Clinician Word Use in Dementia Evaluation Reports as a Function of Cognitive Impairment

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Abstract

Objectives: To examine the extent to which levels of cognitive status influence patterns of word use in dementia evaluation reports. **Methods:** We utilized neuropsychological evaluation reports from 61 geriatric primary care patients referred for suspected dementia. Linguistic Inquiry Word Count analysis was utilized to examine clinician language use in patient reports and whether language use differs dependent on the diagnosis rendered. ANOVA analyses were used to analyze group differences in LIWC word counts across clinical indices of cognitive functioning: dementia diagnosis. **Results:** Our analysis revealed significant differences in language use across diagnostic categories. ANOVA analyses yielded differences in broad negative emotion, $F(2,58) = 4.010$, $p = .023$ as well as other subgroups; anxiety-related word groups, $F(2,58) = 4.706$, $p = .013$; insight words, $F(2,58) = 3.815$, $p = .028$; causation words, $F(2,58) = 3.497$, $p = .037$; certainty words, $F(2,58) = 6.581$, $p = .003$; negation words, $F(2,58) = 3.165$, $p = .05$; time-related words; $F(2, 58) = 7.521$, $p < .001$; and human-related words, $F(2,58) = 6.512$, $p = .003$.
Conclusion: The differences in clinician language use across different diagnostic groups may be reflections of implicit emotional reactions. Many of the patterns found in this study can be linked to previous research concerning word use and underlying thought processes.
Clinical Implications: Awareness of language use is helpful in clinical relationships to attenuate stigma and facilitate treatment and research.

Keywords

Age discrimination/stereotypes, Alzheimer's/dementia, bioethics, clinical geriatrics, gerontology, long-term care, psychology

Introduction

While the etiology of dementia is rapidly under siege, the experience of cognitive impairment and its personal consequences may be harder to grasp for clinicians (Ferri et al., 2005). Kitwood (1997) highlighted the importance of personhood for those living with dementia and other impairments, rather than just the disease process itself. To begin, he defined personhood as "a standing or status bestowed upon one human being, by others, in the context of relationship and social being" (Kitwood, 1997, p. 7, 8). He goes on to assert that language shapes relationships, including clinical relationships. He posited a theory of languaging based upon Buber's "I-It" and "I-thou" model of interaction and the associated positioning within this dyad. The "I-It" relationship illustrated a detached, cool, instrumentality, while the language behind an "I-Thou" relationship communicates social intimacy and the person's value. The "I-it" relationship creates a risk-free space of safeness for the "I" (in the case of this paper, the clinician), often at the expense of the "It" (the patient). The "I-thou" relationship is more vulnerable, involved, and intimate. He states that the latter relationship preserves personhood of the person living with dementia. The detachment of the "I-It" relationship does not usually escape the awareness of patients and often may add to their experience of stigma (Milne & Peet, 2008). Despite the importance of language, the effects of clinician language are still largely unstudied.

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In a review regarding clinician language during feedback sessions following a cognitive evaluation, some clinicians insisted on using vague terms in order to "soften the blow" to patients and caregivers while others insist on delivering feedback with more precise language, such as using the word "dementia" or "Alzheimer's." Some clinicians decide how to describe the diagnosis and prognosis based on their predictions regarding the patient's reaction (Carpenter & Dave, 2004). However, in a study of 90 participants being diagnosed with a form of cognitive impairment, anxiety and depression did not increase following precise diagnostic and prognostic feedback. In some cases, anxiety even decreased following these discussions due to the relief found in offering direct explanations (Carpenter et al., 2008). Clinician predictions about patient reaction and thought processes are not necessarily a good way to structure feedback language when delivering a diagnostic label or prognosis.

With vulnerable populations, diagnostic labels and language use may affect whether people utilize medical services to avoid the social impact labels can carry (Garand et al., 2009). Research suggests that those with suspected cognitive impairment avoid diagnosis, research, and treatment in fear that those around them will reject them (Link, 1987). These efforts to escape rejection is postulated to be avoidance of "otherness," a feeling of separation that occurs when one experiences reactions from others in response to perceived differences (Green et al., 2005). Labeling and clinical languaging may play a substantial role in the way people, both clinicians and patients, approach the diagnostic process and follow-up care.

Our use of language is often a representation of our thought patterns, with clinicians being no exception. This holding true, clinician thoughts and emotions may influence the wording of the evaluation report. Although the test administration and the testing component of the report are relatively objective due to standardization, there is subjectivity in word choice surrounding the patient's story, such as the background, conclusions, and recommendations sections of the report. In short, clinician thought processes and emotion might influence the clinician's conceptual evaluation of the patient during and after assessment, thus shaping the tone of the diagnostic reports. Linguistic analysis of diagnostic reports can offer insight into the clinician's emotions and cognitive appraisals.

The Linguistic Inquiry Word Count software may prove useful in studying the ways that clinician thoughts and emotion are reflected in the diagnostic process. Research has shown that the words people use are reflective and predictive of their dispositions (Tausczik & Pennebaker, 2010). Indeed, the developers of Linguistic Inquiry Word Count believed that language is a fundamental portal to our psyches because it is the primary expression of thought and emotion in a manner that others can understand. Researchers have used this program to study attentional focus, emotionality, social relationships, thinking styles, and other individual differences, including emotional disclosures in health and personality research (Garcia-Caballero et al., 2012; Kahn et al., 2007; Pennebaker et al., 2007; Robinson et al., 2013; Tausczik & Pennebaker, 2010).

Linguistic Inquiry Word Count has been used to evaluate word use and emotional states in dementia caregiving as well as the prediction and detection of dementia (Weyerman et al., 2017). In a study of 53 older individuals who were spousal caregivers, audiotapes recordings of the subjects speaking intimately about their spouses' experiences were analyzed using Linguistic Inquiry Word Count software (Monin et al., 2012). This study found that employing positive emotions, causal reasoning, and emotional regulation moderated the physiological reactivity to the stress-inducing situation of caregiving. This indicated that word use choice may be reflective of cognitive and emotional appraisal as well as important in the ability to regulate emotions. In another caregiving study Linguistic Inquiry Word Count was used to test the excerpts of written expressions of emotion and the sample's ability to find meaning. Those who used positive emotion words showed enhanced meaning making and better emotional functioning (Butcher et al., 2016). It seems emotion, cognitive, and analytic words detected in linguistic analysis are useful in reflecting meaningful emotional states.

The use of linguistic analysis in clinician-patient interactions is limited in the current literature. However, one study used Linguistic Inquiry Word Count to reveal an interesting dynamic in clinician-patient interactions, showing that physicians tended to dominate the conversation through various forms of language, exerting their social status (Sakai & Carpenter, 2010). In sum, word use can (a) provide glimpses into internal attempts to suppress or express emotion and (b) extend influence into the clinician-patient interaction; therefore, how clinicians communicate is important in the context of person-centered care.

This current study used Linguistic Inquiry Word Count to explore how clinicians use emotion, cognitive, and various analytic word groups when writing evaluation reports of people diagnosed with dementia, mild cognitive impairment, or no cognitive impairment (i.e., no evidence of cognitive impairment on testing). This study aims to provide insight into the function of certain clinician language use in juxtaposition with life-changing diagnoses for the patient. This study seeks to answer whether cognitive impairment diagnosis influences clinician word use in diagnostic reports. The extent to which clinicians are prone to emotional reactions when working with people living with suspected dementia may be reflected in their report writing. This study analyzes clinician word use patterns in patient reports using categories previously examined in Linguistic Inquiry Word Count research concerning dementia, including emotion-related words, analytic and cognitive words, and time-oriented words.

Methods

Sample

Data for this study were drawn from 61 diagnostic reports of older people referred for testing by their primary care physicians due to suspicion of cognitive impairment, either based upon family complaints, patient complaints, or primary care clinician concern over a period of about a year. The final sample were those reports that did not have any missing information for demographic analysis. This sample consisted of English-speaking patients with no hearing or vision deficits that would preclude testing. A full neuropsychological battery was administered with a comprehensive review of medical records and informant interviews. Based on this information, each participant was diagnosed with mild cognitive impairment ($n = 13$), dementia ($n = 36$), or no cognitive impairment ($n = 12$).

All patients were evaluated in the geriatric primary care clinic by a doctoral level graduate student under the supervision of a licensed clinical psychologist. There were approximately 5 clinicians assessing patients and writing the reports over a period of about a year, and all reports were supervised and reviewed by one psychologist. Mild cognitive impairment was diagnosed according to published criteria (Petersen et al., 2001) as follows: (1) memory complaint, (2) impaired memory function for age, (3) preserved general cognitive function, (4) intact activities of daily living, (5) were not living with dementia. DSM-IV (American Psychiatric Association [APA], 2000) diagnostic criteria were used for dementia, as follows: (1) memory impairment, (2) impairment in one other area of cognitive functioning, (3) cognitive deficits are severe enough to cause significant impairment in social or occupational functioning and represent a significant decline from a previous level of functioning, (4) cognitive deficits were not caused by delirium.

Linguistic Inquiry Word Count

Linguistic Inquiry Word Count was originally developed in 1993 as part of an exploratory study of language (Francis & Pennebaker, 1993) and has undergone several updates to expand the dictionary of words available for analysis (Pennebaker et al., 2001, 2007).

Linguistic Inquiry Word Count 2007 has a dictionary comprised of approximately 4,500 words and word stems. Each word is defined by word categories. "For example, the word 'cried' is part of four word categories: sadness, negative emotion, overall affect, and a past tense verb." There are 80 different domains or word types (Pennebaker et al., 2007). Linguistic Inquiry Word Count (2007) word groups are arranged hierarchically in specificity. The software scans each word in the text, looking for a match in the Linguistic Inquiry Word Count dictionary and assigns it to the word domains that it belongs to, which can be more than one domain. Linguistic Inquiry Word Count word group output is

given as a ratio of the amount of specific word types used relative to the total word count of a given document section.

Procedure

We quantified the clinician's word use from 61 neuropsychological assessment reports as a function of the patient's cognitive impairment diagnosis to examine the relationship between cognitive impairment diagnosis and possible clinician's views of the patient. The language dimensions in which we sought analysis were consisted of emotion-related words, analytic/cognitive-related words, time orientation-related words, and personhood-related words.

The reports consisted of a Background, Test Results, and Conclusions. The Background is the patient history, description, and context for the appointment, and may be vulnerable to subjectivity in word use. The Test Administration and Results sections are less vulnerable to varied word use because it is relatively standardized and describes level of test performance. The Conclusions section is where the clinician incorporates the assessment and diagnostic results with the context provided by the Background, forming an overall clinical synopsis and suggestions. This section may also be vulnerable to subjectivity in word use because it expresses the clinician's final impressions of the patient. We used Linguistic Inquiry Word Count to analyze the report as a whole and separately for specific sections including the background/history and the conclusion sections. This study assumed the background and conclusion sections were more likely to reflect any subjective views of the clinician when compared to the testing procedure and results section due to standardization procedures in testing.

One-way analysis of variance (ANOVA) was used to examine group differences (dementia, mild cognitive impairment, no cognitive impairment) on several word use categories. Pearson's correlations were estimated between age, education, and word use categories.

Results

The sample was aged 55 to 95 years old ($M = 80.56$, $SD = 7.73$) and consisted of 82% females, 14.8% males, and three subjects had missing data for gender. The sample was primarily Non-Hispanic white (73.8%), African Americans (14.8%), Hispanic (1.6%), and six subjects had missing data for ethnicity. Years of education ranged from 3 to 18 years ($M = 12.62$, $SD = 2.97$). Years of education did not differ based on cognitive status, $F(2,54) = 1.65$, $p = .201$; however as expected, age differed across cognitive status, $F(2,56) = 6.67$, $p = .003$ with those without cognitive impairment being significantly younger than those with both mild cognitive impairment and with dementia. Those with mild cognitive impairment were older than those with dementia, but not significantly.

Table 1. This shows non-significant and significant word groups, with examples of words that are in those domains, and the corresponding diagnoses relationships within these domains. This table focuses on the Background and Conclusions sections of the assessment report, as the Assessment section is standardized and not open to subjective interpretation.

LIWC category	Example words	Entire Document	Background section	Conclusions section
Affective processes	Happy, ugly, bitter	Ns	Ns	Ns
Positive emotion	Happy, pretty, good	Ns	Ns	NI>MCI, D**
Negative emotion	Hate, worthless, enemy	Ns	MCI>NI, D*	Ns
Anxiety	Nervous, afraid, tense	Ns	Ns	NI>MCI, D**
Anger	Hate, kill, pissed	Ns	MCI>NI, D*	Ns
Sadness	Grief, cry, sad	Ns	MCI>NI, D*	Ns
Cognitive processes	Cause, know, ought	Ns	Ns	Ns
Insight	Think, know, consider	Ns	Ns	NI>D, MCI*
Causation	Because, effect, hence	Ns	MCI>D, NI*	Ns
Discrepancy	Should, would, could	Ns	Ns	Ns
Tentative	Maybe, perhaps, guess	Ns	Ns	Ns
Certainty	Always, never	Ns	Ns	MCI<D<NI**
Negation	No, not never	Ns	Ns	D<MCI<NI*
Time-Orientation	End, until, year	N>D>MCI**	Ns	Ns
Future-focused	May, will, soon	N>D>MCI*	Ns	Ns
Human-related	Adult, boy, girl	NI>D>MCI*	Ns	Ns

**Is for significance of $p < .01$.

Before looking at diagnostic group differences, we measured associations between patient demographics and word groups to see if clinicians were more likely to use certain words based on demographics other than diagnostic groups. In the analyzed word groups, clinician insight-related words and negative emotion words in the Conclusions section were correlated with patient age, ($r=-.405$, $p<.01$) and ($r=.341$, $p<.01$), respectively; and insight-related words in the entire document was also correlated with age, ($r=-.310$, $p<.05$). In the entire document, sadness words and certainty words were correlated with patient education, ($r=-.429$, $p<.01$) and ($r=-.271$, $p<.05$). All word group analyses with word examples from the LIWC software, significant or not, are listed within each section of the report and can be found in Table 1.

Additionally, this sample was checked to make sure statistical assumptions were met for the sample demographics. This sample was a clinical sample; therefore more likely to have cognitive disturbance, but the sample was otherwise normal.

Emotion-Related Words

ANOVA analyses on emotion-related word use showed that clinicians used significantly more negative emotion words in the Background section in people diagnosed with mild cognitive impairment, both in the broad negative emotion Linguistic Inquiry Word Count category (i.e., hate, worthless, enemy), $F(2,58)=4.010$, $p=.023$, and also in specific negative emotions including anger (i.e., hate, kill, annoyed), $F(2,58)=3.289$, $p=.044$ and sadness (i.e., crying, grief, sad), $F(2,58)=3.608$, $p=.033$. Anxiety-related word groups (i.e., worried, fearful) in the Conclusions section differed according to

diagnosis, with both mild cognitive impairment and dementia groups being significantly lower than the group with no cognitive impairment, $F(2,58)=4.706$, $p=.013$. Clinicians also used significantly more positive emotion words (i.e., love, nice, sweet), $F(2,58)=5.193$, $p=.008$, and insight words, $F(2,58)=3.815$, $p=.028$ in the Conclusion of reports for people who did not meet criteria for mild cognitive impairment or dementia.

Analytic/Cognitive Words

In analyzing analytic/cognitive word use, clinicians used significantly more causation (i.e., because, hence, effect) words in the Background sections of reports for people with mild cognitive impairment, $F(2,58)=3.497$, $p=.037$. The reports of patients with mild cognitive impairment had the lowest levels of certainty words (i.e., always, never) in the Conclusion sections, whereas certainty words were highest among patients who did not meet criteria for mild cognitive impairment or dementia, $F(2,58)=6.581$, $p=.003$. Negation word use (i.e., no, not, never) in the Conclusions differed depending on dementia status group, $F(2,58)=3.165$, $p=.05$ with the group with no cognitive impairment consisting of the most negation word use and dementia consisting of the least amount of negation words.

Time Oriented Words

Use of time-related words in general in the entire document (i.e., end, until, year) was significantly different across dementia status groups, $F(2,58)=7.521$, $p<.001$, with the group with no cognitive impairment containing significantly more time-related words than the mild cognitive impairment and dementia group. When analyzing
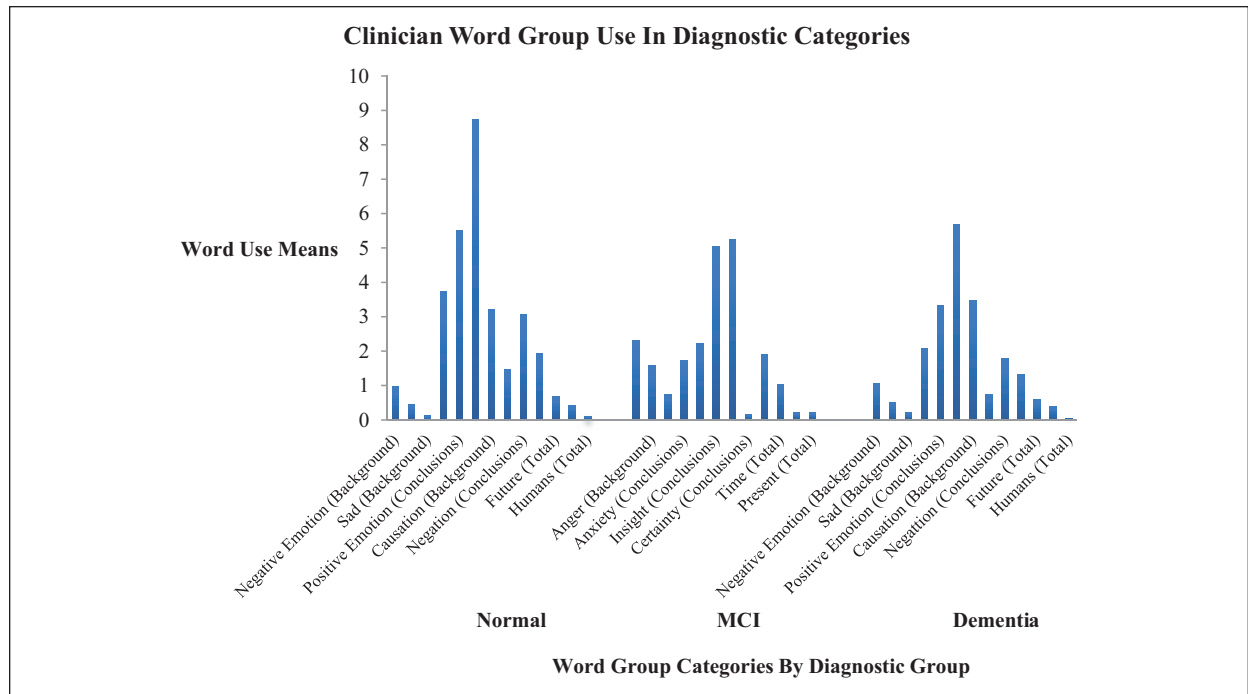
Figure 1. This chart illustrates the relevant mean ratios of specific word group use to total words used in different parts of the report within different diagnostic groups.

specific time orientation words throughout the entire report, there were significant differences in future-focused word use (i.e., may, will, soon) amongst dementia status groups, $F(2,5)=3.351$, $p=.042$ with the group with no cognitive impairment consisting of more future-focused words than both the mild cognitive impairment and the dementia status group; but no significant differences were found between present-focused word use (i.e., present, is, now), $F(2,58)=.986$, $p=.379$.

Analyses of human-related words (adult, boy, girl) in the entire document differed amongst diagnostic groups, $F(2,58)=6.512$, $p=.003$ with the group with no cognitive impairment consisting of significantly more human-related words than each of the other groups, but with mild cognitive impairment containing the least amount of human-related word groups. Even though there is not much research on human-related word group meanings, these results seem relevant with regards to clinical interactions and personhood (O'Connor et al., 2007) discussed in the introduction. SPSS data may be provided upon request by the corresponding author.

Each word group output is generated in ratios, with the number of words in the report that fit into the given word-group divided by the total number of words in the report. This is meant to reduce report length bias.

Discussion

Our study is the first to compare clinician word use in written assessment reports of people with dementia, mild cognitive impairment, and those with no cognitive impairment. We discuss our findings in the order of

word group differences that we find most compelling with regards to the clinical implications of person-centered care (Health and Human Services, 2006). Although this is the first study of its type, many of the relationships we found are consistent with findings from prior Linguistic Inquiry Word Count literature (Figure 1).

Our study investigated differences in emotional and cognitive word groups as indicators of emotional influences in response to impairment. As mentioned, there was a significant difference in the use of anxiety words, with anxiety word groups being used less in reports of those with both mild cognitive impairment and dementia. Use of human word groups depended on cognitive impairment also, with reports of those in the group with no cognitive impairment consisting of the highest amount of human-related words and those in the mild cognitive impairment group having the lowest. Anxiety words also have ties to previous literature, in a different context. In a study investigating the use of language in processing traumatic events, researchers found that a higher use of emotion words showed more *immersion* in the event. This supports our findings of a positive relationship between (iv) emotion words, namely anxiety, and immersion (Holmes et al., 2016). The results found in this study and from Holmes et al. provide evidence that higher levels of cognitive impairment triggers a resistance to personal emotional involvement on the part of the clinician. Essentially, the worse the diagnosis, the more the clinician may *try* to remain objective and emotionally distanced, perhaps in reaction to an emotional response of rendering a severe diagnosis. The negative mean relationships in human word group use and cognitive

impairment further support this theory of purposeful detachment attempts on the part of the clinician upon impairment diagnosis. This is especially noteworthy in the context of person-centered care, referring back to Kitwood's position on personhood and the I-Thou/I-It clinical relationship, treating the patient as a person rather than a disease.

Perhaps the most striking findings were the significantly greater negative affect and focus on causation in the Background sections of mild cognitive impairment reports and lower level of certainty words (i.e., always, never) in the Conclusion sections of mild cognitive impairment reports. These findings mirror the uncertainty surrounding the construct of a mild cognitive impairment diagnosis. The scientific literature has demonstrated considerable uncertainty about mild cognitive impairment, both in terms of heterogeneity and prognosis (Banningh et al., 2008). From a person-centered perspective, there is often a need to understand what is causing cognitive difficulty, and there are often negative emotions and stress surrounding this uncertainty of mild cognitive impairment (Banningh et al., 2008). The focus on causation in the Background sections of mild cognitive impairment reports may suggest the active process of reappraisal. In six writing experiments, Pennebaker et al. postulated that increasing use of causal words was thought to be demonstrative of making reconstrual statements; that is, a reinterpretation (Pennebaker et al., 1997). In a separate experiment, Boals and Klein argued that causal words are used in the descriptions of the most traumatic parts of an event, namely the end of romantic relationship, because causal words are being used to facilitate the organization or reconstruction of emotionally provocative thoughts (Boals & Klein, 2005). The authors in both of these studies support an organizational component behind the use of causal words. In our study, the Background section is written *after* diagnosis and usually *before* the other sections. It is often the very first step of writing the report, trying to use the knowledge gained from interview and assessment to formulate a comprehensive background conceptualization of the patient. With patients that have a diagnosis of mild cognitive impairment, there is a well-documented degree of uncertainty on the part of the patient, the family, and the clinician (Gerstenecker & Mast, 2014). The greater use of causation words with a diagnosis of mild cognitive impairment in the Background further supports both theories of reappraisal, reconstruction, and uncertainty. It indicates that active reappraisal and organization of information may be present in the clinician's thought process under the conditions of great uncertainty when pertaining to a patient with mild cognitive impairment.

The reports of patients who had no cognitive impairment had the highest levels of positive emotion (i.e., happy, pretty, good), insight (i.e., think, know, consider) and certainty words. Clinicians may feel most confident about these results and some emotional relief in delivering these results (Carpenter & Dave, 2004;

Zaleta & Carpenter, 2010). Certainly, when a patient is thought to be without cognitive impairment, not only does it make for easier and more positive diagnostic reporting, but it may also provide an extent of greater perceived certainty about the future.

In our study, negation word use, time-related word use, and future-focused word use differed depending on cognitive impairment. In previous linguistics research of word use meanings and correlates, negation words have been strongly and positively correlated with emotion words, which are also associated with a level of personal involvement (Tausczik & Pennebaker, 2015). The authors assert that this positive relationship is evidence for a link between the expression of emotion, thinking styles, and the writer's social awareness (Tausczik & Pennebaker, 2015), meaning those with more social awareness and more inclination to express emotion are more likely to use negation words (no, not, never), as these words imply a more assured disposition. Therefore, the lack of negation words with higher levels of impairment could indicate lower levels of emotional expression and with more negation words with those who are without cognitive impairment could indicate more clinician assurance. Negative relationships between increased cognitive impairment and negation words may indirectly suggest a hesitance to use absolutes in language as well as a suppression of emotion processes on behalf of the clinician in response to impairment confirmation. In another vein, time-related words and future-focused word use also differed with levels of cognitive impairment. The use of time-related words, and future-focused words observed here might be evidence of a more direct influence of cognitive impairment on clinician word use. The lack of time-focused or future-focused words with higher levels of impairment may reveal an a priori assumption that those with higher impairment were going to have less time left in life years.

To our knowledge, this is the first study to examine the cognitive and affective aspects of word use in cognitive assessment reports. This may provide insight into how implicit thought mechanisms and emotional reactions can influence clinician language in response to a patient's diagnosis, and in return, further supports Kitwood's position on how language can shape a clinician-patient relationship. Although the Linguistic Inquiry Word Count frequencies are influenced by what the patient and family report to the clinician, the ultimate decision about what to include in a report reflects implicit choices made by the clinician. These categories of word use may be helpful in understanding the ways in which the clinician approached the patient's case and/or thinks about the person's situation after hours of testing and data integration.

Limitations

However curious these results may be, this study is a preliminary and exploratory study that is highly associative

and requires further study and replication. Additionally, the links between these word groups and underlying thought processes need to be explored under other conditions as well. Linguistic Inquiry Word Count is probabilistic and associative, this linguistic word count software classifies words individually and reports the ratio of each word group type as it compares to the entire number of words. This limits the ability to read between phrases rather than just words.

Although the software demonstrates reliability and convergent validity, the expanse of psychological meaning is too diverse to rely on with scientific certainty. At best, this can provide qualitative insight into the way that words both reflect and predict dispositions. Mere associations and correlations between words and people offer some area for future study, but hardly any steadfast understandings of the way thought processes work. Additionally, individual differences in thought patterns and word use in reports is a weakness for the Linguistic Inquiry Word Count application; however, because we are studying from the same small pool of clinicians, that should not be a strong confounding variable. Although the number of different clinicians writing reports was small, it is worth noting that there were no measures taken to account for clinician variability Further studies are required not only to validate our findings but to further explore what other kinds of language differ depending on dementia, and this extends to other neurological diagnoses as well.

Clinical Implications

- Our study did show provocative and significant differences in word use depending on diagnosis. Whether or not this word use can be concluded as a result of pervasive social stigmas cannot be directly confirmed. However, it is known that attitudes toward dementia can feel stigmatizing to those living with dementia or caring for someone with dementia. Additionally, studies have shown that patients and caregivers have sensed stigmatized reactions from professionals (Burgener et al., 2008).
- Based in part on our findings, clinical education and continuing education should be redesigned to inform professionals of their tendencies toward certain languaging within the healthcare industry. In our study, the goal of clinical objectivity and emotional distance may be partially responsible for the languaging in report writing. However, with a person-centered model, empathy and relational aspects of the patient-clinician relationship should prioritize these qualities, such as continuity, kindness, and caring empathic staff. These findings regarding language in report writing may offer contextual information regarding how important language is during patient-clinician interactions.

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