Brain Bag Handouts
for
NAEYC Members

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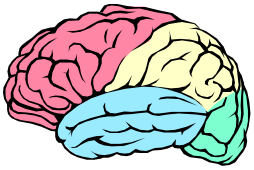
Sign up for ***"Brain in the News"*** *e-tips on the brain at* ***drlamourelle@cox.net***

If you are planning for a year, sow rice;
If you are planning for a decade, plant trees;
If you are planning for a lifetime, educate people.

Chinese Proverb

Brain Rules for School-Age Children



1. Unique programming. All brains are as unique as fingerprints and our brains change with age. The brain develops on different, but predictable timetables which can be 1-3 years apart in early developmental stages. Hormones affect the brain and behavior. Unique experiences and teaching practices change brain structure. Identical twins do not have the same brain structure because each brain is shaped by different environmental factors and experiences.

Implications for policymakers:

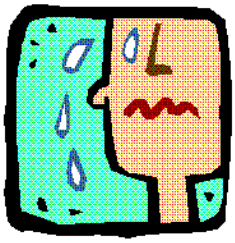
- ✓ Curriculum, standards and behavior guidelines should reflect natural brain growth cycles. (See Critical Windows Chart)
- ✓ Standards and on task language are meaningless to individual brains
- ✓ School strategies for equal access may need to take into account how brain sex differences affect learning when planning curriculum and remedial programs. Female learning preferences differ from males. Sex hormones affect the brain and learning.
- ✓ Males are more prone to active or aggressive behavior. Policies and programs that require prolonged sitting or restraint may be encouraging misbehavior in children, especially males, needing activity.

2. Monitor the Impact of threats. Threats change the body's chemistry and impair learning. Over-controlling behaviors by teachers, punishments, rewards, and threats produce high anxiety and induce learner helplessness. The biological response to stress, the release of cortisol, reduces the brain's capacity for understanding, learning, and memory. Higher-order thinking skills are not biologically available during extreme stress and default survival strategies prevail. This reaction is biological and not something learners can just wish away or not think about. This condition is called downshifting.

Implications for school policymakers and educators:

- ✓ Efforts should be made to reduce the stress of staff, students, colleagues and parents.
- ✓ Leaders must be aware that, under stress, the limbic system hijacks the reasoning centers of the brain and then rational thinking is reduced. The body's hormonal response numbs the learning centers so that long-term learning is reduced.
- ✓ Stressors vary according to the individual and culture.

- ✓ Stress can be induced by inappropriate environments, lack of decision-making opportunities, poor nutrition, and level of hydration.



3. Emotions are critical. While excessive emotions can impair rational thinking, the absence of emotion and feeling is equally damaging when people reason or attempt to be rational. Positive emotions create an excitement and love of learning. They spur motivation to learn and provide the brain chemistry that makes it possible. Positive emotions mitigate the detrimental effects that cortisol has on brain function.

However, do not confuse different types of crying in young children as behavior that must be stopped or "pacified" with an artificial sucking device. In children, tears can help reduce the cortisol load on the brain. Since they have immature language and reasoning systems healthy but challenging stress responses such as frustration, anticipation, or delayed gratification can produce tears. The professional educator must develop the ability to read a learner's tears and respond appropriately.

Kindergarteners without much "brain separation experience" will cry to reduce stress since they have not mastered the developmental skill of separation from loved ones and have sufficient language to express feelings. The language to express feelings is developed by having the experience and a caring adult explaining, soothing and being predictable in a caring response. Experience wires the brain! When parents or others overprotect a child, they may be limiting that child's experience and therefore, the ability to make connections for resiliency under stress.

Implications for policymakers and educators:

- ✓ As mentioned, stress reduces the brain's ability to think and learn. Leaders and educators should be aware of the learner's state when making requests that require rational thinking. The learner's state must be changed to a more favorable learning one before learning and memory storage can successfully take place.

- ✓ Threats, withdrawn privileges, humiliation, etc. are all triggers that activate stress survival centers which make it difficult for children to learn. A child who is not completing work or has not learned multiplication tables may actually benefit from recess instead of withdrawing recess as an inducement to complete work.

- ✓ Encourage positive emotions for long-term learning. Celebrations and rituals are ways to evoke positive emotions for learning.

- ✓ *Music and aromas can be used to change brain wave states and reduce stress. Peppermint and lemon are thought to help to learn. Teachers may want to try different aromas in the room during focused learning activities or test-taking

.

- ✓ The mirror neuron systems, located in the frontal lobe and parietal lobes, are important for developing language and social cues by responding to movements by other humans. This system is also implicated in all learning through modeling or apprenticeship.

4. The brain is meaning-driven and attention is secondary (use it 20% or less). We make meaning three ways: by making patterns, using our emotions and finding relevance. The brain is not efficient at learning isolated facts without feelings or meaning. People learn best with information that is given in context, fits the big picture, and is relevant. This is especially true of work that is difficult and a child does not have the necessary pre-learning to make meaning of the new learning. Consider pre-learning like the rough draft of a paper. It is easier to refine a paper from a rough draft to start from scratch to write a paper without the prior form. When houses are built, "rough" plumbing is installed before the final plumbing and fixtures are set. The rough plumbing serves as the foundation for the final plumbing. If the rough plumbing is faulty, the final outcome and performance will also be affected.

Foundational experiences serve as rough plumbing for learning. Children who have early childhood experiences with science and math have a conceptual foundation that abstract theories can be built upon. Those who do not have the experiences must first build a foundation of concepts to be able to understand the abstract theory. When science and math are introduced later without early learning experiences, foundation building and abstract learning often happen at the same time which means it is like flying an airplane while the basic structure is being defined.

Implications for policymakers and educators:

- ✓ In assessing program and curriculum, look for ways that students, parents, and colleagues can find meaning

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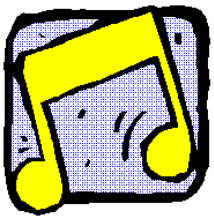
- ✓ Use visual cues for announcing new projects and ideas.
- ✓ Develop a support network of colleagues to explain programs and expectations.
- ✓ Use more role-playing for learning historical facts and events
- ✓ Mnemonics, games, and chants can provide a context and emotion to factual information
- ✓ A child who loves basketball can learn multiplication tables by bouncing a ball as they recite them or by shooting hoops when they miss one. The idea is to complete the exercise with the lowest score possible
- ✓ Use teachable moments like elections and weather events to learn about history, math, economics, and science

5. Music and Multi-pathway learning. Learning is the whole body; visual, auditory, kinesthetic, conscious and non-conscious. The brain is rarely over-stimulated. The best learning environment is one that has a variety of experiences from rich, multi-sensory real-life stimulation. Movement, music, role-playing, real-life experiences, dancing and the arts are examples of multi-path learning. Research has shown that listening to certain types of music can increase spatial-temporal reasoning. The brain has four distinct lobes that can process information simultaneously, in parallel and at the same time. Be cautious about expecting too much sequential order. Brains learn sequentially but also globally and are able to sort out relevance in seemingly chaotic situations. Messy hands and objects in disarray are not necessarily anti-learning since one must develop a process and strategy for cleaning up and putting things back in place which restores order. It also primes the brain to be able to reverse operations which are a key developmental milestone of higher-order thinking.



Our emotional center, the limbic system, receives information that our thinking center interprets and sends to the sensory/motor systems for action. This happens automatically and subconsciously in seemingly chaotic situations. We can and do develop order and make meaning out of situations that have a lot of variable input, or chaos.

Implications for policymakers and educators:

- ✓ Support the increase of arts programs in school as this primes the different systems to work together. A child who is in a school musical must use her frontal lobe to recall and make meaning of her lines, her limbic system to place the right emotional tone to those words, the cerebellum, brainstem, and sensorimotor cortex to produce the corresponding movement and timing. Her left hemisphere will enable her to speak the right words while the right hemisphere and parietal lobes make sure that they fit the emotional tone.

- ✓ Send information home to parents about the value of arts in academic learning

- ✓ Help colleagues with information on the value of the arts and music in the classroom for learning, emotion, and relaxation.

- ✓ Encourage the use of music as a learning tool in the classroom

- ✓ Support project-based learning as a realistic way that brains learn content and process

6. Dynamic memory and learning. Our brain does not store memories; it recreates them, very approximately, every time memories are recalled. The brain is poorly designed for textbooks, rote and semantic learning. It is better at learning when it is in context, episodic or event-oriented, uses motor learning, location changes, music and rhythm. The use of multiple strategies works best, with daily and weekly reviews.

Implications for policymakers and educators:

- ✓ Encourage being there or project-based learning experiences for all students. Being there experiences involve all 19 senses, not just the traditional five we are used to hearing about. Traditional teaching methods only involve two or three senses. The brain has much less information to use to reconstruct memories or store learning.

- ✓ Promote field trips and class visits for all students. Community projects related to learning or jobs for older students.

7. All learning is mind-body. All learning is dependent on the body's physiological state. Our physiology, posture, and movement help the brain store memories for retrieval from our personal library of learning. Eye movements trigger visual, auditory and kinesthetic thinking. Learning is affected by the heart rate, breathing and hormones. The physical body is an integral part of the learning brain.

Implications for policymakers and educators:

- ✓ Feelings are important to learning and behavior

- ✓ Help students, parents, and colleagues learn how to use emotion to teach prosocial behavior and not just for punishment

- ✓ Assist students, parents, and colleagues in naming correct emotional states, feelings and learner states.

- ✓ Encourage Aphysical warm-ups@ before testing. Cross-lateral exercises help the brain work together for cognitive tasks. Exercise increases the oxygen flow to the brain which helps learning and attention. Playdough manipulation also helps wake up both sides of the brain. Awake and alert brains are better able to learn and recall knowledge.
- ✓ Use posters, music, and humor as teaching and leading tools. This adds emotion and interest in learning.

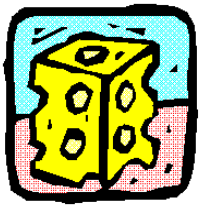
8. Feeding the brain. Proper nutrition includes sufficient protein, trace minerals, liquids and B vitamins. We learn best with fewer carbohydrates and a nibbling diet. Our brain keeps growing new dendrites forever only with continuous novelty, learner-controlled feedback and challenges and proper nutrition.

Implications for Policy Makers:

- ✓ **Food is the fuel for learning. Without it curriculum is meaningless.**

- ✓ Behavior is affected by high carbohydrate diets that do not give the brain enough raw material to make serotonin, a brain calming chemical.

- ✓ Protein is essential to build neurons involved in learning. Let parents know that a protein breakfast is better for their students' brains and learning than high carbohydrate muffins, donuts, and cereals. THIS IS CRITICAL DURING TESTING PERIODS!



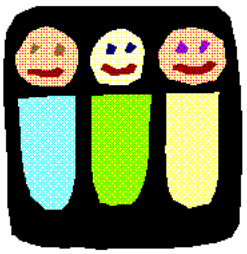
- ✓ Water is the medium that carries the electrochemical impulses that run the brain. Poorly hydrated children are not maximizing their learning potential.

- ✓ The growing brain needs minerals and young children need some fat to aid in the myelination of nerve cells. Growing young brains and eyes also need docosahexaenoic acid (DHA) found in breast milk, tuna, salmon, borage, walnuts, and sardines.

- ✓ When planning snacks or lunch programs, provide for enough protein, especially in the morning hours.

- ✓ Mandatory milk programs for milk sensitive children may precipitate brain allergy and gastric upset which may affect learning. Adults should be aware that a child may not drink his milk because of gastric distress. Demanding compliance out of love or caring may not be appropriate for all children.

9. Reptilian and Social brain. Our brain has developed to specialize, not to be good at everything. Our primary communication skills are language-driven. This may help explain why cooperative learning makes good sense for learning and why learners speak so much in class. The brain is also poorly designed for formal instruction. Rituals are a way of engaging some of the most primitive areas of the brain in a productive manner. Unless this brain is positively engaged, learning will not take place.



<u>Implications for policymakers and educators</u>

- ✓ Encourage group and team problem-solving, fact-finding and solution strategies

- ✓ Encourage groups, (large and small) to converse and test ideas. SILENCE IS NOT GOLDEN AS FAR AS THE LEARNING BRAIN IS CONCERNED

- ✓ Encourage class rituals for celebrations, beginning and ending class and group affirmations

10. Adaptive Brain. The brain excels at adaptation. Single-answer, one-way learning, and testing make little sense. Humans have survived by problem-solving with multiple options, possibilities and choices. A school agenda that emphasizes the right or single best way can be contrary to the way most people learn. The brain learns what it needs to survive.

Implications for policymakers and educators

- ✓ Encourage student/teacher creativity in meeting curriculum goals
- ✓ Help educators find real-world ways to test strategies or use knowledge
- ✓ Help parent/teachers/colleagues focus on the process of acquiring knowledge rather than memorization of facts
- ✓ Encourage feedback from students, parents, and colleagues
- ✓ The brain can learn better when it has a choice; the learning is meaningful and fits the learner's style of processing information. Strategies for learning should focus on learning not instruction.

11. Cycles and rhythms. Our brain is designed for ups and downs, not constant attention. Hormones, diet, emotions and chemistry trigger fluctuations in attention, memory & learning. **The terms "on" or "off" task are irrelevant to the brain.** We also learn better when we have variety and choices, including when to learn. Since individual brains may be on different chronological, biological and hemispheric timetables, demanding that learning occurs at specific times is not the brain-appropriate. Optimal brain learning time is not consciously controlled by students and may not be mandated by teachers. The brain also has cycles of attention which alternate from right to left brain, every 90 minutes.

Attention is most focused at the beginning and end of a learning session. The brain organizes information by chunk size, pieces of information, depending on the brain-age of the learner. The amount of information that can be processed is brain-age related because the younger the child or immature the brain, the smaller the chunks of information that can be processed. Telephone numbers are organized by chunks of 3, 3, and 4. It is harder to memorize numbers in chunks of two.

Implications for policymakers and educators:

- ✓ Provide for downtime in scheduling
- ✓ Schedule announcements in the middle of a class rather than at the beginning or end.
- ✓ **This is a prime time for learning and should be used by educators for curriculum material that is expected to be learned.** Many schools use this time for class announcements, roll taking, etc. These are not learning activities but are done during prime learning time.
- ✓ Give information in manageable chunks for students and other colleagues. Below are some guidelines to use for chunk size (information bit). These numbers may vary by 2 depending on the age and person. For example, some seven-year-old

children may be able to remember five chunks while others are only able to remember one chunk. This is a normal individual variance.

AGE	CHUNK SIZE
3	1
5	2
7	3
9	4
11	5
13	6
15	7

Downtime is important for proper learning. Encourage napping or resting. After a Learning episode, the brain needs time to fix the learning and store the information.

- ✓ Daydreaming is a normal rest function of the brain and not something that should be disciplined or discouraged. Spatial learning may be more prone to daydreaming.

- ✓ Hormones cause a shift in the brain's sleep cycle of teens. Research shows that they need more sleep between 7 and 9 A.M. and will stay later at night. This is a normal brain growth rhythm and not a devious plan by a rebellious, uncooperative teen.

12. Assessment. Most of what is critical to the brain and learning are tough to assess. The most valuable and best learning is often the creation of content biases, working models, how-to skills, personal relevance and interdisciplinary relationships. These are rarely assessed and rarely included in traditional assessments. Is it time to rethink our assessments, again?

Implications for policymakers and educators:

- ✓ Design and implement more flexible assessment programs
- ✓ Train teachers in assessing multiple intelligences
- ✓ Help students learn better test-taking strategies using brain-friendly learning techniques
- ✓ Encourage student/parent participation in designing assessment programs

HOW CAN YOU USE BRAIN RESEARCH INFORMATION IN YOUR JOB AS A POLICYMAKER/LEADER/TEACHER?

Did You Know That. .

Teaching and parenting change the physical landscape of the brain

<u>Threats, rewards, and grades</u> often reduce intrinsic motivation for learning

Over-controlling or overly permissive teaching and parenting practices contribute to learner helplessness

Due to a high cortisol release, helpless learners have decreased the ability to find and solve problems

The brain is highly plastic and will change with experience (positive and negative)

Windows of learning are the best opportunities to teach certain skills and vary by the individual brain

Being on task and standards are meaningless to individual brains

Discipline, to be effective, must be based on how the brain learns best

Music, colors, food, choice, and aromas can enhance learning and improve behavior

The brain needs immediate feedback to learn.

Children's brains cannot make meaning and pay attention at the same time.

Stress (may be emotional, physical, real or imagined) causes the brain to release chemicals that inhibit learning.

The body sends messages to the brain.

All behavior, learning, thoughts, and creativity are created in the brain by chemical messengers.

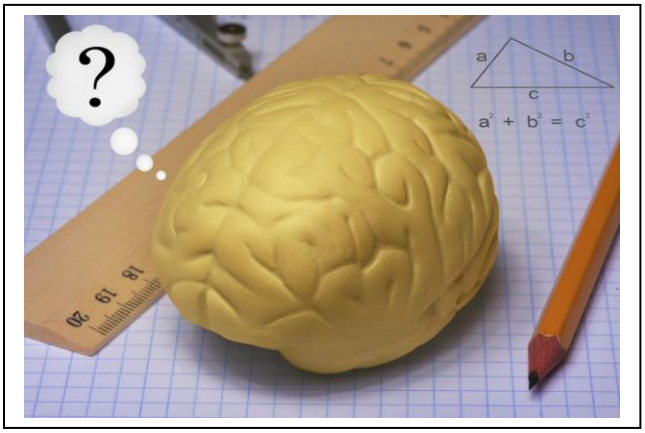
Babies can learn sign language before speaking.

Learning does not occur in your comfort zone. (That's exercise)

The part of the brain that allows children to control their behavior, sit still, and endure boredom begins to mature around 10 or 11 and may not be fully mature until early adulthood (20-25).

DHA(**Docosahexaenoic Acid) a 3-Omega fatty acid** found in breast milk **is essential for brain and eye development**

BRAIN DEVELOPMENT & SKILL TIMELINES



DEVELOPMENTAL SKILL AREA	OPTIMAL OPPORTUNITY	NEXT BEST OPPORTUNITY	FURTHER WIRING POSSIBLE
Early Sounds and Speaking	Prenatal- 24 months The optimal period of Syntax and Grammar Development	2-5 Years Next Best Opportunity	At any age, grammar and syntax unlikely to change after puberty
Emotional Intelligence	Prenatal – 24 months	2-5 Years	At any age
Motor Development	0-24 months	2-5 Years	Decreases with age
Music	Prenatal – 36 Months	3-10 years,	Possible, but more difficult

Reading	Prenatal –24 months	2-5 Years	At any age
Thinking	0-48 Months	4-12 years	At any age
Second Language Development	3-10 Years	At any age	At any age

DEVELOP-MENTAL AREA	AGE	BRAIN DEVELOPMENT activity	CHILD'S DEVELOPING ABILITIES
Speech Areas Motor Areas	2 to 4 years	1. The auditory speech sound system develops by organizing a tomographic map of sounds 2. Brain areas involved in speech production and comprehension myelinate. 3. Frontal lobes begin to connect to spinal cord motor connections.	1. Words and sound recognition increases. Tomographic map of sounds virtually complete by age 4. 2. Increased competency in using speech to get needs met and to appropriately respond to other's speech 3. Children become more skilled at using thought to initiate motor functions like toilet learning. 4. Speech is clearer as the vocal cords and facial muscle connections mature to form words.
Brain Plateau	4 to 6 years	1. The connecting band of fibers, the corpus callosum, myelinates past the motor cortex in the frontal lobe. 2. Connections between the visual and auditory and the visual and motor system begin to establish 3. Spinal connections reach the frontal lobe	1. Children can now use the thought processes of the frontal lobe to initiate an action or to give meaning to incoming information. 2. Coordination is improved and more sophisticated movements are possible. 3. Inner speech guides thinking.

Speech, Motor, And Cognitive	6-8 years	1. Many brain systems are stimulated to grow and connect. 2. Speech, vision, and motor areas are directly connected 3. Skull grows to accommodate the developing brain	1. Inner speech develops. 2. Students can read out loud but may have trouble reading silently. 3. Basic math principles can be taught. 4. Music notation training can begin as well as other experimental programs that please the student. 5. Code notation for math and reading are better understood
Brain Plateau	10-12 years	1. Areas governing concrete reasoning and logical thought develop. 2. Left and right hemispheric specializations become more apparent. 3. The temporal lobe speech and the sound system undergo a new growth era.	1. Math and science activities involving experiments are easier understood. 2. Word building, art and music skill activities are beneficial 3. Exploration with languages, music, and performing arts are more sophisticated. 4. Silent reading better tolerated since major brain systems involved are mostly mature
Increase in brain volume and skull size	14 to 16 years	Abstract reasoning develops further	1. Teens can manage most of their schoolwork and use school and community resources. 2. Abstract thinking and reasoning progressing
Brain Plateau	16-19 Years	Pre-frontal cortex association fibers connect and continue to refine until early adulthood	1. Personal insight and evaluation begin. 2. Creative thinking continues and problem-finding skills improve. 3. Frontal lobes executive functions

			may not mature until around 25 years of age. 3. Talents, skills, and interests are evident and preferences drive behaviors.

References: Jensen, (2000), Campbell et al., (1991) and Hannaford, (1995).

New experiences provide the impetus for brain development. Maturation, the naturally occurring cycle of maturity of brain areas proceeds from the back of the brain to the front and rom the interior centers outward. It makes sense that teachers and caregivers provide optimal experiences that are consistent with the maturational cycles. Providing reinforcement for two to four year olds for mastering self-help skills such as toileting make sense because this is when the areas of the brain and body that manage these operations is in a major growth cycle. The brain is more ready to do code work needed for math and reading around six to eight years and is ready to tolerate boredom around 10 or 11 when the corpus callosum matures.

Memory Pathways

Explicit

Includes both Short-term & working memory

ABC Semantic
words, symbols, abstractions, video, textbooks, computers, written stories

Episodic
locations, events, circumstances "Where were you when...?"

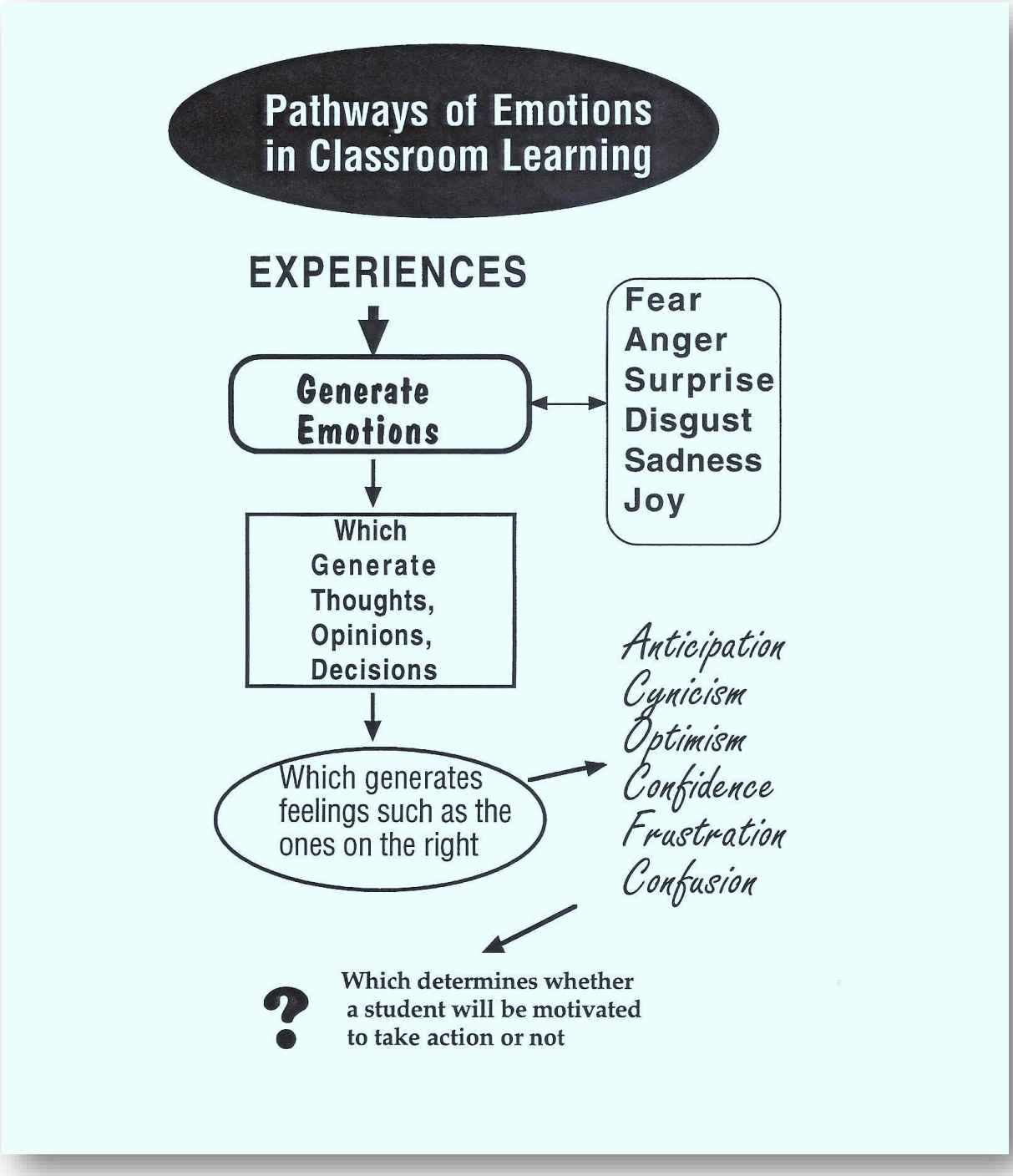
Implicit

Procedural
physical skills: bicycle-riding, manipulatives, "hands-on" learning

Reflexive
automated, non-conscious learning

Conditioned Responses
"hot stove effect" flash cards or many repetitions

Emotional
intense emotions... from trauma to pleasure



THE HEART AND LEARNING

New research has shown that the heart plays a more active role in learning than previously thought. It is well accepted that the brain sends messages to the heart to regulate beats and blood output but it is less well accepted and understood that the heart has a brain of its own. Researchers at the HeartMath Institute in Northern California are studying the connection between the heart, stress and the brain. What they have found has implications for teachers, parents and all who want children to learn and grow.

A phenomenon call entrainment seems to exist between people, mothers and children, partners and others in a physically close relationship. Scientists have noted that when a mother is stressed her baby=s brain waves and heart waves are disorganized and incoherent. When brain waves and heart waves are in incoherent patterns, learning is less possible. Survival mechanisms predominate and long-term memory and ability to store new non-threatening information are limited. It is believed that these messages are sent via electrochemical and electromagnetic waves. Like radio waves, these waves are not visible and are not controlled by the conscious mind. They are controlled by the laws of physics and nature. Referring to the handout, ***Name Your 19 Senses***, think of the possibilities for people to communicate that are not in control of a conscious thought mechanism. Think about the times that you have had a bad feeling about someone. Where you correct? Have you ever had an unsettling feeling about someone and their smiles or conversation did not match? The mind and all of the body, cell by cell, are interconnected and research suggests that they can send messages both ways.

As a parent or teacher your stress, although you may think that it does not affect children because they are too young to understand, their hearts may not be too young to transmit incoherent messages that impair learning and optimal functioning. How then do you think that this principle applies to learn impaired children or those with body movement impairments?

DO TEACHERS TEACH WITH THEIR MINDS OR THEIR HEARTS?

Heart inferences in our language:
Get to the heart of the matter.
My heart is broken.
Put your heart into it.
He has no heart.

Heartless.
Heart Throb. Can you name others?

DOWNSHIFTING AND LEARNING

Downshifting and Fear: Downshifting is a state where the brain feels that it is helpless and cannot succeed. Downshifting usually results from fear in a new or unfamiliar situation. We revert back to tried and true mental programs for solving problems and behaviors, even if they are not totally successful. Consider this. You are trying something new and experience resistance or questioning from another teacher or principal. They may ask, "What are you doing?" You may feel their opposition, along with your uncertainty and lack of experience, and revert back to the old methods that are accepted. You do not grow and nothing changes. This may be what scientists are saying when they state that hardy people and successful people feel the fear but move on anyway. The only way to conquer fear is to do what you fear, experience the fear and get over it. If you do not get over it, you are consumed by it. An old attitude uses to be, "Fall off of a bicycle and get back on it and try again." Many people today, fall off of the bicycle and stay off, blame others or circumstances, file a suit, or wallow in their wounds and become helpless.

Implications for Teachers and Administrators: Understanding how the brain responds to threat, downshifting, is changing the way assessment is looked at. Putting a student in a situation that may produce fear and helplessness and then assessing them for learning is brain antagonistic. In the situation**, what is being tested is how well a student responds under stress when the brain is numbed by hormonal factors released during stress.** Higher cortical thinking areas, learning, and memory are not available under these conditions. Students are not necessarily being tested on what they know. This is one justification for authentic assessment, testing using multiple strategies, and portfolios for assessment. Students are less likely to be put in a situation that produces downshifting if they are at ease, the learning is meaningful, in synch with their preferred learning style and they are valued for how they acquire knowledge. Downshifting is not a conscious choice by the student but is a survival mechanism of the brain.

Can you think of a time where you downshifted in the face of uncertainty?

What can you do to help students learn instead of downshifting?

Noted Neurophysiologist Carla Hannaford to teach "Brain Gym" techniques to educators, students, parents

TALLAHASSEE, Fla. (September 26, 2006) - Dr. Carla Hannaford, known for her groundbreaking work on the relationship between movement and learning, will demonstrate the best ways to achieve student success at Tallahassee Community College.

A biologist and educator with more than 30 years of experience, Hannaford is the author of Smart Moves: Why Learning Is Not All in Your Head, in which she wrote that "movement is essential to learning. Movement awakens and activates many of our mental capacities." One of her studies, for instance, determined that children who spent an hour a day exercising did better on exams than students who didn't exercise at all.

Hannaford will explain the physiology of learning - including heart and brain research and the effects of movement, nutrition, and the environment - in an evening workshop, free and open to the public, on Oct. 5. She'll also demonstrate "Brain Gym" exercises, which dramatically accelerate the higher functions of the cerebellum: memory, spatial perception, language, attention, and decision-making.

"Students who have trouble taking tests are going to learn techniques to keep their stress in control," said TCC Math Professor Karen Kinard, who encourages parents to attend as well - "especially if they notice their children having trouble learning."

In addition, Hannaford, a former counselor for students with learning disabilities, has conducted extensive research on how movement and learning interact for exceptional children.

"Brain Gym is one of the most important strategies I have encountered in my 30 years of teaching," said Cynthia Gaines, a teacher of exceptional students at Gilchrist Elementary and 1984 Florida Teacher of the Year. Gaines spends the first 30 minutes of each day doing Brain Gym activities and integrates them into her teaching.

"Professionally, I am very committed to Brain Gym - personally, even more so," said Emily Millett, a former member of the Leon County School Board whose granddaughters are reading on grade level "after a bad start. For the oldest, after years of tutoring had no impact, we discovered she had vision problems that were correctable with a combination of Brain Gym and vision therapy. She went from reading at a first-grade level to reading at a fifth-grade level in six months."

Downloaded on March 28, 2010, from
http://www.tcc.cc.fl.us/about_tcc/news_events/news_archives/2006/october_2006/noted_neurophysiologist_carla_hannaford_to_teach_brain_gym_techniques_to_educators_students_parents

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