Observed Stigma: Latent Topic Differences Among the General Public and a Mental

Health Population

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Bess J. Martin

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_____
Seong-Hyeon Kim, PhD
Chair

_____
Kenneth Wang, PhD

_____
Wayne Aoki, PhD

_____
Tina R. Armstrong, PhD
PhD Program Director

_____
Justin L. Barrett, PhD
Acting Dean, Graduate School of
Psychology

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Bess J. Martin

Fuller Theological Seminary

Abstract

Mental health researchers have demonstrated the negative impact of mental health stigma, and the public's definition of mental illness has broadened to include more diagnostic labels and less severe conditions (Phelan, Link, Stueve, & Pescosolido, 2000). This researcher explored observed in-group/out-group stigma related to mental illness using structural topic modeling (STM; Roberts, Stewart, & Tingley, 2014) through web scraped data from a social network site (SNS) and mental health forums (MHF) and included posts on both that were related to mental health. Text data was analyzed using STM and the stm package in R, which allowed for the inclusion of the in-group/out-group covariate in determining latent themes present in posts related to mental health. Results indicated a four topic model was the best fit. The Eating Disorders topic accounted for 18.5%, the Anxiety topic 30.5%, the Mental Health in Media topic 30.1%, and the Biopsychology topic 20.8% of all posts. As hypothesized, a z-test of group proportion demonstrated all topics had statistically significant group differences. Mental Health in Media is the only topic to demonstrate greater prevalence in SNS (50%) than MHF (4%). Additionally, contrary to expectations, three of the four topics contained stigmatizing language reflecting public stigma. Only the Biopsychology topic contained neither stigmatizing nor thriving language. By employing advanced methodologies, we may be better able to observe behavior and possibly implement technology assisted interventions to reduce both public and self-stigma.

Keywords: stigma, stereotypes, mental illness, depression, anxiety, schizophrenia, bipolar, substance use, alcohol use, autism spectrum, eating disorders, topic modeling, web scraping, discussion forums, social media

Observed Stigma: Latent Topic Differences Among the General Public and a

Mental Health Population

Over the past sixty years, mental health stigma researchers have established the

negative impact of stigma related to mental illness (Brohan, Slade, Clement, &

Thornicroft, 2010; Corrigan, 1998, 2000, 2004; Corrigan & Kleinlein, 2005; Corrigan &

Penn, 1999; Corrigan & Wassel, 2008; Farina, Holland, & Ring, 1966; King et al., 2007;

Link, 1982, 1987; Link & Phelan, 2006; Link, Struening, Rahav, Phelan, & Nuttbrock,

1997; Pescosolido et al., 2000). But what is stigma, and why does it matter? Stigma

refers to prejudice or negative stereotyping that results in discrimination (Corrigan &

Penn, 1999; Link, Phelan, Bresnahan, Stueve, & Pescosolido, 1999). All stigma,

including mental health related stigma, creates an in-group/out-group dynamic. In turn,

that dynamic then impacts the help-seeking and treatment compliance of individuals with

mental illnesses (Barney et al., 2010). Moreover, discrimination or unjust treatment based

on categorization (Discrimination, n.d.) against this group has led to loss of employment

opportunities, lower incomes, and individuals are more commonly underemployed

(Corrigan & Kleinlein, 2005; Link, 1987). Additionally, stigma is also related to

increased likelihood of arrest and receiving fewer medical services (Corrigan &

Kleinlein, 2005). Finally, these experiences of devaluation and discrimination have

accounted for increased depression symptomatology among those identified as mentally

ill (Link et al., 1997).

This author used Corrigan's (2005) understanding of stigma which includes

negative stereotypes, prejudice, and discrimination and explored observed discussions

within the general public and the marginalized population as related to mental illness and

diagnostic labels. To better understand observed discussions and their relationships to stigma, I briefly covered attribution theory related to stigma, followed by mental health stigma, and the way that it manifests among the general public as well as those with mental illness; I went on to discuss factors that contribute to stigma, as well as the role of diagnostic labels in stigma.

Attribution Theory of Stigma

Attribution theory refers to the attribution of responsibility assigned to the individual based on the cognitive mediator or stereotype. Within the context of a social psychology model stigma begins with a signaling event. This is then interpreted by cognitive mediators or stereotypes, that evoke an affective response and inform a behavioral reaction (see Figure 1; Corrigan, 2000). Attribution theory further suggests that the amount of personal control we attribute to a person or situation has an impact on our affective response to that person or situation (Corrigan, 2000). There is a general belief that mental health disorders fall under relatively more personal control (Corrigan et al., 2000; Weiner, Perry, & Magnusson, 1988). The interaction of stigma and personal control as related to affective responses is discussed in further detail later in this paper.

It should be noted that the attribution of controllability will be mediated by a culture or community's concept of predisposition or fate (Corrigan, 2000). When mental illness is present within communities that believe in a person being born with specific predispositions, then the controllability attributed to them would be minimal. In contrast, communities that believe in fate or karma as the consequences of a person's behavior, such as illness or misfortune as a consequence of sin, these communities attribute more personal control to that person. Corrigan (2000) points out that the idea of misfortune as a

consequence of sin is a component of Judeo-Christian culture and therefore prominent within the United States.

Signaling events. The general public cannot telepathically discern information about others in society, and therefore rely on cues or signaling events. Individuals typically infer mental illness from four types of signals: labels, psychiatric symptoms, physical appearance, and social skills deficits (Corrigan, 2000, 2004; Penn & Martin, 1998). According to Corrigan (2000), psychiatric symptoms, such as bizarre behavior, talking to oneself aloud, inappropriate affect, and language irregularities often produce greater stigmatizing reactions than if an individual is only identified by label.

These signaling events can lead to inaccurate conclusions. As Corrigan (2000) points out, mental illness inferred from physical appearance, dismisses that someone who may have "slovenly appearance" may indeed just be poor or homeless. Conversely some individuals may not display stereotypical signals of mental illness and therefore are not identified with the stereotyped group.

Cognitive mediators and or stereotypes. Stereotypes function as the cognitive mediators used within attribution theory. Stereotypes are knowledge structures that are collectively agreed-on ideas of a social group (Corrigan & Penn, 1999). For example, when a person notices that their friend looks down or sad much of the time, or that they have been gaining weight, they may question whether their friend is experiencing depression. This evaluation is a referred to as a "lay appraisal" (Link et al., 1999). There are benefits of a lay appraisal, as it can help identify mental illness in oneself or a loved one, thereby indicating when treatment or additional help is necessary. If the general public lacked the awareness to identify indicators of mental illness the field of

psychology would lose ground on early intervention and treatment for those without grossly deviant behaviors. However, common negative stereotypes are less helpful and reflect that individuals with mental illness are violent, dangerous, incompetent, or to blame for their disorders (Corrigan, 2004; Dietrich, Heider, Matschinger, & Angermeyer, 2006).

Affective response and or prejudice. Therefore, what do stereotypes have to do with affective responses or prejudice? Stereotypes are beliefs, and Corrigan (2004) notes that prejudicial attitudes involve evaluation. He goes on to note that individuals who endorse prejudicial attitudes and negative affective responses typically also endorse negative stereotypes. Stereotypes function as the cognitive mediator between the incoming information (signaling event) and the emotional response (prejudice).

It is also during this evaluation that individuals attribute personal control to the person with mental illness. As previously mentioned, if an observer attributes control of the situation to the person, then the affective response of the observer is anger or fear (Corrigan, 2000). This process is seen in substance use disorders, depression, and eating disorders, to name a few.

Conversely, if the person is attributed to have little or no control of their mental illness, such as individuals born with developmental disorders, then the corresponding affective response of the observer is pity (Corrigan, 2000). Although much of this is theoretical, it is clear that stigmatizing attitudes and negative stereotypes lead to poor treatment (Corrigan, 2000).

Behavioral reaction and or discrimination. The observer uses cognitive mediators to interpret a signaling event, then stereotypes and an affective response

applied, followed by behavioral reactions and or discrimination can present in a multitude of ways. This may include expressed emotions, negative actions toward the stigmatized group, or limitation of rights or services (Corrigan, 2000, 2004).

Corrigan (2004) noted the behavioral reactions and discriminatory behaviors result in increased prevalence of those in jail having serious mental illnesses. Approximately one-third of states within the US have limited the rights of those with mental illness, preventing them from holding elected offices, voting, or participating on juries. Up to 50% of states limit custody rights of parents diagnosed with mental illness (Corrigan, 2004). These losses of privileges have not necessarily reflected the individual's level of competency, but have been instead associated with the label of mental illness. As Corrigan (2000) indicates, addressing the symptomology of mental illness are not enough to improve the course of the disease, but that stigma and discrimination must also be addressed.

Mental Health Stigma

Stigma related to mental illness has become more differentiated since the first nationwide survey of mental health stigma in 1950 (Pescosolido et al., 2000). Initially understood as one-dimensional, negative, and exemplified by an understanding of paranoid schizophrenia; there has been greater recognition of other major diagnostic categories (Pescosolido et al., 2000). This increased recognition has led to a broader understanding of the causes of mental illnesses to include life stressors, chemical imbalances, and genetic factors rather than poor parenting or "bad character" (Pescosolido et al., 2000).

The work of Kraepelin in 1896 and 1919 initiated these debilitating perceptions of mental illnesses, like schizophrenia, as lifelong problems. He defined schizophrenia as progressively getting worse and leading to poor outcomes and loss of independence (Corrigan, 2000). Corrigan (2000) points out that this view became adopted by the field of psychology and the general public. Though longitudinal studies have found the prognosis of schizophrenia is far less dismal than Kraepelin believed, this understanding may not have yet reached the general public.

Public stigma. Corrigan (2004) defines public stigma as the result of the public unintentionally taking action against those with mental illness by endorsing prejudice. One area of American culture that researchers analyzed to see stigma associated with mental illness has been film and print media. These analyses of film and print media have commonly identified three misconceptions about those with mental illness. These misconceptions or stereotypes include the belief those with mental illness are free spirits and rebels (*One Flew Over the Cuckoo's Nest*); that they are homicidal maniacs and feared (*Gotham*, *American Psycho*), or that they are childlike (*Me, Myself, & Irene*, or *Monk*; Corrigan & Penn, 1999; Dietrich et al., 2006; Fawcett, 2015). Additionally, noting that beyond the promotion of negative images and stereotypes, there is more frequent portrayal of violence associated with this population, and news articles associating violence and crime with mental illness were often given priority over positive stories related to the same population (Dietrich et al., 2006).

This perpetuation of stigmatizing views is seen not only in film and print media but also in sixty years of nationwide surveys. As the definition of mental illness has broadened to include mild anxiety and depression, there has been a nearly two-fold

increase in the number of Americans who described the behavior of individuals with mental illness as violent or dangerous since the original 1950 Star study (Pescosolido et al., 2010; Phelan, Link, Stueve, & Pescosolido, 2000).

Self-stigma. Corrigan's (2004) understanding of self-stigma, that as public stigma becomes internalized, individuals with mental illness may begin to stereotype themselves. Individuals with mental illness, or those identified by the general public as a member of the out-group may experience self-stigma, or stigma constructs associated with beliefs and experiences of those members of the marginalized group. Brohan et al. (2010) further explains this concept to include perceived stigma as how one thinks that the general public views them personally as a part of the stigmatized group; experienced stigma as personal experiences of discrimination or marginalization; and their definition of self-stigma is a reaction to public stigma as the individual internalizes the public perceptions about him- or herself. I considered each of these three facets of self-stigma as experienced exclusively by the marginalized group and referred to them under the umbrella of Corrigan's understanding of self-stigma.

Researchers suggested variation in the perception of public stigma by age and diagnostic group (Corrigan, 2004; King et al., 2007). For example, an individual with social anxiety disorder is more inclined to perceive public stigma and or interpret interpersonal interactions as discrimination or devaluation. Additionally, Alanso et al. (2008) found that perceived stigma was higher with individuals with mental health diagnoses than those with physical health diagnoses. Increased perception of devaluation or discrimination from the general public results in greater withdrawal and secrecy

(Schulze & Angermeyer, 2003). However, if an individual is able to reject the public's negative stereotypes, they are more resilient (Chronister, Chou, & Liao, 2013).

If, on the other hand, an individual embodies the negative stereotypes presented by the general public, they experience a loss of self-esteem and dignity. These losses are the result of taking on the shame, hopelessness, blame, guilt, and corresponding fear of discrimination that has come to be associated with mental illness (Brohan et al., 2010; Corrigan & Watson, 2002; Van Brakel, 2006). Those that endorse the negative stereotypes about mental illness are less likely to seek help from mental health professionals or consult their primary care providers about their symptoms (Corrigan, 2004).

As Byrne (2000) put it, "stigma is in the eye of the beholder" (p. 66). Therefore, what we see is that negative stereotypes function differently among the general population than among those in the marginalized group. Therefore, by understanding stigma from more than one perspective, and engaging with both public and self-stigmas, we are able to gain a broader picture of the stereotypes surrounding mental illness.

Factors Contributing to Mental Health Stigma

There have been multiple research studies including potential factors contributing to mental health stigma. (Anderson, Jeon, Blenner, Wiener, & Hope, 2015; Gary, 2005; Mårtensson, Jacobsson, & Engström, 2014; Pescosolido et al., 1999). Research has found factors related to both being stigmatized as well as being the stigmatizer (Byrne, 2000; Mårtensson et al., 2014). Although results are not always consistent, important factors are gender, racial identity, socioeconomic status, levels of education, as well as the signaling events such as bizarre behavior, appearance, and labels discussed earlier.

Mårtensson et al. (2014) point out that after several studies examined factors such as gender, age, marital status, real-life experiences, and educational level, it was found that males, older individuals, those with lower education levels, and those lacking a personal association with mental illness were factors related to individuals being stigmatizers. In multiple studies cited by Anderson et al. (2015), as well as in their own study, support this, finding women to have endorsed less stigmatizing views of depression and anxiety.

Research is lacking on a direct correlation between stigmatizing attitudes and age. However, research examining mental health stigma among college students has found moderate to low levels of stigma (Ebneter & Latner, 2013), which may correlate to other findings related to educational level (Anderson et al., 2015).

Byrne (2000) points out that an individual is more likely stigmatized if they are male, look unkempt or appear homeless; although Link (1987) asserts that observers stigmatized individuals for being labelled as mentally ill even in the absence of bizarre behavioral cues.

Researchers indicate that gender plays a role in the way observers stigmatize an individual. Pescosolido, Monahan, Link, Stueve, and Kikuzawa's (1999) examination of data from the 1996 GSS, indicated that perceived dangerousness associated with diagnosis (indicating those categorized as drug or alcohol dependent), and that race, ethnicity, and education of the individual were not related. However, respondents were significantly more likely to consider the individual as potentially violent or dangerous if they were male (Pescosolido et al., 1999). Additionally, stereotypes and stigma related to

eating disorders tend to associate this as a female issue despite a rising number of males meeting the criteria for diagnosis (Baum, 2006; Easter, 2012).

Despite Pescosolido et al.'s (1999) lack of significant findings related to race or ethnicity, in comparing individuals with the same disabilities Black Americans are judged more harshly than their White American counterparts (Rushm, 1998 as cited in Corrigan, 2000). This may contribute to why White Americans are more likely to seek treatment using psychiatric services than either Latinx/Hispanics or Black Americans (Corrigan, 2004). Some of these differences may contribute to self-stigma versus public stigma or as Gary (2005) hypothesized that being a member of an already stigmatized group, such as being an ethnic minority, would indicate a double stigma and may have varying effects on different cultural groups.

Stigma and Mental Illness Labels

Categorizing or labeling people is an integral part of the stigmatizing process. As noted in attribution theory, it is identification that is the first step towards discrimination. It is only after an observer identifies someone who they select a corresponding stereotype. Furthermore, diagnostic labels are an effective method by which observers can categorize individuals as mentally ill. Mental health professionals use these stereotypes with the assistance of the DSM-5, as well as the general public for lay appraisals and by those assigned the labels themselves in the use of support from similarly labelled individuals (e.g., Alcoholics Anonymous meetings).

Though researchers have used diagnostic categorization to appraise public stigma since Star's 1950 study, typically focusing on depression, schizophrenia, substance abuse, alcohol abuse, and a generic "mental illness" label (Pescosolido et al., 2000; Pescosolido

et al., 2010; Phelan et al., 2000; Swindle, Heller, Pescosolido, & Kikuzawa, 2000). This study plans to expand upon these basic diagnostic labels since research from the 1996 GSS found that American's have broadened their definition of mental illness to include more mild forms of anxiety and mood disorders (Phelan et al., 2000).

However, in addition to these helpful ways in which categorization functions, according to Link (1987), observers stigmatized individuals in the absence of abhorrent behavior if the label of mental illness was present. The public applies labels to individuals either from a clinician informing a third-party, or by association with psychiatric treatment (e.g., being seen coming out of a psychologist's office; Corrigan, 2004). Lemert in 1951 noted that labelling is the process by which society is able to ascribe a deviant characteristic (as cited in Schulze & Angermeyer, 2003), so once an observer labels and characterizes an individual as deviating from the norm and therefore deviant.

Research has shown some variation in public stigma related themes of negative stereotypes. Corrigan, Morris, Michaels, Rafacz, and Rusch (2012) suggest that self-stigma be targeted by diagnostic group, as the stigma experienced by individuals with depression is different from that of individuals dealing with substance use. He notes a lack of distinction between these categories in the literature. Therefore, this study used data from the Institute for Health Metrics (IHME; 2015), to determine diagnostic categories prevalent among adults in the United States, focusing on depressive disorders, anxiety disorders, schizophrenia, substance use, alcohol use, bipolar disorder, autism spectrum disorder, and eating disorders. Would the inclusion of a broader range of disorders reduce the stereotypes related to violence and danger?

Depressive disorders. Depression is commonly identified by signaling events or symptoms of depressed mood, weight change or change in appetite, change in sleep, and loss of interest in enjoyable activities. According to the IHME (2015) of mental illnesses, depression accounts for the greatest prevalence of years lost due to disability. Although common enough that it is correctly identified about half the time, globally (Coles et al., 2016), only approximately 60% of individuals meeting the criteria for Major Depressive Disorder seek treatment (Anderson et al., 2015). This low prevalence of treatment seeking is related to the presence of public and self-stigma related to depressive disorders.

The 1996 General Social Survey (GSS) indicated that Americans believed that individuals with depression are able to make decisions related to treatment and personal finances (Pescosolido et al., 1999). This same GSS found that most of the American public also considered those suffering from depression as a threat to themselves (Link et al., 1999; Pescosolido et al., 1999).

Anxiety disorders. Anxiety disorders include generalized anxiety, panic disorder, agoraphobia, separation anxiety disorder, selective mutism, specific phobias, social anxiety disorders, and other specified anxiety disorders (American Psychiatric Association, 2013). These diagnoses cover a wide range of levels of functioning, yet 50% of individuals with generalized anxiety disorder and 80% of those with social anxiety disorder do not seek treatment (Anderson et al., 2015).

Anderson et al. (2015) conducted research looking at the differences in stereotypes between social anxiety disorder, depression, and the label "mental illness". They expected to find less stigma or social distancing for social anxiety disorder, as they

hypothesized stigma and social distancing were related to perceived dangerousness. Instead they found that it was comparable to depression and "mental illness". Did broadening the definition of anxiety allow for the stereotype to change to include more mild forms of anxiety, or instead did the stereotype remain and more mild forms of anxiety associated with social distancing related stigma?

      Schizophrenia. Public stereotypes related to individuals with schizophrenia include unpredictability, aggression, dangerousness, unreasonableness, low intelligence, lack of self-control, and frightening (Angermeyer & Matschinger, 1995 as cited in Schulze & Angermeyer, 2003). Schizophrenia, schizophrenia spectrum, and other psychotic disorders lead to individuals being judged more harshly than individuals labelled with other mental health disorders (Corrigan, 2004; Schulze & Angermeyer, 2003).

      Martin, Pescosolido, and Tuch (2000) point out that when compared with depression, drug dependence, alcohol dependence, and "troubles", schizophrenia was the only disorder attributed to chemical and or biological issues. However, this does not seem to effect negative stereotypes, as Schulze and Angermeyer's (2003) qualitative study noted that individuals with schizophrenia are "being crazy, irresponsible for one's actions, being someone who cannot be trusted" (p. 303). This idea of irresponsibility corresponds to findings in the 1996 General Social Survey (GSS), that Americans are willing to use the law to force treatment on those suffering from schizophrenia (Link et al., 1999; Pescosolido et al., 1999). This is additionally related to the beliefs that they are likely a threat to themselves as well as others, and that they are significantly less competent in domains such as managing their treatment or personal finances (Link et al.,

1999; Pescosolido et al., 1999). However, Lysaker, Roe, and Yanos (2007) found that individuals with schizophrenia spectrum disorders who demonstrated higher insight and minimal self-stigma also had significantly lower levels of symptomology.

Substance use. Like other mental health disorders, substance use disorders are more stigmatized than other health related conditions (Livingston, Milne, Fang, & Amari, 2011). Moreover, substance use is often also linked to other stigmatized health related conditions such as HIV/AIDS, hepatitis C, and mental illness.

Livingston et al. (2011) point out the complex nature of substance use disorder stigma, as this stigma is often seen by the general public as necessary to dissuade substance use behaviors (e.g., impaired driving or substance use while pregnant), groups of substance users (e.g., injection drug users), and social problems (e.g., criminality and poverty). These negative stereotypes are endorsed culturally through public policy (e.g., the war on drugs).

Substance use is often associated with moral and criminal behavior, particularly in association with illegal drug use (Livingston et al., 2011). When compared with depression, schizophrenia, alcohol dependence, and "troubles", drug dependence was the only disorder attributed to "bad character" (Martin et al., 2000).

Americans have been found to believe that individuals with substance dependence and alcohol dependence are the most likely violent towards themselves as well as others (Link et al., 1999; Pescosolido et al., 1999). This probably contributed to findings in the 1996 GSS that also showed the public's willingness to use the force of law to ensure treatment of individuals are drug dependent (Pescosolido et al., 1999). Similarly, the general public also views individuals with substance dependence or abuse as less

competent to manage their treatment and personal finances (Pescosolido et al., 1999). It is valuable to look further at differences in public perceptions of illicit drug use and the abuse of prescription medication.

Alcohol use. Stigma related to alcohol use disorders (AUD) plays a considerable role in low levels of treatment seeking (Keyes et al., 2010; Weine, Kim, & Lincoln, 2015). Studies have drawn attention to the reality that less than 25% of American's who meet the criteria for AUD receive treatment.

Using the 1996 GSS, researchers found that Americans considered those with alcohol dependence and or use to represent mental illness, as well as a threat of violence to themselves and others (Link et al., 1999; Pescosolido et al., 1999). However, with the use of this survey, researchers found that observers only saw those with Substance Use Disorder as more violent (Link et al., 1999). Similarly, the general public was found to view individuals with alcohol dependence or AUD as less competent to manage their treatment and personal finances (Pescosolido et al., 1999).

Additionally, because men are more likely to have AUD over their lifetime than women, the general public associates it more with men than women (Weine et al., 2015). A study conducted by Weine et al. (2015) showed that vignettes of women with AUD were less likely perceived to engage in problematic use as compared with the same vignettes of men. Researchers also found men with AUDs were significantly more stigmatized than women, particularly those with lower-income, education, and those who were single but previously married (Keyes et al., 2010). Also, when compared to non-Hispanic white individuals, Black Americans, Latinx/Hispanics, and Asian/Pacific Islanders had higher average stigma scores (Keyes et al., 2010).

The general public tends to classify the cause of AUD by two models: the medical model or the moral model (Weine et al., 2015). The medical model endorses alcoholism as a disease, implying external factors of control. Whereas, the moral model endorses drinking and or alcoholism as a choice, implying internal factors of control. The 2006 GSS shows that the general public strongly endorses both models in relation to AUD, with a significant increase of the attribution of "bad character" from 1996 to 2006 (Pescosolido et al., 2010).

Bipolar disorder. The chronic course and similar prevalence to schizophrenia (1-1.5% of the population) as well as increased media coverage of bipolar disorder should qualify it for inclusion in broader stigma research (Ellison, Mason, & Scior, 2013). Like other mental illnesses, the effects of psychosocial factors, including stigma have an impact on the manifestation and course of bipolar disorder (Michalak et al., 2011). Furnham (2009) and Day and colleagues (2007) found the general public to consider bipolar to have a poor prognosis, worse than depression and similar to schizophrenia, with an unlikely chance of remission or cure (as cited in Ellison et al., 2013).

An examination of an international study by Loo and colleagues, related to the recognition of bipolar disorder by the general public found that vignettes of bipolar symptoms were often contributed to attention deficit hyperactivity disorder (ADHD), drug or other addictions, being a "workaholic", or "overconfidence" (as cited in Ellison et al., 2013, p. 813).

Exploration of stereotypes related to dangerousness of individuals with bipolar in Germany found that less than 30% of people thought of individuals as violent or dangerous, compared to more than 50% of people with schizophrenia (Strip, Coran, &

Mancini-Marie, 2006 as cited in Ellison et al., 2013). Overall Ellison et al. (2013) found that participants viewed bipolar more positively than schizophrenia, but more negatively than depression.

Perceived stigma among individuals during an acute phase of bipolar affective disorder was related to longer term impaired social functioning (Perlick et al., 2007). The impaired social functioning lasted longer than the behaviors that prompted the stigma initially.

A study looking at individuals with bipolar who are managing their illness well, indicated that self-stigma included stereotypes of being damaged or flawed (Michalak et al., 2011). Individuals with bipolar who were able to overcome the internalized or self-stigma had to consider their identity and how it had changed since being diagnosed.

Autism spectrum disorder. Misconceptions about autism spectrum disorder are global and include poor information about symptomology and or diagnostic characteristics, misinformation about etiology, and lack of understanding on how to support individuals with the diagnosis (Obeid et al., 2015). Media portrayals of autism spectrum disorder tend provide a stereotypical pictures of the disorder, often focusing on the disorder in youth. There are misconceptions that autism spectrum disorder is a childhood disorder, that it is more common among those of higher socioeconomic status, and that vaccines are a cause of autism.

Individuals with autism spectrum disorder often have poor self-esteem and difficulty with employment as a result of public stigma (Obeid et al., 2015). Lack of specific signaling events may result in the perception that behaviors associated with autism spectrum disorder are voluntary violations of social norms (Obeid et al., 2015).

Stigma is often most clearly seen through a preference for social distance which is commonly endorsed in relation to individuals with autism spectrum disorder (Obeid et al., 2015).

      Eating disorders. Anorexia nervosa, bulimia nervosa, and binge eating disorders are not exempt from widespread stigma (Ebneter & Latner, 2013). There is a common negative stereotype that the individual is seeking attention through their behavior (Griffiths, Mond, Murray, Thornton, & Touyz, 2015); it is also perceived as trivial, weak, selfish, and self-destructive, and a feminine problem (Easter, 2012). Furthermore, stress from being stigmatized serves only to damage overall well-being among those with eating disorders (Griffiths et al., 2015).

      Stigmas related to eating disorders are often associated with attributions of personal responsibility and blame (Easter, 2012; Ebneter & Latner, 2013). Individuals with these disorders are more often considered to hold more personal control and responsibility for the illness than other non-eating related mental health disorders (Ebneter & Latner, 2013). Participants in their study went on to attribute more personal control to individuals with binge eating disorders than to those with anorexia nervosa or bulimia nervosa. When university students stigma towards individuals with anorexia nervosa, bulimia nervosa, binge eating disorders, depressive disorders, and non-eating disorder related obesity were compared, non-eating disorder related obesity was the most stigmatized, followed closely by binge eating disorders. The least stigmatized or attributed to personal control were depressive disorders (Ebneter & Latner, 2013).

      Research suggests that the increased stigma towards binge eating disorders is due to a stereotype that perceives binge eating disorders as a less serious condition than

anorexia nervosa or bulimia nervosa (Ebneter & Latner, 2013). Individuals with anorexia nervosa and bulimia nervosa however, were more distrusted than individuals with binge eating disorders.

In a study conducted by Easter (2012), 52% of respondents were in favor of some degree of volatile stigma directed toward themselves as it helped to cultivate a desire to recover from eating disorders. There was also expressed concern that embracing a genetic etiology of eating disorders may allow individuals to have a loss of agency and give up attempts at recovery.

Purpose of Study

Mental health disorders come with their own set of challenges, and unfortunately, stigma around these disorders often leads to prejudice and discrimination (Corrigan & Penn, 1999). Pescosolido et al. (2010) demonstrated that mental health stigma has increased, despite public adoption of neurobiological theories of mental illness. This prompted the shift of focus on research towards better understanding ways in which the mental health population thrives.

As the American people's definition of mental illness has broadened to include less severe problems (e.g., mild anxiety and mood disorders; Phelan et al., 2000), so should our research, reaching beyond psychosis and or schizophrenia and anxiety and or depression labels. It should also correct one of the most substantial flaws in attribution research, a reliance on self-report, demonstrating a lack of behavioral observation (Corrigan, 2000). This study proposed to use structural topic modeling (STM; Roberts, Stewart, & Tingley, 2014) to explore and compare observed stigma related to mental illness and specific mental health diagnostic labels as related to the general public and the

mental health population identification. I hypothesized that there would be a difference in latent topics found among posts on social networking sites (SNS; representing the general public) and mental health discussion forums (MHF; representing the mental health population).

The text analysis of SNS expected to find predominately negative latent topics (i.e., negative stigma) related to mental health and the target diagnostic labels. Table 1 outlines some terms associated with mental health stigma that I expected to find through the text analysis. However, the text analysis of discussion forum posts hoped to fulfill Pescosolido and Martin's (2015) call for a focus on community integration, competencies, and abilities. This text analysis expected to find some degree of thriving and solidarity within the mental health community. I assumed if negative latent topics were found within the MHF posts, that they would reflect the latent topics within the SNS posts.

Methods

Participants

Posts collected consisted of 1,152,465 MHF posts dated between November 3rd, 2002 and May 9th, 2017 and 2,135, 962 SNS posts dated between March 31st, 2017 and April 30th, 2017. I removed blank posts and duplicate posts and 2,089,910 posts remained, 1,124,851 from SNS (54%) and 965,059 from MHF (46%). I collected these posts by the diagnostic labels of alcohol and or substance abuse (20.67%), anxiety (16.93%), autism (10.12%), bipolar disorder (9.63%), depression (9.00%), eating disorders (15.63%), mental health (13.50%), and schizophrenia (4.52%). The number of posts collected by each topic from both SNS and MHF are in Table 2, demonstrating

significant differences between the groups. SNS posts reflected a significantly greater number of posts on alcohol and or substance abuse, autism, depression, and mental health. Whereas, MHF posts reflected a significantly greater number of posts related to anxiety, bipolar, eating disorders, and schizophrenia.

As demographic data were not gathered on participants, it has been estimated that they would reflect surveyed American Adults of whom 65% use social media (Perrin, 2015). These social media users have been predominately individuals aged 18-29, accounting for 90% of this age group in the general population; individuals aged 30-49, accounting for 77%; individuals aged 50-64, accounting for 51%; and those 65 and older, accounting for 35% of this age group in the general population. Proportionally more American women (68% of all American women) have used social media than men (approximately 62% of American men). Researchers have shown higher social media usage among individuals with higher education (76%) and high income levels (78%), though more than half of individuals in the lowest-income households (56%) and more than half of those with high school diplomas (54%) have been also using social media (Perrin, 2015). Proportions of racial groups using social media is relatively similar with 65% of Whites, 65% of Hispanics, and slightly less with 56% of Black Americans (Perrin, 2015). I assumed the participants of this study are of a similar make up, represented by predominately younger adults between the ages of 18 and 49, of higher education and income levels, with racial diversity matching the general public, possibly an under-representation of Black Americans, and uncertainty about the participation of Asian Americans.

Procedures

I scraped posts from popular MHFs and Twitter. I chose mental health forums through a process of doing an internet search (Google) of the diagnostic label of interest and "forum" (e.g., Depression forum), and then selecting the top links. The only exception to this process was in searching for "substance use forum." Because the findings did not reflect discussion forums, instead the search used "substance use support forum". Following this selection I modeled further selection decisions after Landers, Brusso, Cavanaugh, and Collmus (2016), these included verifying that the forum content was visible to the general public without the use of a login. Additionally, I explored the terms of service and or use, privacy policy, and or user agreements and eliminated any sites that made promises of content privacy to their members (Anxiety Forum, n.d.; Depression Understood Forums, n.d.; DrugAbuse.com, 2015; Drugs Forum, 2012; Medhelp, 2015; Mental Health Forum, n.d.; My Pro Ana, n.d.; Psych Forums, n.d.; Twitter, 2017; Why Eat, n.d.). A complete list of websites used is in Appendix C.

I explored top SNS and then narrowed to those that involve predominately text posts, illuminating sites such as snapchat, YouTube, and Instagram (Duggan, Ellison, Lampe, Lenhart, & Madden, 2015; Hainla, 2016; Maina, 2016; Moreau, 2016). Ultimately, I chose Twitter, with 313 million monthly users (Hainla, 2016) accounting for 19% of American adults (Duggan et al., 2015), because the application programming interface (API) allowed for limited collection of public posts for free, unlike other top SNS which required a fee. Twitter's API allowed for a researcher to collect a limited number of tweets dating back 10 days at a time and up to 15,000 posts per scrape. I

gathered these posts using the twitteR package (Gentry, 2015) for R. The script used to gather posts from Twitter is in Appendix D.

Data Collection

In order to perform data collection, I learned open-source programing language, Python, using the online 13-hour free Python course offered by Codecademy (www.codecademy.com). Python code was then created which allowed for selection of threads within a MHF discussion topic and pagination through threads (Sample script for gathering data from MHF is in Appendix E).

Collection focused on text posts on SNS and MHFs, both original posts and replies. When available, I collected postdate, post time, and author for each post. Text data gathered from SNS focused on posts using specific terms, mental health and those of the nine chosen diagnostic labels: depression, anxiety, schizophrenia, substance use, alcohol use, bipolar, autism spectrum, eating disorder, and mental illness, all terms are in Table 3. Text data gathered from MHF focused on all threads within topics related to the aforementioned diagnostic labels (e.g., www.psychforums.com discussion topics included substance use, schizophrenia, mental illness, depression NOS, autism, and Asperger's).

Statistical Analysis

I used STM (Roberts, Stewart, & Tingley, 2014) for text analysis; and explored relationships between in-group and or out-group identification (social media or mental health discussion forums) and the latent themes or topics of online posts.

Topic modeling arose out of computer science and machine learning, to allow for the identification of latent themes in text documents. Roberts, Stewart, Tingley, Lucas, et

al. (2014) discuss that topic modeling allows for researchers to discover topics in a "bottom-up approach", rather the researcher making assumptions about the topics. The most common method of topic modeling is to use Latent Dirichlet Allocation (LDA; Blei, Ng, & Jordan, 2003), which used probabilistic models to determine latent constructs (topics) present within text documents. LDA, although a significant breakthrough in text analysis, lacks the ability to correlate topics (as in correlated topic modeling, CTM), or for the inclusion of covariates (such as independent variables). Therefore, this study used STM, which allowed for both the correlation of topics and the inclusion of a covariate. This allowed for the estimation of the topics and the group effect on the topic model (Roberts, Stewart, Tingley, Lucas et al., 2014). Thereby allowing for the determination of a significant relationship between topics discussed in online posts and in-group and or out-group identification as well as the degree of relationship to specific topics and group identification.

Much like in factor analysis, it is important to determine the number of latent dimensions present in the data. I addressed this issue using the held-out likelihood, residuals, and semantic coherence values used by Roberts, Stewart, & Tingley, 2014) in their stm package for R (version 3.3.1; R Core Team, 2016). Additionally, exclusivity of terms was compared to semantic coherence in model selection (Roberts, Stewart, Tingley, Lucas et al., 2014).

I completed analysis in R (version 3.3.1; R Core Team, 2016), and cleaned and converted text data to a text corpus using the tm package (Feinerer & Hornik, 2015) as necessary and stm package (Roberts, Stewart, & Tingley, 2014). Prior to processing, I removed html links, and tags. Then, I converted text to lower case; removing white

spaces, numbers, punctuation, and nonessential English words. Once I processed this text corpus, I removed overly used terms as demonstrated in Figure 2.

Selecting the number of topics may very well be the most important step in this analysis. The R package 'stm' manual (Roberts, Stewart, Tingley, & Benoit, 2017) notes that there is no one way to determine the appropriate number of topics. They suggest that a small corpus with focused content should begin with 3-10 topics, but that a large corpus with more than 100K documents may want to look at more than 100 topics. As this is a large corpus with a focused topic, gathered by key terms, the researcher fitted 2-20 structural topic models on the previously discussed preprocessed matrix with a covariate of group predicting group differences of each topic's prevalence. A spectral algorithm (Arora et al., 2013) initialized the fitted models, I used the values of diagnostic indexes to determine the best fitted model. I selected a model using held-out likelihood, residuals, exclusivity and semantic coherence. Selection criteria using these diagnostic indexes indicated high held-out likelihood, exclusivity, and semantic coherence scores in combination with lower scores for residuals. The values of the fit indexes, held-out likelihood, semantic coherence, exclusivity, and residuals indicated a four topic model would be a good starting place. Topics for closer examination were determined by examining the topic expected probabilities. These diagnostic fit indexes lack cutoffs and therefore I used the above mentioned selection criteria in combination with top 20 FREX scored terms for each topic were also examined in several models with varying numbers of topics in order to determine the substantively supported model. Finally, I examined FREX scored terms for 2-topic through 6-topic models.

Topics comprised of high probability words were examined; labels were determined using FREX scores, lift scores, as well as evaluation of sample text representing the topics. FREX scored words are weighted by highest probability and exclusivity per topic (Roberts, Stewart, & Tingley, 2014). Lift scored words however, are determined by frequency giving greater weight to those that appear less frequently in other topics. Results include the number of topics and topic proportions, as well as word clouds for visual representation dominant topics.

Group differences were analyzed using a z-test to compare two proportions, due to the large sample size (Sirkin, 2006). The equation I used for each topic is in Figure 3, where $\hat{p}_1$ represents MHF mean topic proportion and $\hat{p}_2$ represents the SNS mean topic proportion. Group differences were considered significant when the two-tailed p values of each z-test are less than or equal to .05.

Results

First, for ease of analysis the dataset was subset and a 10% representative sample was used for analysis. The new sample consisted of these 208,940 posts, 112,491 from SNS (54%) and 96,449 from MHF (46%). I processed the corpus using the tm package, through this I transformed the text to lower case, and removed numbers, punctuation, white spaces, and stop words (words without significance). Finally, the text underwent stemming, which reduces terms to their root word (e.g., "washing", "washer", "washed" were reduced to "wash"). After I processed the corpus of posts and removed empty documents, 208,098 posts remained. These preprocessed texts were then used to create a document-term matrix, as a typical step in automated text analysis. The matrix consisted

of 208,098 rows representing the SNS and MHF posts (i.e., documents) and each column composed of terms.

I created a plot of the number of documents and words that would be removed by words existing in a minimum number of documents, as an initial step in determing the lower threshold of words for removal (Figure 2). I removed terms that occurred in four or fewer documents, these terms consisted of predominately misspelled words, what were once unique hashtag labels, and often misspelled hashtags that were not duplicated. Of 299,413 terms that were in the corpus, 272,241 occurred in four or fewer posts and were therefore removed to aid in analysis and the quality of the model. After these terms were removed, 976 documents without terms were then removed. The matrix now consisted of 207,122 documents and 27,172 terms for the final analysis. Posts varied in length, the number of words per post ranged from 1 to 3,633 ($M = 25.48$, $SD = 50.37$). Figure 4 is a WordCloud plot of the 50 most frequent terms among the 27,172 terms used for the analysis.

I grouped the posts by SNS and MHF posts and used these groups as the topic proportions predictor. The processed matrix consisted of 112,018 SNS posts (54%) and 95,104 MHF posts (46%).

I based model selection on diagnostic indexes. As indicated earlier, a lower held-out likelihood, as seen in Figure 5, indicated 2-4 topics would be the best fit. Similarly, higher semantic coherence scores, as seen in Figure 7, indicated 2-4 topics would be the best fit, with a sharp decline in coherence at 5 topics. Furthermore, the exclusivity diagnostic index, as seen in Figure 7, showed similarly a sharp decline in exclusivity when the number of topics increased to 5, and then began to improve as the number of

topics increased. This again showed 2-4 topics to meet the selection criteria. Finally, in

looking at the residuals index, as seen in Figure 8, it is again demonstrated that 2-4 topics

meet the selection criteria of higher scores. I determined the 4-topic model demonstrated

the most cohesive topics, demonstrated parsimony, and was the best model. I listed the

top 20 FREX score terms of the chosen 4-topic model in Table 4.

Four Topics

I labeled Topic 1, Eating Disorders after comparing the common theme of the top

20 FREX scored terms with the representative posts, determined by the PlotQuote

function of the stm package (Roberts et al., 2017). As previously discussed the FREX

terms represented words with high probability and high exclusivity, additionally, lift

terms represented words with high frequency in the respective topics. The FREX terms

seen in Table 4, the lift terms seen in Table 5, and the representative posts reflected food

logs and posts consistent with binge eating. For example, here is an excerpt from a

representative post.

> well...fuck., 1 whole raspberry white chocolate cheesecake (meant to serve
>
> 8-10), 3 slices tirimisu cake, 45 white chocolate reeses, 1 fullfat blueberry
>
> yogurt with a handful of crushed walnuts, 1 lowfat peach yogurt, …
>
> Arbys: Large curly fries, 1 40 ounce bottle of ketchup on the hamburgers
>
> and fries

However, not all posts reflected food diaries another representative post

from this topic, seems representative of the theme:

> Fat fat fat fat fat fat fat fat fat fat fat fat fat fat fat fat fat fat fat fat fat
>
> fat fat fat fat fat fat fat fat fat fat fat fat fat fat fat fat fat fat fat fat fat fat

fat fat fat fat fat fat fat fat fat fat fat fat fat fat fat fat fat fat fat fat fat

fat fat fat fat fat fat fat fat fat fat fat fat fat fat fat fat fat fat fat fat

In addition to the food terms present, FREX terms: "weight", "fat", "calorie",

"diet", and "purge" as well as lift terms: "tearing", "puke" and "workout" indicate that

Eating Disorders is the best fit of the latent theme of Topic 1. The Eating Disorders topic

does not use the terms adapted from the literature (Table 1), however, I contend that the

themes of self-destruction, blame, weak, disinhibition are present in these posts. This

topic did not demonstrate the thriving and solidarity I expected to find among the mental

health community, rather it seems to indicate stigmatizing and or self-stigmatizing

language.

I labeled Topic 2 with the same method as the previous topic, and named it

Anxiety. In addition to the FREX terms seen in Table 4, lift terms in Table 5, and the

representative posts collected showed discussion of the experience of anxiety. As in this

post to a MHF:

> Feel empty. I cry a lot. I constantly feel like i am dreaming. I feel so
>
> hopeless. I have gadepressioand anxiety. I feel like i am never going to get
>
> better or that i wont even know what feeling better feels like i am so alone
>
> in feeling like this.Please help. My newest fear is that I am going to snap
>
> and go crazy like people on rampages do

The terms associated with the latent theme of Topic 2 reflect anxiety

symptomology and coping mechanisms, as seen among both FREX terms (see

Table 4) and lift terms (see Table 5). Therefore, Anxiety was determined as the

best fit for the latent theme of Topic 2. In examining the representative post of the

Anxiety topic the term "hopeless" is used, which also occurs in the expected self-stigmatizing language (see Table 1), additionally the theme of isolation is indicated by the statement "I am so alone in feeling like this". The above representative quote may reflect themes found in public stigma, as it ends "snap and go crazy like people on rampages do". As predicted, self-stigmatizing language reflects that of public stigma.

However, the Anxiety topic is not so straightforward. As indicated in Table 4 the FREX terms of "husband" and "breath", and in Table 5 the lift score term of "calm". These terms are indicative the presence of the expected thriving and solidarity language within this topic.

In exploring, the terms and representative posts of Topic 3, it became less straightforward to determine a theme. FREX terms (see Table 4) reflected diagnostic labels as well as the terms "season", "trump", "teen", "attack", "yall", and "Netflix". Lift terms (Table 5) indicate a variety as well, without diagnostic labels but the addition of "Orlando", "islam", "religios", "immigr", and "Farrakhan" (a well-known Islamic leader and social activist). This topic is more representative of SNS posts, which are shorter in length and more frequently prone to posts by bots, as seen by this portion of a representative post: "#8: Toplay Fidget Spinner Toy Stress Reducer Ceramic Bearing - Perfect for ADD, ADHD, Anxiety, and Autism Adult Ch…" Despite preprocessing efforts this post represented 7 of 30 quotes pulled for this Topic. However, posts within this Topic varied, some demonstrating apparent emotional distress: "Anxiety anxiety anxiety anxiety anxiety anxiety anxiety anxiety anxiety anxiety anxiety anxiety anxiety anx" or "Anxious anxious anxious anxious anxious anxious anxious anxious anxious

anxious anxious anxious anxious anxious anxious anxious anxi." However, other posts referenced mental health discussion in current events such as: "Kate Middleton, Prince William, & Prince Harry Open Up About Mental Health, Princess Diana, & Parenthood"; "BEN STEIN: Leftists Using Violence To Silence Free Speech Display Mental Illness (VIDEO) - #tcot #MAGA #Trump"; or "#Reno judge Dorothy Nash Holmes warns council of a "new hometown homeless" with mental health issues, criminal records and…" These posts seem to reflect a mixture of open conversation and stereotyped stigma of mental illness as related to violence, homelessness, and criminal records. Therefore, this Topic 3 was named Mental Health in the Media. Additionally, these posts use terms that I expected to find among public stigma (Table 1), including "homeless", "violence", and "criminal". Therefore, this topic represents public stigma as predicted.

Finally, I named Topic 4 Biopsychology, similarly based on the 20 FREX terms, 20 lift terms, and representative posts. In addition to the statistics terms present in both the FREX and lift terms were terms such as "mdma" and "cocaine" and lift terms such as "psychot", "chemic", "enzyme" and "vapor". Representative posts included entire research articles related to the biological effects of substance use such as this excerpt from a post:

> Effects of recreational drug abuse by substituting the medicament of
> neurotoxic drugs of abuse. Examples of compounds which are non-
> neurotoxic serotonin releasers suitable for use in this invention include,
> but are not limited to: 1(3,4-methylenedioxyphenyl)-2-(N-methyl)
> aminopropan-1-one (Methylone)... The phrase 'non-neurotoxic selective
> serotonin releaser' as referred to herein means compounds which are

considered to act primarily by binding to the 5HTT serotonin reuptake

transporter and reversing its direction of action, thereby selectively

releasing serotonin by retrograde transport.

This one representative post may lead the reader to assume maybe something

related to substance abuse would be more appropriate; however, another excerpt of a post

indicates broader posts. Such as this post which discusses research related to childhood

trauma and dissociative symptoms:

Research into associations between childhood trauma and dissociation in

62 first-episode and 43 chronic patients with psychosis symptoms finds

chronic patients reported the highest level of dissociation and that more

severe childhood trauma was associated with greater dissociative

symptoms in all group but especially in chronic patients. Emotional abuse

showed the strongest association with dissociation. Results appear in

Psychiatry Research. Abstract … We also demonstrate the salience of

emotional abuse in explaining variance in dissociation especially in

chronic patients.

Additionally, a post reflected outcomes for medication with individuals

with schizophrenia.

Chronic, high-dose use of benzodiazepines among patients with

schizophrenia appears to be associated with a markedly higher overall

mortality rate than is seen in patients with schizophrenia who have not

been exposed to benzodiazepines, according to a report in AJP in

Advance. The report also found a lower overall mortality rate among

patients with schizophrenia who received antipsychotics and antidepressants. The results indicate that any amount of antipsychotic and antidepressant usage is associated with overall mortality rates 14% to 40% lower compared with no use of these medications. The researchers wrote. In contrast, benzodiazepine exposure revealed a clear dose-response curve for mortality, where high exposure was associated with a 70% higher risk compared with no use.

These representative posts, in conjunction with the FREX and lift terms and previous literature discussing biopsychological understanding of mental illness resulted in Topic 4 being named Biopsychology as a reflection of these research related posts associated to the biological effects and psychology symptomology; which may also reflect empirically supported approaches to discussions about mental health. This topic could also be named Medication or Pharmacotherapy as representative posts and terms also reflect these themes. However, it is the inclusion of recreational drug use and dissociative symptomology that resulted in the topic being named Biopsychology. This topic seems to elude expectations and is the only one to not demonstrate expected terms or themes found in Table 1. Nor does it reflect expected themes of thriving or solidarity.

The Eating Disorders topic accounted for 18.5%, the Anxiety topic accounted for 30.5%, the Mental Health in Media topic 30.1%, and finally the Biopsychology topic accounted for 20.8% of all posts.

Z-Test

I calculated the estimated group differences of these four topics between SNS and MHF posts. As hypothesized there were group differences of the latent topics, between

the SNS and MHF posts. The estimated topic proportions between groups, seen in Figure 9 and Table 6, show that the Mental Health in Media topic represented a greater proportion of SNS posts than MHF posts. Conversely Eating Disorders, Anxiety, and Biopsychology topics represented a greater proportion of MHF posts than SNS.

I conducted a z-test for proportion means comparing the estimated topic proportions between the MHF and SNS groups, seen in Table 6. The results were all statistically significant. The percentage of MHF posts making up the Eating Disorders topic (22%) is greater than that of the SNS posts, $z = 28.71$, $p < .001$, two-tailed. Similarly, the percentage of MHF posts making up the Anxiety topic (44%) is also greater than that of the SNS posts, $z = 126.22$, $p < .001$, two-tailed. Additionally, the percentage of the MHF posts that make up the Biopsychology topic (30%) is also greater than that of the SNS posts, $z = 88.78$, $p < .001$, two-tailed. Whereas, the percentage of SNS posts identified as Mental Health in Media (50%) demonstrated significantly greater proportions than the MHF posts, as the negative direction of the results indicated, $z = -284.16$, $p < .001$, two-tailed.

Discussion

Approximately 18.5% of adults in the United States experience mental illness annually (The Institute of Mental Health, n.d.). However, despite nearly 1 in 5 people being effected, mental health stigma resulting in discrimination has been on the rise for the past sixty years. This stigmatizing behavior has led to lower incomes, individuals being more likely underemployed, experience loss of employment opportunities, increased likelihood of arrest, receiving fewer medical services, and impacts help seeking behavior and treatment compliance among those with mental illness (Barney et al., 2010;

Corrigan & Kleinlein, 2005; Link, 1987). Therefore, the reduction of stigma towards the mental health population would benefit quality of life and treatment seeking behavior for this vulnerable subset of the population.

This study aimed to explore and demonstrate differences in mental health stigma between the general public and a mental health population by observing public discourse present on online posts. This was explicitly done by exploring differences in topic proportions across groups. In addition to comparing group differences, I labelled latent themes and examined for terms related to solidarity and thriving or stigma.

Differences in Topic Proportions by Group

The first hypothesis stated that there would be group differences in latent topics found among posts on SNS and MHF. Results of the z-tests indicated significant group differences in topic proportions for all four. This is consistent with the in-group and out-group dynamic created by stigma related discrimination (Corrigan & Penn, 1999; Link et al., 1999). As expected, observed discourse differed between the general public (represented by SNS posts) and a mental health population (represented by MHF posts). Furthermore, the inclusion of a broader number of mental health disorders than previous research did not seem to minimize those group differences.

Additionally, group differences are further explained by the presence of stigmatizing themes in both groups as the manifestation of Corrigan's (2004) understanding of self-stigma. As previously discussed although both groups exhibit stigmatizing themes, the Mental Health in the Media topic demonstrated public stigma. However, the stigmatizing themes found among the MHF posts in both the Anxiety and Eating Disorders topics reflect an internalization of public stigma. For example, the

Eating Disorders topic demonstrates themes of self-destruction, blame, weakness, disinhibition, and among the anxiety posts were themes of hopelessness and violence. As previously stated, self-stigma is conceptualized by Brohan et al. (2010) as a reaction to public stigma in which the negative stereotypes of the general public are internalized and further an out-group experience.

Stigma

The second hypothesis expected to find negative latent topics related to mental health and the diagnostic labels among the SNS posts. As expected, the Mental Health in Media topic which accounted for 50% of SNS posts reflected common stigmatizing attitudes of violence among the representative posts. For example, these representative post "#Reno judge Dorothy Nash Holmes warns council of a "new hometown homeless" with mental health issues, criminal records and…" This is consistent with stereotyped misconceptions associating crime and violence with mental illness as demonstrated by Dietrich et al. (2006).

However, the result that the Eating Disorder and Anxiety topics were more prevalent in MHF did not support the third hypothesis that themes of thriving and or solidarity would be present among the MHF posts. Instead, the representative post of the Anxiety topic, found most predominately among MHF posts, demonstrates internalized public stigma related to the previously discussed negative stereotype of violence as well as a lack of control as associated with mental illness in attribution theory. The statement "snap and go crazy" implies a loss of control which is then paired with the violence of a "rampage". Similarly, the Eating Disorder topic lacks thriving and or solidarity language and however, it also lacks the theme of violence seen in the other topics I have discussed.

The post of "fat fat fat fat…" may indeed reflect more internalized public values, such as weak, selfish, and self-destructive (Easter, 2012).

Interestingly, the prevalence of the Biopsychology topic in MHF also did not support the above stated hypothesis and this topic was the second most prevalent topic among MHF posts accounting for 30% of MHF posts. However, as it contains neither thriving and or solidarity themes nor stigmatizing language I contend that this topic may reflect a biological understanding of mental illness, which according to attribution theory would result in diminished stigma.

Attributing personal control. As previously discussed, attribution theory indicates that observers pity individuals attributed to having minimal control over their mental illness (e.g., intellectual disability). Conversely, observers associate the prominent disorders (i.e., anxiety and eating disorders) with personal control and were therefore more related to stigmatizing themes of violence rather than pity.

It may be that within an individualistic society that attributes of personal control is used to reduce self-stigma within the mental health population. Rather than to focus on an individual's personal control over symptomology or diagnostic etymology, one may instead focus on a sense of agency in ownership of the diagnostic label and group identification. This study hoped to find themes of solidarity and thriving among the mental health population as a first step in reducing self-stigma. Contrary to expectations, it was among the SNS posts that support or solidarity with mental health populations arose. For example, SNS posts such as: "Proud of Prince William & Lady Gaga for tackling the stigma on mental health. Mental health is as important as physical health!" or "Tom Hardy, David Tennant and co. are leading a selfie campaign to break mental health

stigma." Similar to the rise of personal control among marginalized groups such as the civil rights movement, the more recent #metoo movement, or mental health's own #oktosay movement to note the possible relationship between increased sense of agency and or personal control and reduced self-stigma.

Furthermore, a biological understanding of mental illness may well result in reduced stigma. The biopsychology topic found in this model was the only topic to not contain stigmatizing language among the high probability or high frequency terms. The nature of a biological understanding is to attribute causation of mental illness to factors other than a person's character. Therefore, it is beneficial to continue to emphasize the whole person when discussing mental health and or illness. Additionally, in discourse related to those who are thriving it is beneficial to also include the ways in which biopsychosocial factors may aid in their thriving. This may help to reduce the attribution of solely positive personal control to those who are thriving.

The role of stigma. It became evident that mental health stigma related to themes of violence was present in both groups and internalized public values of weakness, selfishness, and self-destructiveness were present among the MHF posts. Despite hypothesized differences in negative latent topics between groups, results are congruent with the previous sixty years of research demonstrating descriptions of those with mental illness as violent or dangerous (Pescosolido et al., 2010; Phelan et al., 2000). For example, MHF posts that stated "My newest fear is that I am going to snap and go crazy like people on rampages do" or the SNS post: "Leftists Using Violence To Silence Free Speech Display Mental Illness".

Although themes of solidarity and thriving may have indicated reduced self-stigma, it is understandable that members of a mental health population would adopt the stigmatizing language of the general public. Individuals in both groups have their identities informed by the broader culture, including social media, print media, and film and or television. As the SNS rise in prominence in people's daily lives, there is a near constant onslaught of information and imagery available and impacting one's own identity within their broader cultural context. Furthermore, a person's ability to curate exposure to information may result in even more entrenched negative mental health stereotypes and or stigma.

It may be individuals expressed the role of mental health stigma and corresponding stigma avoidance behaviors in the posting content of both the mental health population and general public posts. It is possible that the results support the argument that self-stigma is prominent among MHF posts because individuals concerned about stigma attached to mental health seek anonymous online forums (Johnsen, Rosenvinge, & Gammon, 2002). Online population could more likely to represent those with self-stigma as they are intentionally seeking out an anonymous forum in which they may be able to seek help. These posts may represent individuals who may not display stereotypical signals of mental illness and therefore are better able to mask their affiliation with the target population, further contributing to a desire for anonymity.

As previously stated, research suggests individuals with social anxiety disorder is more inclined to perceive public stigma and or interpret interpersonal interactions as discrimination or devaluation and therefore may have a higher likelihood of engaging in help-seeking in an anonymous manner.

Finally, stigma may play a role in the explanation of the absence of depression as a major theme despite greater prevalence among the general public than eating disorders. Depression posts accounted for 9% of the posts gathered in this study, despite being the leading cause of disability globally (The National Institute of Mental Health, n.d.). First of all, depression may be less prevalent among the posts because it was found to be less stigmatized than eating disorders (Ebneter & Latner, 2013). However, apparent discrepancy may be explained in a secondary way, for example, it may be that the nature of depression symptomology may result in decreased help seeking or social engagement and therefore diminished posting on SNS or MHFs.

Methodological Implications

This study did not rely on Likert style questionnaires. Instead, I used an observational methodology in an attempt to decrease reliance on self-report. The observational nature of this study adopts more of a bottom-up approach to understanding current stigmatizing themes and note any differences from previous research. Furthermore, gaining a better understanding of the latent themes present in online discourse both among the general public and a mental health population. Therefore, the methodology allowed the online discussions to drive the focus. This resulted in some differences from previous prominent mental health stigma related research focusing primarily on schizophrenia and or psychotic disorders, depression and or anxiety, and alcohol and or substance use disorders, while MHF posts reflected greater prevalence of anxiety and eating disorders.

Additionally, the use of topic modeling allowed for the analysis of large quantities of text data. Qualitative thematic coding would not have been possible on the sample size

in any reasonable period of time. However, as this methodology is still in its infancy it may see improvement as more researchers establish procedures for selecting an appropriate number of topics.

Limitations

Future researchers should note that as structural topic modeling is a relatively new methodology it lacks specific cutoffs on diagnostic measures in determining the number of topics. The goodness of fit of number of topics will always increase with the number of topics, but perhaps to the point where the latent themes lose meaningfulness. However, latent themes of thriving or depression may have been present if the researcher had used a greater number of topics.

Additionally, labeling topics is similar to the process of labeling factors in factor analysis in that the researcher chooses different names and multiple names are possible. In topic modeling, the researcher derives topic names by exploring high frequency and high probability terms in tandem with representative text, therefore, there is more than one appropriate label possible.

As previously discussed, symptomology of different diagnostic labels may have contributed to the outcomes. Though depressive disorder is the third leading cause of disability globally, as of the year 2000 (Ferrari et al., 2013), and Major Depressive Disorder accounts for approximately 6.7% of the population (Major Depression, 2017), related SNS posts account for a comparable 7.17% , however among MHF posts, depression related posts account for only 1.83% of this sample. Similarly, social isolation/withdrawal may contribute to the lack of corresponding presence on MHFs. Additionally, individuals with autism spectrum diagnoses may inherently be unlikely to

seek social support in MHF. Conversely, anxiety and worry may result in greater frequency of posts by individuals contributing to anxiety discussions.

The existence of anxiety and eating disorders topics among data the researcher collected is related to the prevalence of related posts in the data collection. Researchers should expect the prevalence of anxiety related posts, as approximately 19.1% of adults in the United States met experienced an anxiety disorder in the past year (Any Anxiety Disorder, 2017). However, the greater number of posts related to eating disorders may be related to the collection of posts related to both help seeking and those supporting each other in their disordered eating on proana and promia forums. Other diagnostic labels do not have such robust online communities for promoting the disordered behavior. Furthermore, the anxiety topic may reflect a proclivity towards venting as a coping strategy for managing anxiety symptoms. The existence of an anxiety topic may be the reflection of the sheer volume and length of anxiety related posts.

Finally, the longitudinal nature of MHF posts vs. limited window of SNS post collection, may have contributed to noted differences between the groups. Although the researcher collected similar quantities of posts, the SNS may paint a different picture over a greater span of time if data was collected for longer than one month. Similarly, the researcher collected posts from a SNS with character limited posts (i.e., 140 characters), whereas MHF posts had no character limit. Additionally, I limited the data collection methodology to the collection of text data in the original posts and disregarded linked text or text embedded in images, therefore missing portions of the online discourse related to mental health stigma.

Clinical Implications

The clinical implications for the reduction of mental health stigma are numerous. Theoretically, it should account for greater rates of treatment seeking and treatment compliance, and reduced symptomology. Results indicate the ongoing presence of stigma among the general public as well as self-stigma among a mental health population. The presence of anxiety and eating disorder topics may reflect a greater presence of these disorders among individuals engaged in online discourse and therefore treatment may want to address this interpersonal aspect of the lives of clients meeting these diagnostic criteria.

Furthermore, it may be beneficial for clinicians to include in discourse with their clients the impact of portrayals of mental illness on social media. Representative posts of the prominent Mental Health in Media topic indicate that although stigma is present, posts reflecting advocacy for open discourse and access to treatments are also present. For example, the references to Prince William and Lady Gaga having an open dialogue about stigma and mental health, or a post promoting the Maha Music Festival, held annually in Omaha, Nebraska, which stated "Fellow non-profits: we're on a mission to educate attendees & provide mental health resources at #Maha2017." Also the inclusion of the #oktosay, creates space for clients to take ownership of their diagnostic labels, congruent with research by Corrigan, Kosyluk, and Rüsch (2013) on reducing self-stigma by owning the diagnostic label. The presence of self-stigma among MHF posts may be related to the aforementioned desire for anonymity, however their research compares the owning of the diagnostic label to coming out in the LGBTQ community and the sense of agency that can accompany that ownership.

Finally, a biopsychology approach may contribute to lower self-stigma, as this was the only topic that showed no stigmatizing themes or language. This may be a beneficial avenue of discourse in engaging individuals on topics of mental health with language not yet appropriated by the general public.

Future Research

In light of the above mentioned clinical implications, future research should include exploration of stigma when biological models are employed when discussing mental health. Perhaps research exploring the effect of this kind of discourse on rates of stigmatizing language.

Future researcher should further explore the efficacy of MHFs. If this is a modality in which people feel safe to engage in support or treatment, mental health professionals should know more about the efficacy of involvement in discussion forums for the reduction of symptoms.

Future research should also include topic modeling by diagnostic label. This approach may allow for a better understanding of variation in stigmatizing themes by diagnostic label. Furthermore, the longitudinal monitoring of trends in online discourse as related to current events. This methodology would allow for the analysis of public discourse following events attributed to mental illness such as the mass shooting at First Baptist Church in Sutherland Springs, Texas on November 5th, 2017.

Future research using text analysis may also want to use sentiment analysis to explore the underlying sentiment present in latent topics. This additional methodology would allow for a more systemized approach to the appraisal of tone (violent or otherwise) present in the topics.

Conclusion

As our social interactions move increasingly into the online domain it is imperative that psychologists in the field become fluent in how these interpersonal interactions impact the lives of our clients. In observing online discourse, it is clear that stigma towards mental illness and among those within the mental health population is present. Understanding the ways in which people interact and communicate in online formats is equally informative to future practice, particularly as telemedicine becomes more commonplace.

In conclusion, there is still so much that we do not know about the perpetuation of mental health stigma among the general public and within a mental health population in the face of decades of stigma reduction efforts. However, by employing advanced methodologies we may be better able to observe behavior and possibly implement technology assisted interventions.

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Table 1

Key Terms by Diagnostic Label and Stigma Category

Label	Public Stigma	Self-Stigma
Depression	Threatening, Dangerous, Suicidal, Incompetent	Lazy, Sad, Worthless, Loss
Anxiety	Indulgent, Unreasonable, Irresponsible	Shame, Blame, Secret, Isolation, Exclusion, Hopeless, Embarrassment
Schizophrenia	Unpredictable, Aggressive, Unintelligent, Psychiatric, Criminal, Homeless	Stupid, Crazy, Joke, Psycho-killer, Maniac
Substance Use	Criminal, Poverty, Bad, Violent, Dangerous, Incompetent, Irresponsible, Injection, Illegal, Untrustworthy	Worthless, Invisible, Shame, Secret, Hopeless
Alcohol Use	Violent, Irresponsible, Male, Poor, Uneducated, Bad	Worthless, Lonely, Broken, Liar
Bipolar	Lifelong, ADHD, Drugs, Addiction, Uninhibited, Crazy	Damaged, Flawed, Hopeless, Incompetent
Autism Spectrum	Children, Youth, Vaccines, Wealthy, Rich, Rebellious	Hopeless, Wild, Child, Stupid
Eating Disorders	Attention, Trivial, Weak, Selfish, Self-Destructive, Feminine/Female	Responsibility, Blame, Control, Uninhibited

Note. Terms adapted from Alanso et al. (2008); Brohan et al. (2010); Keyes et al. (2010); Link et al. (1999); Lysaker et al. (2007); Obeid et al. (2015); Pescosolido et al. (2000); Pescosolido et al. (2010); Pescosolido et al. (1999); Phelan et al. (2000).

Table 2

Number of Posts by Diagnostic Label and Post Source

Diagnostic Label	SNS Posts (%)	MHF Posts (%)	z test
Alcohol/Substance Abuse	257,805 (12.33%)	174,161 (8.33%)	-95.56***
Anxiety	165,136 (7.90%)	188,733 (9.03%)	29.19***
Autism	154,712 (7.40%)	56,839 (2.72%)	-157.46***
Bipolar	83,955 (4.02%)	117,313 (5.62%)	53.55***
Depression	149,847 (7.17%)	38,192 (1.83%)	-191.46***
Eating Disorders	113,226 (5.42%)	213,372 (10.21%)	127.76***
Mental Health	172,291 (8.24%)	109,831 (5.26%)	-86.44***
Schizophrenia	27,879 (1.33%)	66,614 (3.19%)	89.01***

Table 3

SNS Search Terms by Diagnostic Labels

Label	Terms
Alcohol Abuse	alcohol use, alcoholic, alcoholism
Anxiety	anxiety, anxious
Autism	autism, autistic
Bipolar	bipolar, manic
Depression	depression, depressed
Eating Disorders	anorexic, anorexia, binge, bulimia, bulimic, eating disorder, proana
Mental Health	mental health, mental illness, mentally ill
Schizophrenia	schizophrenia, schizophrenic
Substance Abuse	addict, addiction, drug use, substance use

Table 4

FREX Score Terms by Topic

Topic	Terms
Eating Disorders	food, weight, water, fat, calori, diet, yesterday, hot, purg, chocol, hug, tea, tast, hair, sugar, bag, burn, haha, bp, xrtt
Anxiety	feel, start, worri, felt, panic, aack, breath, knew, husband, taper, chest, arm, gotten, detox, headach, youn, xanax, itn, dizzi, numb
Mental Health in the Media	Mental, addict, health, autism, alcohol, bipolar, amp, autist, via, video, manic, mentalhealth, anorexia, schizophrenia, season, trump, teen, attack, yall, netflix
Biopsychology	Differ, medic, effect, experi, swim, possibl, certain, agre, mdma, term, similar, howev, negat, given, cocain, depend, process, simpli, perhaps, within

Note. Topic labels were determined by highest probability and exclusivity.

Table 5

Lift Score Terms by Topic

| Topic	Terms
Eating Disorders	mash, ofi, popcorn, cloth, dip, mayfair, jelli, milk, cocounut, teari, cherri, puke, cracker, supper, hun, bacon, woulda, leuc, wee, workout
Anxiety	wd, again, neck, Vicodin, methadone, start, dizzy, panic, gotten, ifeel, yourselfyou, bettern, calm, vision, sometimesi, testicl, guand, mernrnim, sickrtt, alln
Mental Health in the Media	prof, fundraise, Farrakhan, ltvideogt, letstalk, jane, lawmak, draft, abt, matern, orlando, islam, dan, immigr, brunett, san, bredan, meme, kidnap, religios
Biopsychology	hcl, nt, imbal, canut, psychot, chemic, aspect, particular, enzyme, default, error, generalis, probabilitiesimprob, sensemi, stated, focalin, gase, aftereffect, durat, vapor

*Note.* Terms were given higher weight that appeared less frequently in other topics.

Table 6

Mean Topic Proportion by Group

Topic	SNS Posts	MHF Posts
Eating Disorders	.17	.22
Anxiety	.19	.44
Mental Health in Media	.50	.04
Biopsychology	.14	.30

Note. SNS = social network site, MHF = mental health forum. Mean topic proportions are interpreted as 17% of terms in the SNS posts and 22% of MHF posts were assigned to the Eating Disorder topic on average.
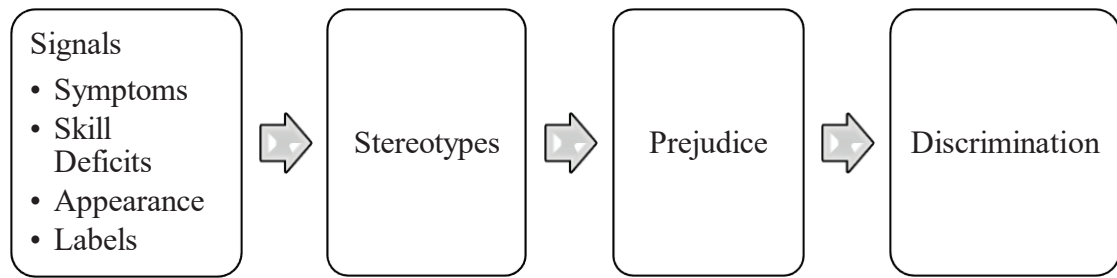
Figure 1. How signals lead to stereotypesand discrimination.
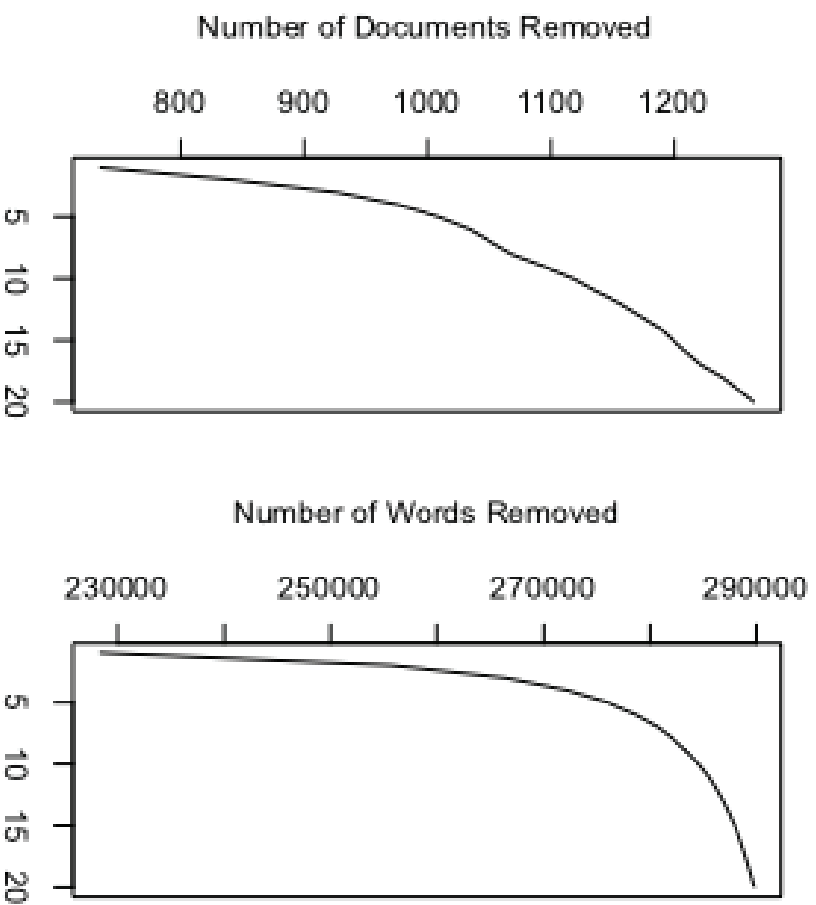
Figure 2. Plot of projected documents and words removed by lower threshold of documents from 1 to 20.

$$Z = \frac{(\hat{p}_1 - \hat{p}_2) - 0}{\sqrt{\frac{\hat{p}_1(1-\hat{p}_1)}{n_1} + \frac{\hat{p}_2(1-\hat{p}_2)}{n_2}}}$$

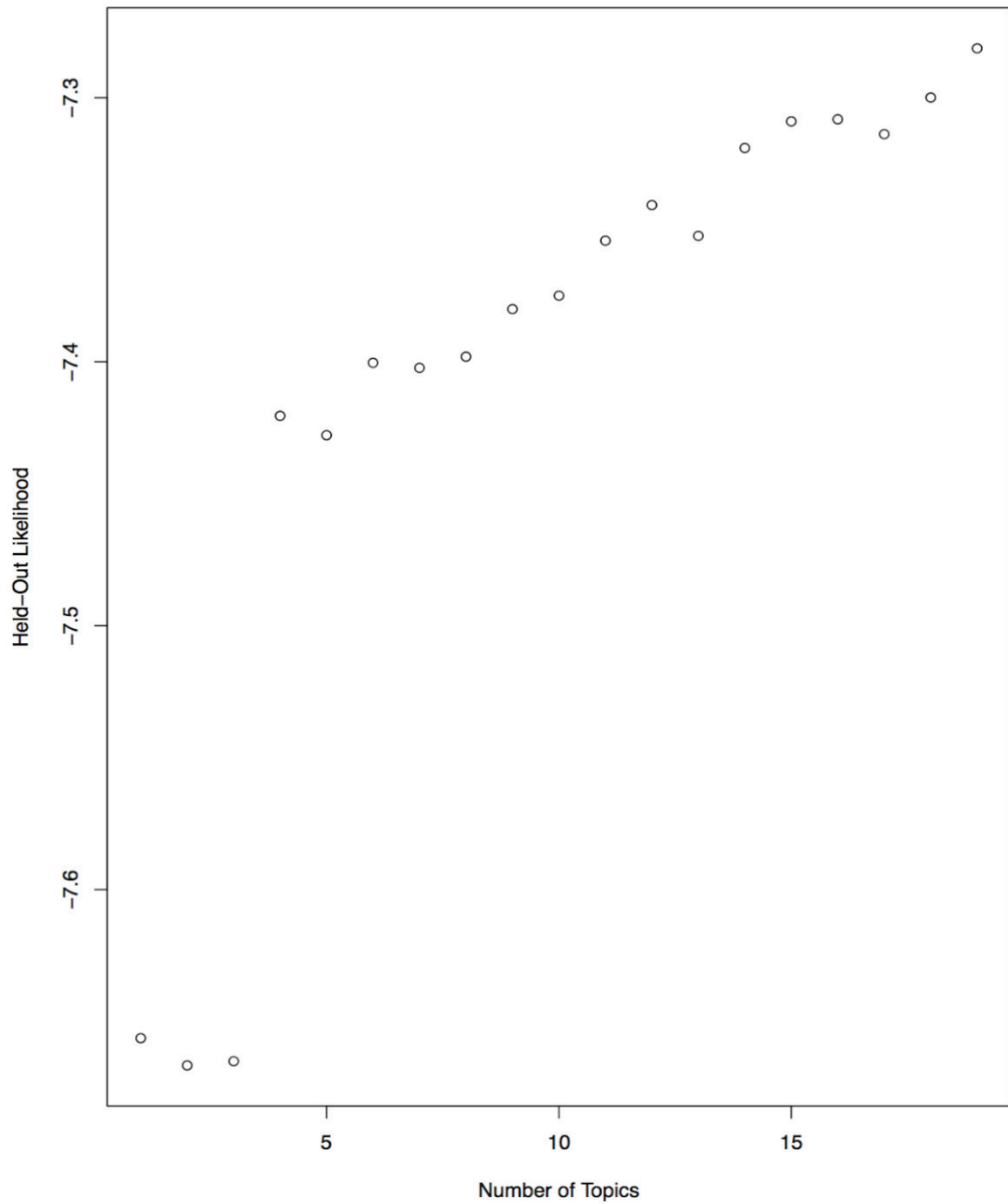*Figure 3*. Equation for Z-test to compare two proportions.

Figure 4. A WordCloud plot of 50 most frequent terms in 207,112 online posts.

Figure 5. Held-Out Likelihood diagnostic index of structural topic models with varying
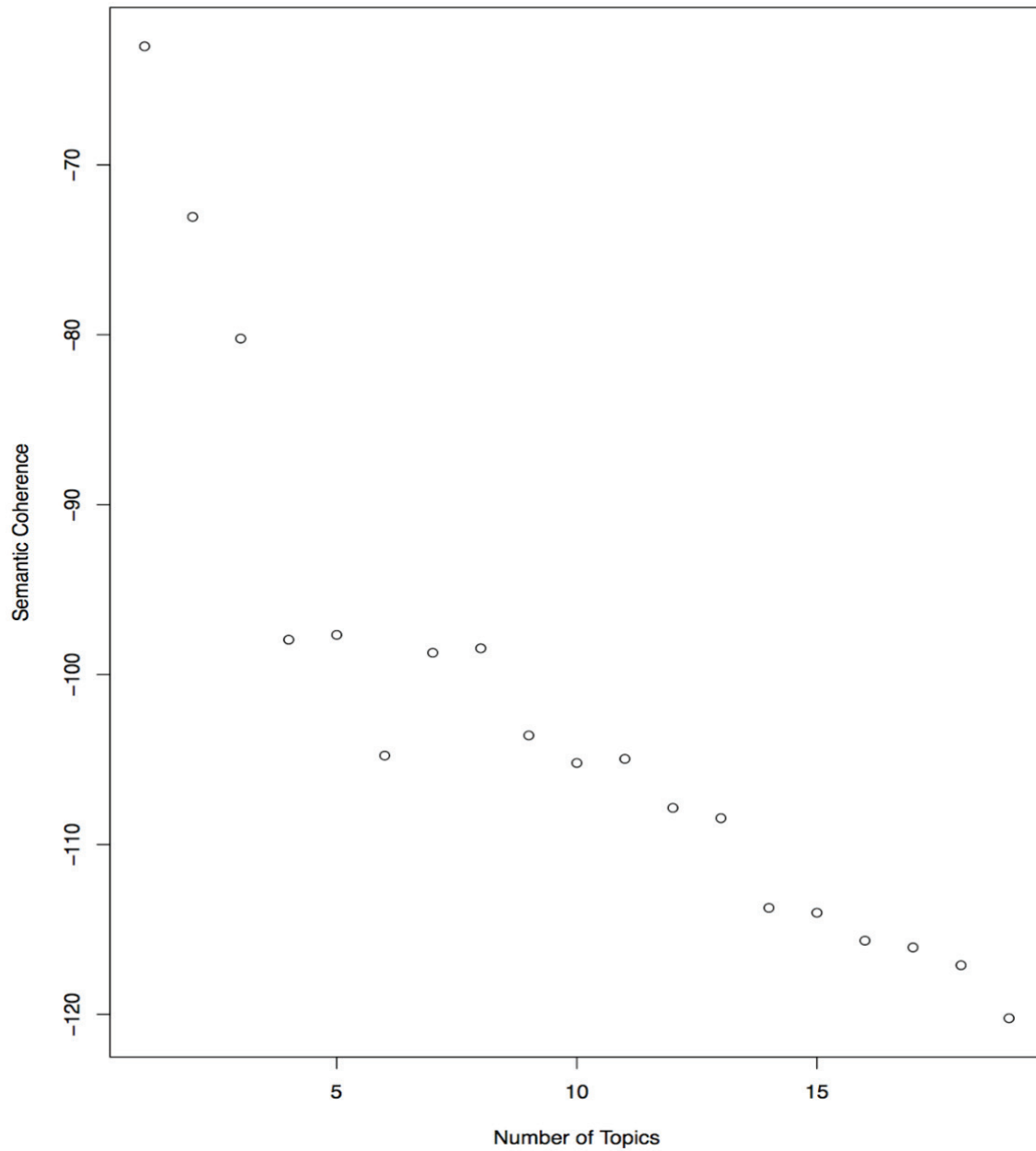
numbers of topics: 2 to 20 topics.

Figure 6. Semantic Coherence diagnostic index of structural topic models with varying
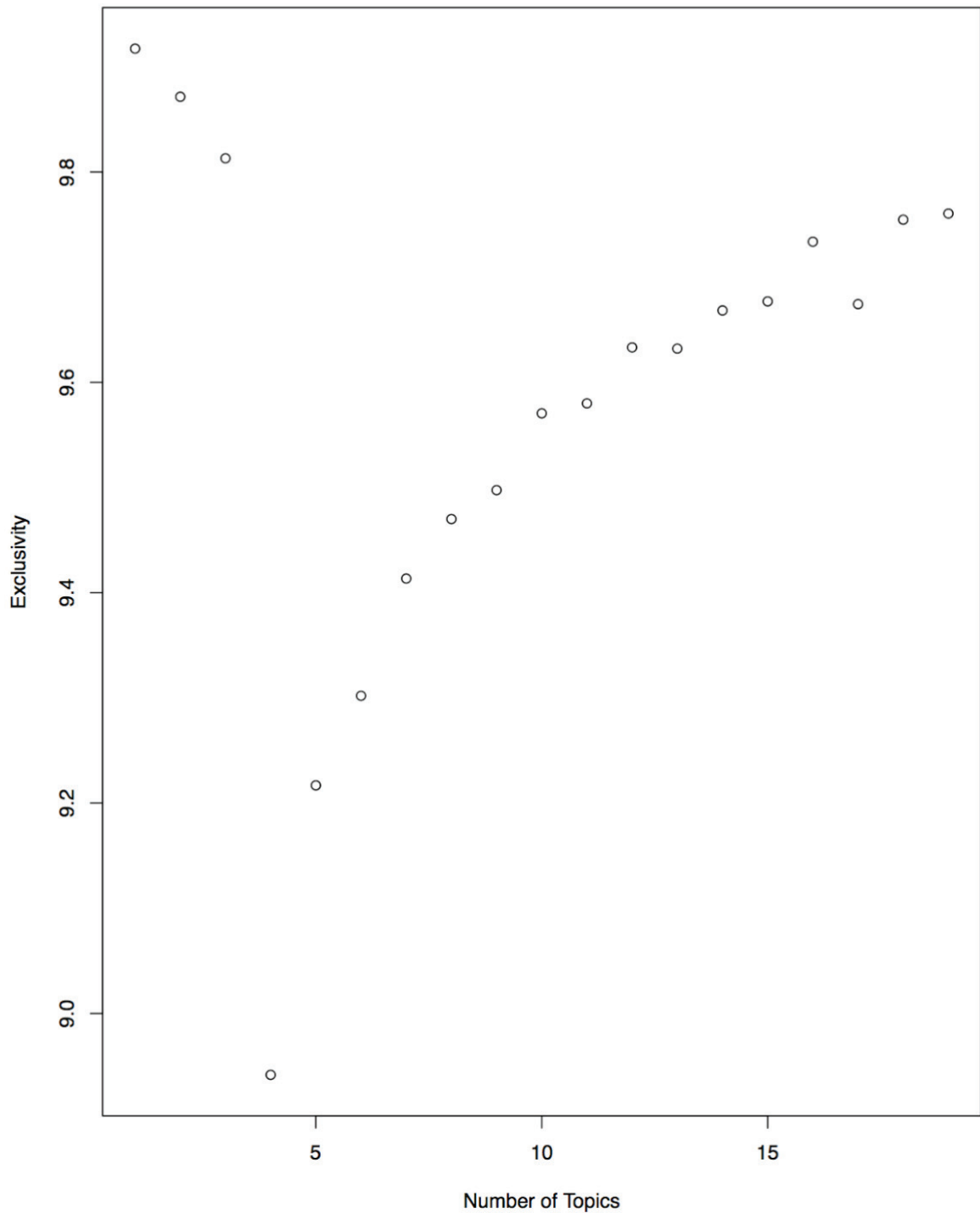
numbers of topics: 2 to 20 topics.

Figure 7. Exclusivity diagnostic index of structural topic models with varying numbers of
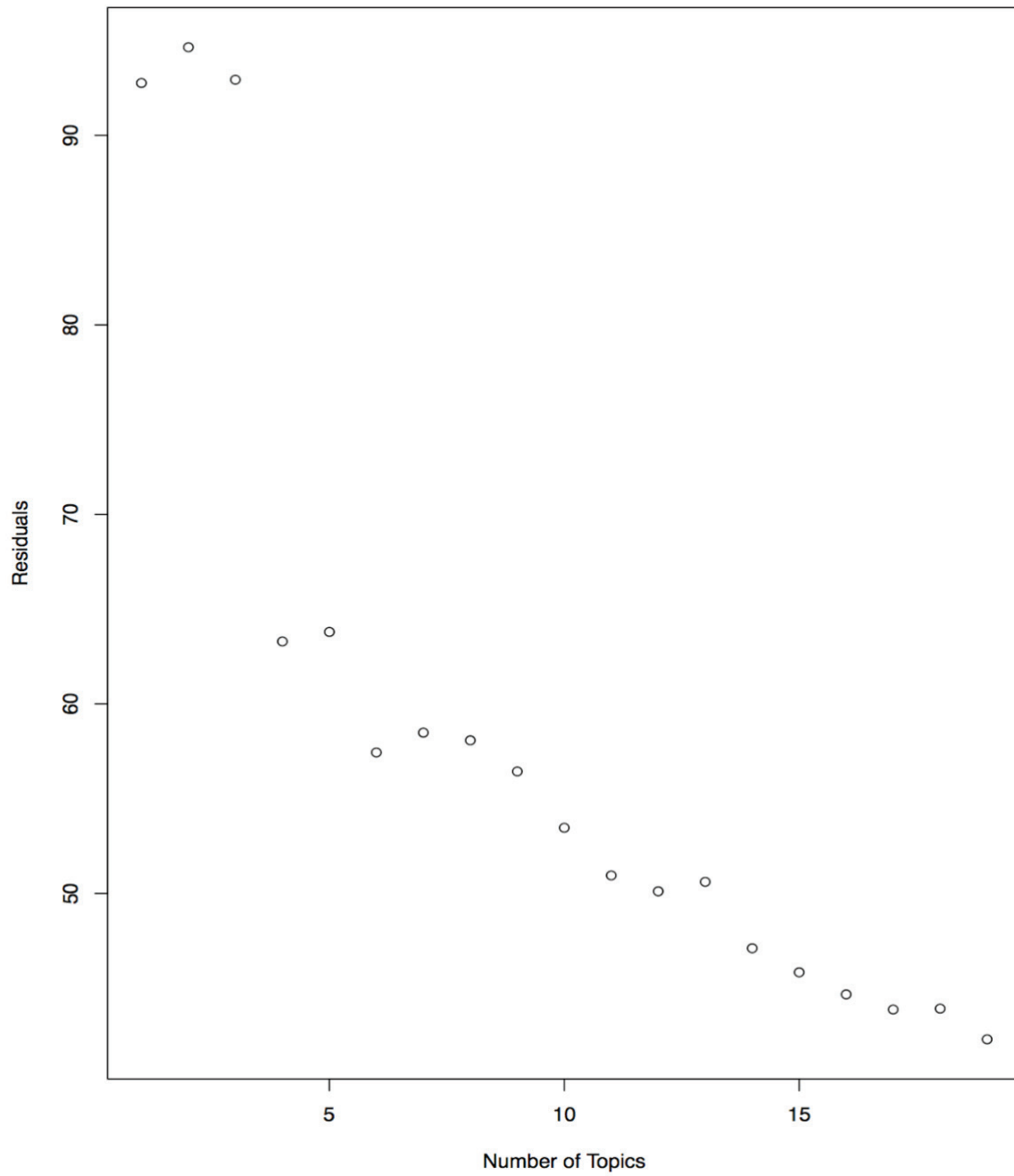
topics: 2 to 20 topics.

Figure 8. Residuals diagnostic index of structural topic models with varying numbers of
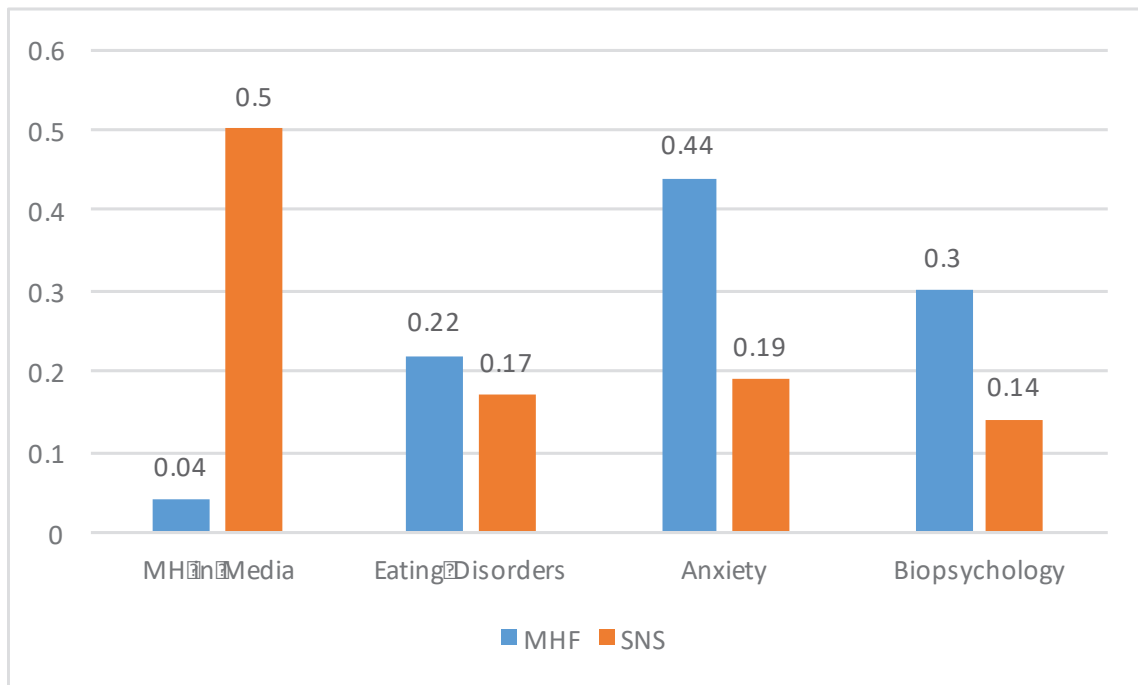
topics: 2 to 20 topics.

Figure 9. Group differences of expected topic proportions of SNS and MHF.

Abstract for *Dissertation Abstracts International*

Mental health researchers have demonstrated the negative impact of mental health

stigma. The public's definition of mental illness has broadened to include more

diagnostic labels and less severe conditions (Phelan, Link, Stueve, & Pescosolido, 2000).

Therefore, this researcher explored observed in-group/out-group stigma related to mental

illness using structural topic modeling (STM; Roberts, Stewart, & Tingley, 2014) through

web scraped data from a social network site (SNS) and mental health forums (MHF).

Web scraping included posts on both SNS and MHF that were related to mental health.

Text data was analyzed using STM and the stm package in R, which allowed for the

inclusion of the in-group/out-group covariate in determining latent themes present in

social media and discussion forum posts related to mental health. Results indicated a four

topic model was the best fit. The Eating Disorders topic accounted for 18.5%, the

Anxiety topic 30.5%, the Mental Health in Media topic 30.1%, and the Biopsychology

topic 20.8% of all posts. As hypothesized, a z-test of group proportion demonstrated all

topics had statistically significant group differences. Mental Health in Media is the only

topic to demonstrate greater prevalence in SNS (50%) than MHF (4%). Additionally,

contrary to expectations three of four topics contained stigmatizing language reflecting

public stigma, only the Biopsychology topic contained neither stigmatizing nor thriving

language. The prevalence of posts related to anxiety and eating disorders may be related

to the pre-existing self-stigma and the assurance of anonymity provided by MHF.

Keywords: stigma, stereotypes, mental illness, depression, anxiety, schizophrenia,

bipolar, substance use, alcohol use, autism spectrum, eating disorders, topic modeling,

web scraping, discussion forums, social media

Appendix A

Human Subjects Review Committee Approval Letter

FULLER
THEOLOGICAL SEMINARY
SCHOOL OF PSYCHOLOGY

DATE:	April 10, 2017
TO:	Bess Martin, MA
FROM:	Fuller Graduate School of Psychology HSRC
PROJECT TITLE:	[1009215-1] Observed stigma: Latent topic differences among the general public and a mental health population
SUBMISSION TYPE:	New Project
REFERENCE #:	a3/17.108
ACTION:	EXEMPT
APPROVAL DATE:	April 10, 2017
EXPIRATION DATE:	April 10, 2020
REVIEW TYPE:	Exempt Review *(Category #2)*

The above-referenced study was reviewed and determined to be exempt from HSRC review and approval in accordance with the Federal Regulations 45 CFR Part 46.101(b), under.

Exempt Category 2: Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: (i) information obtained is recorded in such manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

This notice of exemption is valid for three years and will expire on **April 10, 2020**.

Should you anticipate renewing this study, it is your responsibility to ensure that a continuing review is submitted to the HSRC in a timely manner. Please submit all continuing review materials **30-60 days prior to the expiration date**. If the study is completed prior to the expiration date, a Final Report must be submitted to the HSRC.

Please be reminded of the following:

1. Investigators are responsible for ensuring that this study conforms to the principles of sound research ethics, and that this study is conducted in compliance with applicable laws and regulations, including the HIPAA privacy rule, state law, and institutional policy.
2. Significant changes must be approved by the HSRC prior to implementation. Consult the Guidance for Exempt Studies for a list of significant changes.
3. In the event of any unanticipated problems involving risks to subjects or others, serious and unexpected adverse events, non-compliance issues, or complaints regarding this study must be reported promptly and in writing to the HSRC.
4. Accurate and detailed research records, including informed consent documents, must be maintained for a minimum of three years after the completion of the research.
5. The Fuller Theological Seminary Federal Wide Assurance number is FWA 00007283.

Please maintain a copy of this letter for your records.

Appendix B

List of Appropriate Journals for Submission

1. *American Journal of Epidemiology*

2. *The American Psychologist*

3. *American Sociological Review*

4. *Journal of Community Psychology*

5. *Journal of Health and Social Behavior*

6. *Social Psychiatry and Psychiatric Epidemiology*

Appendix C

List of Appropriate Conference for Submission

1. *American Psychological Association Convention, Washington, DC, August 2017.*

Letter of Submission

Individual Presentation Proposal
2017 APA Annual Convention

1. Preferred mode of presentation:	Paper Session
2. Title of presentation:	Observed stigma: Latent topic differences among the general public and a mental health population
First index term	73.9 social cognition
3. Division to submit this proposal:	09 - SPSSI
4. Principal author:	Bess J Martin, MA
Mailing address:	1099 E Orange Grove Blvd, Apt 4, Pasadena, CA 91104
E-mail address:	bessmartin@fuller.edu
Institution/Company:	Fuller Theological Seminary, Pasadena, CA
Membership status:	APA Member
Name of sponsor:	
PsiChi member:	
5. Coauthors:	None
6. Accommodation request:	Please do not schedule my presentation on Saturday for religious reasons.
7. Electronic archiving:	Yes

Received: *12/1/2016 3:33:04 PM*

Observed stigma: Latent topic differences among the general public and a mental health population

(Abstract attached separately)

Received: *12/1/2016 3:33:04 PM*

Appendix D

Websites Used in Data Scraping

1. www.twitter.com

2. www.depression-understood.org

3. www.mentalhealthforum.net

4. www.anxietyforum.net

5. www.psychforums.com

6. www.drugabuse.com

7. www.medhelp.org

8. www.drugs-forum.com

9. www.myproana.com

10. www.whyeat.net

Appendix E

SNS Scraping R Code

```
install.packages("twitteR")
install.packages("ROAuth")
install.packages("httr")
install.packages("xlsx")
library(twitteR)
library(ROAuth)
library(httr)
library(xlsx)

api_key <- "BgVvL3nV6P17QHCIs6v8lZzj9"
api_secret <-"4dbG5oROboBsHOzOqi14oBoUZ2Gg6wq3gPOqNY7hGgdBODmblw"
access_token <- "4218727995-Sld3Pm7agfCUETJSH9BfAygww8CJlKd7WMO35C3"
access_token_secret <- "1xz3ISOfjj0tiFGm8wnR6y7ihU4hYZZcU2C6iUDVyTLIf"
setup_twitter_oauth(api_key, api_secret, access_token, access_token_secret)

#4/10/17
tweets_mh<- searchTwitteR("mental health", n=15000, lang="en")
tweets_mh.4.10<-twListToDF(tweets_mh)
tweets_dep<- searchTwitteR("depression", n=15000, lang="en")
tweets_dep.4.10<-twListToDF(tweets_dep)
tweets_anx<- searchTwitteR("anxiety", n=15000, lang="en")
tweets_anx.4.10<-twListToDF(tweets_anx)
tweets_schiz<- searchTwitteR("schizophrenia", n=15000, lang="en")
tweets_schiz.4.10<-twListToDF(tweets_schiz)
tweets_subs<- searchTwitteR("substance use", n=15000, lang="en")
tweets_subs.4.10<-twListToDF(tweets_subs)
tweets_drug<- searchTwitteR("drug use", n=15000, lang="en")
tweets_drug.4.10<-twListToDF(tweets_drug)
tweets_etoh<- searchTwitteR("alcohol use", n=15000, lang="en")
tweets_etoh.4.10<-twListToDF(tweets_etoh)
tweets_bipolar<- searchTwitteR("bipolar", n=15000, lang="en")
tweets_bipolar.4.10<-twListToDF(tweets_bipolar)
tweets_eat<- searchTwitteR("eating disorder", n=15000, lang="en")
tweets_eat.4.10 <- twListToDF(tweets_eat)
tweets_aut<- searchTwitteR("autism", n=15000, lang="en")
tweets_aut.4.10 <- twListToDF(tweets_aut)

#export to excel
write.xlsx(tweets_anx.4.10, "/Users/bessmartin/Documents/anx410.xlsx")
write.xlsx(tweets_aut.4.10, "/Users/bessmartin/Documents/aut410.xlsx")
write.xlsx(tweets_bipolar.4.10, "/Users/bessmartin/Documents/bipolar410.xlsx")
write.xlsx(tweets_dep.4.10, "/Users/bessmartin/Documents/dep410.xlsx")
```

```
write.xlsx(tweets_drug.4.10, "/Users/bessmartin/Documents/drug410.xlsx")
write.xlsx(tweets_eat.4.10, "/Users/bessmartin/Documents/eat410.xlsx")
write.xlsx(tweets_etoh.4.10, "/Users/bessmartin/Documents/etoh410.xlsx")
write.xlsx(tweets_mh.4.10, "/Users/bessmartin/Documents/mh410.xlsx")
write.xlsx(tweets_schiz.4.10, "/Users/bessmartin/Documents/schiz410.xlsx")
write.xlsx(tweets_subs.4.10, "/Users/bessmartin/Documents/subs410.xlsx")

#4/11/17
tweets_anx<- searchTwitteR("anxiety", n=15000, lang="en")
tweets_anx.4.11<-twListToDF(tweets_anx)
tweets_dep<- searchTwitteR("depression", n=15000, lang="en")
tweets_dep.4.12<-twListToDF(tweets_dep)
tweets_aut<- searchTwitteR("autism", n=15000, lang="en")
tweets_aut.4.12<-twListToDF(tweets_aut)
tweets_mh<- searchTwitteR("mental health", n=15000, lang="en")
tweets_mh.4.12<-twListToDF(tweets_mh)
write.xlsx(tweets_anx.4.11, "/Users/bessmartin/Documents/anx411.xlsx")
write.xlsx(tweets_aut.4.12, "/Users/bessmartin/Documents/aut412.xlsx")
write.xlsx(tweets_dep.4.12, "/Users/bessmartin/Documents/dep412.xlsx")
write.xlsx(tweets_mh.4.12, "/Users/bessmartin/Documents/mh412.xlsx")

#4/14/17
tweets_anx<- searchTwitteR("anxiety", n=15000, lang="en")
tweets_anx.4.12<-twListToDF(tweets_anx)
tweets_aut<- searchTwitteR("autism", n=15000, lang="en")
tweets_aut.4.14<-twListToDF(tweets_aut)
tweets_bipolar<- searchTwitteR("bipolar", n=15000, lang="en")
tweets_bipolar.4.14<-twListToDF(tweets_bipolar)
tweets_dep<- searchTwitteR("depression", n=15000, lang="en")
tweets_dep.4.14<-twListToDF(tweets_dep)
tweets_mh<- searchTwitteR("mental health", n=15000, lang="en")
tweets_mh.4.14<-twListToDF(tweets_mh)
write.xlsx(tweets_anx.4.12, "/Users/bessmartin/Documents/anx412.xlsx")
write.xlsx(tweets_aut.4.14, "/Users/bessmartin/Documents/aut414.xlsx")
write.xlsx(tweets_bipolar.4.14, "/Users/bessmartin/Documents/bipolar414.xlsx")
write.xlsx(tweets_dep.4.14, "/Users/bessmartin/Documents/dep414.xlsx")
write.xlsx(tweets_mh.4.14, "/Users/bessmartin/Documents/mh414.xlsx")

#4/16/17
tweets_anx<- searchTwitteR("anxiety", n=15000, lang="en")
tweets_anx.4.16<-twListToDF(tweets_anx)
tweets_aut<- searchTwitteR("autism", n=15000, lang="en")
tweets_aut.4.16<-twListToDF(tweets_aut)
tweets_dep<- searchTwitteR("depression", n=15000, lang="en")
tweets_dep.4.16<-twListToDF(tweets_dep)
tweets_mh<- searchTwitteR("mental health", n=15000, lang="en")
```

```
tweets_mh.4.16<-twListToDF(tweets_mh)
write.xlsx(tweets_anx.4.16, "/Users/bessmartin/Documents/anx416.xlsx")
write.xlsx(tweets_aut.4.16, "/Users/bessmartin/Documents/aut416.xlsx")
write.xlsx(tweets_dep.4.16, "/Users/bessmartin/Documents/dep416.xlsx")
write.xlsx(tweets_mh.4.16, "/Users/bessmartin/Documents/mh416.xlsx")


#4/17/17
tweets_anx<- searchTwitteR("anxiety", n=15000, lang="en")
tweets_anx.4.17<-twListToDF(tweets_anx)
write.xlsx(tweets_anx.4.17, "/Users/bessmartin/Documents/anx417.xlsx")
tweets_anxi<- searchTwitteR("anxious", n=15000, lang="en")
tweets_anxi.4.17<-twListToDF(tweets_anxi)
write.xlsx(tweets_anxi.4.17, "/Users/bessmartin/Documents/anxi417.xlsx")
tweets_aut<- searchTwitteR("autism", n=15000, lang="en")
tweets_aut.4.17<-twListToDF(tweets_aut)
write.xlsx(tweets_aut.4.17, "/Users/bessmartin/Documents/aut417.xlsx")
tweets_auti<- searchTwitteR("autistic", n=15000, lang="en")
tweets_auti.4.17<-twListToDF(tweets_auti)
write.xlsx(tweets_auti.4.17, "/Users/bessmartin/Documents/auti417.xlsx")
tweets_bipolar<- searchTwitteR("bipolar", n=15000, lang="en")
tweets_bipolar.4.17<-twListToDF(tweets_bipolar)
write.xlsx(tweets_bipolar.4.17, "/Users/bessmartin/Documents/bipolar417.xlsx")
tweets_dep<- searchTwitteR("depression", n=15000, lang="en")
tweets_dep.4.17<-twListToDF(tweets_dep)
write.xlsx(tweets_dep.4.17, "/Users/bessmartin/Documents/dep417.xlsx")
tweets_depd<- searchTwitteR("depressed", n=15000, lang="en")
tweets_depd.4.17<-twListToDF(tweets_depd)
write.xlsx(tweets_depd.4.17, "/Users/bessmartin/Documents/depd417.xlsx")
tweets_mh<- searchTwitteR("mental health", n=15000, lang="en")
tweets_mh.4.17<-twListToDF(tweets_mh)
write.xlsx(tweets_mh.4.17, "/Users/bessmartin/Documents/mh417.xlsx")
tweets_manic<- searchTwitteR("manic", n=15000, lang="en")
tweets_manic.4.17<-twListToDF(tweets_manic)
write.xlsx(tweets_manic.4.17, "/Users/bessmartin/Documents/manic417.xlsx")
tweets_add<- searchTwitteR("addiction", n=15000, lang="en")
tweets_add.4.17<-twListToDF(tweets_add)
write.xlsx(tweets_add.4.17, "/Users/bessmartin/Documents/add417.xlsx")
tweets_addc<- searchTwitteR("addict", n=15000, lang="en")
tweets_addc.4.17<-twListToDF(tweets_addc)
write.xlsx(tweets_addc.4.17, "/Users/bessmartin/Documents/addc417.xlsx")
tweets_etohc<- searchTwitteR("alcoholic", n=15000, lang="en")
tweets_etohc.4.17<-twListToDF(tweets_etohc)
write.xlsx(tweets_etohc.4.17, "/Users/bessmartin/Documents/etohc417.xlsx")
tweets_etohsm<- searchTwitteR("alcoholism", n=15000, lang="en")
tweets_etohsm.4.17<-twListToDF(tweets_etohsm)
write.xlsx(tweets_etohsm.4.17, "/Users/bessmartin/Documents/etohsm417.xlsx")
```

```
tweets_anor<- searchTwitteR("anorexia", n=15000, lang="en")
tweets_anor.4.17<-twListToDF(tweets_anor)
write.xlsx(tweets_anor.4.17, "/Users/bessmartin/Documents/anor417.xlsx")
tweets_bul<- searchTwitteR("bulimia", n=15000, lang="en")
tweets_bul.4.17<-twListToDF(tweets_bul)
write.xlsx(tweets_bul.4.17, "/Users/bessmartin/Documents/bul417.xlsx")
tweets_proa<- searchTwitteR("proana", n=15000, lang="en")
tweets_proa.4.17<-twListToDF(tweets_proa)
write.xlsx(tweets_proa.4.17, "/Users/bessmartin/Documents/proa417.xlsx")
tweets_binge<- searchTwitteR("binge", n=15000, lang="en")
tweets_binge.4.17<-twListToDF(tweets_binge)
write.xlsx(tweets_binge.4.17, "/Users/bessmartin/Documents/binge417.xlsx")
tweets_schizc<- searchTwitteR("schizophrenic", n=15000, lang="en")
tweets_schizc.4.17<-twListToDF(tweets_schizc)
write.xlsx(tweets_schizc.4.17, "/Users/bessmartin/Documents/schizc417.xlsx")
tweets_mi<- searchTwitteR("mental illness", n=15000, lang="en")
tweets_mi.4.17<-twListToDF(tweets_mi)
write.xlsx(tweets_mi.4.17, "/Users/bessmartin/Documents/mi417.xlsx")
tweets_myi<- searchTwitteR("mentally ill", n=15000, lang="en")
tweets_myi.4.17<-twListToDF(tweets_myi)
write.xlsx(tweets_myi.4.17, "/Users/bessmartin/Documents/myi417.xlsx")


4/18
tweets_add<- searchTwitteR("addiction", n=15000, lang="en")
tweets_add.4.18<-twListToDF(tweets_add)
write.xlsx(tweets_add.4.18, "/Users/bessmartin/Documents/add418.xlsx")
tweets_anx<- searchTwitteR("anxiety", n=15000, lang="en")
tweets_anx.4.18<-twListToDF(tweets_anx)
write.xlsx(tweets_anx.4.18, "/Users/bessmartin/Documents/anx418.xlsx")
tweets_anxi<- searchTwitteR("anxious", n=15000, lang="en")
tweets_anxi.4.18<-twListToDF(tweets_anxi)
write.xlsx(tweets_anxi.4.18, "/Users/bessmartin/Documents/anxi418.xlsx")
tweets_dep<- searchTwitteR("depression", n=15000, lang="en")
tweets_dep.4.18<-twListToDF(tweets_dep)
write.xlsx(tweets_dep.4.18, "/Users/bessmartin/Documents/dep418.xlsx")
tweets_depd<- searchTwitteR("depressed", n=15000, lang="en")
tweets_depd.4.18<-twListToDF(tweets_depd)
write.xlsx(tweets_depd.4.18, "/Users/bessmartin/Documents/depd418.xlsx")
tweets_mh<- searchTwitteR("mental health", n=15000, lang="en")
tweets_mh.4.18<-twListToDF(tweets_mh)
write.xlsx(tweets_mh.4.18, "/Users/bessmartin/Documents/mh418.xlsx")
tweets_mi<- searchTwitteR("mental illness", n=15000, lang="en")
tweets_mi.4.18<-twListToDF(tweets_mi)
write.xlsx(tweets_mi.4.18, "/Users/bessmartin/Documents/mi418.xlsx")
tweets_myi<- searchTwitteR("mentally ill", n=15000, lang="en")
tweets_myi.4.18<-twListToDF(tweets_myi)
```

```
write.xlsx(tweets_myi.4.18, "/Users/bessmartin/Documents/myi418.xlsx")

4/19
tweets_addc<- searchTwitteR("addict", n=15000, lang="en")
tweets_addc.4.19<-twListToDF(tweets_addc)
write.xlsx(tweets_addc.4.19, "/Users/bessmartin/Documents/addc419.xlsx")
tweets_anx<- searchTwitteR("anxiety", n=15000, lang="en")
tweets_anx.4.19<-twListToDF(tweets_anx)
write.xlsx(tweets_anx.4.19, "/Users/bessmartin/Documents/anx419.xlsx")
tweets_aut<- searchTwitteR("autism", n=15000, lang="en")
tweets_aut.4.19<-twListToDF(tweets_aut)
write.xlsx(tweets_aut.4.19, "/Users/bessmartin/Documents/aut419.xlsx")
tweets_binge<- searchTwitteR("binge", n=15000, lang="en")
tweets_binge.4.19<-twListToDF(tweets_binge)
write.xlsx(tweets_binge.4.19, "/Users/bessmartin/Documents/binge419.xlsx")
tweets_dep<- searchTwitteR("depression", n=15000, lang="en")
tweets_dep.4.19<-twListToDF(tweets_dep)
write.xlsx(tweets_dep.4.19, "/Users/bessmartin/Documents/dep419.xlsx")
tweets_depd<- searchTwitteR("depressed", n=15000, lang="en")
tweets_depd.4.19<-twListToDF(tweets_depd)
write.xlsx(tweets_depd.4.19, "/Users/bessmartin/Documents/depd419.xlsx")
tweets_eat<- searchTwitteR("eating disorder", n=15000, lang="en")
tweets_eat.4.19<-twListToDF(tweets_eat)
write.xlsx(tweets_eat.4.19, "/Users/bessmartin/Documents/eat419.xlsx")
tweets_mh<- searchTwitteR("mental health", n=15000, lang="en")
tweets_mh.4.19<-twListToDF(tweets_mh)
write.xlsx(tweets_mh.4.19, "/Users/bessmartin/Documents/mh419.xlsx")

4/20
tweets_add<- searchTwitteR("addiction", n=15000, lang="en")
tweets_add.4.20<-twListToDF(tweets_add)
write.xlsx(tweets_add.4.20, "/Users/bessmartin/Documents/add420.xlsx")
tweets_anx<- searchTwitteR("anxiety", n=15000, lang="en")
tweets_anx.4.20<-twListToDF(tweets_anx)
write.xlsx(tweets_anx.4.20, "/Users/bessmartin/Documents/anx420.xlsx")
tweets_etoh<- searchTwitteR("alcohol use", n=15000, lang="en")
tweets_etoh.4.20<-twListToDF(tweets_etoh)
write.xlsx(tweets_etoh.4.20, "/Users/bessmartin/Documents/etoh420.xlsx")
tweets_etohsm<- searchTwitteR("alcoholism", n=15000, lang="en")
tweets_etohsm.4.20<-twListToDF(tweets_etohsm)
write.xlsx(tweets_etohsm.4.20, "/Users/bessmartin/Documents/etohsm420.xlsx")
tweets_anxi<- searchTwitteR("anxious", n=15000, lang="en")
tweets_anxi.4.20<-twListToDF(tweets_anxi)
write.xlsx(tweets_anxi.4.20, "/Users/bessmartin/Documents/anxi420.xlsx")
tweets_auti<- searchTwitteR("autistic", n=15000, lang="en")
tweets_auti.4.20<-twListToDF(tweets_auti)
```

```
write.xlsx(tweets_auti.4.20, "/Users/bessmartin/Documents/auti420.xlsx")
tweets_bipolar<- searchTwitteR("bipolar", n=15000, lang="en")
tweets_bipolar.4.20<-twListToDF(tweets_bipolar)
write.xlsx(tweets_bipolar.4.20, "/Users/bessmartin/Documents/bipolar420.xlsx")
tweets_dep<- searchTwitteR("depression", n=15000, lang="en")
tweets_dep.4.20<-twListToDF(tweets_dep)
write.xlsx(tweets_dep.4.20, "/Users/bessmartin/Documents/dep420.xlsx")
tweets_depd<- searchTwitteR("depressed", n=15000, lang="en")
tweets_depd.4.20<-twListToDF(tweets_depd)
write.xlsx(tweets_depd.4.20, "/Users/bessmartin/Documents/depd420.xlsx")
tweets_drug<- searchTwitteR("drug use", n=15000, lang="en")
tweets_drug.4.20<-twListToDF(tweets_drug)
write.xlsx(tweets_drug.4.20, "/Users/bessmartin/Documents/drug420.xlsx")
tweets_mh<- searchTwitteR("mental health", n=15000, lang="en")
tweets_mh.4.20<-twListToDF(tweets_mh)
write.xlsx(tweets_mh.4.20, "/Users/bessmartin/Documents/mh420.xlsx")
tweets_mi<- searchTwitteR("mental illness", n=15000, lang="en")
tweets_mi.4.20<-twListToDF(tweets_mi)
write.xlsx(tweets_mi.4.20, "/Users/bessmartin/Documents/mi420.xlsx")
tweets_myi<- searchTwitteR("mentally ill", n=15000, lang="en")
tweets_myi.4.20<-twListToDF(tweets_myi)
write.xlsx(tweets_myi.4.20, "/Users/bessmartin/Documents/myi420.xlsx")
tweets_schiz<- searchTwitteR("schizophrenia", n=15000, lang="en")
tweets_schiz.4.20<-twListToDF(tweets_schiz)
write.xlsx(tweets_schiz.4.20, "/Users/bessmartin/Documents/schiz420.xlsx")
tweets_subs<- searchTwitteR("substance use", n=15000, lang="en")
tweets_subs.4.20<-twListToDF(tweets_subs)
write.xlsx(tweets_subs.4.20, "/Users/bessmartin/Documents/subs420.xlsx")

4/21
tweets_addc<- searchTwitteR("addict", n=15000, lang="en")
tweets_addc.4.21<-twListToDF(tweets_addc)
write.xlsx(tweets_addc.4.21, "/Users/bessmartin/Documents/addc421.xlsx")
tweets_add<- searchTwitteR("addiction", n=15000, lang="en")
tweets_add.4.21<-twListToDF(tweets_add)
write.xlsx(tweets_add.4.21, "/Users/bessmartin/Documents/add421.xlsx")
tweets_anx<- searchTwitteR("anxiety", n=15000, lang="en")
tweets_anx.4.21<-twListToDF(tweets_anx)
write.xlsx(tweets_anx.4.21, "/Users/bessmartin/Documents/anx420.xlsx")
tweets_anxi<- searchTwitteR("anxious", n=15000, lang="en")
tweets_anxi.4.21<-twListToDF(tweets_anxi)
write.xlsx(tweets_anxi.4.21, "/Users/bessmartin/Documents/anxi421.xlsx")
tweets_auti<- searchTwitteR("autistic", n=15000, lang="en")
tweets_auti.4.21<-twListToDF(tweets_auti)
write.xlsx(tweets_auti.4.21, "/Users/bessmartin/Documents/auti421.xlsx")
tweets_binge<- searchTwitteR("binge", n=15000, lang="en")
```

```
tweets_binge.4.21<-twListToDF(tweets_binge)
write.xlsx(tweets_binge.4.21, "/Users/bessmartin/Documents/binge421.xlsx")
tweets_dep<- searchTwitteR("depression", n=15000, lang="en")
tweets_dep.4.21<-twListToDF(tweets_dep)
write.xlsx(tweets_dep.4.21, "/Users/bessmartin/Documents/dep421.xlsx")
tweets_depd<- searchTwitteR("depressed", n=15000, lang="en")
tweets_depd.4.21<-twListToDF(tweets_depd)
write.xlsx(tweets_depd.4.21, "/Users/bessmartin/Documents/depd421.xlsx")
tweets_mh<- searchTwitteR("mental health", n=15000, lang="en")
tweets_mh.4.21<-twListToDF(tweets_mh)
write.xlsx(tweets_mh.4.21, "/Users/bessmartin/Documents/mh421.xlsx")
tweets_mi<- searchTwitteR("mental illness", n=15000, lang="en")
tweets_mi.4.21<-twListToDF(tweets_mi)
write.xlsx(tweets_mi.4.21, "/Users/bessmartin/Documents/mi421.xlsx")
tweets_aut<- searchTwitteR("autism", n=15000, lang="en")
tweets_aut.4.21<-twListToDF(tweets_aut)
write.xlsx(tweets_aut.4.21, "/Users/bessmartin/Documents/aut421.xlsx")


4/23
tweets_add<- searchTwitteR("addiction", n=15000, lang="en")
tweets_add.4.23<-twListToDF(tweets_add)
write.xlsx(tweets_add.4.23, "/Users/bessmartin/Documents/add423.xlsx")
tweets_addc<- searchTwitteR("addict", n=15000, lang="en")
tweets_addc.4.23<-twListToDF(tweets_addc)
write.xlsx(tweets_addc.4.23, "/Users/bessmartin/Documents/addc423.xlsx")
tweets_etohc<- searchTwitteR("alcoholic", n=15000, lang="en")
tweets_etohc.4.23<-twListToDF(tweets_etohc)
write.xlsx(tweets_etohc.4.23, "/Users/bessmartin/Documents/etohc423.xlsx")
tweets_anx<- searchTwitteR("anxiety", n=15000, lang="en")
tweets_anx.4.23<-twListToDF(tweets_anx)
write.xlsx(tweets_anx.4.23, "/Users/bessmartin/Documents/anx423.xlsx")
#error running additional requests


4/24
tweets_anx<- searchTwitteR("anxiety", n=15000, lang="en")
tweets_anx.4.24<-twListToDF(tweets_anx)
write.xlsx(tweets_anx.4.24, "/Users/bessmartin/Documents/anx424.xlsx")
tweets_anxi<- searchTwitteR("anxious", n=15000, lang="en")
tweets_anxi.4.24<-twListToDF(tweets_anxi)
write.xlsx(tweets_anxi.4.24, "/Users/bessmartin/Documents/anxi424.xlsx")
tweets_auti<- searchTwitteR("autistic", n=15000, lang="en")
tweets_auti.4.24<-twListToDF(tweets_auti)
write.xlsx(tweets_auti.4.24, "/Users/bessmartin/Documents/auti424.xlsx")
tweets_binge<- searchTwitteR("binge", n=15000, lang="en")
tweets_binge.4.24<-twListToDF(tweets_binge)
write.xlsx(tweets_binge.4.24, "/Users/bessmartin/Documents/binge424.xlsx")
```

```
tweets_bipolar<- searchTwitteR("bipolar", n=15000, lang="en")
tweets_bipolar.4.24<-twListToDF(tweets_bipolar)
write.xlsx(tweets_bipolar.4.24, "/Users/bessmartin/Documents/bipolar424.xlsx")
tweets_dep<- searchTwitteR("depression", n=15000, lang="en")
tweets_dep.4.24<-twListToDF(tweets_dep)
write.xlsx(tweets_dep.4.24, "/Users/bessmartin/Documents/dep424.xlsx")
tweets_depd<- searchTwitteR("depressed", n=15000, lang="en")
tweets_depd.4.24<-twListToDF(tweets_depd)
write.xlsx(tweets_depd.4.24, "/Users/bessmartin/Documents/depd424.xlsx")
tweets_mh<- searchTwitteR("mental health", n=15000, lang="en")
tweets_mh.4.24<-twListToDF(tweets_mh)
write.xlsx(tweets_mh.4.24, "/Users/bessmartin/Documents/mh424.xlsx")
tweets_mi<- searchTwitteR("mental illness", n=15000, lang="en")
tweets_mi.4.24<-twListToDF(tweets_mi)
write.xlsx(tweets_mi.4.24, "/Users/bessmartin/Documents/mi424.xlsx")
tweets_myi<- searchTwitteR("mentally ill", n=15000, lang="en")
tweets_myi.4.24<-twListToDF(tweets_myi)
write.xlsx(tweets_myi.4.24, "/Users/bessmartin/Documents/myi424.xlsx")
tweets_add<- searchTwitteR("addiction", n=15000, lang="en")
tweets_add.4.24<-twListToDF(tweets_add)
write.xlsx(tweets_add.4.24, "/Users/bessmartin/Documents/add424.xlsx")
tweets_addc<- searchTwitteR("addict", n=15000, lang="en")
tweets_addc.4.24<-twListToDF(tweets_addc)
write.xlsx(tweets_addc.4.24, "/Users/bessmartin/Documents/addc424.xlsx")
tweets_aut<- searchTwitteR("autism", n=15000, lang="en")
tweets_aut.4.24<-twListToDF(tweets_aut)
write.xlsx(tweets_aut.4.24, "/Users/bessmartin/Documents/aut424.xlsx")

4/25
tweets_addc<- searchTwitteR("addict", n=15000, lang="en")
tweets_addc.4.25<-twListToDF(tweets_addc)
write.xlsx(tweets_addc.4.25, "/Users/bessmartin/Documents/addc425.xlsx")
tweets_add<- searchTwitteR("addiction", n=15000, lang="en")
tweets_add.4.25<-twListToDF(tweets_add)
write.xlsx(tweets_add.4.25, "/Users/bessmartin/Documents/add425.xlsx")
tweets_anx<- searchTwitteR("anxiety", n=15000, lang="en")
tweets_anx.4.25<-twListToDF(tweets_anx)
write.xlsx(tweets_anx.4.25, "/Users/bessmartin/Documents/anx425.xlsx")
tweets_anxi<- searchTwitteR("anxious", n=15000, lang="en")
tweets_anxi.4.25<-twListToDF(tweets_anxi)
write.xlsx(tweets_anxi.4.25, "/Users/bessmartin/Documents/anxi425.xlsx")
tweets_aut<- searchTwitteR("autism", n=15000, lang="en")
tweets_aut.4.25<-twListToDF(tweets_aut)
write.xlsx(tweets_aut.4.25, "/Users/bessmartin/Documents/aut425.xlsx")
tweets_binge<- searchTwitteR("binge", n=15000, lang="en")
tweets_binge.4.25<-twListToDF(tweets_binge)
```

```
write.xlsx(tweets_binge.4.25, "/Users/bessmartin/Documents/binge425.xlsx")
tweets_dep<- searchTwitteR("depression", n=15000, lang="en")
tweets_dep.4.25<-twListToDF(tweets_dep)
write.xlsx(tweets_dep.4.25, "/Users/bessmartin/Documents/dep425.xlsx")
tweets_depd<- searchTwitteR("depressed", n=15000, lang="en")
tweets_depd.4.25<-twListToDF(tweets_depd)
write.xlsx(tweets_depd.4.25, "/Users/bessmartin/Documents/depd425.xlsx")
tweets_mh<- searchTwitteR("mental health", n=15000, lang="en")
tweets_mh.4.25<-twListToDF(tweets_mh)
write.xlsx(tweets_mh.4.25, "/Users/bessmartin/Documents/mh425.xlsx")
tweets_mi<- searchTwitteR("mental illness", n=15000, lang="en")
tweets_mi.4.25<-twListToDF(tweets_mi)
write.xlsx(tweets_mi.4.25, "/Users/bessmartin/Documents/mi425.xlsx")

4/26
tweets_add<- searchTwitteR("addiction", n=15000, lang="en")
tweets_add.4.26<-twListToDF(tweets_add)
write.xlsx(tweets_add.4.26, "/Users/bessmartin/Documents/add426.xlsx")
tweets_anx<- searchTwitteR("anxiety", n=15000, lang="en")
tweets_anx.4.26<-twListToDF(tweets_anx)
write.xlsx(tweets_anx.4.26, "/Users/bessmartin/Documents/anx426.xlsx")
tweets_aut<- searchTwitteR("autism", n=15000, lang="en")
tweets_aut.4.26<-twListToDF(tweets_aut)
write.xlsx(tweets_aut.4.26, "/Users/bessmartin/Documents/aut426.xlsx")
tweets_auti<- searchTwitteR("autistic", n=15000, lang="en")
tweets_auti.4.26<-twListToDF(tweets_auti)
write.xlsx(tweets_auti.4.26, "/Users/bessmartin/Documents/auti426.xlsx")
tweets_dep<- searchTwitteR("depression", n=15000, lang="en")
tweets_dep.4.26<-twListToDF(tweets_dep)
write.xlsx(tweets_dep.4.26, "/Users/bessmartin/Documents/dep426.xlsx")
tweets_depd<- searchTwitteR("depressed", n=15000, lang="en")
tweets_depd.4.26<-twListToDF(tweets_depd)
write.xlsx(tweets_depd.4.26, "/Users/bessmartin/Documents/depd426.xlsx")
tweets_mh<- searchTwitteR("mental health", n=15000, lang="en")
tweets_mh.4.26<-twListToDF(tweets_mh)
write.xlsx(tweets_mh.4.26, "/Users/bessmartin/Documents/mh426.xlsx")
tweets_mi<- searchTwitteR("mental illness", n=15000, lang="en")
tweets_mi.4.26<-twListToDF(tweets_mi)
write.xlsx(tweets_mi.4.26, "/Users/bessmartin/Documents/mi426.xlsx")
tweets_myi<- searchTwitteR("mentally ill", n=15000, lang="en")
tweets_myi.4.26<-twListToDF(tweets_myi)
write.xlsx(tweets_myi.4.26, "/Users/bessmartin/Documents/myi426.xlsx")

4/27
tweets_add<- searchTwitteR("addiction", n=15000, lang="en")
tweets_add.4.27<-twListToDF(tweets_add)
```

```
write.xlsx(tweets_add.4.27, "/Users/bessmartin/Documents/add427.xlsx")
tweets_addc<- searchTwitteR("addict", n=15000, lang="en")
tweets_addc.4.27<-twListToDF(tweets_addc)
write.xlsx(tweets_addc.4.27, "/Users/bessmartin/Documents/addc427.xlsx")
tweets_anx<- searchTwitteR("anxiety", n=15000, lang="en")
tweets_anx.4.27<-twListToDF(tweets_anx)
write.xlsx(tweets_anx.4.27, "/Users/bessmartin/Documents/anx427.xlsx")
tweets_anxi<- searchTwitteR("anxious", n=15000, lang="en")
tweets_anxi.4.27<-twListToDF(tweets_anxi)
write.xlsx(tweets_anxi.4.27, "/Users/bessmartin/Documents/anxi427.xlsx")
tweets_aut<- searchTwitteR("autism", n=15000, lang="en")
tweets_aut.4.27<-twListToDF(tweets_aut)
write.xlsx(tweets_aut.4.27, "/Users/bessmartin/Documents/aut427.xlsx")
tweets_anor<- searchTwitteR("anorexia", n=15000, lang="en")
tweets_anor.4.27<-twListToDF(tweets_anor)
write.xlsx(tweets_anor.4.27, "/Users/bessmartin/Documents/anor427.xlsx")
tweets_binge<- searchTwitteR("binge", n=15000, lang="en")
tweets_binge.4.27<-twListToDF(tweets_binge)
write.xlsx(tweets_binge.4.27, "/Users/bessmartin/Documents/binge427.xlsx")
tweets_bipolar<- searchTwitteR("bipolar", n=15000, lang="en")
tweets_bipolar.4.27<-twListToDF(tweets_bipolar)
write.xlsx(tweets_bipolar.4.27, "/Users/bessmartin/Documents/bipolar427.xlsx")
tweets_dep<- searchTwitteR("depression", n=15000, lang="en")
tweets_dep.4.27<-twListToDF(tweets_dep)
write.xlsx(tweets_dep.4.27, "/Users/bessmartin/Documents/dep427.xlsx")
tweets_depd<- searchTwitteR("depressed", n=15000, lang="en")
tweets_depd.4.27<-twListToDF(tweets_depd)
write.xlsx(tweets_depd.4.27, "/Users/bessmartin/Documents/depd427.xlsx")
tweets_manic<- searchTwitteR("manic", n=15000, lang="en")
tweets_manic.4.27<-twListToDF(tweets_manic)
write.xlsx(tweets_manic.4.27, "/Users/bessmartin/Documents/manic427.xlsx")
tweets_mh<- searchTwitteR("mental health", n=15000, lang="en")
tweets_mh.4.27<-twListToDF(tweets_mh)
write.xlsx(tweets_mh.4.27, "/Users/bessmartin/Documents/mh427.xlsx")

4/28
tweets_add<- searchTwitteR("addiction", n=15000, lang="en")
tweets_add.4.28<-twListToDF(tweets_add)
write.xlsx(tweets_add.4.28, "/Users/bessmartin/Documents/add428.xlsx")
tweets_etohc<- searchTwitteR("alcoholic", n=15000, lang="en")
tweets_etohc.4.28<-twListToDF(tweets_etohc)
write.xlsx(tweets_etohc.4.28, "/Users/bessmartin/Documents/etohc428.xlsx")
tweets_anorc<- searchTwitteR("anorexic", n=15000, lang="en")
tweets_anorc.4.28<-twListToDF(tweets_anorc)
write.xlsx(tweets_anorc.4.28, "/Users/bessmartin/Documents/anorc428.xlsx")
tweets_anx<- searchTwitteR("anxiety", n=15000, lang="en")
```

```
tweets_anx.4.28<-twListToDF(tweets_anx)
write.xlsx(tweets_anx.4.28, "/Users/bessmartin/Documents/anx428.xlsx")
tweets_anxi<- searchTwitteR("anxious", n=15000, lang="en")
tweets_anxi.4.28<-twListToDF(tweets_anxi)
write.xlsx(tweets_anxi.4.28, "/Users/bessmartin/Documents/anxi428.xlsx")
tweets_aut<- searchTwitteR("autism", n=15000, lang="en")
tweets_aut.4.28<-twListToDF(tweets_aut)
write.xlsx(tweets_aut.4.28, "/Users/bessmartin/Documents/aut428.xlsx")
tweets_auti<- searchTwitteR("autistic", n=15000, lang="en")
tweets_auti.4.28<-twListToDF(tweets_auti)
write.xlsx(tweets_auti.4.28, "/Users/bessmartin/Documents/auti428.xlsx")
tweets_bul<- searchTwitteR("bulimia", n=15000, lang="en")
tweets_bul.4.28<-twListToDF(tweets_bul)
write.xlsx(tweets_bul.4.28, "/Users/bessmartin/Documents/bul428.xlsx")
tweets_dep<- searchTwitteR("depression", n=15000, lang="en")
tweets_dep.4.28<-twListToDF(tweets_dep)
write.xlsx(tweets_dep.4.28, "/Users/bessmartin/Documents/dep428.xlsx")
tweets_depd<- searchTwitteR("depressed", n=15000, lang="en")
tweets_depd.4.28<-twListToDF(tweets_depd)
write.xlsx(tweets_depd.4.28, "/Users/bessmartin/Documents/depd428.xlsx")
tweets_mh<- searchTwitteR("mental health", n=15000, lang="en")
tweets_mh.4.28<-twListToDF(tweets_mh)
write.xlsx(tweets_mh.4.28, "/Users/bessmartin/Documents/mh428.xlsx")
tweets_mi<- searchTwitteR("mental illness", n=15000, lang="en")
tweets_mi.4.28<-twListToDF(tweets_mi)
write.xlsx(tweets_mi.4.28, "/Users/bessmartin/Documents/mi428.xlsx")
tweets_myi<- searchTwitteR("mentally ill", n=15000, lang="en")
tweets_myi.4.28<-twListToDF(tweets_myi)
write.xlsx(tweets_myi.4.28, "/Users/bessmartin/Documents/myi428.xlsx")
tweets_proa<- searchTwitteR("proana", n=15000, lang="en")
tweets_proa.4.28<-twListToDF(tweets_proa)
write.xlsx(tweets_proa.4.28, "/Users/bessmartin/Documents/proa428.xlsx")
tweets_schizc<- searchTwitteR("schizophrenic", n=15000, lang="en")
tweets_schizc.4.28<-twListToDF(tweets_schizc)
write.xlsx(tweets_schizc.4.28, "/Users/bessmartin/Documents/schizc428.xlsx")

4/30
tweets_add<- searchTwitteR("addiction", n=15000, lang="en")
tweets_add.4.30<-twListToDF(tweets_add)
write.xlsx(tweets_add.4.30, "/Users/bessmartin/Documents/add430.xlsx")
tweets_addc<- searchTwitteR("addict", n=15000, lang="en")
tweets_addc.4.30<-twListToDF(tweets_addc)
write.xlsx(tweets_addc.4.30, "/Users/bessmartin/Documents/addc430.xlsx")
tweets_etoh<- searchTwitteR("alcohol use", n=15000, lang="en")
tweets_etoh.4.30<-twListToDF(tweets_etoh)
write.xlsx(tweets_etoh.4.30, "/Users/bessmartin/Documents/etoh430.xlsx")
```

```
tweets_etohsm<- searchTwitteR("alcoholism", n=15000, lang="en")
tweets_etohsm.4.30<-twListToDF(tweets_etohsm)
write.xlsx(tweets_etohsm.4.30, "/Users/bessmartin/Documents/etohsm430.xlsx")
tweets_anx<- searchTwitteR("anxiety", n=15000, lang="en")
tweets_anx.4.30<-twListToDF(tweets_anx)
write.xlsx(tweets_anx.4.30, "/Users/bessmartin/Documents/anx430.xlsx")
tweets_anxi<- searchTwitteR("anxious", n=15000, lang="en")
tweets_anxi.4.30<-twListToDF(tweets_anxi)
write.xlsx(tweets_anxi.4.30, "/Users/bessmartin/Documents/anxi430.xlsx")
tweets_aut<- searchTwitteR("autism", n=15000, lang="en")
tweets_aut.4.30<-twListToDF(tweets_aut)
write.xlsx(tweets_aut.4.30, "/Users/bessmartin/Documents/aut430.xlsx")
tweets_auti<- searchTwitteR("autistic", n=15000, lang="en")
tweets_auti.4.30<-twListToDF(tweets_auti)
write.xlsx(tweets_auti.4.30, "/Users/bessmartin/Documents/auti430.xlsx")
tweets_binge<- searchTwitteR("binge", n=15000, lang="en")
tweets_binge.4.30<-twListToDF(tweets_binge)
write.xlsx(tweets_binge.4.30, "/Users/bessmartin/Documents/binge430.xlsx")
tweets_bipolar<- searchTwitteR("bipolar", n=15000, lang="en")
tweets_bipolar.4.30<-twListToDF(tweets_bipolar)
write.xlsx(tweets_bipolar.4.30, "/Users/bessmartin/Documents/bipolar430.xlsx")
tweets_bulc<- searchTwitteR("bulimic", n=15000, lang="en")
tweets_bulc.4.30<-twListToDF(tweets_bulc)
write.xlsx(tweets_bulc.4.30, "/Users/bessmartin/Documents/bulc430.xlsx")
tweets_dep<- searchTwitteR("depression", n=15000, lang="en")
tweets_dep.4.30<-twListToDF(tweets_dep)
write.xlsx(tweets_dep.4.30, "/Users/bessmartin/Documents/dep430.xlsx")
tweets_depd<- searchTwitteR("depressed", n=15000, lang="en")
tweets_depd.4.30<-twListToDF(tweets_depd)
write.xlsx(tweets_depd.4.30, "/Users/bessmartin/Documents/depd430.xlsx")
tweets_drug<- searchTwitteR("drug use", n=15000, lang="en")
tweets_drug.4.30<-twListToDF(tweets_drug)
write.xlsx(tweets_drug.4.30, "/Users/bessmartin/Documents/drug430.xlsx")
tweets_eat<- searchTwitteR("eating disorder", n=15000, lang="en")
tweets_eat.4.30<-twListToDF(tweets_eat)
write.xlsx(tweets_eat.4.30, "/Users/bessmartin/Documents/eat430.xlsx")
tweets_mh<- searchTwitteR("mental health", n=15000, lang="en")
tweets_mh.4.30<-twListToDF(tweets_mh)
write.xlsx(tweets_mh.4.30, "/Users/bessmartin/Documents/mh430.xlsx")
tweets_mi<- searchTwitteR("mental illness", n=15000, lang="en")
tweets_mi.4.30<-twListToDF(tweets_mi)
write.xlsx(tweets_mi.4.30, "/Users/bessmartin/Documents/mi430.xlsx")
tweets_myi<- searchTwitteR("mentally ill", n=15000, lang="en")
tweets_myi.4.30<-twListToDF(tweets_myi)
write.xlsx(tweets_myi.4.30, "/Users/bessmartin/Documents/myi430.xlsx")
```

Appendix F

Sample MHF Scrapy Code

```
import scrapy
from scrapy.spider import BaseSpider
from stigma.items import StigmaItem

class StigmaSpider(BaseSpider):
    name = "mh_test"
    allowed_domain = ["mentalhealthforum.net"]
    #start_urls = ["https://www.mentalhealthforum.net/forum/thread164330.html"]
    start_urls = ["https://www.mentalhealthforum.net/forum/forum299.html"]

    #clones the webpage
    def parse(self, response):
        filename = response.url.split("/")[-2] + 'html'
        with open(filename, 'wb') as f:
            f.write(response.body)

    def parse(self, response):
        urls = response.xpath('//h3[@class="threadtitle"]/a/@href').extract()
        for url in urls:
            url = response.urljoin(url)
            yield scrapy.Request(url=url, callback=self.parse_posts)

        #follow pagination link
        next_page_url = response.xpath('//a[@rel="next"]/@href').extract_first()
        if next_page_url:
            next_page_url = response.urljoin(next_page_url)
            yield scrapy.Request(url=next_page_url, callback=self.parse)

    #extract post, author, post_date, and post directly
    def parse_posts(self, response):
        self.log(response.url)
        #response = response.replace(body=response.body.replace('<br />', '\n'))
        for case in response.xpath('//li[@class="postbitlegacy postbitim postcontainer
         old"]'):
            item = StigmaItem()
            item['post_date'] = case.xpath('div/span/span/text()').extract(),
            item['thread'] = case.xpath('div/div/div/h2/text()').extract(),
            item['author'] = case.xpath('div/div/div/div/a/strong/text()').extract(),
            item['post'] = case.xpath('div/div/div/div/div/blockquote/text()').extract()
            yield item

        #follow pagination link
```

```
next_page = response.xpath('//a[@rel="next"]/@href').extract_first()
if next_page is not None:
    next_page = response.urljoin(next_page)
    yield scrapy.Request(url=next_page, callback=self.parse_posts)
```

Appendix G

Analysis R Code

```
install.packages("stm")
install.packages("tm")
install.packages("slam")

#remove missing variables
Stigma <- remove.vars(Sdata, "post_date")
Stigma <- remove.vars(Stigma, "count")
Stigma <- remove.vars(Stigma, "disorder")
Stigma <- na.omit(Stigma)

#create a sample of 10% the original dataset
sample10 <- sample.int(n=nrow(Stigma), size= floor(.1*nrow(Stigma)), replace = F)
st.train10 <- Stigma[sample10, ]
st.test90 <- Stigma[-sample10, ]
library(tm)
st10 <- Corpus(VectorSource(st.train10$post))

#prep corpus
st10 <- tm_map(st10,removeNumbers)
st10 <- tm_map(st10,removePunctuation)
st10 <- tm_map(st10, content_transformer(tolower))
st10 <- tm_map(st10, removeWords, stopwords("english"))
st10 <- tm_map(st10, stripWhitespace)
st10 <- tm_map(st10, stemDocument)

#create dtm
st10.dtm <- DocumentTermMatrix(st10, control = list(wordLengths=c(2,Inf)))

library(slam)
summary(row_sums(st10.dtm))
col_sums(st10.dtm)
st.train10$count <- row_sums(st10.dtm)

#deletes rows when larger than 0
library(ggplot2)
library(dplyr)
st10_meta <- subset(st.train10, count>0)

#prep corpus
st10.out <- readCorpus(st10.dtm, type="slam")
st10.docs <- st10.out$documents
st10.voc <- st10.out$vocab
```

```
#remove sparse terms
st.rem <- plotRemoved(st.docs, lower.thresh = seq(from=1, to=100, by=1))
st10.out4 <- prepDocuments(st.docs, st.voc, meta=st10_meta, lower.thresh=4,
upper.thresh=Inf)
#removed 272241 of 299413(~91%) terms (338563 of 4438087 tokens) due to frequency
#removed 976 documents with no words
#corpus now has 207122 documents, 27172 terms and 4099524 tokens.
#save as stigma7.13b

st10.docs4 <- st10.out4$documents
st10.voc4 <- st10.out4$vocab
st10.meta4 <-st10.out4$meta


#search K
st10K4 <- searchK(st10.docs4, st10.voc4, K=2:20, prevalence =~ group,
data=st10.meta4, init.type="Spectral")
plot(st10K4)
#model selection
st10Select4 <- selectModel(st10.docs4, st10.voc4, K=4, prevalence =~ group,
data=st10.meta4, init.type = "Spectral", runs=10, max.em.its = 500)
plotModels(st10Select4, xlab="Semantic Coherence", ylab = "Exclusivity", labels =
1:length(st10Select4$runout))

st10.4 <- stm(st10.docs4, st10.voc4, K=4, prevalence =~ group, data=st10.meta4,
init.type = "Spectral", max.em.its = 500)

plot(st10.4, type="labels", n = 20, labeltype=c("frex"))
plot(st10.4, type="labels", n = 20, labeltype=c("lift"))
plot(st10.4, type="summary", n = 10, labeltype=c("frex"))
plot(st10.4, type="perspectives", topics=c(1, 2), labeltype=c("frex"))
plot(st10.4, type="perspectives", topics=c(1, 3), labeltype=c("frex"))
plot(st10.4, type="perspectives", topics=c(1, 4), labeltype=c("frex"))
plot(st10.4, type="perspectives", topics=c(2, 3), labeltype=c("frex"))
plot(st10.4, type="perspectives", topics=c(2, 4), labeltype=c("frex"))
plot(st10.4, type="perspectives", topics=c(3, 4), labeltype=c("frex"))

#quotes
st10.4.1 <- findThoughts(st10.4, texts = st10.meta4$post, n=5, topics = 1)
plotQuote(st10.4.1, main = "st10.4.1", width = 280, text.cex = .5)
st10.4.2 <- findThoughts(st10.4, texts = st10.meta4$post, n=5, topics = 2)
plotQuote(st10.4.2, main = "st10.4.2", width = 280, text.cex = .6)
st10.4.3 <- findThoughts(st10.4, texts = st10.meta4$post, n=30, topics = 3)
plotQuote(st10.4.3, main = "st10.4.3", width = 280, text.cex = .6)
```

```
st10.4.4 <- findThoughts(st10.4, texts = st10.meta4$post, n=5, topics = 4)
plotQuote(st10.4.4, main = "st10.4.4", width = 280, text.cex = .6)
labelTopics(st10.4)
save.image("~/Documents/R_Stigma/stigma10.14a.Rdata")

#quotes
st.thoughts1 <- findThoughts(test10Select4$runout[[2]], texts = te10.meta4$post, n=5,
topics = 1)
plotQuote(st.thoughts1, main = "Topic 1", width = 200, text.cex = .8)
st.thoughts2 <- findThoughts(test10Select4$runout[[2]], texts = te10.meta4$post, n=5,
topics = 2)
plotQuote(st.thoughts2, main = "Topic 2", width = 285, text.cex = .6)
st.thoughts3 <- findThoughts(test10Select4$runout[[2]], texts = te10.meta4$post, n=30
topics = 3)
plotQuote(st.thoughts3, main = "Topic 3", width = 285, text.cex = .6)
st.thoughts4 <- findThoughts(test10Select4$runout[[2]], texts = te10.meta4$post, n=5,
topics = 4)
plotQuote(st.thoughts4, main = "Topic 4", width = 200, text.cex = .8)
save.image("~/Documents/R_Stigma/stigma10.7b.rdata")

#wordcloud
cloud(st10.4, topic = 1, min.freq=5, max.words = 50, random.order = FALSE, rot.per=0,
colors=c("navy", "green", "blue", "purple", "red"))
cloud(st10.4, topic = 2, min.freq=5, max.words = 50, random.order = FALSE, rot.per=0,
colors=c("navy", "green", "blue", "purple", "red"))
cloud(st10.4, topic = 3, min.freq=5, max.words = 50, random.order = FALSE, rot.per=0,
colors=c("navy", "green", "blue", "purple", "red"))
cloud(st10.4, topic = 4, min.freq=5, max.words = 50, random.order = FALSE, rot.per=0,
colors=c("navy", "green", "blue", "purple", "red"))

#average topic proportions
apply(st10.4$theta, 2, mean)

#Group differences calculated for each topic
n.mhf <- 96449
n.sns <- 112491
t1.mhf <- .22
t1.sns <- .17
z1<- (t1.mhf-t1.sns)/sqrt(t1.mhf*(1-t1.mhf)/n.mhf + t1.sns*(1-t1.sns)/n.sns)
p1<-2*pnorm(-abs(z1))
```

Appendix H

BESS JOSEPHINE MARTIN
bessmartin@fuller.edu

EDUCATION

Fuller Theological Seminary
Ph.D. in Clinical Psychology   **Anticipated 2019**
Dissertation: "Observed stigma: Latent topic differences among
the general public and a mental health population"

Fuller Theological Seminary
M.A. in Theology   **2018**

Fuller Theological Seminary
M.A. in Psychology   **2015**
Thesis: "A Picture of Depression among Tanzanian
Women"

Southern Adventist University
Bachelor of Arts   **2007**
Majors in Psychology and Religious Studies

AWARDS

Research Fellowship   Fall, 2017 – Spring, 2018

TRI-Faculty Seed Grant   **Fall, 2016**

Weyerhaeuser Research Fellowship   Fall, 2015 – Spring, 2016

Leadership Award in Psychology   **Spring, 2007**

SUPERVISED CLINICAL EXPERIENCE

Casa Colina Hospital and Centers for Healthcare,
Pomona, CA
Pre-Internship   **2017-2018**

- Providing neuropsychological assessments and
  comprehensive reports at the Transitional Living
  Center
- Working in collaboration with an integrative medical
  team to provide comprehensive care.
- Participating in weekly clinical supervision

- Providing individual therapy
- Facilitating and co-facilitating groups (Anxiety, Executive Functioning, and Spiritual Support)

Neuropsychological Health and Counseling Center, Calabasas, CA
Psychological Assistant/Additional Clinical Experience   **2017-2018**

- Providing neuropsychological assessments and comprehensive reports for clinical and forensic populations.
- Participating in weekly clinical supervision
- Training of other students

Los Angeles Christian Health Center, Los Angeles, CA
Clerkship

2016-2017

- Conducting clinical interviews for neuropsychological assessment.
- Providing neuropsychological assessment and testing, scoring, report writing, and providing feedback.
- Working in collaboration with an integrative medical team to provide comprehensive care.
- Co-facilitating psycho-education group on relapse prevention.
- Conducting alcohol and drug screenings, brief interventions, and referrals to treatment (SBIRT)
- Providing triage and crisis care to patients presenting for primary care appointments.
- Collaborating on research looking at relapse prevention and spirituality.

Los Angeles Christian Health Center, Los Angeles, CA
Practicum Intern   **2015 – 2016**
- Provided short-term and long-term individual therapy.
- Co-facilitated psycho-education groups on relapse prevention and mental health recovery
- Conducted alcohol and drug screenings, brief interventions, and referrals to treatment (SBIRT)
- Conducted weekly outreach for treatment at Los Angeles Mission

- Working in collaboration with an integrative medical
  team to provide comprehensive care.
- Collaborated on research looking at relapse prevention
  and spirituality.

San Gabriel Unified School District, San Gabriel, CA
Practicum Intern   **2014-2015**

- Providing play therapy to elementary aged children.
- Participating in weekly clinical trainings
- Participating in weekly clinical supervision

RELATED WORK EXPERIENCE

Fuller Theological Seminary, Pasadena, CA
Teaching Assistant for Alcohol and Substance Abuse   **Summer, 2017**

- Assisting with lecturing on motivational interviewing
- Grading papers
- Assisting students with questions relevant to the course and material covered

Statistics Consultant and Tutor   **2007 – 2018**

- Provided statistics tutoring to undergraduate and graduate students.
- Proficient in R and SPSS
- Assisted Hong Kong Adventist Hospital with quality improvement survey analysis.
- Data entry
- Cleaning data sets
- Conducting statistical analysis (e.g., correlations, regression, factor analysis,
  measurement invariance, and structural topic modeling)

Rockcreek Inc., Rancho Cucamonga, CA
Qualified Intellectual Disability Professional/Administrator   **2011 – 2013**

- Assuring three facilities are in compliance with federal and
  state licensing requirements. Receiving between zero and two
  deficiencies on licensing surveys.
- Overseeing all aspects of implementation of the Individual
  Service Plan (ISP) for each of 18 clients; including 30-day,
  Semi-Annual, and Annual IDT meetings and subsequent
  document distribution.
- Complete required daily, monthly, quarterly, semi-annual, and
  annual reports and evaluations.
- Coordinating and assuring service implementation with
  contracted consultants.

- Assist in interviewing, hiring, orientation, ongoing training, direct staff supervision and performance reviews for all staff in assigned facilities.
- Insuring staff adherence to client schedules, use of specified materials, and accurate data collection methods. Conduct regular audits and follow up with staff on any errors, or discrepancies in data collection.
- Participate in quarterly Human Rights Committee meetings.

Fortwood Center Inc., Chattanooga, TN
Adult Case Manager   **2007 – 2011**
- Provide services to individuals who may have a serious and/or persistent mental illness or other disability of indefinite duration.
- Manage visitations and documentation with a caseload of 50 clients
- Promote recovery, independence, and successful community living in clients.
- Develop long-term relationships with clients
- Coordination of client services to ensure continuity of service provision
- Develop Crisis and Treatment plans with clients
- Certification by the Tennessee Association of Mental Health Organizations
- Competent with HIPPA regulations

School of Education and Psychology, Collegedale, TN
Research Design and Statistics Tutor   **2006-2007**
- Reviewed Papers for APA compliance.
- Tutored students in statistics.
- Assisted students through the research process.
- Graded homework assignments.
- Prepared teaching aids.
- Proctored psychology classes in the professor's absence.
- Conducted statistical analysis for various professors

RELEVANT SKILLS

- Experience with individual and group therapy modalities
- Experience administering neuropsychological and personality assessments
- Experience in research design and statistical analysis with SPSS and R
- Working knowledge of Python

PUBLICATIONS

Kim, S.-H., Martin, B. J., & Nolty, A. T. (2015). The factor structure and measurement invariance of the Daily Spiritual Experience Scale. *International Journal of Psychology of Religion*, *26*, 240-251.

WilliamsMorris, R., Martin, B., Hopson, J., & Welch-Murphy, K. (2010). Besides that, I'm OK: Well-being in Caribbean and American adolescents and youth. *Journal of Research on Christian Education 18*(1), 56-78.

PROCEEDINGS, AND PRESENTATIONS

Martin, B. J. & Kim, S.-H. (2017, August). Observed stigma: Latent topic differences among the general public and a mental health population. Poster Presentation at the American Psychological Association Convention, Washington, DC.

Martin, B. J., Kim, S.-H., Downs, J. A. (2015, April). A Picture of Depression. Oral Presentation at Fuller Theological Seminary Research Colloquium. Pasadena, CA (also presented in a poster presentation in April 2016; Also at APA Convention, Denver, CO, August 2016).

Kim, S.-H., Martin, B. J., & Nolty, A. T. (2015). The factor structure and measurement invariance of the Daily Spiritual Experience Scale. Presented in a poster presentation in April 2014 at APA Division 36 Annual Mid-year Conference, La Mirada, CA; also an oral presentation in April 2014, at Fuller Theological Seminary Research Colloquium in Pasadena, Ca

WilliamsMorris, R., Martin, B., Hopson, J., & Welch-Murphy, K. (2010). Reality and fantasy: Adolescent perceptions of well-being. Presented as a poster presentation at South Eastern Psychological Association (SEPA) Convention, Charlotte, NC, March 2008 and as a paper at SEPA Convention, New Orleans, LA, February 2007.

Martin, B. J. (2007) Multilingualism and first language vocabulary size among Southern Adventist University students. Poster Presentation at SEPA Convention, New Orleans, LA. February 2007 (Also presented at Southern Adventist University's Psycho-Biology Research Expo, Collegedale, TN. April, 2006).

LANGUAGES

English – Native language

Indonesian – speak, read, and write with basic competence

MEMBERSHIPS

American Psychological Association

Division 22: Rehabilitation Psychology

Division 222: Women in Rehabilitation Psychology

Division 40: Society for Clinical Neuropsychology

Psi Chi Honor Society