

Designing a Climate for Closing the Achievement Gap



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Self-Regulation

Self-regulation relies on the prefrontal cortex controlling the subcortical regions associated with reward and emotion

- Predictive
 - Emotional stability
 - Social success
 - Academic performance

Understanding Human Behavior

- Heredity
“Where you start”
- Temperament
“How you react”
- Exposure
“What you adjust to”
- High emotional experiences
“What you do when stressed”



The Result of Chemical Imbalance

- Problems
 - Emotional
 - Physical
 - Cognitive
- Milestones
- Language deficits
 - Dorothy Otnow Lewis, M.D.

How Does the Brain Naturally Manage Hereditary Issues?

- Compensation
 - Heighten other senses
 - Develop alternate pathways to restore functions
- Stress
 - Neurogenesis – Elizabeth Gould

- Any treatment design or setting that allows stress to be pervasive will fail.
 - When it appears successful, the individual was healthy.

Step 1: Ritualize Major Transitions



The Predisposition of How You React to Stimuli

Based on your understanding of temperament

- Learn
 - Based on what we know
- Ritualize
 - To help chemical balance
- Parenting helps reshape chemical reactions
 - When vagal tone does not decrease, it prevents the heart from appropriately responding to stress.
 - A variant of DRD2 dopamine receptors
 - Exposure to sensitive parenting counteracts some effects.

Anchor Points

- Life – wake-up, main meal, bedtime
- School – entry, lunch, dismissal
- Class – beginning & dismissal
- One-on-Ones – greeting, and departure

First Time the Impact of Ritual Has Been Studied

- Life's meaning is found in mundane habits.
- Emotional experiences that produce emotional response provide conscious memorable moments.
- The ability to experience those emotional events productively is based on the quality of life rituals.
 - Heintzelman, Trent, & King 2013



Rules for Designing a Ritual

- Taught
- Practiced
- Consistently reinforced

What Does Establishing a Safe Predictable Environment Mean?

- Ritualize the major transitions in the school day
 - Reduce stimuli
 - Use multiple entry points and exit points
 - Stagger when possible
 - Have specific procedures
 - Tell people what they should do to be successful (not rules).
 - Teach & practice
 - Too many assume that adults and students know procedures (not true).
 - Reinforce

- Adult supervision involves everyone.
- Praising desired behaviors is a priority.
- Occasional rewards
- Always remind students when they fail to follow the correct procedure.
 - ♦ No punitive measure required
- Utilize the science
 - Nonverbal cues
 - Make sure students understand that procedures are there to make them safe.

Exposure

“What you adjust to”

“Those who have limited experience, usually adjust slower to new situations.”

- Less Cognitive Stimulation
 - Less access to home learning resources, books, and computers and smaller designated play spaces
 - Fewer literary learning opportunities (e.g., reading aloud or visiting the library)
 - Spoken to less often, hear less complex words, and hear less encouraging language
- Stressful and Living Conditions
 - More crowded and noisier
 - More neighborhood crime and violence
 - More polluted water and air (e.g., lead)
- Harsh Parenting and Family Instability
 - Exposed to harsher and less responsive parenting
 - Exposed to family turmoil, domestic violence, and conflict

Poverty Reduces Brain Volume

- Frontal Lobe
 - Manages executive cognitive functions
 - Planning, organizing, problem-solving, paying attention, and impulse control
- Parietal Lobe
 - Processes sensory information
- Hippocampus
 - Learning, memory, and stress response
- Amygdala
 - Emotional and social information

Poverty Reduces White and Gray Brain Matter

- Studies using MRI brain scans over the course of children’s lives
 - Children from poverty have significantly lower volumes in the frontal and parietal lobe in gray matter.
 - Early life stresses (e.g., physical abuse, neglect)
 - Associated with smaller hippocampus and amygdala

High Emotional Experiences

“What you do when stressed”



The Role of the Amygdala

- Primary role is survival
 - All stimuli pass through the amygdala.
- Intuitive understanding of nonverbal behavior and the environment
- It is the “pharmacist” of the brain.

The Amygdala Has Three Values

- Safe
- Wanted
- Successful

The Amygdala & Emotions

- First filter of the human brain
- Remembers the best of things and the worst of things
- Holds values & attractions
- Alerted to differences
- Eased by commonality

The Cortex

- Logic and reasoning
- Along with the growth of the cortex, has come the evolution of language.
- Intercedes against the amygdala's innate or impulsive responses

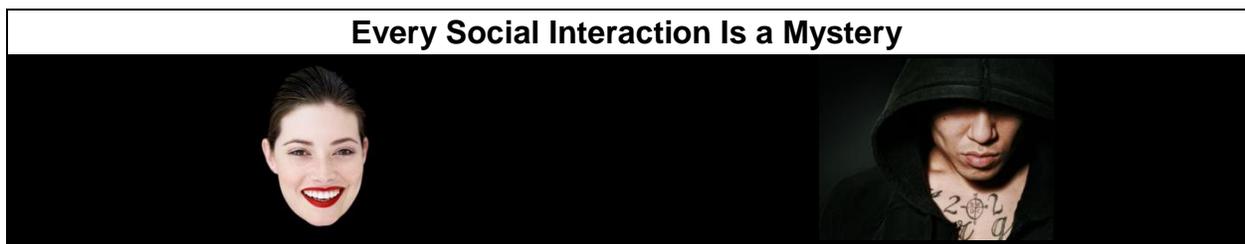
The Evolution of the Cortex Has Led to the Theory That Man Is a Rational Creature

- Although man has the biggest cortex – making him the most rational.
- Man also has the biggest amygdala – making him the most emotional.
- Although the cortex has gotten bigger – the amygdala can still seize control – *hypersensitive*.

The Science of Change

- Start with something simple that has a neurological impact.
 - Don't begin with world peace
 - A successful change enables future change.
 - 20 - 60 - 20 rule

Step 2: Promote Social Comfort



<ul style="list-style-type: none"> ▪ Amygdala <ul style="list-style-type: none"> - Accurately reads the nonverbals of others - Tends to project less threatening nonverbals ▪ Insula <ul style="list-style-type: none"> - Predicts the actions of others - Predicts your own actions 	<ul style="list-style-type: none"> ▪ Amygdala <ul style="list-style-type: none"> - Lacks the ability to read the nonverbals of others - Tends to project threatening nonverbals ▪ Insula <ul style="list-style-type: none"> - Does not predict the actions of others - Predicts your own actions
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“Thin Slices”

- Humans generate a range of instantaneous judgments on things like character, personality, and intentions.
 - Based on 30-second video clip observations
 - Complete strangers were able to accurately predict the ratings of teachers by students who had interacted with the professor over the course of a whole semester.
- Meta-analysis 44 studies
 - Nalini Ambady and Robert Rosenthal 1992

In Every Encounter, the Emotional Brain Seeks

- Safety
 - Facial cues that place people at ease lowers the reaction of the amygdala.
- Familiar
 - Familiarity is predictive of agreement.

Greeting Rituals

- The clear message that they are wanted
 - Smile
- Reinforce a rule
 - Smile

Learn to Focus on Commonality

- The amygdala is alerted to differences and eased by commonalities.
 - Conditioned to focusing on differences
 - Takes practice to change patterns

Step 3: Focus on Success

The Science of Discipline

- 60% of the people in the world inherently follow rules
- 20% of the people in the world need the rules to be consistently present and enforced
- 10% of the people in the world need the rules to be consistently present and enforced for an extended period of time
- 10% of the people in the world will be prone to violate rules and norms



Why Not Just Rules and Consequences?	
	
<p>People Who Tend Not to Violate Social Norms</p> <ul style="list-style-type: none"> ▪ Rule and a threat of punishment if violated <ul style="list-style-type: none"> - Brain activity in a region in the frontal lobe - orbitofrontal cortex ▪ Triggering extreme activity in a second brain region - the dorsolateral prefrontal cortex <ul style="list-style-type: none"> - Responsible for inhibiting behavior that might lead to punishment 	<p>People Who Tend to Violate Social Norms</p> <ul style="list-style-type: none"> ▪ Rule and a threat of punishment if violated <ul style="list-style-type: none"> - Intense brain activity in the orbitofrontal cortex ▪ Low activity in the dorsolateral prefrontal cortex <ul style="list-style-type: none"> - The brain never shifts to inhibition to avoid punishment <ul style="list-style-type: none"> • (Spitzer, 2008)

Machiavellism Studies

- Measured participants'
 - Selfishness
 - Opportunism
 - The tendency to manipulate other people for personal gain
- Individuals who tended not to follow social norms consistently scored the highest on avoiding punishment.

Shift the Focus to Success

- This is not you wanting students to be successful.
- This is getting students who don't believe that they can succeed to believe that they can.
- Success must be a concrete skill that they know that they are developing.

Drop in Ability to Focus

- The ability to focus has been a casualty of technology.
 - Small, Moody, Siddarth and Booheimer 2009
- Internet searching appears much more stimulating than reading.
- Due to extensive exposure, the brain attends more to visual information.
- Constant use has the potential for impaired attention.



Focus Improves Brain Function

- Longitudinal study
 - 20 years of focus training produced intricate connections between prefrontal and parietal cortex, and insula
 - More efficient communication between regions
 - ♦ Eileen Luder 2012

- This connection is responsible for
 - Improved understanding of nonverbal cues
 - Improved monitoring of body functions
 - Improved perception of self-image

Focus Improves Performance

- Study of 51 marines
 - Half did 12 minutes of focus exercises for eight weeks
- Marines that did exercises
 - Improved memory capacity
 - Better mood stability
 - Better ability to perform under pressure
 - P. Jha 2010

Focus Improves Emotional Stability

- Meta-analysis of six studies with a total of 593 patients who did focus exercises or placebo
 - Patients who had three or more episodes of major depression had significantly lower rates of relapse if they were in the focus group.
 - Piet and Hougaard 2011
- Focus training has also been found to alleviate
 - Anxiety
 - Panic disorders
 - Phobias

Success Is Vital to Learning

- Recent studies correlate dopamine response with the drive to succeed and to learn (Schultz 2007).
- "Dopamine is needed to use information already learned." Neuroscientist Kent Berridge, Ph.D., of the University of Michigan
- A study determined that correct responses are rewarded with a release of dopamine, motivating a continued desire for correct answers (Puig, Victoria, & Miller, 2012).

What Are Educational Norms?

Educational norms are behaviors that ensure success in a school setting.

- Teach students what it looks like to ...
 - Be on task
 - Pennsylvania State University researchers found that the ability to self-regulate—to pay attention to a task and inhibit impulsive behavior—was more important than intelligence for early academic success.

Two Key Steps

- Restore the belief that they can succeed.
- Help them experience a sequence of successes.
 - While still challenging them

Step 4: Design According to the Science

Reinforcement

- Humans engage in behaviors that are rewarding
- There are natural (food, water, sex, nurturing) rewards as well as artificial rewards (money, drugs)
- The nucleus accumbens increases the release of dopamine in the reward pathway
- All behaviors that are maintained receive reinforcement in the brain

Designing a Successful Intervention

- Focus on actions
- Make it valued by the amygdala
 - Need to be safe
 - Need to be wanted
 - Need to be successful
- Establish a visual cue
- Maintain predictable persistent practice
- Recognize when it is successfully achieved



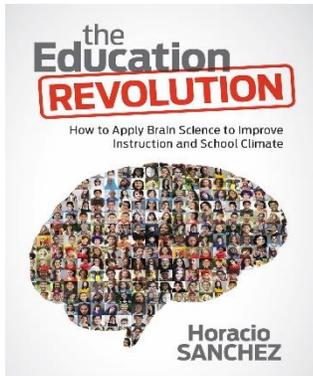
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The Education Revolution is a timely book because it takes relevant findings in neuroscience and bridges the gap between brain science and education. The book illustrates how discoveries in neuroscience can be directly used to modify instruction and improve school climates to advance academic achievement and student behavior. The Education Revolution not only provides a clear explanation of relevant findings in neuroscience but also provides guidance through lesson plans that illustrate how the science can be incorporated into classroom management and instruction. The practical application of neuroscience illustrates that it is time for every teacher to join the Education Revolution!



Book Review

"Horacio Sanchez combines expertise in education, psychology, and neuroscience with extensive teaching experience and extraordinary insight into what makes us all behave the way we do. If we follow his expert advice in this book, a genuine Education Revolution is truly possible--one that reveals the greatest learner each of us can be. Our best hope for the future is having each youth learn and live up to his full potential. This is a revolution we all need."

DAVID L. KATZ MD, MPH, FACPM, FACP, is the founding director (1998) of Yale University's Yale-Griffin Prevention Research Center, and current President of the American College of Lifestyle Medicine.

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