

**Patient information leaflets (PILs)
currently require graduate level
literacy levels:
equivalent to The Guardian or The Telegraph
newspapers**

i-base

Simon Collins ^[1], Liam Martin ^[1], Robin Jakob ^[1],
Matt Williams ^[2], Marta Boffito ^[3].

1. HIV i-Base; 2. UK-CAB; 3. Chelsea & Westminster Hospital

Informed consent

- **Informed consent (IC) as an ethical concept is a cornerstone of medical research.**
- **Patient Information and consent forms are part of the IC process.**
 - What the study is for.
 - What is involved and expected.
 - Possible risks and benefits.
 - That taking part is voluntary.
- **i-Base talks with individuals about joining studies and works with research groups.**

Readability scores

- Recommended in NHS guidelines. [1]
- How difficult is text to read?
- What percentage of people will easily understand - or be excluded.
- Usually include average word, sentence and paragraph length.
- Readability increased with shorter words, sentences (10-12 words), using the active tense, and common words.

1. NHS. Information Sheets & Consent Forms. Guidance for Researchers and Reviewers. March 2011, Annex 9. <http://www.hra.nhs.uk>

Methods

- Evaluate the body text of patient information leaflets from 9 ongoing studies: phase I-IV.
- Text was copied from PDF files into MS Word. Minor edits to help scores. Punctuation added after headings and in bullet lists. Tables were excluded.
- Primary outcome was Reading Ease. Scores calculated online. ^[1] Results compiled in Excel.
- Two community-written patient leaflets were used as comparisons.

1. www.readabilityscore.com and www.read-able.com

Choice of scores

- **Flesch reading ease (Plain English) ^[1]**
Practical range 0 – 100 (but can be <0 and >100)
Target: >70 for general public; higher score is better
- **Flesch-Kincaid reading grade ^[1]**
Adapted for US school grade: lower is better,
Target: grade <8 = reading age 13-14; grade >12 = graduate
Microsoft Word caps highest grade at 12.
- **SMOG grade score ^[2]**
May have advantages for health information. Stricter criteria for higher comprehension. Used for cancer patients in US. ^[3]

1. Wikipedia: Flesch–Kincaid readability tests; 2. Wikipedia: SMOG index 3. Friedma DB, Health Educ Behav. (2006).

Reading scores

Equations are objective estimates.

Flesch reading ease score ^[1]

$$206.835 - 1.015 \left(\frac{\text{total words}}{\text{total sentences}} \right) + 84.6 \left(\frac{\text{total syllables}}{\text{total words}} \right)$$

Flesch-Kincaid reading grade ^[1]

$$0.39 \left(\frac{\text{total words}}{\text{total sentences}} \right) + 11.8 \left(\frac{\text{total syllables}}{\text{total words}} \right) - 15.59$$

SMOG index ^[2]

$$\text{grade} = 1.0430 \sqrt{\text{number of polysyllables} \times \frac{30}{\text{number of sentences}}} + 3.1291$$

1. Wikipediia: Flesch–Kincaid readability tests; 2. Wikipediia: SMOG index.

Target & UK literacy

Reading ease score 80-90: similar to tabloids. ^[1]

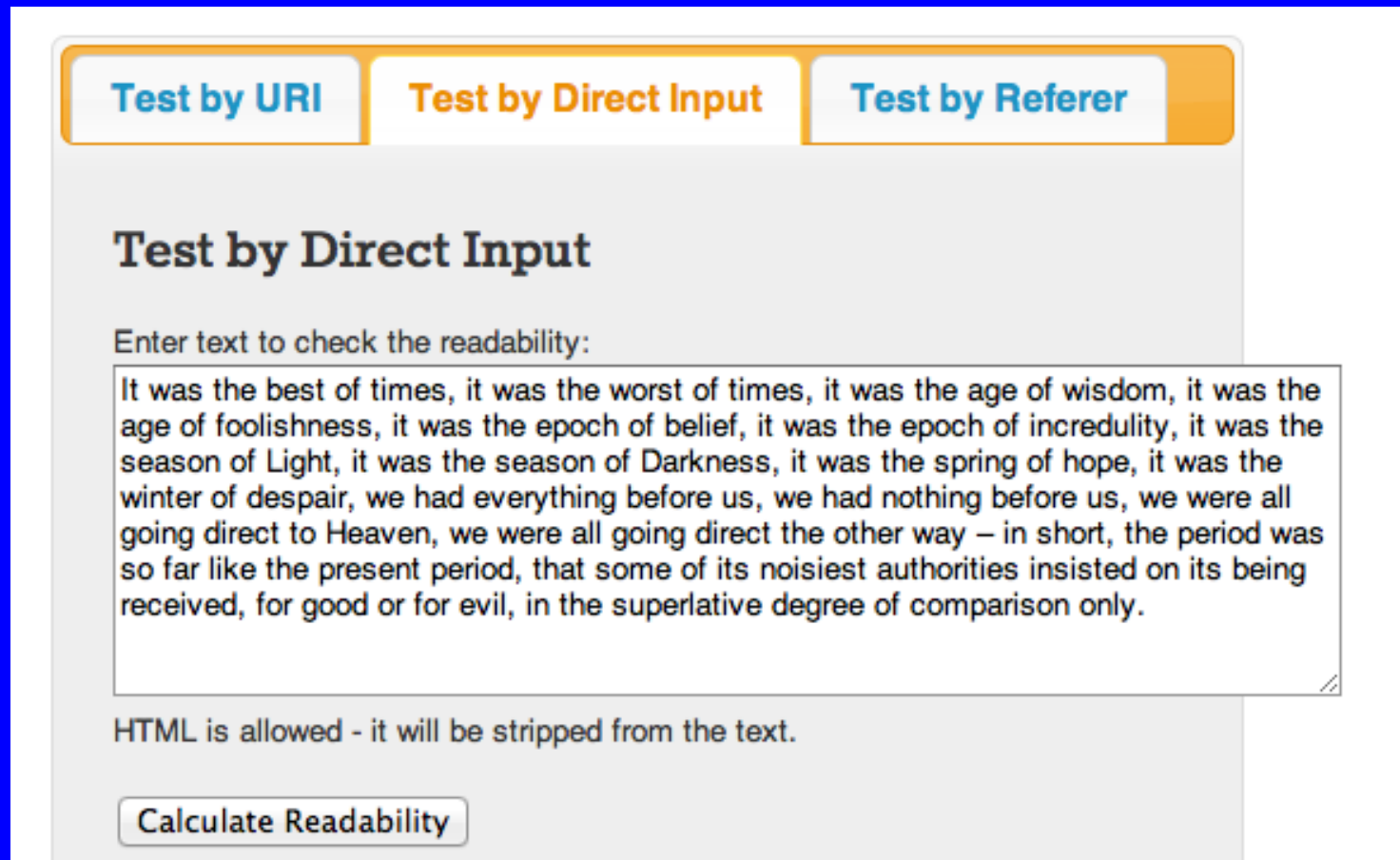
	Score	% of pop
Easy tabloids	95	70-80%
Standard magazine	80	50-60%
Broadsheet	77	30-50%
Academic	31	<30%

UK literacy (2011) ^[2]	Literacy	Numeracy	Comment
Level 2 or higher	57%	22%	GCSE A-C
Level 1	28%	29%	GCSE D-E
Below level 1	15%	49%	“functionally illiterate”
Entry level 3	8%	25%	Reading age 9-11

1. NHS. Information Sheets & Consent Forms. Guidance for Researchers and Reviewers. March 2011.

2. Department for Business, Innovation and Skills. Skills for Life Survey (2011)

Online scores



The screenshot shows the 'Test by Direct Input' section of the Readability Test Tool. At the top, there are three tabs: 'Test by URI', 'Test by Direct Input' (which is selected and highlighted in orange), and 'Test by Referer'. Below the tabs, the heading 'Test by Direct Input' is displayed. Underneath, there is a prompt 'Enter text to check the readability:' followed by a text input area. The input area contains the following text: 'It was the best of times, it was the worst of times, it was the age of wisdom, it was the age of foolishness, it was the epoch of belief, it was the epoch of incredulity, it was the season of Light, it was the season of Darkness, it was the spring of hope, it was the winter of despair, we had everything before us, we had nothing before us, we were all going direct to Heaven, we were all going direct the other way – in short, the period was so far like the present period, that some of its noisiest authorities insisted on its being received, for good or for evil, in the superlative degree of comparison only.' Below the text input area, there is a note: 'HTML is allowed - it will be stripped from the text.' At the bottom of the form, there is a button labeled 'Calculate Readability'.

Free service, unlimited text, instant results.

Online scores

The screenshot shows the 'Test by Direct Input' section of the Readability Test Tool. It features a text input field containing a paragraph of text. Below the input field is a 'Calculate Readability' button. To the right of the input field, a red-bordered box displays 'Text statistics' for the entered text.

Test by URI | **Test by Direct Input**

Test by Direct Input

Enter text to check the readability:

It was the best of times, it was the worst of times, it was the age of foolishness, it was the epoch of darkness, it was the season of Light, it was the season of Darkness, it was the winter of despair, we had everything before us, we had nothing before us, we were all going direct to Heaven, we were all going direct to Hell, in fact, the times were so far like the present period, that some of the wisest among us thought that they had received, for good or for evil, in the superlative degree of comparison only.

HTML is allowed - it will be stripped from the text.

Calculate Readability

Text statistics

No. of sentences	1
No. of words	120
No. of complex words	10
% of complex words	8.33%
Av. words per sentence	120
Av. syllables per word	1.4

Statistics are provided in addition to calculations

Online scores

Readability Indices

Flesch Kincaid Reading Ease	-34.8	
Flesch Kincaid Grade Level	47.9	
Gunning Fog Score	51.3	
SMOG Index	18.2	
Coleman Liau Index	7.5	
Automated Readability Index	57.2	

Online scores

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Readability Test Results

This page has an average [grade level](#) of about 36.

Ooh, that's probably a bit too complicated.
Have you thought about using smaller words and shorter sentences?

A Tale of Two Cities (110 words). Reading ease: -34 Reading grade: 47

Results: document statistics

	Mean n=9	Range n=9	Community examples n=2
Text statistics			
Page number	13	5-23	9
Word count	4513	1875-8530	3582
Sentence count	242	125-401	280
Mean numbers of words per sentence	18.5	15.6-22.1	12.8

**Community examples matched for complexity.
Document length is a literacy factor (START substudy)**

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Readability scores			
Flesch Reading Ease	55.4	47.1-63.1	70.3
Flesch-Kincaid Reading Grade	10.1	9.0-12.0	6.6
SMOG index	9.2	7.9-10.4	6.9

Community examples show targets are achievable.

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Community examples show targets are achievable.

Limitations and discussion

- **Small number of protocols.**
- **Other factors of readability were not assessed:
i.e. text content and layout (font size, use of space and headings).**
- **However, text heavy layouts and results probably underestimated true readability scores.**
- **Patient leaflets are not used in isolation. Talking through a study is essential – but readability enables independent engagement.**

Advantages of readability

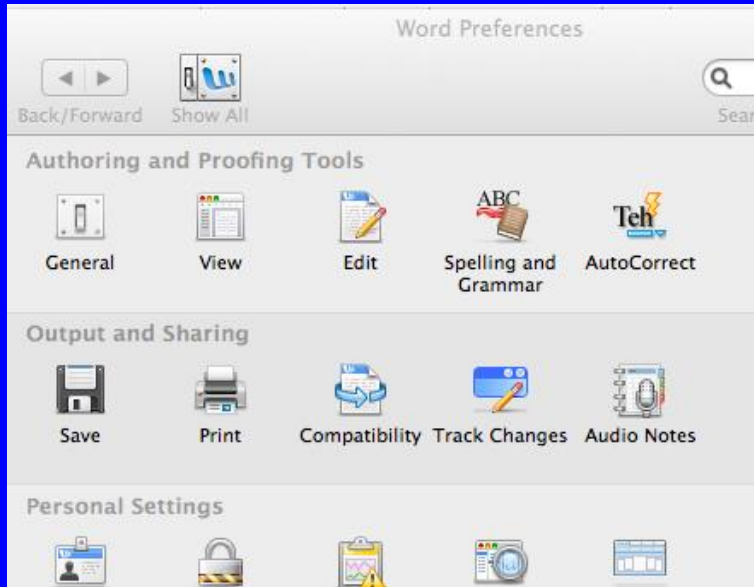
- **Increase the pool of potential participants.**
- **Engage people in research.**
- **Reduce the chance that people leave the study later.**
- **More likely to enable real informed consent.**

Conclusion

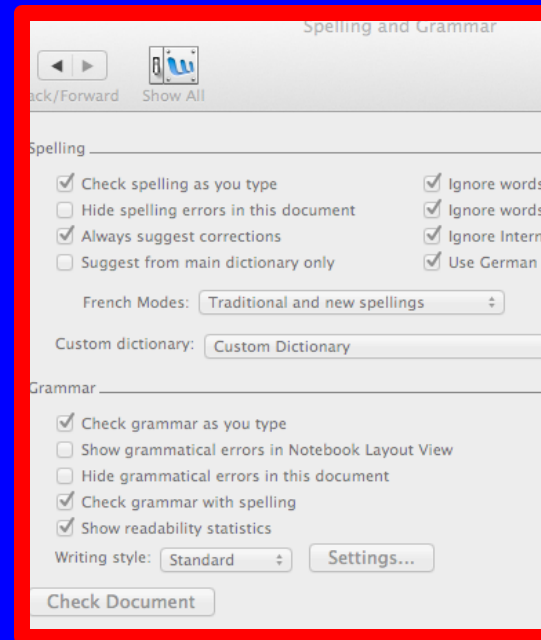
- **This small study showed that literacy levels are commonly too high for most HIV positive people to be actively included in research.**
- **Given the care, detail and costs involved in HIV research, similar attention is needed for patient information.**
- **This is not a recent, UK- or HIV-specific issue.***
- **These skills are easy to learn and the tools are easy to use.**

* See: Grossman SA et al. Jour Oncology (1994); Sugarman J et al. Hastings Centre Report (1999); Paasche-Orlow et al. NEJM (2003) etc.

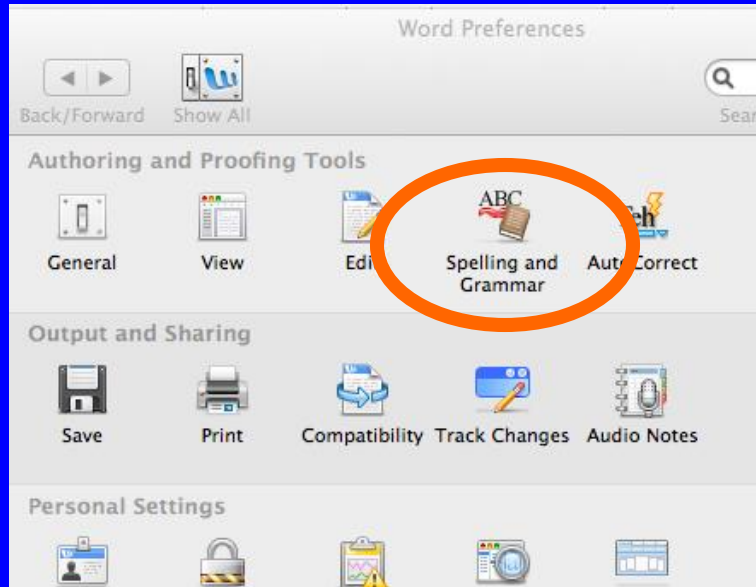
Readability in Microsoft Word



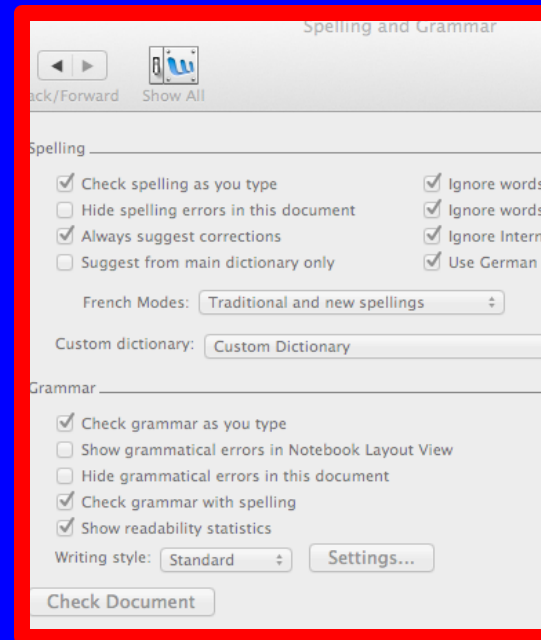
In Spelling and Grammar preferences, check boxes to select:
“Check grammar with spelling” and
“Show readability statistics”



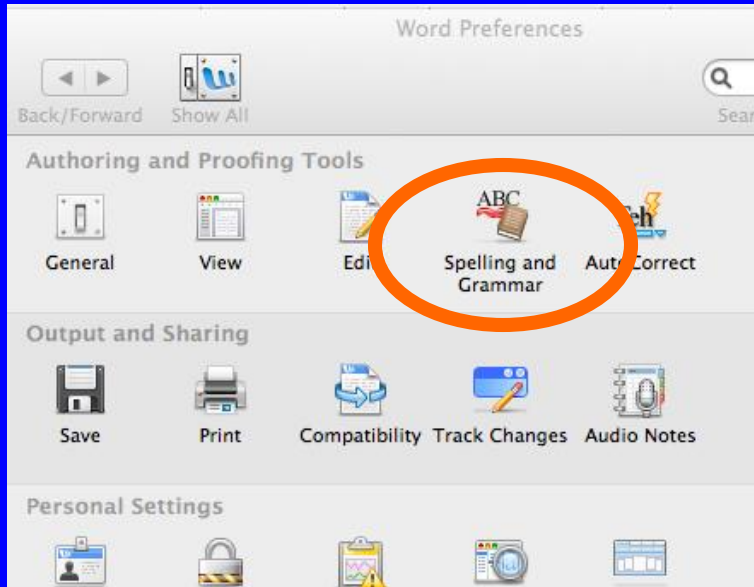
Readability in Microsoft Word



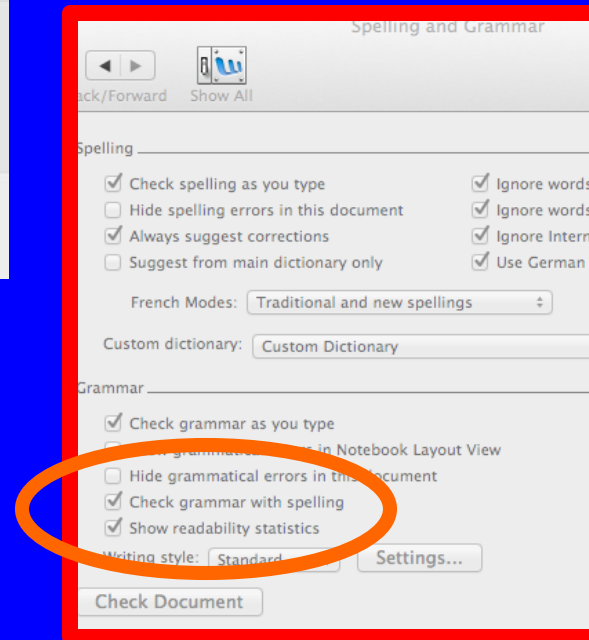
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Readability in Microsoft Word



In **Spelling and Grammar** preferences, check boxes to select: **“Check grammar with spelling”** and **“Show readability statistics”**



Readability in MS Word

The screenshot shows the Microsoft Word interface. The 'Tools' menu is open, and 'Spelling and Grammar' is circled in orange. Below the menu, a document snippet is visible with the following text:

load faster than other n

- Adherence. Drugs can only take your meds on time quickly.

Viral load should drop by at This is sometime referred to not, your doctor will ask you other tests.

If viral load is still detectable change treatment.

The 'Readability Statistics' dialog box is highlighted in red and contains the following data:

Readability Statistics	
Counts	
Words	148
Characters	691
Paragraphs	9
Sentences	15
Averages	
Sentences per Paragraph	1.9
Words per Sentence	9.1
Characters per Word	4.5
Readability	
Passive Sentences	6%
Flesch Reading Ease	77.1
Flesch-Kincaid Grade Level	4.7

OK

Thank you

HIV positive people who contacted i-Base.

Researchers who collaborated with patient leaflets.

Liam Martin, Robin Jakobs, Matt Williams, Marta Boffito.

Further information

i-base.info/guides/about

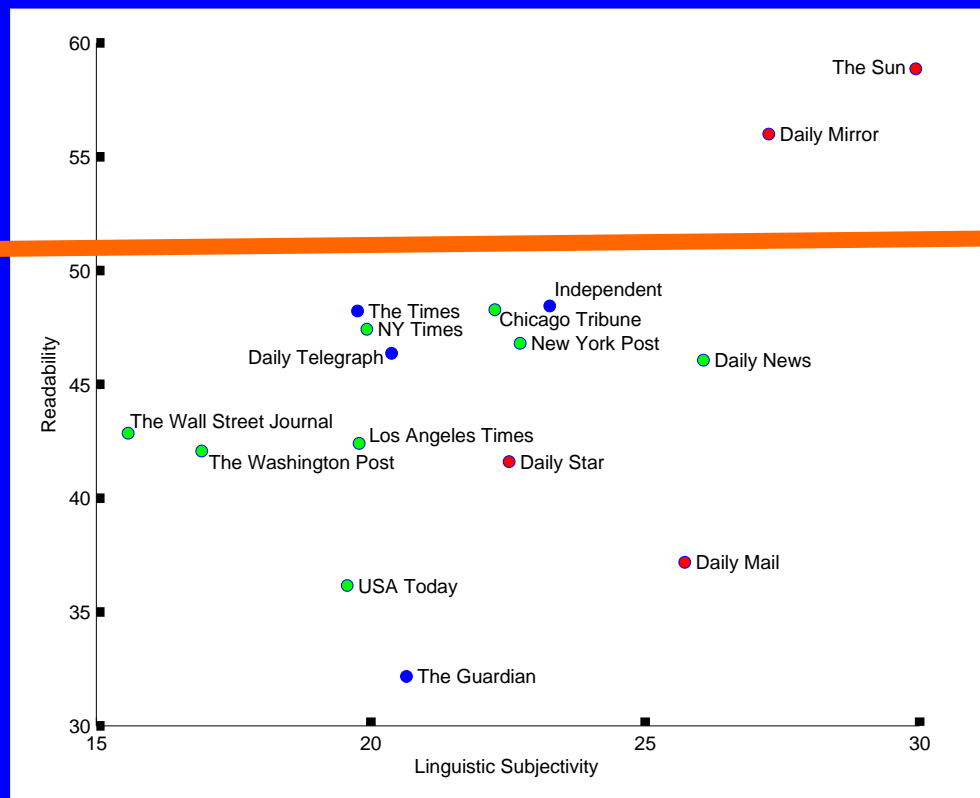
www.plainenglish.co.uk

www.hra.nhs.uk

Additional slides

Newspaper readability

Comparison of selection of US and UK journals based on writing style (Flesch reading ease and subjectivity).



Tabloids:
Sun, Mirror.

Broadsheets:
Telegraph,
Independent,
NY Times,
WSJ.

Cristianini N et al. Digital Journalism 1(1)102-116 (2012) [10.1080/21670811.2012.714928](https://doi.org/10.1080/21670811.2012.714928).

UK adult literacy & numeracy

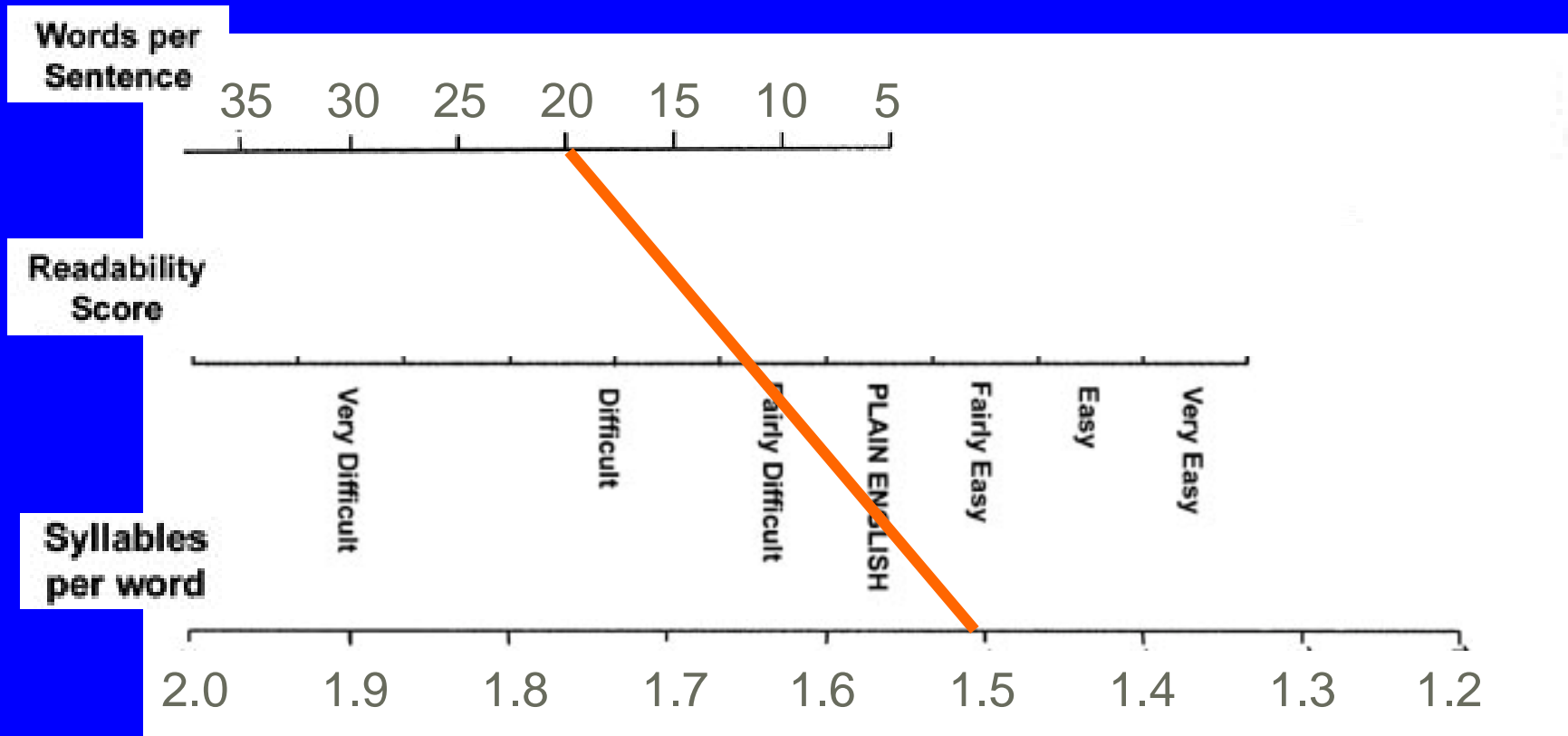
	Literacy	Numeracy	Comment
Level 2 or higher	57%	22%	GCSE A-C
Level 1	28%	29%	GCSE D-E
Below level 1	15%	49%	“functionally illiterate”
Entry level 3	8%	25%	Reading age 9-11
Entry level 2	2%	17%	Reading age 7-9
Entry level 1 or lower	5%	7%	Reading age 5-7

**Based on representative sample of > 7000 adults (16-65 years old).
Not all participants included in all modules.**

Department for Business, Innovation and Skills. Skills for Life Survey (2011). Tables 4.1 and 4.4
<https://www.gov.uk/government/publications/skills-for-life-survey-2011-important-findings>

Flesch reading ease

The intersection of the line joining average words per sentence to average syllables per word show the readability score. The minimum score for Plain English is 60.



Green eggs and ham

Do you like green eggs and ham?

I do not like them, Sam-I-am.
I do not like green eggs and ham!

Would you like them here or there?

I would not like them here or there.
I would not like them anywhere.

I do so like green eggs and ham!
Thank you! Thank you, Sam-I-am!

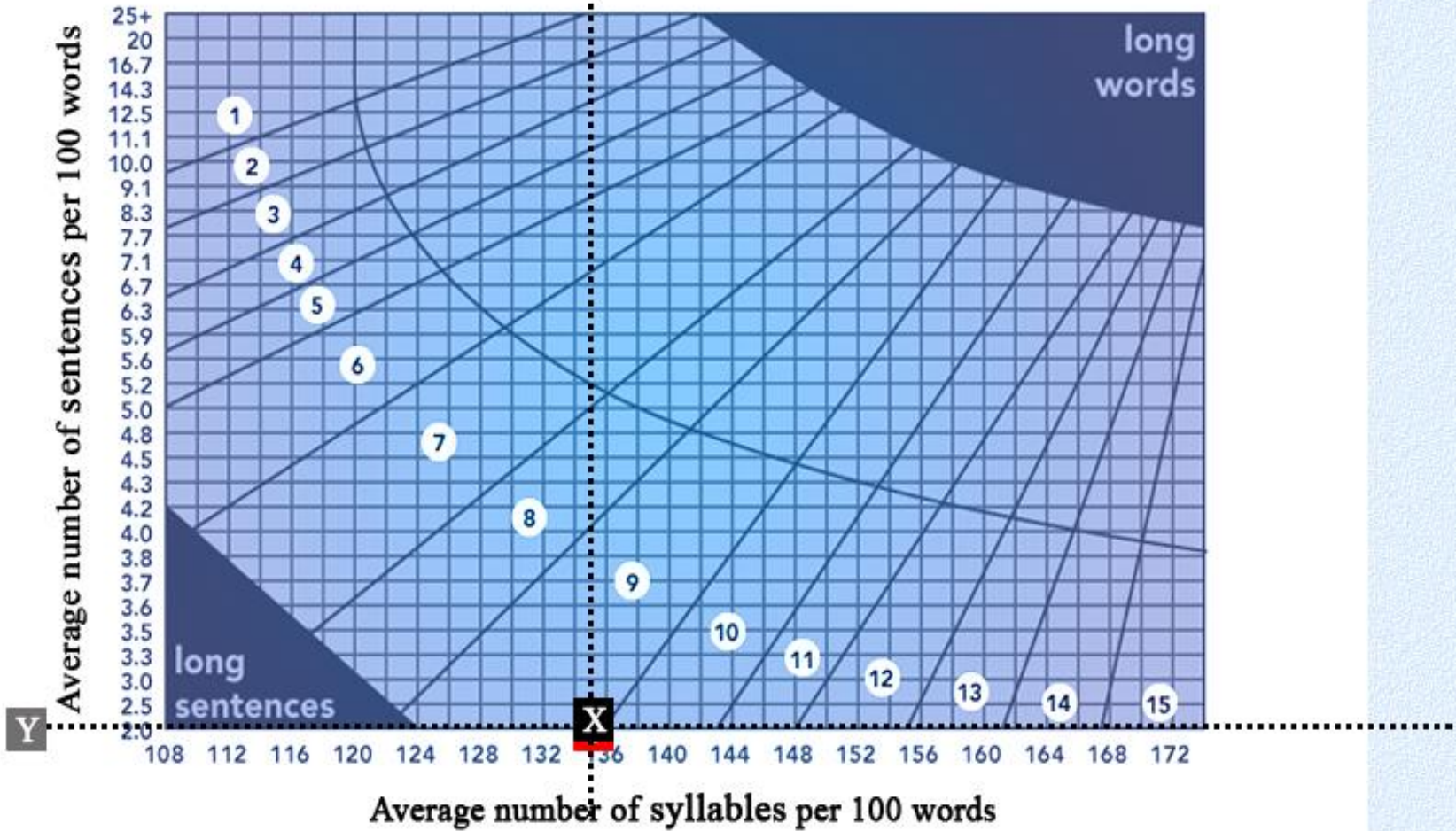
FK reading ease: +112; Reading grade: -0.8

A tale of two cities

It was the best of times, it was the worst of times, it was the age of wisdom, it was the age of foolishness, it was the epoch of belief, it was the epoch of incredulity, it was the season of Light, it was the season of Darkness, it was the spring of hope, it was the winter of despair, we had everything before us, we had nothing before us, we were all going direct to Heaven, we were all going direct the other way – in short, the period was so far like the present period, that some of its noisiest authorities insisted on its being received, for good or for evil, in the superlative degree of comparison only.

The opening sentence of A Tale of Two Cities has 110 words. It has a reading ease: –34 and reading grade: 47

Fry Graph for estimating Reading Ages (grade level)



Target literacy

Reading ease score 80-90: similar to tabloids. [1]

	Score	% of pop
Easy tabloids	95	70-80%
Standard magazine	80	50-60%
Broadsheet	77	30-50%
Academic	31	<30%

UK literacy [2]

Level 2 - 57% or higher - GSCE grade A-C

Level 1 - 27% - GSCE grade D-E

Below Level 1 - 16% - reading age 11

1. NHS. Information Sheets & Consent Forms. Guidance for Researchers and Reviewers. March 2011.

2. Department for Business, Innovation and Skills. Skills for Life Survey (2011)