PSYCHOLINGUISTIC APPROACHES TO COGNITIVE DEVELOPMENT

BY:

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COGNITIVE SCIENCE ON

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LAYOUT OF THE LECTURE

- ❑ INTRODUCTION
- ❑ OBJECTIVE
- ❑ PSYCHOLINGUISTICS
- ❑ COGNITION
- LANGUAGE- COGNITION INTERFACE
- LANGUAGE ACQUISITION AND COGNITIVE DEVELOPMENT
- ❑ CHILD LANGUAGE ACQUISITION THEORIES AND APPROACHES
- LANGUAGE ACQUISITION AND COGNITIVE DEVELOPMENT MODELS
- ❑ CONCLUSION

PSYCHOLINGUISTICS:

- **Psycholinguistics** is a study that combines the fields of linguistics and psychology. Directly translated, psycholinguistics means 'language psychology.'

- The research within the psycholinguistics field can be broken down into specific topics. One of those topics is **phonetics or phonology**, which is the study of speech sounds. Another topic is **morphology**, the study of word structure and relationships between words. There is also **syntax**, which is the study of word patterns and how they build sentences. Then there is **semantics**, the study of the actual meanings of words and sentences, and lastly there is **pragmatics**, or the study of the context or interpretation of meaning.

Mind- Mood- Meaning:
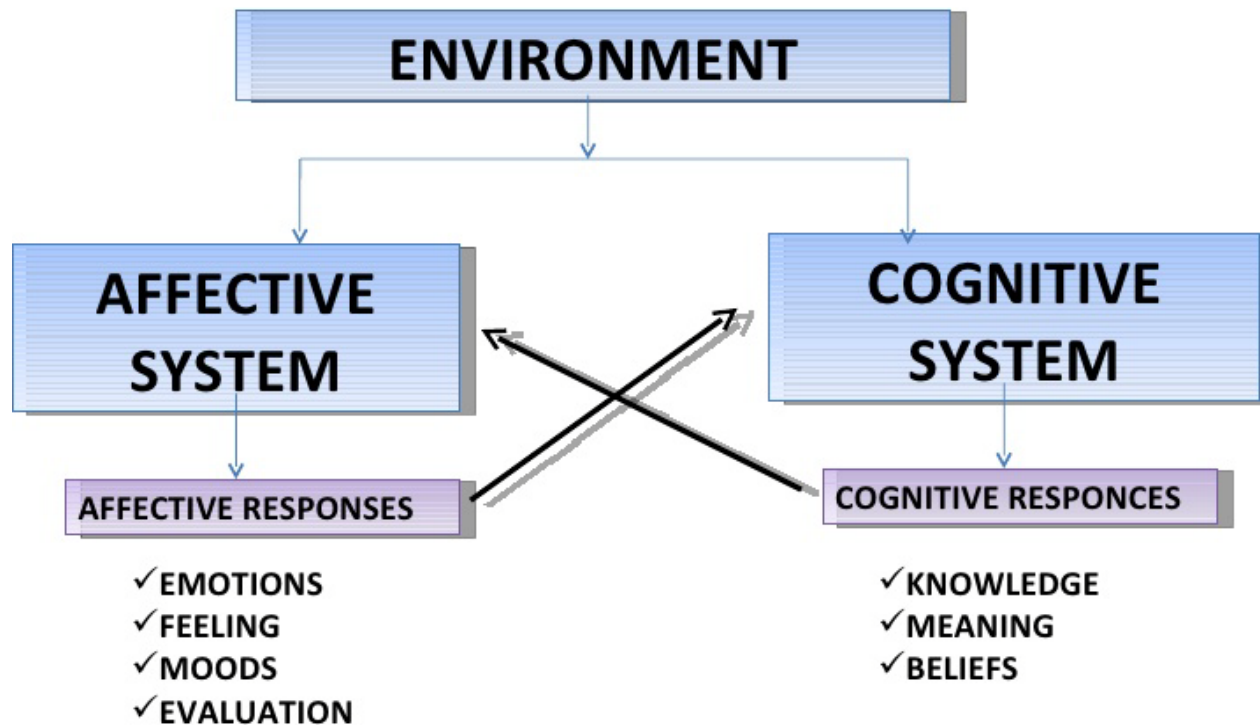
OBJECTIVE:

- Language is the highest cognitive faculty
- Understanding development of language in humans gives insight into the development of cognition in humans
- Theoretical understanding paves way for experimental research and theory formulation
- Cognition can be understood only by understanding the phenomena of language.

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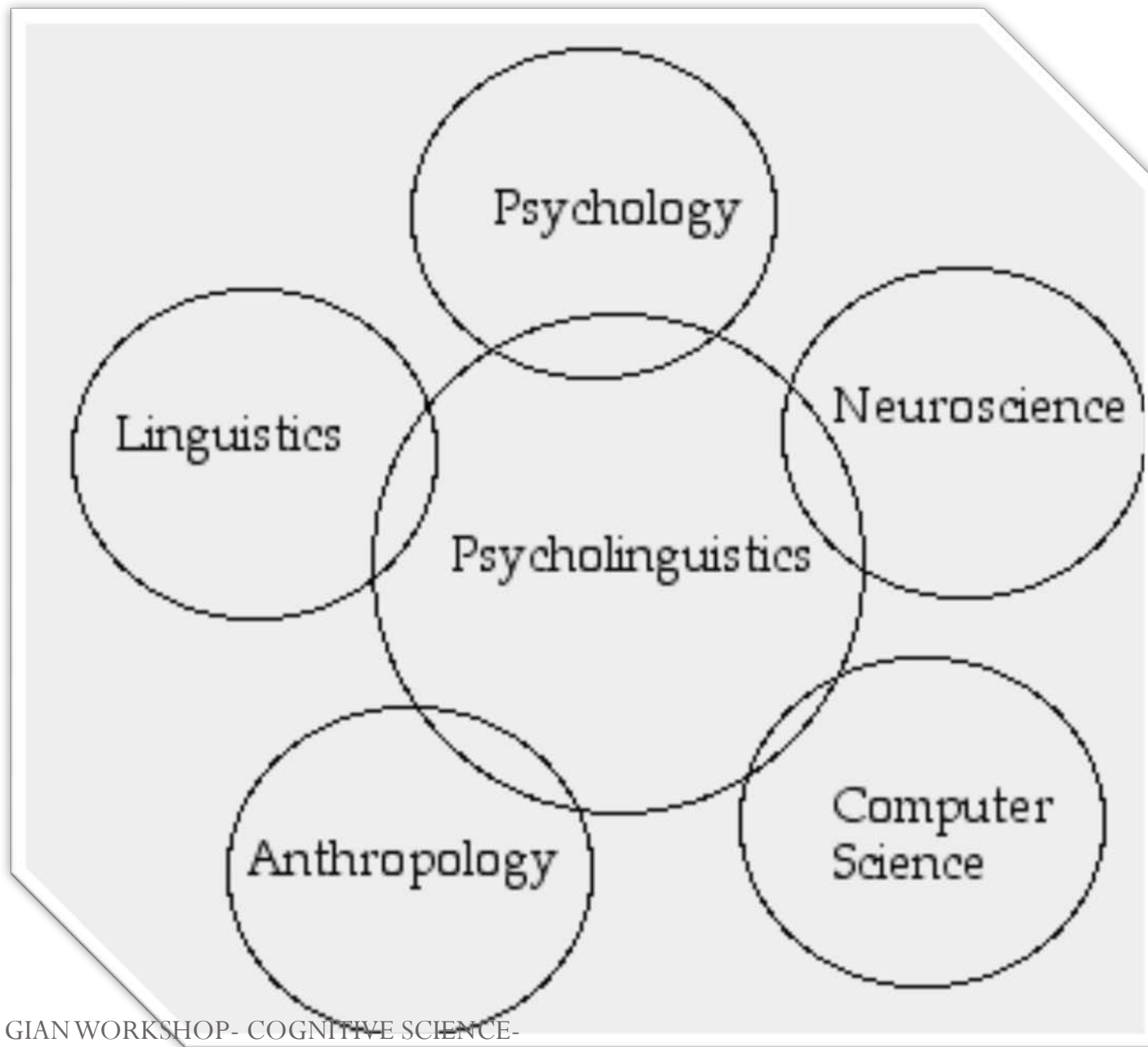
Sub-disciplines within Psycholinguistics

- Theoretical psycholinguistics

  → language theories related to human mental processes in using language (phonological, diction, syntax, discourse and intonation arrangement)

- Developmental psycholinguistics

  → the process of language acquisition (both L1 & L2)

- Social psycholinguistics

  → the social aspects of language, that language is a string of thought and insights

Cont.

- Educational psycholinguistics

  → the educational aspects in formal education: the role of language in the teaching of reading, language proficiency

- Neuro-psycholinguistics

  → the relation between language and the brain: what happens to language input and how output is programmed and formed inside the brain

- Experimental psycholinguistics

  → the act and effect of using language

- Applied psycholinguistics

  → the application of all above subfields into other subjects

SCOPE:

- PSYCHOLINGUISTICS TRIES TO EXPLAIN THE FOLLOWING:

- HOW LANGUAGE IS ACQUIRED BY THE USEERS?

- HOW BRAIN WORKS ON LANGUAGE?

- DIFFERENCE BETWEEN LANGUAGE ACQUISITION AND LEARNING

- LINGUISTIC INTERFERENCE

- LANGUAGE DEVELOPMENT

- ❖ **COGNITION AND PROCESSES OF COGNITIVE DEVELOPMENT**
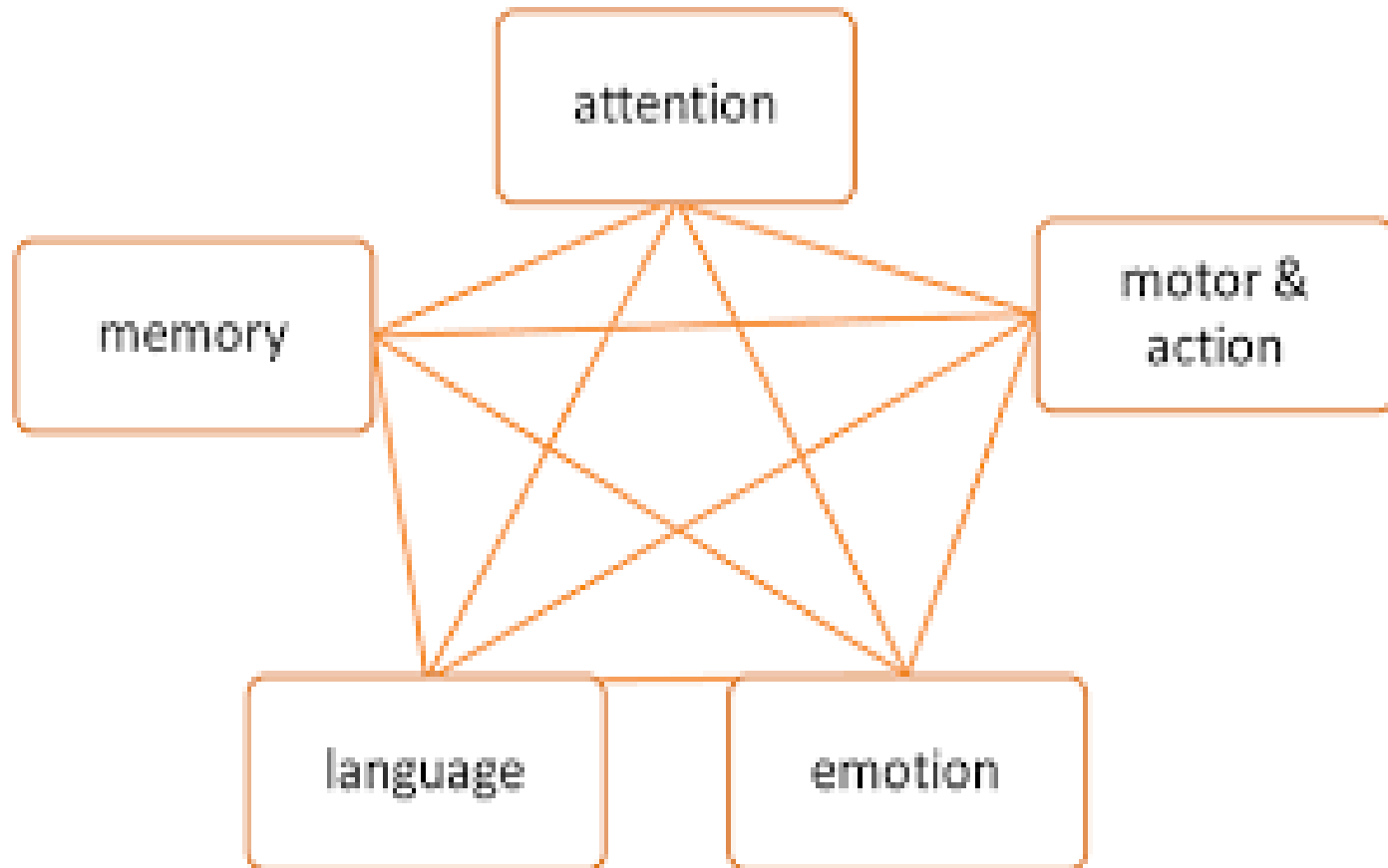
WHAT IS COGNITION?

- cognitive approach explains differences in personality.

- To understand the internal processes of their mind. (Perception ,attention, memory & thinking etc.).

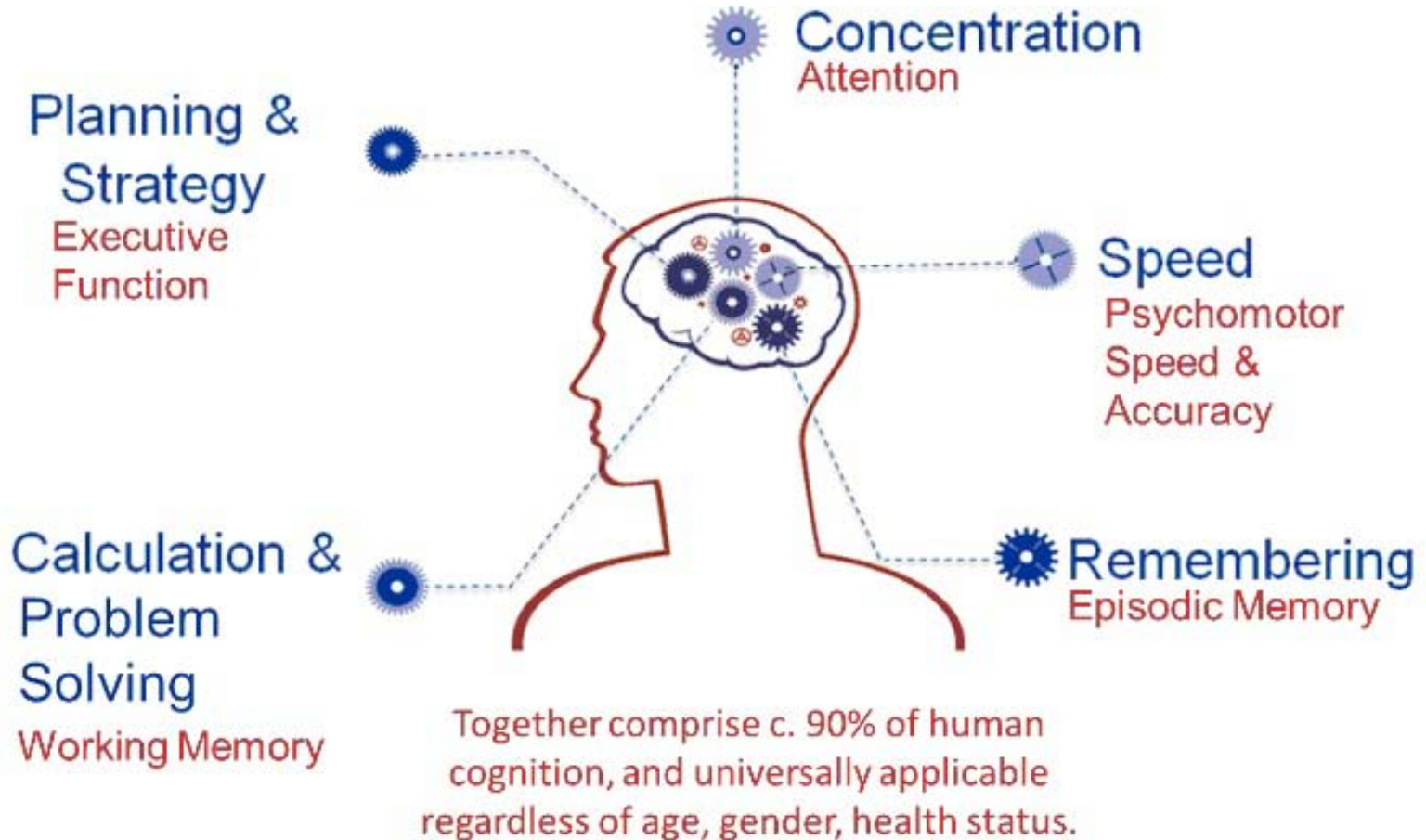- Cognition literally means "knowing".

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CONTD….

COGNITION IS ALL ABOUT:

- PERCEPTION
- ATTENTION
- MEMORY
- REASONING
- PROBLEM SOLVING

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Five Key Cognitive Domains

Human Brain and Cognition

The **Cerebral Cortex**, which is the entire outer rind of the brain, includes multiple lobes and areas. It integrates information received from our senses, controls emotions, and holds memories and thoughts.

Parietal Lobe:
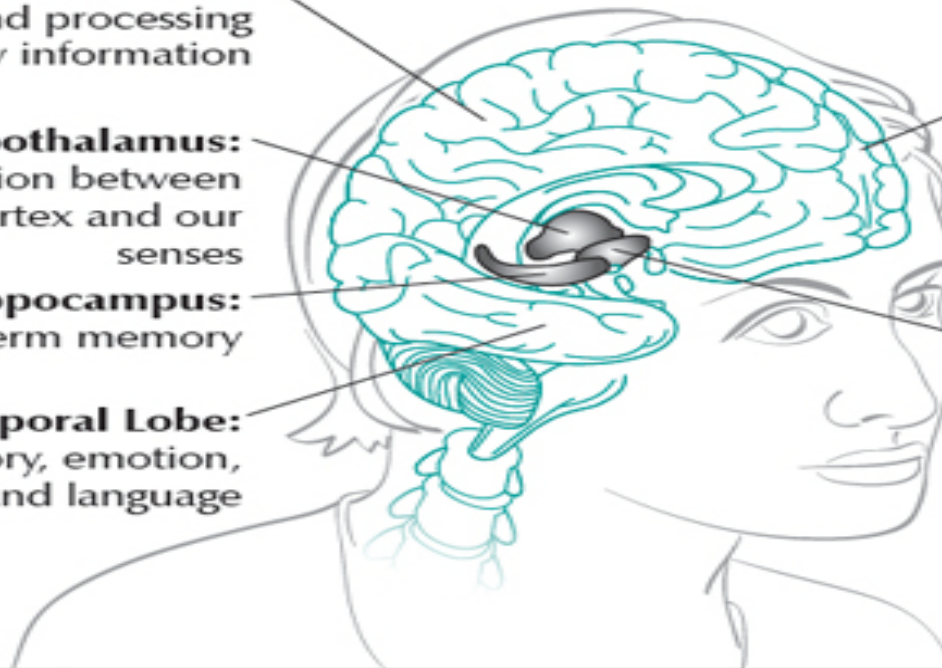Reception and processing of sensory information

Hypothalamus:
Relay station between the cortex and our senses

Hippocampus:
Short-term memory

Temporal Lobe:
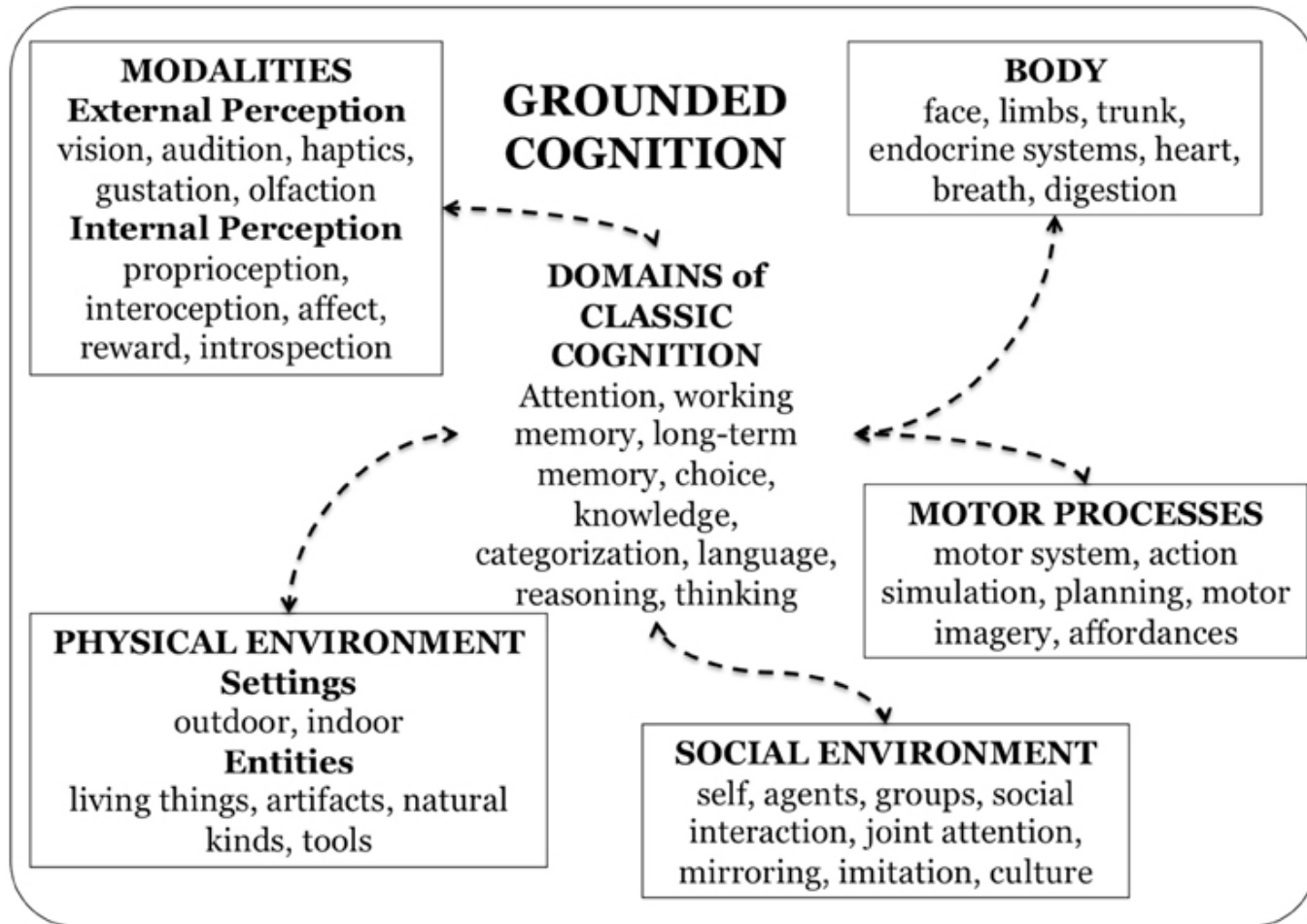Memory, emotion, hearing and language

Frontal Lobe:
Decision making, problem solving and planning

Amygdala:
Emotions and social behavior

Cognitive processes make use of many parts of the brain. Nerve cells throughout the brain (neurons) communicate with each other, creating thoughts, feelings and memories.

Classical Cognition:

MODALITIES
External Perception
vision, audition, haptics, gustation, olfaction
Internal Perception
proprioception, interoception, affect, reward, introspection

GROUNDED COGNITION

BODY
face, limbs, trunk, endocrine systems, heart, breath, digestion

DOMAINS of CLASSIC COGNITION
Attention, working memory, long-term memory, choice, knowledge, categorization, language, reasoning, thinking

MOTOR PROCESSES
motor system, action simulation, planning, motor imagery, affordances

PHYSICAL ENVIRONMENT
Settings
outdoor, indoor
Entities
living things, artifacts, natural kinds, tools

SOCIAL ENVIRONMENT
self, agents, groups, social interaction, joint attention, mirroring, imitation, culture

What is Social Cognition?

Important aspects in Social Cognition

- recognize difference between self and others
- emotional recognition of others
- collaboration
- sharing episodic memory
- "Theory of Mind"
- perspective taking
- empathy
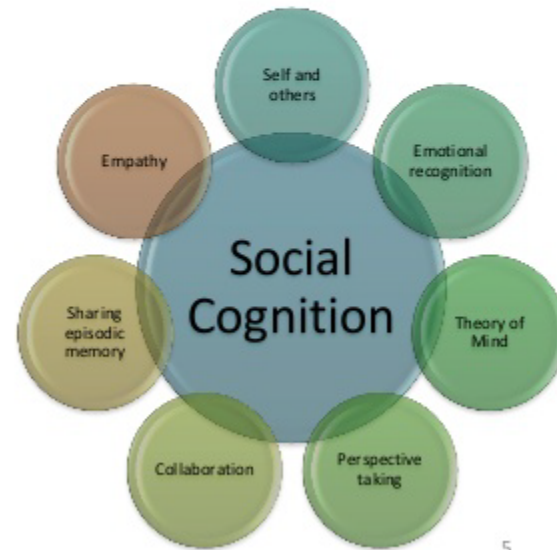
- Theory of Mind:

- "provides children with powerful mechanisms for acquiring and sharing cultural information, including language, social norms, and societal beliefs."

- Uniqueness of Human mind:

- participate in large-scale institutions, wage wars over beliefs, imagine the distant future, and communicate about these processes using syntax and symbols.

Language Acquisition and Cognitive Development

- Stages of Socio- cognitive development:

- Within the first year of life, human children begin to relate to others in new ways, tuning into others' attention through processes such as gaze following and exchanging information with others through simple acts of referential gesture.

- These basic skills for communication and shared attention provide the social foundation for a variety of forms of cultural learning, including the initial stages of language acquisition.

Contd…

- By 2 years of age, these perspective-taking skills allow human children to make pragmatic inferences linking new words with the (inferred) target of another's attention.

- human children begin to experience the world not only through their own eyes, but also together with others, and these abilities for reasoning about others' minds.

- Around the age of four- understanding of others as intentional agents, interpreting others' behavior as the output of a belief and also reasoning about the goals and beliefs not only of other individuals, but also of their cultural group more broadly.

Theories/ approaches of Language acquisition and Cognitive Development:

- Historical Approaches:
- **1) Behaviorism–** 1957- B. F. Skinner- *Verbal Behavior*
- *Functional analysis approach to verbal behavior*
- *Stimulus/ Response; positive/ negative reinforcement*
- **2) Innateness theory-** *Noam Chomsky*
- *Language as fundamental part of human genome*
- *LAD*
- *Critical period hypothesis*
- *Universal Grammar*
- *Linguistic information is a natural predisposition and learning abilities are triggered by hearing speech.*

- **3) Cognitive Theory**
- Four Stages of Cognitive Development- Jean Piaget
- (interaction based understanding- a child acquires a concept before he/ she can acquire a particular language that expresses it)
- Children's language reflects the stages of development of their logical thinking and reasoning skills in stages.
- *A. Sensory- Motor period* (0- 2 years)
- Action- schemas/ information assimilation/ egocentrism.

Contd..

- *B) Pre- operational Period* (2 to 7 years)
- Developed mental schemas- accommodation of new words- they learn to talk about distant things.
- *C) Egocentrism*
- Children's tendency to consider everything as being alive
- They see things from their own perspective
- *D) Operational period* (7 to 11 years)
- - period of concrete operation
- Period of formal operation
- Immature to mature/ illogical to logical/ decentralization of view/ socialization

Contd…

- **4) Social Interaction Theory–** Lev Vygotsky
- Nurture arguments
- Influence of environment
- Child- directed speech (CDS)
- Zone of Proximal Development (ZPD)
- MODERN APPROACHES:
- **5) Usage- Based Theory–** Tomasello (2003)
- Children learn from their own language experiences
- Language structure emerges from language use
- Constructions form the basic units of grammar
- Form/ meaning pairing

Contd...

- Specific constructions become general and abstract subsequently
- Frequency of occurrence of constructions in input
- Pre- emption/ anti frequency.
- **6) Optimality Theory-** Prince and Smolensky (1993)
- Observed forms of language arise from the interaction between conflicting constraints
- Input forms- rules- output forms
- Constraints- a structural requirement that may either be satisfied/ violated by the surface form.
- GEN- EVAL- CON

Working Models of understanding language acquisition and cognitive development:

- **A. BOX- AND- ARROW MODEL**

- Input- Output- Underlying Representation

- *Early- Single- Lexicon Model (Smith 1973)*

- Input = Underlying Representation ⟶ Phonemic

　　　　　　　Output ⟵ Representation

Phonological Rules/ Articulatory instructions

Shortcoming:

- One phoneme would be pronounced differently in different words

- *Early Two- Lexicon Model*
- Children have two- lexicons in the output schema
- Shortcoming:
- Why children select one representation over the other
- How the representation become more adult- like?
- How some forms are deleted?
- Recent One- and Two- Lexicon Models (Hewlett 1990)
- The child becomes aware of the insufficiency of his or her current production
- The child desires to change it
- The child acquires knowledge of the relevant crucial articulatory targets

- The child has sufficient dexterity of the vocal apparatus to implement speech sounds at speed in a variety of phonetic contexts.

- A more recent model is the speech processing model proposed by Stackhouse and Wells (1997).

- Offline and Online processes

Stackhouse and Wells Model:
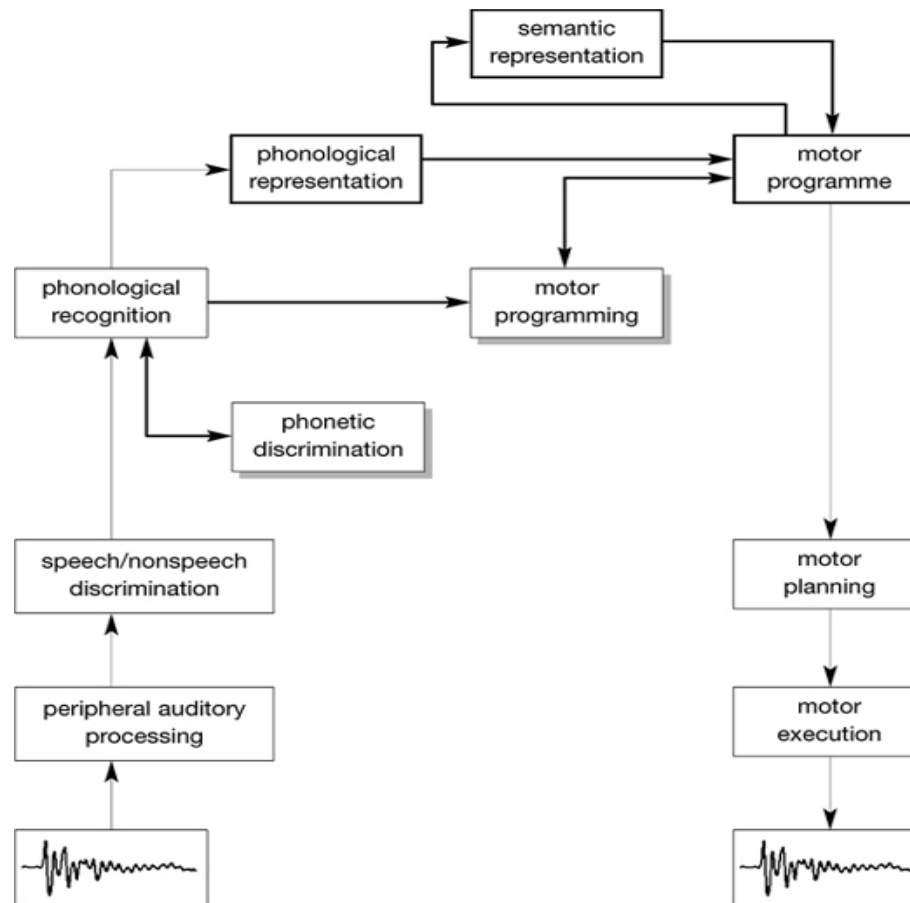
- **B. CONNECTIOANIST MODEL**
- DIFFERENT FROM THE PREVIOUS MODEL BOTH CONCEPTUALLY AND PRACTICALLY
- COMPUTER- BASED
- INFORMATION PROCESSING EMERGES FROM INTERACTION BETWEEN UNITS OF CONNECTIONS
- PROGRAM STIMULATED PERFORMANCE OF A COGNITIVE TASK
- INTERCONNECTED NETWORK OF NODES- SIMILAR TO THE WAY NEURONS FUNCTIONS- PLAUT 1995

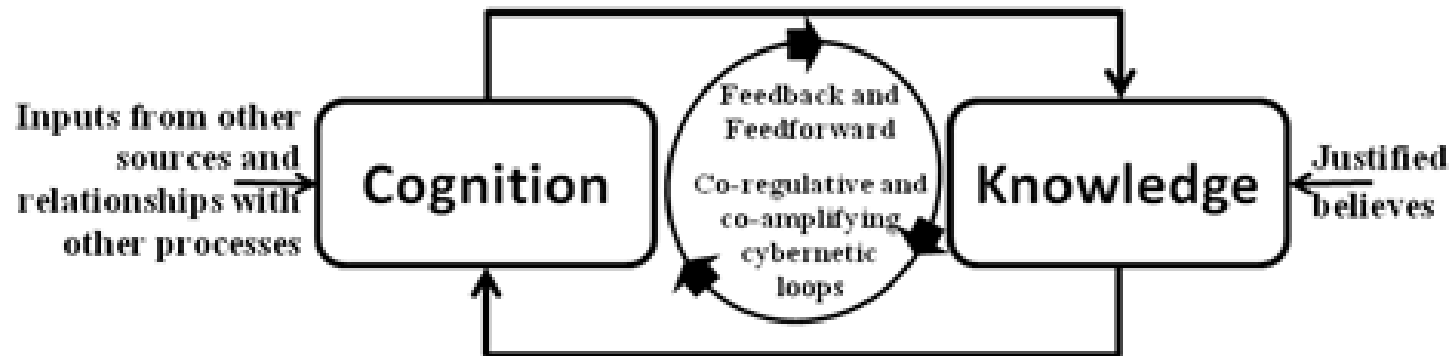# NEURON:

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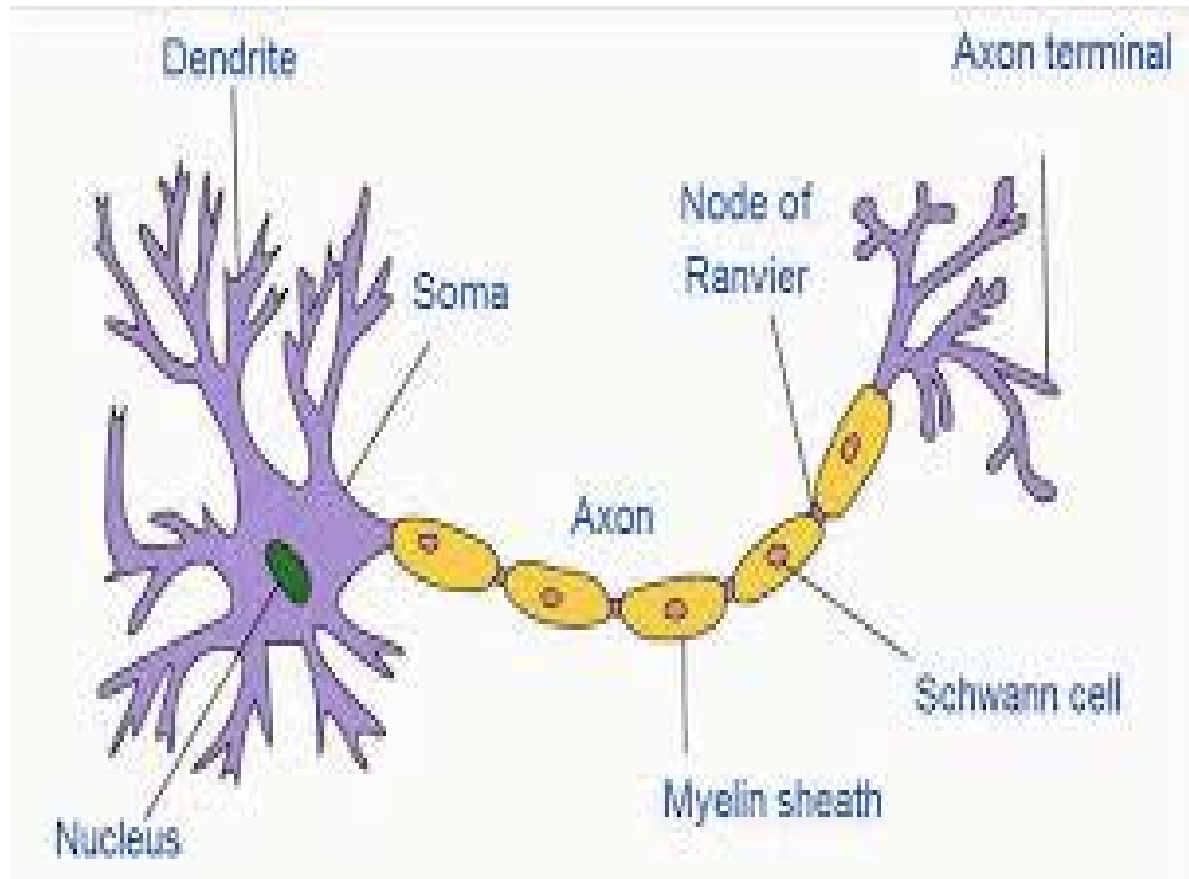
- ACTIVATION LEVEL OF NODES- WORK DONE- TRNSMITTING INFORMATION

- MINIMUM TO MAXIMUM LEVEL OF WORK DONE

- ACTION POTENTIAL

- STRENGTH OF CONNECTIONS/ WEIGHTS

- EXCITATIORY STAGE/ INHIBITORY STAGE

- DIFFERENT TYPES OF INFORMATION ARE REPRESENTED ON DIFFERENT LAYERS OR LEVELS.

- Unsupervised/ supervised learning

- Input oriented/ output oriented

- Back Propagation

- Overlapping Representation

- Advantages/ Limitations

- Connectionist Model is more real- like than Box and arrow Model

- Revising model is simpler in connectionist pattern of models

- Quantitative predictions in connectionist approach- good for building theories

Conclusion:

Cognition generates knowledge via sense data, information perception, inference, interpretation, analogical thinking, imagination, intuition, epistemological values, discipline, methodologies, etc.

Inputs from other sources and relationships with other processes → **Cognition**

Feedback and Feedforward

Co-regulative and co-amplifying cybernetic loops

Knowledge ← Justified believes

Previously acquired knowledge 1) supports and shapes cognitive processes, and 2) influence other related mental processes as conation, and affect; which in turn 3) orient, propels, or inhibit cognitive processes

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THANK YOU……….

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