#Schizophrenia: Use and misuse on Twitter

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ABSTRACT

Background: The role and prevention of stigma in mental illness is an area of evolving research.
Aims: The present study is the first to examine the use and misuse of the word 'schizophrenia' on Twitter.com in comparison with another illness (diabetes) by analyzing Tweets that use the adjective and noun forms of schizophrenia and diabetes.
Method: Tweets containing one of four search terms (#schizophrenia, #schizophrenic, #diabetes, #diabetic) were collected over a forty-day time period. After establishing inter-rater reliability, Tweets were rated along three dimensions: medical appropriateness, negativity, and sarcasm. Chi square tests were conducted to examine differences in the distributions of each parameter across illnesses and across each word form (noun versus adjective).
Results: Significant differences were seen between the two illnesses (i.e., among "schizophrenia", "schizophrenic", "diabetes", and "diabetic") along each parameter. Tweets about schizophrenia were more likely to be negative, medically inappropriate, sarcastic, and used non-medically. The adjective ("schizophrenic") was more often negative, medically inappropriate, sarcastic, and used non-medically than the noun "schizophrenia." Schizophrenia tweets were more likely to be negative and sarcastic when used non-medically and in a medically inappropriate manner.
Conclusions: Our findings confirm the presence of a great deal of misuse of the term schizophrenia on Twitter, and that this misuse is considerably more pronounced by the adjectival use of the illness. These findings have considerable implications for efforts to combat stigma, particularly for youth anti-stigma efforts.

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1. Introduction

Stigma – a highly discrediting attribute that reduces the stigmatized person "from a whole and usual person to a tainted, discounted one" – is an area of evolving research in the schizophrenia literature (Goffman, 2009). Stigmatizing attitudes and beliefs about schizophrenia (and other mental illnesses) decrease treatment seeking behaviors and medication adherence (Corrigan, 2004). Survey, vignette, and interview studies have found that community respondents perceive those with schizophrenia as unpredictable and dangerous. Respondents generally view schizophrenia as more negative and stigmatizing than other mental illnesses, such as depression or anxiety (Angermeyer and Dietrich, 2006; Pescosolido et al, 2010). Early identification of schizophrenia is critical since treatment delays are associated with worse

clinical outcomes (Perkins et al, 2005). Therefore, stigmatizing beliefs held among youth are particularly important for early detection and treatment of schizophrenia.

The formation of stigmatizing beliefs deserves consideration due to stigma's role in diverting treatment. Illnesses with complex etiology such as schizophrenia are particularly likely to be stigmatized (Sontag, 2013). Studies suggest that various medically inappropriate causal explanations for mental illness can increase stigmatizing perceptions of schizophrenia (Lincoln et al., 2008). Increased mental health literacy may also reduce negative, stigmatizing behaviors and beliefs (Rüsch et al., 2005). Stigma also results from labeling, which entails oversimplification of the characteristics of groups and association of the label with negative attributes (Link and Phelan, 2001). Consequently, the adjective form of schizophrenia ("schizophrenic") generates greater negative emotions, including perceptions of dangerousness and greater desire for social distance from the person with the illness, than does the noun "schizophrenia" (Penn and Nowlin-Drummond, 2001; Reynaert and Gelman, 2007; Jorm and Oh, 2009). The adjective "schizophrenic" is associated with perceptions of the permanence of the illness, and facilitates the cognitive separation between "us" and "them" central to the

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process of stigma (Link and Phelan, 2001; Jorm and Oh, 2009). Thus, distinguishing the adjective and the noun forms of the illness is critical for alleviating stigma and advancing treatment (Link et al, 1989). Further, the adjective may facilitate internalization of one's illness, thus leading to self-stigmatizing attitudes, social withdrawal, and harmful psychological outcomes (Livingston and Boyd, 2010). Finally, humor and jokes in social interactions can propagate stereotypic imagery and marginalization of individuals with schizophrenia. Humor may reinforce hostility towards a targeted group and further macrosociological prejudice that maintains power imbalances between social groups (Ford and Ferguson, 2004). Scheff argues that humor indicates references to deviance from social norms, creating the moral 'other' that is stigmatizing to those with mental illness (Scheff, 1971). Humor may denigrate people suffering from schizophrenia, making their suffering less legitimate than the suffering of those with other medical conditions.

Previous newspaper and survey studies about stigma do not capture the dynamic nature of stigma or the naturalistic use of the stigmatizing labels in day-to-day conversation as opposed to formalized print media (Duckworth et al, 2003; Chopra and Doody, 2007; Magliano et al., 2011; Vahabzadeh et al., 2011; Roberts et al., 2013; Thornicroft et al, 2013; Athanasopoulou and Välimäki, 2014; Cain et al, 2014). Previous studies contain a number of methodological problems including response-bias, anchoring effects (whereby participants rely too heavily on the first piece of information they observe to answer future questions), potential problems with the wording of questions for responses, problems with responders' comprehension of survey questions, and social desirability (the tendency for subjects to present themselves positively) (Podsakoff et al, 2003).

We aim to address these shortcomings in previous stigma research through the social media technology. Social media technology offers a novel opportunity to examine perceptions and social attitudes about schizophrenia in a low cost and reproducible way. Twitter.com is a real-time microblogging website with over 241 million active users (Twitter, 2014). Users broadcast "Tweets" of 140-character length to their social network of other "Tweeters". Utilizing this novel technology instead of traditional tools, such as surveys, to study stigma offers several potential advantages. First and foremost, Twitter allows examination of the colloquial use (and misuse) of the illness through naturalistic rather than formalized sampling observed in other media and vignette studies. Second, people may expect to receive responses to their Tweets, making messages dynamic and interactive with others. Third, Twitter allows users to not report their names or to report false names. This anonymity or quasi-anonymity may make people more willing to report sensitive issues on Twitter, including risky health behaviors that track closely to other measures of these behaviors (Prieto et al, 2014; Young et al., 2014). An agent's anonymity is perhaps more salient to the agent when there is greater physical distance from other agents, suggesting that users may be more willing to express stigmatizing beliefs online. Fourth, Twitter offers a platform for hard-to-reach minority groups such as African Americans and Hispanic Americans, who Tweet more frequently than other ethnic groups in certain parts of the United States. Finally, it is widely used among teens and young adults, a population at a higher risk for schizophrenia onset and for whom there remains a need to understand stigmatizing attitudes (Mislove et al, 2011). Twitter has been successfully applied in medical research, to track cholera outbreaks in Haiti, and in psychological research, to reliably predict personality traits (Chunara et al., 2012; Hughes et al, 2012). More recently, it has been utilized as a tool to study mental health conditions: a recent study demonstrated the ability of Twitter to track suicide risk across the United States and another helped estimate and track the incidence of depression (Jashinsky et al, 2013).

It would be instructive to contrast stigma in complex non-psychiatric medical conditions to stigma of schizophrenia. Diabetes is another severe chronic illness that has been used in this context (Lee et al, 2005; Georg Hsu et al., 2008). Both diabetes and schizophrenia are leading causes of global disability, are often undiagnosed, and have high mortality (National Center for Health Statistics, 2012). They are both treatable medical illnesses of complex etiology with a number of misconceptions and negative stereotypes (for diabetes, being "fat", "lazy", or "lacking control") (Mann et al, 2009; Browne et al, 2013). Both illnesses require self-management, which might be affected by public conceptions of the illness. Schizophrenia, compared to diabetes, might be viewed as having a more complex public manifestation due to its salient, and frequently more public, behavioral symptomatology of delusions, hallucinations, and sometimes more erratic and high risk behavior. Due to its complex etiology and variable public manifestation, schizophrenia may not only be associated with negative stereotypes of the illness specifically, but also be more likely to be associated with negative stereotypes of all sorts and variations (Fig. 1).

We examined use of the word "schizophrenia" on Twitter compared to that of diabetes, analyzing Tweets that use the adjective and noun form of schizophrenia and diabetes. We ascertained three dimensions of each illness's linguistic use — namely medical appropriateness (as either medically appropriate, medically inappropriate, or non-medical references to the illness), negative valence, and humor sentiment (which is frequently negative, and therefore we use the term "sarcasm"). We hypothesized that both adjective and noun forms of schizophrenia would be more frequently used incorrectly, non-medically, more negatively, and more sarcastically compared to diabetes. We also hypothesized that negativity and sarcasm would be higher in medically inappropriate uses of the illness, and that these effects are particularly salient for the adjective form of schizophrenia.

2. Methods

After receiving an Exemption from the ethics committee of the Beth Israel Deaconess Medical Center, a total of 1838 Tweets containing one of four hashtags (#schizophrenia, #schizophrenic, #diabetes, #diabetic) were randomly sampled from a data set containing Tweets over a forty day time period (12 September 2013 to 22 October 2013). We determined forty days to be long enough to account for any short-term changes in discussion on Twitter about the illnesses. Tweets were collected using the Twitter Application Programming Interface (API), which provides free programmatic access to Twitter data.

Each Tweet was given one of three ratings under Medical appropriateness: a) medically appropriate, b) medically inappropriate, or c) non-medical. Medically appropriate Tweets include a medically valid reference to the illness or a feature of the illness (e.g. "people with schizophrenia may hallucinate"), or a person with the illness (e.g., "my brother has schizophrenia"). Medically inappropriate Tweets make direct reference to inaccurate facts about the illness, such as confusing multiple personality disorder with schizophrenia, confusing the symptoms of diabetes, or confusing Type I and Type II diabetes. Non-medical references are Tweets that do not reference illness (e.g. using the illness to describe the weather).

Tweets with negative sentiment were rated based on the presence of negative valence words within the Tweet — Tweets with the words "die", "hate", or "pain", for instance, were flagged as negative. Sarcasm was evaluated on the basis of the presence of emoticons or direct references to laughing, sarcasm, or humor. For instance, Tweets with positive emoticons (e.g. ":)") were flagged as containing sarcasm. Definitions for each category are summarized in Table 1.

Of the Tweets with original user-input content, 79 were excluded on the basis of incomprehensibility (incomplete spellings or non-English language). 441 'Retweets' – where one person writes a message and another can respond to the original message with or without additional content – were excluded from the analysis if without additional content. A total of 1318 Tweets were rated (354 for "#schizophrenic", 331 for "#schizophrenia", 284 for "#diabetes", and 349 for "#diabetic"). Three inter-rater reliable raters (two research associates, AJ and NT, and one psychiatry resident, JT) rated Tweets for medical appropriateness, negative sentiment, and sarcasm (Table 2).