

# **Brain Push-Ups**

## **DCC Elder Week 2010**

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# 1. Why talk about Brain Health?

- Increase aging population
  - People living longer with chronic conditions.
  - Health Care Crisis
  - Change in attitudes toward people with disabilities

# 1. Why talk about Brain Health?

- Better imaging techniques of the living Brain
  - New neurons and new neural pathways throughout a lifetime.
  - Brain changes – interaction with environment
    - Needs stimulation.
  - Neuroplasticity—When one part is damaged other parts take over.
  - Cognitive Reserve—Nun Study
  - Beginning to understand relationship between arterial diseases, inflammation and cognitive functioning.

## 2. Distinction between Mind and Brain

- Brain
  - Physical structure
    - What is looked at in an autopsy
- Mind
  - Feeling, thinking
    - Sub-conscious—unaware
      - **emotion, intuition, imagination**
      - **Non-Declarative—automation action, learned motor activities**
    - Conscious—cognitive thought
    - Declarative Memory
      - **Learned information such as facts and events**
      - **The relationship between pieces of information**

# 3. Baby Brain Talk

- What is a Neuron?
  - Nerve cell of the brain
  - Electrical impulses jump from neuron to neuron (synapse)
  - Jump is facilitated by chemical secretions called neurotransmitters
- What happens when Neurons get together?
  - They form patterns which get activated by similar stimuli.
  - These patterns may branch out to different parts of the brain

# 3. Baby Brain Talk

- The brain is comprised of three main parts:
  - The Cerebral Cortex
    - The thinking brain
  - The Mid Brain
    - The limbic system (Hippocampus)
    - Seat of emotion
  - Hind Brain
    - Automatic functions like breathing
- The brain is divided into two halves joined by the Corpus Callosum.
  - Right and left sides have different functions but are seamlessly integrated

# 4. How to Maintain a Healthy Brain

- Nutrition
  - Alcohol in moderation
- Physical Exercise
  - Improve balance to prevent head injuries through falls
- Sleep
- Check for negative medication interactions
- Check for environmental pollutants

# 4. How to Maintain a Healthy Brain

- Medical and Dental Check-ups
  - Control conditions—inflammation of the blood vessels
- Mental Health
  - Maintain a Positive attitude
    - Depression
      - **catastrophizing**
    - Stress
      - **Pain and illness**
      - **Loss of functions**
      - **Loss of loved ones**
      - **Daily requirements of living**

# 4. How To Maintain a Healthy Brain

- Mental Health con't
  - Socialization
    - Maintaining links to family and friends
  - Focused attention
    - Prayer
    - Meditation
    - Intense involvement
      - **Being in a state of Flow**
      - **Doing something creative, new and stimulating**

# 5. Memory and Attention

- Experience the world
  - Input—experience
  - Output— response
- Input is like a digital video camera
  - Lens is the sensory system
    - Vision
    - Hearing
    - Taste
    - Touch
    - Smell
    - Sense of moving through space
  - Lens just captures what goes by it. Image is fleeting.

# 5. Memory and Attention

- Working memory—Snap to take video
  - Temporarily stored
  - If not downloaded to the computer, new video will write over the images
- Long Term memory
  - Video is downloaded to the computer
  - It is put into a file so that it can easily be retrieved.

# 5. Memory and Attention

- Input Techniques
  - Association
    - **Attach to a familiar picture or sound (mnemonic device)**
  - Repetition
  - Rehearsal
  - Chunking
  - Multi-sensory Stimulation

# 5. Memory and Attention

- Output—Retrieving the Video Clip
  - Recall
  - Recognition
  - Association
- Different Types of Memory
  - Episodic Memory
    - Time and place, one's life story
  - Semantic Memory
    - Facts, things data stored as verbal memory
  - Procedural Memory
    - The sequential steps of a task

# 5. Memory and Attention

- Facts about Memory
  - Memory and Attention
    - Stimuli that is moderately novel attracts attention
    - Attention is necessary for experience to be encoded in a way that it can be intentionally retrieved
  - Memory and Emotion
    - Memory becomes more permanent if it is paired with a strong emotion
    - The hippocampus plays a role in moving memory from short term to long term storage
    - Prolonged stress changes neural pathways

# 5. Memory and Attention

- Memory and Reliability
  - Subject to suggestion
  - Brain fills in the gaps in perception
- Memory and Continuity
  - Intact memory gives life meaning
  - Working knowledge of people places and things
  - Feeling of permanence of personality
  - Predictability of future life events

# 6. The G Factor

- Functional Intelligence
  - Processing environmental stimuli
    - Identify Patterns
    - Sequence
    - Awareness of time
    - Categorize by attributes
      - Such as Similarities and differences
    - Mental manipulation
      - Perceive from different vantage points
      - Representation of the world through use of models

# 6. The G Factor

- Think in the Abstract
  - Simplification or essence of a series of concepts
  - A complex construction condensed into one word or a simple form
  - Use of metaphor to convey complex ideas
- Ability to solve problems and predict their outcome.
  - **Ability to construct alternative solutions**
- Quick reaction time in completing a timed task.

# 6. The G Factor

- Interpreting Experience
  - Visual Perception
    - Visual discrimination—figure ground
    - Visual integration—attention to some details and not others
    - Viso-spatial perception
      - The mental manipulation of yourself or an object in space
      - Seeing three dimensions on a two dimensional surface
    - Hand-eye coordination

# 6. The G Factor

- Interpreting Experience
  - Language
    - Processing semantic message of sounds or signs
    - Reading
      - Decoding symbols into sounds and sounds into words
    - Interpretation
      - Understanding of idioms and proverbs in the context of their intended semantic meaning
    - Verbal Expression
      - Ability to tell a story
    - Written expression
      - Ability to organize thoughts into written sentences

# 7. Exercise Your Cognitive Prowess

- Vary your activities and stimulate those neurons to build new pathways.
- Try something new
  - Try using other parts of your brain
  - If you enjoy playing cards, add a verbal activity to your list. Try Scrabble
  - If you like to do Sudoku, make sure you exercise those language skills.
  - If you like to read, join a book group to socialize.
  - Get in the flow, find a creative activity you enjoy.