

AN ABSTRACT OF THE DISSERTATION OF

Stella Kim for the degree of Doctor of Philosophy in Counseling presented on December 3, 2021.

Title: A Corpus Based Examination of Autogenous and Reactive Obsessions in Obsessive-Compulsive Disorder

Abstract approved: _____

Cass Dykeman

Counselors are tasked with being knowledgeable about assessing and treating a broad range of mental health issues. There has been an overall rise in mental health symptoms in individuals during the current COVID-19 pandemic, as well as the increased use of online internet forums as part of help-seeking behaviors. Obsessive-Compulsive Disorder (OCD) received attention during this time due to its close connection to fears of contamination and contracting an illness. However, research on OCD has found that there are several different symptom dimensions and that there are heterogeneous manifestations of obsessions and compulsions. A model of OCD that separates obsessions into autogenous and reactive types has been proposed in order to differentiate between their clinical features. Understanding the differences of these subtypes of obsessions can be beneficial to counselors when working with clients with OCD. This dissertation has two research arms; Research Arm A looked at the psychological and linguistic variables use in anonymous online posts of individuals with OCD, and Research Arm B looked at the collocates of keywords in the autogenous and reactive corpuses. Research Arm A used natural language processing software to look at the differences in 4 linguistic variables and 15 psychological variables in the autogenous and reactive corpuses. A log likelihood ratio compared the usage rates of these variables, and effect sizes were calculated to identify the variables that most differentiated the two corpuses. Research arm B used a collocation study method to look at the words and word networks that most differentiated the

two types of obsessions. The results of these studies show a delineation between the subtypes of obsessions. The results of research arm A showed different psychological variables having large effect sizes in the two different corpuses. The LIWC variables “sexual” and “insight” in the autogenous corpus and “health” and “body” in the reactive corpus had the largest effect sizes. First person singular and third person singular had larger effect sizes in the autogenous corpus. In research arm B, the keywords sexual and POCD had the strongest keyness in the autogenous corpus while contamination and checking had the strongest keyness in the reactive corpus. These results indicate the clinical importance of training counselors about the heterogeneity of the symptoms of OCD, as research has shown that many individuals do not seek out help due to fears of being inaccurately assessed, particularly for those with obsessions with a sexual theme. These results also have implications for future research, as there is a lack of research about each subtype of OCD from a corpus linguistic approach.

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A Corpus Based Examination of Autogenous and Reactive Obsessions in Obsessive-Compulsive
Disorder

by
Stella Kim

A DISSERTATION

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Doctor of Philosophy dissertation of Stella Kim presented on December 3, 2021.

APPROVED:

Major Professor, representing Counseling

Dean of the College of Education

Dean of the Graduate School

I understand that my dissertation will become part of the permanent collection of Oregon State University libraries. My signature below authorizes release of my dissertation to any reader upon request.

Stella Kim, Author

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CONTRIBUTION OF AUTHORS

Cass Dykeman assisted with the methodology and research design. Evelyn Stamey assisted with the data analysis. Ibrahim El Khalil Mlata assisted with corpus construction.

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DEDICATION

I dedicate this dissertation to my husband and best friend in life, Brian Hansen. Your endless love and support made this all possible. Angkor Wat awaits us!

Chapter 1: A General Introduction

The recent COVID-19 pandemic highlighted the high level of anxiety that comes with the uncertainty of contracting a serious illness and the urgency of taking proper hygienic precautions (Khosravani et al., 2021; Wheaton et al., 2020). These global experiences during a public health crisis shed some light on the anxiety that individuals with obsessive-compulsive disorder (OCD) regularly feel when confronted with their intrusive thoughts. Many individuals' mental health declined as they faced increased stressors and fears about the virus, particularly for individuals with contamination fears (Wheaton et al., 2020). However, the findings have been varied as some individuals with contamination OCD found that their symptoms actually improved during the pandemic; they felt comforted by others taking public health guidelines such as handwashing and masking seriously (Littman et al., 2020). Others who do not suffer from contamination fears but experience obsessions related to themes such as symmetry and checking found that their symptoms were not significantly exacerbated by the pandemic. The heterogeneity of responses of individuals with OCD during this global pandemic shows the importance of understanding the nuances of this illness as well as the differences in symptom presentations.

OCD is a complex disorder with different manifestations of symptoms. A cognitive model of OCD (Lee & Kwon, 2003) provides an understanding of the differences in the autogenous and reactive types of obsessions. Autogenous obsessions include repugnant themes such as sexual obsessions about pedophilia or obsessions about inflicting harm on oneself or others. Reactive obsessions include fears about contamination, forgetting to lock doors or turn the stove off, and maintaining symmetry. The differentiation of these types of obsessions is integral to the ability to assess and treat OCD effectively. The compulsions that result from experiencing these different types of obsessions tend to look differently as well, and some autogenous obsessions may not have any observable rituals. Many individuals experience rituals

in the form of rumination, reassuring themselves, or internally scanning their bodies for signs of arousal so that there are no overt behaviors that can be observed (Lee & Kwon, 2003).

Online forums have gained large followings of individuals with OCD which allows for connection with a large group of individuals with shared experiences, as well as to gain help and support about mental health (De Choudury & De, 2014). Recently, during the COVID-19 pandemic, researchers conducted a natural language processing study to analyze posts during the pandemic. They found that Reddit had increased posts during the pandemic due to spikes in mental health symptoms and stressors (Low et al., 2020). This study, in addition to the multitude of others that looked at the use of online forums by individuals with mental health, found that Reddit is a frequently used outlet for individuals experiencing distress due to their anonymity. Despite the existing literature about the linguistic processes of individuals with psychiatric disorders, few studies exist to specifically study the linguistics of OCD and the different themes of obsessions. Studies show the concerning lack of understanding that exists within the clinical treatment community about the lesser-known forms of OCD that deal with repugnant obsessions (Glazier et al., 2013).

In a review of the academic literature on OCD, seven key themes emerged: (a) a cognitive process model to categorize OCD subtypes, (b) the role of metacognitions in individuals with OCD, (c) the psychological processes of OCD, (d) the linguistic processes of OCD, (e) multicultural considerations for working with OCD, (f) avoidance of formal treatment due to stigma, and (g) common psychological themes of help-seeking individuals with OCD on online forums.

OCD is a singular diagnosis in the *Diagnostic and Statistical Manual (DSM-5)* but is a heterogeneous disorder with various manifestations. The cognitive process model of OCD (Lee

& Kwon, 2003) sets forth two subtypes of obsessive thoughts: autogenous obsessions and reactive obsessions. Autogenous obsessions include sexual, aggressive, immoral, or other repugnant thoughts. Some common examples of autogenous obsessions about harm include thoughts about fatally pushing someone or stabbing a family member. These thoughts are characterized as appearing abruptly without any specific stimuli and are appraised by the individual as very disturbing. These obsessions are experienced as being threatening to the individual's self-perception (Moulding et al., 2014), especially sexual themes such as pedophilia (Cathey & Wetterneck, 2013). There is a higher degree of concealment and secrecy with autogenous obsessions due to the nature of the thoughts.

Reactive obsessions differ from this, as they are usually triggered by something in the immediate environment, such as things that relate to symmetry, contamination, and ordering objects (Lee & Kwon, 2003). Common examples include intrusive thoughts of catching a sexually transmitted disease or being contaminated with an illness after touching a door knob. The distress that results from these types of obsessions is related to the responsibility the individual feels to prevent some sort of negative consequence that manifests from the intrusive thought. Because these thoughts are triggered by external stimuli, there are more observable compulsions such as cleansing, washing, counting, ordering, and checking (Lee & Kwon, 2003). Though individuals often acknowledge the excessive nature of their compulsions, the reactive obsessions are thought to be realistic to the sufferer, as opposed to the ego-dystonic nature of autogenous obsessions. The differences between these subtypes of obsessions have been confirmed through past research and lend more evidence towards a more nuanced understanding of how OCD manifests in different individuals (Moulding et al., 2007).

The cognitive model of OCD lends itself to the understanding of differing metacognitions in individuals with these two types of obsessions. One of the key differences found between the two types of obsessions is that reactive obsessions set off worries about the negative consequences of not performing rituals, while autogenous obsessions cause the sufferers to think negatively about themselves for having repugnant thoughts (Keles Altun et al., 2017). Another difference is that there is also a higher appraisal of threat that occurs due to disgust sensitivity in the cognitions of individuals with reactive obsessions such as contamination (Bikhram et al., 2017). Individuals with autogenous obsessions tend to ruminate about the meaning of having repugnant thoughts such as inappropriate sexual obsessions and thus, their metacognitions focus greatly on questioning their character and morals (Keles Altun et al., 2017). The cognitive processes in these two subtypes of obsessions also differ in the cognitive appraisal and control strategies. Individuals with autogenous obsessions rated higher on thought control while individuals with reactive obsessions rated higher on feelings of responsibility. Autogenous obsessions tend to have higher thought control efforts because they are deemed to be inappropriate, and individuals believe they need to try to utilize avoidance strategies, as they do not believe they have any physical or overt ways to neutralize these thoughts. On the other hand, reactive obsessions tend to have coping techniques considered confrontational, which means individuals engage in rituals such as counting, cleaning, and checking because they believe that they have the responsibility to prevent negative outcomes (Lee & Kwon, 2003).

In addition to metacognitions in OCD, there are several psychological processes common in individuals with OCD. The first and foremost is anxiety, which highlights the excessively distressing emotional responses that get paired with individuals' obsessions. It is also important to highlight that OCD is frequently accompanied by comorbid depression, especially in those

experiencing autogenous obsessions (Yap et al., 2012). Researchers also found that self-punishment played a role in the maintenance of obsessions, even when controlling for depression (Jacoby et al., 2016). There is also a high level of self-punishment in individuals with OCD that manifests through neutralizing self-worth. In particular, individuals with autogenous obsessions tend to have higher ratings of negative self-inference and more feelings of guilt related to their intrusive thoughts (Seo & Kwon, 2013). Shame, embarrassment, and guilt also play large roles in the distress that individuals experience in different aspects of their lives. Guilt sensitivity was found to play a major role in individuals with checking rituals, as they perceived the potential harm of their obsessions in an amplified way (Melli et al., 2016). These psychological processes impact individuals' self-worth and ability to enjoy social relationships and lead to concealing symptoms from others.

Though the linguistic processes of OCD have been less studied than cognitive and psychological processes, there are a few important findings in the current literature. Individuals with OCD frequently use conditional constructions, as they worry that if they do not perform a ritual a negative consequence will occur. This can appear as thoughts constructed as *if* one does not perform a ritual, *then* something bad will happen (Abramowitz & Jacoby, 2014). Contrasting language also shows up in linguistic processes, as individuals acknowledge the ego-dystonic nature of their obsessions and contrast the anxious thoughts to how they perceive themselves in reality (Hartman, 2018). This was also found to be a prominent feature of language used in individuals with sexual orientation OCD to take an ego-dystonic stance from their thoughts (Coimbra-Gomes, 2020). A Linguistic Inquiry and Word Count (LIWC) study of online posts of individuals with mental health concerns found that first-person singular pronouns and negative emotions were significantly higher in this group when compared to a control group.

Additionally, individuals with OCD posted more frequently about themes related to anxiety than the control group (Lyons et al., 2018).

In addition to psychological and linguistic aspects, multicultural and religious differences are also important considerations when conceptualizing OCD. Research has shown that African American and Asian Americans are more likely to report symptoms of contamination obsessions when compared with European Americans (Wheaton et al., 2012). When comparing treatment-seeking behaviors among minority groups, individuals of Latino ancestry were more likely to deal with OCD through religious faith (Williams et al., 2017). More specifically, a Mexican sample found that OCD symptom severity decreased as spirituality increased (Berman et al., 2020). In terms of specific subtypes of OCD, Scrupulosity OCD has been found to be particularly prevalent in the Orthodox Jewish community. Understanding and integrating the religion and values in consultation with religious leaders is recommended for treatment (Huppert et al., 2007). Treatment for OCD has also been found to be effective with sexual minority clients when adapted in an LGB-affirming way, especially when working with obsessions related to sexual orientation or HIV status (Holt et al., 2019). Clinical work and research show the importance of adapting treatment to new understandings of diverse client populations.

There are several barriers to treatment for many individuals experiencing mental health issues, and this is true for individuals with OCD as well. There are barriers that are unique to OCD that make it challenging for individuals to disclose their symptoms (Kusularuk et al., 2015). Individuals suffer from low self-esteem and inner conflict when it comes to repugnant obsessions because the thoughts go against their moral values and characters. There is also a great deal of stigma that exists around repugnant obsessions, especially those involving sexual themes. A past study found increased social rejection for sexual obsessions when compared with

contamination obsessions (Cathey & Wetterneck, 2013). Additionally, there seems to be a hierarchy of obsessions that are deemed to be more acceptable than others, with themes such as contamination and “just right” OCD being met with less stigma than themes that have to do with sex or harm (Homonoff & Scitutto, 2019). In addition to social rejection from repugnant obsessions, individuals also experience “the feared self” (Moulding et al., 2014), which leads them to believe that they may be dangerous people, will cause harm to others, and may be insane. These factors all contribute to the fear of seeking out appropriate treatment for OCD, especially in the case of repugnant autogenous obsessions.

One of the greatest challenges to finding appropriate and effective treatment for individuals with OCD is finding a clinician who understands the nuances of the different themes of obsessions. Similar to the studies done on stigma faced by individuals with OCD by their peers, there were similar results from research that looked at clinicians’ attitudes towards individuals with OCD. This study found that sexual obsessions were met with the most social rejection from clinicians (Steinberg & Wetterneck, 2017). Other studies have looked at psychiatrists’ attitudes towards treating patients with OCD. In a study by Kusalaruk et al. (2015), 80% of psychiatrists responded that OCD was difficult to treat, and only 7.7% were proficient in providing exposure and response prevention (ERP). In addition to these stigmatizing attitudes of treatment providers, a study by Glazier et al. (2013) found that physicians were least likely to be able to accurately diagnose obsessions about sexual themes, pedophilia, and harm. The clinicians who misdiagnosed OCD were also the least likely to recommend an evidence-based treatment for OCD such as cognitive-behavioral therapy (CBT). When the stigmatizing attitudes about sex and harm are combined with the inability of clinicians to accurately identify symptoms of OCD, many individuals choose not to seek formal treatment.

Online forums provide a space and outlet for individuals who face barriers to formal treatment. In particular, online forums such as Reddit provide safety in the anonymity of users. A study by De Choudhury and De (2014) found that the disinhibition provided by anonymous posts encouraged emotional engagement, informative feedback, and open conversations. They found that websites such as Reddit provide a fulfilling alternative to individuals with stigmatizing disorders. Individuals with OCD are more likely to post when distressed to draw in feedback and support from other posters on the forum (Campbell & Longhurst, 2013). A study of youth with OCD ranging from ages seven to 17 years also found that internet help-seeking was most common amongst those who rated their symptoms as being severe (Rufino et al., 2019). As the use of the Internet and technology increases, the written narratives on online support forums can provide rich information about the symptoms and experiences of those suffering from OCD.

Relationship of Dissertation Research to CACREP Standards

The 2016 CACREP standards Section 5.C for Clinical Mental Health Counseling lays out the knowledge and skills required of mental health counselors in practice (CACREP, 2016). The skills needed to assess and treat OCD are threefold: applying theories and models for case conceptualization (5.C.1.c.), the use of diagnostic classification systems (5.C.2.d.), and treatment planning with appropriate techniques and interventions for a broad range of mental health issues (5.C.3.b.). Working with OCD requires that counselors understand not only the importance of basic counseling skill foundations such as therapeutic alliance building, but a firm understanding of the concepts of behavioral therapy. The conceptualization and treatment of OCD are primarily based on concepts of classical conditioning and how the amygdala's response to threats is reinforced by performing rituals. The gold standard for the treatment of OCD is ERP, which is a specialized treatment based on these behavioral principals (Cusack et al., 2016). Additionally,

OCD tends to have a high comorbidity with depression and other anxiety disorders. Therefore, counselors must be able to effectively create and implement treatment plans that address the broad picture of symptoms since studies have shown that OCD with comorbid conditions such as posttraumatic stress disorder are much more difficult to treat (Gershuny et al., 2002, 2008). The importance of being knowledgeable about differential diagnoses and treatment modalities that could address some of the comorbid symptoms is an integral responsibility for counselors.

Description of Manuscript 1

Language use in mental health narratives can shed light on the subjective experiences of individuals with OCD. There have been many studies about the psychological processes of OCD, but there is a lack of literature about its linguistic features. Most studies have focused on quantitative methods to study psychological processes such as intolerance of uncertainty (Sarawgi et al., 2013), guilt (Shapiro & Stewart, 2011), and doubt (Samuels et al., 2017) in OCD. To date, there have been two linguistic studies about sexual orientation OCD (Coimbra-Gomes, 2020; Coimbra-Gomes & Motschenbacher, 2019) and two qualitative discourse analysis studies about the use of language in OCD (Knapton, 2019, 2021). This study would provide a more generalized overlook about the different themes of OCD as opposed to focusing on just one subtype. It also will provide information about both the psychological and linguistics aspects of OCD in one study.

Chapter 2 presents the first study in which LIWC was used (Pennebaker et al., 2015) to analyze linguistic and psychological variables of the autogenous and reactive corpuses. The linguistic variables were first-person singular, first-person plural, third-person singular, and third-person plural. The psychological variables were negative emotions, anger, anxiety, insight, causation, certainty, risk, religion, swear words, body, health, sexual, discrepancy, future, and

death. The corpora were analyzed through LIWC (Pennebaker et al., 2015). The statistical analysis used for this study was a log-likelihood (*LL*) ratio to test the significance of the differences in variables between the corpora.

The research questions were:

RQ1 What is the use rate of linguistic processes for individuals with reactive obsessions?

RQ2 What is the use rate of psychological processes for individuals with reactive obsessions?

RQ3 What is the use rate of linguistic processes for individuals with autogenous obsessions?

RQ4 What is the use rate of psychological processes for individuals with autogenous obsessions?

RQ5 How do the use rates of linguistic processes differ for individuals with reactive obsessions compared to those with autogenous obsessions?

RQ6 How do the use rates of psychological processes differ for individuals with reactive obsessions compared to those with autogenous obsessions?

The target journal for the first study is the *Journal of Obsessive-Compulsive and Related Disorders*. This is an international journal that publishes research about OCD and related disorders such as trichotillomania, hoarding, and body dysmorphic disorder. This journal has published articles about the assessment, treatment, neurobiology, classification, genetics, and prevention of OCD and its related disorders. It has an impact score of 1.62. It has published articles that are referenced in this study, such as “Repugnant Obsessions: A Review of the Phenomenology, Theoretical Models, and Treatment of Sexual and Aggressive

Obsessional Themes in OCD” (Moulding et al., 2014). This journal has also published studies based on the cognitive process model of OCD, upon which the corpuses for this study were constructed. One of the articles that references this model in studying the psychological variable of self-inferences is “Autogenous/Reactive Obsessions and Their Relationship With Negative Self-Inferences” (Seo & Kwon, 2013).

This study was preregistered at <https://osf.io/9ujgt>. It will be archived in PsyArXiv. The submitted version will be uploaded to PsyArXiv as there are no restrictions according to Sherpa Romeo. For Open Science badges, I have used the preregistered badge for this study.

Description of Manuscript 2

This study provides information about the collocates of keywords in autogenous and reactive obsessions. According to Brezina (2018), linguistic processes can uncover connections in language, therefore revealing discursive patterns about certain topics. The differences in the language and discourse of written narratives of individuals posting on Reddit provides insight for researchers and clinicians about the subjective experiences of different types of OCD.

Furthermore, the use of keyness to identify node words can also provide important information about the core concerns and most frequently used words for individuals experiencing different themes of obsessions. Finding effective treatment with clinicians who are competent in assessing and treating OCD is challenging, and this study can provide more insight into the heterogeneity of OCD (Glazier et al., 2013). Manuscript 2 can help clinicians learn about the autogenous and reactive subtypes of obsessions and the unique psychological nuances associated with different themes of obsessions within these subtypes.

Chapter 3 presents a collocation and keyness study about the autogenous and reactive forms of obsessions in OCD. Keywords were generated by uploading the two corpuses into

Wordsmith 8.0. Graphcoll was used in #Lancsbox to identify the collocates of the node words of the autogenous and reactive corpuses (Brezina et al., 2015).

The research questions for this study were:

RQ1 What words most differentiate autogenous obsession posts from reactive obsessions posts?

RQ2 What words most differentiate reactive obsession posts from autogenous obsession posts?

RQ3 In online posts of individuals experiencing autogenous obsessions, what are the collocates of the word with the strongest keyness?

RQ4 In online posts of individuals experiencing autogenous obsessions, what are the collocates of the word with the second strongest keyness?

RQ5 In online posts of individuals experiencing reactive obsessions, what are the collocates of the word with the strongest keyness?

RQ6 In online posts of individuals experiencing reactive obsessions, what are the collocates of the word with the second strongest keyness?

The target journal for the second study is the *Applied Linguistics*. This journal publishes studies that connect the study of language to real world issues. It intends to make relevant connections between theory and research with practical applications. The journal has an impact factor of 5.741. An example of a published collocation study is, “Sketching Muslims: A Corpus Driven Analysis of Representations Around the Word ‘Muslim’ in the British Press” (Baker et al. 2012). It has also published linguistic studies about psychotherapy, such as “Hanneke Bot: Dialogue Interpreting in Mental Health” (Inghilleri, 2009). Another example pertains to the use

of language in how individuals recount and experience trauma: “Language and Trauma: An Introduction” (Busch & McNamara, 2020).

This study was preregistered at <https://osf.io/43ame/>. It will be archived in PsyArXiv. The submitted version will be uploaded to PsyArXiv, as there are no restrictions according to Sherpa Romeo. For Open Science badges, I have used the preregistered badge for this study.

Specialized Glossary

This glossary describes the terms used in this study and covers vocabulary for corpus linguistics studies as well as clinical terms associated with OCD.

Autogenous obsessions: Autogenous obsessions are a subtype of obsession derived from the cognitive processing model of OCD. They often refer to obsessions that occur without an environmental trigger and often include themes of harm and unwanted sexual thoughts and images and are often ego-dystonic in nature.

Bayesian information criterion (BIC): BIC is an estimate of a function of the posterior probability of a model being true.

Collocation: A collocation is the repeated co-occurrence of words in texts. Corpus linguistic studies uncover the strength of associations between words that frequently co-occur (Brezina, 2018).

Corpus linguistics: Corpus linguistics is the study of language that can uncover patterns of words and grammatical features.

Corpus/corpora: A corpus is an electronic collection of naturally occurring examples of language. This dissertation looked at two different corpora.

Exposure and response prevention (ERP): ERP is the gold standard treatment for OCD, which is a type of cognitive-behavioral therapy (CBT) that works to break the conditioning

between obsessions and compulsions. It gradually has the sufferer increase exposure to anxiety-inducing stimuli while preventing the use of compulsions and rituals.

HOCD: HOCD is a commonly used acronym for homosexual OCD, or sexual orientation OCD (SO-OCD). This subtype of OCD introduces intrusive thoughts that cause a discordant emotional response resulting in anxiety and uncertainty about one's sexuality.

Keyness: Keyness describes words that occur frequently in the specific corpus that are infrequent in others.

#Lancsbox: #Lancsbox is a corpus analysis tool developed at Lancaster University. It allows users to upload corpora and download existing corpora and wordlists and provides analyses for corpus linguistics such as collocations.

LIWC: LIWC is a closed dictionary text analysis application that can produce results about various components in a written text, such as emotional and cognitive words. The output includes summary variables and the hierarchical categories associated with each word (Pennebaker et al., 2015).

Log-likelihood test: Log likelihood tests are commonly used in keyword analysis. LL performs tests for a significant difference in frequency between two corpora.

Mutual information (MI): MI determines what pairs of words have substantial links between them. The higher the MI score, the higher the chance it is a collocation.

Node word: Node words are the "words of interest." They are used to rank collocates on how frequently they co-occur in the corpus (Brezina, 2018).

POCD: POCD is a commonly used acronym for pedophilia OCD. This is a theme of OCD where individuals fear that they might be pedophiles and that they might harm children, causing immense anxiety and distress.

Reactive obsessions: Reactive obsessions usually occur due to external stimuli in the direct environment of the individual. Common examples include fears of contamination after touching a public doorknob.

ROCD: ROCD is a commonly used acronym for relationship OCD, or relationship substantiation. This is a theme of OCD where the sufferer becomes extremely distressed about doubts about a romantic relationship, and it results in compulsions to neutralize the anxiety.

Token: A token is a singular instance of a word in a text (Brezina, 2018).

Thematic Linkage of MS1 & MS2

The two manuscripts are linked by using the same two corpora to explore the autogenous and reactive subtypes of OCD. While the first manuscript focuses on linguistic and psychological processes with these subtypes, the second study focuses on collocations of words within the corpora. More specifically, the first study can provide insight about the psychological processes (e.g., negative emotions, health, sex, insight) using LIWC variables, as well as different uses of pronouns. It can lend understanding of the similarities and differences between the most prominent psychological variables that individuals with autogenous and reactive obsessions write about. The second study will uncover the most frequently used words in the corpora and how they occur together in individuals' posts to provide insight on common experiences in the subtypes of OCD. Both can provide insight on the unique nuances in the reactive and autogenous types of OCD by looking at how individuals describe their experiences in online forums. The clinical implications of this will add to the evidence on the heterogeneity of OCD and the need to train counselors to better understand different manifestations of OCD.

Organization of the Manuscript and Guide to the Reader

This dissertation is comprised of four chapters. The first chapter provides an overview of the studies as well as a glossary and overall introduction to the topic of corpus linguistics in studying OCD. Chapter two presents the literature review for the first manuscript, as well as the methods, analysis, and results of the LIWC study. Chapter three provides the same organization as chapter 2 but also data and results for the second manuscript, which is a collocation study utilizing #Lancsbox. The final chapter provides summaries of the results as well as a discussion of the overall dissertation. A bibliography and appendices complete the dissertation.

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Chapter 2: Manuscript 1

**Linguistic and Psychological Features of Autogenous and Reactive Obsessions in
Obsessive-Compulsive Disorder**


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Abstract

Obsessive-compulsive disorder (OCD) is typically thought of as a single mental health disorder. More recently, internally-focused (autogenous) and externally-focused (reactive) subtypes have been proposed. This study examined the language used in describing these subtypes using anonymous posts from Reddit. The study used natural language processing software to look at differences in the use of the linguistic variables of first-person singular, first-person plural, third-person singular, and third-person plural as well as use of the psychological variables negative emotion, anger, anxiety, insight, causation, certainty, risk, religion, swear words, body, health, sexual, discrepancy, future, and death. A log likelihood ratio (G^2) was calculated to determine the differences of usage rates in the two corpuses. The results showed a large effect size of the use of first-person singular pronouns in both the autogenous and reactive corpuses. The psychological variables of “insight” and “sexual” had the largest effect sizes in the autogenous corpus, while “health” and “body” had the largest effect sizes in the reactive corpus. The differences in the usage rates of the linguistic and psychological variables in the corpuses show the heterogeneity of OCD and the importance of understanding lesser known forms of obsessions such as those with repugnant themes. Clinical implications and future research recommendations are discussed.

Keywords: reactive OCD, autogenous OCD, obsessive-compulsive disorder, LIWC, corpus linguistics

Linguistic and Psychological Features of Autogenous and Reactive Obsessions in Obsessive-Compulsive Disorder

Movies often offer glimpses into the lives of people with psychiatric disorders. For example, the main character in *As Good As It Gets* ritually avoids stepping on cracks, washes his hands excessively, and locks his door numerous times; he is affected by obsessive-compulsive disorder (OCD) and fears repercussions if he does not complete these rituals. However, OCD is a heterogeneous psychiatric disorder that is about more than just contamination, orderliness, and repetitions. Much of the diagnostic knowledge about OCD does not show the clinically presented diversity of the obsessions and compulsions of those with the disorder. A common outlet for the OCD community is online forums, which offer a veil of protection from judgment or scrutiny due to the anonymous nature of the posts, and provides support and advice for individuals who suffer from forms of OCD that are perceived as less acceptable than contamination, symmetry, checking, or ordering. The language used in online posts to describe the nature of symptoms, distress, and psychological processes can offer insight about the differences in the lived experiences of those with the subtypes of OCD. This could also potentially lead to deeper understanding about the ways OCD manifests in individuals who feel afraid or ashamed to disclose their symptoms in treatment.

The unique lived experiences of individuals can vary drastically across the subtypes of OCD, which affects approximately 2% of the population; it is considered a highly heterogeneous condition (McKay et al., 2004). Greater understanding of how individuals talk about their symptoms and experiences with OCD in online forums could provide insight into the unique mechanisms of distress, as well as offer ways to effectively treat them in therapy. However, there is currently a lack of research about individuals' perceptions of their experiences with OCD

(Keyes et al., 2018; Knapton, 2016). The research continues to call for more studies to be conducted on OCD, especially due to the treatment-resistant nature of some cases (Gershkovich et al., 2017). Though many of these studies are from a pharmacological perspective, understanding the nuances of lived experiences could help clinicians tailor treatment strategies to each individual patient. Studying the subjective written experiences of individuals with autogenous and reactive OCD could benefit current practices by creating better understanding of the functions that obsessions and compulsions serve. Additionally, understanding the unique psychological processes and emotional reactions of the subtypes of OCD could add nuances to treatment by targeting the sources of the distress.

The language used by individuals with OCD has not been studied quantitatively outside of two corpus linguistic studies that looked at sexual orientation OCD (SO-OCD; Coimbra-Gomes, 2020; Coimbra-Gomes & Motschenbacher, 2019). Knapton (2016), in a qualitative study using the autogenous-reactive model, looked at individuals' experiences with OCD and noted the diverse inter- and intra-individual variations of symptoms within the categories of autogenous and reactive obsessions. The author recommended continued research into the heterogeneous nature of OCD to inform clinical assessments and treatment options (Knapton, 2016). Another study found that sufferers with taboo or repugnant OCD thoughts were not associated with impairment in certain areas of their lives, as opposed to individuals with contamination OCD, who had clear associations with impairments in health-related quality of life (QoL) (Schwartzman et al., 2017). This demonstrates how aggressive, blasphemous, and sexual obsessions vary and that more research is needed to understand the subjective experiences of lesser-known types of OCD, many of which carry shame and stigma. Furthermore, Tausczik and Pennebaker (2010) have discussed the emotional tone and cognitive styles of these individual

differences as they are reflected in linguistic processes. However, there is a lack of research about the language of mental health disorders.

In a review of the academic literature on OCD, five key themes emerged: (a) key OCD terms, (b) a cognitive process model to categorize OCD subtypes, (c) the role of metacognitions in individuals with OCD, (d) the psychological processes of OCD, and (e) the linguistic processes of OCD. In this study, these themes are discussed. Then the research questions guiding the study are detailed.

Knowledge of two terms in particular is essential for a clear understanding of OCD research. These terms describe obsessions that differ from those related to contamination and checking (Sheikhmoonesi et al., 2014; Williams et al., 2017). One subtype of obsession, which has been researched and conceptualized, is *repugnant obsessions* (Moulding et al., 2014). Repugnant obsessions are described as forbidden, taboo, or unacceptable thoughts (Moulding et al., 2014) that relate to distressing impulses or images about sex, religion, harm, or aggression (Purdon, 2004). A specific subtype of repugnant obsessions commonly used in diagnosing and treating OCD is *scrupulosity*. Scrupulosity has been characterized as an obsession related to moral or religious issues that are accompanied by compulsions that cause distress and impairment (Miller & Hedges, 2008). Understanding the terms repugnant obsessions and scrupulosity is essential for building a full clinical picture of OCD; these variations have been conceptualized and researched according to the underlying cognitive processes.

A cognitive process model is helpful in understanding the diversity of obsessions that can manifest in individuals with OCD, as it delineates differences between stimuli, thought content, and subsequent thought processes. Lee and Kwon (2003) proposed a model that categorized obsessions as either reactive or autogenous. Reactive obsessions are triggered by external

stimuli, such as when an individual touches a public door and in response experiences obsessions about contamination and getting ill from the germs. These types of obsessions can also relate to obsessions of order, symmetry, or making a mistake. Autogenous obsessions tend to deal with more repugnant obsessions, and they are experienced without a triggering event or stimuli. These obsessions also tend to be experienced as ego-dystonic due to their sexual, aggressive, or forbidden nature (Lee et al., 2005; Lee & Kwon, 2003).

The cognitive processes underlying obsessions vary, not only by how they are evoked and their content, but by how individuals think about them afterwards. Individuals with autogenous obsessions tend to try to control their thoughts due to their taboo nature, and they engage in more cognitive avoidance strategies, such as distracting themselves or avoiding thinking about a topic. Reactive obsessions are conceptualized as being dealt with in a more confrontational way, as individuals believe that by doing a ritual, they can prevent the harmful outcome of the obsession's threat (Lee & Kwon, 2003). One study using the cognitive process model of OCD, which shows the importance of studying how individuals with OCD think about their symptoms and how cognitions vary between the subtypes, found support for the differentiation between the subtypes (Moulding et al., 2007).

The role of metacognition in OCD is important with regard to the subjective experiences of individuals with autogenous or reactive obsessions. Generally, individuals with reactive obsessions think about external harm and fear negative consequences stemming from their thoughts, whereas individuals with autogenous obsessions tend to make negative inferences about their own character and judge themselves for their repugnant thoughts (Keles Altun et al., 2017). Reactive obsessions are also related to an inflated sense of responsibility (Keles Altun et al., 2017; Siev et al., 2011), while autogenous obsessions are related more to individuals'

appraisals of thoughts and metacognitive beliefs, such as thought-action fusion (Belloch et al., 2006; Solem et al., 2009). Individuals with autogenous obsessions also think much more about the meaning of having these forbidden thoughts and needing to have control over the thoughts (Belloch et al., 2006; Keles Altun et al., 2017; Siev et al., 2011). Meanwhile, the scrupulosity subtype of OCD was found to have metacognitive characteristics of both reactive and autogenous obsessions: the responsibility and threat appraisals of reactive obsessions and the beliefs about the importance and control of thoughts of autogenous obsessions (Siev et al., 2011). Metacognitions about obsessions are closely related to the psychological processes and emotions of individuals with OCD.

The psychological processes of OCD are similar across the subtypes. Anxiety is a hallmark of both autogenous and reactive OCD. In addition, co-morbid depression has been found to be common in individuals with OCD and related to poorer responses to treatment (Overbeek et al., 2002; Yap et al., 2012). Depression in individuals with aggressive obsessions has been found to predict suicidal ideation (Balci & Sevincok, 2010). Obsessions have also been found to cause negative self-inferences and feelings of guilt in both types (Seo & Kweon, 2013).

Another consistent psychological process this study revealed was self-punishment, which often led to hypervigilance around obsessions and exacerbated symptoms (Jacoby et al., 2016). In particular, individuals experiencing autogenous obsessions tended to make more efforts to neutralize their self-worth (Seo & Kwon, 2013) and conceal their thoughts from others (Belloch et al., 2006). Obsessions were also associated with shame and embarrassment when they had a repugnant nature (Siev et al., 2011). The findings about reactive obsessions highlight the role that shame plays in the QoL of individuals with OCD, particularly with regard to contamination fears and being able to enjoy social and sexual relationships (Schwartzman et al., 2017).

Guilt is a clinical feature of OCD that has been understood as an important concept in its phenomenology. Indeed, a review of 14 articles specifically studying guilt in OCD showed the prominence of guilt as a psychological process of OCD. Individuals experienced guilt as a result of their OCD symptoms, which also exacerbated their existing trait-guilt (Shapiro & Stewart, 2011). Researchers are now focusing on guilt as a psychological process directly related to OCD. Individuals not only experience guilt about their obsessions, they also start to fear the guilt, as it drives the motivation to punish themselves to prevent harm from coming to themselves and others (Chiang et al., 2016). The role of guilt sensitivity has also been shown to predict checking-related OCD (Melli et al., 2017). Language-use analyses could provide understanding for the subjective psychological experiences of individuals with OCD.

There are linguistic processes that are characteristic of individuals speaking about their OCD symptoms. A Language Inquiry and Word Count (LIWC) study looked at the language of individuals utilizing online discussion forums for major depressive disorder (MDD), generalized anxiety disorder (GAD), borderline personality disorder (BPD), OCD, and schizophrenia and found there were higher frequencies of singular personal pronouns and negative emotions in individuals with mental health disorders compared to the control group. Moreover, the frequency of anxiety-word use was significantly higher in individuals with OCD than the MDD, BPD, and control groups (Lyons et al., 2018).

More specific to the hallmark symptoms of OCD, which include doubt, uncertainty, and catastrophizing, is the use of conditional constructions. This manifests as the worry that if an individual has a thought but does not complete a compulsion, something bad will happen (Abramowitz & Jacoby, 2014). A linguistic analysis of spoken testimonials in individuals with OCD found the use of “if” occurred 156 times across 12 different testimonials. Though the study

only provided descriptive statistics, the author concluded that this was central to individuals' conflicting conceptions of reality when dealing with OCD (Hartman, 2018). Contrast was also found to be used in language about OCD, as symptoms are often ego-dystonic and stem from anxiety, not rational thought. This can be seen through the use of contrasting subjective reality with what is a forced counterfactual reality, such as "I don't want to be a bad person but my brain is telling me I'm a monster" and by establishing balance by counteracting a distressing thought through the use of compulsive thoughts and behaviors (Hartman, 2018). This is consistent with the neutralizing effects of rituals done to establish balance and lower anxiety in people with OCD.

Six research questions guided this study. These questions were:

RQ1 What is the use rate of linguistic processes for individuals with reactive obsessions?

RQ2 What is the use rate of psychological processes for individuals with reactive obsessions?

RQ3 What is the use rate of linguistic processes for individuals with autogenous obsessions?

RQ4 What is the use rate of psychological processes for individuals with autogenous obsessions?

RQ5 How do the use rates of linguistic processes differ for individuals with reactive obsessions compared to those with autogenous obsessions?

RQ6 How do the use rates of psychological processes differ for individuals with reactive obsessions compared to those with autogenous obsessions?

Method

Design

This study used a synchronic corpus linguistic design with 19 variables. The linguistic process variables were first-person singular, first-person plural, third-person singular, and third-person plural. The psychological process variables were negative emotions, anger, anxiety, insight, causation, certainty, risk, religion, swear words, body, health, sexual, discrepancy, future, and death. The forms of OCD variables were autogenous and reactive. The unit of analysis was words (tokens).

To determine the sample needed for adequate power, a priori analysis was done via G*Power (Faul et al., 2009). The statistical analysis involved a χ^2 test derivative, thus the effect size needed for input was Cohen's w (Johnston et al., 2006). The effect size was the average of Cohen's w in a research study on anxiety disorders (Hong et al., 2020). The input parameters were as follows: (a) test family- χ^2 tests; (b) statistical goodness-of-fit tests: contingency tables; (c) type of power analysis- a priori: compute required sample size- given α , power, and effect size; (d) $w = 0.31$; (e) power ($1 - \beta$ error probability) = 0.90; (f) $\alpha = 0.01$; and (g) degrees of freedom (Df) = 1. The output parameters were a sample size of 155 with an actual power of 0.90.

Corpus

Scope, Register, and Sources

This study explored the language used by individuals who participated in online forums about their symptoms of OCD. Therefore, I searched public posts by individuals on Reddit Application Programming Interface (API). Reddit is a public forum that allows users to post anonymously and receive feedback and responses. The subreddit r/OCD allows users to post about their OCD experiences and to reply to community members' posts. These individuals

posted about the following: reactive OCD (symmetry, ordering, checking, and contamination) or autogenous OCD (“forbidden thoughts,” such as harm OCD, scrupulosity OCD, sexual thoughts OCD, pedophilia OCD, and responsibility OCD). Reddit API was instructed to search for posts from individuals experiencing intrusive thoughts. The keywords used were: contamination OCD, counting OCD, ordering OCD, symmetry OCD, checking OCD, scrupulosity OCD, sexual orientation OCD, pedophilia OCD, POCD, harm OCD, HOCD, sexual thoughts OCD, sexual OCD. The counts for the results for these searches were: 2,859, 818, 88, 255, 3484, 18,293, 286, 395, 4,775, 3,585, 2,739, 2,409, and 3,737, respectively. The total number of posts scraped was 43,723. I categorized them into the autogenous and reactive subtypes to construct the corpuses. The posts were collected on January 25, 2021, going back to the first post available on Reddit. The total word count for posts about autogenous obsessive thoughts subcorpus was 3,591,494 and the total word count for reactive obsessive thoughts subcorpus was 2,283,945.

Preprocessing

The corpus was created using Python Reddit API Wrapper package. The posts about OCD were publicly accessible and anonymously published without any identifiable information. Text that greeted users or asked for advice at the end were excluded, and only the body of the text that included the user’s subjective experience of OCD was used. Tokenization took the corpora and divided them into individual words before processing using Python. The two corpora were also preprocessed to check for non-standard orthography, including typing and spelling errors. Due to the possibility that the same Reddit post may have shown up in multiple searches, duplicate entries were deleted from the corpus.

Measures

The measures used were selected scales from the LIWC dictionary (Pennebaker et al., 2015). The scales chosen for this study were related to symptoms of OCD and the unique manifestations of its various subtypes. For example, religion was chosen as a linguistic scale because of its relevance to scrupulosity OCD. The psychometric properties of LIWC, including its internal reliability and external validity, have been reported by its authors (Pennebaker et al., 2015).

LIWC Linguistic Processes

The linguistic-process scales chosen for this study included first-person singular, first-person plural, third-person singular, and third-person plural. Analyzing these pronouns provided information about the attentional focus of the individuals writing the blog posts, as well as how they were processing the experience of living with OCD. Individuals experiencing emotional pain are more likely to use first-person pronouns because they are drawn into their own experiences (Rude et al., 2004).

LIWC Psychological Processes

The 15 scales selected were negative emotions (e.g., sad), anger (e.g., mad), anxiety (e.g., nervous), insight (e.g., know), causation (e.g., effect), certainty (e.g., never), risk (e.g., doubt), religion (e.g., church), swear words, body (e.g., ache), health (e.g., pill), sexual (e.g., incest), discrepancy (e.g., should), future (e.g., soon), and death (e.g., kill).

Apparatus

This study used the latest version of LIWC (LIWC2015) to analyze the corpus (Pennebaker et al., 2015). LIWC is a closed dictionary text analysis application that can produce results about various components in a written text, such as emotional and cognitive words. The

output includes summary variables and the hierarchical categories associated with each word. For example, many individuals living with OCD have comorbid depression; LIWC would be able to analyze any words associated with sadness and categorize them as a negative emotion, which is considered an affective process.

Statistical Analysis

RQs 1-4 are descriptive in nature and both raw word count and a normalized word count will be reported for each subcorpus. RQs 5-6 are inferential in nature examining for differences in the proportions. As such, the log-likelihood ratio test (G^2) was used. The effect size to be reported was the Bayesian information criterion (BIC), with the BIC strength descriptors from Fabozzi et al. (2014). Given the large number of comparisons planned, a family wise error rate of $p < 0.01$ was employed. R was used for all analyses.

Results

The results for the first four research questions (descriptive statistical analysis) can be found in Table 2.1. The most frequently used linguistic variable in both the autogenous and reactive corpuses was first person singular. In terms of RQs 5-6 (inferential statistical analysis), the psychological variables of insight and sexual had the strongest keyness in the autogenous corpus, and health and body had the strongest keyness in the reactive corpus. Complete keyness findings can be reviewed in Table 2.2. Supplemental results including proportional data can be found on this research project's Open Science Foundation website (<https://osf.io/9ujgt>).

Discussion

This study explored linguistic and psychological processes in online forum posts of individuals with autogenous and reactive types of OCD. RQs 1-4 examined use rates of linguistic and psychological processes amongst the two OCD subtypes. RQs 5-6 explored linguistic and

psychological process differences between the two OCD subtypes. The obtained results will be addressed to the research question in order.

In terms of RQ1 and RQ 3 (linguistic usage rates), what stands out is the statistical and effect size findings regarding the first personal singular in both subcorpus. There exist two probable reasons for this obtained result. The first reason is that the use of the first-person singular pronoun (I, me, my) is shown to be an indicator of mental health distress (Lyons et al., 2018; Tausczik & Pennebaker, 2010). The use of online forums by individuals with OCD expresses the subjective distress and anxiety that they are experiencing, thus frequently using the first-person singular pronouns. The second reason for this result is that users posting in the r/OCD subreddit may be exhibiting social withdrawal due to their anxiety disorder and are less likely to utilize third-person pronouns. Reddit users tend to be more conversational in neutral forums compared to anxiety forums, where they are less likely to ask questions or thank other posters (Ireland & Iserman, 2018). The most probable reason for the sizeable effect size of the first-person singular pronoun in both the autogenous and reactive corpus is that individuals seeking out the specific r/OCD subreddit are looking to find an outlet and subsequent support from other OCD sufferers pertaining to their symptoms. The use of “I,” “me,” and “my” conveys their experiences and requires self-disclosure.

RQ 2 looked at the use rate of psychological processes in the reactive corpus. The most frequently used variables were insight and health. There are a few probable reasons for these results. The first reason is that epidemiologically, the health variable relates directly to contamination, which is one of the most frequent types of reported obsessions (Bhikram et al., 2017). The second reason for the result is that psychologically, disgust plays a large role in experiencing contamination obsessions. The heightened experience of disgust is related to

heightened threat appraisals. This leads to more exaggerated fears which may then lead individuals to seek out support on Reddit to assuage their anxiety (Bikhram et al., 2017; Cisler et al., 2010). Lee and Kwon's (2003) research shows that though individuals with reactive obsessions tend to perceive the threat from their obsessions as being realistic or plausible, they also have insight that their reactions are excessive. Given the communal nature of online forums such as Reddit, it is probable that individuals who post about their OCD symptoms relating to health are seeking distress reassurance for the risk and fear that they attach to their obsessions despite the insight they possess about these thoughts being caused by OCD.

RQ 4 looked at the use rate of psychological processes in the autogenous corpus. Insight was the most frequently used psychological variable in the autogenous corpus. A likely explanation for this finding is that individuals with autogenous obsessions were found to have higher ratings on importance of thought. Because the nature of their obsessions is perceived as immoral or unacceptable, sufferers tend to spend more time ruminating about the thoughts and attempting to control them (Lee & Kwon, 2001). The LIWC insight variable includes words such as "think" or "know" (Pennebaker et al., 2010), and this would reflect an attempt on the individual's part to reassure themselves that their thoughts are not reflective of their values or moral character. Fergus (2013), in particular, found support for the notion that autogenous obsessions cannot be assuaged by modifying the environment like autogenous obsessions can by washing and cleaning *ad infinitum*. The only way to neutralize the anxiety from the obsessions was to engage in covert rituals such as thought control, which would explain the high frequency of using insight variables in the autogenous corpus. It seems very likely that individuals with repugnant obsessions regarding sex, harm, and religion would make much effort to distance

themselves from these intrusive thoughts by engaging in cognitive mitigation strategies to convince themselves that they are not actually capable of these acts.

In terms of RQ 5, which looked at the differences in use rates of linguistic processes, first-person singular in the autogenous corpus had a large effect size. Though both corpuses had frequent use of the first-person singular pronoun, it is probable that the observed proportion in the autogenous corpus was significantly larger because taboo and repugnant thoughts lead to increased levels of subjective distress. These types of thoughts increase self-conscious emotional reactivity of feelings such as shame and guilt. Additionally, the conflict between the individual's value system and the nature of the repugnant thoughts also leads to greater emotional distress (Berman et al., 2020). As previously discussed, first-person singular pronouns indicate mental health distress (Lyons et al., 2018; Tausczik & Pennebaker, 2010). Because individuals with autogenous obsessions experience increased self-conscious emotions which are linked to higher emotional reactivity, it would make sense that there is a higher use of first-person pronouns in the autogenous corpus.

In terms of RQ 6 which looked at the differences in use rates of psychological processes, the variable for sexual had the strongest keyness in the autogenous corpus. A likely explanation for this is that repugnant obsessions regarding sex have been found to be ego-dystonic in its sufferers. This causes anxiety and guilt because though they realize these thoughts are not aligned with their values and intent, they still cause a great deal of distress. Autogenous obsessions are more likely to cause the individual to ruminate about the meaning of having these types of repugnant obsessions (Lee & Kwon; Williams et al., 2015). The second explanation for why sexual obsessions may have been the most commonly reported type of autogenous obsession in the corpus, as opposed to religious or aggressive obsessions, is because of the

extremely taboo nature of pedophilia, incest, sexual harm, or abuse. Individuals fear their symptoms may be misunderstood as actual intent to harm others and may be subject to risk assessments and mandated reporting by the therapist (Veale et al., 2018). Mental health clinicians often misdiagnose OCD, especially when there are sexual obsessions about pedophilia and sexual orientation (Glazier et al., 2013). The sexual psychological variable most likely was the variable with the strongest keyness in the autogenous corpus due to the taboo nature of sexual obsessions and the accompanying shame and guilt that individuals experience, as well as the realistic fears of being reported or facing legal consequences for sharing the symptoms that they perceive as threatening. However, one of the hallmarks of OCD is uncertainty, which makes sharing symptoms with a clinician even more challenging. While individuals with OCD may know they would never act on them, the uncertainty of OCD makes them fear that they may actually be capable of causing harm to others.

The health and body variables had the strongest keyness in the reactive corpus. A probable reason for this is that contamination obsessions address health and bodily concerns due to the fear of germs, dirtiness, and contracting/spreading an illness from bodily fluids and environmental contaminants (Lee & Kwon, 2003). The subsequent compulsions are frequent handwashing, showering, and cleansing the body. Checking, symmetry, and repeating compulsions also fall under reactive obsessions, and they frequently include checking the body for signs of illness. Though the variable for body is also frequently used in the autogenous corpus to probably discuss sexual obsessions and the monitoring of bodily responses to these thoughts, the significant effect size of this variable in the reactive corpus supports previous research that germ aversion and excessive hand washing are hallmarks of contamination OCD (Brady et al., 2021; Vickers et al., 2017). The health variable could very well be representative of

the obsessions, and the body variable could be representative of the performed compulsions that are meant to neutralize the threat of the obsessions.

There were three limitations for this study. The first limitation is that while LIWC is able to categorize words into variable categories, there are lexical ambiguities that may not be detected. Because the unit of analysis was tokens, the context of the categorized words was not taken into consideration which could change the psychological tone of the word. The second limitation is that posts were scraped only from Reddit. There are many other sources of online support specifically created for individuals with OCD that were not included in this study. The last limitation is that because the sample scraped from Reddit was anonymous and did not include any information about the individuals posting in the forums, the results are not generalizable to any broad population.

There are several implications for counselors and other clinicians. The first is that there is a clear distinction between the autogenous and reactive subtypes of OCD, and the results of this LIWC study support the model of OCD set forth by Lee and Kwon (2003). Training counselors in diagnosis and assessment must include the heterogeneous nature of OCD and encompass the various presentations of obsessions. Another implication for practice relates to the fact that individuals with autogenous obsessions tend to place great importance on the meaning of the thoughts that they are experiencing and tend to ruminate about their values, character, and morals. Thus, practitioners must recognize this added level of distress that individuals experience and implement ERP treatment that acknowledges the nuances of autogenous obsessions. Clinicians must be cautious to not provide reassurance about the nature of the obsessions, as this reinforces the cognitive cycle of obsessions, while still providing emotional support for psychological distress. The high frequency of insight in both the autogenous and reactive corpus

translates to clinical practice, in that clinicians will most likely not be working with clients with overvalued ideation or even delusional beliefs, so the ERP treatment can be tailored to be more or less aggressive according to how ready the client feels to engage in exposures. Lastly, the use of first-person singular pronouns and expressions of distress found in both the reactive and autogenous corpus indicate high levels of mental health distress. Individuals seeking support on online forums may be similar to individuals in treatment who engage in constant reassurance-seeking. These behaviors could reinforce the social isolation they experience because friends and family members could become tired of providing reassurance. Clinicians could draw from the treatment approach of depression by Klerman (1984) to integrate interpersonal techniques to improve their relationships and social functioning.

There are several implications for future research drawn from this study. First, this corpus linguistics study was limited to Reddit posts, whereas many other blogs, forums, and websites containing experiences of individuals with OCD exist. Studying these additional sources could provide more insight into subjective experiences of autogenous and reactive obsessions. Future research could also explore the specific themes of obsessions that fall under these subtypes. There have been a few corpus linguistics done on sexual orientation OCD (SO-OCD), but the other types of obsessions have not been studied on their own. Additional linguistic studies can also contribute to the existing body of literature about autogenous and reactive obsessions by focusing on specific psychological variables that have been identified as being hallmarks of these obsessions such as disgust, guilt, and responsibility (Shapiro & Stewart, 2011). Lastly, previous research has shown higher levels of emotional distress and suicidality in individuals with autogenous obsessions. A corpus linguistic study looking at the language of suicidality in OCD

posts could shed light on how clinicians could effectively target the core of what may drive individuals who have OCD to die by suicide.

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Table 2.1*Results for RQs 1-4*

Category	Variable	Autogenous		Reactive	
		Raw Count	Norm. Count	Raw Count	Norm. Count
Linguistic	1 st ps	381,775	106,300	227,024	99,400
Linguistic	1 st pp	7,182	2,000	4,796	2,100
Linguistic	3 rd ps	32,682	9,100	18,499	8,100
Linguistic	3 rd pp	21,548	6,000	13,018	5,700
Psychological	anger	27,654	7,700	13,703	6,000
Psychological	anxiety	56,027	15,600	33,117	14,500
Psychological	body	29,091	8,100	22,154	9,700
Psychological	cause	68,956	19,200	45,222	19,800
Psychological	certain	63,928	17,800	41,796	18,300
Psychological	death	6,823	1,900	2,969	1,300
Psychological	discrep.	72,189	20,100	43,623	19,100
Psychological	future	36,633	10,200	24,438	10,700
Psychological	health	58,182	16,200	47,734	20,900
Psychological	insight	152,638	42,600	79,938	35,000
Psychological	religion	7,182	2,000	4,111	1,800
Psychological	risk	27,654	7,700	18,728	8,200
Psychological	negemo	143,659	40,000	78,796	34,500
Psychological	sexual	34,478	9,600	7,537	3,300
Psychological	swear	10,415	2,900	4,567	2,000

Table 2.2*Results for RQs 5-6*

Cat.	Variable	Autogenous Norm. Ct.	Reactive Norm. Ct.	G^2	<i>BIC</i>	BIC Description
Psy	sexual	9,600	3,300	8651.1	8635.51	Very Strong
Psy	insight	42,600	35,000	2015.36	1999.77	Very Strong
Psy	health	16,200	20,900	1682.94	1667.36	Very Strong
Psy	negemo	40,000	34,500	1128.62	1113.03	Very Strong
Ling	1 st ps	106,300	99,400	644.79	629.20	Very Strong
Psy	anger	7,700	6,000	585.16	569.58	Very Strong
Psy	swear	2,900	2,000	457.98	442.39	Very Strong
Psy	body	8,100	9,700	404.83	389.25	Very Strong
Psy	death	1,900	1,300	311.67	296.08	Very Strong
Ling	3 rd ps	9,100	8,100	161.73	146.15	Very Strong
Psy	anxiety	15,600	14,500	111.97	96.38	Very Strong

Note. $p < .01$, adjusted error rate = .002778, $Df = 1$, critical value = 9.05

Chapter 3: Manuscript 2

**A Collocation Study of Autogenous and Reactive Obsessions in Obsessive-Compulsive
Disorder**

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The research presented in this manuscript was part of the first author's dissertation and was conducted under the approval of the Oregon State University Institutional Review Board (Study ID 2019-0374). Correspondence concerning this article should be addressed to Stella Kim, Counseling Academic Unit, Oregon State University, 104 Furman Hall, Corvallis, OR, 97331-3502. Email: kimstel@oregonstate.edu

Abstract

This study explored the subjective experiences of individuals with autogenous and reactive forms of obsessions in obsessive-compulsive disorder. Past studies have found greater levels of shame, stigma, and concealment for those experiencing lesser-known forms of OCD, particularly those that deal with sexual themes. This study looked at what words most differentiated (i.e., keyness analysis) these subtypes. In addition, the word networks (i.e., collocates) of the words that most differentiated the subtypes were examined. The keywords “sexual” and “POCD” had the strongest keyness in the autogenous corpus. Contamination and checking had the strongest keyness in the reactive corpus. The collocates of the node words in the autogenous corpus show a focus on the intrusive thoughts themselves, whereas the collocates in the reactive corpus focus on performing compulsions such as checking. Limitations, clinical implications, and future research recommendations are discussed.

Keywords: reactive OCD, autogenous OCD, obsessive compulsive disorder, corpus linguistics

A Corpus Based Examination of the Reactive and Autogenous Forms of OCD

For different people, what comes to mind when they think of obsessive compulsive disorder can relate to fear of germs, excessive washing of hands, compulsive need to put things in order, or habit of counting things. However, people who suffer from OCD also experience thoughts such as violent and sexual obsessions. Many of these individuals fear that the general population, including mental health clinicians, will not be able to understand their symptoms and may even end up facing criminal consequences due to the nature of their intrusive thoughts. With the increased accessibility of technology and online forums, people who are unable to access treatment for lesser-known types of OCD can express themselves anonymously and crowdsource support and information. Written narratives can provide a wealth of information about psychological processes through examining linguistic and psychological dimensions of online posts. The goal of such an examination would be to illuminate the experiences of the different types of obsessions.

This study sought to contribute research to the existing literature about the linguistic processes of individuals who live with OCD. To date, there have been only two corpus linguistics studies that looked at OCD, and they looked only at the sexual orientation subtype of OCD (Coimbra-Gomes, 2020; Coimbra-Gomes & Motschenbacher, 2019). This study also aims to enrich the knowledge base for clinicians to understand the psychological and linguistic processes associated with different subtypes of OCD. Linguistic processes can uncover connections in language and discourse (Brezina, 2018). The lack of access to trained clinicians is a major issue in treating individuals with OCD; research has found that clinicians need to be more educated to learn about the heterogeneity of OCD (Glazier et al., 2013). In addition to lack of access, clinician incompetence continues to be a major issue, as traditional cognitive-

behavioral therapy (CBT) does not adequately treat symptoms of OCD, and the gold standard for OCD, exposure and response prevention (ERP), is not commonly taught in training programs.

This study can help clinicians learn about subtypes of OCD while also understanding the unique psychological processes associated with each subtype. In particular, feelings of guilt and shame have been found to be associated more with the autogenous subtype of OCD (Lee & Kwon, 2003). Targeting specific psychological processes unique to the subtypes can help to build trust between clients and clinicians, as well as to choose interventions that target specific emotional distress linked to that subtype.

In reviewing the literature on language and OCD, four themes emerged: (a) features of autogenous obsessions, (b) features of reactive obsessions, (c) avoidance of formal treatment due to stigma, and (d) common psychological themes of help-seeking individuals with OCD on online forums. After a review of the literature, the research questions for this study will be discussed.

Autogenous obsessions tend to occur without external stimuli to trigger the intrusive thought and contain ego-dystonic themes (Lee & Kwon, 2003). These types of intrusive thoughts are considered by individuals experiencing them to be repugnant, taboo, and ego-dystonic, and therefore are experienced as threatening to their self-perceptions (Moulding et al., 2013). In particular, autogenous obsessions about sexual themes such as pedophilia are more likely to be perceived by these individuals as less acceptable than other types of obsessions (Cathey & Wetterneck, 2013). Autogenous obsessions are therefore less likely to be disclosed to others due to fears of social rejection and disapproval. Another feature of autogenous obsessions is the construct of mental contamination, which individuals can experience after having a repugnant thought (Rachman, 2006). Scrupulosity or religious OCD has been found to be associated with a

construct in which individuals feel an inner sense of dirtiness without the presence of an external trigger (Fergus & Rowatt, 2014). Autogenous obsessions, when compared to reactive obsessions, tend to cause intense emotional distress in individuals due to the ego-dystonic nature of the thoughts as well as the negative inferences about the self that are created from them.

Reactive obsessions are triggered by external stimuli and set off a set of compulsive behaviors to undo the threat of these thoughts. These types of obsessions are more often described as being realistic due to having an identifiable trigger that the individual experiences (Lee & Kwon, 2003). These obsessions are related to contamination, symmetry, mistakes, and accidents. In contrast to autogenous obsessions, reactive obsessions provoke anxiety not so much due to the thoughts themselves but more because of their potential negative consequences (Lee et al., 2005). Reactive obsessions also tend to have more observable compulsions such as washing, checking, and ordering, due to the need to prevent bad things from occurring (Moulding et al., 2006). Individuals experiencing autogenous and reactive subtypes of OCD often express hesitation to seek treatment due to a myriad of fears and social stigmas.

Individuals with OCD anticipate stigma from others and experience self-stigma. They fear that they will be viewed as mentally “ill” or not “normal” by others. In particular, repugnant or forbidden obsessions related to sexual themes and harm can carry more stigma than other types of obsessions. A study by Cathey and Wetterneck (2013) found that sexual obsessions were met with more social rejection than contamination obsessions. Within sexual obsessions, individuals with pedophilia OCD (POCD) experience much more external stigma than those with sexual orientation OCD (SO-OCD; Snethen & Warman, 2018). Similarly, Homonoff and Sciotto (2019) found that individuals with harm OCD were met with more stigmatizing attitudes by others than were individuals with “just right” obsessions. They also experience a crisis of self-

conception as many of their obsessions are intrusive and go against their beliefs. These studies highlight the challenges that individuals with autogenous obsessions experience in sharing about their symptoms with others as well as having to reckon with ego-dystonic thoughts within themselves.

In addition to stigma from others and self-stigma, a few studies have looked at clinicians' stigmatization of attitudes toward individuals with various types of obsessions. Specifically, clinicians were found to hold the most socially rejecting attitudes toward individuals who experienced sexual obsessions. Interestingly, researchers also found that contamination was met with as much stigma as harm obsessions. Scrupulous or religious obsessions were met with the least amount of social rejection (Steinberg & Wetterneck, 2017). Psychiatrists also reported negative attitudes toward their patients with OCD, expressing annoyance that they talked too much, were too needy, were not compliant with treatment, and were difficult to treat (Kusalaruk et al., 2015). In addition to stigma, many clinicians failed in their differential diagnosis to correctly identify taboo thoughts and autogenous obsessions as OCD symptoms. They were the least accurate in identifying sexual obsessions about sexual orientation (77.0%), sexual obsessions about pedophilia (42.9%), aggressive obsessions (31.5%), and religious obsessions (28.8%; Glazier et al., 2013). Many individuals who fear stigma and the consequences of misidentification of OCD turn to online forums to seek support and information about their symptoms instead of seeking formal treatment.

Due to stigma and shame, individuals experiencing symptoms of OCD often avoid seeking formal treatment. Those experiencing repugnant or forbidden obsessions related to the autogenous subtype of OCD were more likely to express a fear of involuntary hospitalization than those with other types of obsessions due to being misdiagnosed by clinicians (Glazier et al.,

2015). A qualitative study found that individuals did not seek formal treatment due to external factors such as fearing clinicians' reactions to their symptoms and a fear of criminalization, particularly among those with sexual obsessions. Glazier et al. (2015) also found internal psychological barriers such as individuals thinking that their symptoms were not severe enough compared with other psychological disorders to seek help or that they did not deserve to get help (Robinson et al., 2017). They were also found to have higher levels of self-concealment compared to individuals without OCD, and this self-concealment was more prevalent in individuals experiencing repugnant obsessions (Wheaton et al., 2016). Due to these internal and external barriers, formal treatment may not be a plausible option for many individuals suffering with OCD. With the increased use of technology and communication, other methods such as virtual communities have become options for obtaining support.

Individuals with OCD seek help on online forums for various reasons. Among cited reasons for using online communication are the amount of easily accessible information about symptoms and treatment, tips about living with OCD, and being able to communicate with a supportive community (Stein, 1997). Virtual space for blogs and forum posts written by individuals with OCD can provide insight into clinical implications as well. A study by Campbell and Longhurst (2013) found that there were gendered differences in the ways the posters expressed their experiences with OCD. Females were more likely to conceptualize it as a journey, while males saw it as a battle. This could be helpful in conceptualizing how an individual may approach treatment and how adaptable they might be to challenges they face. They also found that individuals were more likely to post when in distress to gain social support from others (Campbell & Longhurst, 2013). These few studies show that a closer examination of

online communication can uncover individuals' subjective experiences and enrich the understanding of individuals' experiences and how to treat nuances of OCD.

Statement of Research Questions

There were six research questions that guided this study:

- RQ1 What words most differentiate autogenous obsession posts from reactive obsessions posts?
- RQ2 What words most differentiate reactive obsession posts from autogenous obsession posts?
- RQ3 In online posts of individuals experiencing autogenous obsessions, what are the collocates of the word with the strongest keyness?
- RQ4 In online posts of individuals experiencing autogenous obsessions, what are the collocates of the word with the second strongest keyness?
- RQ5 In online posts of individuals experiencing reactive obsessions, what are the collocates of the word with the strongest keyness?
- RQ6 In online posts of individuals experiencing reactive obsessions, what are the collocates of the word with the second strongest keyness?

Method

Design

A synchronic corpus linguistic design was used for this study. The variables were word usage uniqueness (i.e., keyness) and word relatedness (i.e., collocation). The corpora were drawn from online posts by individuals with autogenous obsessions and reactive obsessions. The level of measure was continuous. The unit of analysis was individual words.

To determine the power required for this study, a power analysis was done in G*Power 3.1 to determine the requisite sample size for an adequately powered study (Faul et al., 2009). Since the planned analyses involved a chi-square derivative, Cohen's w was the relevant effect size. The Cohen's w was drawn from an anxiety study (Helle et al., 2016). The following input parameters were employed: (a) test family = χ^2 tests; (b) statistical test = goodness-of-fit tests: contingency tables; (c) power analysis = compute required sample size, given α , power, and effect size; (d) effect size $w = 0.17$; (e) α error probability = .01, (f) power (1- β error probability) = 0.80; and (g) degrees of freedom = 1. The G*Power 3.1 output parameters were: (a) total sample size = 405 and (b) actual power = 0.80.

Corpus

The corpus for this study was the same as used by Kim and Dykeman (2021) for a study of OCD subtypes examining personological and function word use. The register was blogging, and the subregister was blogging about OCD. There were two subcorpuses: autogenous and reactive.

Reactive Subcorpus

Register, Scope, and Sources. The scope was public posts on OCD made by individuals in Reddit API. This corpus contained posts written by individuals with the reactive type of obsessions of OCD identified by the cognitive processes model of Kwon and Lee (2003). The autogenous subtype corpus included posts about symmetry, ordering, checking, and contamination. Reddit was scraped on January 25, 2021, and resulted in 949,264 tokens in the autogenous corpus.

Preprocessing. All words were converted to lowercase letters, punctuation was removed, and all words were converted to a .txt file. Words that were not single-token, such as HOCD

(harm obsessive compulsive disorder), were kept as written in the forums. Stopwords were filtered out to focus on meaningful words. The stopword list used was from the NLTK (Bleier, 2021). The corpora were checked for non-standard orthography including typing errors and spelling errors. All abbreviations were also changed to spell out the full words (e.g., “idk” to “I don’t know”). The corpora were converted to .txt files and uploaded into #Lancsbox.

Autogenous Subcorpus

Register, Scope and Sources. The register was the same as for the reactive corpus. The scope was posts that were classified as autogenous obsessions. The autogenous subtype corpus includes repugnant obsessions such as harm OCD, scrupulosity OCD, pedophilia OCD, and responsibility OCD that appeared from January 25, 2021, to the oldest existing post on Reddit. The total number of tokens for the reactive corpus was 1,413,950.

Preprocessing. The preprocessing was the same as for the reactive corpus.

Measures

Node Words

A node word is the focus of analyses in a collocation study. A node word is the word of interest or “any word which the user wishes to interrogate” (Baker, 2016, p. 141). Node words are used to rank collocates on how frequently they co-occur in the corpus. Collocation studies are used to study the strength of the relationship between a node and collocate (Brezina et al., 2015).

Keyness

Keyness describes words that are important in a corpus and that indicate what a text is really about (Scott & Tribble, 2006). These words occur frequently in the specific corpus that are infrequent in others. Keyness analysis identifies words that are salient and reflective of the subject of the text (Jensen, 2020).

Collocation

Collocation is the repeated co-occurrence of words in texts. Collocations create opportunities to study the connection between words, and corpus techniques uncover the strength of associations between words that frequently co-occur (Brezina, 2018).

Apparatus

WordSmith Tools 8.0

WordSmith Tools is a program that examines how words are used in texts. Keywords were identified by comparing the tokens of the corpora to determine the frequency in which they appear.

Collocation Graph (GraphColl)

GraphColl is an analysis tool in #Lancsbox that analyzes collocation networks (Brezina et al., 2018). After a corpus is loaded, node words are searched in the corpus to identify collocates using specific parameters for the search settings. This tool visually displays linguistic collocations of identified node words. Node words and their collocates are represented with lines that represent the strength of their relationships. The length of the line is inversely proportional to the strength of the relationship between the words. Darker colors represent higher frequencies of collocates, and the position of the collocates around the node words represent the position (to the left or right of node) where they tend to appear in the corpora (Brezina et al., 2015).

Data Analysis

For the first two research questions, a log-likelihood ratio test (G^2) was used for analysis of keywords in the autogenous and reactive subcorpora using procedures from Egbert and Biber (2019). The top ten keywords for each corpus are reported. The effect size was Bayesian information criterion (BIC). The BIC strength descriptors were drawn from (Fabozzi et al.,

2014). Wordsmith Tools 8.0 (Smith, 2020) was used for the keyness analysis with the alpha set at 01.

In terms of RQs 3-6, the collocation parameters were: statistic ID = 5, statistic name = Mutual Information (MI³), the span of the left and right context = 5, statistic cut-off value =20, minimum collocate frequencies in the corpus =20, and filter = NLTK stopwords (Brezina, 2018). All analyses occurred via #Lancsbox's feature (Brezina et al., 2018).

Results

The results for RQs 1-2 were identified using Wordsmith Tools 8.0. The top ten keywords with the strongest keyness for the autogenous and reactive corpuses can be found in Table 1. RQs 3-6 looked at collocates with the strongest keyness, and the complete GraphColls are in Figures 1-4. Supplemental results including proportional data can be found on this research project's Open Science Foundation website (<https://osf.io/43ame/>)

Discussion

This study looked at collocations of words in online posts of individuals with autogenous and reactive obsessions. The first two research questions looked at which words in the reactive and autogenous corpuses that most differentiated each corpus from the other. RQs 3-4 looked at the collocates of the words "checking" and "sexual," which were the words with the strongest keyness in the reactive and autogenous corpuses, respectively. RQs 5-6 looked at the collocates of "contamination" and "POCD" which were the words with the second strongest keyness.

RQ1 looked at what words most differentiated the autogenous corpus from the reactive corpus. The tokens with the strongest keyness were "sexual" and "POCD." The most basic explanation for this finding is that amongst the heterogeneous themes of OCD, unwanted sexual or aggressive thoughts have been found to be particularly distressing and repugnant to the

individual. These types of obsessions have been linked to greater levels of distress and negative self-beliefs (Moulding et al., 2014). A subset of unwanted sexual thoughts often relates to sexually harming children and fearing being a pedophile (Bruce et al., 2018). In addition to the nature of these obsessions, as well as the fear of being misdiagnosed and not receiving the proper treatment from mental health professionals could lead to increased levels of distress and hopelessness, thus prompting individuals suffering from POCD to seek advice in online forums.

RQ2 looked at the words that most differentiate the reactive corpus from the autogenous corpus. The words with the strongest keyness in this corpus were checking and contamination. One explanation of these results is that these two words are related to a very common compulsion and obsession experienced by many OCD sufferers. A more nuanced explanation could be that individuals post frequently about checking rituals on Reddit because consistent with past research, there is an inflated perception of responsibility for harm that individuals then seek relief from by performing compulsions (Foa et al., 2002). A hallmark of reactive obsessions is that they are triggered by external stimuli (Lee & Kwon, 2001), so it would make sense that individuals would then act to neutralize the threats posed by the intrusive thoughts. Similarly, contamination fears are also associated with inflated estimates of threat and responsibility (Wheaton et al., 2010).

In terms of RQ3, two main themes emerged about the collocates for the word “sexual.” The first theme has to do with the ego-dystonic nature of the obsessions and includes the collocates “thoughts,” “intrusive,” “assault,” “abuse,” and “never.” It is noteworthy that the strongest collocate is “thoughts,” which means that individuals posting on the Reddit forum about sexual OCD were posting about their obsessions, not their compulsions. This is consistent with the autogenous subtype of OCD where individuals experience intrusive thoughts but do not

have physical, observable compulsions (Lee & Kwon, 2001). The top words used to describe these intrusive thoughts are “assault” and “abuse,” which may indicate that these individuals possess the insight to know that the thoughts they experience are not in line with their actual sexual desires and morals which would cause harm to others. This may be further supported by the word “intrusive” which is often indicative of how the individual would never act on these thoughts or have the desire to do so.

The second theme that emerged was about the narrative of what the thoughts might mean for the individual. The words “attraction” and “orientation” were strong collocates and could indicate the doubt that OCD introduces for individuals about sexual orientation. Because a clinical feature of sexual obsessions is the distress related to what the meaning of having these types of thoughts is, these collocates could be indicative of the rumination with which the individual engages (Vella-Zarb et al., 2017).

RQ4 looked at the collocates of “POCD,” which had the second strongest keyness in the autogenous corpus. Similar to the previous research question, the word “thoughts” was a strong collocate. This could indicate that the individuals experiencing obsessions about pedophilia experience intrusive obsessions and write about them in the Reddit forums. Because “thoughts” is a strong collocate and is linked to the obsessions, this further supports Lee and Kwon’s (2003) model of OCD which posits that autogenous obsessions do not have to be triggered by specific external stimuli. Once these thoughts are introduced, subsequent thoughts could also be related to the rumination individuals engage in to reassure themselves. Another theme related to POCD can be seen with the collocates “HOCD” and “ROCD.” These are subtypes of sexual obsessions that are related to sexual orientation and relationship substantiation. In both cases, an explanation for why these were strong collocates is that the obsessions have to do with attraction to others.

An individual experiencing pedophilic intrusive thoughts could very well then experience anxiety and distress about their own sexual identity or relationships, as catastrophic thoughts about being in the wrong relationship were found to predict the presence of ROCD (Melli et al., 2018). It is also possible that these three subtypes of sexual obsessions can be related, as the rituals can be similar in nature. Individuals will often look at photos, watch movies, or look at other stimuli and scan their bodies for signs of arousal that would support or discredit the obsessive thought (Doron et al., 2016; Vella-Zarb et al., 2017; Williams, 2008).

RQ5 looked at the collocates of the word with the strongest keyness in the reactive corpus. The collocates for checking included words describing the common compulsive rituals that accompany reactive obsessions. To neutralize the threat posed by the intrusive thought, words that accompanied checking such as “things,” “locks,” and “doors” substantiate the cognitive processing model of OCD (Lee & Kwon, 2001) by showing how individuals modify their environments to perform observable acts. The other collocates such as “sure” and “constantly” convey one of the hallmarks of OCD, which is uncertainty. The rituals performed in response to reactive obsessions serve to ascertain some level of reassurance and certainty that the rituals will prevent a negative outcome for the individual. These collocates are consistent with past research which showed that IU (intolerance of uncertainty) is especially prevalent and significant in individuals with checking rituals (Tolin et al., 2003).

RQ6 addressed the collocates of the word “contamination,” which had the second strongest keyness in the reactive corpus. The words “fear,” “fears,” and “germs” were strong collocates. There are a few explanations for this result. The first is that reactive obsessions, such as intrusive thoughts about contamination, are triggered by external stimuli in the immediate environment, such as touching a doorknob. This could then trigger the fearful thought that the

individual may get sick, contract an illness, or pass the germs onto someone else. Thus, fears of unwanted and negative consequences are a hallmark of reactive obsessions. More specifically, research about contamination OCD has shown that there are specific dimensions to these fears that center around disgust responses. Higher ratings of disgust propensity and sensitivity predicted contamination obsessions, with fears of contagions underlying the feelings of disgust (Olatunji et al., 2004). Another finding is that the word “anyone” was also a strong collocate for “contamination.” Compared to the autogenous corpus, this is the rare keyword that includes a word that references others. Past research has shown that contamination OCD is accompanied by inflated sense of responsibility, as well as interpersonal concerns about protecting others (Ashbaugh et al., 2006). Because there is an inflated sense of responsibility to prevent harm from coming to others, there is also excessive interpersonal reassurance seeking involved with this form of OCD, which could also explain the frequency of other-directed words such as “anyone” appearing in this corpus (Leonart & Radomsky, 2019).

This study used a collocation study design which has two main limitations. First, the corpus was selected and built from one source, which was the OCD subreddit forum. Additional sources of posts could have diversified the corpora, as Reddit is an anonymous forum that specific users might utilize to write about topics that they would not share elsewhere. The second limitation is that while collocations provide important insight into language usage and expressions of subjective experiences, it does not equate to definitive conclusions about the context in which these words appeared in the corpora.

There are three clinical implications from these findings. The first implication is that this study supports the model of OCD developed by Lee and Kwon (2001) that shows the differentiation between autogenous and reactive obsessions and their symptom manifestations.

Clinicians must be trained to understand the nuances and heterogeneity of the various subtypes of OCD to be able to competently assess and treat these symptoms. Secondly, the collocations for both the reactive and autogenous corpuses show that there are linkages between the underlying psychological processes, such as the connection of pedophilia OCD to ruminations about sexual orientation (HOCD) and relationship substantiation (ROCD), and the linkage between responsibility, disgust, and harm in contamination OCD. These are important nuances that need attention in treatment, in addition to the gold standard ERP, for the progress and outcomes of interventions to be successful. The third clinical implication is that clinicians must incorporate the interpersonal aspects of OCD. For example, contamination fears could affect family members, friends, and other familiar people close to the individual by involving them in the decontamination, cleaning, and disinfecting rituals. These individuals must also be involved in treatment to learn to respond effectively to reassurance seeking from the affected individual, as this is a form of avoidance that runs counter to the goals of ERP. Similarly, sexual obsessions also involve interpersonal components as the affected individual will frequently perform checking rituals to confirm or invalidate their obsessions about attraction to their partners.

In terms of research implications, the research body needs more studies on clinician competency, familiarity, and confidence in working with various presentations of OCD. This study shows the heterogeneity and complex nuances of OCD, as well as the shortcomings of clinician knowledge on treating repugnant obsessions such as POCD. The lack of clinician familiarity with autogenous obsessions could lead to OCD being mistaken for sexual paraphilias and cause more harm to the individual with OCD. It also can perpetuate the cycle of shame and secrecy that individuals experiencing repugnant obsessions experience. More studies about the interpersonal aspects of OCD would also add to the complexity and nuanced understanding of

the various subtypes of obsessions. There have been a few studies that show the effects of family and partners' responses to OCD that affect symptoms, and it is clear from the results of this study that psychological processes such as harm, ruminations about responsibility to others, and worries about relationships play a large role in OCD.

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Table 3.1*Keyness Results (RQs 1 & 2)*

OCD Type	Rank Order	G^2	BIC	BIC Descriptor
Autogenous	1 sexual	2,550.36	2,535.57	Very strong
	2 POCD	2,359.52	2,344.73	Very strong
	3 harm	1,497.00	1,482.21	Very strong
	4 HOCD	1,425.18	1,410.38	Very strong
	5 gay	989.94	975.15	Very strong
	6 attracted	934.33	919.54	Very strong
	7 sex	812.39	797.60	Very strong
	8 porn	799.68	784.89	Very strong
	9 pedophile	751.61	736.82	Very strong
	10 children	727.73	712.94	Very strong
Reactive	1 checking	3,818.78	3,803.98	Very strong
	2 contamination	3,145.29	3,130.50	Very strong
	3 hands	1,800.29	1,785.50	Very strong
	4 wash	1,185.10	1,170.30	Very strong
	5 counting	1,113.32	1,098.53	Very strong
	6 check	1,058.47	1,043.67	Very strong
	7 clean	961.29	946.50	Very strong
	8 contaminated	902.85	888.06	Very strong
	9 washing	888.94	874.15	Very strong
	10 door	849.12	834.32	Very strong

Figure 3.1

First-order Collocates of Sexual (RQ 3)

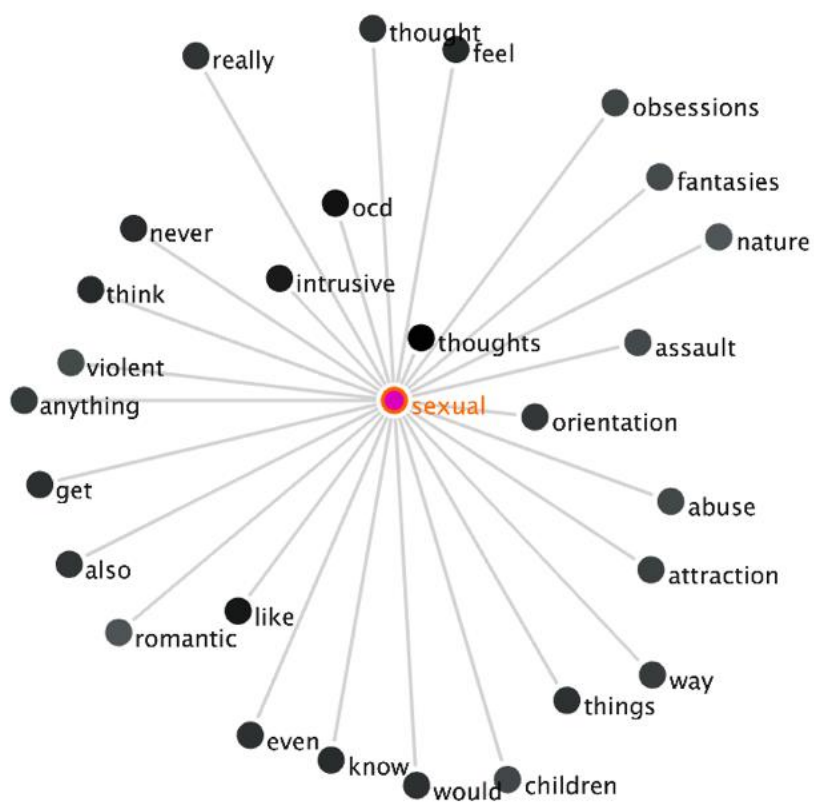


Figure 3.2

First-order Collocates of POCD (RQ 4)



Figure 3.3

First-order Collocates of Checking (RQ 5)

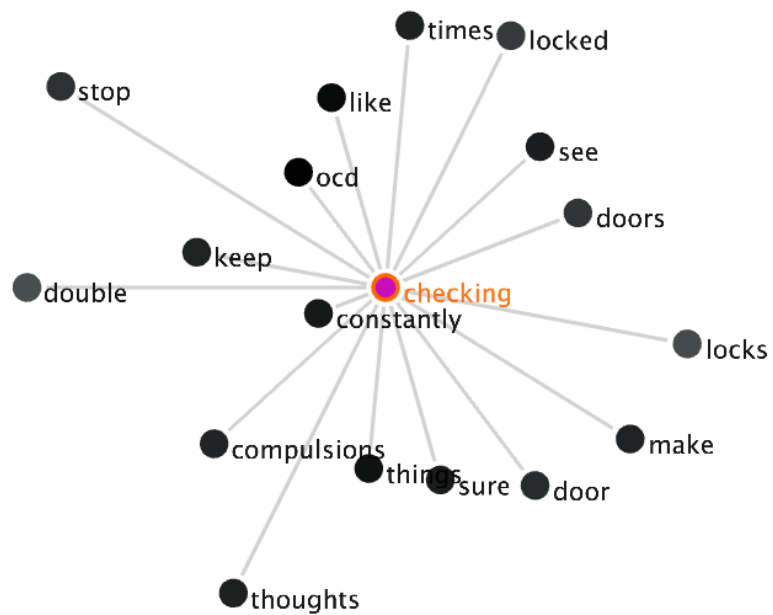
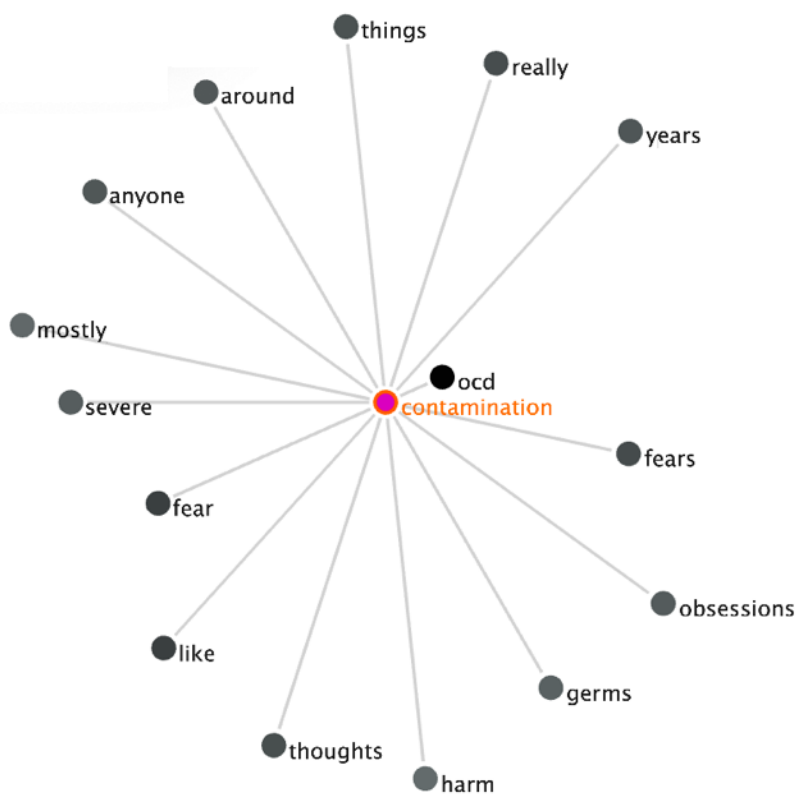


Figure 3.4

First-order Collocates of Contamination (RQ 6)



Chapter 4: A General Conclusion

Clinical mental health counselors are tasked with possessing and demonstrating knowledge of treating various psychological disorders (CACREP, 2016). OCD has a 2.3% lifetime prevalence rate (NIMH, n.d.), and specialized knowledge to identify and treat lesser-known types of obsessions and compulsions is required. Current research shows the heterogeneity of the presentation of OCD, as well as the lack of training and knowledge amongst clinicians in identifying and treating lesser-known forms of OCD (Glazier et al., 2015; Stahnke, 2021). A major concern of individuals seeking out counseling for repugnant obsessions is the fear of being inaccurately assessed by a clinician who is not familiar with these types of symptoms. A counselor who does not possess the knowledge to assess for these types of obsessions can cause harm to clients by reporting them as a risk to themselves or others. Understanding the nuances of OCD and understanding the linguistic and psychological processes of this disorder could provide skills and increase competence for counselors to work with individuals with OCD.

This dissertation examined the linguistic and psychological aspects of OCD in public Reddit posts, and this chapter summarizes the findings of the studies. I review the results of the LIWC and collocation studies, their limitations, and their clinical implications. I also discuss future research implications and my own agenda for continuing further research on this topic.

Summary of Findings

The first study, “Linguistic and Psychological Features of Autogenous and Reactive Obsessions in Obsessive-Compulsive Disorder,” showed that there is a delineation between the types of words used when individuals with autogenous and reactive obsessions talk about their symptoms. The LIWC variables “sexual” and “insight” in the autogenous corpus and “health” and “body” in the reactive corpus had the largest effect sizes. In terms of linguistic variables,

first-person singular and third-person singular had larger effect sizes in the autogenous corpus. First-person plural was the only linguistic variable that did not have a statistically significant level.

The second study, “A Collocation Study of Autogenous and Reactive Obsessions in Obsessive-Compulsive Disorder,” showed that the words with the strongest keyness in the two corpora had very large effect sizes. This supports the literature that proposes separating out these two types of obsessions when assessing for OCD. Similar to the findings from the first study, the words with the strongest keyness in the autogenous corpus were “sexual” and “POCD.” This is consistent with existing research that shows the distressing nature of repugnant obsessions and the way individuals utilize online forums to disclose these types of symptoms that they might otherwise be too afraid to share. In the reactive corpus, “checking” and “contamination” had the strongest keyness. The collocates for these node words fit in with the autogenous/reactive model of OCD (Lee & Kwon, 2003), which describes reactive obsessions as being triggered by external stimulus in the environment that is then followed by a compulsion to neutralize the threat and anxiety of the obsession.

Limitations

These studies have several limitations. The first study analyzed 15 psychological LIWC variables (Pennebaker et al., 2015). These variables were chosen based on their relevance to various themes of intrusive thoughts in OCD (e.g., LIWC variable “religion” was chosen for scrupulosity obsessions). It might be possible that the inclusion of additional variables may have changed the outcome of the results or the frequency of words in certain categories. Another limitation is that while corpus linguistic studies can provide information about word usage, they do not provide any firm conclusions about the bodies of text. The unit of analysis in the two

studies was tokens, which does not allow for any context for the words being analyzed. The meanings of words could change according to the context in which they were used. Additionally, the corpora were constructed from only one source, which did not allow for a collection of posts from different sources.

Thematic Link

In both studies in this dissertation, the corpora and research questions were based on the model of OCD developed by Lee and Kwon (2003). This model suggests that there are two different types of obsessions that vary by the evoking stimuli, cognitive processes, and content of thoughts. The autogenous and reactive forms of obsessions served as the foundations for structuring the research questions and analyses of the corpora. The psychological and linguistic variables from the first study are also related to the node words used for analysis in the second study. The variables, such as health, sexual, and body, were related to themes of OCD, such as repugnant thoughts about sex and concerns about contamination that came up as collocates of the node words in the collocation study.

Recommendation for Future Research

There are several different directions for future research. The first direction would involve conducting corpus-based studies about each individual theme of OCD. To date, there have been only targeted studies like this about sexual orientation OCD (SO-OCD or HOCD) that use corpus-based methods (Coimbra-Gomes, 2020; Coimbra-Gomes, E., & Motschenbacher, 2019). Conducting LIWC and collocation studies about each theme of OCD could provide information about the most salient themes that appear in written word. It could highlight unique aspects of individuals' experiences that have these types of obsessions, as well as bring understanding to the most prevalent shared psychological processes. Past researchers have

already attempted to look at shared symptom dimensions that exist across different presentations of OCD. The Dimensional Obsessive-Compulsive Scale (DOCS) categories are contamination, responsibility for harm, unacceptable thoughts, and incompleteness (Abramowitz et al., 2010). Further LIWC and collocation studies could substantiate these symptom dimensions, as well as create psychological process dimensions that exist across different types of obsessions.

The second direction would be to expand corpora construction using different sources to diversify the narratives used in the research. In addition to online forums such as Reddit, OCD Action, and PsychForums, the use of online therapies and app-based treatments such as NOCD have risen in popularity (Gershkovich et al., 2021; Hong et al., 2020). These treatments combine app-based interventions and direct communications with a therapist. With participant consent and de-identification of data, the written communications about symptoms could be analyzed using corpus linguistics. A past study extracted app-based communications from NOCD to identify subtypes of OCD among 25,369 individuals (Feusner et al., 2021). This illustrates the breadth of data available through treatment apps and the potential to conduct future studies by following the development of technology and its use in clinical treatment.

The third direction would be to target specific populations to look at the experiences of individuals through a multicultural lens. Past research shows that degree of religiosity plays a role in the level of distress experienced from OCD, and specifically with scrupulosity concerns (Altin, 2009; Inozu et al., 2012). This future research could also shed more light on symptom presentations and perceptions amongst other groups such as Orthodox Jewish communities where the intersection of religion and mental illness could be more difficult to establish (Huppert et al., 2007; Huppert & Siev, 2010). A recent study looked at symptom presentations across age,

culture, and gender (Hunt, 2020). This could also be studied using corpus linguistics, though it might be challenging due to the frequently anonymous nature of online posts.

Implications for Future Practice

There are several implications for future practice drawn from these studies. The overarching implication is the need to train counselors to be competent in identifying the heterogeneous nature of OCD and being able to parse out intrusive thoughts from ones that actually pose danger to the client or others. The top keywords in the collocation study for the autogenous corpus were related to sexual themes, while the reactive corpus was about contamination fears and checking behaviors. The studies demonstrated a clear differentiation between the words used to describe autogenous obsessions and reactive obsessions.

The results of the first study showed that there is a high level of insight in both corpuses. In most cases of OCD, individuals possess the knowledge that their obsessions are not infused with their desires or moral character. However, a small subset of individuals with OCD have overvalued ideation, which means that they are not able to identify and acknowledge the senselessness of their thoughts. Insight has been found to be a predictor of treatment outcomes, with those lacking insight having worse outcomes than those who possess insight into their symptoms (Himle et al., 2006). Thus, treating clinicians must be able to assess for insight prior to starting treatment, as CBT or ERP may not be successful with those who do not possess insight (Neziroglu et al., 2013).

The collocation study results lend themselves to specific areas of focus for future practice. The words with the strongest keyness in the autogenous corpus included sexual, HOCD, and POCD. Clinicians treating individuals with autogenous obsessions must be aware that the distress caused by sexual themes may prevent clients from feeling comfortable in being open

about their symptoms. They must also acknowledge that they understand the fear they may have about the clinician misunderstanding their obsessions and the potential fear they have of being inaccurately assessed as posing a risk to others. For clinicians working with individuals with reactive obsessions, it is important to acknowledge that their distress comes from an inflated sense of responsibility to prevent harmful outcomes if they were to not perform rituals. Words with strong keyness in the reactive corpus included checking, washing, and counting, all which relate to the need to prevent negative consequences.

Future Research Agenda

I appreciated learning how to work with corpus linguistics for my dissertation as I had never realized how studying bodies of text could reveal so much about psychological disorders. The design of the corpus linguistics studies does not include human subjects, which allows for so many potential directions in future research agenda. A logical next step would be to conduct similar LIWC and collocations studies but using varied sources from different websites other than Reddit. In addition to online forums and website message boards, texting within confidential treatment apps has become an integrated part of treatment in apps such as NOCD (Gershkovich et al., 2021). The pivot to using technology and teletherapy during the recent pandemic showed the ability for individuals to benefit from ERP virtually (Pal & D'Souza, 2021). Similar results would corroborate the findings of this dissertation and lend more evidence to the autogenous/reactive OCD model by Lee and Kwon (2003), as well as add evidence for using corpus linguistics to study mental health disorders.

I would also be interested in comparing the linguistic characteristics that differentiate how individuals with POCD talk about their thoughts and experiences as compared with individuals with pedophilia. Individuals with POCD tend to possess high levels of insight, they

still experience great distress about their intrusive thoughts and worry about what it means about their morals or character. Many linguistic studies exist that look at the chat logs of pedophiles (Bogdanova et al., 2012; Gupta et al., 2012) to detect grooming behaviors to aid criminal law, yet studies do not exist that compare the language usage of POCD and pedophilia. Being able to identify linguistic differences could help clinicians to have a framework when evaluating individuals with POCD when listening to how they describe their experiences. Increasing the knowledge about differentiating these two diagnoses amongst clinicians is an important aspect of decreasing the stigma of seeking out mental health treatment for POCD, as it is often shrouded in shame and fear about being mistaken for a pedophile.

In addition to these quantitative studies, I am also interested in a qualitative study using a phenomenological approach to explore the experiences of individuals with sexual obsessions. There are few qualitative studies about OCD, and they are about the general experiences of individuals affected by it (Bhattacharya & Singh, 2015; Keyes et al., 2017) without focusing on specific themes of OCD. There have also been qualitative studies done on partner relationships, barriers to seeking treatment, and experiences with mindfulness-based interventions (Hertenstein et al., 2012; Robinson et al., 2017; Walseth et al., 2017) but none that explore the lived experiences of individuals suffering from sexual intrusive thoughts. Both the LIWC and collocation study results in this dissertation showed the prevalence of these types of intrusive thoughts among those with autogenous obsessions. The central research question would be, how do individuals with sexual theme OCD experience having intrusive thoughts? Research has found that lack of clinician knowledge of OCD contributes to misdiagnosis and underdiagnosis (Senter et al., 2021). To date, most research on OCD has used quantitative studies. Additional qualitative studies would provide a more comprehensive understanding of the subjective

experience of having repugnant obsessions and address the issue of misdiagnosing OCD as other psychiatric illnesses.

Conclusion

Understanding the nuances of OCD is an important aspect of counselors' responsibilities of assessment and treatment. This dissertation shows the benefits of approaching the study of OCD using corpus linguistics. The studies highlighted the linguistic and psychological differences between the autogenous and reactive forms of obsessions in OCD. The key differences were in the saliency of the distress related to the repugnant forms of obsessions in the autogenous corpus, and the emphasis on preventing negative consequences by performing compulsions in the reactive corpus. Another key finding was the high levels of insight that was found in both the autogenous and reactive corpuses, thus reinforcing the existing understanding that individuals with OCD possess the knowledge that their obsessions are excessive. Thus, treatment should not involve traditional CBT that restructures cognitive distortions. Instead, it should focus on managing the obsessions using ERP. However, the body of literature is still lacking in studies that look more closely at individual subtypes of autogenous and reactive obsessions. Future studies that examine the psychological nuances of each subtype would be beneficial for the assessment and treatment of OCD by counselors.

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APPENDICES

Appendix A: Copy of IRB Approval



Oregon State University
Research Office

Human Research Protection Program
& Institutional Review Board
B308 Kerr Administration Bldg, Corvallis OR 97331
(541) 737-8008
IRB@oregonstate.edu
<http://research.oregonstate.edu/irb>

Date of Notification	October 10, 2019	Study Number	IRB-2019-0374
Notification Type	Oversight Determination		
Principal Investigator	Cass Dykeman		
Study Team Members	Kim, Stella J		
Study Title	A corpus linguistic analysis on public blog posts about reactive and autogenous types of Obsessive Compulsive Disorder (OCD)		
Funding Source	None	Cayuse Number	N/A

DETERMINATION: RESEARCH, BUT NO HUMAN SUBJECTS

It has been determined that your project, as submitted, does meet the definition of research but **does not** involve human subjects under the regulations set forth by the Department of Health and Human Services 45 CFR 46.

Additional review is not required for this study.

Please do not include HRPP contact information on any of your study materials.

Note that amendments to this project may impact this determination. Please submit a new request if there are changes (e.g., funding, data sources, access to individual identifiers, interaction with research subjects, etc.).

The federal definitions and guidance used to make this determination may be found at the following link: [Human Subject](#)

Appendix B: Biographical Statement

Stella Kim is a Licensed Mental Health Counselor in New York State. She received her Bachelor of Arts degree from Boston College, where she was an Undergraduate Research Fellow in the Psychology department. She completed her Master of Science degree from Pace University and held a Graduate Fellowship in the College of Arts and Sciences. She is pursuing her doctorate in Counselor Education and Supervision at Oregon State University. Her professional experiences include clinical work in day treatment programs, intensive outpatient treatment, college counseling centers, and serving as a clinical interviewer on large scale epidemiological studies. Her research interests focus on the phenotypic traits of OCD, schizophrenia, and bipolar disorder.