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Quantifying Word Use to Study Health Literacy in Doctor-Patient Communication

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Abstract

Most health literacy research to date has assessed health literacy using either general reading tests or text-based appraisals of reading and numeracy skills, yet the definition of health literacy includes domains beyond reading ability. Effective oral communication between doctor and patient is an important component of health literacy, but only recently have efforts been made to develop measures that tap into domains beyond those that can be assessed with text-based measures. Focusing on oral exchange, this paper describes computer-assisted approaches to quantifying word use and the development of three word-use measures that can be used to study health literacy in transcripts of clinical encounters. The measures can be used to assess either the expressed literacy level of patients or the aural literacy demands made by doctors. Importantly, the computer-assisted quantitative measures described here make it possible for word use to be analyzed at a level of detail that human raters would be hard pressed to attain.

INTRODUCTION

Across a range of populations and settings, a variety of studies have revealed troubling disparities in health knowledge, use of health care services, and health outcomes associated with limited literacy (Institute of Medicine [IOM], 2004). The problem is widespread. According to the 2003 National Assessment of Adult Literacy (NAAL), up to 19% of U.S. adults have limited literacy skills and cannot consistently and accurately complete text-based tasks (Kutner, et al., 2007, Rudd, 2007). As medical care becomes more complex, and as chronic diseases requiring long-term management become more common, adults with limited literacy are increasingly disadvantaged when striving to maintain their health or seeking care. For this reason, the IOM (2004) stressed the importance of making all health communications accessible to people at every level of literacy.

"Literacies" rely on cultural and conceptual knowledge (Gee, 1996), health literacy builds on an understanding of health and science (IOM, 2004). The most commonly cited definition of health literacy, or literacy in health contexts, is usually some variant of "the degree to which

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individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions" (U.S. Department of Health and Human Services, 2000). Thus, by definition, health literacy includes a variety of skills—reading and writing certainly, but also a facility with numbers and calculations (numeracy) and the ability to understand spoken health information and to describe one's health needs. In addition, health literacy is dynamic and essentially resides at the intersection of patient abilities and the demands of the particular situation.

In the case of oral communication in health care settings, literacy demands are in part a function of how a doctor communicates with a specific patient. A rich tradition of research makes it abundantly clear that conversations between patients and health care providers have a profound effect on clinical outcomes (Kaplan, Greenfield, & Ware, 1989; Roter, 2000; Roter & Hall, 1992). Patient-centered communication, which is critical to providing quality care (IOM, 2003), requires a high degree of information exchange between doctor and patient (Roter & Hall, 1992). According to Daltroy (1993), doctors and patients must accomplish specific communication tasks. Doctors should seek to understand a patient's underlying beliefs and usual coping strategies so that they can describe the models that guide their medical conclusions and treatment choices in ways that facilitate the integration of new information with a patient's models of disease and past experiences.

In choosing what words to use, speakers make assumptions about their listener's knowledge base (Damico, 1993). Doctors and nurses often overestimate patients' health literacy level (Bass, Wilson, Griffith, & Barnett, 2002) and their knowledge of medical terminology (Byrne & Edeani, 1984; Schillinger, Bindman, Wang, Stewart, & Piette, 2004). Schillinger et al. (2004) found that patients with low scores on a test of functional health literacy were more likely to report poor communication with practitioners in terms of general clarity, explanation of condition, and explanation of process of care.

Doctors' word use constitutes the "aural literacy demand" placed on patients. Doctors can jeopardize clear communication when they discuss health matters using sophisticated scientific words and concepts. They often use medical terms that are fundamental to their area of clinical expertise (Bourhis, Roth, & MacQueen, 1989) but are unknown to patients without medical training (Boyle, 1970; Byrne & Edeani, 1984; Castro, Wilson, Wang, & Schillinger, 2007; Chapple, Campion, & May, 1997; Cole, 1979; Hadlow & Pitts, 1991). The challenge is for doctors to express themselves in language that lay people can understand. Hinds, Patterson and Pfeffer (2001) have demonstrated that achieving this is often no small challenge, because experts organize the concepts in their area of expertise differently than the lay person and often have great difficulty conveying their knowledge without reliance on abstractions. Even if medical and scientific words are not used, doctors may use a more sophisticated vocabulary than many patients are used to hearing.

For their part, patients must express themselves clearly to participate actively in decision-making. Patients' success in describing their symptoms accurately depends in part on the sophistication of the vocabulary they can call on. Thus, measures of word use can offer insight into their "expressed literacy level." By extension, such measures may also indicate the vocabulary that patients are likely to comprehend.

The substantial health literacy-related difficulties many patients face can be understood and addressed only with a full analysis of all aspects of health literacy and health communication. This requires a variety of methodologies and methods. Most research to date has assessed patient health literacy in terms of reading ability, using either approximations of reading skills such as the Rapid Estimate of Adult Literacy in Medicine (Davis, et al., 1993) or measures of reading comprehension such as the commonly used CLOZE test contained in the Test of

Functional Health Literacy in Adults (Parker, Baker, Williams , & Nurss 1995). These measures assess a key aspect of health literacy and have been important for documenting the associations between health literacy and health outcomes, but they leave oral communications unmeasured.

The need for quantifiable and objective measures of doctor and patient communication in clinical encounters can be met by focusing on word use. Only recently have researchers begun to develop measures and approaches to study how health literacy is reflected in oral language as it occurs during clinical encounters (Roter, Erby, Larson, & Ellington, 2007). In this paper, three new measures of oral language based on word use, appropriate for the study of health literacy, are proposed and tested. The approach taken here utilizes word-use measures that can be automatically applied to transcripts using widely available computer software (SAS, 1999-2000). There is no need to train coders to apply complex schemes. The measures were developed from transcripts of clinical encounters. Numerical values were assigned to each word in the transcripts. These numerical values were then aggregated to generate statistical assessments of doctor and patient word use. Measures of patients' expressed literacy level and doctors' aural literacy demands need to meet basic criteria to be considered reliable and valid. Accordingly, we conducted a systematic development process and a series of assessments.

First, if the measures are intended to assess patients' expressed literacy level, they should correlate with known predictors of literacy, such as educational attainment and age (Kutner, et al., 2007). Thus, we expect that patients with lower education, should score lower on measures of oral literacy. In addition, older patients should also score lower on measures of oral literacy.

Second, if the word-use measures are to provide a valid assessment of the aural literacy demand that doctors place on patients, then they should correlate with other measures of literacy demand. Readability formulas are used to assess the "reading level" of texts—that is, their literacy demand. We hypothesized, therefore, that if the word-use measures were used to assess written texts, they would correlate with readability formula scores for those same texts.

Finally, given the differing roles and levels of expertise doctors and patients inhabit, in the context of a clinical encounter the word-use measures should distinguish between doctors and patients. Even if doctors strive to communicate clearly with their patients, their role in the clinical encounter will likely involve explanations using more medical terms and more difficult language than patients generally use. Thus, on average, doctors should have higher scores than patients on measures of word use.

METHODS

Two data sets, one of transcripts from clinical encounters and another of texts, primarily health-related, were used to develop and test the measures. The transcripts came from audiotaped clinical encounters that were recorded for a study of doctor-patient communication in a rheumatology practice at a large teaching hospital (Katz, Daltroy, Brennan, & Liang, 1992). The doctors and patients were audiotaped during their first clinical encounter; patients also completed pre-encounter surveys. A total of 22 rheumatologists and 124 newly referred patients participated. The study was approved by the hospital Institutional Review Board and informed consent was obtained from both patients and doctors.

To test if the measures would correlate with a readability formula, we collected 35 texts available in digital format written for a wide range of audiences, including general interest stories from newspapers, health promotion pamphlets, disease-specific patient information sheets, and medical journal articles. We chose to develop this data set of texts for this comparison rather than applying the readability formula to the transcripts to avoid potential

problems in applying readability formulas to transcripts of dialogs. The formulas are based on sentence length and structure, but spoken language often consists of short utterances or incomplete sentences. Transcript "sentences" depend more on the transcriber's style and where they choose to place periods than they do on characteristics of the speech. Also, frequent interruptions by the other speaker can serve to shorten what might actually be much longer trains of thought. In contrast, the measures developed here look only at word use, and their application to written texts does not introduce any difficulties.

To prepare the texts, we removed all addresses, reference lists, author names, and titles, leaving only the main prose portions to be assessed. We assessed word use in the texts using the SAS programs developed to generate the measures from the transcripts, and we used Microsoft Word to calculate readability. Microsoft Word calculates the Flesch Reading Ease score, a 100-point scale based on average sentence length and average number of syllables per word; texts with higher scores are considered easier to read.

Approach to Measures Development

The word-use measures we developed in this study were constructed based on three approaches to assigning values to words: 1) *word frequencies*, the frequency with which the word is used in text, 2) *common words*, whether the word is in common usage in oral language, and 3) *medical words*, whether the word can be considered specialized medical terminology. An overview of the three approaches is described below, and then details of the measures are provided.

Word Frequencies—The first way we assigned values to words was to use a measure common in linguistics, the standardized frequency index (SFI). An SFI value represents the likelihood that a word will occur in a million words of text, adjusted for the word's dispersion across content areas and logarithmically transformed into a normal distribution. We used the *Educator's Guide to Word Frequency* (Zeno, 1995), which quantifies word frequency in a corpus drawn from 6,333 educational documents in nine content areas, to obtain SFI values for the vocabulary used during the clinical encounters. Words with high SFI values appear frequently in texts from a wide range of subject areas, while words with low SFI values appear much less frequently and are likely to be limited to a few content areas. Thus, the higher a word's SFI value the more likely it is to have been read in text by the average person; words with low SFI values could be considered "rare" words that are less often encountered in text. SFI values, in combination with sentence features, such as length, are widely used by text book developers to determine the reading demands of texts.

Common Words—The second approach we took to assigning values to words was to determine whether a word is in common usage in oral language. We used a list of 7,682 words —taken from study transcripts of 4th grader's speech (Snow, 1991) which were spoken by at least 60% of the children—as a "common" word list. We assumed that words known to 4th graders would also be part of most adults' spoken vocabulary and therefore could safely be called "common." The words on the common word list are mostly high-frequency words, as determined by their SFI values. There are exceptions, however, because spoken and written language differ: some words that appear infrequently in the texts assembled for the *Educator's Guide to Word Frequency* (e.g; bingo, slimmer, peppy) may still be part of most people's spoken vocabulary. Thus, although there is considerable overlap, the two classification schemes do provide different strategies for distinguishing words.

Medical Words—Our third approach to quantifying word use was to determine whether a word could be considered "medical." We developed a list of 13,690 specialized medical words that are both statistically rare in non-medical texts and uncommon in speech. We started with

the entire lexicon of Medical Subject Headings (MeSH) from the National Institute of Medicine (National Institute of Medicine, 2002), then excluded words appearing on our common word list or having an SFI value above the fifth percentile (SFI value = 42.7). Finally, because the MeSH does not include trade names of medications, we added the names of 980 drugs from a consumer website (MedicineNet.com, 2002). In the context of studying health literacy, these trade names should be considered medical language since medications have a specific medical purpose.

Measures Development

We summarized word use into a variety of indicators, and each indicator's psychometric properties were examined to identify the most useful set of measures. We selected three measures which we named: 1) *rare word tendency* (based on SFI values); 2) *challenge* (based on common words); and 3) *medicalization* (based on medical words). Programs written in SAS System for Windows (SAS, 1999-2000) were used to assign three tags to each word, indicating the SFI value, whether or not it was on the common word list, and whether or not it was "medical."

SFI values were taken from a DOS-based program developed from the *Educator's Guide to Word Frequency* (TASA, 1996). The assignment of tags followed a two-step process. First, the transcripts were converted into a data set of "raw words." There were 774,762 words in the transcripts, and each was tagged with a SFI value. Some words used in the clinical encounters did not appear in the *Educator's Guide to Word Frequency*, while others had very low SFI values, but from a practical view did not warrant being considered "rare." Second, some words were modified, others were assigned SFI values, and still others were set as missing. All modifications were done programmatically in the SAS code with changes made uniformly across all transcripts. The following modifications were made:

1. Misspellings were corrected. For example, in an effort to capture speech the transcriptionists often recorded "nnnooo" and the like to show emphasis. Spellings were changed for 1.70% of the raw words.
2. Spoken language was changed to written language. For example "gonna" appeared frequently in the transcripts and was changed to "going." Such changes were made to 1.43% of the raw words.
3. Words without an SFI value in the *Educator's Guide to Word Frequency* were changed to an alternative form if there was a value available for the alternate. Coming from a rheumatology clinic, the transcripts contained many variants of "ache," such as "achiness," and "achier," but only "ache" appeared in the Guide. Many words were in the *Guide* only in singular form, yet a plural form appeared in the transcripts. Such changes were made to 0.06% of the raw words.
4. Medical words without SFI values were assigned an SFI value of 35.2. The Guide, as a sample of words taken from a variety of materials, did contain some rather rare medical words. The value of 35.2 was determined by assembling a list of 411 words and drug names from glossaries and drug lists on the Arthritis Foundation web site (list available from the first author). There were SFI values for 67 of these words, and the average value was 35.2. Medical words without SFI values comprised 0.43% of the raw words.
5. Proper names were assigned a missing SFI value. Proper names contained in the Guide vary widely in their SFI values, but in effect serve a similar function in speech. When a patient or doctor mentioned a town with a common name, such as Springfield, it would be counted as "easy," whereas a town with an uncommon name, such as

Abbington, would be counted as "hard." Proper names with SFI values set to missing comprised 0.09% of the raw words.

6. Nonsense words and single letters were assigned a missing SFI value. Often words that were only partially spoken or names of people and places that were abbreviated were included in the transcripts and actually had SFI values. These values tended to be very low, but these partial words or letters did not add meaning to the conversation. Nonsense words set to missing comprised 3.17% of the raw words.

7. Numbers were assigned an SFI value of 60. Commonly written numbers such as 1 through 10 and multiples of 10 up to 100 have fairly high SFI values (range 75.5 to 48.2), meaning that they appear frequently. Other numbers are less common, but may not be more "difficult." Therefore, the rounded average SFI value of commonly written numbers was assigned to 0.25% of the raw words.

To ensure that the measures would be independent of the total number of words spoken during the doctor-patient encounters, we took a standard size sample of words from each speaker. The challenge here was to determine the minimum number of words that would provide stable measures across all speakers. Repeated random samples of words from each speaker were used to generate multiple data sets for analysis. This process was repeated multiple times using samples of words of increasing size. For each speaker, the variability of the repeated measures at each word-sample size were compared using the coefficient of variability. The stability of the measures increased as word sample sizes increased in increments of 50, but after reaching a sample size of 400 words there were no appreciable gains in stability. The final measures, all based on randomly selected 400-word samples from each speaker, are summarized in Table 1 and described below.

Rare Word Tendency—*Rare word tendency* is the skewness of the SFI distribution of the 400-word sample. This measure, a parameter of the distribution, and not a count of rare words, best captured the variability in word use due to statistically rare words, as assessed by SFI values. The use of rare words skews the distribution; the more prevalent such words are, and the smaller their SFI values are, the greater the skew. The mean and median SFI values were also considered as potential measures, but across speakers the vast majority of words spoken are not statistically rare, and there was inadequate variability in those measures.

Challenge—Challenge is the ratio of uncommon types (count of unique uncommon words) to common tokens (count of all common words, including repetitions) in the 400-word sample. In the field of linguistics, words can be counted as *types*—the number of unique words, or as *tokens*—the total number of words. The type-to-token ratio (TTR), based on all words in a sample, is a accepted measure of lexical diversity. A greater TTR is assumed to be an indicator of more highly developed language skills in children (Nurss & Hough, 1985). In the context of clinical encounters with adult patients, lexical diversity *per se* will not be that important. To illustrate, a doctor and patient might engage in preliminary small talk that covers a range of topics, leading to high TTRs, yet still using simple and understandable vocabulary throughout that conversation. Therefore, a new measure, *challenge*, was developed as a more nuanced approach than the TTR. The words spoken were first separated into common and uncommon words. With this division, *challenge* provides a measure of how many unique uncommon words (i.e. uncommon types) are used in relation to the total number of common words used (i.e. common tokens). Speech in which a speaker is constantly introducing new uncommon words, especially if those words are embedded in relatively few common words, should be more challenging to understand.

Medicalization—*Medicalization*, the degree to which a speaker relies on medical terminology, is the ratio of medical words to all words spoken. Because the measures are based on 400-word samples, this measure is a simple count of all medical words used (i.e. tokens).

ANALYSIS

Descriptive statistics were used to describe the characteristics of the doctors, patients, and their encounters. Pearson correlation coefficients were calculated to test the hypothesis that measures of patient word use would correlate with two known predictors of literacy, age and education. Pearson correlation coefficients were also calculated to test the hypothesis that the word-use measures would correlate with another measure of literacy demand—a readability formula. Finally, independent t-tests were conducted to test the hypothesis that the word-use measures would distinguish between doctors and patients.

RESULTS

Patient and doctor characteristics are summarized in Table 2. Patients' average age was 49 (range 18-90 years); 76% were female, 90% were white, and 56% had at least some college education. Patients saw a male physician in 86% of the encounters and a white physician in 88% of encounters. Half the encounters (50%) were with fellows or junior physicians, and half with more senior practitioners. On average, doctors and patients talked for 20 minutes. During the average encounter doctors used 3171 words that could be assigned SFI values; patients used 2739. The average encounters included 43 medical words on the part of doctors, 26 on the part of patients.

Our analysis showed that education was positively correlated with patient word use as assessed by all of the word-use measures (see Table 3). The relationship between *challenge* and education ($r=0.41$, $p<0.01$) was the strongest. Education was not as strongly correlated with *rare word tendency* ($r=0.19$, $p<0.05$), and the relationship between education and *medicalization* ($r=0.15$, $p<0.10$) did not reach statistical significance. Patient age was not correlated with any of the patient word-use measures.

Examining whether the word-use measures correlated with a readability assessment, we found that as readability of the sampled texts increased, *rare word tendency* ($r=-0.60$, $p=.0001$), *challenge* ($r=-.89$, $p<.0001$), and *medicalization* ($r=-0.76$, $p<.0001$) decreased.

Two of the measures did distinguish between doctors and patients. Doctors tended to use more challenging language and more medical words than patients (see Table 4). Patients scored higher on *rare word tendency* compared to doctors, but this difference was not statistically significant.

DISCUSSION

This study presents a new approach to assessing the oral component of health literacy in the context of clinical encounters. The word-use measures developed and examined in this study show promise for the study of both the expressed literacy level of patients and the aural literacy demands made by doctors during clinical encounters. The measures can be applied to already existing data sets. Importantly, the computer-assisted quantitative measures described here make it possible for word use to be analyzed at a level of detail that human raters would be hard pressed to attain. These measures, and the approach taken to developing them, warrant further study.

Challenge, the rate at which a speaker introduces uncommon words into speech, met all three validity criteria: patients with higher educational attainment used more challenging language

than patients with lower educational attainment; more readable texts had lower *challenge* scores; and doctors had higher *challenge* scores than patients. These findings suggest that *challenge* can serve as a useful measure of both expressed literacy level for patient and aural literacy demands made by doctors.

The use of specialized medical vocabulary, as measured by *medicalization*, was more common among doctors than patients. With this group of well-educated patients, many of whom had their rheumatological conditions for some time, it might have been expected that patients would make extensive use of medical terminology, yet this measure still distinguished between doctors and patients. Also important, when applied to written texts, the *medicalization* measure correlated negatively with the assessed readability score. The association between patients' use of medical words and their educational attainment did not reach statistical significance (with α set at 0.05), but this relationship might emerge in a patient sample with greater variability in educational levels. On balance, then, the *medicalization* measure also appears to be well-suited for the study of the oral domain of health literacy.

The approach we took to constructing *medicalization* benefits from the inclusion of medical terminology from a broad range of medical specialties, thereby making it potentially applicable across a wide range of clinical settings. Similar measures were developed and validated by Roter et al. (2007) based on a short list of terms specific to genetic counseling and applied to genetic counseling sessions. A context-specific word list approach is promising as well, but if word lists were developed for particular clinical contexts, there would be limited comparability across studies examining the use of medical terminology.

Rare word tendency assesses the extent to which a speaker uses low-frequency words—that is, words with lower SFI values that are statistically less likely to appear in written texts. The measure was associated with the readability of texts and was correlated with patient education, but it failed to distinguish between doctors and patients. These findings suggest that the measure could be useful for assessing patients' expressed literacy level, but as it did not distinguish between doctors and patients, its utility may be relatively limited. Further tests of this measure in populations with greater educational variability should be conducted. We did not examine the dynamic use of words by doctors and patients as the encounter progresses. It is possible, therefore, that this measure was influenced by a tendency for speakers to standardize their vocabulary as a conversation progresses, either in an attempt to take into account the other's level of understanding or simply because as the words are spoken they become cognitively available to the other speaker (Bromme, Jucks, & Wagner, 2005).

The data we used have several limitations. The transcripts were made over a decade ago. Despite that they still offer a unique opportunity to examine word use in initial encounters where doctors and patients, meeting for the first time, are likely to be as descriptive as possible. While doctor-patient communication certainly has evolved over time, especially with patient's increasing use of the internet to seek health information, there is also evidence that fundamental aspects of clinical communication, as well as general literacy levels, do not change so quickly. Despite repeated findings over several decades indicating the value of patient-centered care (IOM, 2003), the average number of seconds a patient is allowed to talk before being interrupted has remained relatively steady at around 20 seconds (Langewitz, et al., 2002; Marvel, Epstein, Flowers, & Beckman, 1999; Rabinowitz, Luzzati, Tamir, & Reis, 2004). Moreover, during the past decade the literacy skills of U.S. adults has actually decreased (Kirsch, Jungblut, Jenkins, & Kolstad, 1993; Kutner, Greenberg, & Baer, 2006; Rudd, 2007). Therefore, although these data are not recent, our analysis still provides useful insights, as well as identifies important areas for further research.

It should be remembered that the transcripts from which these word-use measures were developed involved clinical encounters with relatively well-educated patients. It is therefore important to examine the properties of these measures in a patient population with more variability in educational attainment. Yet, while studying this relatively well-educated group we found relationships between the measures and patient education, as well as differences between doctors and patients. These findings can be interpreted as a sign that these measures have potential. In addition, all of the examined transcripts came from a single rheumatology clinic. To understand the properties of the measures more fully, investigations based on clinical encounters in other settings are also needed.

Finally, it will be important to examine the word-use measures with a patient group whose health literacy levels have been formally assessed with text-based measures, thus allowing the relationship between text-based and oral language-based health literacy skills to be fully explored.

After further development, measures such as these will allow for more detailed studies of how patients' expressed literacy levels, and the aural literacy demands that doctors place on their patients, relate to critical outcomes such as patient understanding, adherence to treatments, and clinical outcomes. This work might provide a fuller understanding of one possible pathway from limited literacy to poorer health outcomes.

Measures such as those developed here, combined with other quantitative methodologies that have been applied to clinical encounters, also have the potential to provide insight into literacy-specific aspects of communication in the clinical encounter. Future research could combine quantitative assessments of word use with interaction analysis to yield important insights. As one example, investigators could study how often doctors pose diagnostic questions using vocabulary that the patient might be expected to understand (applying the quantitative measures), yet specific enough to meet the doctor's exact information needs (applying a qualitative interaction analysis).

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Table 1

Overview of Word-Use Measures

Measure	Construction	Interpretation
Rare word tendency	Skewness of SFI-value distribution of all tokens (with sign reversed)	Higher score = speaker tends to use more low-frequency words relative to the overall distribution of words
		Lower score = speaker tends to use more high-frequency words relative to the overall distribution of words
Challenge	Ratio of uncommon types (unique words) to common tokens (all words)	Higher score = speaker uses a lot of unique uncommon words relative to all common words used
		Lower score = speaker uses fewer unique uncommon words relative to all common words used
Medicalization	Number of medical words in 400-word sample of speech	Higher score = speaker uses more medical words
		Lower score = speaker uses fewer medical words

Table 2

Patient and Encounter Characteristics

Female (%)	75.8
Age (mean, SD)	49.5±16.4
Years of education (mean, SD)	13.9±2.9
White (%)	90.2
Severity of disease (%)*	
Mild	32.3
Moderate	42.7
Severe	25.0
% seeing male doctors	86.3
% seeing white doctors	87.9
% seeing senior doctors (vs. junior or fellows)	50.8

* *Mild* = self-limiting (acute) connective tissue diseases such as tendonitis. *Moderate* = chronic inflammatory rheumatic diseases such as osteoarthritis. *Severe* = systemic inflammatory diseases such as lupus.

Table 3

Correlations: Doctor and Patient Word Use with Patient Age and Education

Measures	Patient Age	Patient Education
Patient word use		
Rare word tendency	.03	.19**
Challenge	.10	.41***
Medicalization	.03	.15*
Doctor word use		
Rare word tendency	−.22**	.17*
Challenge	−.22**	.26***
Medicalization	−.16*	.04

* p < .10

** p < .05

*** p < .01

Table 4

Comparison of Doctor and Patient Word Use

	Mean±SD	Range	*t* (246)	p (*t*-test)
Rare word tendency				
Doctor	0.98±0.20	0.59 to 1.58	−1.17	.2444
Patient	1.01±0.23	0.46 to 1.66		
Challenge				
Doctor	0.08±0.02	0.02 to 0.13	6.54	<.0001
Patient	0.06±0.02	0.01 to 0.13		
Medicalization				
Doctor	5.04±2.98	0 to 14	3.30	.0011
Patient	3.84±2.75	0 to 14		