



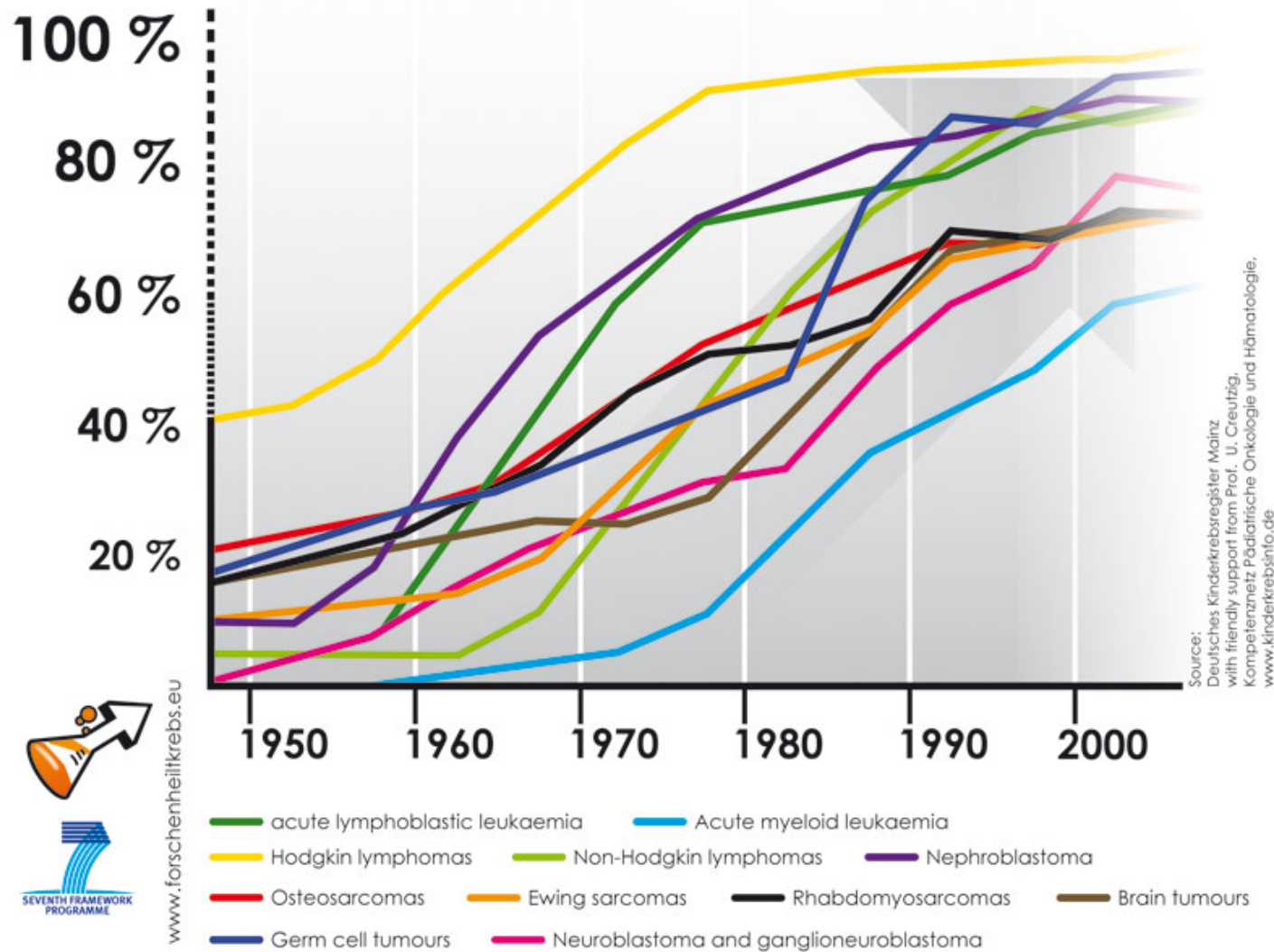
UNIVERSIDAD DE SEVILLA

# Neurolinguistic side-effects of childhood cancer treatment



Dr Gloria Álvarez Benito  
Universidad de Sevilla





The survival rate of children with brain cancer and tumours has been going up in the last years.

With the increase of cancer survival, different communicative, cognitive and psychological late-effects have been observed in children.

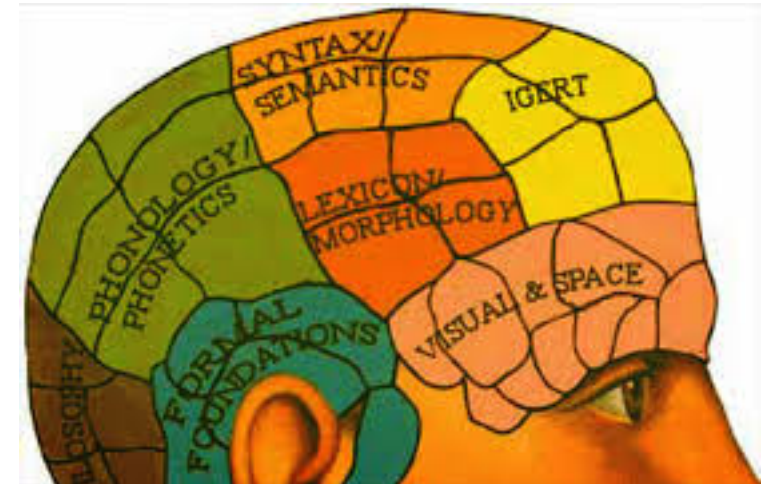
These long-term effects may be caused by:

- Surgery
- Chemotherapy
- Radiotherapy



Broca's area > Speech production

Wernicke's area > reception



Frontal Eye Fields
  Motor
  Visual-temporal
  Vision
  Visual-parietal

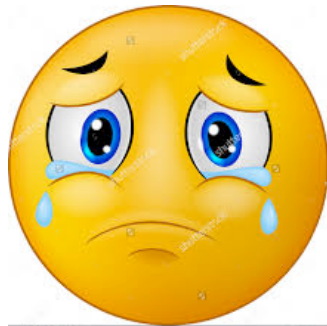
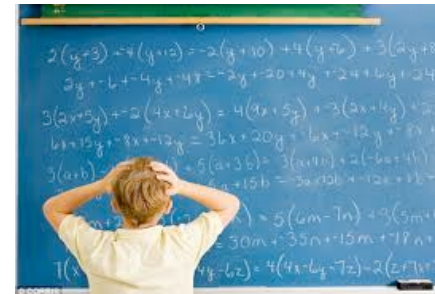


Broca's Region
  Audition
  Wernicke's
  Cognition
  Emotion
  Olfaction
  Somatosensory

- ❑ Language impairment sometimes occurs after brain damage outside the classical language areas (Dronkers et al. 2000). This suggests that there are parts of the brain outside the classical language areas that are involved in language processing (Démonet et al. 1992).
- ❑ Although there are obvious links of Broca's area with speech production, and Wernicke's area with reception and perception, grammar clearly does not live in one of these regions and vocabulary in another (McMahon & McMahon 2013).

These sequelae have a direct impact on the survivors's

academic performance,



emotional state,

social interaction,



**And consequently they affect children's quality of life in general.**

# Communication difficulties

---

The objective of this presentation is to focus on the **communicative difficulties or language dysfunctions** most commonly observed in children survivors of brain tumours treated at Virgen del Rocío in Seville (Spain).



# Types of communicative difficulties

BRAIN FOG

VERBAL

Morphological

Lexical

Structural or syntactic

Semantic



NONVERBAL

Hand & body gestures

Face expressions

Eye contact



# Examples of verbal difficulties



"Que te has colao, calabao"  
instead of "Que te has colao,  
bacalao"

"Libro de biografía" instead  
of "libro de biología"

"Porros" instead of  
"puros"

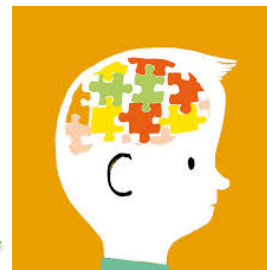
"Canguro" instead  
of "gorila"

"Caramelos sudokus" instead  
of "caramelos sugus"

"Marandina" instead  
of "mandarina"

"Austria" or "Australia"  
instead of "Asturias"

"Hubo" instead of  
"buhó"



Lexical diversity measures the number of different words used in discourse (written or spoken)

Instruments of measure:

**TTR** (Type Token Ratio): number of different words/ total number of words.

**Dvoc** takes into account the decline of TTR as the sample size increases independent of sample size).

The experimental group presents not only a lower RLD but also smaller difference between spoken and written discourse than the control group.

It measures the **proportion of lexical items** or content words (verbs, nouns, adjectives and adverbs) in discourse.

**The more content words, the more information** is provided (in opposition to function words).

Children learn their mother language in two phases:

1<sup>st</sup> > content words (grammatical words are often missing at the beginning)

2<sup>nd</sup> > grammatical or function words

- **Spoonerism:** syllable exchange between two words, generally at initial position

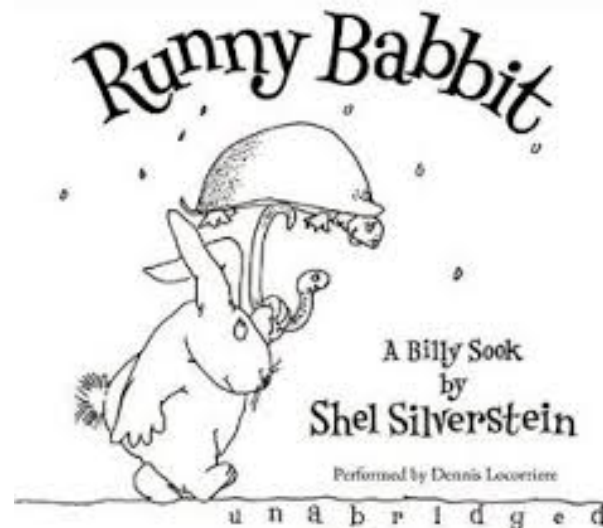
English example: *blushing crow* for *crushing blow*

Spanish example: *porro folar* for *forro polar*

- **Metathesis:** syllable exchange inside the word:

English example: *wishdasher* for *dishwasher*

Spanish example: *marandina* for *mandarina*, *hubo* instead of *buhu*,

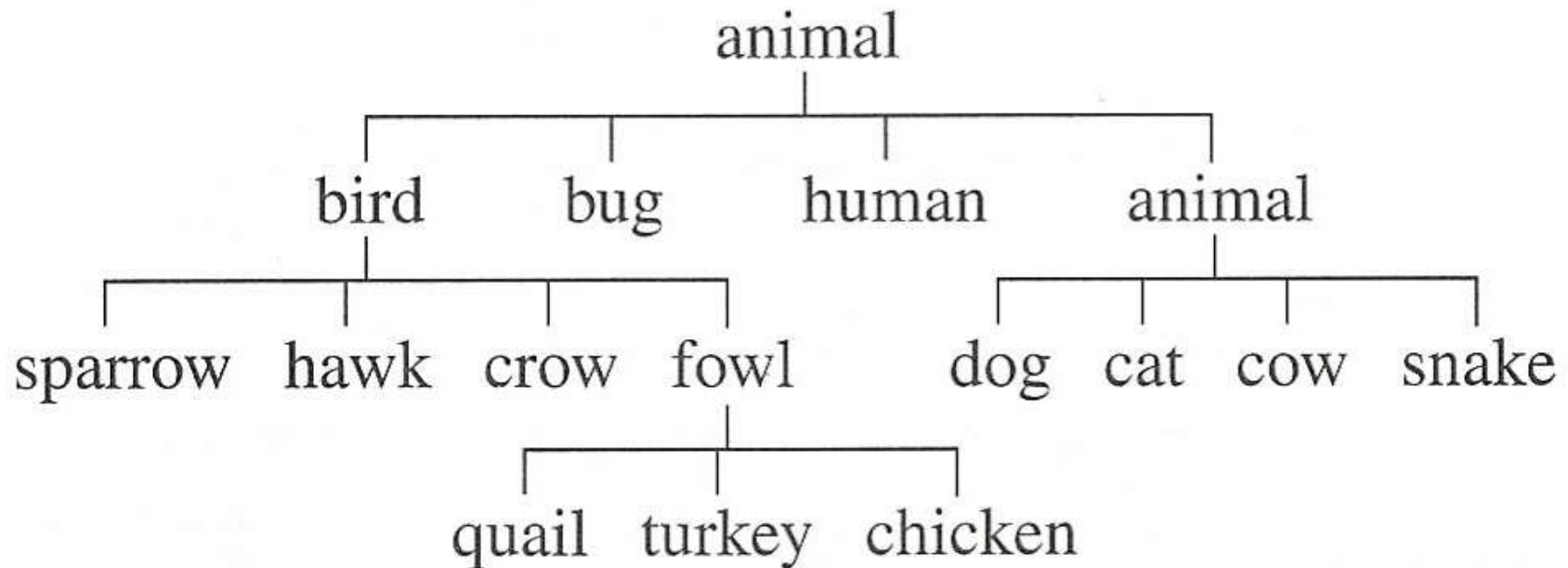


# Hyperonymy vs. hyponymy

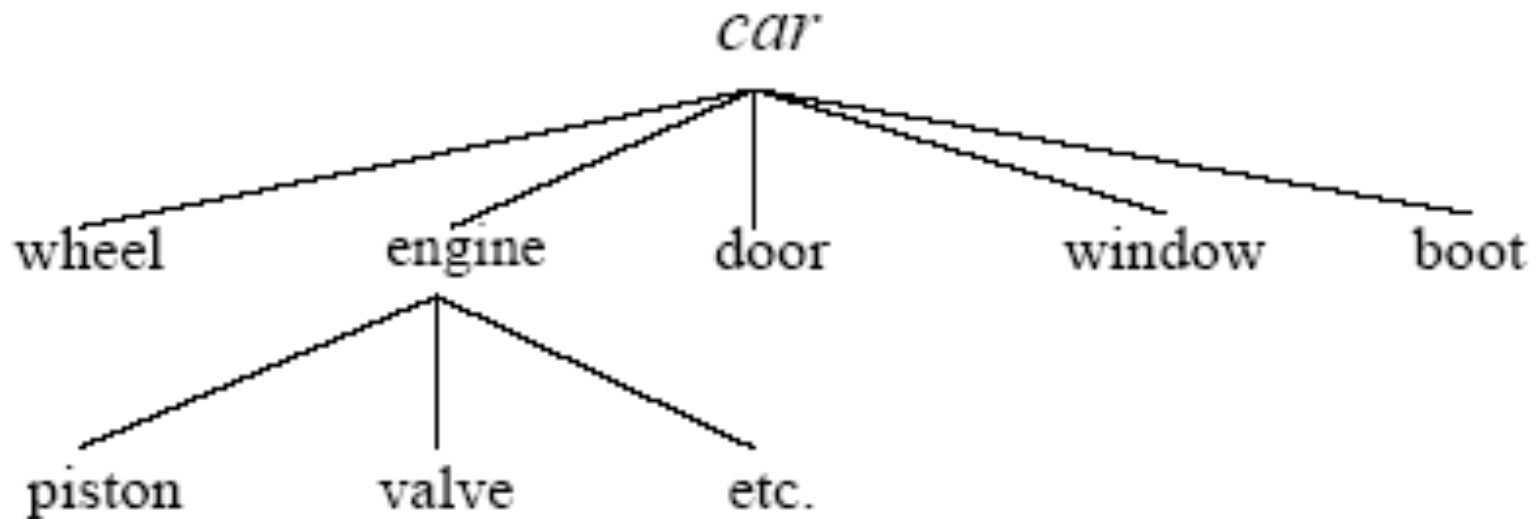


Preference for Hyperonyms

Ex. Esos **árboles** que dan unos **frutos** que le gustan a los cerditos. Parecidos a los alcornoques.

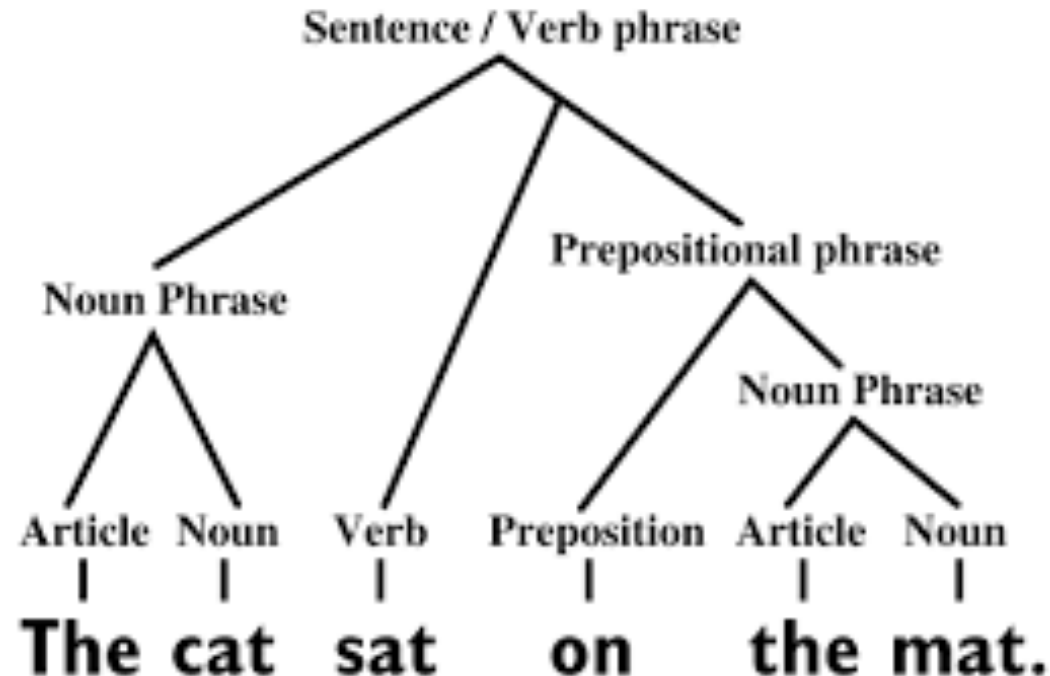


Ex.: Esa parte del reloj que marca las horas.



- Preference for simple sentences.
- Coordination over subordination.
- Extended use of modifying clauses.

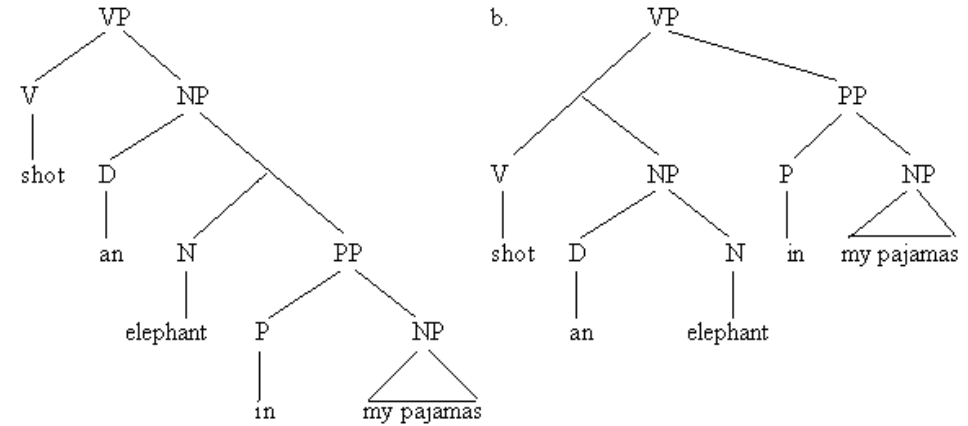
Basic constituent structure analysis of a sentence:



## Lexical



## Structural



EL POLLO ESTÁ  
LISTO PARA  
COMER



THE CHICKEN IS  
READY TO EAT

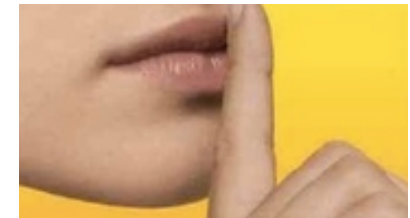


Body communication is the study of communication that occurs through body movements, positions, and facial expressions.

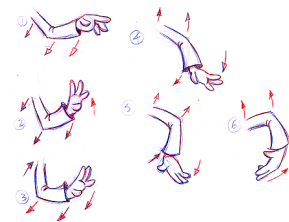


# Types of Gestures

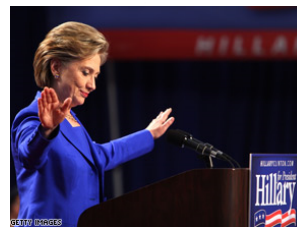
↑ Emblems:



↑ Illustrators:



↓ Regulators:



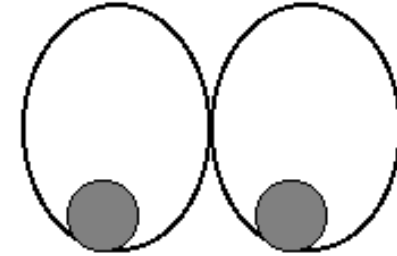
↑ Adaptors:



↓ Affect Displays:



- ↑ **Emblems.** They are body gestures that directly translate into words or phrases. They are used consciously and purposely to communicate the same meaning as the words. They are culture specific.
- ↑ **Illustrators.** They complement or enhance the verbal messages they accompany. Expressions are often illustrated with hands, head and body movements. They increase the ability to remember.
- ↓ **Regulators.** They control the flow of communication, that is to say they regulate what the speaker says.
- ↑ **Adaptors.** They are gestures that satisfy some personal needs and release the body tension.
- ↓ **Affect Displays.** They communicate emotions or feelings. They are generally unconscious.



Functions of eye contact (Kendon 1967):

- Regulating the flow of communication.
- Monitoring feedback.
- Reflecting cognitive activity.
- Expressing emotions.
- Communicating the nature of interpersonal relationship

- Children's language & communication are proved to be affected after cancer treatment.
- Language difficulties seem to be an important cause for cognitive impairment.
- Identifying the main communicative deficits will help us to develop appropriate recovery strategies and training programmes for school and social integration of children survivors.





[galvarez@us.es](mailto:galvarez@us.es)

<http://www.personal.us.es/galvarez>