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Using Twitter to Compare Attitudes Towards Schizophrenia and Psychosis: Investigating the Prevalence of Stigma

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ABSTRACT

Schizophrenia remains one of the most stigmatized psychiatric diagnoses. It has been argued that the condition requires renaming. Psychosis is often used as an alternative term in UK clinical practice. We explored the prevalence of stigmatizing attitudes towards schizophrenia and psychosis using Twitter. Quantitative content analysis was used to analyze Tweets ($n = 423$) containing the terms "psychosis," "psychotic," "schizophrenia," or "schizophrenic." Tweets were categorized according to the presence and type of stigma. Both schizophrenia and psychosis were frequently stigmatized on Twitter. However, Tweets using the terms psychosis/tic were significantly more likely to contain stigmatizing attitudes (70.9%, $n = 151$) than Tweets using the terms schizophrenia/c (42.4%, $n = 89$; $p < 0.001$). Adjective terms were significantly more commonly stigmatized (76.6%, $n = 164$) than nouns (36.4%, $n = 76$; $p < 0.001$). The term "psychotic" was frequently used pejoratively. Both "schizophrenia" and "psychosis" are associated with high levels of stigma on Twitter. If schizophrenia is to be renamed, psychosis may not be a suitable replacement.

1 | Introduction

Of all diagnostic terms, "schizophrenia" is arguably one of the most stigmatized (Hazell et al. 2022; Oral 2007). Link and Phelan's (2001) widely cited sociological definition conceptualizes stigma as consisting of several interacting components; labeling, stereotyping, separation, status loss and discrimination (the behavioral component of stigma). The World Health Organisation (2021) has identified the reduction of stigma, discrimination, and human rights abuses towards people with mental health difficulties as a global priority.

Surveys suggest that in the UK, schizophrenia is commonly associated with public perceptions of dangerousness, unpredictability and a poor prognosis (Wood et al. 2014; Crisp et al. 2000). Media coverage is frequently negative, including representations linking schizophrenia and the perpetration of violence (Goulden et al. 2011; Cain et al. 2014) and this contributes to negative, inaccurate public perceptions. People diagnosed with schizophrenia may internalize negative stereotypes, leading to disempowerment and a negative self-concept (Harrison and Gill 2010). Furthermore, well-intentioned public awareness campaigns which emphasize biogenetic causal

This project was conducted using the social media platform formerly known as Twitter. We will refer to it as Twitter as this was its name at the time of carrying out the research, however we are aware that the platform was renamed "X" in July 2023.

explanations for mental health have been associated with increased public prejudice, fear and desire for social distance (Read et al. 2006).

1.1 | The Schizophrenia Label

Labeling theory (Scheff 1974; Imhoff 2016) suggests that the diagnostic language used to describe mental distress may contribute to stigma. Indeed, for decades, schizophrenia has been a contested term (Guloksuz and van Os 2018). Various criticisms have been put forward, including that the word (literally translating as "split-mind" disease) does not accurately represent the condition it intends to describe (Wong 2019). Whilst other presentations have undergone name changes in relation to issues of stigmatization, such as "manic depression" which was formally renamed to "bipolar disorder" in the 1980s (Ellison et al. 2015), the term schizophrenia has remained part of the diagnostic lexicon since it was first coined by Bleuler in 1908 (Fusar-Poli and Politi 2008). These issues were highlighted in a review by the Schizophrenia Commission (2012), which noted that "[p]sychiatrists must be extremely cautious in making a diagnosis of schizophrenia as it can generate stigma and unwarranted pessimism. The more general term "psychosis" is preferable, at least in the early stages." (Schizophrenia Commission 2012, p. 7). Practice guidance from the British Psychological Society (2017) also suggests that the broader term "psychosis" may be used to describe key elements of the presentation.

Beyond the issue of language, the validity of the schizophrenia construct (i.e., as a distinct categorical entity) has been questioned (Bentall et al. 1988; van Os 2009; Guloksuz and van Os 2018). van Os (2016) advocates for a psychosis spectrum approach, given the high degree of heterogeneity in presentations, response to treatment and outcome. Bentall (2006) proposes a symptom-focused approach which is oriented to the specific presenting problems without a requirement for diagnostic classification. However, the best conceptualisation of the schizophrenia construct is far from a settled issue.

Globally, there is a growing movement to rename schizophrenia. Name changes have already been implemented in countries and territories including Japan, South Korea and Taiwan (Lasalvia 2018). Some authors argue that a name change would help to reduce public stigma, improve acceptability of the diagnosis and encourage a reformulation and reconceptualisation of the condition within the scientific community (Mesholam-Gately et al. 2021; George and Klijn 2013). However, renaming is a complex process which requires the involvement of multiple stakeholders and there is currently a lack of consensus as to what the alternative name should be (Lasalvia et al. 2021).

1.2 | Twitter in Attitudes Research

Social media is an increasingly popular source of data in health research. The micro-blogging platform, Twitter (now "X") is commonly used to discuss mental health, for example to share experiences, knowledge and raise awareness (Berry et al. 2017). Users can interact and share their views by posting brief messages ("Tweets") of up to 280 characters. Therefore, Twitter may offer a useful insight into public attitudes and discourse (McKee 2013; Zimmer and Proferes 2013; Ahmed et al. 2017) Previous studies have used content analysis to explore attitudes on Twitter towards a range of conditions including schizophrenia, depression and OCD (Robinson et al. 2019; Passerello et al. 2019; Joseph et al. 2015; Reavley and Pilkington 2014; Alvarez-Mon et al. 2019). Consistent with the wider literature, findings suggest that schizophrenia is disproportionately stigmatized compared to other mental health conditions.

To our knowledge, only one previous study, by Passerello et al. (2019), has used Twitter to compare attitudes towards schizophrenia and psychosis. Surprisingly, given the significant stigma associated with the term "Schizophrenia," the term "Psychosis" was reported as being more frequently stigmatized. Authors differentiated between noun and adjectival forms of diagnostic terms (e.g., "schizophrenia," "schizophrenic"), however they do not explicitly report on how this impacted on stigma, which is a limitation. Proponents of "person-first" language suggest that adjectives are more stigmatizing than nouns, since it is thought that adjectives objectify the individual and reduce personhood (Haghighat and Littlewood 1995). The inability to differentiate between stigma attributed to noun versus adjectival forms is a limitation of the Passarello study. Moreover, the study was conducted based on a sample of Twitter data from 2017 and has not been subject to more contemporary replication.

1.3 | Research Questions and Hypotheses

We aimed to replicate and develop the work of Passerello et al. (2019) by exploring the prevalence of stigma in Tweets using different diagnostic terms (schizophrenia or psychosis) and comparing the use of noun and adjective terms. Building on previous studies (Passerello et al. 2019; Joseph et al. 2015), we tested the following hypotheses:

H1. *Overall, the terms schizophrenia or schizophrenic (schizophrenia/c) will be more frequently associated with stigmatizing attitudes, compared to the terms psychosis or psychotic (psychosis/tic) – Main effect of diagnostic terminology.*

H2. *There will be no difference in the prevalence of stigma between Tweets using the word schizophrenic, and those using the word psychotic.*

H3. *There will be a higher prevalence of stigma in Tweets referring to schizophrenia, compared to Tweets referring to psychosis.*

H4. *Overall, adjective terms ("schizophrenic" or "psychotic") will be more frequently associated with stigmatizing attitudes, compared to noun terms ("schizophrenia" or "psychosis") – Main effect of word forms.*

H5. *There will be a greater prevalence of stigma in Tweets using the word schizophrenic, compared to Tweets using the word schizophrenia.*

H6. *There will be a greater prevalence of stigma in Tweets using the word psychotic, compared to Tweets using the word psychosis.*

2 | Methods

2.1 | Design

Quantitative content analysis was used to compare the prevalence of stigmatizing attitudes in Tweets using the terms schizophrenia/c and psychosis/tic.

2.2 | Data Collection

At the time of conducting this study, Twitter permitted users to conduct research using its platform, provided that certain conditions were met (Gold 2020). This included that researchers inform Twitter of their intentions by applying for Academic Research Access, and adhere to the Developer Agreement and Policy, which protects users′ security and privacy (Archived URL: https://developer.twitter.com/en/developer-terms/agreement-and-policy). CT was granted Academic Research Access by Twitter on November 6, 2022. This enabled access to real-time and historic Twitter data via the Application Programming Interface (API v2).

2.3 | Sampling

We used the Twitter-approved tool "Tweet Downloader" (Archived URL: https://developer.twitter.com/apitools/downloader) to search the Twitter API v2 for Tweets containing the words "psychosis," "psychotic," "schizophrenia," and "schizophrenic." We restricted the search to Tweets published in English, and excluded Retweets. Tweets were downloaded and imported into Microsoft Excel. The data collected comprised of the Tweet, the user′s Twitter bio (a short personal description shown on the user′s profile), Twitter handle (public username) and the name of the user as defined on their profile. This data was collected to enable the categorization of "user type." Only publicly available Tweets were collected.

Tweets were sampled from a single, arbitrarily chosen date (May 20, 2022), approximately 6 months before the date of collection (November 27, 2022). The date was checked by conducting a simple Google search to ensure that no news items or current affairs of global significance were announced on this particular date.

2.4 | Analysis

2.4.1 | Development of the Coding Scheme

Tweets were manually coded using quantitative content analysis, based on a coding framework adapted from Passerello et al. (2019); described further below. Quantitative content analysis enabled Tweets to be systematically categorized based on the presence and type of stigma towards schizophrenia/c and psychosis/tic.

2.4.2 | Inter-Rater Reliability

Two iterations of pilot coding were undertaken by authors CT and PB using Passarello et al.′s (2019) coding framework. A sample of 120 Tweets (not included in the final analysis) were independently coded. Any Tweets that were difficult to categorize were discussed until a consensus was reached. Following this, refinements were made to the coding framework to ensure that any areas which caused disagreement were resolved before full coding taking place. Refinements included differentiating between "neutral or possibly supportive" and "unambiguously supportive" attitudes, to acknowledge ambiguity in the meaning of Tweets, and the addition of a "conspiracy theories" category, given an immediately obvious prevalence of Tweets referring to conspiracies, typically in the context of the COVID-19 pandemic.

Using the revised coding manual, a further 120 Tweets were independently coded by CT and PB to check for inter-rater reliability. Overall basic agreement (averaged across all categories) was 86.6%, which is acceptable (Huxley 2020). After full coding by CT, a subset of the final dataset (20% of Tweets, $n = 100$) was randomly generated for reliability coding (Coe and Scacco 2017). It has been suggested that a subset of approximately 10%–20% of texts is sufficient for reliability coding in quantitative content analysis (Huxley 2020; Coe and Scacco 2017). Inter-rater reliability testing was completed by a third coder (LM). A training session was provided to enable familiarization with the study aims and coding manual (Huxley 2020). Overall basic agreement was 87.0%. Category-specific inter-rater agreement is shown in Appendix A.

2.4.3 | Final Coding Scheme

First, Tweets were screened using the following exclusion criteria:

a. Lack of context: Where the Tweet was unable to be understood by the reader or the Tweet was a spam Tweet with no meaning behind it.

b. Non-English: Where all or the majority of the Tweet was not in English.

c. Repetition: Where the Tweet was exactly the same as another Tweet in the dataset.

d. Retweet: A reposted or forwarded Tweet that was originally posted by another user.

If included, each tweet was coded into either three or four categories (shown below). Full category definitions are included in the Coding Manual (Appendix B), also available via https://osf.io/zarux/.

a. User type: Individual, consumer, health professional, organization and mental health advocate.

b. Tweet content: Personal experience of mental illness, awareness promotion and resources, research findings, advice giving, advertisement, news media and personal opinion or dyadic interaction.

c. Attitude: Stigmatizing, personal experience of stigma, supportive, neutral or possibly supportive, and anti-stigma.

d. If category (c) indicated stigma, stigma type: Social distancing, dangerousness, snap out of it, personal weakness, inaccurate beliefs, conspiracy theories, mocking or trivializing, and self-stigma.

2.4.4 | Confidence Ratings

In addition to the process adopted by Passerello et al. (2019), Tweets were given confidence ratings relating to the classification of stigma, and an overall confidence rating for the categorization of the Tweet. This aimed to increase the rigor of the coding process. Confidence was rated on a 0–4 scale:

0. Not relevant and does not apply.

1. Probably does not apply.

2. May apply, but significant uncertainty as to meaning.

3. Probably relevant and applies, but some doubt as to context or intended meaning.

4. Category clearly relevant and applies to this Tweet.

Tweets which were given an overall confidence rating of 2 or less (i.e., Tweets which were significantly ambiguous and therefore difficult to code) were excluded from the analysis.

2.5 | Analysis Plan

Quantitative content analysis enabled Tweets to be systematically categorized according to the presence and type of stigma. Fisher-Freeman-Halton exact tests were used to compare the prevalence of stigma in Tweets using the terms schizophrenia/c and psychosis/tic. All statistical analyzes were conducted using SPSS version 29.0.

3 | Results

3.1 | Inclusion and Exclusion

Figure 1 shows the method by which Tweets were identified and assessed for eligibility.

3.2 | User Type and Tweet Content

Regarding "user types," across all terms most Tweets were derived from individuals. The next most common user type was consumers (i.e., users referring to personal experience of mental illness). A minority of Tweets were from organizations, health professionals or mental health advocates.

Across all terms most Tweets consisted of personal opinion or a dyadic interaction between users. The second most common
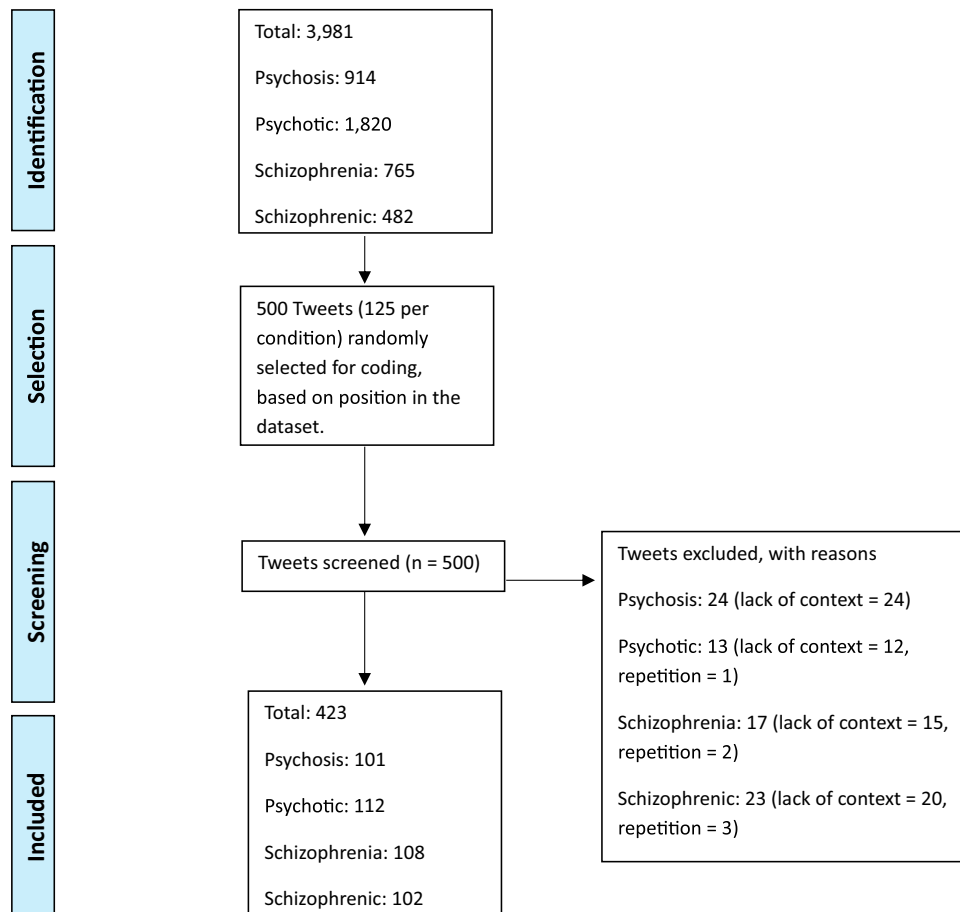

FIGURE 1 | Identification and screening of tweets.

TABLE 1 | The percentage of tweets in each "user type" and "content" category.

	Schizophrenic	Schizophrenia	Psychotic	Psychosis
	User type			
Individual	82.4 (85)	70.4 (76)	94.6 (106)	78.2 (79)
Consumer	10.8 (11)	17.6 (19)	4.5 (5)	15.8 (16)
Organization	0	7.4 (4)	0.9 (1)	1 (1)
Health professional	5.9 (6)	0.9	0	2 (2)
Mental health advocate	0	3.7	0	3 (3)
	Tweet content			
Personal experience	9.8 (10)	14.8 (16)	2.7 (3)	14.9 (15)
Awareness promotion	1 (1)	15.7 (17)	1.8 (2)	4 (4)
Research findings	0	8.3 (9)	0	4 (4)
Advice giving	0	0	0	0
Advertisement	0	1.9 (2)	0.9 (1)	2 (2)
News media	0	4.6 (5)	0	2 (2)
Personal opinion	89.2 (91)	54.6 (59)	94.6 (106)	73.3 (74)

Note: n shown in brackets.

category was personal experience of mental illness. Tweets using adjectives contained a considerably higher proportion of personal opinion than Tweets using nouns. This difference was particularly pronounced for schizophrenia/c. "Schizophrenia" Tweets contained the highest proportion of awareness promotion (15.7%, $n = 17$) and research findings (8.3%, $n = 9$) of any term.

Table 1 shows the proportion of user types and type of Tweet content for each term.

3.3 | Attitude

There was a relatively high prevalence of stigmatizing attitudes across all conditions. Confidence ratings related to the classification of stigma are provided in Appendix C.

3.3.1 | Comparing Word Forms

Comparing attitudes within Tweets using noun and adjective terms, there was a higher prevalence of stigmatizing attitudes in Tweets using the adjectives "schizophrenic" or "psychotic" (76.6%, $n = 164$) than Tweets using the nouns "schizophrenia" or "psychosis" (36.4%, $n = 76$).

For Tweets using nouns, 55.5% ($n = 116$) were rated as neutral or possibly supportive, 36.4% ($n = 76$) as stigmatizing, 5.7% ($n = 12$) as supportive and 1.4% ($n = 3$) as anti-stigma.

For Tweets using adjectives, 76.6% ($n = 164$) were rated as stigmatizing, 21% ($n = 45$) as neutral or possibly supportive, and 1.9% ($n = 4$) as supportive.

3.3.2 | Comparing Diagnostic Terminology

Comparing attitudes in Tweets according to diagnostic terminology, there was a substantially higher prevalence of stigma in Tweets using the terms psychosis/tic (70.9%, $n = 151$), than Tweets using the terms schizophrenia/c (42.4%, $n = 89$).

For schizophrenia/c, around half of the Tweets were categorized as neutral or possibly supportive (49.5%, $n = 104$), 42.4% ($n = 89$) were rated as stigmatizing 5.7% ($n = 12$) as supportive and 1.4% ($n = 3$) as anti-stigma.

For psychosis/tic, most Tweets were classed as stigmatizing (70.9%, $n = 151$), 26.8% ($n = 57$) as neutral or possibly supportive, 1.9% ($n = 4$) as supportive and 0.5% ($n = 1$) as anti-stigma.

3.3.3 | Comparing Specific Terms

For "schizophrenic," most Tweets were categorized as stigmatizing (62.7%, $n = 64$), 32.4% ($n = 33$) were rated as neutral or possibly supportive, and 3.9% ($n = 4$) were supportive.

For "schizophrenia," most Tweets were classed as neutral or possibly supportive (65.7%, $n = 71$), 23.1% ($n = 25$) were rated as stigmatizing, 7.4% ($n = 8$) as supportive and 1.9% ($n = 2$) as anti-stigma.

For "psychotic," most Tweets were rated as stigmatizing (89.3%, $n = 100$), and the remaining 10.7% ($n = 12$) were classed as neutral or possibly supportive.

For "psychosis," half of the Tweets were rated as stigmatizing (50.5%, $n = 51$), 44.6% ($n = 45$) were rated as neutral or possibly supportive, 4% ($n = 4$) as supportive and 1% ($n = 1$) as anti-stigma.
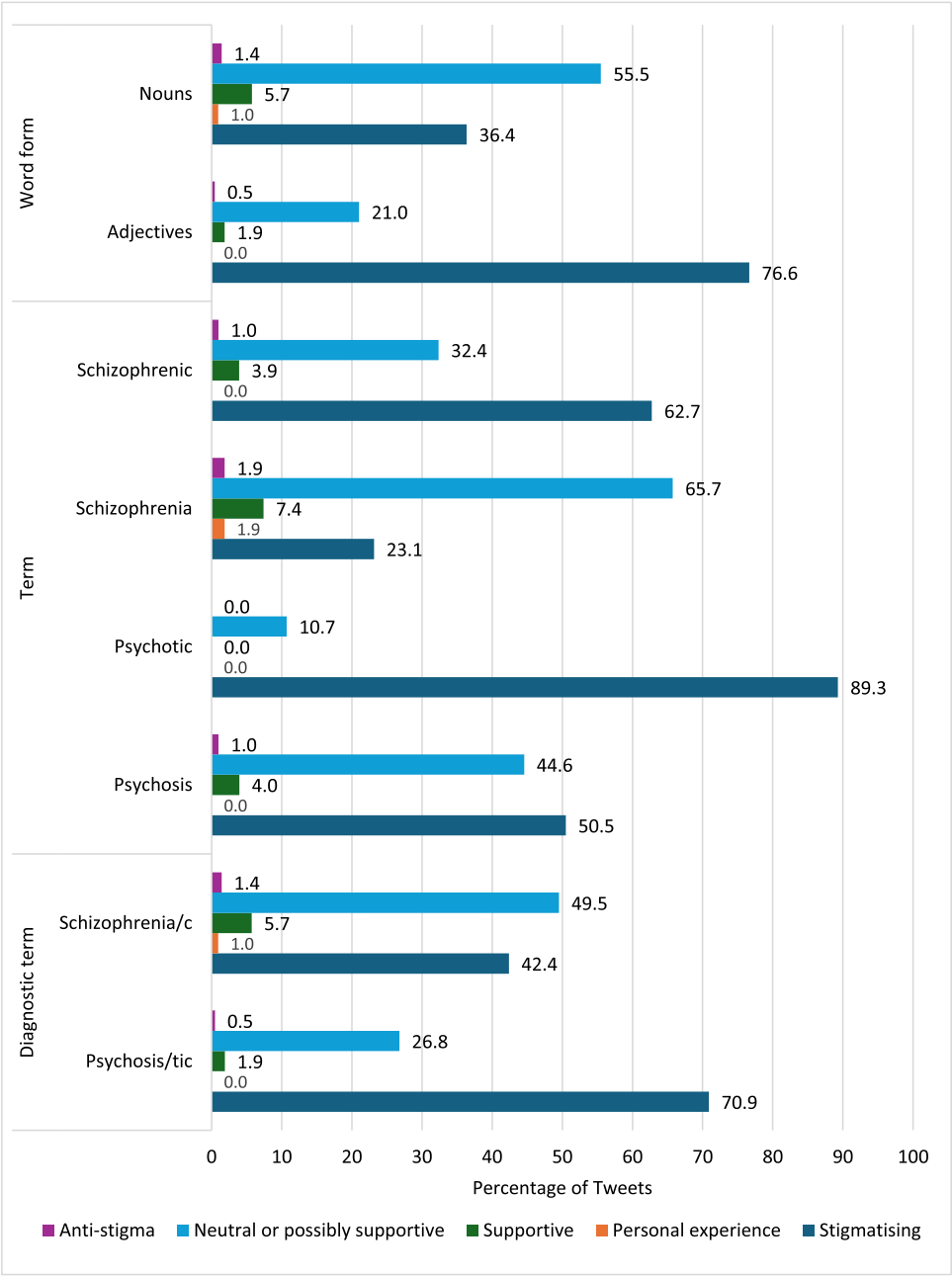
FIGURE 2 | The proportion of tweets in each "attitude" category.

Figure 2 shows the proportion of Tweets in each "attitude" category.

3.4 | Stigma Type

The proportion of stigmatizing tweets in each "stigma type" category is shown in Figure 3.

Regarding the type of stigma, for "schizophrenic" most stigmatizing Tweets were categorized as mocking or trivializing (82.2%, $n = 60$), 8.2% ($n = 6$) as inaccurate beliefs, 5.5% ($n = 4$) as social distancing, 1.4% ($n = 1$) as self-stigma and 1.4% ($n = 1$) as dangerousness.

For "schizophrenia," 55.6% ($n = 15$) the stigmatizing Tweets were classed as mocking or trivializing, 18.5% ($n = 5$) as

dangerousness, 14.8% ($n = 4$) as conspiracy theories, 7.4% ($n = 2$) as social distancing and 3.7% ($n = 1$) as inaccurate beliefs.

Stigmatizing "psychotic" Tweets contained the highest proportion of mocking or trivializing attitudes of any term (85.5%, $n = 87$), while 8.8% ($n = 9$) were categorized as dangerousness, 3.9% ($n = 4$) as social distancing and 1% ($n = 1$) as self-stigma.

Stigmatizing "psychosis" Tweets contained the highest proportion of conspiracy theories (34.5%, $n = 19$), while 45.5% ($n = 25$) were rated as mocking or trivializing, 7.3% ($n = 4$) as dangerousness, 5.5% ($n = 3$) as self-stigma, 3.6% ($n = 2$) as personal weakness, 1.8% ($n = 1$) as inaccurate beliefs and 1.8% ($n = 1$) as social distancing.
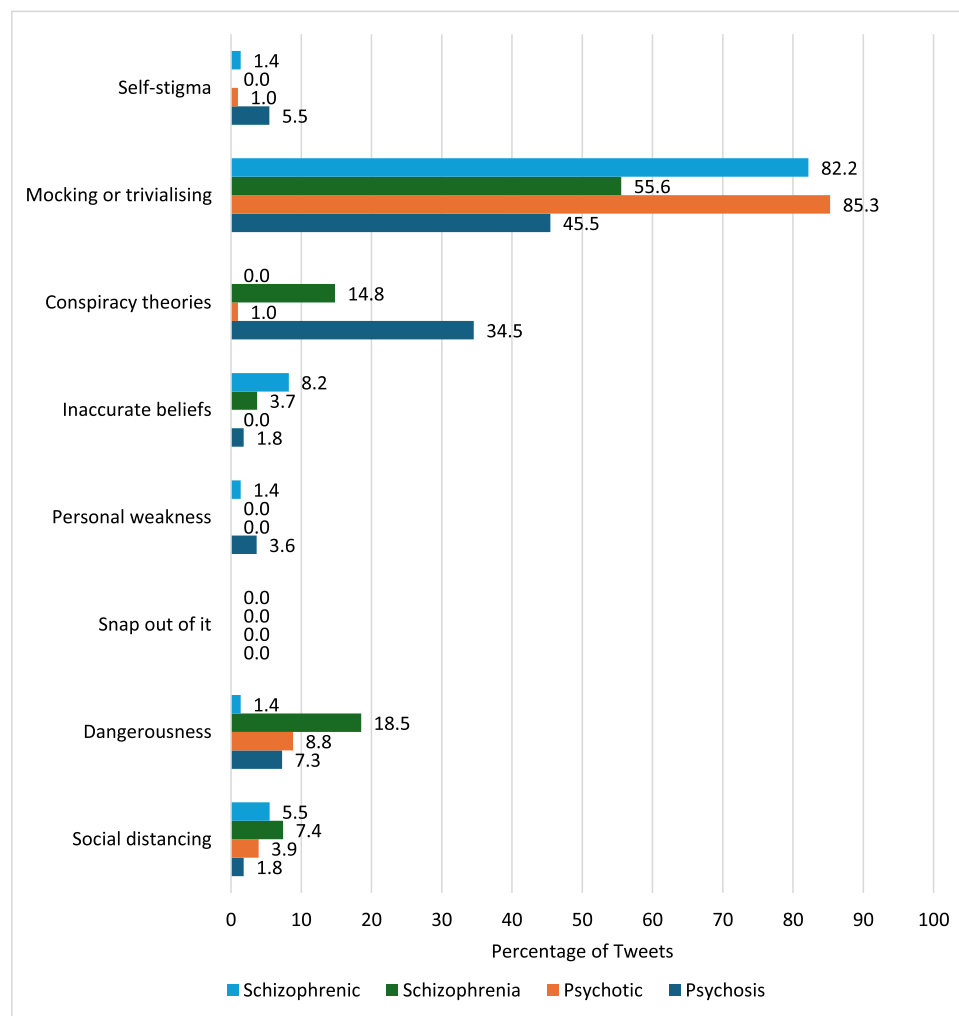
FIGURE 3 | The proportion of stigmatizing tweets in each "stigma type" category.

3.5 | Statistical Analysis

Fisher-Freeman-Halton exact tests (Lydersen et al. 2007) were carried out to test hypotheses 1–6 (Table 2) as for each of the planned statistical analyzes, data did not meet chi-square assumption due to small expected cell counts (McHugh 2013). Cramer's V was used to measure effect size. Regarding planned post-hoc comparisons, focusing on the prevalence of stigmatizing attitudes specifically, adjusted standardized residuals (z-scores) were computed for each cell of the 5×2 contingency tables and p-values were then calculated (Beasley and Schumacker 1995).

4 | Discussion

We aimed to replicate and extend the work of Passerello et al. (2019) by comparing the prevalence of stigma in Tweets using different diagnostic terms (schizophrenia and psychosis) in their noun and adjective forms.

Most importantly, stigmatizing attitudes were prevalent across all conditions. There were no terms which were not subject to relatively frequent stigmatization. Comparing diagnostic terminology, stigma was significantly more prevalent in Tweets

referring to psychosis/tic (70.9%) than Tweets referring to schizophrenia/c (42.4%), which is consistent with Passarello et al.'s (2019) finding. As expected, stigma was significantly more prevalent in Tweets using adjectives (76.6%) than Tweets using nouns (36.4%). The most stigmatized term was "psychotic," followed by "schizophrenic." "Psychotic" was frequently used as an insult. Consistent with Passarello et al.'s (2019) findings, but surprising in the context of other research, "schizophrenia" was the least stigmatized term. Across all terms, the most common type of stigma was mocking or trivialization. Most Tweets consisted of personal opinion.

These findings can be compared with previous studies which used Twitter to explore attitudes towards psychosis and/or schizophrenia (Robinson et al. 2019; Passerello et al. 2019; Joseph et al. 2015; Reavley and Pilkington 2014; Alvarez-Mon et al. 2019). Passerello et al. (2019) found that Tweets using the terms psychosis/tic more commonly contained stigmatizing attitudes (31.5%, $n = 131$) than Tweets using the terms schizophrenia/c (9.6%, $n = 41$). The current study found the same result, however we observed a substantially higher prevalence of stigma towards both diagnostic terms. This difference is even more pronounced when compared to earlier studies, suggesting a potential increase in stigmatization of these terms on Twitter over time. Indeed, nearly 10 years before the current

TABLE 2 | Results of Fisher-Freeman-Halton exact tests and post-hoc analyzes for Hypotheses 1–6.

A priori hypotheses	Supported?	Fisher-Freeman-Halton Exact Test, two-tailed p value	Cramer's V (effect size)	Prevalence of stigmatizing attitudes	p value for stigmatizing attitudes
H1. Overall, the terms schizophrenia or schizophrenic (schizophrenia/c) will be more frequently associated with stigmatizing attitudes, compared to the terms psychosis or psychotic (psychosis/tic) – *Main effect of diagnostic terminology.*	No	< 0.001	0.295, p < 0.001	Schizophrenia/c: 42.4% ($n = 89$) Psychosis/tic: 70% ($n = 151$)	< 0.001
H2. There will be no difference in the prevalence of stigma between Tweets using the word schizophrenic, and those using the word psychotic.	No	< 0.001	0.323, p < 0.001	Schizophrenic: 62.7% ($n = 33$) Psychotic: 89.3% ($n = 100$)	< 0.001
H3. There will be a higher prevalence of stigma in Tweets referring to schizophrenia, compared to Tweets referring to psychosis.	No	< 0.001	0.295, p < 0.001	Schizophrenia: 23.1% ($n = 25$) Psychosis: 50.5% ($n = 51$)	< 0.001
H4. Overall, adjective terms ("schizophrenic" or "psychotic") will be more frequently associated with stigmatizing attitudes, compared to noun terms ("schizophrenia" or "psychosis") – *Main effect of word forms.*	Yes	< 0.001	0.408, p < 0.001	Adjectives: 76.6% ($n = 164$) Nouns: 36.4% ($n = 76$)	< 0.001
H5. There will be a greater prevalence of stigma in Tweets using the word schizophrenic, compared to Tweets using the word schizophrenia.	Yes	< 0.001	0.405, p < 0.001	Schizophrenic: 62.7% ($n = 64$) Schizophrenia: 23.1% ($n = 25$)	< 0.001
H6. There will be a greater prevalence of stigma in Tweets using the word psychotic, compared to Tweets using the word psychosis.	Yes	< 0.001	0.431, p < 0.001	Psychotic: 89.3% ($n = 100$) Psychosis: 50.5% ($n = 51$)	< 0.001

Note: $V \leq 0.2$ = weak association, $< 0.2\ V \leq 0.6$ = moderate association, $V > 0.6$ = strong association (IBM 2024).

study Reavley and Pilkington (2014) compared stigma in Tweets using the hashtags #schizophrenia and #depression. In contrast to the current study, most Tweets referring to schizophrenia were categorized as neutral (42%, $n = 193$) or supportive (42%, $n = 191$), with just 5% ($n = 21$) rated as stigmatizing. Notably, within Reaveley and Pilkington's study (2014), Tweets about schizophrenia were derived from a wider range of user types, contained a much smaller proportion of personal opinion (12%, $n = 54$) and a higher proportion of awareness promotion and research findings (29%, $n = 132$; 22%, $n = 100$). By comparison, the current study contained a high proportion of personal opinion, mostly derived from individuals. It seems reasonable to suppose that Tweets aiming to raise awareness or share research findings are less likely to express negative attitudes, which may help to explain the difference in prevalence of

stigma. Nonetheless, the current study and findings from more recent research (Robinson et al. 2019; Passerello et al. 2019; Alvarez-Mon et al. 2019) suggest that levels of psychosis-related stigma on Twitter have increased over the past 10 years.

We found a higher prevalence of stigma towards adjectival terms. Many Tweets appropriated "psychotic" as an insult, rather than referring to psychosis as a mental health presentation. Indeed, "psychotic" Tweets contained the highest proportion of mocking or trivializing attitudes. Commonly, "psychotic" was used in reference to support or express disdain towards polarizing public figures (e.g., Donald Trump, Elon Musk). While there is a lack of research concerning the use of the word "psychotic" specifically, similar findings related to the pejorative use of adjectives have been reported in previous

Twitter research (Joseph et al. 2015; Alvarez-Mon et al. 2019). Joseph et al. (2015) compared attitudes in Tweets using the noun and adjective forms of schizophrenia and diabetes. Of all terms, "schizophrenic" Tweets contained the highest proportion of medically inaccurate (30.1%) and nonmedical uses (33.3%). Interestingly, "schizophrenic" Tweets were more likely to be negative and sarcastic when not referring to the illness itself. Together, these findings suggest a high prevalence of pejorative uses of psychosis-related terms on Twitter. The misappropriation of diagnostic terms within the public sphere may contribute to pejoration (i.e., a shift in meaning) of these terms over time.

We observed a higher prevalence of stigma in Tweets using the terms psychosis/tic, compared to Tweets using the term schizophrenia/c. This adds to a small body of literature which suggests that psychosis is associated with experiences of both public stigma (e.g., within social networks) and internalized stigma (including reduced self-confidence and a negative self-image (Burke et al. 2016; Wood et al. 2018). This suggests that if schizophrenia is renamed, "psychosis" may not be a suitable replacement, having acquired its own stigmatic connotations. An intriguing study by Maletta and Vass (2023) provides further evidence to support this view. Authors used linguistic software to analyze the emotional tone of UK newspaper articles containing the words "schizophrenia" and "psychosis" ($n = 9802$) between 2000 and 2019. On average, psychosis was associated with a slightly more negative tone than schizophrenia in newspaper reports. Furthermore, both terms were discussed increasingly negatively over time.

4.1 | Strengths and Limitations

To our knowledge, this is the first study to systematically compare attitudes in Tweets using the terms "schizophrenia" and "psychosis" in their noun and adjective forms. Previous Twitter studies have focused only on schizophrenia (Reavley and Pilkington 2014), or schizophrenia and psychosis together (Robinson et al. 2019; Alvarez-Mon et al. 2019). We used an established methodology to analyze the content of Twitter posts, which allowed comparisons to be made with previous work. We took several measures to maximize reliability of the content analysis (e.g., involving a second coder, assessing inter-rater reliability).

A potential limitation of the study is the sample size. We randomly sampled 500 Tweets from a single point in time. Variable sample sizes are reported within the Twitter literature, however a larger dataset collected over a period of time, such as Robinson et al.'s study (2019) may provide a more comprehensive overview of Twitter content as a whole. Nonetheless, we identified themes with a relatively high prevalence, suggesting that the sample size was sufficient to detect themes within the data (Fugard and Potts 2015).

We included all uses of the terms psychosis/tic and schizophrenia/c. Many psychosis/tic Tweets used the terms colloquially, rather than to refer to mental illness. Therefore, the stigmatizing use of these terms may not reflect an intention to stigmatize psychosis itself. Rather, this may indicate the way in which psychosis-related terms have been adopted and appropriated within popular culture. Studies have shown that terms such

as "psychotic" are commonly used inaccurately and pejoratively within the media (Goulden et al. 2011; Ross et al. 2019). Future research may benefit from differentiating between medical and nonmedical uses of psychiatric terms (Passerello et al. 2019).

This study took place during the COVID-19 global pandemic. We observed a high prevalence of Tweets referring to "mass formation psychosis," in the context of anti-vaccination conspiracies (Kużelewska and Tomaszuk 2022). This suggests that the pandemic may have influenced trends in the use of psychosis-related terms. Whether these terms remain part of public discourse remains to be seen and may influence whether the term psychosis continues to attract increasing stigma.

4.2 | Clinical and Research Implications

The current study does not support the view that psychosis is less stigmatized by the public than schizophrenia. It may be that broader efforts to reconceptualise schizophrenia and address public misconceptions about the nature of mental illness will prove more fruitful in increasing public acceptance, than simply changing the name (Bentall 2013; Brabban et al. 2013). It has been argued that schizophrenia lacks construct validity and should abandoned altogether (Bentall et al. 1988; van Os 2016; Bentall 2013).

Several significant changes were made to Twitter following completion of this study. This included the removal of Academic Research Access and the introduction of paid subscriptions. The removal of academic access means that future replication of this study will not be possible. Other social media platforms could potentially be used to study public stigma. Indeed, Facebook has been used to study various health-related topics (Franz et al. 2019).

Finally, given the findings in the present study, we would strongly encourage future researchers considering stigmatic judgements of specific diagnostic or clinical terms to separately attend to both adjectival and noun word forms.

5 | Conclusions

This study found that both schizophrenia and psychosis were subject to frequent stigmatization on Twitter. This suggests that if schizophrenia is to be renamed, psychosis may not be a suitable replacement.

Simply renaming schizophrenia is unlikely to eradicate stigma (Bentall 2013; Brabban et al. 2013). It has been argued that the concept lacks validity and requires reconceptualising. Efforts to reduce public stigma should address assumptions regarding the nature of severe mental illness. This may include a recognition that psychosis may arise as an understandable response to adverse life experiences.

Anglia Faculty of Medicine and Health Sciences (FMH) Research Ethics Committee (reference: ETH2223-0645). A Protection Impact Assessment (DPIA) was also completed after ethical approval was gained. Although only publicly available personal data were collected, in line with recommendations from the DPIA the dataset was anonymised as soon as coding was complete by deleting the user's name, Twitter handle and bio. This ensured that the retained dataset could not include any personally identifiable data, so was not subject to the Data Protection Act or General Data Protection Regulation (GDPR).

Consent

All information utilized for this project was available in the public domain and consent was not obtained from authors of any individual tweets.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data are publicly available via this link: https://osf.io/zarux/. Consistent with our ethical approval, the redacted datafile does not include identifying details of the original author of the Tweet.

Peer Review

The peer review history for this article is available at https://www.webofscience.com/api/gateway/wos/peer-review/10.1002/mhs2.70026.

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Appendix A

See Table A1.

TABLE A1 | Category-specific agreement for inter-rater reliability (CT & LM).

Category	Term				Overall agreement (across terms)
	Psychosis	Psychotic	Schizophrenia	Schizophrenic	
Exclusion	96%	88%	92%	80%	88%
	24/25	22/25	23/25	20/25	88/100
User type	85.7%	100%	95.2%	94.7%	93.9%
	18/21	22/22	20/21	18/19	78/93
Tweet content	76.2%	95.5%	85.7%	73.7%	83.1%
	16/21	21/22	18/21	14/19	69/83
Attitude	52.4%	81.8%	76.2%	79%	75%
	11/21	18/22	16/21	15/19	60/80
Stigma type	66.7%	88.2%	87.5%	87.5%	85%
	4/6	15/17	7/8	7/8	34/40

Note: Percentages refer to basic agreement. One hundred Tweets (25 per condition) were randomly selected for inter-rater reliability coding.

Appendix B

Coding Manual

Exclusion criteria

Before full coding, Tweets will be screened and excluded based on the following criteria:

a. Lack of context: Where the tweet is unable to be understood or categorized by the reader, or the tweet was a spam tweet with no meaning behind it.

b. Non-English: Where all or the majority of the tweet is not in English.

c. Repetition: Where the content of the tweet is exactly the same as another tweet in the dataset.

d. Retweet: A reposted or forwarded tweet that was originally posted by another user.

Coding framework

Each Tweet is coded into either three, or four categories:

a. User type: Individual, consumer, health professional, organization or advocate.

b. Tweet content: Personal experience of mental illness, awareness promotion and resources, research findings, advice giving, advertisement, news media and personal opinion or dyadic interaction.

c. Attitude: Stigmatizing, personal experience of stigma, supportive, neutral or possibly supportive, and anti-stigma.

d. If category (c) indicated stigma, stigma type: Social distancing, dangerousness, snap out of it, personal weakness, inaccurate beliefs, conspiracy theories, mocking or trivializing, and self-stigma.

General guidelines for coding

- Ratings focus on **how the reader may experience the tweet** (e.g., does the tweet appear stigmatizing, mocking, sarcastic).

- If the intended meaning or context of the tweet is not clear, consider whether it is still possible to categorize the tweet (e.g., does it appear stigmatizing). Overall confidence ratings may be lower in these cases.

- Do not google things.

- Do not click on hyperlinks within tweets.

- During coding, take at least a 10 min break every hour.

Confidence ratings (0–4) are made as follows:

- 4 = category clearly relevant and applies to this Tweet.

- 3 = probably relevant and applies, but some doubt as to context or intended meaning.

- 2 = may apply, but significant uncertainty as to meaning.

- 1 = probably does not apply.

- 0 = not relevant and does not apply.

Tweets with a rating of 2 or less will be excluded from the analysis.

Category Definitions and Example Tweets - adapted from Passarello et al. (2019)[a]	
Self-identified user type (rate as x – pick best option)	
Category	**Definition**
Individual	A user who does not specify whether they suffer from a mental illness
Consumer	A user who states or implies on their profile or within the sample tweet, that they suffer from, or have personal experience of mental illness (does not include family members)
Organization	A user who states on their profile, or implies within the sample tweet that they are representing an organization, or group of people (e.g., media, charities, NGOs)
Health professional	A user who claims to be a registered healthcare professional (e.g., nurse, doctor, counselor, psychologist), on their profile or within the sample tweet
Mental health advocate	A user who states on their profile, or within the sample tweet, that they are a mental health advocate (e.g., life coach, charity worker)

		Example Tweet[a]	
Tweet Content (choose best option)		**Schizophrenia/schizophrenic**	**Psychosis/psychotic**
Personal experience of mental illness	The user expresses their personal experience of having a mental illness, or distress associated with mental illness (note – this does not include family members)	As a #schizophrenic, my social brain is not all what it could be. Twitter seems like an avalanche of media frenzy 24/7 but maybe I'm nub:/	Having a rough time lately with my #mentalhealth Feeling exhausted and just not myself #depression #anxiety #psychosis
[b]Awareness promotion and resources	The user promotes awareness about schizophrenia or psychosis, by providing information or pointing users in the direction of any source of information (regardless of whether or not this appears to be helpful)	Schizophrenia truth and myths https://t.co/wGYFtMBNRa #schizophrenia #mentalhealth	Did you check out our video library yet? It's full of helpful resources about #schizophrenia & #psychosis https://t.co/CMuFhZb9QC
Research findings	The user details outcomes in research by summarizing or linking to publications and articles	#Mental problems such as #schizophrenia and #bipolar disorder could be linked to a yeast infection in the #gut https://t.co/v1u1CBQZod	Young people with #psychosis have a 24× greater risk of death than their peers: https://t.co/KnGBZjMZZA
[b]Advice giving	The user suggests or tells the reader what they should do	n/a	n/a
Advertisement	The user advertises events or products and services for sale	Applications close soon: Neuroscience PhD Projects in our lab (School of Medicine, Uni of #Wollongong #Australia) http://bit.ly/ 2y2D7Fs #uow #neuropharmacology #MedicinalCannabis #cannabinoids #depression #schizophrenia #cognition #microbiota #FindAPhD #PhD #DoSomethingAmazing	Don't miss HOAX Our Right to Hope @HoaxOrth Award-winning trilogy of art on #psychosis Liverpool & Salford https://t.co/apUVQRNEYP
News media	The user tweets a summary of, or hyperlink to, a news story	Mental health trust is asked to take action after death of Norwich man at hospital unit #schizophrenia #bhive https://t.co/eZ51APnuCg	Antiques Roadshow expert died after psychotic episode, inquest hears-#postpartum #psychosis https://t.co/lppuWm3N6O
Personal opinion/ dyadic interaction	The user in conversation with someone or expressing their own personal opinion or view	Reading Bleed Through by Adriana Arrington - this is one tough read #Schizophrenia	@donnabrazile and, now he's using the moab to divert attention w NKorea. #psychosis ya think?
Attitude - choose any, rate confidence 0–4 (more than one may apply)			
Stigmatizing	A tweet that expresses a negative attitude toward schizophrenia or psychosis	As a woman, I'm laughing at this, because I think these things are only things you've ever heard inside your own head #Schizophrenia much?	@realDonaldTrump Your level of #psychosis and #sociopathic tendencies is truly the only way you sleep at night

(Continues)

13 of 15

Attitude - choose any, rate confidence 0–4 (more than one may apply)			
Personal experience of stigma	The user describes a personal experience of being stigmatized because of schizophrenia or psychosis	Being #Schizophrenic, on a down phase, relating traumas to therapist, they like to tell me I'm a coldblooded emotionless sociopath.]No! #Bipolar	Moving account of how an experience of #psychosis and the #stigma that surrounds it, changed a life forever https://t.co/yjkg3qAVbS
Supportive	The tweet is **unambiguously** supportive to those with schizophrenia or psychosis	I love the insight into #psychosis wish everyone suffering could have access to successful treatment #moneyformentalhealth	Ty for your kindness. I also want to send love and support to all those suffering #schizophrenia or #SchitzoAffectve as well as family members
[b]Neutral or possibly supportive	There is a neutral, or **possibly** supportive attitude	n/a	Let's do a Scottish sequel: Surviving #Psychosis https://t.co/IGufn98Wz9
Anti-stigma	The tweet promotes a reduction in stigma toward those with schizophrenia or psychosis	@pfrench123 Always great to see novel and engaging ways to break down #stigma in #psychosis. We hope the project does very well	MIND MATTERS: Mental illness doesn't always lead to #violence https://buff.ly/2hsyzBn #schizophrenia #bipolar #treatment #getthefacts

If category (c) indicated stigma, rate stigma type. Choose any, rate confidence 0–4 (in some cases, more than one category may apply)			
Social distancing	The user expresses the wish to have no contact with someone with schizophrenia or psychosis	#IfYouSeeMeInRealLife you're not a schizophrenic. If not go to your nearest psychiatrist now! #Schizophrenia #MentalHealthAwareness	n/a
Dangerousness	The user implies that someone with schizophrenia or psychosis is dangerous and may cause harm	Schizophrenic Canadian who beheaded bus passenger walks free, won't be monitored http://medicalnews.drifterup.com/News/Details/40640... #Schizophrenia @MedicalNewsLH	Any excuse for #war. #American politics has truly been taken over by #psychotic #warmongers at the detriment to #humanity. #HandsOffSyria
"Snap out of it"	The user implies that the person with schizophrenia or psychosis can "snap out of it" by choice	n/a	n/a
Personal weakness	The user implies that schizophrenia or psychosis are because of personal weakness	n/a	n/a
Inaccurate beliefs	The tweet indicates the user has a lack of knowledge or inaccurate beliefs about schizophrenia or psychosis (e.g., references split personality)	The US Government is a split personality... #Schizophrenia	@ddanielsen you did all you could @F1abraham can't be fixed, there's no fixing a person who is that #psychotic. @MTV you made her fix it
[b]Conspiracy theories	The tweet is primarily about a conspiracy theory linked to schizophrenia or psychosis (e.g., mass psychosis)	n/a	n/a
Mocking or trivializing	(a) The user is rude, insulting or trivializing toward someone with schizophrenia or psychosis; (b) The user uses schizophrenia or psychosis as an insult	Some people follow you, when you follow back, they unfollow. #Twitter #schizophrenia	@Pamela_Moore13 What kind of drugs is this POS on #psychotic
Self-stigma	The tweet implies the user has internalized a stigmatizing attitude toward schizophrenia or psychosis	I'm going mad today though I've been officially diagnosed as a crazy person. Schizophrenia is a real downer #Schizophrenia #hearingvoices	I think I'm starting to realize that everyone around me is a lot more in touch with reality than I am. #psychosis #mentalillness

[b]Overall confidence in rating (0–4). Note: Tweets with an overall confidence rating of ≤ 2 will be excluded from the analysis

The rater should rate their overall confidence in their rating/categorization of the Tweet (0–4 scale):

- 4 = category clearly relevant and applies to this Tweet

(Continues)

[b]Overall confidence in rating (0–4). Note: Tweets with an overall confidence rating of ≤ 2 will be excluded from the analysis

- 3 = probably relevant and applies, but some doubt as to context or intended meaning
- 2 = may apply, but significant uncertainty as to meaning
- 1 = probably does not apply
- 0 = not relevant and does not apply

[a]Example Tweets taken from: Passerello et al. (2019). Using Twitter to assess attitudes to schizophrenia and psychosis. BJPsych Bulletin, 43(4), 158-166. https://doi.org/10.1192/bjb.2018.115. In accordance with the study ethical approval processes, we have not included quote Tweets from this study due to the risks of Tweets being able to be traced and linked to the identity of the original author.
[b]Amendments made to Passarello et al.'s coding framework (i.e., where additional categories were added).

Appendix C

See Table C1.

TABLE C1 | Confidence ratings in classification of stigmatizing tweets (CT).

Confidence rating	Term			
	Psychosis	Psychotic	Schizophrenia	Schizophrenic
4 - category clearly relevant and applies to this Tweet	51%	59%	40%	50%
	26	59	10	32
3 - probably relevant and applies, but some doubt as to context or intended meaning	31.4%	28%	40%	39.1%
	16	28	10	25
2 - may apply, but significant uncertainty as to meaning	17.6%	13%	20%	11%
	9	13	5	7
1 - probably does not apply	—	—	—	—
Total number of stigmatizing Tweets	51	100	25	64