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Towards a better readability measure – the Bog index

After almost a century, isn't it time we redesigned the readability formula?
Nick Wright – Director of Editor Software and co-designer of the StyleWriter editing software

Summary

Editor Software's plain English editing software, StyleWriter, has a new readability measure – the Bog index – so called because it measures how writing can bog down the reader. The index is a better way to measure the readability and style of documents than existing readability formulas, which generally use only sentence length and a syllable or character count. The key feature of the Bog index is a graded 200,000-word dictionary. Each word has a grade from easy to difficult depending on the word's frequency and its ease of understanding. Each word also belongs to a category such as:

- difficult or easy
- formal or informal
- jargon or non-jargon
- poor style or good style
- technical or non-technical
- unusual or common.

The Bog index, unlike standard readability formulas, also measures redundant phrases, passive verbs, hidden verbs and other common style issues.

The Bog index doesn't just measure poor writing habits. It measures characteristics of good style in your writing – called Pep because these features pep up writing style. Pep makes reading easier and more enjoyable. It consists of lively verbs, interesting nouns, names and conversational style (contractions, personal pronouns, direct questions and short sentences).

Finally, StyleWriter's Bog index adjusts its score and rating depending on the writing task and likely audience. It also includes a sentence variety calculation in its statistics.

The Bog index consists of **Sentence Bog + Word Bog – Pep** where:

$$\text{Sentence Bog} = \frac{\text{(Average Sentence Length)}}{\text{Long Sentence Limit}}$$

$$\text{Word Bog} = \frac{\text{(Style problems + Heavy Words + Abbreviations + Specialist Words)} \times 250}{\text{Number of Words}}$$

$$\text{Pep} = \frac{\text{(Names + Interest Words + Conversational)} \times 25}{\text{Number of Words}} + \text{Sentence Variety}$$

For a full explanation, see the appendix.

After almost a century, isn't it time we redesigned the readability formula?

Readability formulas have been around a long time. First designed in the United States in the 1920s and developed mainly since the 1950s by the pioneering work of Rudolf Flesch and others, readability formulas aim to measure the ease of reading of writing. Many formulas exist. Some of the better known include the Flesch-Kincaid, the Flesch Reading Ease, Gunning Fog index and the SMOG formula . All the measures – there are over 200 – apply a mathematical formula to measure the ease of reading, typically by calculating sentence length and counting the syllables of words in the document.

But after almost a century of development, are readability formulas any good? Our research shows they offer only a basic guide to ease of reading. We have developed a new readability measure, the Bog index, to overcome many of the failings of previous readability formulas.

The early work by Rudolf Flesch in the 1940s and 1950s was the foundation of today's plain language movement. His publications The Art of Plain Talk (1946); The Art of Readable Writing (1949); Why Johnny Can't Read (1955); How to Test Readability (1951); and How to Write Better (1951) were groundbreaking efforts to reform the language of business, education and government. Today, Flesch is best known for one readability formula – Flesch Reading Ease. This index measures writing by calculating sentence length and syllable count to produce a single statistic and compares this to a
0-100 scale to give a rating from very easy to very difficult. The associated Flesch-Kincaid score rates the document by the necessary US grade level of education needed to understand the writing style. These are probably the most used readability statistics as they are available in Microsoft Word. So most documents produced today can get an analysis using these decades-old formulas.

Flesch Reading Ease Formula:

206.835 – (1.015 x average sentence length) – (84.5 x average number of syllables per word)

The Flesch Reading Ease, like almost every readability formula, says that using shorter sentences and fewer long words, makes writing easier to understand. There's truth in this statement. All plain English advocates recommend using the simpler, more familiar words and keeping average sentence length to around 15 to 20 words in a document. For example:

Original:

An employment application that is forwarded to the employer within the period of twenty- one days has a higher probability than a competing application of gaining that all-important interview.
Sentence Length 28, Flesch Reading Ease 3.1 (very difficult) Grade Level 19.7
StyleWriter's Bog index: 102
(Bad)

Redraft:

Send in an application within three weeks and there is more chance of that all-important job interview.
Words 17, Flesch Reading Ease 60.1 (standard) Grade Level 9
StyleWriter's Bog index: 17
(excellent)

The redraft is shorter, clearer and contains the same information. So does that mean a writer simply needs short words and short sentences to be a clear writer? Unfortunately, it's not so simple. Readability formulas have come under strong criticism, even from plain English advocates.

What's wrong with readability formulas?

'Some, I am afraid, will expect a magic formula for good writing and will be disappointed with my simple yardstick. Others, with a passion for accuracy, will wallow in the little rules and computations but lose sight of the principles of plain English. What I hope for are readers who won't take the formula too seriously and won't expect from it more than a rough estimate.'

Rudolf Flesch commenting on his own readability formula in 'The Art of Plain Talk'

Readability formulas are simplistic, crude tools and at best only a rough guide to your writing style. They measure only two – admittedly important – factors: sentence length and word length. They don't consider:

- the age, background knowledge, interest or motivation of the readers
- the type of document
- the layout and design

- other style issues detracting from style and ease of reading:
    - passive verbs
    - hidden verbs
    - redundant phrases
    - acronyms and abbreviations
    - general and abstract language
    - specialist terms
    - unusual and difficult words
- that some words of the same length detract from readability more than others
- word frequency or familiarity
- words and techniques that improve readability.

Measuring word difficulty and style

All readability formulas mark writing down for using two-syllable and three-syllable words. Readability formulas assume that the longer the word, the more difficult it is. So when a word processor or readability program reports on writing style, understand what's happening. If you write, **'Remember to go together to the conference next Wednesday'** you've used four difficult words. Is syllable count more important than word familiarity? Which list of words do you consider more difficult?

Long Word	Short Word
remember	gelid
together	latria
conference	prate
Wednesday	regna

Most readability formulas penalize every long word – even when they are some of the most common words in the language – while short, difficult words such as **gelid**, **latria**, **prate** and **regna** attract no penalty.

One readability formula tries to overcome this problem. The Dale-Chall formula calculates the US school grade level based on sentence length and the number of 'hard' words. Hard words are those that don't appear in their list of 3,000 common words familiar to most fourth grade students. Although this is a move in the right direction, everything depends on the words in the list.

According to Dale-Chall, **America**, **English** and **French** are easy words but **Italy**, **Greek** and **France** are not on this list and therefore considered hard words. Similarly, **cabbage**, **cigarette** and **moon** are easy words but **noodles**, **cigar** and **noon** are hard words. Some words on the easy list are strange inclusions. **Carelessness** is on the list of 3,000 common words, but typing it into Google gets two million hits. By comparison, type in '**zoo**' (not on the list) and Google finds 98 million hits. Is **carelessness** an easy word and **zoo** a hard word? Isn't **zoo** much more familiar to any child than **carelessness**?   And should the word **zoo** attract the same penalty as the word **abrogable**?

Word familiarity is a much better measure of reading ease than sentence length – even for words with the same meaning (Google hits in brackets).

Easy	Difficult
abolished (5,900,000)	abrogable (13,500)
accepting (59,000,000)	inveigle (121,000)
attractive (83,900,000)	pulchritudinous (109,000)
renounced (5,260,000)	abnegated (50,000)

Should a readability formula assign the same penalty for the word **attractive** as the word **pulchritudinous**? Should a readability formula assign any penalty for using the word **accepting**?

Probably the easiest way to show how standard readability formulas fall down is how they treat proper nouns. Flesch, Gunning and others recommend not counting proper nouns, whatever the word length. But computerized readability formulas, ignore this advice. So **April**, **May** and **June** are easy words, but **January**, **September** and **December** are hard words. **Sunday** is an easier word than **Wednesday**. **Dave**, **John** and **Fred** are easier than **Donald**, **Jonathon** or **Frederick**.

The Bog index's graded wordlist overcomes these problems. The index finds heavy words (so named because they bog the sentence down) and assigns a different penalty depending on its frequency
and complexity. For example, **vagaries** and **variance** have a one-point penalty, **valiance** and **venality**
have a two-point penalty and **vocative** and **vulpine** have a four-point penalty. The word **attractive** has no penalty in the Bog index, but **pulchritudinous** scores a four-point penalty. Proper nouns attract no penalty.

Adjusting readability for writing task and audience

As the Bog index is a computer-based calculation, we can adjust the formula for writing tasks and audience. StyleWriter has 20 different writing tasks and three audiences – public, in-house and specialist.

StyleWriter lowers the Bog index penalty for long sentences depending on the writing task and lowers its word score depending on the audience. There's no drop in the heavy word score if you are writing to the public. If you choose in-house audience, the program does not penalize you as heavily for using abbreviations and acronyms. If writing for a specialist audience, the Bog penalty assigned for using abbreviations and acronyms or specialist words is lower.

For example, resetting StyleWriter from analyzing general writing for the public to specialist writing in a technical report lowers the Bog index on the following text by 14 percent.

Therapeutic nerve shock is but one of the ramifications of regional analgesia. The history of the introduction and development of perineural injections of analgesic and neurolytic agents for therapy coincides with that of similar types of injections to control the pain associated with surgical procedures. The use of surgical analgesic nerve blocks has eclipsed by far similar procedures employed to cure or alleviate pain or symptoms resulting from disease or injury.

Measuring good style (Pep)

Standard readability formulas are negative. But writers can improve the style, clarity and readability of writing by using short sentences, direct questions, contractions, personal pronouns, phrasal verbs (**find out** rather than **investigate**) and interest words (proper nouns, concrete, specific or descriptive words that paint a picture in the reader's mind).

Dull writing

Language is written in a monotonous manner because it is assumed that this is what is expected of us in the position occupied in the organization. A set of habits has been formed as writing becomes a formula of an abstract vocabulary, along with a series of clichés, redundant phases and jargon expressions of our industry or sector. Personality and colour are absent as conformity to the stereotype of the bureaucrat or businessperson is considered the correct way to write.

Bog index 104 (bad)

Interesting writing (with the Pep highlighted)

We write stilted English. Why? Because **that's** what everyone expects. **We've developed bad habits. We** choose **lifeless** words, **throw in clichés** and redundancies and **revel in mimicking** the latest industry jargon. **There's** no personality, no colour as **we** become the typical bureaucrat or businessperson, **churning out tedious** memos and reports like everyone else.

Bog index 0 (excellent)

By measuring Pep, the Bog index encourages variety in sentence style and an interesting word choice. This overcomes the most common criticism against plain English: *'Writing in plain English reduce the language to the lowest level, producing dull, basic English or baby-talk.'*

Comparing typical business writing and journalism (examples taken from the Economist magazine) is revealing. To be fair to business writers, we compared press releases (from an internationally known accountancy firm's website) rather than business reports. The results consistently show how the business press releases scored badly with little or no use of interesting words or other features of Pep. Here's the comparison between business press releases and the Economist magazine.

Bog and style	Economist	Press releases
Bog index	35 (good)	65 (average)
Average sentence length	19.8 (good)	27 (bad)
Passive verb index	20 (excellent)	29 (good)
Style and readability issues in every 1000 words	44	92
Pep		
Pep index	12	4
Interest words in every 1000 words	54	3
Short sentences and direct questions	20 percent	5 percent

The accountancy firm's Bog index was typical of business writing. The Pep scores show business press releases use a boring and dull sentence structure and vocabulary. Only 5 in 100 sentences were under 11 words or a direct question and only 3 percent of words added any interest or color to the writing style. Here are two examples from the company's press releases with no interesting words or other Pep features to liven up the dull style.

> The survey records a steady stream of new regulations from many of the large economies, governing documentation requirements, the application of transaction-based methodologies and valuations of intellectual property and business opportunities.
> **Bog index 164 (dreadful)**

> At a time when the management of risk is at the top of companies' agendas, the service is simply designed to meet that imperative and provide the highest quality of audit and assurance possible – surely a positive move and a sign of an audit firm responding to the needs of clients.
> **Bog index 133 (dreadful)**

This is the common style in most organizations and why most government and business writing is dull and inefficient. There's no interest or journalistic techniques to carry the message. If you've read a report and found you can't remember what you read in the last half-a-dozen pages, you'll know what we mean. Remember, the press releases should be of a high standard, all passed by well-educated managers and competent public relations professionals.

One press release contained this 84-word sentence. Take a deep breath before attempting to understand this monster. Ironically, it was in a press release calling for clarity from the European Union when issuing financial regulations.

> Without this tangible clarity, the overarching benefits of the better handling of cross-border risks and greater consistence among national regulators as well as the more specific benefits of the European Stability Risk Council – for example, the creation of a more inclusive forum by bringing together central banks and financial sector regulators separate from the auspices of the European Central Bank – and the European System of Financial Supervisors – for example, the delivery of a more efficient and industry-aware rule making capacity – will not be realized.

Bog index 257 (dreadful)

By comparison, the professionally written and edited Economist magazine has a much more readable style, not only because it has a shorter average sentence length, but also because it uses short sentences, direct questions and 18 times as many interest words. Examples of interest words in just one 515-word Economist article included:

Proper nouns   America, Arunachal Pradesh, China, Japan, Mao Zedong, Russia, Taiwan, Tiananmen Square

Interest words: aircraft-carrier, clout, corrupt, diamond, flaunted, goose-stepping, grim, jubilee, lament, parade, smacked, staggering, thwart, trombones, wrangle

These words add interest and color to writing. The proper nouns are essential to the content. The interest words add to the clarity by drawing pictures in the readers' minds. And if you hadn't noticed already, a standard readability formula would consider 20 of these 24 words difficult.

Finally, let's put to rest the idea that word length is all-important in the readability formula. The length of words averaged 4.9 characters in the Economist samples and 5.0 in the accountancy firm's press releases – a negligible difference.

Comparing conventional readability formulas with the Bog index

The best way to assess conventional readability formulas and StyleWriter's Bog index is to look at contrasting writing styles. We'll look at how they treat management-speak – so common in business and government – and good, descriptive journalism.

Management-speak

The ARP and AAR outputs were determined as part of the overall operational FSX needs. Management were then asked to oversee both ARP and AAR production with consideration being given to ARP and AAR in the annual accounts. The ongoing assessment of the above requirements is a necessity for ARP and also AAR production.
Average sentence length 18, Flesch Reading Ease 47.5 (fairly difficult) – grade level 11.0
Bog index: 123 (bad)

Journalism

Elephants, rhinoceroses and wildebeest have migrated across parched the African grasslands to the continent's high tablelands, searching for desperately needed water. Zoologists studying animal migration have reported devastating losses with thirteen million animals under threat. Alexander Donaldson, from the African Wildlife Agency, declared this was
'disastrous and endangering animals to the point of extinction.'
Average sentence length 18, Flesch Reading Ease 5.2 (very difficult) – grade level 16.9
Bog index: 18 (excellent)

Why does the Flesch Reading Ease rate management-speak (47.5) only halfway down its scale from 0 (very difficult) to 100 (very easy), but finds the journalism example (5.2) bordering on gobbledygook? Why does the measure of grade level education show that you need nearly six more years of education to understand the clear and descriptive piece of journalism compared to the

mind-numbing management-speak? Why does StyleWriter's Bog index give the opposite result, considering the journalism excellent writing and the management-speak bad writing? The answer is simple – it depends on how you assess the words and style.

Flesch's Reading Ease and the Flesch-Kincaid Grade Level look just at the number of syllables. The journalist's writing contains longer words – averaging 6.5 characters a word compared to 4.8 (thanks to the overuse of three-letter abbreviations) in the management-speak example. StyleWriter's Bog index knows the words in each sentence and distinguishes between words and abbreviations. It allows clear, specific and descriptive words, proper nouns and Pep words such as **grasslands** and **tablelands** in the journalist's writing adding interest and specific content, which make the document easier to read. The Bog index also marks the management-speak down for using abbreviations, passive verbs, jargon and other style faults. It finds no Pep to relieve the deadening style.

Is using American school grades useful?

Early readability research set out to find suitable text for school books. So every readability formula takes its statistic and converts it to a scale implying the United States grade of school level education needed to understand the text.

Our experience also shows the grade level of education can differ by three years on the same text depending on which readability formula you use. Sometimes it's the difference in assumptions in the readability formula. Other times it's the way readability formulas are checked by computers. It's often a case of garbage in, garbage out. Some computer-based readability formulas cannot always accurately measure sentence length. For example, if you count periods, question marks and exclamation marks as sentence breaks and divide the total into the number of words to find the average sentence length, you get inaccurate results. Addresses in letters, headings in reports and bullet points can also give false readings. Some readability formulas count colons and semicolons as sentence breaks while other measures (including the Bog index) don't.

Counting syllables should be easy, but programmers take short cuts. Some count each vowel as a syllable unless two vowels occur together. Others reduce the formula to a character count so every word of seven characters or more is a difficult word.

So even if grade level was the best measure, you can't trust the standard, computerized readability formulas to give you an accurate result.

An alternative to school grades

Educational grade might be of some use when writing to the public. In the United States, for example, 25 percent of the population does not have a high school diploma. But most writing is directed to a specific audience. In a typical office, how many people reading documents don't

have a high school diploma? Sometimes you are writing to a specialist audience where everyone has a college degree.

What good is there in saying you need a grade education level of 16.5 years to understand a scientific report?   The author would probably agree but argue that it's suitable for its intended audience. A much better rating than the US grade education is to describe the writing style as going from very easy to very difficult (as Flesch originally recommended), or from excellent to gobbledygook (as in the Bog index).

We have found writers respond well to our scale of ratings, especially as you can adjust the ratings for different audiences and writing tasks. Few people using StyleWriter will ever send out a document with a poor, bad, dreadful or gobbledygook rating. Most users follow StyleWriter's prompts and recommendations until they achieve three good or excellent ratings for the Bog index, sentence length and Passive index.

Turning the Bog index into an editing tool

Because StyleWriter's Bog index can accurately measure the result of each sentence, we have a powerful editing tool. First, we can plot each sentence on a graph for its readability and style. Second, we can highlight sentences with poor readability and edit them. Third, we can even highlight the words to edit to improve readability. Here's StyleWriter finding a sentence in this article that has a high Bog index.
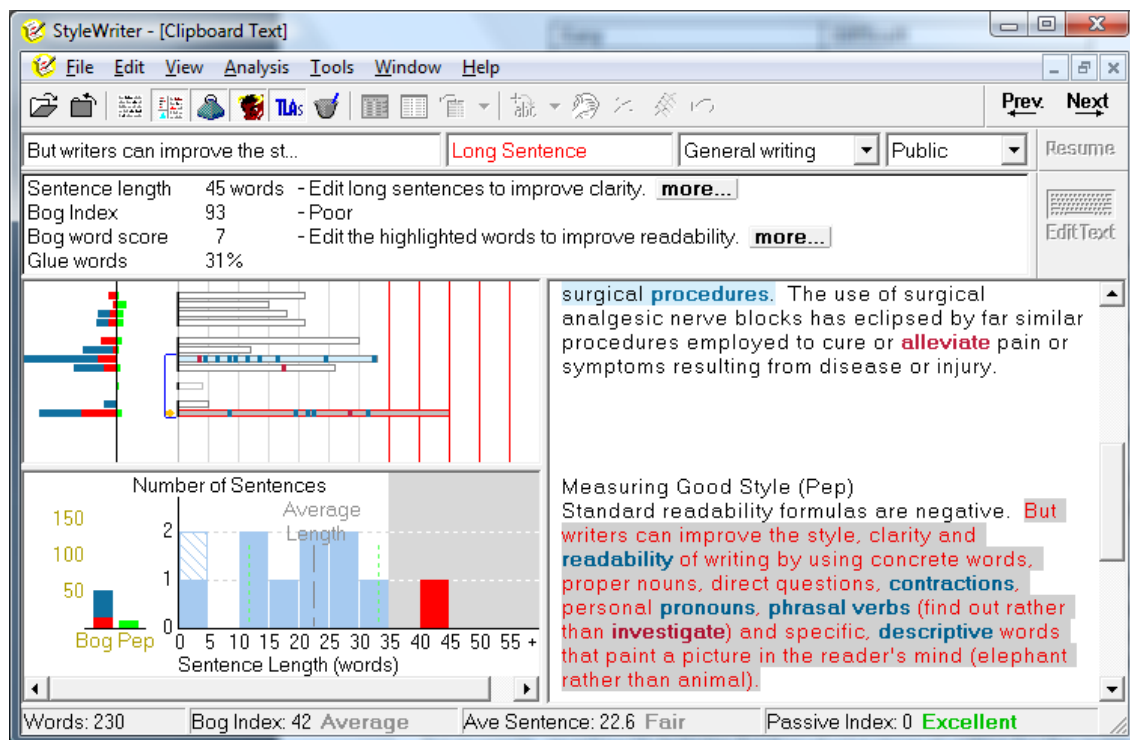
The program, set to assess general writing written for the public, highlights the sentence with a high

Bog index (93), and words that contribute to poor readability, as well as showing:

- at the top of the screen – statistics on sentence length and the Bog index with buttons marked 'more...' which the writer can click on to find out how to edit the highlighted sentence
- in the upper graph – sentence analysis and sentence length (sentences shown in white being plain English), with the red and blue horizontal bars showing the bog for each sentence
  - Red for sentence length contribution to Bog
  - Blue for word choice contribution to Bog
  - Green for Pep for each sentence
- In the lower graph – the overall Bog and Pep for the document
- In the histogram – the average sentence length and sentence variety
- At the foot of the screen – the overall Bog index (Bog minus Pep), the average sentence length and the passive verb index (with ratings)

Looking at the information in the sentence highlighted, it's easy to improve it by simply switching it to a list, for example:

Redraft:

You can write clear, stylish and readable writing by using more:

- concrete words
- proper nouns (names)
- direct questions
- contractions
- personal pronouns
- phrasal verbs (**find out** rather than **investigate**), and
- descriptive words (**elephant** rather than **animal**).

## Other benefits of using a graded dictionary in the Bog index

Measuring the readability of the document and each sentence with the Bog index is just one way software can help break bad writing habits. StyleWriter helps writers by highlighting long sentences, passive verbs, complex words, redundant phrases, hidden verbs and many other style and usage issues. Organizations can add house-style rules to the program. Now, by adding a graded dictionary, StyleWriter offers new editing and proofreading tools for writers and editors.
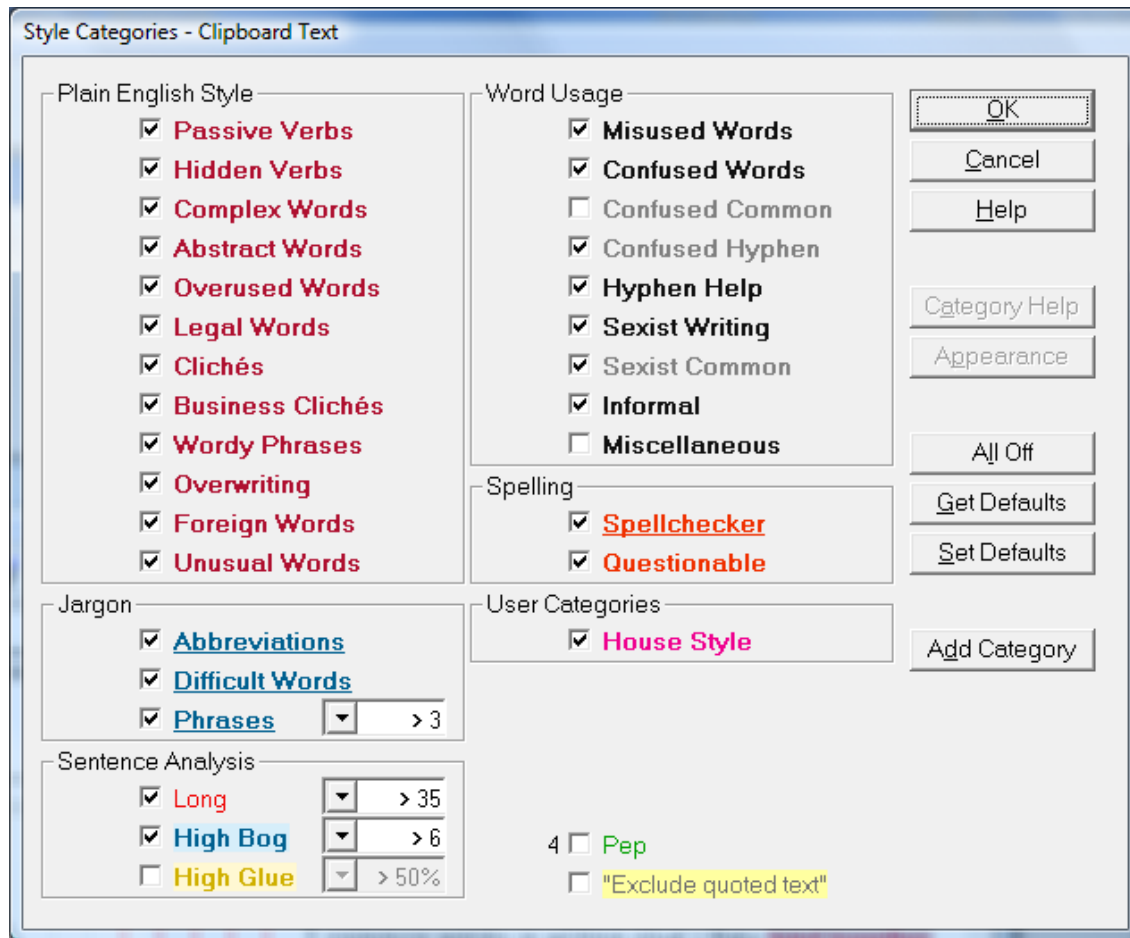
The Jargon buster

StyleWriter discourages writers from overusing abbreviations and acronyms – probably the most common form of jargon. Its wordlist also has thousands of words flagged as contributing to jargon. If you write two or more of these words consecutively, StyleWriter uses its word grading to report on jargon and abstract phrases.

Examples from a telephone company's tender:

- business management resource
- class inventory management system
- convergent network solutions
- CSA customer interaction
- in-scope processing
- key financial indications

- logical connectivity
- model explicit linked deliverables

- network infrastructure systems
- operational capacity planning
- transformational deployment
- transport deliverable solutions

Unusual, unknown and questionable
With a 200,000-word graded wordlist, StyleWriter knows which words in your writing are unusual or questionable. So as well as accurately working out your readability and style, the program can also flag words it considers you should edit as outside the range of most people's vocabulary. There's usually a plain English alternative. For example:

- **diachronic** = evolving
- **dulcify** = sweeten or mollify
- **empoisoning** = poisoning, filling with venom
- **engirdling** = encircling, surrounding
- **enplaning** = boarding, boarding the plane
- **proem** = introduction, preface
- **pyrexia** = fever

Sometimes, StyleWriter highlights an unusual word such as **finical** (from the word finicky) or **easer** (one who eases) or **indult** (a deviation from church law), picking up typing errors missed by your spell-checker:

- Why should people pay for **finical** advice when the broker is investing their money?
- It is **easer** to use a pointed implement for technical work.
- Please don't **indult** my intelligence, I'm probably smarter than you are.

Writers and editors can also question words highlighted by StyleWriter that are not on the 200,000- word wordlist. For example, one of the accountancy firm's press releases contained the words **tronc** (tips or gratuities) and **troncmaster** (the person collecting the tips).

Hardly everyday, plain English. Another example was **malus** found in a national newspaper in this sentence:

> Among the requirements included in the new arrangement is that poor performance will lead to a considerable contraction of bonus payments through **malus** [the opposite of bonus] or clawback arrangements.
> Bog index 116 (bad)

Redraft:
> The new arrangements mean poor performance will lead to smaller bonuses or even clawing back those already paid.
> Bog index 27 (good)

The Questionable word category in StyleWriter allows us to add any advice on a particular word. For example, StyleWriter can flag words that fool a spell-checker. Word's spell-checker considers these sentences correct.

- I am writing to you **toady** about our recruitment policy.
- The Council welcomes **pubic** scrutiny on its policies.
- This **tine** I have many **ides** to contribute.
- The **twp** contracts were **singed** today.

StyleWriter's Questionable word category identifies and highlights the words and offers the correct spelling.

High-glue sentences
Standard readability formulas encourage you to use one-syllable words. But overusing short words, especially the most common 200 or so (excluding personal pronouns), can waste words. Editors call the most common words in writing **glue** – they are the glue words between the adjectives, adverbs, nouns and verbs. Overusing glue words, a common fault – even with good writers – leads to a wordy style.

Example with glue words highlighted:
> I **was able to** use **the** contacts **that** I **have in the** factory **and** spoke **to a** number **of** people **about the** issue **that had been** raised **of** staff moral.
> Words: 30 – Glue 60 percent

**Redraft cutting out the glue words:**
> I spoke **to** several contacts **at the** factory **about** staff morale.
> Words 11 – Glue: 36 percent

The graded wordlist works out the percentage of glue words in each sentence and highlights high- glue sentences to encourage a concise writing style.

Plain English or gobbledygook
Here's the difference between plain English and the typical writing style found in millions of business and government documents.
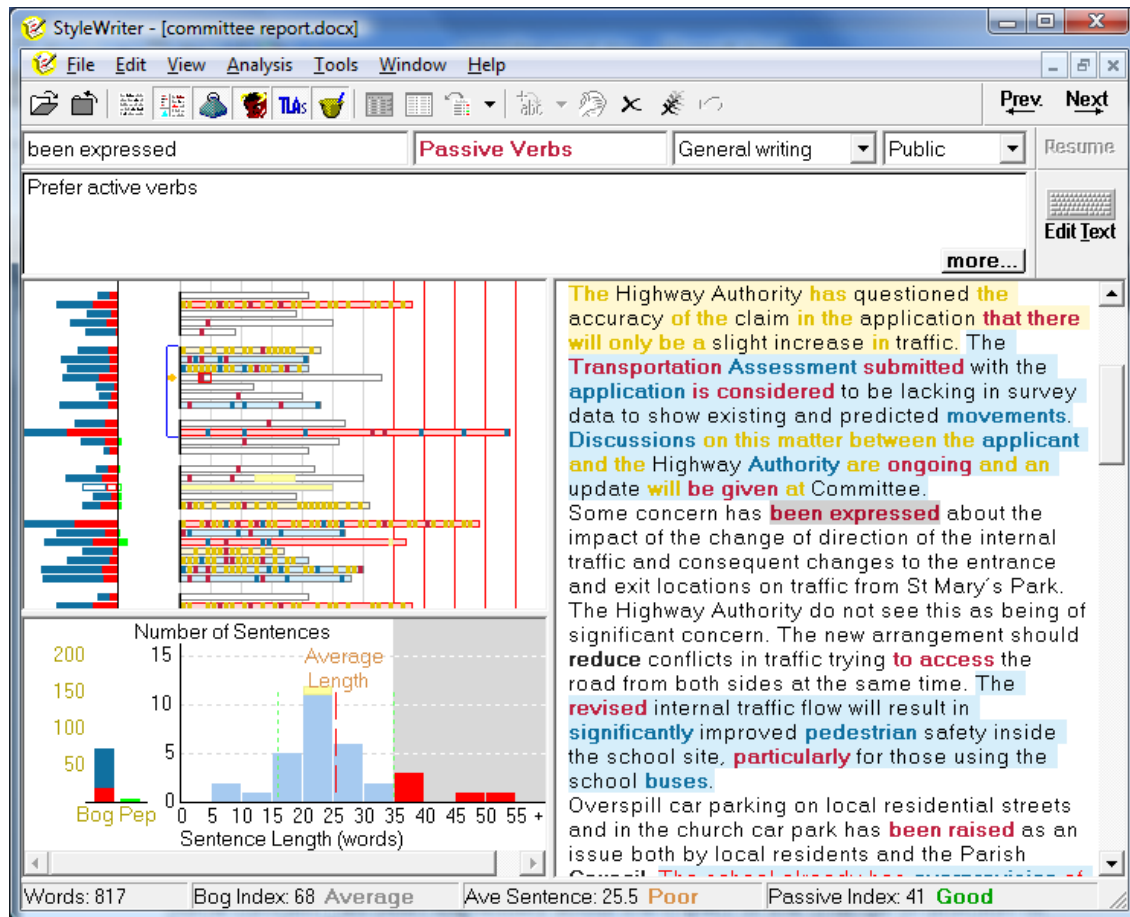
Government report
StyleWriter can offer this author hundreds of suggestions to turn this typical government report into plain English.
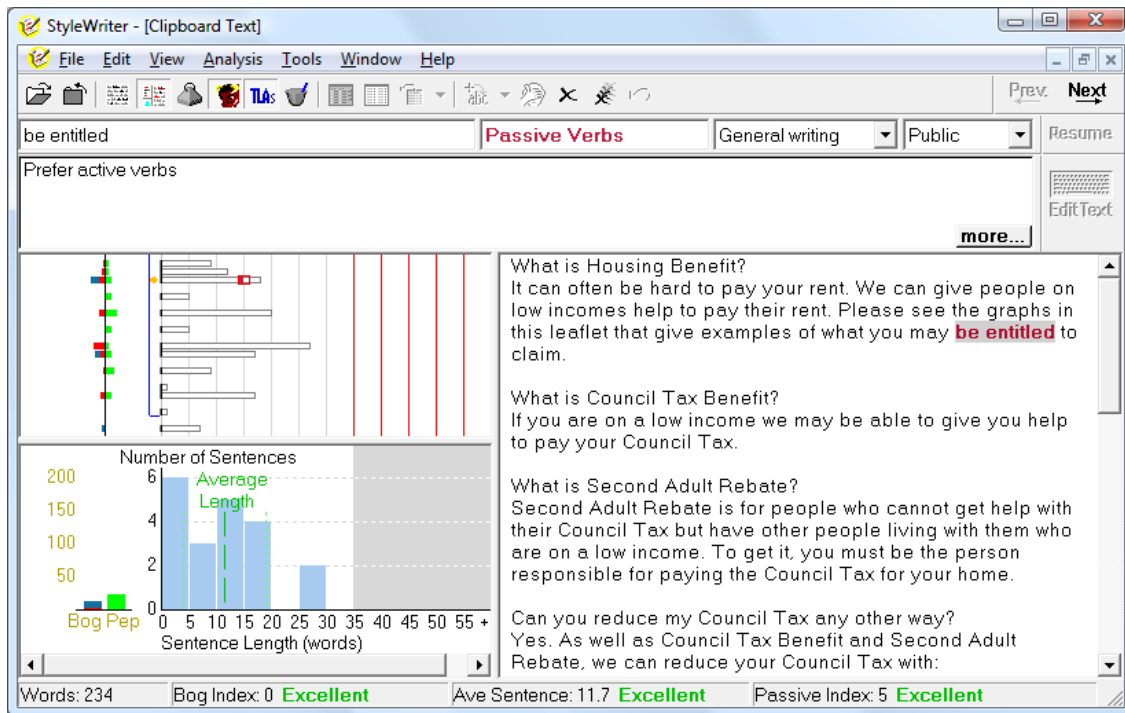
On the following page is a leaflet analyzed by StyleWriter that shows all the hallmarks of plain English.

Can You Read Me Now?

How to Use the New BOG Readability Formula to Write for Your Target Audience!

Learn more at: http://www.StyleWriter-USA.com

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Plain English leaflet
Although this is the style readers say they prefer, most writers find it hard to break poor writing habits and write in such a clear and readable style. Our research shows only one in fifty business and government documents scores three excellent ratings – a sure sign of plain English writing.

Auditing documents in organizations
StyleWriter can keep a record of the key statistics of each document checked. You can save this information automatically, both the original draft and the redraft statistics. Businesses and government agencies can use StyleWriter to audit the style of documents and set minimum writing standards.

Conclusion

StyleWriter's new Bog index, with its graded dictionary, transforms the basic and unreliable readability formula designed decades ago into a powerful writers' and editors' tool. Rather than a simple statistic and grade level, the Bog index identifies sentences that need editing into clear and readable English. The program's comprehensive approach encourages plain English and transforms most business and government documents – simplifying and cutting up to 30 percent of the words.

If every organization wrote to the standard recommended and encouraged by the program, plain language would become a reality rather than an unobtainable goal. Rudolf Flesch would approve.

Appendix – StyleWriter's Bog index

StyleWriter's Bog index is a measure that improves on the standard readability formulas. Its key feature is to measure readability with a graded wordlist rather than simply using a syllable count, or word length. It then rates the style and readability of your document according to document type – the **Writing Task** – and the **Target Audience**.

The Bog index has three distinct parts, **Sentence Bog**, **Word Bog** and **Pep**. Bog is anything that detracts from easy reading – it bogs your reader down. **Pep** is anything that makes your writing easier to read and more interesting – it peps up your writing.

Bog index = Sentence Bog + Word Bog – Pep

Sentence Bog deals with the problem of sentence length. StyleWriter takes the **Average Sentence Length** for the document, squares it, and then divides the result by the **Long Sentence Limit** for the chosen Writing Task. This reflects the fact that some Writing Tasks demand shorter sentences.

$$\text{Sentence Bog} = \frac{(\text{Average Sentence Length})^2}{\text{Long Sentence Limit}}$$

Word Bog – the second part of the Bog index, is the crucial measure of word

difficulty. Unlike traditional readability formulas, StyleWriter's Bog index measures:

- word difficulty (rather than word length)
- abbreviations and acronyms
- wordiness
- passive verbs
- style issues.

StyleWriter assigns a value to each of these and expresses the result as the amount found in 250 words of your document.

$$\text{Word Bog} = \frac{(\text{Style Problems} + \text{Heavy Words} + \text{Abbreviations} + \text{Specialist}) \times 250}{\text{Number of Words}}$$

Pep counts the features in your document that are the hallmarks of good writing. These include:

- names
- interesting words
- conversational expressions, including:
    - personal pronouns
    - contractions
    - direct questions (1 to 10 words)
    - short sentences (1 to 5 words)
- variation in sentence lengths.

Pep reduces the **Bog** because it makes the reader's job easier and more enjoyable – even overcoming some of the effects of **Bog**.

StyleWriter assigns a **Pep** value to each of these features and expresses the result as the amount found in 25 words of your document (one tenth of the effect from Bog).

$$\text{Pep} = \frac{(\text{Names} + \text{Interest Words} + \text{Conversational}) \times 25}{\text{Number of Words}} + \textit{Sentence Variety}$$

Where:

$$\textit{Sentence Variety} = \frac{\text{Standard Deviation} \times 10}{\text{Average Sentence Length}}$$

Note: Standard Deviation is a statistical measure of the variability in a set of numbers – in this case the sentence lengths in your document. If a document contains many sentences of similar length, the *Sentence Variety* would be zero or one. For most writing, the standard deviation will
be about half the Average Sentence Length, making a *Sentence Variety* of around four or five. You can increase *Sentence Variety* by including some short sentences in your document, but it can never be more than ten.

Adjusting the Bog index by writing task and audience

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Good clear writing differs depending on the writing task and the audience. A medical paper read by scientists naturally uses more difficult words than a speech to the public. StyleWriter's Bog index adjusts its score and rating depending on the writing task and audience you choose. There's no drop in the word score if you are writing to the public. If you choose In-house Audience, the program does not penalize you as heavily for using abbreviations and acronyms. If you choose specialist audience, the program does not penalize you so heavily for using abbreviations and acronyms or specialist words.