

Neuroscience, Zen, and the Art of Coaching for Habitual Excellence



Process Quest, LLC

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17 September 2013

Overview

Neuroscience and Human Performance

- Neuroplasticity
- chemical effects on learning, memory, and performance
- Why some performers choke and others thrive under pressure

Neuroscience and Zen

Coaching with Neuroscience (and Zen) in Mind

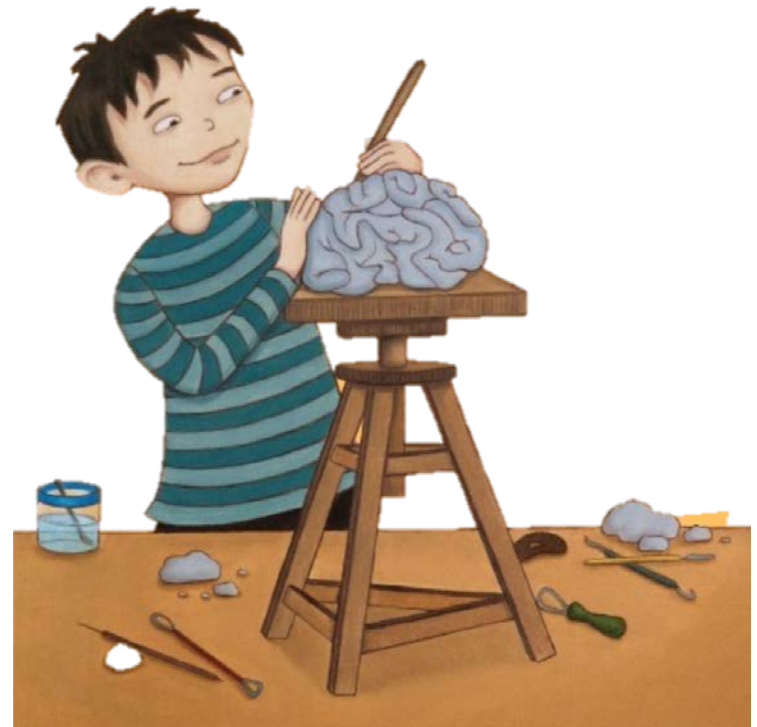
Neuroscience and its Role in Coaching

Neuroscience is the scientific study of

- the structures and functions of the brain and nervous system
- how psychological functions are produced by the neural circuitry

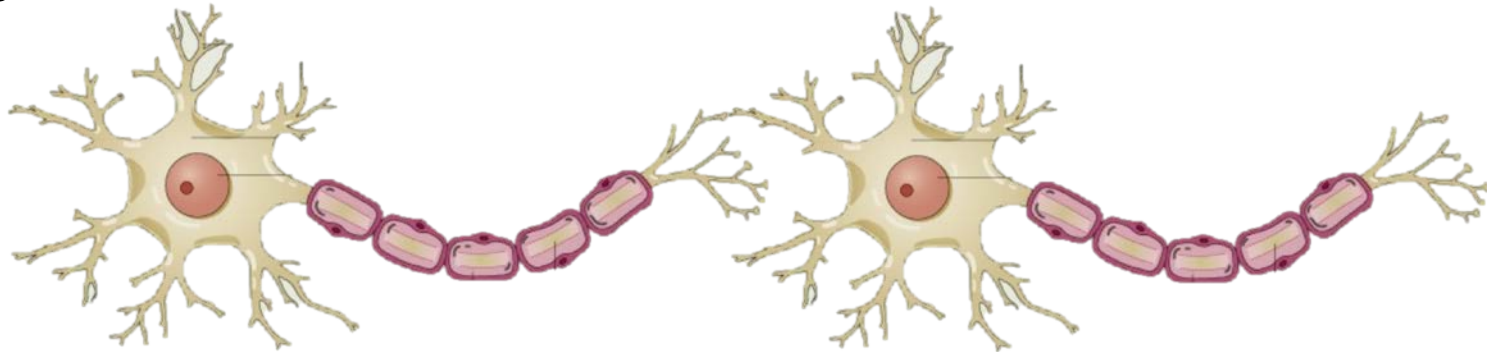
Neuroplasticity is the ability of the brain to reorganize itself throughout life – and the basis for how we learn, how we perform, and how we can *use the brain to change the brain* (for the better).

Understanding the science behind the workings of the brain can facilitate coaching by enabling the use of “tools” to enable optimal performance under a variety of conditions.



Neurons and Neural Networks

Neurons (“nerve cells”) transmit, receive, and store electrochemical signals.



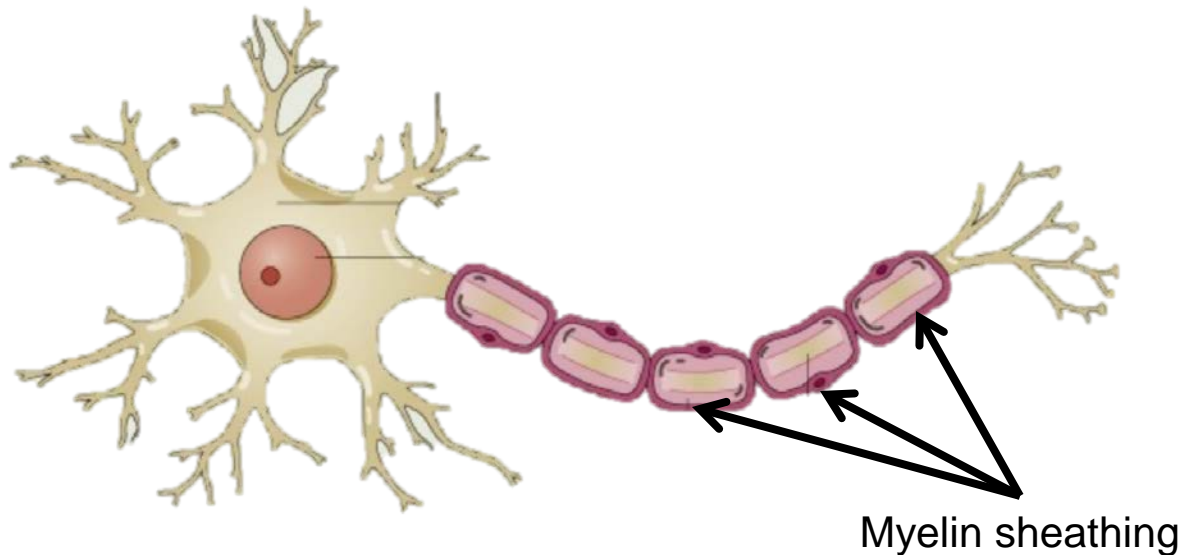
Neural networks are groups of chemically connected or functionally associated neurons.

- A single neuron can be connected to numerous other neurons.
- The connection point (synapse) where two neurons meet usually occurs between dendrites to axons.
- Signals are transmitted across synapses by *neurotransmitters*.

Signal Transmission Among Neurons -1

Myelin is a white fatty substance that coats neural axons and facilitates the transmission of electrical impulses along length of each neuron.

- Thicker layers of myelin result in faster signal transmission.
- Myelin also attracts other neurons – strengthens existing neural networks or creating new ones.
- Myelin is built up through action and repetition; it can atrophy from disuse or disease.



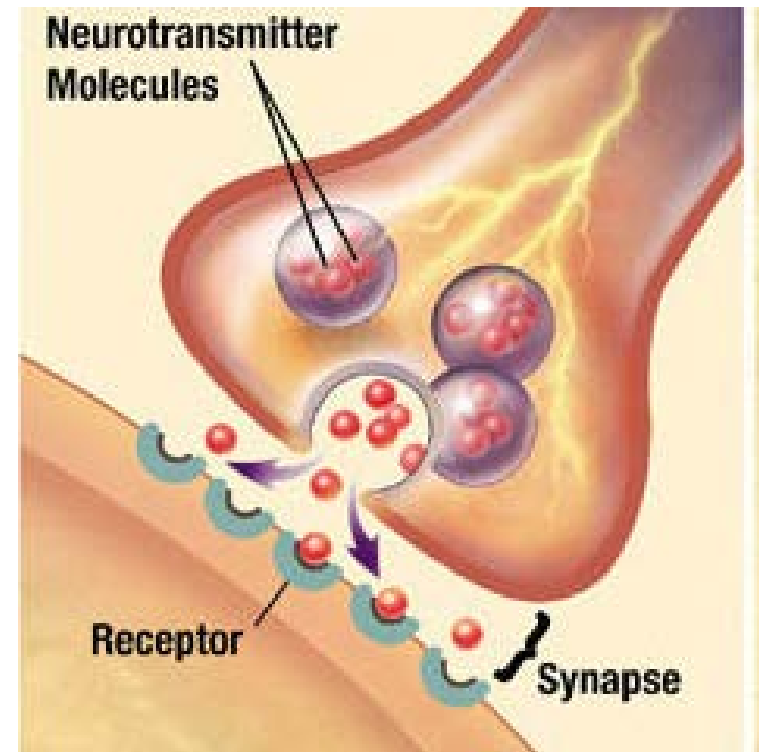
Signal Transmission Among Neurons -2

When the electrical signal reaches the terminal nodes of the axon, it triggers the release of chemical *neurotransmitters*.

- Made in the neuron cell body
- Stored in axon terminals nodes
- Released into the synaptic gap

There are at least 50 types of neurotransmitters.

- Each sends a different message type.
- Each is recognized (or not) by receptors on dendrite surfaces.
- Transmission affects the action potential in the receiving dendrite.
- After release, they are destroyed or “recycled” back into the original axon.



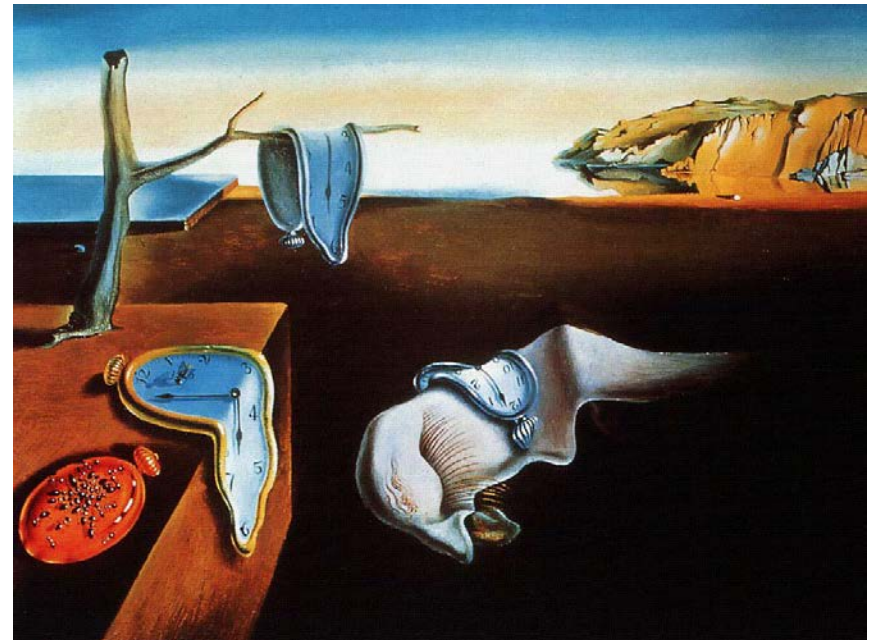
Hebb's Theory

Repeated activation of the same neurons by the same stimuli stimulates the formation of neural networks.

- A neural network is created or modified every time new learning occurs.
- Disused neural networks may be “pruned,” freeing the associated resources.

“Persistence or repetition of an activity tends to induce lasting cellular changes that add to stability and synaptic strength between neurons.” (*Neurons that fire together, wire together.*)

The neural networks that are used most often can actually fire automatically when given the right cues or conditions.



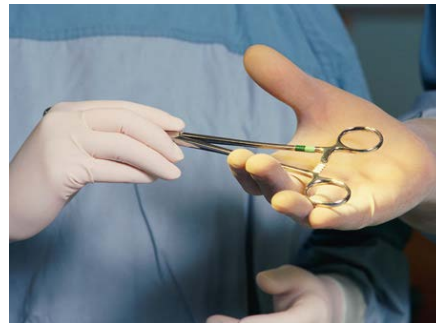
The Persistence of Memory (Salvador Dali, 1931)

Habitual Behavior / Automaticity

Habits are acquired patterns of behavior that

- occur automatically in response to a specific environmental cue
- include a neurochemical reward component
- are triggered by a physiochemical or psychological need

Automaticity (“unconscious competence”) is the ability to perform a task without overtly thinking about the component sub-tasks / knowledge it is a habit without the “baggage.”



Automaticity is the sign that something has been mastered. It indicates the presence of a well-developed neural network with components that can (and often do) bypass manipulation in the working memory.

Automaticity is a “Green” Adaptation

Brain tissue consumes a large amount of energy in proportion to its volume – in humans, 2% of body mass uses 25% of metabolic energy.

Brain functions have evolved to use energy as efficiently as possible.

- Selective / focused attention
- Limited resources for working memory
- Hard-wiring for critical functions

Myelin and neurotransmitters enable automaticity.

- Myelin does not unwrap, only gets thicker.
- Neurotransmitters regulate *synaptic pruning*.



Established neural networks can transmit signals 100 times faster and more efficiently than neurons that are not networked.

Automaticity, Performance, and Stress

Automaticity in the performance of routine tasks allows individuals to direct limited cognitive energy towards more purposeful activities.

- keeps frequently used skills/ knowledge out of working memory
- frees cognitive resources for creativity, problem-solving

Automaticity is both dependent on and susceptible to the effects of neurotransmitters.

- Neurochemicals are needed for neural network formation.
- Neurochemicals can disrupt or enhance established network functions.



Choking



Clutch Performing



Flowing

Overview

Neuroscience and Human Performance



Neuroscience and Zen

Coaching with Neuroscience (and Zen) in Mind

What is Zen?

“One way to think of Zen is this: a total state of focus that incorporates a total togetherness of body and mind: Zen is a way of being; it also is a state of mind. *Zen involves ... seeing things without the distortion created by your own thoughts.*”

- *Urban Dictionary*



Zen is

A *discipline*

- set of processes and practices that are followed in order to reach a goal
- following the way requires continuous, conscious effort over a lifetime
- correct implementation of the way means forward progress towards the goal

A *mindset* with focus on the present, in both internal and external worlds

- conscious attention / focus on the present moment
- filtering out distractions
- recognizing and acknowledging present conditions as they are, without assessing or judging – “it is what it is”

A *study of* the (often contradictory) *dualities* that exist in our worlds

- “Reality” is subjective and fluid – what we experience affects our perceptions and our perceptions affect our experiences
- Individual experiences affect perceptions differently in each person: my reality is not and never will be the same as your reality (or my reality in other times)
- The act of examining reality changes reality.

Neuroscience is a “Zen” Field of Study

Learning and performing are energy-intensive activities that happen best in conditions that include *discipline* and the proper *mindset*.

- set of processes and practices that are followed in order to reach a goal
- consciously focusing on what is happening in the present, filtering out distractions
- requires continuous, conscious effort over a lifetime

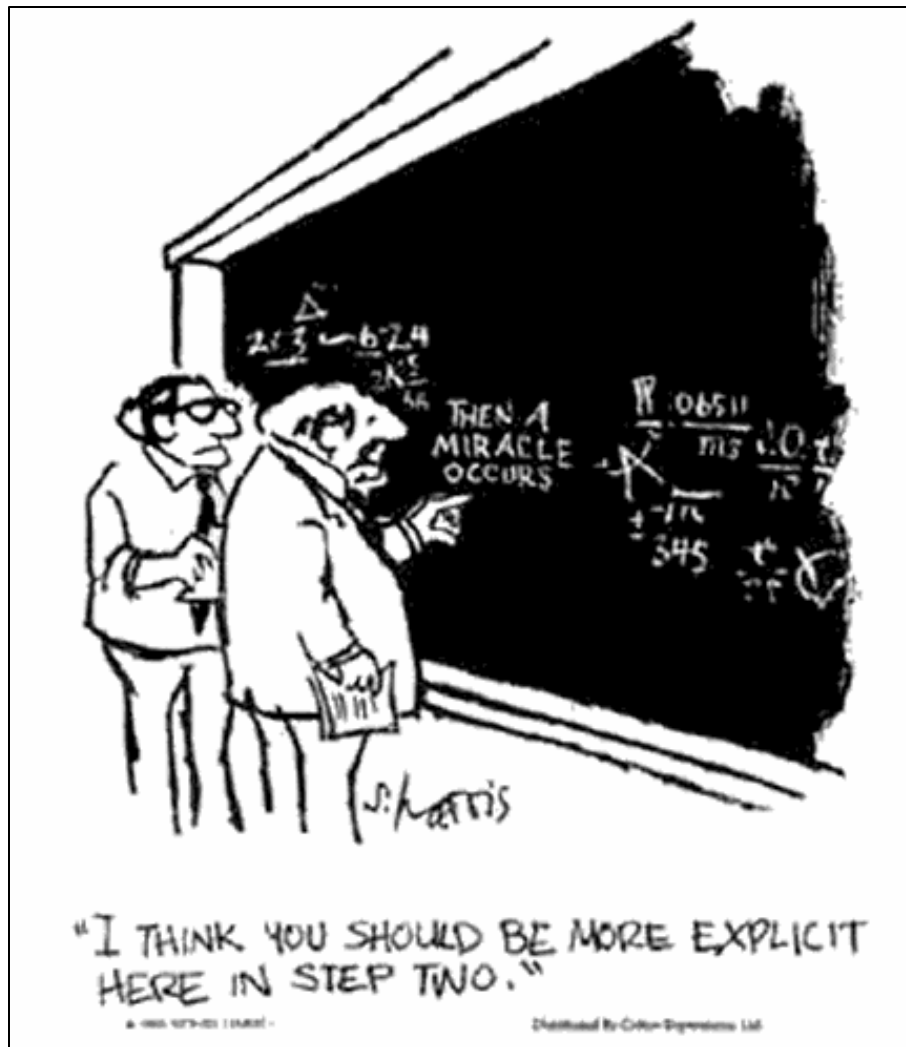
“Knowledge” is subjective and fluid.

- What we learn is filtered through and colored by our past experiences that influence what and how well we learn.
- Even if people “know” the same thing, they know it differently than others.
- The acts of learning and performing change what we know and do.

Neuroscience is a study in *dualities*.

- Physical structure (from neurons to hemispheres)
- The same structures and functions can have different functions and operating parameters under different physical and biochemical conditions.

How Neuroscience and Zen Intersect....



Overview

Neuroscience and Human Performance

Neuroscience and Zen

▶ Coaching with Neuroscience (and Zen) in Mind

- Automaticity in performance: Choking, clutch performing, and flowing
- Coaching as a tool for optimizing automaticity in performance

Choking: Automaticity Disrupted

Choking is suboptimal performance by a skilled individual under pressure in high-stakes circumstances.



The act of attempting to consciously control the performance of mastered skills short-circuits the workings behind automaticity.

Source: Beilock, 2010

Choking: Stress on Steroids

Stress can be a *physical* threat or a *situation that the brain interprets as* a threat.

- actual: attack / assault, accident, natural disaster, injury
- perceived: worry, self-consciousness, anger, fear, surprise

All stress is interpreted the same way by the limbic system and generates the same physical response(s) via adrenaline and cortisol:



Fight



Flight



Freeze

This is Your Brain on Cortisol

Cortisol changes how the pre-frontal cortex (PFC) works.

- PFC functions include regulating intense emotions, impulse control, decision-making, and problem-solving, and creativity
- PFC is also the (likely) location of the working memory
 - worry or anxiety uses resources (time and capacity)
 - oldest / most established functions get first priority with limited resources
 - reduces analytic and decision making abilities
 - working memory cannot access unconscious (automatic) functionalities

Attempts to consciously control skills/knowledge that has reached automaticity-level performance leads to

- overthinking – with the wrong resources (too much information and/or the wrong information): *analysis-paralysis*
- emotions triumph over reason: *blind panic / rush to (rash) action*

Stress and analysis-paralysis/panic form a negative feedback loop.

Clutch Performing: Automaticity Enabled

Clutch performing occurs when a person in a stressful situation performs at/above the normal (“unstressed”) level of competence.



Elements of Clutch Performing

Focus: on the desired performance outcome, NOT on the “reward”

- directed, goal-oriented self-talk (“smooth motions,” “balance”)
- ignoring or shutting out distractions

Discipline: trust the process, and trust the brain

- ignoring or shutting out distraction
- not thinking about what has already gone wrong; focusing on what’s working

Adaptability

- using the process to work the problem
- abandoning the plan if it’s not working

Presence in the moment

- focus on the right performance of *this* step only
- don’t anticipate the outcome (no mourning or celebration before its time)

Desire balanced by fear

- desire: for doing the best performance possible
- fear: of being bested by own past performances

Source: Sullivan, 2010

Why Clutch Performing Works

Discipline

- solid mastery of skills and knowledge
- practice of sufficient quantity and quality
 - under normal *and* stress conditions
 - using multiple strategies, considering multiple contingencies

Mindset

- positive self-talk (“I am ready. I am prepared. I know how to do this.”)
- mental imagery: visualizing possible scenarios, then visualizing successful performance under the various conditions
- relaxation cues: techniques to quell anxiety when feeling tense
- constructive control: adjust pace, timing, strategy, message to fit the actual circumstances
- naming and owning the fear of failure: acknowledge the fear and meet it head on rather than avoiding it
- meditation or relaxation practices prior to performance

Flowing: Automaticity Empowered

Flow is mindful, focused performance – “Zen” automaticity.

Flow is characterized by

- intense, focused concentration on the present moment
- merging of action and awareness
- loss of reflective self-consciousness
- a sense of personal control
- the distortion of temporal experience
- intrinsic reward from the experience itself



Source: Csíkszentmihályi, 1990

Why Flow Performing Works

Flow performance shares elements of master performance attained through *deliberate practice*.

- clear and motivating goals that are both challenging and attainable
- strong attention that is focused on the present, not the whole picture
- focus is on the activity itself (the process), rather than the outcome
- immediate feedback is available (from internal or external sources)
- performance awareness overcomes self-consciousness
- performance for the sake of performing (intrinsic versus extrinsic reward)
- performance is balanced between current skills and challenges (“stretch”)

Flow performance not only reinforces and maintains skills, it stimulates growth.

- Mastery level performances tend to stabilize over time.
- Once a skill is mastered, new challenges must be attempted in order to maintain the state of flow.

Stretch

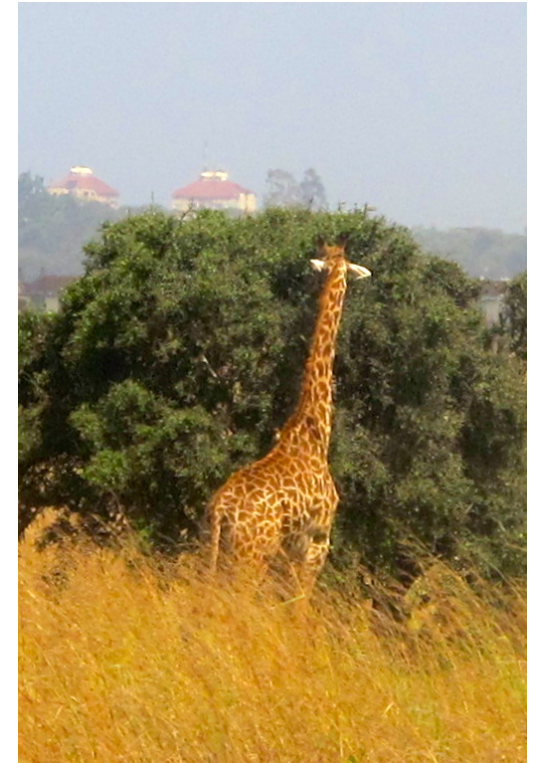
The brain learns best in “stretch” conditions:

- affect balanced between stress and comfort
- environment is challenging but not threatening

Stress triggers emotional responses in the limbic system (controls memory formation and retrieval).

- Too much anxiety inhibits short term memory
- Too little anxiety prevents focused attention to stimuli
- Positive experiences stimulate release of dopamine

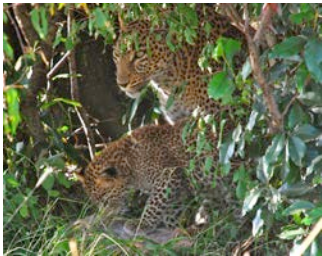
Stretch conditions help to create a state of “relaxed-alertness” – the optimal neurological environment for learning and performing.



Relaxed-alertness: A Koan for Learning and Performing

Relaxed-alertness is the optimal condition for learning...

- Interesting challenges promote myelin- and neural network-building
- Attainable challenges stimulates release of pleasure neurotransmitters



... and for performing.

- Similar conditions for learning / performance enable automaticity.
- Too comfortable / too stressful conditions adversely effect automaticity.

Coaching for Optimal Performance

Focus on

- Following the process in a disciplined way
- Directing mindset
 - Focus attention
 - Acknowledge, then ignore, distractions
 - Work on the now
 - Emphasize the positive
- Practicing correctly
 - authentic conditions
 - Appropriate feedback
 - Stretch for continuous growth and improvement
- Setting appropriate goals
 - Performance-based, not reward-based
 - Continuous improvement – excellence as a journey

Coaching is about giving direction, not answers.



Neurology, Zen, Coaching, and Habitual Excellence

The idea that **the brain can change its own structure and function through thought and activity** is, I believe, the most important alteration in our view of the brain since we first sketched out its basic anatomy and the workings of its basic component, the neuron.

- *Norman Doidge, The Brain That Changes Itself*

Coaching is the art of facilitating the performance, learning, and development of another – it is **unlocking a person's potential** to maximize their own performance.

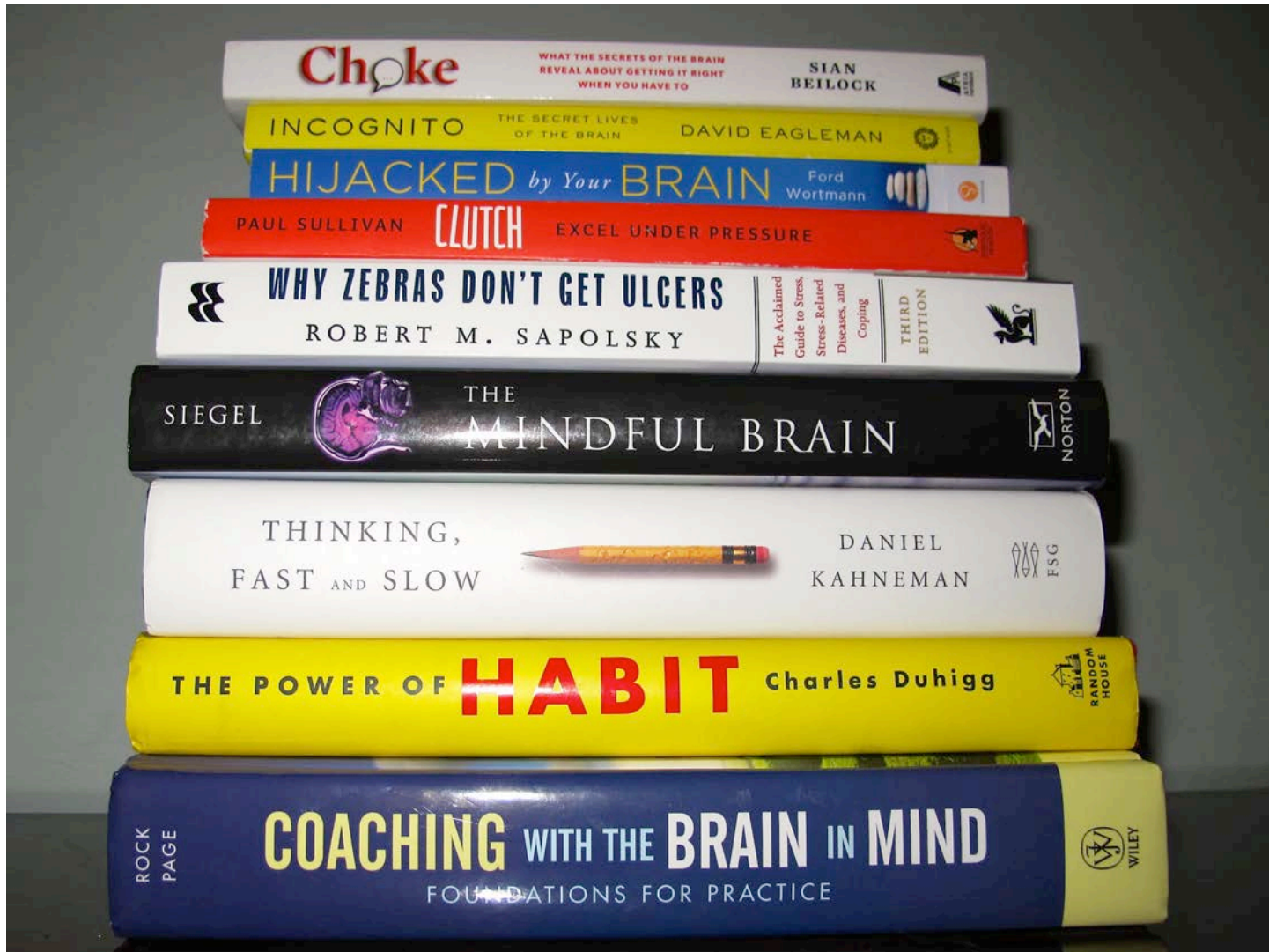
- *Timothy Gallwey*

Excellence is an art won by training and habituation: we do not act rightly because we have virtue or excellence, but we rather have these because we have acted rightly. **Virtues are formed by actions - we are what we repeatedly do.** Excellence, then, is not an act but a habit.

- *Aristotle*



For More Information...



Questions?

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