



Language

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Language

A structured system of communication used to express thoughts and convey information from one entity to another.

→ Requires the ability to produce and comprehend words, sounds, signs, symbols, or gestures

Examples:

- Speech, writing, braille, body language, sign language, programming, tactile, chemical, other auditory language**



Origin of Human Language (1 of 2)

Speech sets humans apart from all other creatures simply based off of the physiological development of human speech organs such as the **tongue**, **teeth**, **lips**, and the **larynx**, which includes the trachea and vocal chords.



Origin of Human Language (2 of 2)

- The exact origin of language is unknown
- According to Merlin Donald, it's "the most striking feature of the human mind"
- "Many animals have the equipment for spoken language, but only people have all the right neural connections" - Tom Siegfried
- Language is most definitely a *social science*
- Because the creation of language came after culture, early humans were communicating in different ways
 - Mimesis



Broca's area

Broca's area is an important part of language formulation — even if someone has the motor ability to form the sounds necessary for words, Broca's area is necessary to form and express **language**.

Angular gyrus

The **angular gyrus** assembles information to help us understand words and concepts.

Regions of the Brain that Control Language Functions

Insular cortex

Buried underneath the outer lobes of the cerebral cortex, the **insular cortex** is important for many functions, including motor control, emotion and self-awareness, but is also important in the processing of language.

Wernicke's area

Wernicke's area works with the **angular gyrus, insular cortex** and **basal ganglia** to process words and word sequences to determine context and meaning.





Stages of Human Language Acquisition

1. prenatal recognition of and responsivity to human voices
2. postnatal cooing
3. Babbling
4. one-word utterances
5. two-word utterances
6. telegraphic speech
7. basic adult sentence structure (by age 4)



Language Acquisition (2 of 2)

If a child is never spoken to, they will never acquire speech. Though this is true, many individuals are unable to communicate in “conventional” ways for many reasons.

Apart from dialect, people encounter many forms of language barriers. For example, those with *sensory impairments*, such as blindness or deafness, use various methods to communicate and comprehend information.

Examples include, but are not limited:

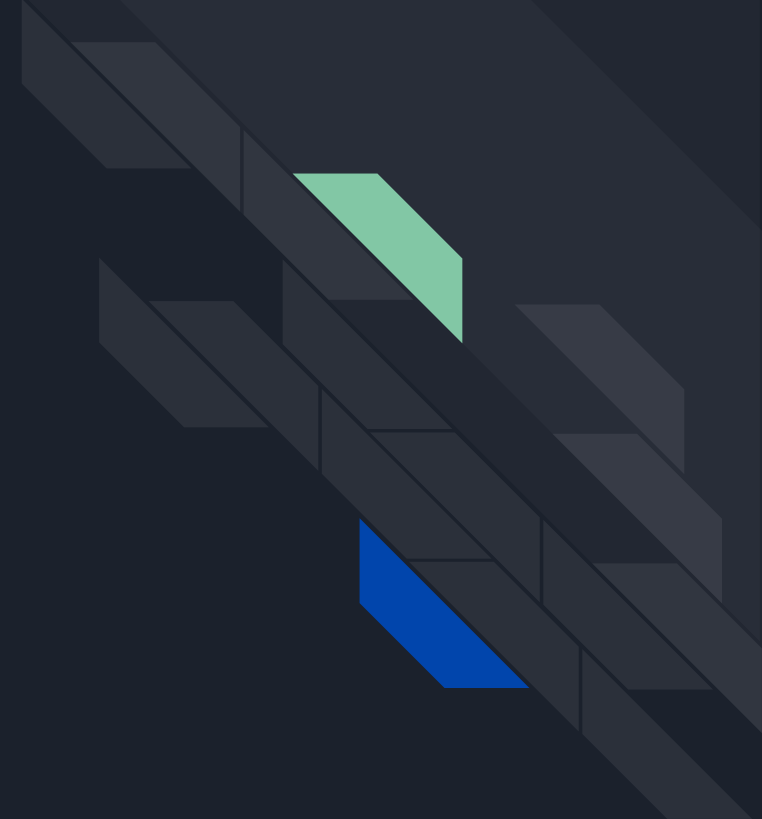
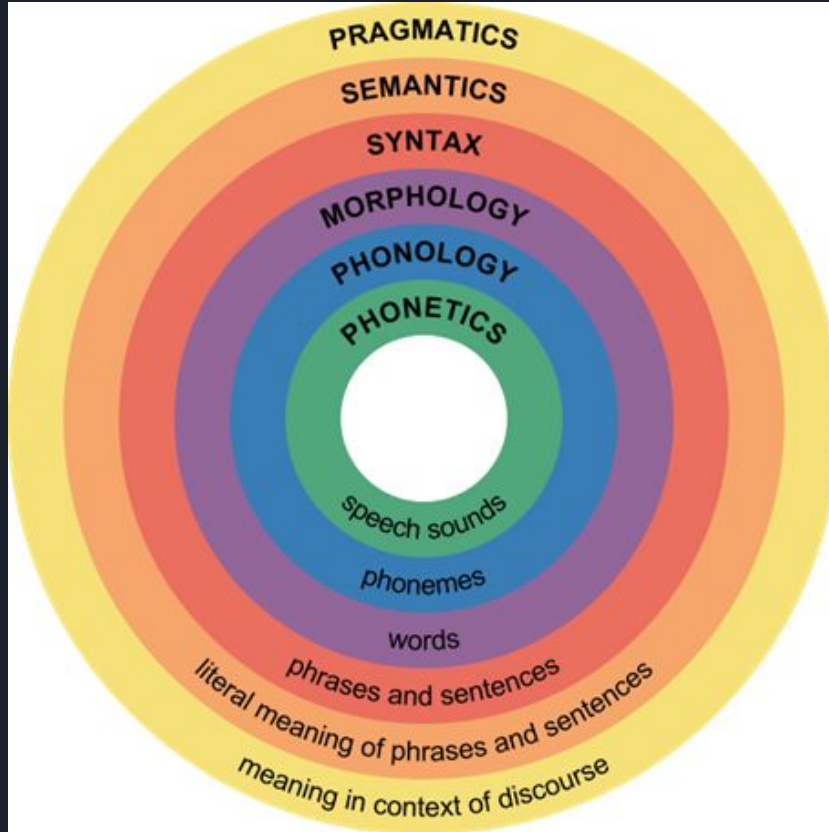
- Braille, signed languages, tactile fingerspelling, tracking, face-to-face communication systems, and speechreading

Spoken Language

No child is born with a preference of one language over another, they know no difference.

- There are roughly 6,000 spoken languages throughout the world
 - This number is continually declining due to language extinction
- <https://www.theguardian.com/education/2011/feb/21/endangered-languages-research-project>

Parts of Language





Parts of Language

Language is divided in four major parts:

1. Phonology

2. Morphology

3. Syntax

4. Semantics & Pragmatics



Parts of Language- Phonology

- The study of speech sounds of an individual language, also known as phonemes.
- English has 44 phonemes (24 consonants & 20 vowels)
- A phoneme itself does not have a meaning.
- For Example:** Boy (bɔɪ)
- All languages have different phonemes



Parts of Language- Morphology

- The study of words and meaningful units of language like suffixes and prefixes
- It also can be known as Grammar
- For example:** dog & dogs and walk & walking



Parts of Language - Syntax

- It is the study of how words are put into the right order to create meaningful phrases or sentences

- All languages have their own rules (Grammar): own rules of morphology and syntax.

- **For example:** “Eugene walked the dog” vs “The dog walked Eugene.”

- In order for the sentences or phrases to convey the intended meaning, the words must be in a certain order.



Parts of Language - Semantics and Pragmatics

- Semantics is the context and meaning of sentences
- Pragmatics refers to how the sentences are going to apply.
- **For example:** Fire
- It has a very different meaning if they are in charge of a seven-gun salute than it does if they are sitting in a crowded movie theater.



Bilingualism

- The ability to speak two distinct languages
- According to Torri Myler, the more words we know, the more things we know about the world.
- Children learn language easily, because the language acquisition starts at the beginning of our lives (crying) and ends around puberty.



Advantages of Being Bilingual

Better Cognitive functioning:

1. Better Executive Control system

For example: Taking care of activities like high-level thought, multitasking, and sustained attention.

2. Better spatial working memory

3. Delay onset of cognitive diseases such as dementia (can be delayed for five years if bilingual).



Disadvantages of Being Bilingual

- Lesser Vocabulary than monolingual
- Suffer more “tip of the tongue”
- Weaker verbal skill such as pronunciation



As a Bilingual (Multilingual)

- I know how to speak English, Mandarin, Cantonese (Mother tongue), a little bit of Malay, and Korean.
- My Story:
 - Forced to study Mandarin, English, and Malay in Kindergarten in Malaysia
 - Had to learn extra languages such as Cantonese because parents are from different tribes of Chinese.



Communication Differences Between Genders

Men:

- communicate information
- maintain status
- talk about future action
- use language to solve problems
- fear loss of independence: Men like to have own personal space
- men talk more overall, but more in public: for advice
- more activity, less conversation



Communication Differences Between Genders

Women:

- talk to create and support relationships
- talk for its own sake
- establish intimacy: like to stay close with someone else
- seek emotional support through language
- women talk less, but more at home
- less activity, more conversation



Communication Difference Between Genders

Others:

Paralanguage: the nonlexical component of communication by speech, for example intonation, pitch and speed of speaking, hesitation noises, gesture and facial expression such as “mhm, ah, & oh”. (Men-less; women-more)

Touch: Men- men use pats, back slaps and shoulder touches as a way to display dominance; Women- may reach out and touch someone’s arm or offer a hug to build a connection and show support



Communication Difference Between Genders

Posture: Men- mostly have wider postures and stand with their arms farther away from their bodies and legs apart; Women- more likely to keep their arms closer to their bodies and cross their legs.

Eye Contact: (During communication) Men-most commonly as a challenge of power or position; Women-to make a strong connection and develop a relationship.

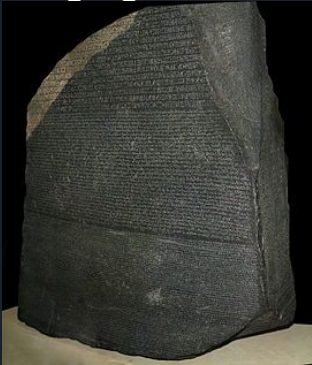


Merging the two

Having as many languages in the world that we do is a good thing as well as a bad. Taking all these languages and putting them into something such as your phone or laptop connects the world together. But doing that is what makes everyday life easier. Not just when it comes to social media but think about everything else. ATM's that have multiple languages, Siri on your phone, your car stereo, Kiosk (restaurant order things) and how they translate movies.

How to learn these Languages

There are multiple sites and ways to learn all these languages over the screen instead of in person. This world is changing and how to adapt is changing as well. Being bilingual is so easy in this day and age which will benefit you in the long run. However, it took a while to get these things on the screen from the in person. This is a rosetta stone which is what the biggest language learner that will teach you any language that you want.





Social Media

With the advancements of social media we not only get to connect to people constantly through social media society creates new words to add to our language every year. These social media applications along with others serve as catalysts for the creation of new words.

Facebook



Instagram



Snapchat



Twitter



TikTok





Social Media

Not only does social media create new words but It helps to create new meanings to words.

1. Troll : Someone who deliberately makes **people** mad **online** to get a **reaction**.
2. Catfish: an internet user who poses as someone other than themselves online.
3. Tablet, which is used to refer to portable screens.

Words that had other meanings, have been given new meanings online, these meanings then become the new normal in everyday verbal communication.

Lit, fleek, selfie, and even emoji are words that were created through social media and eventually made it to the oxford dictionary. Words tend to shape society and we can watch society evolve with the rapidly changing internet vocabulary.



Programming Languages

- Python - YouTube, Instagram, Pinterest, SurveyMonkey
- Java - Android App Development & building enterprise-scale web applications
- C/C++ - Almost all low-level systems such as operating systems, file systems, etc.
- JavaScript - popup buttons logic
- Go (Golang) - Developed by Google, companies that rely heavily on distributed systems, frequently used by start-ups in Silicon Valley
- R - Data analysis & machine learning
- Swift - iOS applications (Apple)
- MATLAB - Computer Vision and Image processing industry & statistical analysis



Programming Language

Are programming languages “true” languages?

- Under debate
- Some schools are allowing programming languages to qualify for foreign language requirements.
- No semantics
- Can't be used verbally
- Created language, not natural



Language translators

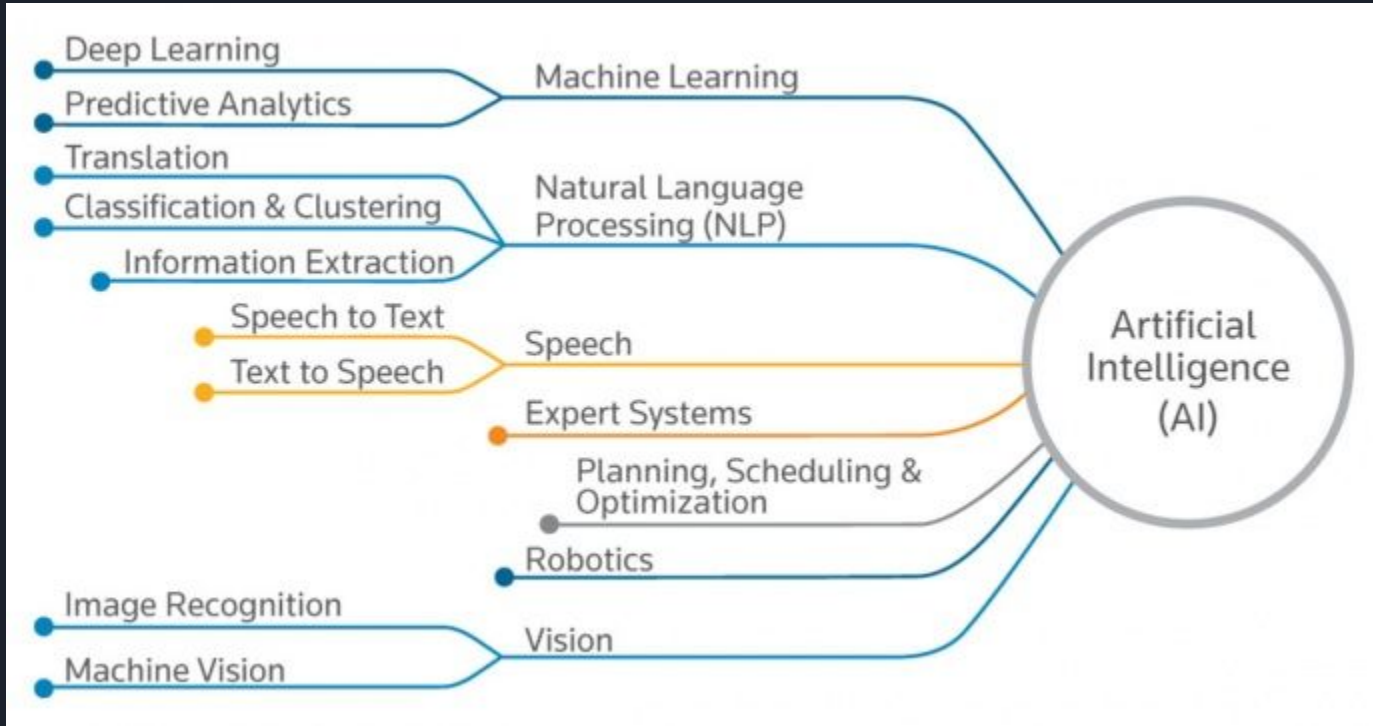
- Typically statistical probability is used instead of complex rules based on syntax, grammar and semantics
- Types:
 - Non-talking translators
 - Text to speech translators
 - Speech to speech translators
- Homonyms are problematic for speech based translators



Voice assistants / Artificial Intelligence (AI)

- Siri (Apple)
- Alexa (Amazon)
- Cortana (Microsoft)
- Use waveform of speech that eventually ends up as math
- Problems
 - Accents
 - Speech disabilities
 - Complex commands
 - Large number of examples required

Language & AI





Language & AI

- Deep learning - Collection of algorithms used in machine learning, used to model high-level abstractions in data through the use of model architectures, which are composed of multiple nonlinear transformations
- Machine learning - Capability of a machine to improve its own performance. It does so by using a statistical model to make decisions and incorporating the result of each new trial into that model. In essence, the machine is programmed to learn through trial and error.
- Natural language processing - Branch of artificial intelligence that helps computers understand, interpret and manipulate human language. Draws from many disciplines, including computer science and computational linguistics, in its pursuit to fill the gap between human communication and computer understanding.



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