

8 Cognition : Thinking / Intelligence / Language

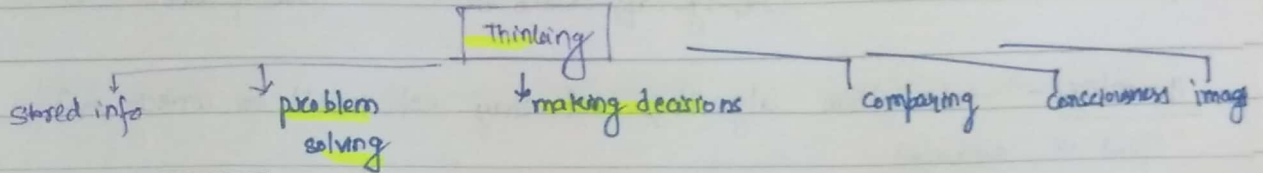
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Thinking (Cognition) (Latin word → "to know")

↳ mental activity - brain - processing information

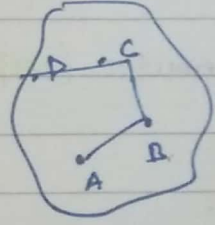
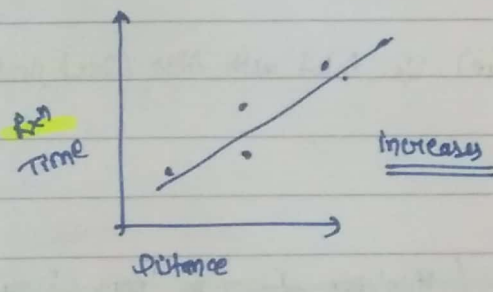
- organizing
- understanding
- communicating

Thinking >>> Memory



Mental Imagery

mental images for objects / events → have a pictorial quality.

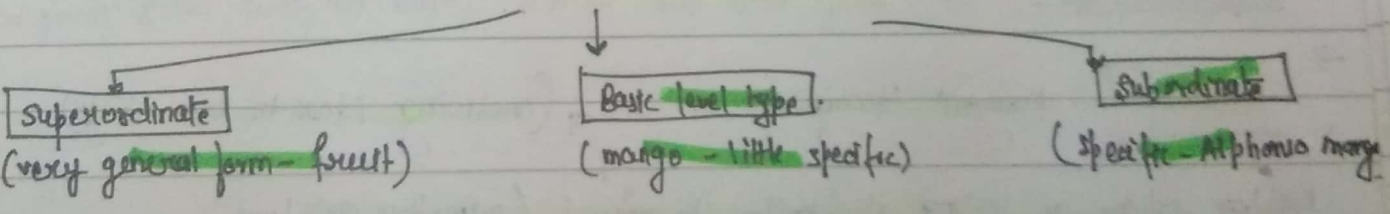


means people form mental images
 "mentally travelled"

mental images are formed in everyday life, creating is opposite of actual object seeing

Concepts

ideas that represent a class / category of objects / events / activities



✓ Formal concepts : certain rules / features to define them → maths / science.

✓ Natural concept : → experiences with these in real world (fuzzy) (less structured)

Prototype : An example of a concept that closely matches defining characteristics of a concept

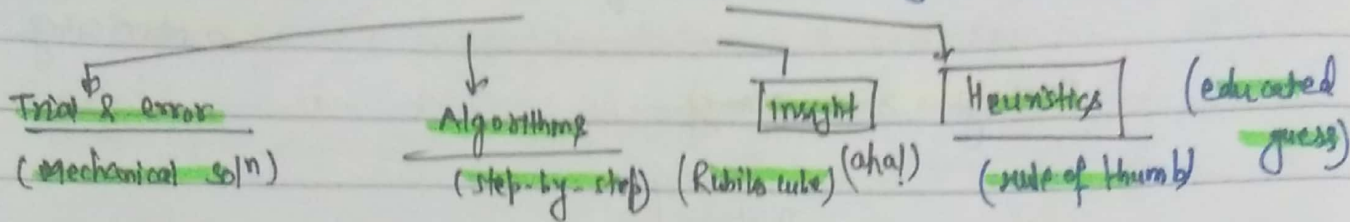
South Asia : mangoes good prototype for fruits. (emphasis of person to objects)
 (culture plays imp role)

Problem Solving & Decision Making

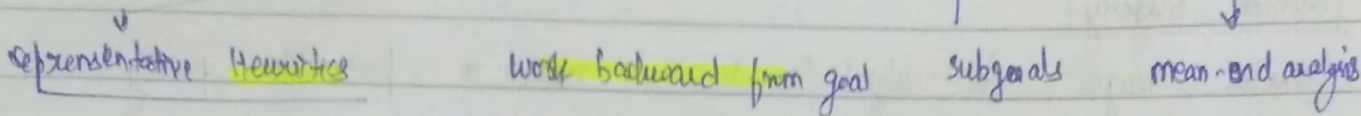
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- when a goal must be reached by thinking & behaving in certain way



Heuristics :- faster than algorithms but may not result to correct solⁿ.
(speed vs accuracy)



[Thought :- Robots with heuristics (Deep blue) vs Robot with Algo (Deep Junior)]

Barriers to Problem Solving:

→ Functional fixation :- knife not used as screw (thinking objects in term of typical way)

→ mental sets :- Persist with problem-solving patterns that have worked in past

→ Confirmation bias :- set is "belief" rather than method. (which fits your beliefs ignoring contrary)

→ creativity - divergent thinking required (Combining ideas in new ways)

Problem solving by looking at problem in unusual / inventive solutions.

Convergent thinking :- Helpful in routine problems but not for creative solution.

automatic problem solving like walking | Not all attention to a particular problem
("sweatshop") more creative solutions and ideas.

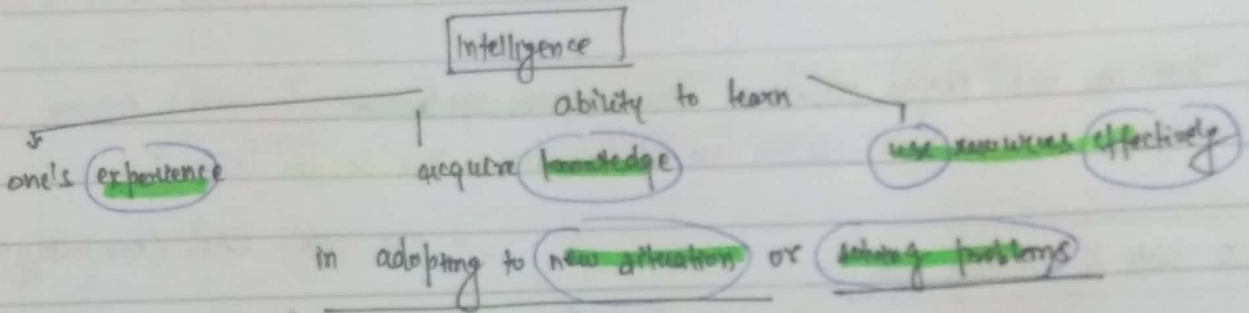
→ Confluence approach - intellectual abilities + intrinsic motivation + ...

- creativity has been a neglected subject & should be taught / given attention (Japan)

Personality Attribute + Brand Name + Base
Date:

→ People: - Broad range of knowledge of multiple subjects / good at using mental imagery / open to new experiences / value their independence / more women - ventional in their work but not otherwise.

Divergent thinking: keeping a journal / Brainstorming / free writing / Mind mapping.



Intelligence Tests: -

- Binet's Mental Ability: - first & slow learners / age groups → mental age

Stanford-Binet and IQ: - Terman (1916) Stern: $IQ = \frac{MA}{CA} \times 100 = \frac{15}{10} \times 100 = 150$
 MA = Mental age CA = chronological Age.

Three versions -

- Weschler Tests: specifically for adult (WAIS-IV), (WISC-IV), (WPPSI-III)
 Adult children preschool

more popular to US.

verbal scale

(Information comprehension, vocab, Arithmetic)

performance scale

(Picture completion, object assembly etc)

Test construction

(Good test / Bad test)

- Validity - test measures what is supposed to measure. (not unreliable test)
- Reliability: consistent, same across different times given to same people

Standardization :-

under similar conditions (sample set diverse & large)
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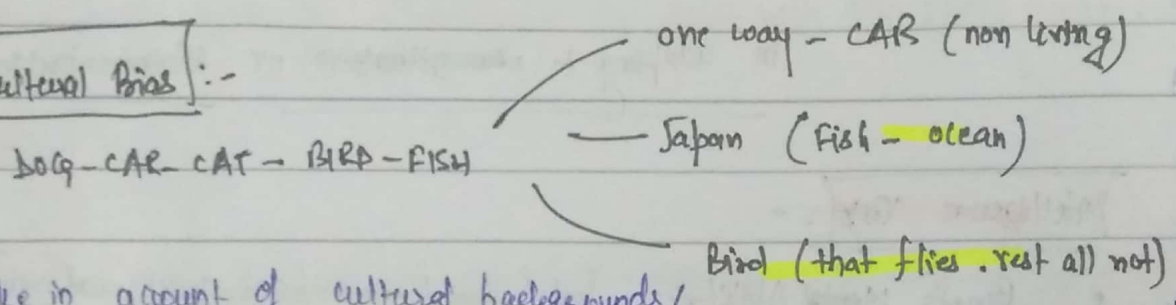
Process of giving the test to a large group of people that represents the kind of people for whom the test is designed.

Norms: scores from standardization group -> norm (standards against which all other can be compared) -> Normal curve distribution

{ Gift test for intelligence -> reliable X Valid X.
Height " " " " -> reliable ✓ valid X -> opposite test X }

* Tests are not perfect picture -> do everyone equal resource? would perceive intelligence same? effective use of resource - how do you define?

IQ Tests & Cultural Bias :-



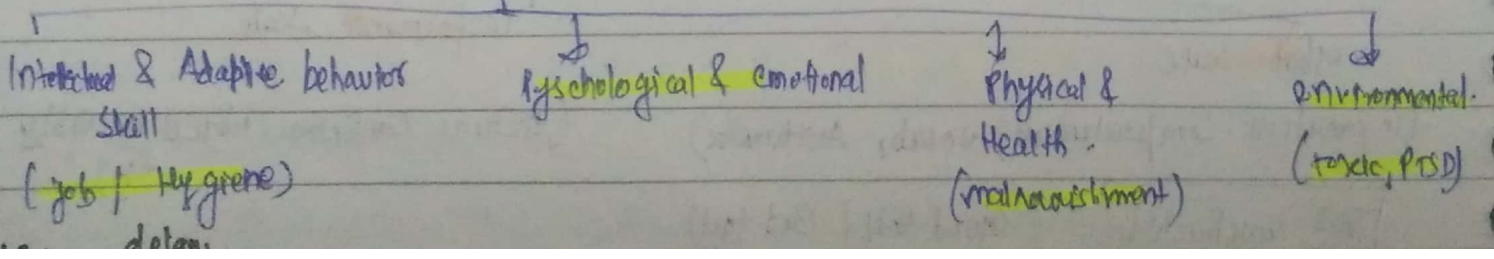
Tests need to take in account of cultural backgrounds / socioeconomic levels - culturally fair

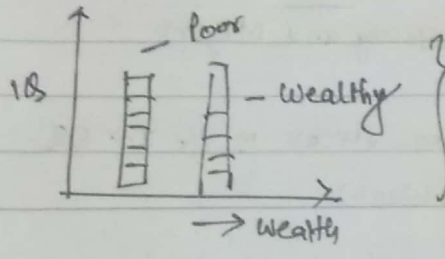
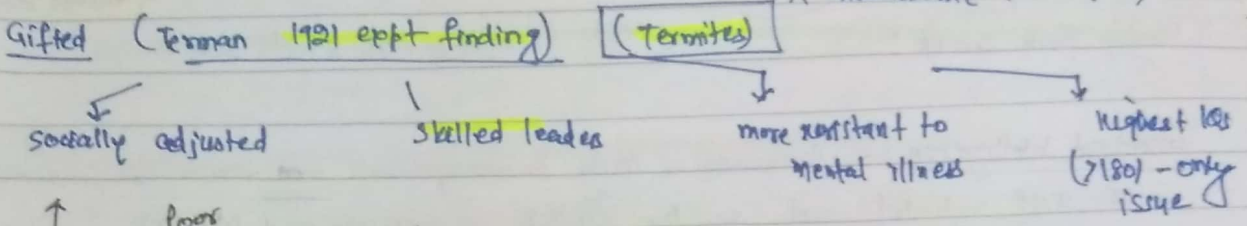
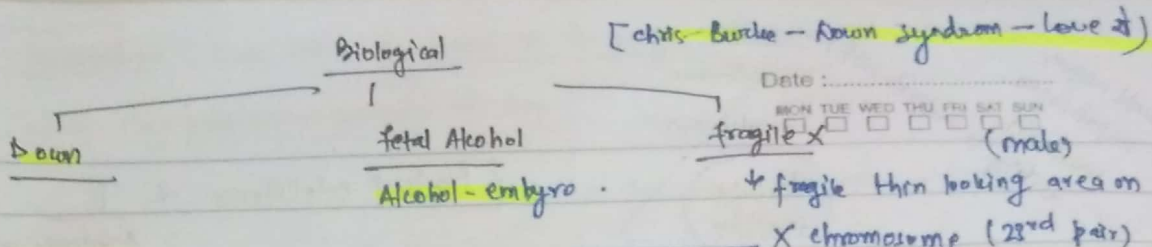
(more focus on non verbal abilities)

IQ Individual Differences

exist at an earlier developmental stage
↑ compared to other at same CA.

- Mental Retardation (Developmental Delay) :- behavioural + cognitive skills





Both can achieve equally

- < high energy level + persistence + timing one's work - Purpose of life >

* Terman's expt flaw -

- ✓ Termites were acquired from school (not random or diversified)
- ✓ could not remain objective & became surrogate father to many.

Still Groundbreaking study of 20th century - longitudinal study

* Success: experiences + personality + generosity *

(Traditional test measured)

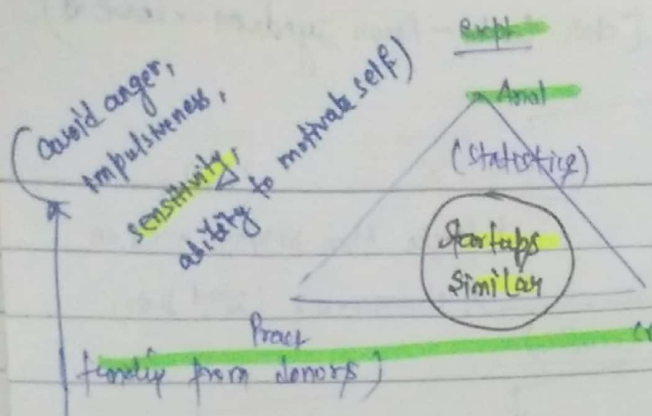
Theories of intelligence

• Spearman's G factor → Problem solving & factor - general intelligence
 music/art/business - S factor - specific intelligence

Too much simplified → Spearman, Guilford → 120 factors of intelligence (1967)
 , originally

• Gardner's Multiple Intelligence :- 7+2 = 9 factors - like verbal/musical/
Mathematical / Existential / Inter-personal / Spatial / Naturalist.

• Sternberg's Triarchic Theory } Analytical + creative + Practical }
 } Pragmatic + divergent } Street smart

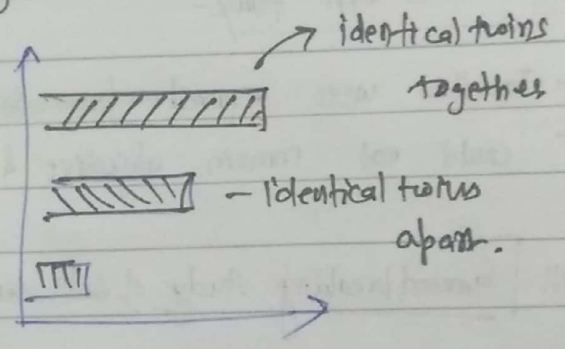
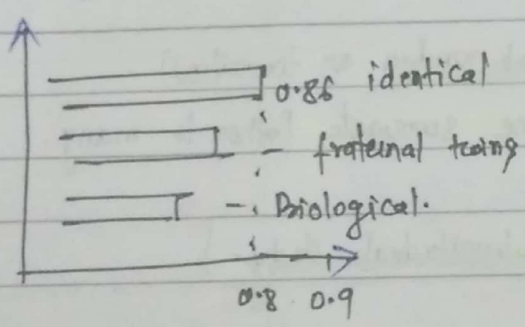


Practical intelligence of []
 Academic setting

Emotional Intelligence :- Awareness & Ability to manage one's own emotions, as well as self-motivated and socially skilled (Salovey and Mayer)

① Goleman proposed :- very very powerful influence on success in life \rightarrow EQ.
 (sensitivity, persistence, empathy are also important)

* Intelligence - Nature / Nurture debate *



② Heredity plays a significant role but not complete else correlation 1.

Actual correlation : $0.86 > 0.5$ (As environmental set up even living differently in same country not very different)

Language (Grammar + Syntax)

✓ system \rightarrow combining symbols (words) \rightarrow unlimited no. of meaningful statements can be made
 ✓ let us know how people think.

for communication

Mathematics : Play (free morpheme) + imp (bound morpheme) - no meaning of own)

Phonemes :- basic units of sound in language

(English - 35-40 phonemes)

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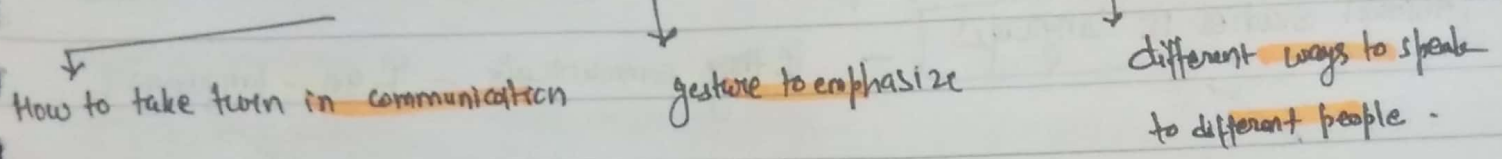
'a' of cat different from 'a' of day

↓
learn other language → difficulty to pronounce phonemes correctly

- infant - ability to recognize all phonemes → 9 months it deteriorates → only language exposed.

Pragmatics - practical aspect of communicating with others.

social 'niceties' of language



→ infants: Higher pitch #, repeat words, stress certain words.
Japanese highly sensitive.

Language & Thought

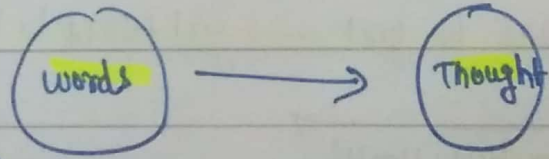
language ↔ thought ? Controversy.

Linguistic Relativity Hypothesis (Sapir-Whorf)

Innuits Arctic region

Language influences & shapes thoughts.

(so many words for snow)



determine

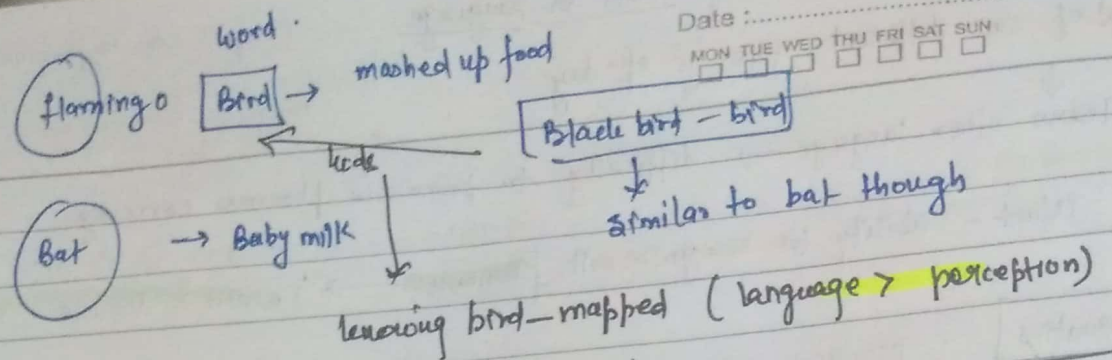
Not much scientific backing

Cognitive Universalism (Rosch-Helber)

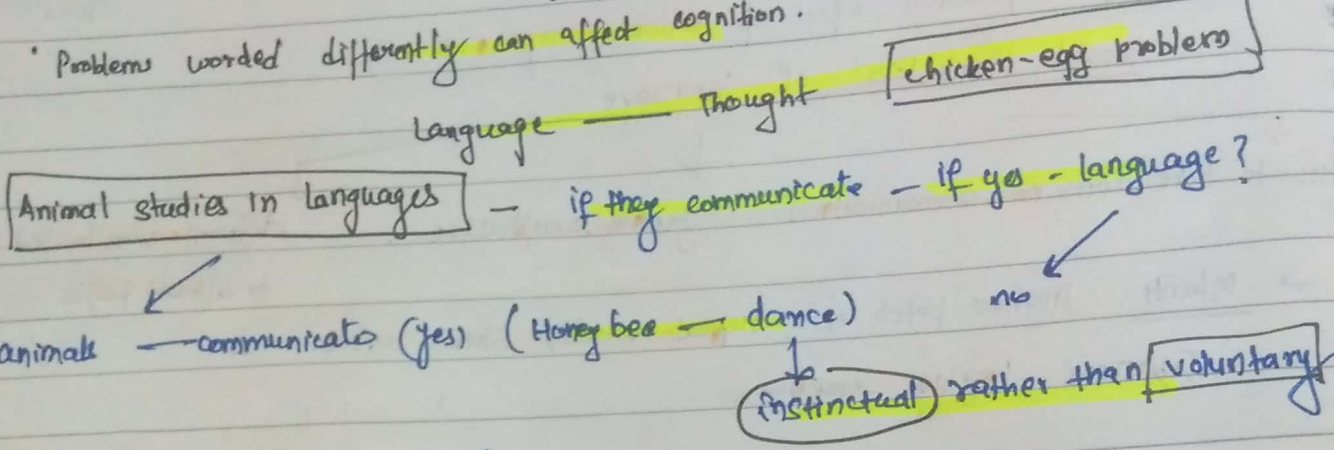
- concepts are universal & influence the development of language

- color identification example (English - African)

However higher level of processing has found support for Linguistic Relativity



Problems worded differently can affect cognition.



animals communicate (yes) (Honey bee - dance) -> instinctual rather than voluntary

can animals learn language?
 can't say with surety

- kanzee (chimpanzee)
- Rebate dolphins
- parrots

Promising results.

- However:-
- none beyond 3 yr baby
 - not knowing syntax - can language be complete
 - boy talked to girl ↔ girl talked to boy → do they understand differ.

Mental Exercises & Cognitive Health - Divergent Thinking

- crossword, puzzles, reading stay - mentally active - less senile dementia.

- See people - draw them
- Smell: touch food & smell & identify (eyes closed)
- Visuospatial: visualize distances actual (buildings) - from google
- Board games, mix them
- Cryptic crosswords
- memory - memorize menu & food prices
- writing book on copy