



# *All Kinds of Minds* in Quito, Ecuador

Mel Levine's Theory of Neurodevelopmental Systems

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*All Kinds of Minds*  
*A Mind at a Time*

- ◆ Mel Levine
- ◆ 8 Neurodevelopmental Constructs
- ◆ How can this information help students, parents and teachers?



# Starting Point

Premise:

The role of a teacher is....

to help students learn.

*(Assumes that the teacher possesses a knowledge the student does not.)*

## ➤ How?

- By evaluating each student's potential, and then filling in gaps.
- Know what a student comes to you with, maximize *his individual* possibilities.



# 1996-2004 Seis en Uno

## Un cambio radical:

Evaluación académica (recuerdo de datos exactos)



Fortalezas y debilidades individuales (potencial humano)

→ Individualizando a la  
educación



# Lo que sabemos acerca del cerebro:

## Fact 1:

Los cerebros son tan únicos como los rostros:

- Misma estructura básica, pero aún existe una variación grande.
- Los individuos poseen diferentes potenciales y diferentes dones.

## Fact 2:

- Different skills (“constructs”) are located in different parts of the brain.
- No one has 100% of all the skills (“constructs”) possible.



# Mel Levine

- ◆ Pediatric Neurologist
- ◆ North Carolina, Harvard and Oxford trained.
- ◆ Lives on a farm with his wife and animals (no kids)
- ◆ Practice involves “demystification” or explaining a child’s brain to him so he realizes his own strengths and weaknesses.

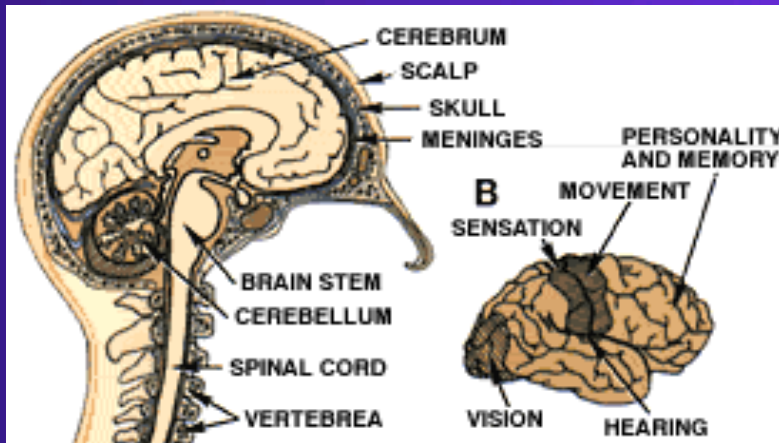


Mel Levine:

*Ocho conceptos de desarrollo neuronal (2002)*

1. Atención
2. Ordenamiento tempo-secuencial
3. Ordenamiento espacial
4. Memoria
5. Lenguaje
6. Funciones neuromotoras
7. Cognición social
8. Cognición de orden más alta

# 1. Atención



El “Cerebro Antiguo” está asociado con los conceptos básicos del balance del sueño.

- ◆ La energía mental controla
  - El estado de alerta
  - El balance entre el sueño y el despertamiento
  - La consistencia del rendimiento
- ◆ El procesamiento controla
  - La determinación de lo importante
  - El procesamiento profundo y detallado
- ◆ La producción controla
  - El paso
  - Automonitoreo

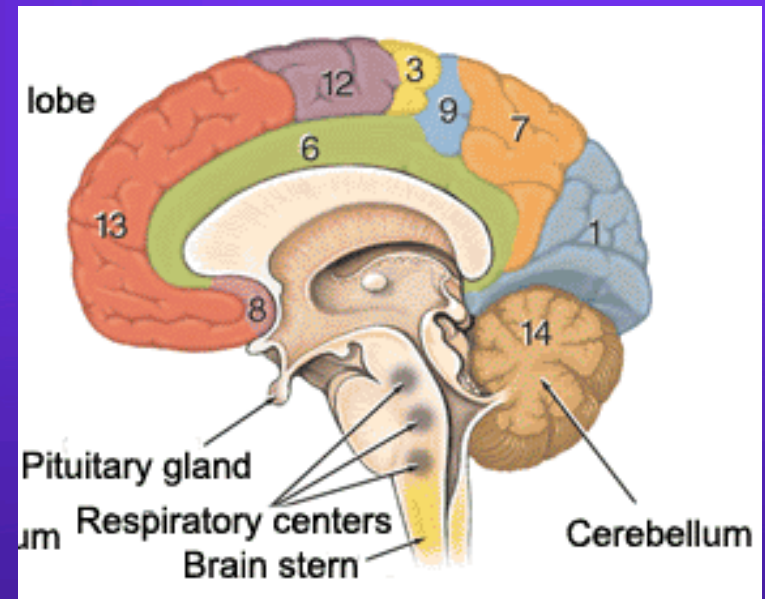


# Examples of Attention problems

- ◆ Inability to fall asleep at night (constant sleepiness in class).
- ◆ Inconsistent work performance.
- ◆ When asked to identify key parts of a study, underline everything.
- ◆ Inability to identify key characters, concepts and/or level of importance of information.
- ◆ Often wait until the last minute to complete assignments.
- ◆ Cannot keep self on task.

## 2. Ordenamiento Temporal-Secuencial

- ◆ Conciencia secuencial
- ◆ Percepción secuencial
- ◆ Memoria secuencial
- ◆ Rendimiento secuencial
- ◆ Manejo de tiempo
- ◆ Pensamiento secuencial más alto



El Cerebelo está asociado con los conceptos de tiempo en el cerebro.

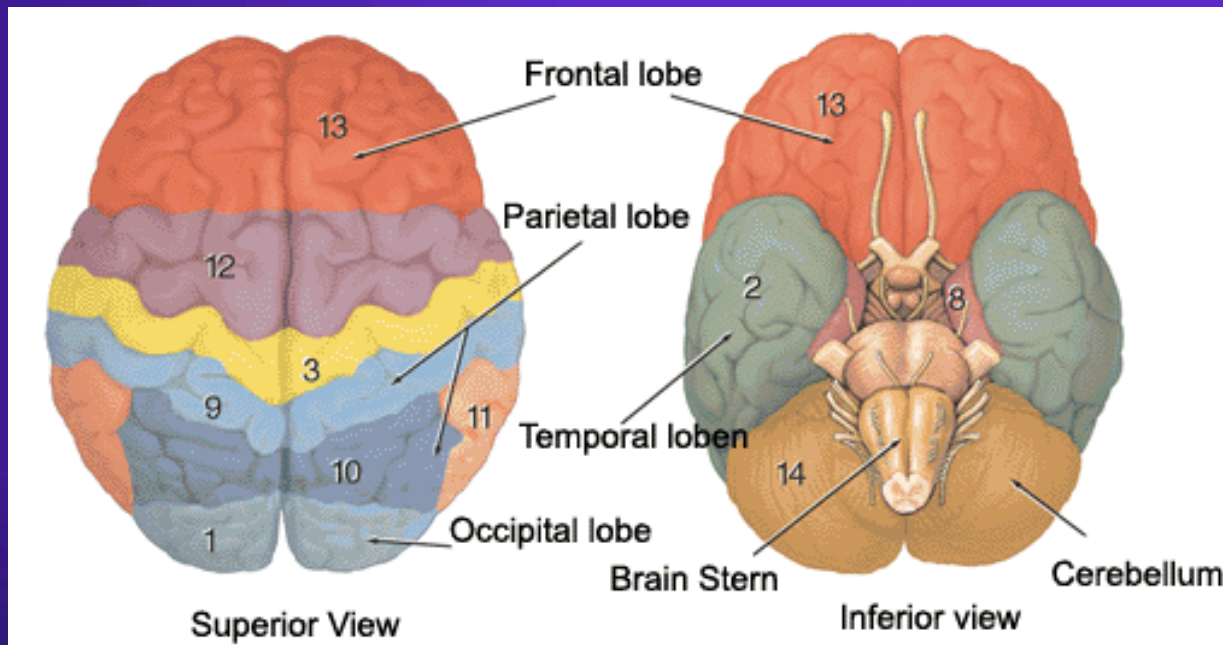


# Examples of temporal-sequential ordering problems

- ◆ Lack of consciousness about ordered systems and their importance.
- ◆ Unaware of correct order for symbols (letters and numbers).
- ◆ Inability to keep math formulas in order; inability to spell consistently.
- ◆ Cannot convey ordered systems on demand (perform a math problem on the board in front of the class).
- ◆ Unaware of time.
- ◆ Inability to conceive of “ $E=mc^2$ ”.

# 3. Ordenamiento Espacial

- ◆ Conciencia espacial
- ◆ Percepción espacial
- ◆ Memoria espacial
- ◆ Rendimiento espacial
- ◆ Manejo de materiales
- ◆ Pensamiento espacial más alto



Los conceptos espaciales están asociados con el hemisferio derecho del cerebro.

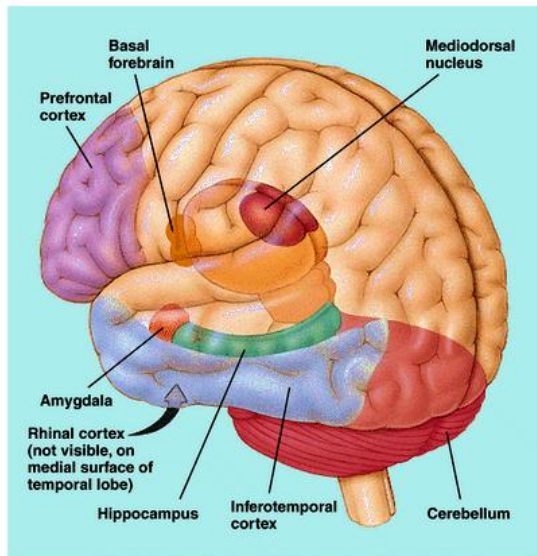
# Examples of Spatial Ordering problems

- ◆ Does not understand their body in space; forgets to pay attention to their body.
- ◆ Cannot perceive differences in depth perception; cannot manipulate three-dimensional objects in space.
- ◆ Cannot recall physical location of objects.
- ◆ Inability to draw objects with correct dimensions.
- ◆ Cannot keep track of things; always appears to be a mess to others; loses things constantly.
- ◆ Difficulty manipulating imaginary or intangible spatial concepts as in conceiving of the moons of Saturn without seeing them.



# 4. Memoria

## ► Structures of the Brain That Play a Role in Memory



Los lóbulos frontales están asociados con la memoria de corto plazo, la Amygdala con memorias emocionales, y el hipocampo y las áreas de corteza con las memorias de largo plazo.

- ◆ Memoria de corto plazo
  - Determinar lo importante
  - Recodificación
- ◆ Memoria emocional
- ◆ Memoria activa de trabajo
  - Mantenimiento de idea
  - Planificación próxima/distal
  - Enlace entre las memorias de corto y largo plazo
- ◆ Memoria de largo plazo
  - Consolidación
  - Acceso
    - Recordar

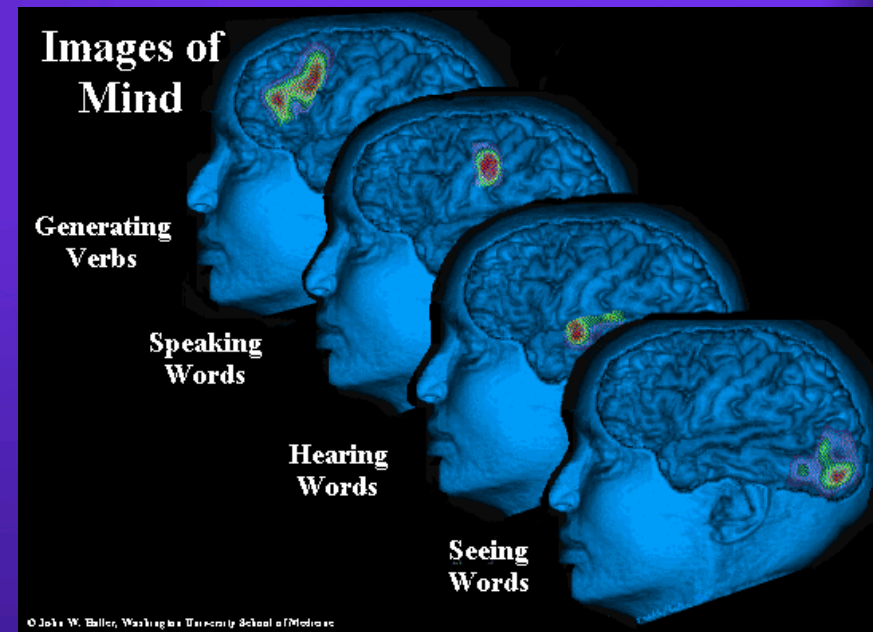


# Examples of Memory Problems

- ◆ Inability to remember small pieces of memory in the immediate term (shorter than five minutes, less than 7 “bits”).
- ◆ Inability to choose what is important in a lecture (ability to identify the most important information out of a speech).
- ◆ Difficulties reformatting information into meaningful chunks (related to past experience).
- ◆ Over- or under-association with feelings.
- ◆ Difficulty retaining information (key ideas) for a minimum sustained period of time.
- ◆ Inability to determine what belongs in long or short term planning.
- ◆ Inability to make the link between short and long term memories.
- ◆ Difficulty consolidating information (via repetition, sleep, review).
- ◆ Inability to easily retrieve information that has been stored in long term memory (causes severe recall problems).

# 5. Lenguaje

- ◆ Lenguaje receptivo
  - Procesamiento fonológico
  - Entender la semántica
  - Comprensión de oraciones
- ◆ Lenguaje expresivo
  - Articulación y fluencia
  - Uso Semántico
  - Elaboración verbal



El lóbulo frontal izquierdo y parietal están asociados con los centros de lenguaje principales del cerebro.

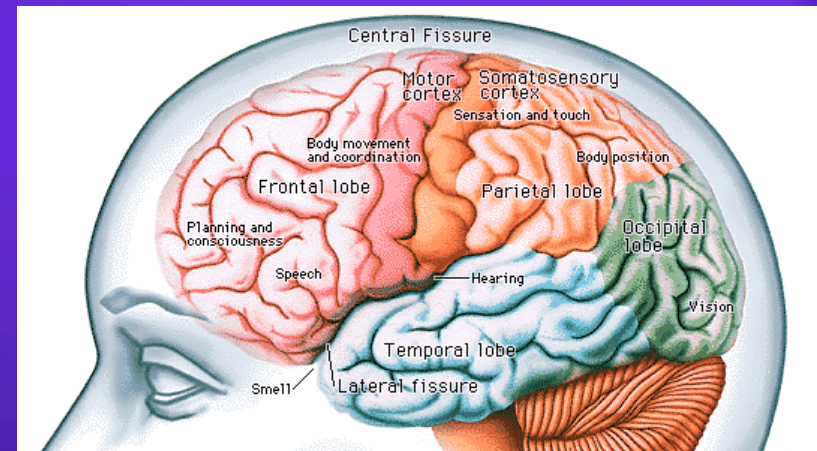


# Example of Language Problems

- ◆ Difficulty distinguishing between individual sounds.
- ◆ Inability to understand when grammar is correct or incorrect (identify correct sentence structure).
- ◆ Unclear pronunciation (in smaller children, parents may understand what child says, but others find it hard to identify what is being said).
- ◆ Inappropriate use of semantic rules (continues to generalize past tense “ed” rule beyond 6 years of age).
- ◆ Has difficulty with orally expressing elaborate ideas.

# 6. Funciones Neuromotoras

- ◆ Funciones motoras gruesas
  - Procesamiento espacial
  - Sentido de posición corporal
  - Producción motora gruesa y memoria
- ◆ Funciones motoras finas
  - Coordinación mano-ojo
  - Memoria procedimental motora fina
- ◆ Funciones grafomotoras
  - Previsualización
  - Memoria grafomotora y producción (ser capaz de escribir)



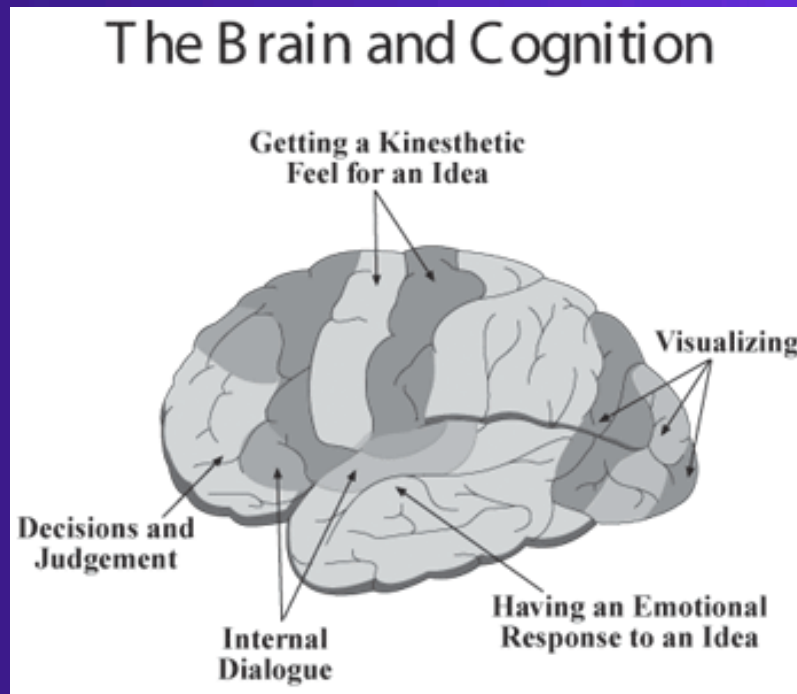
La corteza motor en la parte superior del cerebro está asociada con las funciones neuromotoras.

# Examples of Neuromotor Function Problems

- ◆ Difficulty understanding location of body in space, awkward body positioning.
- ◆ Inability to remember dance steps in order.
- ◆ Inability to hit a tennis ball with a racquet.
- ◆ Forgetfulness about steps in writing (order of letter strokes).
- ◆ Inability to “imagine” how the final written page will look.
- ◆ Inability to transcribe what can be said into written form.



# 7. Cognición social



Los lóbulos frontales y prefrontales están asociados con la cognición social.

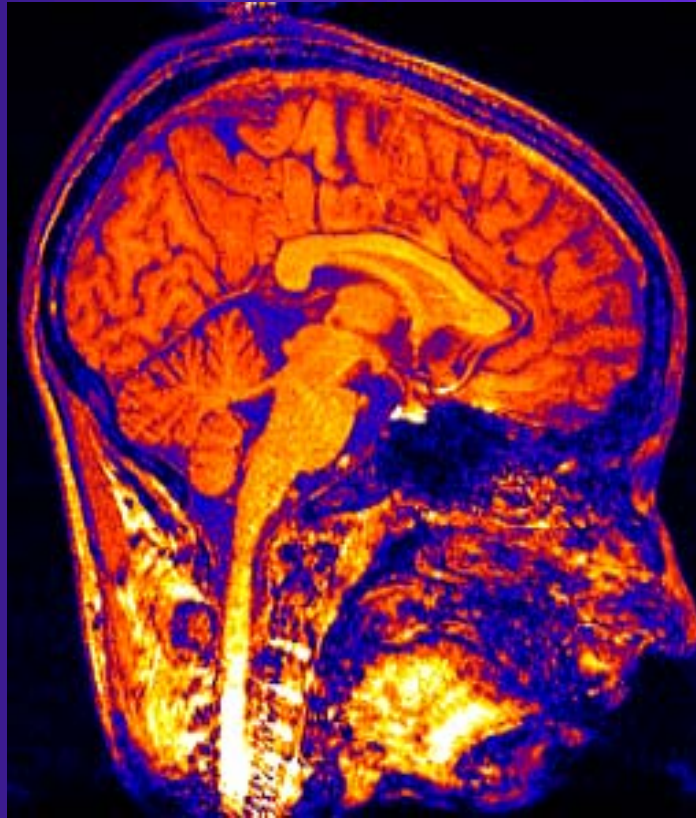
- ◆ Pragmáticas verbales
  - Comunicación/interpretación de sentimientos
  - Regulación de humor
  - Técnica conversacional
- ◆ Comportamientos sociales
  - Auto marketing
  - Colaboración
  - Resolución de conflictos
- ◆ Perspicacia política



# Examples of Social Cognition Problems

- ◆ Difficulty interpreting feelings as expressed through words.
- ◆ Trouble judging appropriate moments/audiences for certain jokes.
- ◆ Problems starting and maintaining conversation.
- ◆ Lack of clarity in how to “sell oneself” (lack of understanding of how others perceive you).
- ◆ Trouble managing conflictive situations, often in fights for what has been said or misinterpreted.
- ◆ No chance at being a “good” politician.

## 8. Cognición de orden más alta



- ◆ Formación de conceptos
  - conceptualización no verbal
- ◆ Pensamiento crítico
- ◆ Creatividad/lluvia de ideas
- ◆ Resolver problemas
- ◆ Uso de reglas
- ◆ Razonar/pensamiento lógico
- ◆ Representaciones mentales

La cognición de orden más alta es una actividad de todo el cerebro, pero está asociada principalmente con los lóbulos frontales.



# Examples of Higher Order Cognition Problems

- ◆ Trouble organizing intangible concepts (based on language of otherwise).
- ◆ Inability to reflect and judge situations.
- ◆ Inability to brainstorm in groups or be creative individually.
- ◆ Trouble tackling problems (written or oral).
- ◆ Difficulty applying rules.
- ◆ Trouble thinking logically and applying basic rules of reason.
- ◆ Inability to form mental images of concepts.



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