

# The Developmental Web

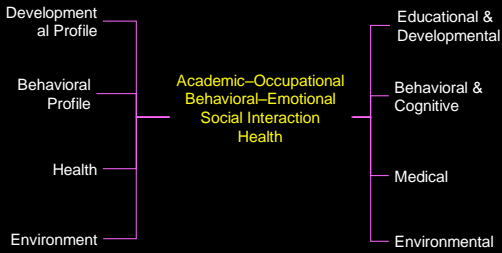
A neurodevelopmental approach to the assessment and management of developmental and behavioral disorders

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# Disclosures

- Dr. Tridas is a speaker for:
  - Eli Lilly
  - McNeil
  - Novartis
  - Shire
- Dr. Tridas is a consultant for:
  - Eli Lilly
  - McNeil
  - Novartis
- Dr. Tridas does research for:
  - Eli Lilly

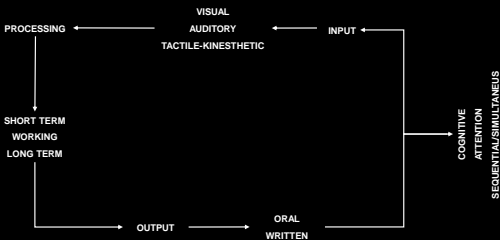
# The Developmental Web



# Developmental Web

Contributing Factors to Clinical Presentation

# Developmental Profile



# Developmental Factors

The Learning Connection

## Factors Affecting Input

- Level of cognitive development (IQ)
- Attention
- Sequential/Simultaneous Functions
- Rate

## Cognitive Development

- IQ
  - Mental age
  - Is the information presented at a level that the child can process?

## Sequential Processing

- The sequence or order of the basic elements affects meaning
  - i.e. dog – god
  - 52 – 25

## Simultaneous Processing

- All features must be processed at once
  - i.e. someone's face
  - It is like the bird's eye view
    - The forest not the trees

## Rate

- Speed of processing
- Affects fluency and overall production

## Attention

- Attention
  - Selectivity
  - Duration
  - Depth
  - Planning

## Input

- Visual
- Auditory
- Tactile-Kinesthetic

## Visual Processing

- Conceptualization and problem solving
- Letter and whole word revisualization
- Copying from the chalk board
- Making/interpreting maps, charts, graphs
- Art, designing, using tools, playing sports
- Recalling faces, geometric forms
- Previewing actions (i.e. P.E, sport play, etc)

## Visual Perceptual Problems

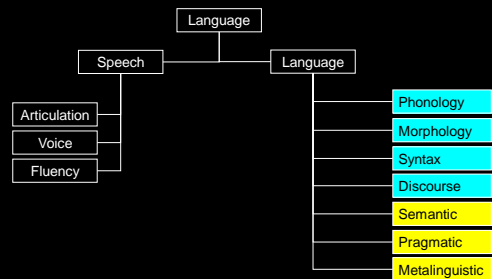
- IMAGINEHOWCONFUSINGITWOULDBEIFEVERYTHINGYOUREADLOOKEDLIKETHIS!
- ORI FTH EWOR DSBE GINA NDEN DI NPLAC ESTH ATDON'NTM AKES ENSET OY OU?
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- w r e o n a l p a  
T o s e t a e l v e g e .  
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## Tactile-kinesthetic Processing

- Impacts Fine Motor Function
  - Progresses in a proximal-distal fashion
  - Affected by:
    - Sense of body position or movement
    - Visual spatial processing
    - Verbal-motor integration
    - Motor planning
    - Motor sequential memory
    - Monitoring
    - Tone
    - Coordination

## Auditory

## Language



## Speech

Verbal Means of Communicating

## Speech

- Articulation
  - How speech sounds are made
    - Produce the "r" sound in order to say "rabbit" instead of "wabbit".
- Voice
  - Use of the vocal folds and breathing to produce sound
    - Overuse or misuse can lead to hoarseness or loss of voice.
- Fluency
  - The rhythm of speech
    - Hesitations or stuttering can affect fluency.

## Language

## Language

- The ability which persons have that allows them to *communicate* with other human beings and with themselves (thinking).
- Facilitates the transmission of ideas, emotions and desires from one person to another .
  - Through visual, auditory and/or tactile symbols

## Language Processing

- Phonology
- Morphology
- Syntax
- Discourse
- Semantics
- Pragmatics
- Metalinguistics

## Phonology

All the **Phon**-words

## Definition

- From the Greek
  - *Phone*: an individual sound unit of speech
  - *Logos*: an instance of speaking
    - word, speech or subject of discussion
- The study of the sound system of a language and the rules that govern how phonemes combine into words

## Phoneme

- The **basic units of sound** in a language by which morphemes, words, and sentences are constructed
- The **smallest unit of speech** that serves to distinguish one utterance from another in a language.
- The **40 - 52 phonemes** of the English language can combine to form thousands of words
- Words must be broken into their phonemes before they can be recognized by the language system

## Phonics

- A **form of instruction** to facilitate the understanding and use of the alphabetic principle.
- **Emphasizes the relationship between phonemes** (the sounds) **and graphemes** (the letters) to decode words.
- Instructional methods
  - Analogy-based phonics, Analytic phonics, Embedded phonics, Onset-rime phonics instruction, Phonics through spelling, Synthetic phonics, Systematic and explicit phonics instruction.

## Phonemic Awareness

- The ability to **notice, think about, and work with the individual sounds** in spoken words.
- Beginning readers show phonemic awareness by **blending the sounds of a word to say the word**
  - /c/ /a/ /t/ = cat

## Phonological Awareness

- Ability to perceive that language is composed of sounds and the understanding of these sounds
- Identifying and manipulating larger parts of spoken language such as words and syllables
- Includes phonemic awareness, rhyming and syllabication

## Phonological Awareness

- The many ways to write the sound [k]
  - c: **cost**
  - k: **kayak**
  - ck: **chicken**
  - ch: **chemistry**
  - q: **liquid**
  - que: **toque**

## Morphology

Word construction

## Definition

- From the Greek
  - *morph*: form
  - *ology*: word, study, speech
- Identification, analysis and description of the structure of words

## Morphology

- Word construction impacts meaning
- Different parts of the word will affect meaning
  - *un*: opposite
    - *un*common
  - *ing*: indicates action
    - *Cooking*
  - *s*: plural
    - *toys*

## Morphology

- Changes in words
  - Suffixes
  - Prefixes
  - Speech Inflection
  - Word roots/Derivations

## Syntax

Sentence building

## Definition

- From the Greek : put in order
  - *syn*: together
  - *taxis*: arrangement
- The study of the rules that govern how words or other elements of sentence structure are combined to form grammatical sentences.
- Organization of words in sentences
  - The ordering of and relationship between the words and other structural elements in phrases and sentences.

## Syntax

- Includes grammar and
- Requires knowledge of the mechanics of language
- Defines different types of sentences
- The sequence of words affects the meaning
  - i.e., “The dog is in the house” vs. “The house is in the dog”

## Types of sentences

- Declarative
  - Makes a statement.
- Interrogative sentence
  - Asks a question.
- Exclamatory sentence
  - Shows strong emotion.
- Imperative sentence
  - Gives a direction or a command.

## Syntax

- Grammar
- Sentence interpretation and/or construction
- Noun pronoun relations
- Interpreting/using tenses
- Effect of prepositions and conjunctions
- Responding/formulating to “wh” questions

## Discourse

- A sequence of sentences
- A unit of language greater than a sentence
- Spoken or written language
- Four modes
  - Description
  - Exposition
  - Narration
  - Persuasion

## Discourse

- Understanding paragraphs
- Telling stories
- Understanding directions/explanations

## Semantics

The Word Meaning

## Definition

- From the Greek
  - *sema*: sign
- The study of the relationship between linguistic symbols and their meanings
  - Meaning of a word, phrase, sentence, or text

## Semantics

- Word meanings
- Helps with:
  - Vocabulary development
  - Precise word meanings (multiple meanings, word relationships)
  - Word recognition (association with meaning)

## Semantic

- Auditory
  - “Give me a *hand*”
    - Help
    - Clapping
    - Body part
  - “See the *star*?”
    - Celestial body
    - Celebrity

## Semantics

- Visual
  - Use
  - Parts
  - Properties
  - Location



## Impact

- Comprehension: Auditory/Written
  - Concrete/Descriptive
    - Facts
  - Implied/Inferred
    - Metalinguistics
- Social interaction
  - What did s/he mean by that?
    - Semantic-Pragmatic language disorder

## Pragmatic

## Definition

- The processes of **exchanging** information and ideas
  - Requires formulating, transmitting, and translating **intended** messages.
- The use of language in social contexts
  - Knowing **what** to say, **how** and **when** to say it.
  - Understand what the speaker **meant** by what he said.

## Theory of Mind

- A requirement for pragmatic language
- An understanding of other's beliefs, intents, desires and knowledge
- The recognition that others have beliefs, desires and intentions that are different from one's own

## Pragmatic Language

- Recognition of different uses of language
  - Greetings
  - Requests
  - Demands
  - Informing
  - Promising
- Modify language according to the listener or situation
  - Listener
    - Age
    - Background knowledge
  - Situational
    - Playground vs. church

## Pragmatic Language Rules

- Staying on topic
- Introducing new topics
- Proximity to listener
- Eye contact
- Taking turns
- Gestures
- Facial expressions
- Prosody
- Clarifying or rephrasing

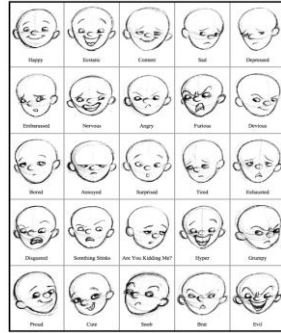
## Pragmatic Language Rules

- May vary across and within cultures
- Must understand rules of communication partner

## Prosody

- Ability to convey attitude or emotions through:
  - Speech intonation
  - Voice stress
  - Speech rate
  - Volume
  - Use of pause and hesitations.
- Does the **cadence of speech** match **affect, attitude** and **intention**?

## Facial Expressions



## Impact

- Isolation from social surroundings
  - Says inappropriate or unrelated things during conversations
  - Tells stories in a disorganized way
  - Limited variety in language use
    - Prosody
    - Content

## Metalinguistic Skills

How does language works?

## Definition

- From the Greek
  - *meta*: beyond
  - *linguistic*: related to language
- The study of language and its relationship to culture and society
- The explicit knowledge of the nature and properties of language, how language is structured and used

## Definition

- Structure: Linguistic knowledge
  - Encoding parts of speech
  - Morphosyntactic rules
- Use: Linguistic processing
  - Selectively attending to different aspects of language

## Definition

- "The ability to reflect upon & manipulate the structural features of spoken language, treating language itself as the object of thought..."

(Turner & Henman, 1984)

## Definition

- Metalinguistic skills increase in complexity with age
- Sophisticated awareness of
  - Rhymes
  - Puns and jokes
  - Metaphors
  - Ambiguous, deliberately misleading statements

## Impact

- Learning a new language
- Understanding what was meant by what was said/written
- Social interaction
- Relates to all other language functions
  - Phonology, morphology, semantics, syntax, pragmatics

## Memory

- Short Term
- Active working
- Long Term

## Short Term Memory

- Holds information for a few seconds
- Limited storage capacity
- Depends on:
  - Volume
  - Modality
    - Visual, Auditory, Sequential
  - Attention

## Working Memory

- Intermediate duration
- Holding an idea in mind while developing, elaborating, clarifying, using it
  - Recalling answers while thinking of the question
  - Complex math problems
  - Reading (summarizing/comparing while decoding)
  - Selecting color while remembering what you are drawing

## Working Memory

- Factors affecting it:
  - Attention
  - Rate
  - Volume
  - Automaticity of skill

## Long Term Memory

- Unlimited storage capacity
- Long duration
- Retrieval affected by:
  - Relevancy of stimulus
  - Frequency of use
  - Strategy for memorization (consolidation)

## Long Term Memory

- Consolidation
  - Paired associations
    - i.e. word/spelling, date/event
  - Categories
    - i.e. plants, animals, minerals
  - Rules and recurring patterns
    - i.e. dark clouds/rain, proper noun/capitalized
  - Chains
    - i.e. steps in division, cursive writing

## Output

- Oral
  - Casual
  - Benefits from tone, gestures, etc.
- Written
  - Very formal
  - Depends on fine motor / graphomotor function
    - Motor sequences, pencil grip, spatial organization

## Fine Motor Function

- Progresses in a proximal-distal fashion
- Affected by:
  - Sense of body position or movement
  - Visual spatial processing
  - Verbal-motor integration
  - Motor planning
  - Motor sequential memory
  - Monitoring
  - Tone
  - Coordination

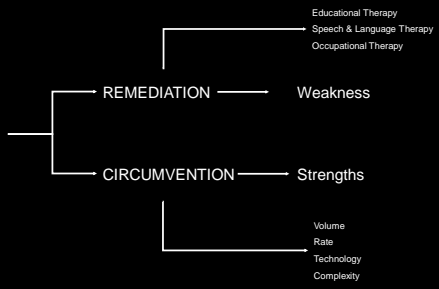
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- Attention
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## Developmental Web

*Management*

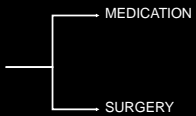
# Educational Management



# Psychological Management



# Medical Management



# Environmental Management

