

Introduction to linguistics

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ABSTRACT. This is an introduction to linguistics, by insisting on mathematical aspects. We first discuss homo sapiens, how he appeared from big apes, and how he lived in ancient times. Then we discuss the reasons, origins and further developments of advanced human language, and other forms of fine vocal expression, up to the present times, with the basic findings of modern linguistics explained. Then, we go on a similar discussion regarding writing, and alphabets. Finally, we discuss optimization questions for human communication, from a computer science and information theory perspective.

Preface

You have certainly witnessed episodes of hard work, be that physical or intellectual, and alone or as part of a group, where very few words, if any, besides a couple of enthusiastic exclamations, complemented perhaps by a few vulgarities too, are needed.

The same goes for relaxation activities, such as sleep. Or listening to music, which is the traditional relaxation way of humans, because with a bit of effort various types of non-spoken music, such as classical, or jazz, or hardcore electronic, or even some screaming metal that no one really understands, can sound pleasant to the human ear.

And the same goes for many other types of human activities, making love for instance, or fist fighting the old way, do not normally require much talking either. Importantly, and getting now beyond our basic human life, communication with other animal species does not need advanced language either, with for instance some basic knowledge of meowing doing the job, in order to have a warm and reliable relationship with your cat.

Which leads us to the question, leaving a bit aside the various joys and sorrows of the modern life, as we know it, are language, and speaking, and writing, really necessary? I mean, are we humans designed to need our present advanced languages, or not?

And good question that is. At the first glance, you would probably argue that, even in the context of the many activities evoked above, where spoken or written language is certainly not needed, there is still a lot of language, this time in the form of thoughts passing through your head, when doing these activities, which is needed. But is this really correct. Not clear, and more scientific experience with the functioning of the brain, of humans or other animals, or some experience with daily multilingualism, and all the delightful mess that this brings, or why not experience with some chemicals, again slightly altering your brain, rather tends to confirm the contrary, that thoughts and brain are something quite subtle, going beyond the reach of the language that we are used to speak and write, and so, not really needing that language, in order to properly function.

The present book is an introduction to linguistics, somewhat by adhering to the above ideas and principles, that human languages are not the alpha and omega of everything, but rather a mere phenomenon to be studied, and by insisting on mathematical aspects, in their study. The book is organized in 4 parts, the plan being as follows:

(I) To start with, as a matter of getting away from the modern life, and its complications, which can be quite confusing in the context of linguistics, we will first discuss homo sapiens, how he appeared from big apes, and how he lived in ancient times.

(II) Then we will discuss, with some combined anatomy and social science helping, the reasons, origins and further developments of advanced human language, and other forms of fine vocal expression, with the basic findings of modern linguistics explained.

(III) Then, we will go on a similar discussion regarding writing, and alphabets. Here, besides the basic story of the subject explained, our approach will be a bit more computer science and information theory oriented, and with a look into music notation too.

(IV) Finally, we will discuss abstract optimization questions for human communication, from a computer science and information theory perspective, and with a flavor of Darwin evolution theory too, when examining the dynamics of communication forms.

In the hope that will like this book, and I should perhaps mention, as a disclaimer, that I am quite an amateur in linguistics, but with my interest in the subject being serious and real, and this since long, due to a variety of reasons, personal and professional.

Many thanks to everyone having helped me in my learning, including people speaking different languages, musicians playing all sorts of music, computers having their own way of talking, and also, importantly, fellow mathematicians and physicists, that I often have troubles in understanding. And with special thanks to my beloved cats, meow, from the bottom of my heart, for their precious help with the preparation of the present book.

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Part I

Homo sapiens

Felicità
E un cuscino di piume
L'acqua del fiume
Che passa e che va

CHAPTER 1

Big apes

1a.

1b.

1c.

1d.

1e. Exercises

Exercises:

EXERCISE 1.1.

EXERCISE 1.2.

EXERCISE 1.3.

EXERCISE 1.4.

EXERCISE 1.5.

EXERCISE 1.6.

EXERCISE 1.7.

EXERCISE 1.8.

Bonus exercise.

CHAPTER 2

Homo sapiens

2a.

2b.

2c.

2d.

2e. Exercises

Exercises:

EXERCISE 2.1.

EXERCISE 2.2.

EXERCISE 2.3.

EXERCISE 2.4.

EXERCISE 2.5.

EXERCISE 2.6.

EXERCISE 2.7.

EXERCISE 2.8.

Bonus exercise.

CHAPTER 3

The Stone age

3a.

3b.

3c.

3d.

3e. Exercises

Exercises:

EXERCISE 3.1.

EXERCISE 3.2.

EXERCISE 3.3.

EXERCISE 3.4.

EXERCISE 3.5.

EXERCISE 3.6.

EXERCISE 3.7.

EXERCISE 3.8.

Bonus exercise.

CHAPTER 4

Domestic animals

4a.

4b.

4c.

4d.

4e. Exercises

Exercises:

EXERCISE 4.1.

EXERCISE 4.2.

EXERCISE 4.3.

EXERCISE 4.4.

EXERCISE 4.5.

EXERCISE 4.6.

EXERCISE 4.7.

EXERCISE 4.8.

Bonus exercise.

Part II

Linguistics

*Open to everything happy and sad
Seeing the good, meme si tout va si mal
Voir le soleil quand la nuit nous accable
Oh, pour un jour croire aux dieux, croire aux fables*

CHAPTER 5

Anatomy, voice

5a.

5b.

5c.

5d.

5e. Exercises

Exercises:

EXERCISE 5.1.

EXERCISE 5.2.

EXERCISE 5.3.

EXERCISE 5.4.

EXERCISE 5.5.

EXERCISE 5.6.

EXERCISE 5.7.

EXERCISE 5.8.

Bonus exercise.

CHAPTER 6

Ancient languages

6a.

6b.

6c.

6d.

6e. Exercises

Exercises:

EXERCISE 6.1.

EXERCISE 6.2.

EXERCISE 6.3.

EXERCISE 6.4.

EXERCISE 6.5.

EXERCISE 6.6.

EXERCISE 6.7.

EXERCISE 6.8.

Bonus exercise.

CHAPTER 7

Modern languages

7a.

7b.

7c.

7d.

7e. Exercises

Exercises:

EXERCISE 7.1.

EXERCISE 7.2.

EXERCISE 7.3.

EXERCISE 7.4.

EXERCISE 7.5.

EXERCISE 7.6.

EXERCISE 7.7.

EXERCISE 7.8.

Bonus exercise.

CHAPTER 8

Classification, schemes

8a.

8b.

8c.

8d.

8e. Exercises

Exercises:

EXERCISE 8.1.

EXERCISE 8.2.

EXERCISE 8.3.

EXERCISE 8.4.

EXERCISE 8.5.

EXERCISE 8.6.

EXERCISE 8.7.

EXERCISE 8.8.

Bonus exercise.

Part III

Alphabets

*Nostalgia, nostalgia canaglia
Che ti prende proprio quando non vuoi
Ti ritrovi con un cuore di paglia
E un incendio che non spegni mai*

CHAPTER 9

Ancient writing

9a.

9b.

9c.

9d.

9e. Exercises

Exercises:

EXERCISE 9.1.

EXERCISE 9.2.

EXERCISE 9.3.

EXERCISE 9.4.

EXERCISE 9.5.

EXERCISE 9.6.

EXERCISE 9.7.

EXERCISE 9.8.

Bonus exercise.

CHAPTER 10

Modern alphabets

10a.

10b.

10c.

10d.

10e. Exercises

Exercises:

EXERCISE 10.1.

EXERCISE 10.2.

EXERCISE 10.3.

EXERCISE 10.4.

EXERCISE 10.5.

EXERCISE 10.6.

EXERCISE 10.7.

EXERCISE 10.8.

Bonus exercise.

CHAPTER 11

Fun with accents

11a.

11b.

11c.

11d.

11e. Exercises

Exercises:

EXERCISE 11.1.

EXERCISE 11.2.

EXERCISE 11.3.

EXERCISE 11.4.

EXERCISE 11.5.

EXERCISE 11.6.

EXERCISE 11.7.

EXERCISE 11.8.

Bonus exercise.

CHAPTER 12

A look into music

12a.

12b.

12c.

12d.

12e. Exercises

Exercises:

EXERCISE 12.1.

EXERCISE 12.2.

EXERCISE 12.3.

EXERCISE 12.4.

EXERCISE 12.5.

EXERCISE 12.6.

EXERCISE 12.7.

EXERCISE 12.8.

Bonus exercise.

Part IV

Optimization

*Let me take you by the hand
And lead you through the streets of London
I'll show you something
To make you change your mind*

CHAPTER 13

Computers

13a.

13b.

13c.

13d.

13e. Exercises

Exercises:

EXERCISE 13.1.

EXERCISE 13.2.

EXERCISE 13.3.

EXERCISE 13.4.

EXERCISE 13.5.

EXERCISE 13.6.

EXERCISE 13.7.

EXERCISE 13.8.

Bonus exercise.

CHAPTER 14

Machine language

14a.

14b.

14c.

14d.

14e. Exercises

Exercises:

EXERCISE 14.1.

EXERCISE 14.2.

EXERCISE 14.3.

EXERCISE 14.4.

EXERCISE 14.5.

EXERCISE 14.6.

EXERCISE 14.7.

EXERCISE 14.8.

Bonus exercise.

CHAPTER 15

Keyboards, cyborgs

15a.

15b.

15c.

15d.

15e. Exercises

Exercises:

EXERCISE 15.1.

EXERCISE 15.2.

EXERCISE 15.3.

EXERCISE 15.4.

EXERCISE 15.5.

EXERCISE 15.6.

EXERCISE 15.7.

EXERCISE 15.8.

Bonus exercise.

CHAPTER 16

Meow - cats

16a.

16b.

16c.

16d.

16e. Exercises

Congratulations for having read this book, and no exercises for this final chapter.

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