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Linguistic analysis of written language used by young adults with and without invisible disabilities

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Linguistic Analysis of Written Language Used by Young Adults With and Without Invisible Disabilities

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Abstract

Spoken and written language patterns are subtle aspects of behavior that may differ between those with and without invisible disabilities. One tool to measure language is the Linguistic Inquiry and Word Count (LIWC), a computer-based measure comprising a variety of components (emotional, cognitive, and structural) present in oral and written language samples (Pennebaker, Boyd, Jordan, & Blackburn, 2015). Using LIWC analyses, previous research suggests a significant difference in written language usage amongst individuals with depression compared to those without depression (Brockmeyer, et al., 2015). Unfortunately, a limited amount of research has been conducted using LIWC analyses to examine written language usage in individuals with and without Autism Spectrum Disorder (ASD; Newton, et al., 2009). Nguyen and colleagues (2014) discovered that, when compared to other online communities, individuals in online autism communities tend to exhibit a language style that suggests lower valence thus indicating lower overall moods. The present study explored the relationship between invisible disability and written language patterns using LIWC analysis. We examined responses to open-ended, discussion board prompts presented to participants in a Qualtrics survey. Participants included 11 individuals with Autism Spectrum Disorder, 20 individuals with depression, and 131 individuals with no disability. As expected, language differences were observed between groups. Individuals with ASD tended to use more analytical thinking and articles while those with depression used more personal pronouns, 3rd person plural, common adverbs, cognitive processes, insight, causation, discrepancy, and informal language.

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Linguistic Analysis of Written Language Used by Young Adults With and Without Invisible Disabilities

One major reason as to why mental illness is so distressful is because there is such a large discrepancy between visible and invisible disabilities (Invisible Disabilities Association, 2017). For instance, if an individual says something or does something inappropriate, onlookers will be more forgiving if that individual has a visible disability versus an invisible disability. Given the stigma, many individuals with invisible disabilities such as mental illnesses and intellectual disabilities are less inclined to disclose their disability. Students with invisible disabilities often struggle with disclosing their disorder partially due to stigma (Johnstone, 2001). The lack of desire to disclose one's disability to an educator is so strong that students often do not seek services in times of crises in order to maintain a disability-free identity (Lightner, Kipps-Vaughan, Schulte, & Trice, n.d.). Even if students choose not to disclose their invisible disability, they may still exhibit noticeable verbal and nonverbal behaviors to which others respond differently (Brockmeyer, et al., 2015).

Spoken and written language patterns are one such subtle aspect of behavior that may differ between those with and without invisible disabilities. Indeed, individuals with Autism Spectrum Disorder (ASD) often have difficulties with pragmatic aspects of language, including use of sarcasm and figurative language (Landa, 2000). The pragmatic difficulties that are characteristic of ASD are unfortunately the very thing that makes individuals with ASD feel stigmatized and handicapped (Landa, 2000). Individuals with ASD have reported that they have anxiety, avoid social situations, and struggle with their perceptions of themselves because of their social communication difficulties. These difficulties extend to the workplace and to social relationships, which can negatively influence others' perceptions of individuals with ASD and

their capabilities (Landa, 2000).

Language differences

Language differences amongst individuals are rather abundant. How an individual chooses to use language reveals a great deal about that person's personality, emotions, and social connections (Pennebaker, 2011). According to Pennebaker, the most exposable words used are actually the ones that are acknowledged the least by laypeople. These words, or stealth words, are function words – words that cannot stand on their own and thus create connections between and organize content words. Function words include articles, prepositions, auxiliary verbs, negations, conjunctions, quantifiers, common adverbs, and words of assent. These words consist of roughly 60% of the words used, are processed differently in the brain than content words, and can reliably predict one's academic performance, likelihood to commit suicide, physical and mental health, and more. On the contrary, content words represent objects and actions; they include nouns, regular and action verbs, adjectives, and adverbs. Content words are the words that are most often remembered from a conversation.

One useful tool to measure language differences is the Linguistic Inquiry and Word Count (LIWC; Pennebaker, Boyd, Jordan, & Blackburn, 2015; Tausczik & Pennebaker, 2010). This scale is a computer-based measure composed of the emotional, cognitive, and structural components that are present in an individual's verbal and written speech samples. The database's dictionary contains nearly 6,400 words in categories such as personal pronouns, common verbs, negative emotion, family, friends, insight, causation, achievement, risk, death, and swear words. This measure has a relatively high level of reliability and validity (Pennebaker, et al., 2015).

LIWC was originally developed to coincide with Pennebaker's extensive work on

emotional writing and language (Pennebaker, Mehl, & Niederhoffer, 2003). Pennebaker wanted to create an instrument that would aid in the exploration of the features present in writing on negative experiences that predict future health. Many of the LIWC categories were developed in response to psychological theories (e.g., discrepancy and inhibition words) while others analyze basic linguistic information (e.g., articles, pronouns, and prepositions) and the author's psyche (e.g., positive/negative emotion words and cognitive words). Because the ability to correctly use style words requires a mastery of basic social skills, style words are more frequently linked to an individual's social and psychological measures when compared to content words (Tausczik & Pennebaker, 2010).

According to Tausczik and Pennebaker (2010), individuals who use high rates of emotion words tend to use fewer articles, prepositions, and relativity words but use more pronouns, auxiliary verbs, and negations. Tausczik and Pennebaker (2010) believe that this relationship suggests a correlation between expressing one's emotions and individuals' thinking styles and social awareness. Because emotion words account for only roughly 5% of the words people use, function words are a much better indicator of emotional state (Pennebaker & Lay, 2002; Pennebaker, Mehl, & Niederhoffer, 2003). For instance, individuals who frequently use the word *I* tend to be followers, truth-tellers, are more likely to self-disclose, and are more likely to take responsibility (Biesen, Schooler, & Smith, 2016; Pennebaker, 2011). Conversely, frequent usage of the words *me* and *you* is associated with high rates of criticism, negative interaction behaviors, and negative long-term relationship outcomes (e.g., an increased likelihood to divorce and diminished relationship satisfaction; Biesen, Schooler, & Smith, 2016). Additionally, individuals who use articles often tend to have better performance in college, be more organized, have a higher rate of emotional stability, be conscientious, be more politically conservative, and

be older (Pennebaker, 2011).

Language differences may also indicate one's perceived quality of relationship interactions. More specifically, research has shown that there is an association between pronoun usage and perceived interaction quality and worry. Researchers Biesen, Schooler, and Smith (2016) found that participants who worry a lot/display high anxiety levels and participants who have low levels of perceived interaction quality will use more second person pronouns and first person singular pronouns but use fewer first person plural pronouns.

Other studies have found a correlation between one's memory recall of negative events and pronoun usage (Seih, Chung, & Pennebaker, 2010). More specifically, these studies have universally concluded that first-person pronoun usage and the first-person perspective are associated with more vivid and richer memory recall while the third-person perspective/pronoun usage is correlated with memory avoidance, negative self-evaluation, and reduced cognitive processing of the negative event. Ultimately, first person singular pronouns are "associated with age, sex, depression, illness, and more broadly, self-focus;" first person plural pronouns are associated with group identity and emotional distancing; and second and third person pronouns indicate how socially engaged/aware the speaker is (Pennebaker, Mehl, & Niederhoffer, 2003, p. 570).

Previous research also suggests that the use of cognitive language (e.g., because, realize, consider, understand) in expressive writing is associated with positive outcomes such as improved physical health, increased working memory, and a decrease in intrusive thoughts (Seih, Chung, & Pennebaker, 2011). Researchers have also concluded that the more someone utilizes positive emotion words and cognitive words while writing, the more likely that individual is to benefit from writing (Campbell & Pennebaker, 2003). Additionally, use of cognitive words,

particularly insightful and causal words, among students is linked to higher grades, increased immune function, and better overall health. These words also serve as indicators of mood and behavior (Pennebaker & Lay, 2002).

Language can also be correlated with the Big Five personality traits of neuroticism, extraversion, and agreeableness (Pennebaker, Mehl, & Niederhoffer, 2003). Neuroticism (emotional instability) is positively correlated with negative emotion words, negatively correlated with positive emotion words, and correlated with increased use of first-person pronouns. Extroversion is positively correlated with positive emotion words and social processes words; and agreeableness is positively correlated to positive emotion words and negatively correlated to negative emotion words.

In addition, there are gender differences in word use. For example, women tend to use more first-person singular pronouns, cognitive words, and social words whereas men tend to use articles more (Pennebaker, 2011). Previous research indicates that the reason women tend to use more first-person singular pronouns than men is because women tend to be more self-focused and more self-aware than men (Newman, Groom, Handelman, & Pennebaker, 2008). Furthermore, although men and women tend to use first person plural pronouns at about the same rate, men tend to use a more distanced, impersonal form of the pronoun (e.g., when telling someone to do something, like take out the recycling, a man will be more likely to say "we need to take out the recycling," than a woman even though the speaker has no intention of taking out the recycling with the other person) while women tend to use a warmer form of the pronoun (e.g., referring to herself and her pet as "we" instead of "me and Lucky are going to the park). Despite the fact that women typically use slightly more negative emotion words than men, men and women use positive emotion words at an equal, high rate. Research also suggests that

women typically use more cognitive words and social words than men because they typically think about and talk about others more often. Some other sex differences include men using more prepositions, numbers, nouns, big words, words per sentence, and swear words than women while women typically use more personal pronouns, negative emotion words, verbs, auxiliary verbs, certainty words, negations, and hedge phrases than men. This indicates that women typically discuss psychological and social processes more while men discuss more objects and other impersonal subjects more (Newman, et al., 2008).

Language also varies across age. In 2009, Argamon, Koppel, Pennebaker, and Schler found that adults (33-47 years) use significantly more big words, prepositions, and articles when compared to the other two age groups (13-17 years and 23-27 years). In another study using participants ranging from ages 8 years old to 80 years old, Pennebaker and Stone noted that the younger writers used significantly more time references, personal pronouns (especially first-person pronouns), and past tense verbs while the older writers used more articles, nouns, prepositions, big words, future-tense verbs, and cognitive words (2003). Additionally, younger writers used more negative emotion words while older writers used more positive emotion words.

Language and Depression

The *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; *DSM-5*; American Psychiatric Association, 2013) defines major depressive disorder (MDD) as having at least five of the following symptoms during the same two-week period, the symptoms representing a change from prior functioning, and at least one of the symptoms including a depressed mood or anhedonia (a loss of interest or pleasure): (1) a depressed mood the majority of almost every day; (2) a significant decrease in interest or pleasure in at least most activities throughout the majority

of almost every day; (3) significant change in weight – either a loss or gain of 5% of one's body weight inside a month – independent of dieting or a decrease/increase of appetite most days; (4) presence of insomnia or hypersomnia most days; (5) a presence of either psychomotor agitation or retardation almost every day; (6) feelings of fatigue or lack of energy most days; (7) feeling like one is worthless or having excessive/inappropriate guilt that may or may not be delusional most days; (8) an inability to think or concentrate and/or feelings of indecisiveness most days; and (9) the presence of recurrent thoughts of death, suicidal ideation with or without a specific plan, and/or a suicide attempt. In its definition of major depressive disorder the *DSM-5* also mentions that the aforementioned symptoms must cause the individual "clinically significant distress or impairment in social, occupational, or other important areas of functioning" (American Psychiatric Association, 2013, 161). Additionally, the individual's episode must not be due to or better explained by the use of a substance, some other medical condition, or schizo-disorders and/or other psychotic disorders. Finally, in order for an individual to be diagnosed with MDD, the individual must not have previously experienced a manic or hypomanic episode. Individuals with MDD can have either single or recurrent episodes, have varying levels of severity (mild, moderate, or severe), have psychotic features, be in partial or full remission, and/or be unspecified. Some factors that may put an individual at an increased risk of developing MDD, especially for early-onset and recurrent forms, include a high level of neuroticism, adverse childhood experiences, stressful life events, having a first-degree family member with a diagnosis of MDD, and a diagnosis of other nonmood disorders (especially borderline personality disorder, substance use disorder, anxiety disorder, chronic or disabling medical conditions, diabetes, morbid obesity, and cardiovascular disease).

Previous research suggests that spoken and written language patterns for individuals with depression may differ from those without depression. How an individual utilizes pronouns is indicative of that individual's level of interpersonal distress and, consequentially, emotional problems and personal distress (Biesen, Schooler, & Smith, 2016). Individuals with depression tend to use more first-person singular pronouns and fewer first-person plural, second person, and third person pronouns in reference to interpersonal relationships when compared to individuals without depression (Biesen, Schooler, & Smith, 2016; Pennebaker, Mehl, & Niederhoffer, 2002). This may be due in part to *I*-words being correlated with self-focus and *You*-words being correlated to other-focus (Biesen, Schooler, & Smith, 2016). In a recent study by Brockmeyer et al. (2015), researchers examined symptoms of depression and anxiety and autobiographical memory recall task responses in patients with anorexia nervosa. Using LIWC analyses, the researchers found that participants used first-person singular pronouns when recalling negative memories but not when recalling positive memories and that there was a positive correlation between first-person singular pronoun usage and symptoms of depression and anxiety. Additionally, participants with both major depressive disorder and non-chronic depression used more first-person singular pronouns than healthy controls did during negative memory recall compared to positive recall. Interestingly, in addition to using more first-person pronouns, individuals with depression utilize the word "I" at a significantly higher frequency compared to the words "me," "my," and "mine" (Pennebaker, Mehl, & Niederhoffer, 2002).

Research on suicidal ideation indicates higher rates of first person singular pronouns and lower rates of first person plural pronouns. A study by Stirman and Pennebaker (2001) examines the language of 18 suicidal and nonsuicidal poets. The linguistic analysis of these individuals points toward increased first person singular pronouns, decreased first person plural pronouns,

infrequent references to other people, and increased references to death amongst individuals with suicidal ideation. LIWC results also indicate increased usage of the future tense, positive emotion words, social references, and self-focus words (i.e., "I," "me," etc.; Egnoto & Griffin, 2016). Egnoto and Griffin (2016), in studying 25 suicide notes from public sources and 21 legacy notes from spree killers, utilized LIWC to differentiate between those who have harm ideation and those who have suicidal ideation. The researchers found that the spree killers with harm ideation utilized more negative emotion and anger words than their suicidal and control counterparts. However, those with suicidal ideation utilized more first-person pronouns and future tense verbs than the spree killers.

In summary, previous research indicates that, compared to those without depression, individuals with depression utilize more first-person singular pronouns, negatively-valenced diction, more cognitive words, future tense, positive emotion words, social references, and references to death. Additionally, individuals with depression use fewer first-person plural, second-person, and third-person pronouns (Pennebaker, 2011).

Language and Autism Spectrum Disorder

The *DSM-5* (American Psychiatric Association, 2013) defines individuals with autism spectrum disorder (ASD) as having recurrent difficulties in social situations – particularly with communication and interaction – across a variety of contexts (i.e., playing with others, communicating with peers, romantic and platonic relationships, etc.). These obstacles include (1) difficulty in social-emotional reciprocity (i.e., an inability to maintain back-and-forth conversation, atypical social approach, a lack of sharing of interests or emotions with others, or a failure to initiate/respond to social situations); (2) shortfalls in nonverbal communication such as inability to maintain eye contact or exhibit appropriate body language or a lack of understanding

of such nonverbal cues – this also includes the implementation or absence of inadequate facial expressions and other nonverbal cues; and (3) an inability to develop, maintain, and understand social relationships including but not limited to an ability to adjust one's behavior to a variety of social contexts and shortcomings in the sharing of imaginative play with others, making friends, and/or a disinterest in having relationships with peers. Individuals with ASD also tend to repetitive behavioral patterns and restrictive activities and/or interests. These characteristics must be evident in at least two of the following ways: (1) "repetitive motor movements, use of objects, or speech (e.g., simple motor stereotypies, lining up toys or flipping objects, echolalia, idiosyncratic phrases);" inflexibility/rigidity manifested via a strict adherence to routine or some sort of ritualized pattern of either verbal or nonverbal behavior; (3) intense, fixated interests in highly restricted areas (i.e., knowing everything there is to know about weather patterns and an insistence to talk only about the subject); hyper-hyposensitivity to sensory inputs (e.g., pain, temperature, sounds, textures, smells, an excessive need to touch certain objects, a fascination with movement or lights; American Psychiatric Association, 2013, p. 50). These symptoms must be present beginning in early development and may or may not become exacerbated as the individual ages. Additionally, these symptoms must cause the individual significant impairment in their social, occupational, etc. areas of functioning. These symptoms must not be due to or better explained by some intellectual disability or a global developmental delay. Some specifiers that may be present in an individual's diagnosis of ASD include, with/without intellectual impairment, with/without language impairment, an association with a known genetic or medical condition or some environmental factor, and an association with some other neurodevelopmental/mental/behavioral disorder.

The severity of the diagnosis is calculated by the level of support that the individual needs (e.g., level one is defined as requiring support, level two is defined as requiring substantial support, and level three is defined as requiring very substantial support). Individuals diagnosed with a level 1 severity of ASD typically have difficulty with initiating conversation and social interactions, have obvious abnormal responses to social situations (i.e., being insensitive to someone who is crying because s/he does not know how to react), may appear to have minimal interest in social engagement, a lack of conversational reciprocity, difficulties making eye contact, inflexible behavior/routines that disrupts the individual's functionality, difficulty making transitions, and/or organizational difficulties that may or may not interfere with the individual's ability to be independent. Individuals diagnosed with a level 2 severity of ASD need more support than individuals with a severity of level 1. They have significant deficits with both their verbal and nonverbal communication skills, their social difficulties are apparent despite supports in place, rarely initiate social interactions, have atypical responses to social overtures, significantly inflexible or rigid behavior, difficulty coping with transitions and change, have obvious frequent restricted and repetitive behaviors that interfere with their ability to function in a variety of situations, and experience difficulty and/or distress when attempting to alter their focus and/or change their actions. Individuals diagnosed with a level 3 severity of ASD need a substantial amount of support. These individuals have "severe deficits in verbal and nonverbal social communication skills [that] cause severe impairments in functioning," very rarely and very limitedly initiate social interaction, have "minimal response to social overtures from others," have significant inflexibility in behavior, "extreme difficulty coping with change," "restricted/repetitive behaviors [that] markedly interfere with functioning in all spheres," and

experience significant difficulty and distress when required to change their focus and/or actions (American Psychiatric Association, 2013, p. 52).

Current statistics show that roughly 1% of the world population has reported ASD. Symptoms of the disorder typically become noticeable around 12-24 months of age with an apparent lack of interest in social situations, developmental delay/plateau/regression, delayed language development, and/or intense, repetitive behavior. Some factors that may put an individual at an increased risk for developing ASD include low birth weight, exposure to valproate as a fetus, older/advanced parental age, heritability (37-90%), and a known genetic mutation (American Psychiatric Association, 2013).

To examine possible language differences between those with ASD and those without ASD, researchers Nguyen, Duong, Phung, and Venkatesh (2014) collected data from roughly 2,000 individuals in 10 online autism communities (clinical group) and individuals from 100 control online communities. They examined their sentiment-related content, topics discussed, and linguistic style, finding that individuals on the spectrum discussed topics related to social skills and education significantly more than the study's control group. Using LIWC, Nguyen et al. discovered that individuals on the spectrum tend to use words from the health, family, negative emotion, anxiety, and work dictionaries significantly more than the control group. Interestingly, the ASD group used words from the sadness and positive emotion dictionaries significantly less than the control group. Using ANEW analysis, Nguyen and colleagues (2014) discovered that, when compared to other online communities, individuals in online autism communities tend to exhibit a language style that suggests lower valence thus indicating lower overall moods.

Nguyen, Duong, Venkatesh, and Phung (2015) conducted a follow-up study examining data from a website called LiveJournal. From this site, they used 10 communities interested in autism (autism community). To create their control dataset, they used 20 communities selected from the first four community categories in the LiveJournal database. The researchers also examined another variable: personal versus community posts. The personal posts are defined as posts that each individual blogger makes on his/her own page; the community posts are defined as posts that bloggers make on their respective community blogs (i.e., autism community blog). Using the language from these four sets of data (autism vs. control and personal vs. community), the researchers used LIWC to examine differences in topics discussed, language style differences, and variation in expressed emotion. The results indicate that individuals in the autism community tend to discuss more autism-related topics, social communication and interaction issues, and education. Individuals from the control community tended to discuss more generic topics (i.e., cooking, pets, fashion, etc.). In terms of language styles, individuals in the autism community used more words related to anxiety, anger, negative emotion words, health words, social words, and words related to death and religion. The control community, however, utilized more words related to positive emotion, the body, sexual words, and words related to ingestion when compared to the autism community. When comparing community posts to personal posts, individuals in the autism community discussed their diagnosis, medication, education, and social skills more in the community setting than on their personal blogs; the more generic topics were discussed more in personal blogs. In terms of language, individuals used more words related to non-fluencies, assent, swear words, more positive emotion words, fewer anxiety words, and fillers in their personal blogs than in the community blogs. As could be

expected, the posts in the community blogs had a higher word count and more words per sentence than the personal blog pages.

Additionally, a recent study by Schriber, Robins, and Solomon (2014) suggests that individuals on the spectrum are more inclined to be neurotic and less inclined to be extroverted, agreeable, conscientious, and open to experience. These results were consistent across all ages (children, adolescents, and adults), gender, and both self and parent reports. Despite this correlation, this trend in personality traits is not a reliable predictor of whether or not an individual has ASD, severity of diagnosis, or the ability of an individual with ASD to adjust to situations. Interestingly, this study indicated that individuals with ASD are more likely to self-enhance when compared to their typically developing peers while typically developing individuals were more likely to self-diminish. In other words, individuals with ASD were more likely to talk positively about themselves, and, potentially, use more positive emotion words than their typically developing peers. Overall, this study shows that individuals with ASD tend to have a specific personality profile while simultaneously exhibiting similar levels of cognition and insight compared to typically developing individuals. This is important because, as previously mentioned, personality is also correlated with language differences. Because individuals with ASD are more likely to score high in neuroticism, they may also use more negative emotion words, fewer positive emotion words, and more first-person pronouns. Individuals with ASD may also utilize fewer positive emotion words because they are less likely to score high in extroversion. Additionally, rates of extroversion are also correlated with a lower rate of social processes words. Finally, the low rate of agreeableness amongst individuals with ASD may be indicative of fewer positive emotion words and more negative emotion words (Schriber, Robins, & Solomon, 2014).

Unfortunately, a limited amount of research has been conducted using LIWC analyses to examine written language usage in individuals with and without Autism Spectrum Disorder (ASD; Newton, et al., 2009). Of the research that has been conducted, most studies explore online communities. To the researchers' knowledge, there is no research to-date that compares language usage amongst different invisible disability groups and a non-disability group. Additionally, there is reason to suspect that language patterns among those with autism spectrum disorder would differ from those of their neurotypical peers. Newton et al. examined bloggers with ASD and without ASD using LIWC analysis and found that there was no statistically significant difference in word usage in participants with and without ASD (2009). However, Newton et al. did discover that individuals with ASD used statistically significantly more variation in social words when compared to individuals without ASD. The researchers believe that this similarity may be attributed to the asynchronistic nature of "computer-mediated communication" (Newton, Kramer, & McIntosh, 2009, p. 463). In other words, individuals with ASD may find it easier to communicate via technology rather than in-person where their difficulties are more apparent.

Rationale for the Present Study

Prior to this study, there has been minimal research examining language differences in the ASD community compared to a no disability group or another invisible disability group. Additionally, all existing research compares participants with ASD using a within-subjects format or compares them to those with no disability in an uncontrolled setting. For example, Nguyen et al.'s (2014) study examines ASD and no disability participants' posts in personal blogs and compares them to their posts in a community blog. This methodology, which is present in several other studies that examine language in the ASD community, does not include a

consistent writing prompt for all participants to respond to; thus, many confounding variables are possible. This is the largest and most concerning gap in the literature, as it is unclear whether any differences might be due to topic and audience. For example, when bloggers are writing about their own specific interests for an audience who shares that interest, their posts may be quite different from those they might make to a standard writing prompt.

Additionally, there is no prior research to the researcher's knowledge that examines online discussion board responses in the ASD community. Because prior research argues that the asynchronistic nature of computer-mediated communication may put those on the spectrum at a more level playing field to their typically developing peers, individuals with ASD may show no language difference when compared to individuals who have no disability responding to the same online discussion board prompts. This may be because computer-mediated communication does not force individuals on the spectrum through the uncomfortable feat of making and maintaining eye contact or responding to nonverbal social cues. It is important to study if individuals on the spectrum benefit from online discussion board writing because, if this is the case, then educators could encourage individuals with ASD to take online courses.

On the contrary, however, there has been an extensive amount of research conducted to analyze language differences amongst individuals with and without depression. Because of the plethora of research on depression and the lack thereof on ASD, I thought that it would be interesting to not only compare the language of individuals with ASD to those with no disability, but to also compare their language to individuals with depression. By doing this, I am also able to incorporate a data check to make sure that my results from my depression group align with previous research. This will help tell me if my results are valid and reliable. Furthermore, Seih, Chung, and Pennebaker (2010) have completed similar studies examining individuals' written

responses to a prompt (e.g., participants were instructed to write about an emotional event in the first-, second-, and third-person perspective. Therefore, this study helps to back up my decision to conduct my research in a discussion board format. Finally, because individuals with ASD are also more likely than average to be diagnosed with depression, this comparison allows me to separate these effects.

To the researcher's knowledge, there have been no studies done to-date comparing language usage in individuals with Autism Spectrum Disorders, depression, and no disorder in a controlled setting using the same prompt. The present study was designed to examine the relationship between invisible disability and written language patterns. More specifically, I examined the type of language that various groups of participants (Autism Spectrum Disorder, depression, or no disability) use in response to an online discussion board. This was an exploratory study examining LIWC measures between individuals with a diagnosis of ASD, depression, or no diagnosis.

Overview

The current study explores language differences amongst individuals with and without invisible disabilities (i.e., depression and autism spectrum disorder). Participants responded to two open-ended discussion board prompts and completed a basic demographic questionnaire. The discussion board responses were then analyzed using LIWC.

Method

Participants

Participants included 162 young adults between the ages of 18 and 30 ($N_{no\ disability} = 131$, $N_{depression} = 20$, $N_{ASD} = 11$). Participants were recruited from the Disability Resource Center on a volunteer-basis with a diagnostic qualification of either autism spectrum disorder or depression, UTC's Honors College, and from local support and advocacy groups (Greater Chattanooga Aspies through the Chattanooga Autism Center; see Table 1 for demographics). Participants recruited from local support and advocacy groups were contacted by and received flyers (see supplemental materials) from individuals with whom we partnered who work for the organization. Participants recruited from UTC's Disability Resource Center were recruited using a flyer sent out via email, newsletter, and/or social media. Participants were also recruited through the University of Tennessee at Chattanooga's SONA website to account for the control condition (no disability). We targeted young adults to mimic the typical college classroom setting. Participants who could not read or write in English were excluded. It is important to note participants with ASD most likely had a diagnostic specification of Level 1. Additionally, a $5 Amazon gift card was given to participants recruited through the DRC or Autism Center, granted they provided an e-mail address at the end of the study. Gift cards were awarded within one week of participation (and after discussion responses were analyzed). Participants recruited from SONA were, in accordance with the IRB-approved SONA policy, given extra credit to a psychology course of their choice that was dependent on confirmation of their participation that was shared with the psychology professor of their choice.

Measures

Before the start of the study, participants filled out an informed consent form. During the

study, participants completed a demographics questionnaire (e.g., age, gender, race/ethnicity, education level, and whether or not they had a disability). Participants then responded to an online questionnaire in discussion board format (with a 100 word response minimum). Participants were asked to respond to the following two prompts: "What is something you wish others knew about you?" and "What is something that does not make sense?" These prompts have been suggested as effective for therapeutic journaling (Tartakovsky, 2014). All individually identifying information was removed or disguised from responses to protect participant confidentiality. Participants' discussion responses were then analyzed using LIWC analyses (Tausczik & Pennebaker, 2010).

Procedure

Participants were recruited from UTC's Disability Resource Center, the Chattanooga Autism Center, local advocacy groups, and UTC's SONA system. Participants recruited from UTC's Disability Resource Center, the Chattanooga Autism Center, and local advocacy groups were recruited using a snowball sample by receiving a recruitment flyer through the organizational newsletter, coordinator, and/or via email. The recruitment flyer that was distributed contained information about the population that targeted, what was required of participants for the study, how to contact the researchers, information about the incentive, and information pertaining to the confidentiality of participants' responses (see supplemental materials).

SONA participants read a brief description of the study posted on the SONA website that was similar to the description provided on the recruitment flyer. SONA participants who were interested in continuing with the study clicked on a link provided within the post that took them to the study created via Qualtrics. Participants recruited from UTC's Disability Resource Center

or local disability advocacy groups were sent the study's link after contacting us via e-mail. The first screen participants encountered was an Informed Consent form that explained the rights of the participant within the study. Consent was indicated by the selection of the appropriate button; those who did not consent to participate in the experiment were directed out of the Qualtrics survey and thanked for their time. In addition, participants who did not consent to the Informed Consent were not awarded a gift card or SONA points. On the same page as the Informed Consent, participants entered in a captcha saying provided by Qualtrics to ensure that they were not a robot. This step was created to prevent someone from developing a code to automatically complete the survey on its own, thus generating money for that person.

Participants then responded to an online questionnaire in discussion board format (with a 100-word response minimum). They were instructed to respond as if they were a student in an online or hybrid course, with the first "getting to know you" activity being a short discussion response. Participants answered to the following two prompts: "What is something you wish others knew about you?" and "What is something that does not make sense?" (Tartakovsky, 2014). These prompts have been suggested as effective for therapeutic journaling but might also be used in an online discussion board setting as a "getting to know you" exercise for online courses. Participants were instructed that they were free to skip any prompts that they did not wish to answer. As an attention check, the survey was designed in such a way that all questions were required with each question having an option that states "Prefer Not to Answer." For the discussion prompt questions, the survey was designed so that participants were unable to move on to the next question unless their response was at least 100 words long or, in the event that a prompt made them uncomfortable, they selected "Prefer Not to Answer." This step was essential in order for us to ensure that discussion prompt responses are long enough for us to linguistically

analyze. Additionally, in order to maintain our sample size, participants who selected "Prefer Not to Answer" to one of the original prompts ("What is something you wish others knew about you?" or "What is something that does not make sense?"), were led to a prompt alternate. If a participant skipped the first original prompt, they were directed to the respective prompt alternative ("What is one topic that you feel like you need to learn more about in order to help you live a more fulfilling life? Explain"). If they skipped the prompt alternate as well, they were directed to the next original prompt ("What is something that does not make sense?"). If they selected "Prefer Not to Answer" for this prompt, they were directed to the next prompt alternate ("Explain the words that you would like to live by and why"). If, again, they selected "Prefer Not to Answer," they were led to the demographics page. This was the general procedure despite the point at which a participant felt the need to skip a prompt.

At the end of the study, participants completed a demographics questionnaire (including whether or not they a disability or disorder diagnosed by a medical or psychological professional). The participants' demographics obtained included age, gender, race/ethnicity, highest level of education achieved, and disability status (autism spectrum disorder, depression, anxiety, ADHD, dysgraphia, etc., or no disability – refer to attached supplemental information). Because depression, anxiety, and dysgraphia are often comorbid conditions with ASD, we needed the information on their occurrence as control variables.

Participants were also asked for permission to use their discussion responses in subsequent research after we remove any identifying information. For example, if participants reported any names, locations, or other information that might allow identification, we will remove it/replace with blanks to protect confidentiality. Only those who opted to allow their discussion responses to be used in the future will have their discussion responses selected for

inclusion in a future study.

Lastly, participants recruited outside of the SONA System were asked to provide an e-mail address to which they would like their gift card to be sent. E-mail addresses were used solely for the purpose of delivering participants' Amazon gift card. Non-SONA participants received a $5 Amazon gift card for their participation, funded through a Provost Student Research Award. After completion, the participants were thanked for their time and were told they would receive their Amazon gift card within 1 weeks' time upon analyzing their discussion board responses.

Participants' discussion responses were analyzed using LIWC analysis (Tausczik & Pennebaker, 2010). The demographics assisted the researcher in understanding the types of individual participants utilized in the study in order to help better interpret results.

Participants recruited through the DRC and advocacy groups were sent an e-mail by a representative of the organization containing the researchers' e-mail contact information and an informed consent form. This email contained a unique link to a Qualtrics survey. Additionally, in the SONA system students were assigned a unique ID code – researchers are not given student names or UTC IDs so as to protect participant confidentiality. Participants who were recruited through the Chattanooga Autism Center and local advocacy groups were emailed a link for a Qualtrics survey.

Linguistic Inquiry and Word Count (LIWC). This scale is a computer-based measure comprising a variety of components, including emotional, cognitive, and structural components, that are present in an individual's verbal and written speech samples (Pennebaker, Boyd, Jordan, & Blackburn, 2015). The database's dictionary contains nearly 6,400 words in categories such as personal pronouns, common verbs, negative emotion, family, friends, insight, causation,

achievement, risk, death, and swear words. This measure has a relatively high level of reliability and validity.

Results

Analysis Overview

The data collected from the participants were placed into Excel files that contained each participant's response to each prompt. To do this, I first created a file for all no disability participants, a file for depression participants, and a file for ASD participants. I then created a combined, or master, file with all participants' responses to each prompt. I next cleaned my data by removing any participants who recorded a disability outside of the two that I was looking at (i.e., selective mutism, mild hearing loss, anxiety, etc.; $N_{other\ disability} = 19$), selected "Prefer Not to Answer" for all discussion board prompts ($N_{prefer\ not\ to\ answer} = 39$), did not take the study seriously (i.e., plagiarized a response from the Internet; $N_{did\ not\ take\ study\ seriously} = 4$), took the study more than once ($N_{repeat} = 14$), and who were outside of the age range that I was examining (e.g., older than 34 years of age; $N_{outside\ of\ age\ range} = 1$). In total, there were 72 participants whose responses were not analyzed via LIWC.

After cleaning the data, I ran the master dataset through LIWC. Because this was an exploratory study, the discussion responses were analyzed for all LIWC variables. We then took the LIWC results and ran an analysis of variance (ANOVA) across both prompts combined in order to compare each of the three conditions (ASD, depression, and no disability) on each of the variables in the LIWC analysis (see Table 3). Combining responses across prompts provided a larger sample of language, which is useful for reliable LIWC scores. A post-hoc analysis of Tukey's b was also performed to compare the means of the three groups.

Next, we ran ANOVAs for all LIWC variables for the two most commonly answered prompts separately to see if there were any differences between prompts (see Table 4). The two most commonly answered prompts were: "What is something you wish others knew about you?" ($N_{no\ disability} = 127$, $N_{depression} = 19$, $N_{ASD} = 10$) and "What is something that does not make sense?" ($N_{no\ disability} = 125$, $N_{depression} = 20$, $N_{ASD} = 9$).

Finally, we analyzed the overall (combined prompts) data by group and gender using a 3 (group) x 2 (gender) ANOVA (see Table 4). These analyses were conducted to determine whether the group differences were dependent upon gender differences. These were important checks given that there was a higher proportion of males in the ASD group compared to the depression and no disability group.

Due to the large number of variables used and analyses conducted, only the statistically significant ($p < .05$) results or trends from each analysis are presented and discussed in the following sections. First, I will summarize the patterns of differences found. Then I will report the findings by individual variables.

No Disability Responses

The average response for the no disability participants for both prompts combined contained 251.38 words ($SD = 45.221$). There was no difference in number of words by prompt. Most of the respondents chose Prompt 1 (n = 127) or Prompt 2 (n = 125) rather than the alternate 1A (n = 8) or 2B (n = 11).

For the combined prompts, there were relatively high numbers of analytical thinking, clout, authentic, emotional tone, and total function words and low numbers of filler words, nonfluencies, words of assent, netspeak, swear words, informal language, death, religion, money, leisure, risk, sexual, health, body, feel, hear, see, male references, female references, friends,

family, anger anxiety, 3rd person singular, 2nd person, and 1st person plural words. Descriptive statistics for all LIWC variables for the No Disability group are provided in Table 2.

> *Something I with other people knew about me is that I'm a soft and kind hearted person, I just come off as a hard person to get along with because of my past. When I was younger I was put through some pretty traumatic things that have caused me to put up walls with loved ones and friends in fear of getting hurt again. The logic isn't right, but when I was younger i thought that if I put up walls and didn't let anyone in, I would be happier. This was not true, in reality I was more alone and couldn't make myself open up to people to gain relationships and trust. Now, after opening up to close friends and family I realized I was living and money life and I was bitter, but now I am outgoing, loving and caring. My heart is full of nothing but love.*

Depression Responses

The average depression participant used 249.30 words (*SD* = 47.828) combined across prompts. There was no difference in number of words by prompt. Most of the respondents chose Prompt 1 (n = 19) or Prompt 2 (n = 20) rather than the alternate 1A (n = 1) or 2B (n = 0). Descriptive statistics for all LIWC variables for the Depression group are provided in Table 2.

Participants with depression were more likely to use dictionary words, 3rd person plural, common adverbs, interrogatives, cognitive processes, insight, causation, discrepancy, and informal language compared to those with no disability, and they were less likely to use analytical language and articles compared to those with no disability. Compared to those with ASD, participants with depression were more likely to use personal pronouns, 3rd person plural, common adverbs, cognitive processes, insight, causation, discrepancy, and informal language, and less likely to use analytical thinking and articles compared to participants with ASD. To

illustrate this pattern, an average response from the depression group in answer to the prompt "In at least 100 words, please respond to the following prompt: What is something you wish others knew about you?" is provided below.

> *I wish others understood just how conflicted I am every time I interact with them and how stressful it is for me to have a long-term relationship with them. I wish they knew that the reason I tend to go days before answering their texts or messages is that I'm terrified of what they're going to need me to say or do to help them out. I wish they knew that I don't want to hang out very often because the idea of having to entertain them for an extended period of time causes enough anxiety to make me want to hide in my room all day and not come out. Most of all, I wish others knew that while I am honored by their trust in me and the value they place on my suggestions and opinions, it places an immense amount of pressure on me that sometimes is so unbearable that I shut down and don't speak to or see anyone for hours at a time.*

ASD Responses

The average ASD participant used 254.91 words (*SD* = 41.021) combined across prompts. There was no difference in number of words by prompt. Most of the respondents chose Prompt 1 (n = 10) or Prompt 2 (n = 9) rather than the alternate 1A (n = 1) or 2B (n =2). Descriptive statistics for all LIWC variables for the ASD group are provided in Table 2.

Participants with ASD were more likely to use analytical thinking and articles compared to those with no disability, and more likely to use analytical thinking and articles compared to the depression group. They were less likely to use dictionary words, personal pronouns, 3rd person plural, common adverbs, interrogatives, cognitive processes, insight, causation, discrepancy, informal words, and swear words compared to those with no disability, and less

likely to use personal pronouns, 3rd person plural, common adverbs, cognitive processes, insight, causation, discrepancy, and informal language compared to participants with depression. To illustrate this pattern, an average response from the depression group in answer to the prompt "In at least 100 words, please respond to the following prompt: What is one topic that you feel like you need to learn more about in order to help you live a more fulfilling live? Explain" is provided below.

> *One topic I need to learn more about in order to fulfill my life is cooking and saving money. I need to learn how to save money because I usually spend eighty-five percent of my paychecks in two weeks when they are above a hundred dollars. I need to learn more about this because I don't want to become a beggar. I need to learn more about cooking since I need to eat healthier and I cannot do that if the only things I eat are microwavable foods. Also, I do not want to have to spend a lot of money on microwavable food.*

Analytical Thinking (Analytic)

Scores on Analytical Thinking ranged from 1.86 to 85.58 (M = 25.08, SD = 16.56). The overall one-way ANOVA for the analytic variable was just above the margin of significance. A Tukey's b post hoc test revealed that participants with depression used analytical language significantly less compared to individuals with no disability and with ASD (see Table 3). Those with ASD used analytical language significantly more often compared to individuals with no disability and those with depression. These differences were limited to prompt 2 (see Table 4). Participants with depression used analytical language statistically significantly less compared to individuals with no disability and to individuals with ASD. Those with ASD used analytical language statistically significantly more compared to individuals with no disability and to

individuals with depression. Finally, these differences were not dependent on gender; there was no gender main effect or a significant interaction of group with gender.

Clout (Clout)

Scores on Clout ranged from 2.44 to 93.92 (*M* = 31.80, *SD* = 19.16). The overall one-way ANOVA for the clout variable was statistically significant. However, a Tukey's b post hoc test revealed that there was no statistically significant difference in means between groups, even though the no disability group scored higher than the depression group and the ASD group, respectively (see Table 3). However, the variability was significantly different between groups: the no disability group was more variable than the other two groups. There was no statistically significant difference between prompts and the differences were not dependent on gender; there was no gender main effect or a significant interaction of group with gender.

Dictionary Words (Dic)

Scores on Dictionary Words ranged from 78.95 to 100.00 (*M* = 94.35, *SD* = 3.00). The overall one-way ANOVA for the dictionary words variable was not statistically significant. However, results showed that participants with depression tended to use dictionary words significantly less compared to individuals with no disability and with ASD. Those with ASD tended to use dictionary words more compared to individuals with no disability and those with depression (see Table 3). These differences were limited to prompt 1 (see Table 4). There was no statistically significant difference for prompt 2. The Tukey's b post hoc test for prompt 1 revealed that participants with depression used significantly more dictionary words compared to participants from the other two groups and participants with ASD used significantly fewer dictionary words compared to both participants with no disability and participants with depression. However, the variability was significantly different between groups: the ASD

participants were more variable than the other two groups. Finally, these differences were not dependent on gender; there was no gender main effect or a significant interaction of group with gender.

Total Pronouns (Pronoun)

Scores on Total Pronouns ranged from 9.21 to 28.15 (M = 19.58, SD = 3.33). The overall one-way ANOVA for the total pronouns variable was not statistically significant. However, those with ASD tended to use pronouns less compared to individuals with no disability and those with depression and those with depression tended to use more pronouns compared to individuals with ASD and those with no disability (see Table 3). These differences were limited to prompt 2; there was no statistically significant difference for prompt 1 (see Table 4). The Tukey's b post hoc test for Prompt 2 revealed that participants with depression used significantly more pronouns than both the no disability and ASD groups whereas the ASD group used significantly fewer pronouns compared to the no disability and depression groups. Finally, while there was no gender main effect, there was a significant interaction of group with gender ($p < .05$). While there was no gender difference in the control group, men in the depression group used more pronouns than women but in the ASD group, women used more pronouns than men.

Personal Pronouns (Ppron)

Scores on Personal Pronouns ranged from 3.95 to 20.28 (M = 11.33, SD = 2.56). The overall one-way ANOVA for the personal pronouns variable was not statistically significant. However, those with depression tended to use personal pronouns less compared to individuals with no disability and with ASD. Those with ASD tended to use personal pronouns more compared to individuals with no disability and those with depression (see Table 3). These differences were limited to prompt 2 (see Table 4). The one-way ANOVA for the personal

pronouns variable in prompt 2 was statistically significant; the Tukey's b post hoc test revealed a significant difference between means. Participants with depression used personal pronouns statistically significantly more compared to individuals with no disability and to individuals with ASD. Those with ASD used personal pronouns significantly more compared to individuals with no disability and to individuals with depression. Finally, these differences were not dependent on gender; there was no gender main effect or a significant interaction of group with gender.

3rd Person Plural (They)

Scores on 3rd Person Plural ranged from 0 to 7.84 (*M* = 1.67, *SD* = 1.43). The overall one-way ANOVA for the 3rd person plural variable was just above the margin of significance. A Tukey's b post hoc test revealed that participants with depression used 3rd person plural pronouns statistically significantly more compared to individuals with no disability and with ASD. Those with ASD used 3rd person plural pronouns statistically significantly less compared to individuals with no disability and those with depression (see Table 3). These differences were limited to prompt 1 (see Table 4). The one-way ANOVA for the 3rd person plural variable in prompt 1 was statistically significant; the Tukey's b post hoc test also revealed a significant difference between means. Participants with depression used 3rd person plural pronouns statistically significantly more compared to individuals with no disability and to individuals with ASD. Those with ASD used 3rd person plural pronouns statistically significantly less compared to individuals with no disability and to individuals with depression. Finally, these differences were not dependent on gender; there was no gender main effect or a significant interaction of group with gender.

Articles (Article)

Scores on Articles ranged from 1.44 to 9.44 (*M* = 4.59, *SD* = 1.68). The overall one-way ANOVA for the articles variable was statistically significant. A Tukey's b post hoc test revealed

that participants with depression used articles statistically significantly less compared to individuals with no disability and with ASD. Those with ASD used articles statistically significantly more compared to individuals with no disability and those with depression (see Table 3). These differences were limited to prompt 2 (see Table 4). There was no statistically significant difference for prompt 1, but there was a statistically significant difference between groups for prompt 2. The one-way ANOVA for the articles variable in prompt 2 was statistically significant; the Tukey's b post hoc test revealed a significant difference between means. Participants with depression used articles at a statistically significant rate that was comparable to those with no disability. When compared to participants with ASD, participants with depression and no disability used statistically significantly fewer articles. Finally, these differences were not dependent on gender; there was no gender main effect or a significant interaction of group with gender.

Common Adverbs (Adverb)

Scores on Common Adverbs ranged from 2.42 to 12.09 (M = 6.69, SD = 2.14). The overall one-way ANOVA for the common adverbs variable was not statistically significant. However, those with depression tended to use common adverbs more compared to individuals with no disability and with ASD. Those with ASD tended to use common adverbs less compared to individuals with no disability and those with depression (see Table 3). These differences were limited to prompt 1 (see Table 4). There was no statistically significant difference for prompt 2, but there was a statistically significant difference between groups for prompt 1. The one-way ANOVA for the common adverbs variable in prompt 1 was not statistically significant. However, the Tukey's b post hoc test revealed a significant difference between means. Participants with ASD and participants with no disability used common adverbs

at a significantly comparable rate. These participants used common adverbs statistically significantly less when compared to participants with depression. Finally, these differences were not dependent on gender; there was no gender main effect or a significant interaction of group with gender.

Conjunctions (Conj)

Scores on Conjunctions ranged from 4.14 to 15.35 (M = 8.25, SD = 1.80). The overall one-way ANOVA and the Tukey's b post hoc test for the conjunctions variable was not statistically significant. However, individuals with depression tended to use more conjunctions compared to the other two groups while individuals with ASD tended to use fewer conjunctions compared to the other two groups (see Table 3). These differences were limited to prompt 2 (see Table 4). There was no statistically significant difference for prompt 1, but there was a statistically significant difference between groups for prompt 2. The one-way ANOVA for the conjunctions variable in prompt 2 was statistically significant. Additionally, the Tukey's b post hoc test revealed no statistically significant difference between means. Finally, these differences were not dependent on gender; there was no gender main effect or a significant interaction of group with gender.

Interrogatives (Interrog)

Scores on Interrogatives ranged from 0 to 5.02 (M = 2.43, SD = 1.08). The overall one-way ANOVA for the interrogatives variable was statistically significant. A Tukey's b post hoc test revealed that participants with depression used interrogatives statistically significantly more compared to individuals with no disability and with ASD. Those with ASD used interrogatives statistically significantly less compared to individuals with no disability and those with depression (see Table 3). There was no statistically significant difference between prompts and

the differences were not dependent on gender; there was no gender main effect or a significant interaction of group with gender.

Anxiety (Anx)

Scores on Anxiety ranged from 0 to .88 (*M* = .55, *SD* = .66). The overall one-way ANOVA for the anxiety variable was not statistically significant. However, those with depression tended to use more anxiety-related words compared to the ASD and no disability groups whereas those with ASD tended to use fewer anxiety-related words compared to the depression and no disability groups (see Table 3). These differences were limited to prompt 2 (see Table 4). There was no statistically significant difference for prompt 1, but there was a statistically significant difference between groups for prompt 2. The one-way ANOVA for the anxiety variable in prompt 2 was statistically significant. The Tukey's b post hoc test revealed a significant difference between means. Participants with depression and participants with no disability used a comparative amount of anxiety words. Participants with ASD, however, when compared to the other two groups, used statistically significantly more anxiety-related words. Finally, these differences were not dependent on gender; there was no gender main effect or a significant interaction of group with gender.

Cognitive Processes (CogProc)

Scores on Cognitive Processes ranged from 10.9 to 30.26 (*M* = 20.55, *SD* = 4.15). The overall one-way ANOVA for the cognitive processes variable was statistically significant. A Tukey's b post hoc test revealed that participants with depression used cognitive processes words statistically significantly more compared to individuals with no disability and with ASD (see Table 3). Those with ASD used cognitive processes words statistically significantly less compared to individuals with no disability and those with depression. These differences were

limited to prompt 2 (see Table 4). There was no statistically significant difference for prompt 1, but there was a statistically significant difference between groups for prompt 2. The one-way ANOVA for the cognitive processes variable in prompt 2 was statistically significant. The Tukey's b post hoc test revealed no significant difference between means. Finally, there was a gender main effect but no significant interaction of group with gender. In all three groups women used more cognitive processes words than men did.

Insight (Insight)

Scores on Insight ranged from .93 to 9.95 (M = 4.83, SD = 1.76). The overall one-way ANOVA for the insight variable was statistically significant. A Tukey's b post hoc test revealed that participants with depression used insight words statistically significantly more compared to individuals with no disability and with ASD (see Table 3). Those with ASD used insight words statistically significantly less compared to individuals with no disability and those with depression. These differences were limited to prompt 1 (see Table 4). There was no statistically significant difference for prompt 2, but there was a statistically significant difference between groups for prompt 1. The one-way ANOVA for the insight variable in prompt 1 was not statistically significant. However, the Tukey's b post hoc test revealed a significant difference between means. Participants with depression used insight words statistically significantly more compared to individuals with no disability and to individuals with ASD. Those with ASD used insight words statistically significantly less compared to individuals with no disability and to individuals with depression. Finally, these differences were not dependent on gender; there was no gender main effect but there was a significant interaction of group with gender. While there was no gender difference in the control group, men in the depression group used more insight words than women but in the ASD group, women used more insight words than men.

Causation (Cause)

Scores on Causation ranged from .47 to 8.41 (*M* = 3.23, *SD* = 1.31). The overall one-way ANOVA for the causation variable was not statistically significant. However, those with depression tended to use causation language more compared to individuals with no disability and with ASD (see Table 3). Those with ASD tended to use causation language less compared to individuals with no disability and those with depression. These differences were limited to prompt 1 (see Table 4). There was no statistically significant difference for prompt 2, but there was a statistically significant difference between groups for prompt 1. The one-way ANOVA for the causation variable in prompt 1 was not statistically significant. However, the Tukey's b post hoc test revealed a significant difference between means. Participants with depression used causation language statistically significantly more compared to individuals with no disability and to individuals with ASD. Those with ASD used causation language statistically significantly less compared to individuals with no disability and to individuals with depression. Finally, these differences were not dependent on gender; there was no gender main effect or a significant interaction of group with gender.

Discrepancy (Discrep)

Scores on Discrepancy ranged from 0 to 6.64 (*M* = 2.84, *SD* = 1.27). The overall one-way ANOVA for the discrepancy variable was not statistically significant. However, those with depression tended to use discrepancy words more compared to individuals with no disability and with ASD (see Table 3). Those with ASD tended to use discrepancy words less compared to individuals with no disability and those with depression. These differences were limited to prompt 1 (see Table 4). There was no statistically significant difference for prompt 2, but there was a statistically significant difference between groups for prompt 1. The one-way ANOVA for

the discrepancy variable in prompt 1 was statistically significant. The Tukey's b post hoc test revealed a significant difference between means. Participants with depression used discrepancy words statistically significantly more compared to individuals with no disability and to individuals with ASD. Those with ASD used discrepancy words statistically significantly less compared to individuals with no disability and to individuals with depression. Finally, these differences were not dependent on gender; there was no gender main effect or a significant interaction of group with gender.

Tentative (Tentat)

Scores on Tentative ranged from .93 to 12.72 (M = 4.22, SD = 1.71). The overall one-way ANOVA for the tentative variable was not statistically significant. However, those with no disability tended to use fewer tentative words compared to the two disability groups whereas those with ASD tended to use more tentative words compared to the no disability and depression groups (see Table 3). These differences were limited to prompt 2 (see Table 4). There was no statistically significant difference for prompt 1, but there was a statistically significant difference between groups for prompt 2. The one-way ANOVA for the tentative variable in prompt 2 was statistically significant. The Tukey's b post hoc test revealed no significant difference between means. Finally, these differences were dependent on gender; there was a gender main effect but no significant interaction of group with gender. In all three groups women used more tentative words than men did.

Certainty (Certain)

Scores on Certainty ranged from 0 to 3.32 (M = 1.95, SD = 1.08). The overall one-way ANOVA for the certainty variable was not statistically significant. However, those with ASD tended to use fewer certainty words than the no disability and depression groups while the

depression group tended to use more certainty words compared to the no disability and ASD groups (see Table 3). These differences were limited to prompt 2 (see Table 4). There was no statistically significant difference for prompt 1, but there was a statistically significant difference between groups for prompt 2. The one-way ANOVA for the certainty variable in prompt 2 was not statistically significant. However, the Tukey's b post hoc test revealed a significant difference between means. Participants with depression and with ASD used certainty words at a statistically significantly comparable rate. Additionally, the depression and ASD samples had a statistically significant difference in means when compared to the no disability group. Finally, these differences were not dependent on gender; there was no gender main effect or a significant interaction of group with gender.

Feel (Feel)

Scores on Feel ranged from 0 to 3.68 (M = .84, SD = .79). The overall one-way ANOVA for the feel variable was not statistically significant. However, individuals with depression tended to use more feel words compared to the no disability and ASD groups whereas the ASD group tended to use fewer feel words compared to the no disability and depression groups (see Table 3). These differences were limited to prompt 2 (see Table 4). There was no statistically significant difference for prompt 1, but there was a statistically significant difference between groups for prompt 2. The one-way ANOVA for the feel variable in prompt 2 was statistically significant; the results show that the no disability group used the fewest number of feel words and the ASD group used the greatest number of feel words. However, the Tukey's b post hoc test revealed no significant difference between means. Furthermore, the variability was significantly different between groups: the depression group had less variability than the other

two groups. Finally, these differences were not dependent on gender; there was no gender main effect or a significant interaction of group with gender.

Biological Processes (Bio)

Scores on Biological Processes ranged from 0 to 7.55 (*M* = 1.85, *SD* = 1.55). The overall one-way ANOVA for the biological processes variable was not statistically significant. However, those with ASD tended to use fewer biological processes words compared to the no disability and depression groups and those with no disability tended to use more biological processes words compared to the depression and ASD groups (see Table 3). These differences were limited to prompt 1 (see Table 4). There was no statistically significant difference for prompt 2, but there was a statistically significant difference between groups for prompt 1. The one-way ANOVA for the biological processes variable in prompt 1 was not statistically significant. However, the Tukey's b post hoc test revealed a significant difference between means. Participants with depression used biological processes words statistically significantly more compared to individuals with no disability and to individuals with ASD. Those with ASD used biological processes words statistically significantly less compared to individuals with no disability and to individuals with depression. Finally, these differences were not dependent on gender; there was no gender main effect or a significant interaction of group with gender.

Future Focus (FocusFuture)

Scores on Future Focus ranged from 0 to 4.27 (*M* = 1.54, *SD* = .82). The overall one-way ANOVA for the future focus variable was not statistically significant. However, those with ASD tended to use fewer future focus words compared to the other two groups while those with depression tended to use more future focus words compared to the other two groups (see Table 3). These differences were limited to prompt 1 (see Table 4). There was no statistically

significant difference for prompt 2, but there was a statistically significant difference between groups for prompt 1. The one-way ANOVA for the future focus variable in prompt 1 was not statistically significant. However, the Tukey's b post hoc test revealed a significant difference between means. Participants with depression used future focus language statistically significantly more compared to individuals with no disability and to individuals with ASD. Those with ASD used future focus language statistically significantly less compared to individuals with no disability and to individuals with depression. Finally, these differences were not dependent on gender; there was no gender main effect or a significant interaction of group with gender.

Informal Language (Informal)

Scores on Informal Language ranged from 0 to 1.79 (M = .27, SD = .36). The overall one-way ANOVA for the informal language variable was not statistically significant. However, those with depression tended to use informal language more compared to individuals with no disability and with ASD (see Table 3). Those with ASD tended to use informal language less compared to individuals with no disability and those with depression. These differences were limited to prompt 1 (see Table 4). There was no statistically significant difference for prompt 2, but there was a statistically significant difference between groups for prompt 1. The one-way ANOVA for the informal language variable in prompt 1 was not statistically significant. However, the Tukey's b post hoc test revealed a significant difference between means. Participants with depression used informal language statistically significantly more compared to individuals with no disability and to individuals with ASD. Those with ASD used informal language statistically significantly less compared to individuals with no disability and to individuals with depression. However, the variability was significantly different between

groups: the ASD group was less variable than the other two groups. Finally, these differences were not dependent on gender; there was no gender main effect or a significant interaction of group with gender.

Swear Words (Swear)

Scores on Swear Words ranged from 0 to .85 (*M* = .04, *SD* = .14). The overall one-way ANOVA for the swear words variable was statistically significant. However, those with depression tended to use swear words more compared to individuals with no disability and with ASD. Those with ASD tended to use swear words less compared to individuals with no disability and those with depression (see Table 3). These differences were limited to prompt 1 (see Table 4). There was no statistically significant difference for prompt 2, but there was a statistically significant difference between groups for prompt 1. The one-way ANOVA for the swear words variable in prompt 1 was statistically significant. The Tukey's b post hoc test revealed a significant difference between means. Participants with depression used swear words statistically significantly more compared to individuals with no disability and to individuals with ASD. Those with ASD used swear words statistically significantly less compared to individuals with no disability and to individuals with depression. However, the variability was significantly different between groups: the depression group had more variability than the other two groups. Finally, these differences were not dependent on gender; there was no gender main effect or a significant interaction of group with gender.

Quotation Marks (Quote)

Scores on Quotation Marks ranged from 0 to 5.31 (*M* = .45, *SD* = .81). The overall one-way ANOVA for the quotation marks variable was not statistically significant. However, those with no disability tended to use fewer quotation marks compared to the ASD and depression

groups and those with ASD tended to use more quotation marks compared to the depression and no disability groups (see Table 3). These differences were limited to prompt 2 (see Table 4). There was no statistically significant difference for prompt 1, but there was a statistically significant difference between groups for prompt 2. The one-way ANOVA for the quotation marks variable in prompt 2 was statistically significant. The Tukey's b post hoc test revealed a significant difference between means. Participants with depression used quotation marks statistically significantly more compared to individuals with no disability and to individuals with ASD. Those with ASD used quotation marks statistically significantly less compared to individuals with no disability and to individuals with depression. Finally, these differences were not dependent on gender; there was no gender main effect but there was a significant interaction of group with gender. While there was no gender difference in the control group, men in the depression group used more quotation marks than women but in the ASD group, women used more quotation marks than men.

Apostrophes (Apostro)

Scores on Apostrophes ranged from 0 to 7.55 (M = 1.48, SD = 1.56). The overall one-way ANOVA for the apostrophes variable was statistically significant. These results indicate that the no disability group used statistically fewer apostrophes compared to the depression and ASD groups. Those with depression used statistically more apostrophes compared to the ASD and no disability groups (see Table 3). A Tukey's b post hoc test revealed no significant differences between means. However, there were differences between prompts. These differences were limited to prompt 2 (see Table 4). There was no statistically significant difference for prompt 1, but there was a statistically significant difference between groups for prompt 2. The one-way ANOVA for the apostrophes variable in prompt 2 was statistically

significant. However, the Tukey's b post hoc test revealed no significant difference between means. However, the variability was trending toward significance: the ASD group had more variability than the other two groups. Finally, these differences were not dependent on gender; there was no gender main effect or a significant interaction of group with gender.

Other Punctuation (OtherP)

Scores on Other Punctuation ranged from 0 to .93 (M = .04, SD = .15). The overall one-way ANOVA for the other punctuation variable was not statistically significant. However, those with no disability tended to use fewer other punctuation compared to the other two groups and those with ASD tended to use more other punctuation compared to the other two groups (see Table 3). These differences were limited to prompt 1 (see Table 4). There was no statistically significant difference for prompt 2, but there was a statistically significant difference between groups for prompt 1. The one-way ANOVA for the other punctuation variable in prompt 1 was statistically significant. The Tukey's b post hoc test revealed a significant difference between means. Participants with depression and participants with no disability used statistically significantly comparable rates of other punctuation. When compared to the ASD group, the depression and no disability groups used statistically significantly more other punctuation. Finally, these differences were not dependent on gender; there was no gender main effect but there was a significant interaction of group with gender. In all three groups, women used more other punctuation than men did.

Discussion

This study sought to explore language differences amongst individuals with no disability, depression, and autism spectrum disorder. In general, individuals with ASD tended to use more analytical thinking and articles and fewer dictionary words, personal pronouns, 3rd person plural,

common adverbs, interrogatives, cognitive processes, insight, causation, discrepancy, informal words, and swear words compared to those with no disability, and more analytical thinking and articles and fewer personal pronouns, 3rd person plural, common adverbs, cognitive processing, insight, causation, discrepancy, and informal language words compared to those with depression. Individuals with depression were more likely to use dictionary words, 3rd person plural, common adverbs, interrogatives, cognitive processes, insight, causation, discrepancy, and informal language words and less likely to use analytical thinking and articles compared to those with no disability.

Although this was an exploratory study, I did expect to see some differences. Based on previous research on depression, I expected participants with depression to use more first person singular pronouns, cognitive words, increased usage of the future tense, and more negative emotion words. Interestingly, there was no statistically significant difference in 1st person pronoun usage amongst groups. However, it is important to note that the "I Pronoun" category failed the homogeneity of variance test; the ASD group had more variability than both the depression and no disability groups. Previous research also suggests there is a correlation between high rates of cognitive words, especially insightful and causal language, and depression; the results of this study did support this finding. This study also indicated that depression participants used more 3rd person plural pronouns than the other two groups; this directly contradicts previous research.

Based on previous research, I also expected participants with ASD to use more health references, social references, more positive and negative emotion words, anger words, death words, religion words, and swear words than the other two groups. Because there are mixed results for anxiety word usage amongst the ASD community, I did not know what to expect for

that variable. Previous research also indicates that individuals who frequently use articles are more likely to perform better in college, be organized, be more emotionally stable, conscientious, be more politically conservative, and be older (Pennebaker, 2011). The results of this study indicate that individuals with ASD use articles more frequently than both individuals with no disability and individuals with depression. These results are surprising because previous research suggests that individuals with ASD are actually less likely to be conscientious or emotionally stable (Schriber, Robins, & Solomon, 2014). Additionally, individuals with ASD often struggle with organization. In prior research on language differences amongst individuals with ASD, the literature argues that individuals with ASD tend to use a significant amount of anxiety and swear words. Unfortunately, previous research compares the language of individuals with ASD to each other in a within-subjects format. Fortunately, this study utilizes a between-subjects format. Keeping this in mind, the results of this study indicate that individuals with ASD actually use more anxiety-related words and fewer swear words when compared to participants with no disability and to participants with depression. This was true even though participants with diagnoses of anxiety were excluded from my analyses.

Previous research also indicates that men use more articles than women. However, the results of this study show no differences in article use by gender. The literature also suggests that women use more cognitive words than men. In line with the previous research, the results of this study also show a main effect due to gender for cognitive processes words. In addition, some of the group differences found in this study may have been due to gender differences. The tentative variable had a significant gender main effect but no interactions of group with gender across all three groups with women using more tentative words than men. Because this variable is a subcategory of the cognitive processes variable, this result was expected. However, insight,

another subcategory of cognitive processes, did not show this same pattern. Insight exhibited both a gender main effect and an interaction of group with gender differences. Interestingly, while there were no gender differences amongst the no disability group, men in the depression group used more insight-related words than women and women in the ASD group used more insight-related words than men. Thus, the group differences for insight in the two disability groups may be due to gender. Moreover, past literature argues that women use more personal pronouns than men and that men use more swear words than women. However, the results of this study indicate no gender differences in either of these two categories. Total pronouns and quotation marks only had significant interactions of group with gender. For both of these variables, men in the depression group used more total pronouns/quotation marks compared to women in the depression group and women in the ASD group used more total pronouns/quotation marks than men in the ASD group; there were no interactions in the no disability group. Therefore, the group differences for these two variables might have been due to the gender distribution of the groups.

The data from this study will provide researchers with a better understanding of language and invisible disabilities. The results of this project will be used to examine whether college students who read posts written with different language patterns can detect the differences and if the differences lead to responses with stigmatizing behaviors, even if the writer does not explicitly disclose a disability. Consequently, this will allow researchers to better address the topic of stigma and combat it. It is imperative that, as a society, we discover how to eradicate stigma since it is so incredibly debilitating, and even fatal, to those who experience it. If this study shows what language perpetuates stigma then that brings researchers one step closer to

knowing how to teach language in a manner that does not encourage stigmatizing behaviors and, thus, demolishes them.

Limitations

One of the major limitations of this study is the sample size. The sample size of this study was extremely skewed. There were significantly more participants with no disability compared to participants with either depression or ASD. Additionally, the sample size of the depression and ASD groups was very small, thus limiting the statistical power of these results. It is important to take the uneven and small sample size of this study into consideration when interpreting these results.

Because most of the participants in this study were recruited at a university, participant demographics are not generalizable to the general population. Of the 131 no disability participants, 22 were male (16.7%) and 109 were female (83.3%). Of the 20 depression participants, 3 were male (15%) and 17 were female (85%). Of the 11 ASD participants, 7 were male (63.6%) and 4 were female (36.4%). Globally, depression rates are at a 2:1 female-to-male ratio and ASD rates are at a 3:1 male-to-female ratio (Albert, 2015; Loomes, Hull, & Mandy, 2017). Thus, neither group was representative of the groups' true gender distribution. It is important to take this into consideration when interpreting this study's results. Additionally, several participants either did not consent or did not complete this study. Due to this, we could not use their responses in this analysis.

Another limitation includes the measurements used in this study. Because this study relied on self-report of disability, the results could be biased due to participants not accurately and/or truthfully self-reporting (i.e., choosing not to report a diagnosis). Due to this limitation, some participants with depression, for instance, may have reported that they have no disability,

which, in turn, would skew the results of this study. On the other hand, it is possible that some participants without a disability might have reported having a disability in order to complete the study and obtain a gift card. One limitation that LIWC poses is the fact that it does not pick up on the context of the text, sarcasm, irony, and idioms (Tausczik & Pennebaker, 2010) and these are exactly the areas in which ASD individuals might have greater difficulty.

It is important to note that there were several LIWC variables that did not pass the homogeneity of variance test. When the variability within some groups is much higher than other groups, ANOVA is not an appropriate statistical analysis and the conclusions drawn may be invalid. These variables include: clout, words per sentence, dictionary words, first person singular pronouns, sadness words, words related to friends, words relating to feelings, reward words, past focus, work words, home words, money words, informal language, swear words, netspeak, nonfluencies, periods, and parentheses. In some cases, the disability groups were more variable, as might be expected given the small sample sizes. Additionally, individuals with ASD or depression may be very different from one another in the level of severity or symptoms, and those differences might be reflected in their language patterns.

Additionally, the large number of variables and statistical tests utilized in this study yielded an increased probability of finding statistically significant differences that might have resulted by chance. This is because the more variables and statistical tests present in the study, the more likely it is for a type 1 error (false positive) to occur.

Finally, comorbidity of diagnoses may have skewed the results for this study. For instance, there is a very high comorbidity rate between ASD and depression and between anxiety and depression (American Psychiatric Association, 2013). If a participant had comorbid disorders, s/he may be more likely to utilize a language style characteristic of both disorders (i.e.,

a participant with both depression and ASD might have used a significant amount of cognitive words, first person singular pronouns, and articles than another participant who had only ASD). Fortunately, I think that the prompts used in this study adequately tapped into the language style that participants use due to the prompts' introspective nature. Because the prompts were thought provoking and open-ended, participants were allowed the freedom to write whatever they wanted and explore themselves through their responses.

Implications and Future Directions

This study is crucial in the understanding of ASD and the additional struggles that these individuals experience. Because this study was in a discussion board format, much like that seen in online classes, this allows researchers, educators, and clinicians to get a glimpse into the additional challenges experienced by individuals with ASD. While the response rate for this study was low among participants with both depression and ASD, individuals with ASD were particularly unresponsive. It is important to note the lack of response from the ASD population because this same unresponsiveness may extend to participation in online classes, discussion boards, and online class assignments. This may have been because individuals on the spectrum often have a processing delay and, therefore, struggle with writing. Because it is difficult for them and thus a task that is associated with negativity, individuals with ASD may simply avoid writing tasks. As the education system, particularly at the university level, becomes increasingly reliant on technology, it is crucial for educators, advocates, clinicians, and researchers to be aware of the added difficulties that individuals on the spectrum may experience, particularly in relation to online learning. More specifically, although, theoretically, the asynchronous nature of online classes would put individuals with ASD on a level playing field, this study shows that, in reality, individuals on the spectrum may not be as inclined to engage in online learning if it

involves writing assignments, particularly of a personal nature. Additionally, because peers and instructors evaluate online assignments, language differences in individuals with ASD may negatively influence these evaluations.

Future directions for this study include replicating the study with a larger sample size, particularly for the depression and ASD groups. In addition, it would be beneficial to distribute a follow-up questionnaire inquiring about the lack of response amongst the ASD population. Finally, discussion responses from this study will be used in a future study examining implicit stigma in college students. Prototypical responses for ASD, Depression, and No Disability will be created. College student participants will be randomly assigned to read different responses and to indicate whether or not they would be willing to work with the author of the vignette in a group project for an online class. They will also be asked to complete some measures related to implicit stigma. This study will provide researchers, advocates, educators, and clinicians with a better understanding of the whether negative stigma can be elicited from language patterns alone.

Conclusion

Prior research has demonstrated that there are language differences between individuals with depression and individuals without depression. There has also been significant research conducted examining language differences due to gender. However, little research has been done examining language differences in individuals with ASD either compared to individuals with no disability or to individuals with a different invisible disability (i.e., depression). This study is the first to examine language differences amongst individuals with ASD compared to both a sample with no disability and to a sample with another invisible disability (e.g., depression). Although differences depended upon the specific prompt and on participant gender, overall participants with ASD were more likely to use words related to analytical thinking and to

use articles compared to those with either depression or no disability. Those with ASD were less likely to use personal pronouns, 3rd person plural pronouns, common adverbs, cognitive processes words, insight words, causation words, discrepancy words, and informal language compared to those with depression. These results suggest that individuals with ASD may have a distinctive language profile that deserves further consideration.

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APPENDIX A

TABLES

Table 1

Demographics

	Experimental Group			Total
	No Disability (Control)	Depression	Autism Spectrum Disorder	
N =	131	20	11	162
Age				
18 – 24	129	18	11	158
25 – 34	2	2		4
Prefer Not to Answer	-	-	-	-
Gender				
Men	22	3	7	32
Women	109	17	4	130
Other	-	-	-	-
Race/ethnicity				
White	106	17	11	134
Black or African American	11	2	-	13
American Indian or Alaska Native	-	-	-	-
Asian	6	1	-	7
Native Hawaiian or Pacific Islander	-	-	-	-

Other	6	-	-	6
Prefer Not to Answer	2	-	-	2
Education Level				
Less than high school	-	-	-	-
High school graduate	28	1	3	32
Some college	84	15	7	106
2 year degree (i.e., associates degree)	10	2	-	12
4 year degree (i.e., bachelor's degree)	8	2	-	10
Master's, professional, or doctoral degree (JD, PhD, MD, etc.)	1	-	-	1
Other	-	-	-	-
Prefer Not to Answer	-	-	1	1

Table 2

Descriptives

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Min.	Max.
						Lower Bound	Upper Bound		
Word Count	1	131	251.38	45.221	3.951	243.57	259.20	102	460
	2	20	249.30	47.828	10.695	226.92	271.68	203	379
	3	11	254.91	41.021	12.368	227.35	282.47	213	361
	Total	162	251.36	45.023	3.537	244.38	258.35	102	460
Analytical Thinking	1	131	25.45	16.58	1.449	22.58	28.319	1.860	85.58
	2	20	18.35	14.05	3.142	11.77	24.92	3.330	50.60
	3	11	33.01	17.50	5.278	21.25	44.77	9.080	68.90
	Total	162	25.08	16.56	1.301	22.51	27.66	1.860	85.58
Clout	1	131	33.75	20.08	1.754	30.28	37.22	2.440	93.92
	2	20	24.23	13.41	2.999	17.95	30.51	2.970	53.02
	3	11	22.30	8.007	2.414	16.92	27.68	7.020	32.78
	Total	162	31.80	19.16	1.505	28.82	34.77	2.440	93.92
Authentic	1	131	74.63	20.02	1.749	71.17	78.09	14.59	99.00
	2	20	77.25	15.18	3.396	70.14	84.36	43.94	98.55
	3	11	70.55	22.32	6.729	55.56	85.55	30.75	95.10
	Total	162	74.68	19.59	1.539	71.64	77.72	14.59	99.00
Emotional Tone	1	131	51.25	31.29	2.734	45.84	56.66	1.000	99.00
	2	20	37.99	28.90	6.463	24.46	51.52	4.990	96.11
	3	11	54.13	35.05	10.57	30.58	77.69	4.040	99.00
	Total	162	49.81	31.40	2.467	44.94	54.68	1.000	99.00
Words per Sentence	1	131	19.79	4.852	.4239	18.95	20.62	9.830	33.43
	2	20	20.40	5.266	1.177	17.94	22.87	11.16	30.91
	3	11	21.23	9.654	2.910	14.74	27.71	11.59	45.00
	Total	162	19.96	5.313	.4174	19.14	20.78	9.830	45.00
Words > 6 Letters	1	131	14.96	4.195	.3665	14.24	15.69	6.850	34.07
	2	20	14.87	3.270	.7312	13.34	16.40	8.020	19.09
	3	11	14.58	5.994	1.807	10.55	18.61	5.930	28.51
	Total	162	14.93	4.209	.3307	14.27	15.58	5.930	34.07
Dictionary Words	1	131	94.35	2.899	.2533	93.85	94.85	85.40	100.0
	2	20	95.27	1.716	.3839	94.47	96.07	92.38	98.10
	3	11	92.67	5.049	1.522	89.28	96.06	78.95	97.41
	Total	162	94.35	3.003	.2359	93.88	94.82	78.95	100.0

Total Function Words	1	131	60.51	3.688	.3222	59.87	61.14	49.12	68.04
	2	20	61.17	4.258	.9522	59.18	63.16	50.22	69.81
	3	11	59.59	4.537	1.368	56.54	62.64	49.12	65.93
	Total	162	60.53	3.810	.2993	59.93	61.12	49.12	69.81
Total Pronouns	1	131	19.53	3.117	.2723	18.99	20.07	10.49	28.15
	2	20	20.61	4.172	.9329	18.66	22.56	13.68	27.36
	3	11	18.31	3.969	1.196	15.64	20.98	9.210	23.25
	Total	162	19.58	3.335	.2620	19.06	20.09	9.210	28.15
Personal Pronouns	1	131	11.33	2.372	.2073	10.92	11.74	5.750	18.70
	2	20	12.10	3.356	.7505	10.52	13.67	5.980	20.28
	3	11	9.927	2.800	.8444	8.045	11.80	3.950	14.12
	Total	162	11.33	2.563	.2014	10.93	11.72	3.950	20.28
1st Person Singular	1	131	7.788	2.244	.1961	7.400	8.176	.9800	13.92
	2	20	8.721	3.264	.7300	7.193	10.24	2.560	16.98
	3	11	7.962	2.778	.8378	6.095	9.829	3.510	12.55
	Total	162	7.915	2.428	.1908	7.538	8.291	.9800	16.98
1st Person Plural	1	131	.7702	1.158	.1012	.5699	.9705	.0000	6.080
	2	20	.3435	.7139	.1596	.0093	.6776	.0000	3.020
	3	11	.3400	.7111	.2144	-.1377	.8177	.0000	2.220
	Total	162	.6883	1.097	.0862	.5180	.8585	.0000	6.080
2nd Person	1	131	.9012	1.393	.1217	.6604	1.142	.0000	7.960
	2	20	.6125	.8447	.1888	.2171	1.007	.0000	2.960
	3	11	.3845	.7337	.2212	-.1084	.8774	.0000	2.350
	Total	162	.8305	1.307	.1026	.6277	1.033	.0000	7.960
3rd Person Singular	1	131	.2364	.6146	.0537	.1302	.3427	.0000	3.470
	2	20	.1725	.6131	.1370	-.1144	.4594	.0000	2.670
	3	11	.2027	.6723	.2027	-.2489	.6544	.0000	2.230
	Total	162	.2262	.6148	.0483	.1309	.3216	.0000	3.470
3rd Person Plural	1	131	1.634	1.414	.1235	1.390	1.879	.0000	7.840
	2	20	2.251	1.585	.3545	1.509	2.993	.0000	5.780
	3	11	1.038	1.015	.3060	.3562	1.720	.0000	3.480
	Total	162	1.670	1.430	.1124	1.448	1.892	.0000	7.840
Impersonal Pronouns	1	131	8.189	2.014	.1760	7.841	8.538	3.250	12.28
	2	20	8.511	2.375	.5310	7.399	9.623	3.560	14.34
	3	11	8.384	3.852	1.161	5.796	10.97	.3900	15.35
	Total	162	8.242	2.208	.1735	7.900	8.585	.3900	15.35
Articles	1	131	4.554	1.660	.1450	4.267	4.841	1.440	9.440
	2	20	4.063	1.664	.3721	3.284	4.842	1.750	7.350
	3	11	6.100	1.299	.3918	5.226	6.973	4.320	8.310
	Total	162	4.598	1.688	.1326	4.336	4.860	1.440	9.440

Prepositions	1	131	12.51	2.136	.1867	12.14	12.88	7.520	18.14
	2	20	12.23	1.778	.3977	11.40	13.06	9.330	16.25
	3	11	12.17	2.479	.7474	10.50	13.83	7.460	15.49
	Total	162	12.45	2.111	.1658	12.12	12.78	7.460	18.14
Auxiliary Verbs	1	131	10.84	2.230	.1948	10.45	11.22	4.980	17.49
	2	20	10.71	2.434	.5444	9.578	11.85	5.330	14.83
	3	11	11.38	2.410	.7266	9.760	12.99	7.390	15.93
	Total	162	10.86	2.258	.1774	10.51	11.21	4.980	17.49
Common Adverbs	1	131	6.697	2.173	.1898	6.321	7.072	2.420	12.09
	2	20	7.305	1.753	.3919	6.485	8.125	4.350	10.03
	3	11	5.500	2.136	.6441	4.065	6.936	2.590	8.240
	Total	162	6.691	2.145	.1685	6.358	7.024	2.420	12.09
Conjunctions	1	131	8.170	1.802	.1574	7.859	8.482	4.140	15.35
	2	20	9.051	1.638	.3664	8.284	9.817	6.250	13.08
	3	11	7.764	1.861	.5613	6.513	9.015	4.820	10.37
	Total	162	8.251	1.804	.1417	7.972	8.531	4.140	15.35
Negations	1	131	2.906	1.177	.1028	2.703	3.110	.0000	6.830
	2	20	3.385	.9832	.2198	2.925	3.845	1.180	4.930
	3	11	2.786	1.380	.4160	1.859	3.713	.8700	6.120
	Total	162	2.957	1.174	.0922	2.775	3.139	.0000	6.830
Common Verbs	1	131	20.30	2.814	.2459	19.81	20.79	12.41	27.10
	2	20	20.76	2.727	.6098	19.49	22.04	16.00	25.59
	3	11	20.87	3.117	.9398	18.78	22.96	15.35	25.00
	Total	162	20.40	2.814	.2210	19.96	20.83	12.41	27.10
Common Adjectives	1	131	4.935	1.687	.1474	4.644	5.227	1.730	9.090
	2	20	4.852	2.350	.5255	3.752	5.952	.9100	11.02
	3	11	5.724	2.182	.6580	4.258	7.190	3.040	11.16
	Total	162	4.979	1.813	.1424	4.697	5.260	.9100	11.16
Comparisons	1	131	2.663	1.365	.1193	2.427	2.899	.0000	7.360
	2	20	2.678	1.679	.3755	1.891	3.464	.4500	7.090
	3	11	3.104	1.854	.5591	1.858	4.350	1.080	7.440
	Total	162	2.695	1.436	.1128	2.472	2.918	.0000	7.440
Interrogatives	1	131	2.378	1.058	.0924	2.195	2.561	.0000	5.020
	2	20	3.033	.9524	.2129	2.587	3.478	.8900	4.940
	3	11	2.064	1.260	.3800	1.217	2.911	.4300	3.960
	Total	162	2.438	1.080	.0848	2.270	2.605	.0000	5.020
Numbers	1	131	.7508	.8250	.0720	.6082	.8934	.0000	5.690
	2	20	.4760	.5081	.1136	.2381	.7138	.0000	1.780
	3	11	.9181	.7989	.2408	.3814	1.454	.0000	2.820
	Total	162	.7282	.7940	.0623	.6050	.8514	.0000	5.690

Qualifiers	1	131	2.573	1.207	.1054	2.364	2.782	.4300	6.060
	2	20	2.886	1.045	.2338	2.396	3.375	1.200	5.450
	3	11	2.077	1.398	.4215	1.138	3.016	.0000	4.230
	Total	162	2.578	1.206	.0948	2.391	2.765	.0000	6.060
Affective Processes	1	131	5.715	2.259	.1973	5.325	6.105	.9800	13.99
	2	20	5.887	1.959	.4382	4.970	6.804	2.400	10.09
	3	11	5.751	2.863	.8632	3.828	7.675	.9400	10.09
	Total	162	5.739	2.255	.1771	5.389	6.089	.9400	13.99
Positive Emotion	1	131	3.473	1.794	.1567	3.163	3.783	.0000	9.000
	2	20	3.208	1.518	.3396	2.497	3.918	.4800	6.130
	3	11	3.661	2.470	.7448	2.002	5.321	.4400	7.390
	Total	162	3.453	1.805	.1418	3.173	3.733	.0000	9.000
Negative Emotion	1	131	2.077	1.461	.1276	1.825	2.330	.0000	8.530
	2	20	2.622	1.166	.2608	2.076	3.168	.0000	5.360
	3	11	1.870	1.138	.3433	1.105	2.635	.0000	3.510
	Total	162	2.130	1.414	.1111	1.911	2.350	.0000	8.530
Anxiety	1	131	.5422	.6976	.0609	.4216	.6628	.0000	3.950
	2	20	.6725	.6329	.1415	.3762	.9687	.0000	2.270
	3	11	.4927	.3146	.0948	.2813	.7041	.0000	.8800
	Total	162	.5549	.6697	.0526	.4510	.6588	.0000	3.950
Anger	1	131	.5226	.6925	.0605	.4029	.6423	.0000	3.410
	2	20	.4305	.4546	.1016	.2176	.6433	.0000	1.350
	3	11	.3790	.3570	.1076	.1392	.6189	.0000	.8800
	Total	162	.5015	.6492	.0510	.4008	.6022	.0000	3.410
Sadness	1	131	.3943	.5460	.0477	.2999	.4887	.0000	2.370
	2	20	.6975	1.137	.2543	.1651	1.229	.0000	4.730
	3	11	.2918	.3823	.1152	.0349	.5486	.0000	1.110
	Total	162	.4248	.6432	.0505	.3250	.5246	.0000	4.730
Social Processes	1	131	9.814	3.306	.2889	9.242	10.38	.9600	19.26
	2	20	9.354	3.209	.7176	7.852	10.85	3.960	15.47
	3	11	7.657	2.687	.8102	5.852	9.462	3.070	10.87
	Total	162	9.610	3.285	.2581	9.101	10.12	.9600	19.26
Family	1	131	.2182	.4597	.0401	.1387	.2976	.0000	2.420
	2	20	.1320	.2532	.0566	.0135	.2505	.0000	.8900
	3	11	.1073	.3557	.1072	-.1317	.3463	.0000	1.180
	Total	162	.2000	.4330	.0340	.1328	.2672	.0000	2.420
Friends	1	131	.3100	.4614	.0403	.2302	.3897	.0000	3.240
	2	20	.3335	.4291	.0959	.1326	.5343	.0000	1.570
	3	11	.6145	1.163	.3508	-.1671	1.396	.0000	3.480
	Total	162	.3335	.5325	.0418	.2509	.4162	.0000	3.480

Female References	1	131	.2275	.5228	.0456	.1371	.3178	.0000	3.270
	2	20	.1855	.5168	.1155	-.0564	.4274	.0000	1.780
	3	11	.0000	.00000	.00000	.0000	.0000	.0000	.0000
	Total	162	.2069	.5055	.0397	.1284	.2853	.0000	3.270
Male References	1	131	.3325	.7010	.0612	.2114	.4537	.0000	3.850
	2	20	.1125	.4062	.0908	-.0776	.3026	.0000	1.780
	3	11	.2736	.6897	.2079	-.1897	.7370	.0000	2.230
	Total	162	.3014	.6716	.0527	.1972	.4056	.0000	3.850
Cognitive Processes	1	131	20.29	3.941	.3444	19.61	20.97	10.90	29.82
	2	20	23.08	3.734	.8350	21.33	24.83	15.57	29.38
	3	11	19.05	5.789	1.745	15.16	22.94	11.37	30.26
	Total	162	20.55	4.156	.3265	19.90	21.19	10.90	30.26
Insight	1	131	4.756	1.672	.1461	4.466	5.045	.9300	9.950
	2	20	5.717	1.937	.4333	4.810	6.624	2.360	9.850
	3	11	4.100	2.102	.6340	2.687	5.512	1.740	8.770
	Total	162	4.830	1.765	.1386	4.556	5.104	.9300	9.950
Causation	1	131	3.154	1.180	.1031	2.950	3.358	.4700	6.090
	2	20	4.080	1.882	.4208	3.199	4.960	.6300	8.410
	3	11	2.707	1.107	.3339	1.963	3.451	1.110	4.820
	Total	162	3.238	1.316	.1033	3.033	3.442	.4700	8.410
Discrepancy	1	131	2.801	1.296	.1132	2.577	3.025	.0000	6.490
	2	20	3.363	1.095	.2450	2.850	3.875	2.110	6.640
	3	11	2.378	1.095	.3304	1.641	3.114	.7800	4.230
	Total	162	2.841	1.274	.1001	2.644	3.039	.0000	6.640
Tentative	1	131	4.090	1.706	.1490	3.795	4.385	.9300	12.72
	2	20	4.657	1.393	.3116	4.005	5.309	1.990	6.690
	3	11	4.971	2.094	.6314	3.564	6.378	2.750	9.650
	Total	162	4.220	1.711	.1344	3.955	4.485	.9300	12.72
Certainty	1	131	1.979	1.028	.0898	1.801	2.157	.0000	4.900
	2	20	2.052	1.406	.3145	1.394	2.710	.0000	6.820
	3	11	1.502	1.058	.3190	.7917	2.213	.0000	3.320
	Total	162	1.956	1.082	.0850	1.788	2.124	.0000	6.820
Differentiation	1	131	5.609	1.819	.1589	5.294	5.923	2.150	11.40
	2	20	5.833	1.574	.3521	5.096	6.569	2.900	8.550
	3	11	5.568	1.899	.5727	4.291	6.844	3.040	7.910
	Total	162	5.634	1.787	.1404	5.356	5.911	2.150	11.40
Perceptual Processes	1	131	2.617	1.167	.1019	2.415	2.819	.3600	5.880
	2	20	3.024	1.617	.3617	2.267	3.781	.8900	5.490
	3	11	2.723	1.215	.3665	1.906	3.540	.9400	5.400
	Total	162	2.674	1.232	.0968	2.483	2.865	.3600	5.880

See	1	131	.6994	.7165	.0626	.5756	.8233	.0000	3.200
	2	20	.5525	.6404	.1432	.2527	.8522	.0000	2.140
	3	11	.6745	.3854	.1162	.4156	.9334	.0000	1.390
	Total	162	.6796	.6888	.0541	.5727	.7865	.0000	3.200
Hear	1	131	.4307	.5733	.0500	.3316	.5298	.0000	3.640
	2	20	.5730	.7670	.1715	.2140	.9319	.0000	3.140
	3	11	.7172	.7217	.2176	.2323	1.202	.0000	1.860
	Total	162	.4677	.6115	.0480	.3728	.5626	.0000	3.640
Feel	1	131	.8226	.7348	.0642	.6956	.9496	.0000	3.680
	2	20	1.101	1.179	.2636	.5491	1.652	.0000	3.420
	3	11	.6709	.6472	.1951	.2360	1.105	.0000	1.570
	Total	162	.8467	.7979	.0626	.7229	.9705	.0000	3.680
Biological Processes	1	131	1.868	1.537	.1343	1.603	2.134	.0000	7.550
	2	20	1.845	1.480	.3309	1.152	2.538	.0000	4.830
	3	11	1.685	1.958	.5906	.3694	3.001	.0000	6.100
	Total	162	1.853	1.551	.1219	1.612	2.094	.0000	7.550
Body	1	131	.3813	.6961	.0608	.2610	.5017	.0000	6.040
	2	20	.5080	.8367	.1870	.1163	.8996	.0000	3.380
	3	11	.3418	.2629	.0792	.1651	.5184	.0000	.8700
	Total	162	.3943	.6929	.0544	.2868	.5018	.0000	6.040
Health	1	131	.9607	1.004	.0877	.7871	1.134	.0000	5.220
	2	20	.7875	.9571	.2140	.3395	1.235	.0000	3.590
	3	11	.6863	1.209	.3647	-.1263	1.499	.0000	3.290
	Total	162	.9207	1.010	.0793	.7639	1.077	.0000	5.220
Sexual	1	131	.1024	.3509	.0306	.0417	.1631	.0000	2.240
	2	20	.0960	.2629	.0588	-.0270	.2190	.0000	1.060
	3	11	.0254	.0844	.0254	-.0312	.0821	.0000	.2800
	Total	162	.0964	.3292	.0258	.0453	.1475	.0000	2.240
Ingestion	1	131	.2347	.6782	.0592	.1174	.3519	.0000	5.030
	2	20	.1945	.3607	.0806	.0257	.3633	.0000	1.330
	3	11	.5945	1.338	.4034	-.3043	1.493	.0000	3.720
	Total	162	.2541	.7117	.0559	.1437	.3646	.0000	5.030
Drives	1	131	6.932	2.422	.2116	6.514	7.351	1.840	12.45
	2	20	5.940	2.225	.4977	4.898	6.981	2.370	9.360
	3	11	6.630	2.715	.8186	4.805	8.454	3.240	12.59
	Total	162	6.789	2.426	.1906	6.413	7.166	1.840	12.59
Affiliation	1	131	2.117	1.535	.1341	1.852	2.383	.0000	7.110
	2	20	1.767	1.324	.2961	1.147	2.386	.0000	6.420
	3	11	1.706	1.639	.4944	.6047	2.807	.0000	4.310
	Total	162	2.046	1.516	.1191	1.811	2.281	.0000	7.110

Achievement	1	131	1.508	1.403	.1226	1.265	1.751	.0000	9.300
	2	20	1.333	1.061	.2374	.8359	1.830	.0000	3.380
	3	11	1.784	1.160	.3497	1.005	2.563	.3900	4.810
	Total	162	1.505	1.347	.1058	1.296	1.714	.0000	9.300
Power	1	131	2.017	1.314	.1148	1.790	2.245	.0000	5.940
	2	20	1.671	1.302	.2912	1.061	2.281	.4800	5.590
	3	11	1.967	1.193	.3599	1.165	2.769	.3600	3.700
	Total	162	1.971	1.302	.1023	1.769	2.173	.0000	5.940
Reward	1	131	1.458	.9878	.0863	1.287	1.629	.0000	4.200
	2	20	1.149	.8192	.1831	.7660	1.532	.0000	2.960
	3	11	1.496	1.749	.5276	.3207	2.671	.0000	5.930
	Total	162	1.422	1.033	.0811	1.262	1.583	.0000	5.930
Risk	1	131	.4849	.5481	.0478	.3902	.5797	.0000	2.490
	2	20	.6180	.5774	.1291	.3477	.8882	.0000	2.460
	3	11	.4463	.5618	.1694	.0689	.8238	.0000	1.480
	Total	162	.4987	.5511	.0432	.4132	.5842	.0000	2.490
Past Focus	1	131	2.448	1.687	.1473	2.156	2.740	.0000	8.170
	2	20	2.175	.9911	.2216	1.711	2.639	.4700	4.940
	3	11	1.675	1.304	.3933	.7989	2.551	.0000	3.950
	Total	162	2.362	1.600	.1257	2.113	2.610	.0000	8.170
Present Focus	1	131	15.35	2.950	.2578	14.84	15.86	7.520	24.52
	2	20	15.94	2.344	.5243	14.84	17.03	12.44	22.05
	3	11	16.96	3.464	1.044	14.63	19.29	10.96	23.33
	Total	162	15.53	2.934	.2305	15.08	15.99	7.520	24.52
Future Focus	1	131	1.534	.8307	.0725	1.391	1.678	.0000	4.270
	2	20	1.682	.7805	.1745	1.316	2.047	.3800	3.140
	3	11	1.373	.9367	.2824	.7443	2.002	.0000	3.290
	Total	162	1.542	.8295	.0651	1.413	1.670	.0000	4.270
Relativity	1	131	10.80	3.039	.2655	10.28	11.33	3.110	20.37
	2	20	9.477	2.630	.5882	8.246	10.70	5.990	13.98
	3	11	9.979	2.578	.7773	8.247	11.71	4.820	15.51
	Total	162	10.58	2.984	.2344	10.12	11.05	3.110	20.37
Motion	1	131	1.401	.8414	.0735	1.256	1.546	.0000	5.210
	2	20	1.043	.6449	.1442	.7411	1.344	.0000	2.270
	3	11	1.151	.6064	.1828	.7443	1.559	.3700	2.220
	Total	162	1.340	.8124	.0638	1.214	1.466	.0000	5.210
Space	1	131	5.419	1.822	.1592	5.104	5.734	.8800	9.860
	2	20	4.578	1.688	.3776	3.788	5.368	2.210	9.710
	3	11	5.152	1.604	.4838	4.074	6.230	2.190	8.860
	Total	162	5.297	1.804	.1417	5.017	5.577	.8800	9.860

Time	1	131	4.101	2.024	.1768	3.751	4.451	.7100	12.98
	2	20	3.870	2.059	.4604	2.906	4.834	1.420	8.750
	3	11	3.710	.9591	.2891	3.066	4.355	2.610	5.220
	Total	162	4.046	1.969	.1547	3.740	4.352	.7100	12.98
Work	1	131	2.207	2.344	.2048	1.801	2.612	.0000	13.94
	2	20	1.118	1.154	.2581	.5782	1.658	.0000	4.710
	3	11	1.645	1.200	.3618	.8392	2.451	.0000	3.510
	Total	162	2.034	2.196	.1725	1.693	2.375	.0000	13.94
Leisure	1	131	.6350	.9896	.0864	.4639	.8060	.0000	6.820
	2	20	.5870	.7447	.1665	.2384	.9355	.0000	3.110
	3	11	.7563	.8979	.2707	.1531	1.359	.0000	2.350
	Total	162	.6373	.9526	.0748	.4895	.7851	.0000	6.820
Home	1	131	.1870	.3336	.0291	.1294	.2447	.0000	1.600
	2	20	.3720	.9434	.2109	-.0695	.8135	.0000	4.000
	3	11	.0709	.2351	.0709	-.0870	.2289	.0000	.7800
	Total	162	.2020	.4508	.0354	.1320	.2719	.0000	4.000
Money	1	131	.3969	.8658	.0756	.2472	.5466	.0000	5.640
	2	20	.6565	1.598	.3574	-.0916	1.404	.0000	6.180
	3	11	.7236	1.264	.3811	-.1257	1.572	.0000	4.230
	Total	162	.4511	1.009	.0793	.2945	.6077	.0000	6.180
Religion	1	131	.4817	1.008	.0881	.3073	.6561	.0000	4.730
	2	20	.4415	1.104	.2469	-.0753	.9583	.0000	4.810
	3	11	.1109	.2656	.0800	-.0675	.2893	.0000	.8300
	Total	162	.4516	.9894	.0777	.2980	.6051	.0000	4.810
Death	1	131	.1231	.3813	.0333	.0572	.1890	.0000	2.650
	2	20	.0850	.2169	.0485	-.0165	.1865	.0000	.7900
	3	11	.0336	.1115	.0336	-.0413	.1085	.0000	.3700
	Total	162	.1123	.3526	.0277	.0576	.1670	.0000	2.650
Informal Language	1	131	.2825	.3668	.0320	.2191	.3459	.0000	1.790
	2	20	.3170	.3707	.0829	.1434	.4905	.0000	.9900
	3	11	.0427	.1417	.0427	-.0524	.1379	.0000	.4700
	Total	162	.2704	.3606	.0283	.2145	.3264	.0000	1.790
Swear Words	1	131	.0363	.1158	.0101	.0162	.0563	.0000	.4700
	2	20	.1450	.2774	.0620	.0151	.2749	.0000	.8500
	3	11	.0000	.0000	.0000	.0000	.0000	.0000	.0000
	Total	162	.0472	.1461	.0114	.0246	.0699	.0000	.8500
Netspeak	1	131	.0381	.1679	.0146	.0091	.0671	.0000	1.290
	2	20	.0000	.0000	.0000	.0000	.0000	.0000	.0000
	3	11	.0000	.0000	.0000	.0000	.0000	.0000	.0000
	Total	162	.0308	.1516	.0119	.0073	.0543	.0000	1.290

Assent	1	131	.1195	.2571	.0224	.0751	.1640	.0000	1.350
	2	20	.1135	.2545	.0569	-.0056	.2326	.0000	.9500
	3	11	.0427	.1417	.0427	-.0525	.1379	.0000	.4700
	Total	162	.1136	.2503	.0196	.0747	.1524	.0000	1.350
Nonfluencies	1	131	.0708	.1830	.0159	.0392	.1024	.0000	.9000
	2	20	.0585	.1465	.0327	-.0100	.1270	.0000	.4900
	3	11	.0000	.0000	.0000	.0000	.0000	.0000	.0000
	Total	162	.0645	.1729	.0135	.0376	.0913	.0000	.9000
Fillers	1	131	.0179	.0835	.0073	.0034	.0323	.0000	.5000
	2	20	.0000	.0000	.0000	.0000	.0000	.0000	.0000
	3	11	.0000	.0000	.0000	.0000	.0000	.0000	.0000
	Total	162	.0144	.0754	.0059	.0027	.0261	.0000	.5000
Total Punctuation	1	131	10.55	3.071	.2683	10.02	11.08	5.210	21.03
	2	20	12.13	2.653	.5933	10.89	13.38	6.280	18.11
	3	11	11.01	5.491	1.655	7.324	14.70	2.590	23.02
	Total	162	10.78	3.254	.2557	10.27	11.28	2.590	23.02
Periods	1	131	5.135	1.319	.1152	4.907	5.363	1.830	9.810
	2	20	4.851	1.508	.3372	4.145	5.556	2.060	8.490
	3	11	5.300	2.122	.6399	3.875	6.726	2.220	8.630
	Total	162	5.111	1.401	.1101	4.894	5.329	1.830	9.810
Commas	1	131	2.965	1.750	.1529	2.663	3.268	.0000	7.910
	2	20	3.404	1.520	.3400	2.692	4.115	.4800	6.040
	3	11	2.686	2.488	.7501	1.014	4.357	.0000	7.890
	Total	162	3.001	1.777	.1396	2.725	3.276	.0000	7.910
Colons	1	131	.0215	.0914	.0079	.0056	.0373	.0000	.4600
	2	20	.0195	.0872	.0195	-.0213	.0603	.0000	.3900
	3	11	.0327	.1085	.0327	-.0402	.1056	.0000	.3600
	Total	162	.0220	.0916	.0072	.0078	.0362	.0000	.4600
Semicolons	1	131	.0473	.1531	.0133	.0209	.0738	.0000	.8600
	2	20	.0735	.1799	.0402	-.0107	.1577	.0000	.5300
	3	11	.0391	.1296	.0390	-.0480	.1262	.0000	.4300
	Total	162	.0500	.1545	.0121	.0260	.0740	.0000	.8600
Question Marks	1	131	.2674	.5423	.0473	.1736	.3611	.0000	3.100
	2	20	.4045	.4927	.1101	.1738	.6351	.0000	1.440
	3	11	.0654	.2170	.0654	-.0803	.2112	.0000	.7200
	Total	162	.2706	.5236	.0411	.1893	.3518	.0000	3.100
Exclamation Marks	1	131	.0321	.1798	.0157	.0010	.0632	.0000	1.840
	2	20	.0550	.1362	.0304	-.0087	.1187	.0000	.4300
	3	11	.000000	.000000	.000000	.000000	.00000	.0000	.0000

Dashes	Total	162	.0327	.1686	.0132	.0066	.0589	.0000	1.840
	1	131	.1951	.3610	.0315	.1327	.2575	.0000	1.710
	2	20	.2580	.4803	.1074	.0332	.4827	.0000	1.760
	3	11	.1900	.3384	.1020	-.0374	.4174	.0000	.8800
Quotation Marks	Total	162	.2025	.3741	.0293	.1444	.2605	.0000	1.760
	1	131	.4226	.8127	.0710	.2821	.5631	.0000	5.310
	2	20	.4770	.8132	.1818	.0964	.8575	.0000	2.360
	3	11	.8118	.8616	.2597	.2329	1.390	.0000	2.160
	Total	162	.4558	.8167	.0641	.3290	.5825	.0000	5.310
Apostrophes	1	131	1.336	1.417	.1238	1.091	1.581	.0000	5.800
	2	20	2.436	1.787	.3996	1.599	3.273	.0000	5.280
	3	11	1.570	2.253	.6795	.0558	3.084	.0000	7.550
	Total	162	1.487	1.563	.1228	1.245	1.730	.0000	7.550
Parentheses	1	131	.0960	.3257	.0284	.0397	.1523	.0000	2.330
	2	20	.0940	.2897	.0648	-.0416	.2296	.0000	.9900
	3	11	.2391	.7929	.2390	-.2936	.7718	.0000	2.630
	Total	162	.1055	.3687	.0289	.0483	.1627	.0000	2.630
Other Punctuation	1	131	.0382	.1264	.0110	.0163	.0601	.0000	.7500
	2	20	.0655	.2204	.0492	-.0376	.1686	.0000	.9300
	3	11	.0754	.2502	.0754	-.0926	.2435	.0000	.8300
	Total	162	.0441	.1506	.0118	.0207	.0675	.0000	.9300

Table 3

Mean(Standard Deviation) and One-Way Analysis of Variance, Group by LIWC Results

Variable	Experimental Group			*F*	*p*
	No Disability (Control)	Depression	Autism Spectrum Disorder		
Analytic	25.452[ab] (16.587)	19.889[a] (15.407)	33.015[b] (17.507)	3.018	.052
Clout	33.754[a] (20.085)	24.360[a] (13.089)	22.309[a] (8.007)	3.708	.027*
Dic	94.354[ab] (2.899)	95.273[a] (1.716)	92.677[b] (5.049)	2.708	.070
Ppron	11.33[ab] (2.372)	12.100[a] (3.356)	9.927[b] (2.800)	2.601	.077
They	1.634[ab] (1.414)	2.251[a] (1.585)	1.038[b] (1.015)	2.827	.062
Article	4.554[ab] (1.660)	4.016[a] (1.636)	6.100[b] (1.299)	5.716	.004**
Adverb	6.697[ab] (2.173)	7.305[a] (1.753)	5.500[b] (2.136)	2.562	.080
Interrog	2.378[ab] (1.058)	3.033[a] (.9524)	2.064[b] (1.260)	4.033	.020*
CogProc	20.291[ab] (3.941)	23.099[a] (3.640)	19.059[b] (5.789)	4.911	.009**
Insight	4.756[ab] (1.672)	5.633[a] (1.927)	4.100[b] (2.102)	3.704	.027*
Cause	3.154[ab] (1.180)	3.990[a] (1.879)	2.707[b] (1.107)	5.551	.005**

Discrep	2.801[ab] (1.296)	3.363[a] (1.095)	2.378[b] (1.095)	2.514	.084
Informal	.2825[ab] (.3668)	.3170[a] (.3707)	.0427[b] (.1417)	2.478	.087
Swear	.0363[a] (.1158)	.1381[a] (.2722)	.0000[b] (.0000)	5.740	.004**
Apostro	1.336[a] (1.417)	2.320[a] (1.821)	1.570[a] (2.253)	4.499	.013*

Note. * = $p \leq .05$, ** = $p \leq .01$. Means labeled with different superscripts were significantly different at $p \leq .05$ according to Tukey's b HSD post hoc test.

Table 4

Mean(Standard Deviation) & One-Way Analysis of Variance, Group by LIWC Results by Prompt

Variable		Experimental Group			*F*	*p*
		No Disability (Control)	Depression	Autism Spectrum Disorder		
Analytic	Prompt 1	21.025[a] (17.503)	18.358[a] (12.093)	28.247[a] (21.464)	1.102	.335
	Prompt 2	31.156[ab] (25.736)	20.317[a] (24.052)	42.220[a] (26.007)	2.576	.079
Dic	Prompt 1	95.676[a] (2.689)	96.073[a] (2.059)	93.1770[b] (5.589)	3.831	.024*
	Prompt 2	93.007[a] (4.451)	94.617[a] (2.806)	91.254[a] (6.758)	1.975	.142
Pronoun	Prompt 1	22.379[a] (4.188)	23.375[a] (4.795)	22.203[a] (6.073)	.447	.640
	Prompt 2	17.061[ab] (4.581)	18.444[a] (5.467)	14.354[a] (5.666)	2.293	.104
Ppron	Prompt 1	14.548[a] (3.063)	15.332[a] (3.025)	14.102[a] (3.847)	.671	.513
	Prompt 2	8.161[ab] (3.504)	9.272[a] (4.400)	5.158[a] (4.539)	3.880	.023*
They	Prompt 1	1.207[a] (1.389)	2.498[b] (1.869)	.8800[a] (.4141)	7.101	.001**
	Prompt 2	2.074[a] (2.207)	2.157[a] (2.181)	1.321[a] (.9867)	.545	.581
Article	Prompt 1	3.944[a] (1.927)	3.207[a] (1.421)	4.615[a] (1.378)	2.122	.123
	Prompt 2	5.033[a] (2.453)	4.648[a] (3.070)	7.346[b] (3.478)	3.694	.027*
Adverb	Prompt 1	6.902[a] (2.648)	6.987[b] (2.082)	4.885[a] (1.644)	2.995	.053
	Prompt 2	6.732[a] (3.170)	7.675[a] (2.922)	5.938[a] (3.721)	1.121	.329
Conj	Prompt 1	8.621[a] (2.399)	8.807[a] (2.130)	7.801[a] (1.901)	.660	.518
	Prompt 2	7.530[a] (2.511)	9.244[a] (2.586)	7.706[a] (2.615)	3.970	.021*
Interrog	Prompt 1	2.146[a] (1.341)	2.548[a] (1.221)	1.834[a] (1.560)	1.087	.340
	Prompt 2	2.735[a] (1.594)	3.596[a] (1.743)	2.312[a] (1.820)	2.883	.059
Anx	Prompt 1	.9003[a] (1.348)	.9821[a] (1.008)	.3100[a] (.4035)	1.073	.345
	Prompt 2	.2212[a] (.4340)	.4345[a] (.5148)	.8722[b] (.3854)	10.358	.000**
Cogproc	Prompt 1	20.403[a] (5.279)	21.502[a] (4.277)	17.679[a] (7.127)	1.723	.182
	Prompt 2	20.822[a] (5.596)	24.425[a] (4.738)	21.593[a] (6.858)	3.615	.029*

Insight	Prompt 1	4.717[ab] (1.546)	5.441[a] (1.410)	3.452[b] (1.846)	2.821	.063
	Prompt 2	5.048[a] (2.545)	5.984[a] (2.778)	5.242[a] (2.984)	1.118	.330
Cause	Prompt 1	2.321[ab] (1.180)	2.896[a] (1.879)	1.591[b] (1.107)	2.398	.094
	Prompt 2	4.108[a] (1.888)	4.906[a] (2.257)	3.760[a] (1.172)	1.750	.177
Discrep	Prompt 1	3.397[ab] (1.800)	4.174[a] (1.616)	2.350[b] (1.248)	3.640	.029*
	Prompt 2	1.964[a] (2.728)	2.512[a] (1.869)	1.990[a] (1.502)	.863	.424
Tentat	Prompt 1	4.414[a] (2.711)	4.306[a] (1.487)	4.628[a] (2.259)	.051	.950
	Prompt 2	4.076[a] (2.158)	4.954[a] (2.195)	5.650[a] (3.513)	3.066	.050*
Certain	Prompt 1	1.769[a] (1.355)	1.518[a] (1.048)	1.740[a] (1.062)	.303	.739
	Prompt 2	2.104[ab] (1.399)	2.618[a] (2.333)	1.330[a] (1.363)	2.217	.112
Feel	Prompt 1	1.093[a] (1.237)	1.171[a] (1.281)	.3840[a] (.5620)	1.679	.190
	Prompt 2	.5379[a] (.8013)	1.007[a] (1.504)	1.067[a] (.9936)	3.255	.041*
Bio	Prompt 1	1.482[ab] (1.472)	1.810[a] (2.130)	.5740[b] (.8385)	2.170	.118
	Prompt 2	1.885[a] (2.289)	1.971[a] (1.752)	2.276[a] (3.102)	.130	.879
FocusFuture	Prompt 1	2.150[ab] (1.472)	2.715[a] (1.200)	1.362[b] (1.162)	3.007	.052
	Prompt 2	.8844[a] (.9749)	.6820[a] (.7432)	.9577[a] (1.230)	.425	.654
Informal	Prompt 1	.2264[ab] (.4532)	.4189[a] (.6199)	.0000[b] (.0000)	2.809	.063
	Prompt 2	.3530[a] (.6648)	.2570[a] (.4530)	.0000[a] (.0000)	1.463	.235
Swear	Prompt 1	.0345[ab] (.1610)	.1568[a] (.3782)	.0000[b] (.0000)	3.546	.031*
	Prompt 2	.0379[a] (.1702)	.1335[a] (.3788)	.0000[a] (.0000)	2.146	.120
Quote	Prompt 1	.3975[a] (1.159)	.3636[a] (.9584)	.2920[a] (.6158)	.046	.955
	Prompt 2	.3841[a] (.9181)	.6300[a] (1.181)	1.218[b] (1.331)	3.368	.037*
Apostro	Prompt 1	1.518[a] (2.051)	2.587[a] (2.043)	1.424[a] (2.509)	2.239	.110
	Prompt 2	1.311[a] (1.462)	2.411[a] (1.979)	1.897[a] (2.456)	4.369	.014*
OtherP	Prompt 1	.0170[a] (1117)	.0000[a] (.0000)	.1500[b] (.4743)	3.736	.026*
	Prompt 2	.0713[a] (.2567)	.0315[a] (.1408)	.0000[a] (.0000)	.565	.570

Note. * = $p \leq .05$, ** = $p \leq .01$. Means labeled with different superscripts were significantly different at $p \leq .05$ according to Tukey's b HSD post hoc test.

APPENDIX B

INFORMED CONSENT

Linguistic Analysis of Written Language Used by Young Adults
Informed Consent (SONA Participants)

June 6, 2017

Invitation to participate: We are conducting a study to determine language use patterns amongst young adults of various backgrounds. To participate, *you must be 18 years of age or older*.

What will you do: If you choose to participate in this project, you will complete a survey containing two discussion board prompts requiring responses of a minimum of 100 words. Following your response to the discussion questions, you will be asked about your background information including information regarding any disabilities you may have. Altogether it should take you approximately 30 minutes to complete.

Risks and benefits of participating: While this survey deals with hypothetical discussion board prompts that may be used in an "About Me" introductory academic scenario, sometimes thinking about and responding to these prompts can be uncomfortable for some people. If the topic makes you uncomfortable, please *do not* participate. In addition, if you feel that you need to talk to anyone about any issues raised by this survey please contact the Student Counseling Center at 423-425-4438, located in the University Student Center. The Counseling Center provides several services to deal with personal problems, anxiety, depression, and other issues that may be triggered via self-reflection. At the end of this survey you will be asked if we can use your essays in a subsequent study after removing any and all identifying information. There is no penalty for answering no to this question. We will not provide you with any additional incentives for your participation beyond any extra credit available through courses participating in the SONA system, but the results of this study will be used to help researchers, professionals, and educators in recognizing language differences and identifying what these language differences may mean.

Your rights as a participant: Participation in this study is completely voluntary. You may choose to withdraw from the study at any time and you are free to skip any questions that you would prefer not to answer. Your decision of whether or not to participate will not affect your academic standing at the University of Tennessee at Chattanooga in any way. If you decide to withdraw your data after completing participation, you may contact the researchers and we will remove your information.

Privacy and confidentiality: If you do choose to participate in this study, your participation will be completely confidential. We will not reveal any individually identifying information in any report of our results. You will be assigned an ID code that will be included with your responses; your e-mail contact will be kept in a separate file.

Questions about this study or your rights as a participant? *The methods used in this research have been reviewed and approved by the Institutional Review Board (IRB) of the University of Tennessee at Chattanooga. If you have any questions, please contact lead researcher Dr. Amye Warren, at 423-425-4293 (Amye-Warren@utc.edu), or Dr. Amy Doolittle,*

Chair of the IRB, at 423-425-5867(Amy-Doolittle@utc.edu). Please print this letter for your records.

Your help is greatly appreciated.

Sincerely,
Amanda Schwartz

The Institutional Review Board of the University of Tennessee at Chattanooga (FWA00004149) has approved this research project #17-101

Do you consent to participate in this research project?

I agree I disagree

Linguistic Analysis of Written Language Used by Young Adults
Informed Consent (DRC Participants)

June 6, 2017

Invitation to participate: We are conducting a study to determine language use patterns amongst young adults of various backgrounds. To participate, *you must be 18 years of age or older*.

What will you do: If you choose to participate in this project, you will complete a survey containing two discussion board prompts requiring responses of a minimum of 100 words. Following your response to the discussion questions, you will be asked about your background information including information regarding any disabilities you may have. Altogether it should take you approximately 30 minutes to complete.

Risks and benefits of participating: While this survey deals with hypothetical discussion board prompts that may be used in an "About Me" introductory academic scenario, sometimes thinking about and responding to these prompts can be uncomfortable for some people. If the topic makes you uncomfortable, please *do not* participate. In addition, if you feel that you need to talk to anyone about any issues raised by this survey please contact the Student Counseling Center at 423-425-4438, located in the University Student Center. The Counseling Center provides several services to deal with personal problems, anxiety, depression, and other issues that may be triggered via self-reflection. At the end of this survey you will be asked if we can use your essays in a subsequent study after removing any and all identifying information. There is no penalty for answering no to this question. An incentive of a $5 Amazon gift card will be provided for your participation. You will receive the gift card within one week's time of your discussion board analyses. The results of this study will be used to help researchers, professionals, and educators in recognizing language differences and identifying what these language differences may mean.

Your rights as a participant: Participation in this study is completely voluntary. You may choose to withdraw from the study at any time and you are free to skip any questions that you would prefer not to answer. Your decision of whether or not to participate will not affect your academic standing at the University of Tennessee at Chattanooga in any way. If you decide to withdraw your data after completing participation, you may contact the researchers and we will remove your information.

Privacy and confidentiality: If you do choose to participate in this study, your participation will be completely confidential. We will not reveal any individually identifying information in any report of our results. You will be assigned an ID code that will be included with your responses; your e-mail contact will be kept in a separate file.

Questions about this study or your rights as a participant? *The methods used in this research have been reviewed and approved by the Institutional Review Board (IRB) of the University of Tennessee at Chattanooga. If you have any questions, please contact lead researcher Dr. Amye Warren, at 423-425-4293 (Amye-Warren@utc.edu), or Dr. Amy Doolittle,*

Chair of the IRB, at 423-425-5867(Amy-Doolittle@utc.edu). Please print this letter for your records.

Your help is greatly appreciated.

Sincerely,
Amanda Schwartz

The Institutional Review Board of the University of Tennessee at Chattanooga (FWA00004149) has approved this research project #17-101

Do you consent to participate in this research project?

I agree I disagree

Linguistic Analysis of Written Language Used by Young Adults
Informed Consent (Chattanooga Autism Center Participants)

June 6, 2017

Invitation to participate: We are conducting a study to determine language differences amongst young adults of various backgrounds. To participate, *you must be 18 years of age or older*.

What will you do: If you choose to participate in this project, you will complete a survey containing two discussion board prompts requiring responses of a minimum of 100 words. Following your response to the discussion questions, you will be asked about your background information. Altogether it should take you approximately 30 minutes to complete.

Risks and benefits of participating: While this survey deals with hypothetical discussion board prompts that may be used in an "About Me" introductory academic scenario, sometimes thinking about and responding to these prompts can be deeply disturbing for some people. If the topic makes you uncomfortable, please *do not* participate. In addition, if you feel that you need to talk to anyone about any issues raised by this survey please contact the National Suicide Prevention Lifeline at 1-800-273-TALK (8255). The hotline provides several services to deal with personal problems, anxiety, depression, and other issues that may be triggered via self-reflection. At the end of this survey you will be asked if we can use your essays in a subsequent study after removing any and all identifying information. There is no penalty for answering no to this question. An incentive of a $5 Amazon gift card will be provided for your participation. You will receive the gift card within one week's time of your discussion board analyses. The results of this study will be used to help researchers, professionals, and educators in recognizing language differences and identifying what these language differences may mean.

Your rights as a participant: Participation in this study is completely voluntary. You may choose to withdraw from the study at any time and you are free to skip any questions that you would prefer not to answer. Your decision of whether or not to participate will not affect your professional or therapeutic standing at the Chattanooga Autism Center a in any way.

Privacy and confidentiality: If you do choose to participate in this study, your participation will be completely confidential. No information identifying you individually will be reported in the study results and the researchers will not discuss your data with anyone else.

Questions about this study or your rights as a participant? *The methods used in this research have been reviewed and approved by the Institutional Review Board (IRB) of the University of Tennessee at Chattanooga. If you have any questions, please contact lead researcher Dr. Amye Warren, at 423-425-4293 (Amye-Warren@utc.edu), or Dr. Amy Doolittle, Chair of the IRB, at 423-425-5867(Amy-Doolittle@utc.edu). Please print this letter for your records.*

Your help is greatly appreciated.

Sincerely,
Amanda Schwartz

The Institutional Review Board of the University of Tennessee at Chattanooga (FWA00004149) has approved this research project #17-101

Do you consent to participate in this research project?

I agree I disagree

APPENDIX C

QUESTIONNAIRE

Compensation

1) Please provide the ID code that was assigned to you by the researchers so that you can receive your compensation for participating in the study.

Prompts (Original Prompts)

In at least 100 words, please respond to the following prompts:

1) What is something you wish others knew about you?
2) What is something that does not make sense?

Prompts (Prompt Alternates)

In at least 100 words, please respond to the following prompts:

1) What is one topic that feel like you need to learn more about in order to help you live a more fulfilling life? Explain.
2) Explain the words that you would like to live by and why.

Demographic Questionnaire

1) Age:
   ( ) 18 – 24
   ( ) 25 – 34
   ( ) 35 – 44
   ( ) 45 – 54
   ( ) 55 – 64
   ( ) 65 – 74
   ( ) 75 – 84
   ( ) 85 or older
   ( ) Prefer Not to Answer
2) What is your gender?
   ( ) Male
   ( ) Female
   ( ) Other
   ( ) Prefer Not to Answer
3) Race/ethnicity (please select the option that best applies)
   ( ) White
   ( ) Black or African American
   ( ) American Indian or Alaska Native
   ( ) Asian
   ( ) Native Hawaiian or Pacific Islander
   ( ) Other
   ( ) Prefer Not to Answer
4) Highest level of education achieved:
   ( ) Less than high school
   ( ) High school graduate

( ) Some college
( ) 2 year degree (i.e., associates degree)
( ) 4 year degree (i.e., bachelor's degree)
( ) Master's, professional, or doctoral degree (JD, PhD, MD, etc.)
( ) Other
( ) Prefer Not to Answer

5) Have you ever been diagnosed with any disabilities or disorders by a medical or psychological professional? If so, please list your diagnoses.
( ) Yes _____
( ) No
( ) Prefer not to answer
6) Do we have your permission to use your essays in a follow-up study? We guarantee that we will remove all identifying information.
( ) Yes
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