

Scientific English for Hispanic scientists

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- *Scientific* and *scientists* are very related words in English. In Spanish, they are represented by the single word “*científico*”.
- In **English**, the words for nationalities and languages are capitalized.
- Ethnic groups may be capitalized (**Hispanics**) or lowercased (**hispanics**). Be consistent!
- Regarding **plurals**, adjectives do not agree with nouns that they modify (Hispanic scientists), and adjectives appear before the noun that is being modified.

Key points of this lecture

- What scientific English is
- English as the international language of science
- Style, parallelism, and syntax
- Declarative sentences
- Problem words (not false cognates)
- Words and expressions to avoid
- Flesch–Kincaid readability tests in Word documents

Main information sources

- **Scientific English: a guide for scientists and other professionals.** R. A. Day and N. Sakadusky. Third edition, 2011.
- **How to write and publish a scientific paper.** R. A. Day and B. Gastel. Seventh edition, 2011. [IPK library and PAHO website](#) (Spanish version of earlier edition).
- **Essentials of English grammar: a practical guide to the mastery of English.** L. Sue Baugh, 1989.
- **A practical English grammar.** A. J. Thomson and A. V. Martinet. Fourth edition, 1986.
- **Wikipedia** accessed November 8, 2013 (http://en.wikipedia.org/wiki/Flesch%E2%80%93Kincaid_readability_tests)
- **English Club** accessed November 8, 2013 (<http://www.englishclub.com/index.htm>)

What scientific English isn't

- Slang (#\$%&)
- Exclamation sentences (I cannot write English well!)
- Euphemisms (private parts, golden years, pass away)
- Clichés and idioms (too good to be true)
- Buzzwords (disconnect, interactive, etc)

What sometimes isn't scientific English

- Question sentences (Do you write research questions?)
- Passive voice (useful a few times)
- First person (accepted by a number of journals)

English as the international language of science

- **Scientific papers should be published in English** to be accessible to scientists throughout the world.
- English is also the international language of **business** and **technology**.
- English has a massive vocabulary of around a **half-million words** (probably similar to Spanish).
- However, you will need to master a few thousand to write **clearly**.

Style in scientific English

- Clear (complex information)
- Simple (but interesting)
- Concrete (short words and sentences)
- Organized (IMRAD: Introduction, Methods, Results, and Discussion)

Parallelism

- The term parallelism simply refers to **logic**.
- Adjectives should be **parallel** with other adjectives, verbs with verbs, and phrases with phrases in sentences or paragraphs.
- These words should have the **same structure**; if the structure changes, the readers will be confused.

Parallelism (cont.)

Wrong:

- We sold cell cultures to the Americans, the French, Italians, and Cubans.

Right:

- We sold cell cultures to **the** Americans, **the** French, **the** Italians, and **the** Cubans.
- We sold cell cultures to Americans, French, Italians, and Cubans.

Parallelism (cont.)

- Wrong: The lecture was both a tedious one and much too long.
- Right: The lecture was **both** tedious and long.

- Wrong: It is time not for emotion but clear thinking.
- Right: It is time not **for** emotion but **for** clear thinking.

- Wrong: I have sent an e-mail, washed the Petri dishes, and went to the conference room.
- Right: I have sent an e-mail, washed the Petri dishes, and **gone** to the conference room.

The new finding on the two hominids indicates that:

- They died around the same time.
- The debris flow carried them to their place of burial.
- The fossils were found along with a wide range of other animals.
- The hominid fossils are intact and well preserved.

The new finding on the two hominids indicates that:

- They died around the same time.
- ~~The debris flow carried them to their place of burial.~~
- They were carried by debris flow to their place of burial.
- The fossils were found along with a wide range of other animals.
- ~~The hominid fossils are intact and well preserved.~~
- The hominid fossils were intact and well preserved.

Syntax

- Syntax deals with **word order**.
- We must consistently keep the words in our sentences, and the sentences in our paragraphs, in **logical order**.
- What one needs to know is the **fundamental principle of syntax**: Modifiers should be as close as possible to the words, phrases, or clauses they modify.
- If words **relate** to each other, they should be **near** each other.
- Word order is much freer in **Spanish** than it is in English.

Importance of syntax

- Wrong: I knew a man with a wooden leg named George.
- Right: I knew a man **named George** with a wooden leg.

- Wrong: For sale: car owned by lady with dent in rear.
- Right: For sale: car **with dent in rear** owned by lady.

The word *only* can be inserted anywhere in a sentence. However, changing its place in the sentence can change the meaning.

1. Only we studied the induction of cytokines.
2. We **only** studied the induction of cytokines.
3. We studied **only** the induction of cytokines.
4. We studied the induction **only** of cytokines.
5. We studied the induction of **only** cytokines.
6. We studied the induction of cytokines only.

There are four kinds of declarative sentences

- Simple declarative sentences
- Compound declarative sentences
- Complex declarative sentences
- Compound-complex declarative sentences

Simple declarative sentences

- A simple declarative sentence consists of one independent clause.
- An independent clause contains a subject and a verb.
- Most good writers recognize the expressive power of simple declarative sentences.
- These sentences are not necessarily short.

Compound declarative sentences

- Compound declarative sentences contains two, or more independent clauses.
- Almost any two simple declarative sentences can be joined together to form a compound declarative sentence; the two clauses should have a close connection.

The two independent sentences are usually joined in one of three ways

1- A comma and a coordinating conjunction

(for, and, nor, but, or, yet, so) or FANBOYS

The scientist identified the problem, **but** he found it difficult to solve.

2- A semicolon

The scientist identified the problem; he found it difficult to solve.

3- A semicolon and a coordinating adverb (however, therefore, thus, moreover, nevertheless) always followed by a comma

The scientist identified the problem; **however**, he found it difficult to solve.

Complex declarative sentences

- A complex declarative sentences has one independent clause and one or more dependent clauses.
- They are independent sentences to which a dependent clause, beginning with a **qualifier**, has been added.
- The most frequent qualifiers are **if**, **when**, **whereas**, and **although**.

Examples of complex declarative sentences

- **When** the temperature decreases, less activity is observed.
- **If** glucose is added, the medium will support growth.
- **Although** I am not absolutely sure, I think you can improve your English.

Problem words

- at - in - on
- among - between
- while - whereas
- if - whether
- fewer - less
- much - many
- like - as
- an – a
- besides - beside
- e.g. - i.e.

Prepositions *at*, *in*, and *on*

- The English words *at*, *in*, and *on* equate to “*en*” in Spanish.
- This could cause confusion on which one to use.
- In English we use *at*, *in*, and *on* as prepositions of **place** and **time**.

Prepositions of place: **at, in, on**

at	in	on
POINT	ENCLOSED SPACE	SURFACE
at IPK	in France	on the bench
at the university	in Havana	on the book cover
at school	in the journal	on a page
at work	in a building	on the door
at home	in a laboratory	on the floor

Examples using *at*, *in*, and *on* as prepositions of **place**

- You arrived **at** the laboratory.
- She works **in** a laboratory.
- He has a meeting **in** New York.
- The author's name is **on** the cover of the thesis.
- There was a “no enter” sign **on** the door.

Prepositions of time: **at, in, on**

at	in	on
PRECISE TIME	MONTHS, YEARS, CENTURIES and LONG PERIODS	DAYS and DATES
at present	in April	on Sunday
at 3 o'clock	in summer	on Tuesdays
at 10:30 am	in the summer	on 1 January
at noon (12:00 pm)	in 1990	on 25 December 2013
at lunchtime/dinnertime	in the 1990s	on Christmas Day
at bedtime	in the next century	on Independence Day
at sunrise	in the Ice Age	on my birthday
at sunset	in the past/future	on New Year's Eve

Examples using *at*, *in*, and *on* as prepositions of time

- We have a meeting **at** 9 am.
- The library closes **at** midnight.
- Mary left the lab **at** lunchtime.
- There should be a lot of progress **in** the next century.
- We do not work **on** Saturdays.

Between should be limited to a comparison of two items; however, ***among*** should be used to compare three or more.

- Neglected tropical diseases contribute to global health disparities **between** rich and poor countries (Matlashewski et al, Lancet Infect Dis 2011).
- Although all humans share 99% of their DNA, the relatively few differences **among** us matter (Pennisi, Science 2010).

While and ***whereas*** are often interchangeable; however, **while** has a connotation of time, **whereas** ***whereas*** has no obvious relation to time.

- It is highly expressed in fetal cells and cancer cells, **whereas** the other isoforms (PKM1, PKR, and PKL) are expressed in normal somatic tissues (Keller et al, Science 2013).
- She sleeps **while** we learn English.

If and *whether* can be interchangeable as “conditional” words.

- But *if* is the better choice for a conditional sentence:

If the substrate is blue, it may be useless.

- **Whether** is the better choice when two alternatives are possible:

I need to decide **whether** to attend the conference.

Less should be used with quantities and qualities; ***fewer*** should be used with countable units

- It takes **less** effort to do **fewer** experiments.
- More recently, a combination of atovaquone and clindamycin has been shown to be effective, with **fewer** side effects (Alter et al, Sem Hem 2007).

Much should be used to describe a quantity or degree, not a number; however, ***many*** can be used with numbers

- We have had **much** less success in the culture and, therefore, the study of the **many** commensal or symbiotic organisms of our microbiota that do not directly parasitize us (Harvill, Mbio 2013).

We can use *like* and *as* to make comparisons (often confused in English)

The structure of the sentence is usually:

- VERB + **LIKE** + NOUN / PRONOUN

He speaks **like** a native speaker.

- **AS** + SUBJECT + VERB

Do not do **as** I do.

Like vs. As

- He speaks **like** a scientist...he may not be a scientist.
- He speaks **as** a scientist...he is very likely a scientist.
- We can use *like* (or *such as*) when giving examples.
- We can use *as* in certain expressions, such as: **as** you know, **as** you requested, **as** we agreed.
- We also use **as.....as** to give comparisons.
He is **as** clever **as** his brother.

The article ***an*** is used before words starting with a **vowel sound**.

- **an** hour
- **an** M.S. degree (because we pronounce “em ess”)
- **an** mRNA (because we pronounce “em are”)
- **an** SOS

Besides - Beside

- ***Besides*** usually means “in addition to”; ***beside*** means “near to”.

Besides scientific books and journals, I keep mystery novels **beside** my bed.

e.g. - i.e.

- The abbreviation **e.g.** stands for *exempli gratia*, which means “**for example**”.
Use a clear liquid, **e.g.**, water, white vinegar, or club soda.
- The abbreviation **i.e.** stand for *id est*, which means “**that is**” or “**in other words**”.
Use an inert gas, **i.e.**, one that is not reactive.

Words and expression to avoid

Avoid

a number of

a small number of

endeavor

no later than

on a daily basis

take into consideration

ultimate

Preferred usage

many, some

a few

try

by

daily

consider

last

Flesch–Kincaid readability tests

- They are readability tests designed to indicate **comprehension difficulty in academic English**, and they were modified for the US Army (1976).
- There are two tests, the **Flesch Reading Ease** and the **Flesch–Kincaid Grade Level**.
- Although they use the same measures (**word length and sentence length**), the results of the two tests correlate approximately inversely.

Flesch Reading Ease

- With this formula, higher scores indicate that material is easier to read; lower scores indicate that material is more difficult to read.

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

Interpretation of Flesch Reading Ease scores

Score	Readability
90 - 100	easily understood by an average 11-year-old student
60 - 70	easily understood by 13- to 15-year-old students
0 - 30	best understood by university graduates

- **Time** magazine scores about 52.
- **Harvard Law Review** scores in the low 30s.

Flesch–Kincaid Grade Level

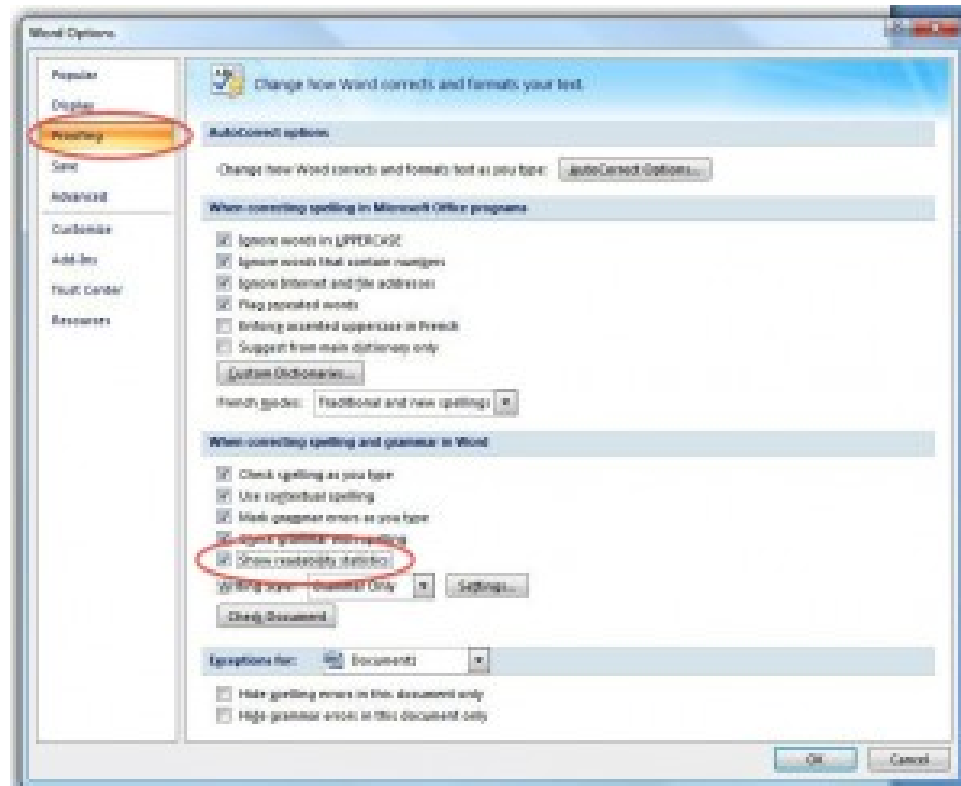
- This readability test is used extensively in US education (3.4-12 score).
- The result is a number that corresponds to a grade level; for example a score of 8.2 would indicate that the text is expected to be understandable by a US student in the 8th grade.

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

1- Click on the round button (last versions of Microsoft Windows) at the top-left and click on **Word Options**.



2- Click on **Proofing**, then put a checkmark next to **show readability statistics**, then click **OK**.



3- Run a spell check on your **Word document**, and at the end you will find the results of the **Flesch–Kincaid readability tests**.

Readability Statistics	
Counts	
Words	74
Characters	307
Paragraphs	4
Sentences	5
Averages	
Sentences per Paragraph	1.6
Words per Sentence	14.4
Characters per Word	4.0
Readability	
Passive Sentences	0%
Flesch Reading Ease	82.9
Flesch-Kincaid Grade Level	5.2

OK

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