigma around schizophrenia is present on Twitter. The body of literature surrounding schizophrenia stigma on Twitter is mixed, however, with some articles identifying up to 68% of Tweets perpetuating stigma, and some identifying less than 5% (Kara & Kara, 2022; Reavley & Pilkington, 2014). These significant disagreements display the need for further research into this topic to identify the true level of stigmatization on Twitter, which would provide a concrete understanding of how stigmatization is perpetuated and help in identifying avenues to decrease stigmatization level. Therefore, the first goal of the study will be to add to the present body of research, evaluating the level of stigmatization on Twitter towards schizophrenia, as well as specific themes that arise

within discussions about schizophrenia. This will not only clarify the discrepancies in stigmatization's prevalence on social media in previous studies, but also provide an updated understanding of how much stigma is truly present on social media in the present day. No studies have been published since 2022 that examine levels of schizophrenia stigma on Twitter in the English language. Kara and Kara (2022) investigated the use and misuse of the word "schizophrenia" on Turkish Twitter in attempts to identify the presence of schizophrenia stigma, but no other studies have been published to date (Kara & Kara, 2022). This study will result in a nuanced understanding of the types of discussions occurring on Twitter about schizophrenia, furthering knowledge on how exactly schizophrenia stigma is created and communicated on social media.

Stigma in the Context of Elon Musk

Elon Musk acquired ownership of Twitter on October 27th, 2022. Throughout the course of this acquisition, he has made public statements of his goal of increased "free speech", as well as promised decreased censorship and moderation. Declarations such as his Tweet, "the bird is freed", posted on October 27th, 2022, have reached millions of Twitter users and refers to the app's logo, suggesting the loosening of restrictions on content posted on the platform (Musk, 2022). Musk also fired Twitter's top executives shortly after his acquisition, including CEO Parag Agrawal and Vijaya Gadde, who oversaw legal affairs and safety (Dang & Roumeliotis, 2022). Further, Musk laid off over half of Twitter's staff, many of which were responsible for content moderation and marking misinformation (Collins et al., 2022). These actions produced public perception that Twitter's environment as a whole would shift due to Elon Musk's ownership, with popular media sites like Vice, NBC, and U.S. News perceiving "a much more laissez-faire approach to the type of content allowed on the platform", "a platform where hate and misinformation spread unchecked", and "cut backs on moderation in the name of promoting free speech" (Gilbert, 2022, para. 3) (Zadrozny, 2022, para. 34) (Hadera & Tulp, 2022, para. 3). These reports indicate a change in the perceptions of the types of discussions acceptable on Twitter under Elon Musk, suggesting that users would perceive more "freedom" and less moderation in the types of conversations they can have on Twitter. These changes have created fear in researchers that discussions on Twitter will have increased hostility, abuse, toxicity, and misinformation due to the perception of increased allowance of unchecked hate. Previous research has found that norms governing a social media group often influences the level of hostility in the group (Kupferschmidt, 2022). Therefore, when these norms are loosened and the general public perceives less moderation, hostility will increase. Perceptions of norms and rules on social media have been found to affect user activity, and often, people will act in ways that will help them avoid punishment (Gross & Vostroknutov, 2022). For example, 'shadow-banning', a type of perceived content moderation on many social media platforms, has been found to cause users to change the types of content they post and police themselves according to perceived rules (Savolainen, 2022). Hangarter also states that content moderation and knowledge about existing content moderation guidelines can curb online hostility (Hangartner et al., 2021). Thus, a decrease in perceptions of moderation and regulation due to Elon Musk may lead to an increase in activity that was previously outlawed, such as hostile discussions or stigmatization of specific groups. Some research has already been conducted on how this change in ownership has affected levels of hate speech, as research from School of Communication and Media at Montclair State University finds that Elon Musk's purchase of Twitter has drastically increased levels of hate speech, causing the use of racial slurs to increase from less than 84 times per hour to 4,778 times per hour (Benton et al., 2022). The study goes on to state that users of Twitter may have gained a sense of freedom through Musk's Twitter takeover, which may have led to more unfiltered discussions and increased hate speech (Benton et al., 2022). Research from Jikeli and Soemer (2022) also identified a change in discussions on Twitter due to Elon Musk's acquisition and found a large increase in the number of conversations about Jewish people, more than doubling since October 2022. Many of these discussions included anti-semitic sentiment, such as making dehumanizing, demonizing, or stereotypical allegations about Jewish people or the Jewish religion (Jikeli & Soemer, 2022). However, due to the recent nature of this transfer, very little to no research has been done on how Elon Musk's acquisition has affected stigmatization of any mental health disorder, including schizophrenia. This is an unprecedented shift in ownership and

social norms that has not been seen before and provides a new opportunity to investigate stigma on social media in the context of changing content moderation perceptions. This introduces the second goal of the present study, which is to identify whether the alteration in social norms of Twitter due to Elon Musk has impacted stigmatization perpetuated towards schizophrenia or people with schizophrenia, filling the gap in current literature. The findings of this study will contribute to prior work examining stigmatization of schizophrenia on Twitter, allowing us to gain an understanding of how content moderation perceptions and social norms are related to schizophrenia stigma, providing guidance for future efforts to decrease schizophrenia stigmatization.

Materials and Methods

Research Strategy

The present study is a mixed method content analysis that examines stigmatizing attitudes towards schizophrenia on Twitter before and after Elon Musk's acquisition of Twitter.

Data Collection

Tweets used in the current study are all in the public domain, and ethics approval was not required. The Tweets were retrieved using Twitter's advanced search function on <https://twitter.com>. This provides access to the Streaming Application Programming Interface, which is the most widely used publicly available source of Twitter data, through which day-to-day Twitter users find Tweets when utilizing the search function (Kim et al., 2013). The following criteria were used during data collection: containing the exact phrase "schizophrenia", written in English, including replies and original Tweets, including Tweets with links, from the dates October 28th 2022 to October 30th 2022 and October 28th 2021 to October 30th 2021. Searching for the exact phrase "schizophrenia" derives Tweets that all discuss schizophrenia in some way. Including replies, original Tweets, and Tweets with links allows for the study to consider Tweets in all contexts. The dates October 28th, October 29th, and October 30th were chosen for both 2022 and 2021, as they are the three days after Elon Musk officially became the owner of Twitter, as well as those three days from the year before. The timespan of three days was picked, as it was determined to be the most feasible option to code under the time restraints of the project and with only one independent manual coder. Additionally, the two-time spans were chosen as they reflect the same dates in two different years, ensuring that no holidays or seasonal conditions differ, allowing for effective comparison of stigmatization level before and after Musk's acquisition. A one-year difference was used to decrease the influence of outside factors on stigma level and discussion type. Tweets were excluded during coding as needed. Each Tweet that was excluded fell into one of the following categories: (a) in a language other than English; (b) repeated Tweet; (c) was a reply whose original Tweet was deleted, rendering it difficult to identify the sentiment with no context.

Content Analysis

Tweets were sorted into 5 distinct categories: (1) stigmatizing; (2) personal experience of stigma; (3) support of schizophrenia; (4) neutral; (5) anti-schizophrenia stigma. Each category, its definition, and a representative Tweet coded within each category is detailed in Table 1. These categories and their definitions were directly derived from Reavley and Pilkington (2014), who conducted a similar study to discover the extent of stigmatization in schizophrenia and depression on Twitter, utilizing the categories (1) stigmatizing; (2) personal experience of stigma; (3) supportive; (4) neutral; (5) anti-stigma (Reavley & Pilkington, 2014). These categories and their definitions were derived by consensus of the authors of the study and were built off of pre-existing literature and theory. This provides an informed and reliable method of coding to decrease bias in category creation that may have arisen if categories were created

myself. Coding each Tweet into one of these categories allows the present study to identify the types of discussions being conducted on Twitter pertaining to schizophrenia as a whole, providing a nuanced understanding of the types of schizophrenia discussions on Twitter. This method of coding was chosen over other possible methods, such as the Berger Stigma Scale or the ISMI, as most pre-existing stigma measuring methods included 10+ categories, making the coding process more complicated and less feasible for a single researcher. Additionally, many of these established scales focus on people who are stigmatized, which is not related to the present study, which aimed to determine the level of stigma perpetuated by the general public. The wording of categories three and five were expanded on from the codes used by Reavley and Pilkington (2014) to specify “support of schizophrenia” and “anti-schizophrenia stigma”, instead of “support” and “anti-stigma”. This was done to increase clarity in the coding stage and better reproducibility. All coding was done manually on Excel.

Table 1. Theme definitions and representative Tweets.

Theme	Definition	Representative Tweet
Stigmatizing	Indicates a negative attitude towards schizophrenia or people with schizophrenia.	“You should get your undiagnosed schizophrenia looked at you attention wh*re.”
Personal Experience of Stigma	Describes a personal experience of stigmatizing attitudes or discrimination towards schizophrenia or people with schizophrenia.	“90% of the time schizophrenia is either performatively glorified or I’m treated like a crazy person who is a danger to society”
Support of Schizophrenia	Supportive towards schizophrenia or people with schizophrenia.	“Lol it’s funny because yes we actually do? People with schizophrenia make up a huge percentage of the homeless population and need far more support than our society gives them.”
Neutral	Indicates a neutral attitude towards schizophrenia or people with schizophrenia.	“Schizophrenia is a chronic and severe mental disorder that affects how a person thinks, feels, and behaves. Symptoms usually start between ages 16 - 30. The symptoms of schizophrenia fall into three broad categories: positive, negative, and cognitive.”
Anti-schizophrenia Stigma	Explicitly promotes the reduction of stigma towards schizophrenia or people with schizophrenia.	“ppl with psychosis/schizophrenia/mood disorders r not violently dangerous and dont commit murders, they r more likely to BE the targets of violence, meanwhile ppl with right wing views regularly assault innocent ppl, most mass murderers with political motives r very right wing”

Data Analysis

After all coding was completed, Tweets were separated by category and counted for frequency. A double bar graph was created on Excel, representing the frequency of all five categories in percentage between 2021 and 2022, allowing for an analysis of the trends of general types of discussions between both years. Next, a pie graph was created on Excel to compare the level of stigmatization in 2021 and 2022. Unlike the first graph, there were only two groups taken into consideration: stigmatizing and non-stigmatizing. While non-stigmatizing is not a category within the five criteria, all four of the criteria excluding stigmatizing can be grouped into “non-stigmatizing”. This allows for a clear display of how much stigmatization was found in comparison to general, non-stigmatizing discussions of schizophrenia. The detailed nature of all five groups is not relevant here, as the present study aims to find whether Elon Musk has increased stigmatization, not whether any other types of discussions pertaining to schizophrenia were affected.

Statistical Analysis

A 2x2 chi-squared test was used to determine whether there was a significant association between Elon Musk’s acquisition of Twitter and stigmatization level. This test was conducted using the Social Science Statistics Chi-Square Calculator (2018). The only groups utilized in this test are stigmatizing and non-stigmatizing, which aligns with the second goal of determining whether Elon Musk had an effect on stigmatization level, not on the rest of the non-stigmatizing categories. The null hypothesis for this test is that Elon Musk’s acquisition of Twitter has no association with stigmatization level. An odds ratio test was also conducted to quantify the strength of the association between Elon Musk and stigma level. The odds ratio statistic was derived from MedCalc Software Ltd (2019).

Results, Products, and Findings

A total of 2,894 Tweets were retrieved from Twitter over the 6-day period. After applying the exclusion criteria, 80 Tweets were excluded, and a total of 2,814 Tweets were analyzed.

Content

Each category made up the following percentages of Tweets before Elon Musk’s acquisition of Twitter: stigmatizing (40.4%; 490 Tweets), neutral (41.1%; 498 Tweets), anti-stigma (7.4%; 90 Tweets), supportive of those with schizophrenia (9.9%; 120 Tweets), personal experience of schizophrenia stigma (1.2%; 15 Tweets). Each category made up the following percentages of Tweets after Elon Musk’s acquisition of Twitter: stigmatizing (44.0%; 705 Tweets), neutral (40.0%; 640 Tweets), anti-stigma (4.8%; 76 Tweets), supportive of those with schizophrenia (9.1%, 145 Tweets), personal experience of schizophrenia stigma (2.2%, 35 Tweets). These percentages are displayed in Figure 1.

Percentage of Tweets Before and After Elon Musk

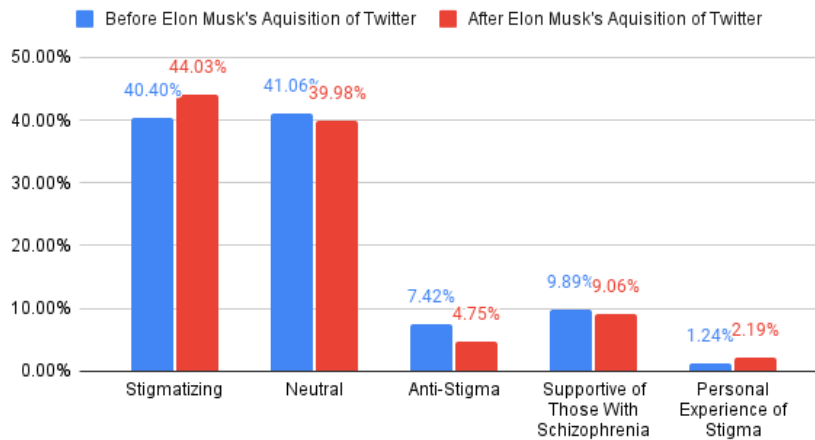


Figure 1. Frequency and Percentage of Tweet Content Before and After Elon Musk.

Change in Stigmatization

The majority of Tweets both before and after Elon Musk’s acquisition of Twitter fell into the non-stigmatizing category, which includes the neutral, anti-stigma, supportive of those with schizophrenia, and personal experience of schizophrenia stigma categories. These categories and frequencies are summarized in Table 2.

Table 2. Stigmatizing and Non-Stigmatizing Tweets Frequency.

	Stigmatizing	Non-stigmatizing	Marginal Row Totals
Before Elon Musk	490	723	1213
After Elon Musk	705	896	1601
Marginal Column Totals	1195	1619	2814

There was an increase in stigmatization from 2021 to 2022, with 40.4% of Tweets coded as stigmatizing in 2021, and 44.0% of Tweets coded as stigmatizing in 2022. These percentages of stigmatizing vs. non-stigmatizing Tweets both before and after Elon Musk’s acquisition of Twitter are displayed in Figure 2 and Figure 3.

Tweets Before Elon Musk's Acquisition of Twitter

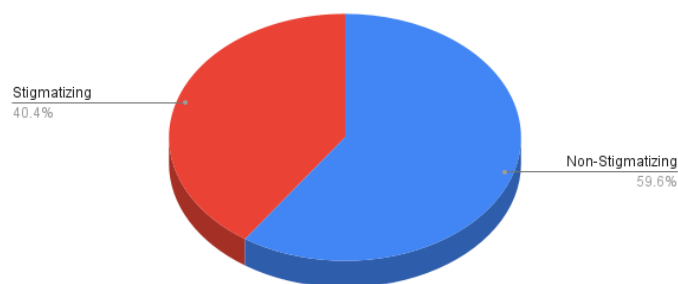


Figure 2. Percentage of Stigmatizing and Non-Stigmatizing Tweets Before Elon Musk’s Acquisition.

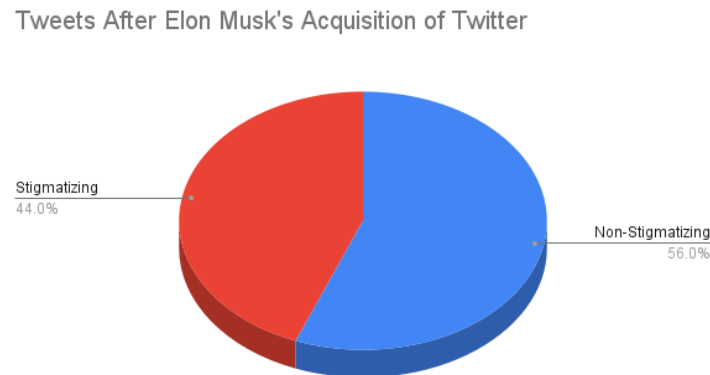


Figure 3. Percentage of Stigmatizing and Non-Stigmatizing Tweets After Elon Musk’s Acquisition.

Chi-Square Test

A chi-square test was conducted to identify whether Elon Musk's ownership of Twitter is associated with stigma level. The null hypothesis is that Elon Musk’s acquisition of Twitter has no association with stigma levels. The relationship between these variables was marginally significant, X^2 (degree of freedom= 1, N = 2814) = 3.741, $p = .05309$. Although the p-value is not smaller than 0.05, the most commonly used significance level, it is only slightly above it, which suggests a marginally statistically significant association between acquisition and stigma levels. Therefore, Tweets after Elon Musk’s acquisition are more likely to perpetuate stigma than Tweets before Elon Musk’s acquisition.

Odds Ratio Test

An odds ratio test was conducted to assist in quantifying the strength of the association between Elon Musk and stigmatization level. The odds ratio statistic was 1.161, which means that Tweets after the acquisition were 1.161 times more likely to perpetuate stigma compared to before the acquisition. The p-value derived from the odds ratio test was .0532, again suggesting marginal statistical significance.

Discussion

The current study had two major goals. The first goal aimed to determine the level of schizophrenia stigma on Twitter in the present day, and the second goal aimed to examine the impact of Elon Musk’s acquisition of Twitter on the level of stigma perpetuated in Tweets about schizophrenia.

Schizophrenia Stigma Level

Stigmatizing attitudes were found to be present both before and after Elon Musk’s acquisition of Twitter, with 40.4% of Tweets before Elon Musk and 44.0% of Tweets after the transfer of ownership. The high level of schizophrenia stigma found is consistent with previous literature that suggests stigmatization around schizophrenia is highly

prevalent on social media (Kara & Kara, 2022). Further, this study's findings were very similar to the work of Robinson et al. (2019), which identified schizophrenia to be the most stigmatizing mental health disorder on Twitter, with 41% of analyzed Tweets about schizophrenia to be stigmatizing (Robinson et al., 2019). This agreement with the previous literature suggests that the stigmatization level of schizophrenia continues to remain prevalent in the current day. This study's results also report much higher rates of schizophrenia stigma in comparison to the work of Reavley and Pilkington (2014), which is the source from which the current study's coding was derived from. Their study found that only 5% of Tweets about schizophrenia perpetuated stigma, a much lower percentage in comparison (Reavley & Pilkington, 2014). One explanation for this difference in identified stigmatization level may be the search terms utilized, as Reavley and Pilkington (2014) used "#schizophrenia" as its key search term, while the current study used the word "schizophrenia", revealing tweets that would have been excluded from the work of Reavley and Pilkington. This explanation aligns with a limitation that was acknowledged in their study, which stated that the use of hashtags as a search term may have increased the chance of missing content related to casual uses and conversations of schizophrenia (Reavley & Pilkington, 2014).

Discussions about Schizophrenia

The most common category of non-stigmatizing Tweet was "neutral", which suggests general discussions about schizophrenia in neither positive nor negative connotations, such as medical or scientific contexts. The lowest category of non-stigmatizing Tweet was "personal experience of schizophrenia stigma", contrasting with the stark amount of stigmatization present. This might indicate a need for encouragement and amplification of the voices of those with schizophrenia in attempts to increase public awareness of issues around stigmatization. This agrees with the findings of Jansli (2022), which identified many users felt visibility of those with schizophrenia was an issue, and encouraging open conversation about mental health stigma was essential in reducing stigmatization on Twitter (Jansli et al., 2022). It also must also be acknowledged that there was a noteworthy increase in Tweets about schizophrenia after Elon Musk's acquisition of Twitter, with 388 more Tweets collected for 2022 than 2021 over the same three-day period. This is consistent with past literature that suggests individuals are increasingly utilizing social media as a means for discussing mental illness and those with mental illnesses, allowing for the spread of education and support, as well as the spread of misinformation and stereotypes (Naslund et al., 2020).

Elon Musk's Effect on Stigma Level

In comparing the level of schizophrenia stigma before and after Elon Musk's acquisition of Twitter, stigmatization increased from 40.4% of Tweets to 44.0% of Tweets. A chi-squared test was calculated to determine the association between Elon Musk's acquisition of Twitter and an increase in stigmatization level of schizophrenia, and found that the association was marginally statistically significant. Further, the odds ratio statistic was 1.161, meaning Tweets after Elon Musk's acquisition were 1.161 times more likely to perpetuate stigma than Tweets from before Elon Musk's acquisition, indicating a weak association. The p-value for the odds ratio test was also in between 0.05 and 0.1, which suggests that the robustness of the evidence for the association between Musk's acquisition of Twitter and stigmatization level is weak. The marginally significant association between an increase in stigmatization level and Elon Musk indicates that the change in perception of the amount of content moderation and acceptable types of discussions on Twitter, brought by Elon Musk's acquisition, increased Twitter user's perpetuation of stigmatizing attitudes towards schizophrenia. This relationship between social norms and hostile behavior is consistent with the findings of Wachs et al. (2022), which concluded that hate speech perpetuation in adolescents was highly associated with the social norms in their environments, similar to how stigmatization perpetuation was associated with social norms on Twitter (Wachs et al., 2022). These findings also coincide with previous literature suggesting content moderation perceptions on social media influences how those on a social media platform conduct themselves, often increasing hostility or misinformation, as when these perceptions decreased, and users perceived less restrictions and

moderation, stigmatization increased (Kupferschmidt, 2022). These results also serve to add onto past studies, as while previous work found increased content moderation perceptions on social media affected user activity, these results indicate that decreased content moderation perceptions affect user activity as well (Savolainen, 2022). Overall, these results support the association between user perception of social norms/content moderation and perpetuated stigma level, suggesting platforms must be conscious of how these perceptions develop. If more users perceived certain types of discussions to be outlawed, such as stigmatization of schizophrenia, said discussions would decrease, making this relationship a valuable tool for platform leaders looking to ensure safety on social media. Some possible ways these perceptions may be altered are public statements made by platform officials/owners, official guidelines that must be read and accepted by users, or details provided in the rules of the platform. However, the marginal significance of this association indicates more research is needed to determine the strength of the impact that social norms and content moderation perceptions have on stigmatization level. Possible explanations for the marginal association may be attributed to the sample size utilized in this study, as similar social science papers had sample sizes between 7,000-20,000 Tweets, in comparison to the current study's small sample size of 2,814 (Kara & Kara, 2022; Robinson et al., 2019; Yi et al., 2020).

Conclusions and Further Directions

Implications

This is the first study to assess the impact of Elon Musk's acquisition of Twitter on stigmatization of schizophrenia. It was found that stigmatization of schizophrenia on social media increased with changes in social norms and decreased perception of content moderation. Therefore, awareness of content moderation guidelines and user expectations on a social media platform may be important in considering courses of action in decreasing online stigmatization and hate speech. Actions to be taken might include putting emphasis on guidelines that discourage stigmatization against those with mental health disorders or making public statements pertaining to Twitter policy against discrimination, making it clear that stigmatization is not acceptable. Further, the study found that schizophrenia stigma is highly prevalent on social media as a whole. Recommendations concur with existing literature, which suggests that as online social interaction increases, companies must consider taking action to decrease stigmatization (Passerello et al., 2019). The results of this study also identified high levels of neutral discussions and low amounts of discussions of personal experience of stigma, which may assist in informing those working towards developing algorithms capable of detecting stigma or those creating programs to decrease stigmatization and increase knowledge about schizophrenia (Robinson et al., 2019).

Limitations

The current study utilized pre-existing codes derived from a content analysis of a previous study on schizophrenia stigmatization level on Twitter. While the use of a pre-existing code aimed to decrease bias in the coding process, all coding was manually performed by one coder. This suggests a certain degree of subjectivity due to coder's cognitive biases, perceived context, and emotional tone of some Tweets. Steps were taken to decrease the possibility of coder bias, such as conducting randomized spot checks on the codes of Tweets throughout the coding process to ensure coding was consistent. Additionally, the use of the Streaming API to retrieve Tweets acts as a possible limitation, as the Streaming API only produces 1% of existing Tweets, in comparison to other data collection methods, such as the Twitter API for Academic Research, which provides a full archive of past Tweets. While this platform was considered, it was found to be unobtainable, as the criteria for gaining this access level includes being a master's student, doctoral candidate, faculty, or research-focused employee at an academic institution or university. Other Twitter API access levels, such as Elevated and Elevated+, do not allow for the retrieval of Twitter data more than 7 days old, which

would not meet the needs of my research. However, the Streaming API, being the most used and publicly available search method for Tweets, allows this study to better represent how the average user experiences Twitter. Another possible limitation to this research is the possibility of other confounding factors contributing to the trends identified that are unrelated to a change in social norms due to Elon Musk's acquisition of Twitter, such as the pandemic or societal shifts. The use of a one-year gap and consistent dates between 2022 and 2021 attempts to decrease the impact of confounding variables.

Future Directions

The marginal significance found in this study exemplifies the need for further exploration of the relationship between stigmatization and social norms on social media, which can be done by examining the effects of Elon Musk's acquisition. Future research may consider analyzing stigmatization of other mental/physical disorders before and after Elon Musk to further understand how stigmatization is impacted by content moderation perceptions. Researchers investigating stigmatization of mental health disorders on social media, specifically schizophrenia, should consider the key terms utilized for data extraction, as words that appear in conversational contexts may derive different levels of stigmatization. Researchers may consider the use of different tenses to search for their data, such as "schizophrenic" or "psychotic", which have also found different results (Passerello et al., 2019). For future work to reach more comprehensive findings, a large sample size should be utilized, encompassing more Tweets over a longer span of time. Additionally, other methods of data extraction, such as the "firehose" or the Academic Research API, may be utilized to increase the percentage of Tweets analyzed. Research on the effects of social norms and content moderation perceptions on stigmatization of mental health on social media is essential in informing social networking companies about possible avenues to make social media platforms safer for those with mental health disorders. While there are existing policies and guidelines in place on platforms like Twitter, more can be done to protect the well-being of those impacted by stigmatization. The detrimental effects of stigmatization, as well as the high levels of stigma around schizophrenia, warrants further research and action.

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