I. The CEO of the Brain

Cognitive capacities located in the frontal lobe of the brain, more so than any other brain region are essential to live and thrive as an adult. A range of brain functions, from basic alertness to working memory, judgment, goal execution and self-control depend upon the frontal lobe and its connections. For good reason it is sometimes referred to as the CEO of the brain.

Whether engaged in learning, complex decision making or keeping our cool under stress, the frontal lobe is critical to succeed in life.

A. Executive Processing

The ability to get started on complex goal-directed behaviors requires the coordinated efforts of the prefrontal cortex and the anterior cingulate areas of the brain. These abilities include mental alertness, focus, concentration, persistence to task, freedom from distractibility, speed and efficiency of information processing and working memory.

1. Start your engine!

Goal directed activity begins with the ability to remain alert and avoid dozing off, initiate task activity as well as sustain physical effort until the job is done. Like breathing and heart rate, these activities are beyond conscious control.

Arousal

Trouble staying awake, signs of drowsiness and inability to respond to target stimuli can be associated with drowsiness, encephalopathy or confusion. Usual culprits include anesthesia following surgery, pain medications, heart problems or kidney infections. Mental dullness, cognitive slowing and response delays are less serious forms of frontal lobe impairment.

Initiation

Spontaneous problem solving is the ability to generate problem solving ideas, “get going” or “get started” on a physical or mental activity. Deficits in mental initiation are associated with poor self-care
skills, resulting in risk of failure to thrive and self-neglect in the home. For example, failing to drink enough fluids, eating nutritious meals on regular basis or taking medications as directed.

**Stamina**

Attentional energy, endurance and vigor are required to avoid running out of steam before completing a task. Lack of stamina can result in piles of uncompleted tasks and along with inertia, can result in self-care issues.

### 2. Information Processing

#### Central Processing Speed

The time it takes to perceive and respond to visual or auditory sensory stimuli. Delays in auditory processing speed can be associated with problems listening and comprehending instructions, “catching on” and understanding key information during conversations. Delays in visual processing can result in problems in spatial relations and whole to part relationships. Reading and math are two subjects where accurate perception and understanding of spatial relationships are very important. Both of these subjects rely heavily on the use of symbols (letters, numbers, punctuation, math signs).

#### Perceptual Processing Speed

Delays in visual processing can result in the inability to rapidly read, comprehend and recall written information and instructions. In addition, poor perceptual skills can lead to problems in organization skills, including ability to set priorities, stay on task, complete tasks in a timely manner as well as follow work through to completion.

#### Motor Processing Speed

Delays in simple motor reaction time can be associated with physical or mental fatigue, normal aging or a neurodegenerative disorder.

#### Working Memory

Active or immediate memory allows one to simultaneously process and manipulate information during problem solving. Delays in processing speed have the effect of rapidly overloading the limits of active memory. Performance is measured on various auditory mental control tasks including mental computation, digit recall forward, backward and sequencing. Visual mental control is measured on a symbol span task. Working memory is essential to multitasking, carrying out multistep activities or following complex instructions.

### 3. Attention Processing

#### Attention Regulation Not Attention Deficit

Inattention can frequently be traced back to delays in central processing speed. What is frequently referred to attention deficit disorder, upon careful examination reveal problems with modulating and
regulating attention under changing environmental demands. Think of attention as a radio that is experiencing difficulty picking up certain frequencies at the end of the dial.

Deficits in attention regulation can result in problems disengaging attention, alternating attention between two tasks or exhibiting inattention under high or low demand conditions because of relative delays in auditory or visual central processing speed. Common patterns include drifting off under less challenging or predictable conditions as well as inability to keep up the pace under the firehose of real life demands.

The Attention Spectrum

Attention is measured on a spectrum of skills ranging from simple vigilance and focus to sustained concentration, selective attention and more complex divided attention skills. Alternating attention requires one to rapidly shift attention back and forth between two activities to complete one task.

Cognitive shift of set allows one to successfully keep track of problem solving successes or failures as well as identify and correct mistakes during behaviors. Along with working memory and perceptual processing speed, divided attention is one of the essential cognitive functions required to multitask, complete advanced activities of daily living such manage one’s medications and finances as well as safely operate a motor vehicle

B. Executive Control

Modulation, Regulation, Balance

Separate brain functions are required to stay on course throughout the day and complete activities. Executive control skills are what allows us to remain motivated, mentally flexible and under emotional control. The ability to achieve a balanced state of heightened awareness, focus and emotional detachment is critical for learning and strategic problem solving to take place.

1. Mindfulness

Thought monitoring allows one to organize one’s thoughts and convey main ideas in a coherent fashion without repeating oneself or slipping off track. Mindfulness is dependent upon attention processing and is located in the dorsolateral prefrontal cortex of the brain. Inability to remain mindful, either by drifting off when bored or trying to juggle multiple conversations in your head can result in lapses in attention. In the same way we attempt to multitask actions, we tend to multitask thoughts, often with poor outcome. Single mindedness can pay off.

2. Mental Flexibility

Cognitive shift allows one to adapt to changes in routine or task demands, problem solve under duress, change focus from one mindset or topic to another and successfully navigate life transitions. Glitches in the anterior cingulate region of the brain can result in the inability to avoid worrying or repeating the same negative thoughts over and over.
As you recall, the anterior cingulate is part of the limbic system, and receives input from the amygdala, the fear based center of the brain. This is why, under heighten emotional arousal, when mental flexibility would be most helpful, we tend to get stuck and repeat ineffective problem solving strategies.

3. Emotional Control

Knowing how to avoid impulsive behaviors and learning from one’s own mistakes is associated with the orbitofrontal cortex. Self-control is associated with circumspective, mindful, careful, and cautious behavior. Individuals prone toward either poor thought monitoring or flexibility may experience signs of lowered frustration tolerance when fatigued or problems maintaining emotional control when routines or perspectives are challenged.

C. Problem Solving

Figuring Out the Game Plan

The ability to accomplish your game plan and achieve your goals requires a combination of intellectual abilities, such as general knowledge and verbal reasoning in combination with analytical and conceptual reasoning abilities.

Keep in mind, that while general knowledge and verbal reasoning skills are necessary for advanced problem solving, they are insufficient for independent living. In contrast, abstract reasoning and concept formation are more relevant to real life learning. There is no rule book in life.

While intelligence, both verbal and analytical reasoning skills are critical in making informed decisions, by no means is a high IQ enough to live and thrive independently. What is needed is executive functioning, a frontal lobe skill.

Executive functioning is considered the conductor of the brain, orchestrating critical skills necessary for higher order reasoning. Self-insight, judgment, strategic planning, realistic goal setting, outcome prediction and perseverance all dependent on executive function that is operating in tip top condition. Strategic thinking is essential to independent living and allows you to map out a goal based on past experiences as well as change direction when life sends us off course.

1. Crystallized Intelligence

General knowledge and language skills or what is sometimes referred to as “book smarts,” are acquired through the left hemisphere of the brain. As we expand our knowledge base we create a dense network of interrelated information. This deep data bank allows us to rapidly assimilate new facts, through a process called chunking, and make the most of our limited working memory space.

Repeated learning, or consolidation, also ensures information is resilient to injury, which is why it is called crystalized intelligence. Over time, factual knowledge, in addition to life experience, skills and habits become hard wired into place and are stored in the medial temporal lobe.

Crystallized intelligence stays relatively stable across most of adulthood and gradually begins to decline after age 65. In most cases, information is not lost; it just takes longer to access.
2. Fluid Intelligence

Conceptual problem solving is the capacity to think logically and solve problems in new situations, independent of acquired knowledge. To think analytically requires the capacity to solve novel problems, to learn, to reason, to see connections and to get to the bottom of things. Fluid intelligence relies on visual, spatial analysis as well as motor speed and dexterity as found in the right hemisphere of the brain.

Because fluid intelligence depends on cognitive and motor reaction time, it peaks in young adulthood and then steadily declines. Age related damage to the cerebellum, one of the motor centers of the brain; in combination with delays in processing speed are two major culprits in reducing fluid intelligence.

3. Executive Function

Strategic problem solving or executive function, involves the ability to anticipate future events, set goals, develop a strategy and the necessary sequential steps in order to successfully carry out a task. More important, it allows one to realistically evaluate results and self-correct to achieve a different outcome.

Self-insight is also part of the executive team and allows one to acknowledge and accept cognitive and behavioral limitations. For this reason it is considered the highest of all brain functions. Self insight is the gateway for transformative change in our life.

**Executive Function: AKA “How to Get What You Want Out of Life”**

![Executive Function Diagram]

**The Answer to Brain Freeze**

Executive function relies on cognitive capacities located in the frontal lobe. While the frontal lobe is very powerful, the downside is that it is not very resilient. The frontal lobe can be easily knocked
offline, adversely affected by normal aging, medications, head trauma, heart and lung disease, neurological disorders as well as anxiety and depression.

The good news is strategic thinking allows you to bypass or compensate for deficits in frontal lobe function. Learn to level the playing field by working smarter not harder. Strategic problem solving is not a gift, it is not inherited or a type of intelligence.

**Work Smarter Not Harder**

Actually, strategic thinking involves nothing more than development of effective life management habits. Like any athletic or musical skill, strategic thinking relies on procedural or motor memory, skills located in the back of the brain. The more you practice new behaviors the deeper they get hard wired into the brain. However, you will need to continue to practice any skill to keep it sharp.

Executive function skills such as self-discipline, good habits and organization are the ticket to overcoming glitches in the frontal lobe of the brain.

**A Wise Investment for the Future**

The truth is that life just keeps getting more complicated, with increasing demands on time, money and energy. These precious resources need to be carefully allocated for what is most important in our busy lives. Getting into a habit of tuning in and checking your resources before making a move can be a wise investment.

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**Navigate Life Transitions Better**

- **Strategic Problem Solving**
  - Mindfulness
  - Self Discipline
  - Good Habits
  - Organization
  - A Skill You Can Learn, Relearn Or Improve At Any Age
  - Better Organized
  - People Are Less Forgetful
  - Work Smarter, Not Harder