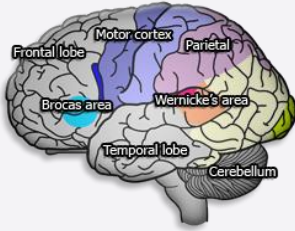


The Neuropsychology of Emotional Disorders



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Presentation Goals

1. Discuss why children with emotional disorders remain the single most challenging special education population to educate successfully.
2. Discuss the neural architecture of emotional functioning including the neurobiology of empathy.
3. Explore the neurobiological correlates and *treatment options* for bipolar disorder, depression, and anxiety disorders in children.
4. Present a treatment algorithm utilizing multiple intervention methods such as school wide positive behavioral supports, therapy, parent training, as well as *neurofeedback* to promote emotional wellness in children.

Behavioral Trends

According to the National Center for Educational Statistics (2007):

- * 78% of schools experience one or more violent crimes.
- * Middle schools report highest rates of violent crimes.
- * Percentage of kids experiencing violent crimes in 2006 is not much different than 1999, despite curricular changes emphasizing character education.
- * A strong relationship exists between committing violent acts and social-emotional disorders in children (Swanson, Holser, & Ganju 1990; Eronen, Tiihonen, & Hakola, 1996; Valliant et al., 1999; Worling, 2001)

Educational Facts

- * Children with emotional disturbances remain the single most challenging special education population to educate successfully. WHY?
- * Children with emotional disturbances are twice as likely to drop out of school and tend to earn worst grades than children with other disabilities (Reddy, 2001).
- * Approximately 1/3rd of ED children receive homebound instruction- more than any other disability group.

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Emotional Disturbance

- * Poverty and family stressors key environmental predictors. Currently 1/3rd of all ED children come from households with an annual income of less than \$12,000 per year.
- * African Americans represent better than 1/4th of all children labeled emotionally disturbed.
- * Approximately half of ED children reside with just one parent.
- * Disproportionate rate of physical abuse in children with emotion disturbances – more than any other disability group (Reddy, 2001).

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The ED Paradox for Schools

- * The rate of diagnosing pediatric bipolar disorder in outpatient clinical settings has doubled in the past five years (Leibenluft & Rich, 2008), though ED in schools remains proportionally the same the last 30 years.

	Percentage of Total Enrollment			
	1980	1990	2000	2006
LD	3.6	5.2	6.0	5.6
Speech	2.9	2.4	2.3	3.0
MR	2.0	1.3	1.3	1.1
OHI	.2	.1	.6	1.2
Autism	--	--	.2	.5
*ED	.6	.9	1.0	1.0
(ALL)	10.1	11.4	13.3	13.6

-Source: National Center for Educational Statistics (2007)

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The ED Paradox for Schools

3 Explanations for the ED Paradox:

- 1) *Other-Health Impaired* coding used as an umbrella term to capture any child s on medication.
- 2) School IEP teams comprised mainly of non-mental health professionals determining mental health code.
- 3) Federal definition of ED rather vague with few parameters given (*i.e. inappropriate feelings under normal circumstances??*)

**** Universal codes lead to universal treatments****

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Behaviorism: The good, the bad, and the ugly.

- * Meta-analysis demonstrated behavior modification one of the most effective intervention strategies for **managing** classroom behavior (Lloyd, Forness, & Kavale, 1998).
- * Extremely effective technique in most parent education training programs.
- * Most educators easily understand reinforcement contingencies.
- * Very practical to implement in a school setting.
- * Effective at all levels (K-12) of the educational arena.

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Behaviorism: The good, the bad, and the ugly.

- * Dismisses observable behavior as being reflective of brain functioning.
- * Characterizes most behavior as stemming from a lack of incentive to behave properly, most notably due to a poor moral foundation.
- * Similar assessment and treatment paradigms; namely, an over-reliance on behavior checklists as well as **behavior plans** despite the presenting emotional condition.
- * Goal is to induce task specific performance, as opposed to the internalization of self-regulatory behaviors (Cicerone, 2002).

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Behaviorism: The good, the bad, and the ugly

- * Conditions a child to behave in a self-centered manner based upon "what's in it for me?"
- * Hours of time poured into learning discrete skills in a specific setting that rarely generalizes to other situations (i.e. Lovaas training).
- * Can be harmful with some emotional conditions (i.e. self mutilating behavior, anxiety disorders such as selective mutism, depression, etc.)
- * No observable behavior has a single cause (Kagan, 2007), though treatment plans operate under a simplistic stimulus response → paradigm.

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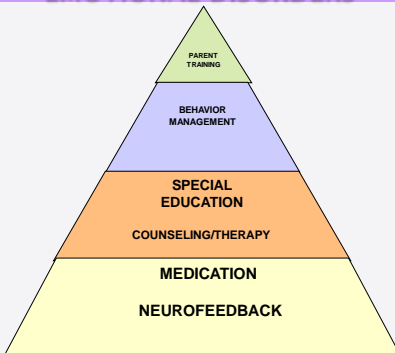
The Neurobiological Architecture of Human Emotion

Neuropsychology is the study of brain-behavioral relationships with respect to learning and behavior. It presumes that a child's ability to adapt to the social demands of their environment *begins* with the functional organization of the brain.

- * Observable behavior often reflects striving for **homeostasis** in the brain
- * Therefore, treatment for behavioral and emotional disorders should focus upon both intrinsic and extrinsic factors, rather than simply exploring rational functions of behavior (i.e. BIP's).

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INTERVENTION ALGORITHM FOR EMOTIONAL DISORDERS



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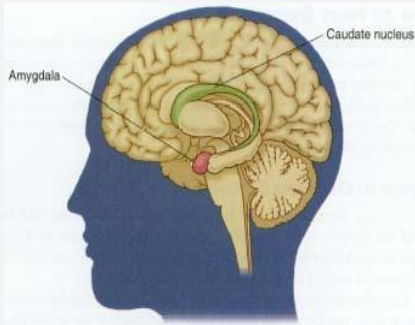
The Cerebral Orchestra of Emotions: Subcortical Regions

(1) **Amygdala** - responds to **unexpected** and **unfamiliar** events (Kagan, 2007). Ascribes emotional valence to stimuli. Primarily responsible for fear conditioning by providing a rapid, *precognitive* assessment of the situation.

- * A hyperactive amygdala source of most anxiety problems.
- * Kids with anxiety issues need structure in their day to reduce chances for unexpected and unfamiliar events.
- * Serotonin can help calm down amygdala, like a warm blanket over brain.

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The Cerebral Orchestra of Emotions: Subcortical Regions



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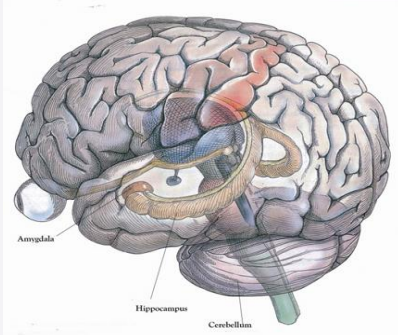
The Cerebral Orchestra of Emotions: Subcortical Regions

(2) **Hippocampus** - located in medial temporal lobe and responsible for facilitating memory functioning. This structure also involved with emotional learning.

- * **Emotional learning** (classical conditioning) can take place outside of conscious control with paired association between amygdala and hippocampus**a phobia!!**
- * Chronic stress from abuse or neglect releases cortisol which reduces hippocampal volume and leads to memory loss and clouded thinking.
- * A hypervigilant hippocampus develops from chronic stress thereby priming the system to over-react to benign situations (*PTSD*).

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The Cerebral Orchestra of Emotions: Subcortical Regions



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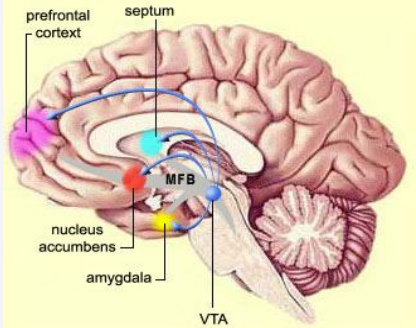
The Cerebral Orchestra of Emotions: Subcortical Regions

(3) Nucleus Accumbens - located in forebrain and part of basal ganglia.

- * Reward center of brain which is activated in anticipation of reward.
- * Most recreational drugs including cocaine and amphetamines increase **dopamine** in this area.
- * Involved in task motivation and rewards.
- * Under-activity of reward center of our brain associated with anhedonia and depression.

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The Cerebral Orchestra of Emotions: Subcortical Regions



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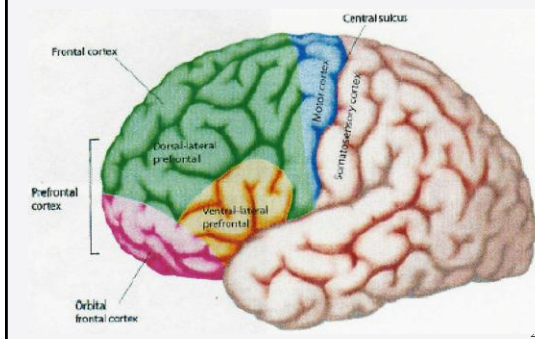
The Cerebral Orchestra of Emotions: Cortical Regions

(1) Orbitofrontal cortex - region of the brain responsible for ascribing an emotional valence or value judgment to another's feelings. Often triggers an automatic social skills response (Rolls, 2004).

- * Has rich interconnections with the limbic system.
- * Responsible for *emotional executive functioning*.
- * Self-regulation of behavior as highest levels of emotional decision making dictated by this brain region.

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Frontal Circuitry



The Cerebral Orchestra of Emotions: Cortical Regions

(2) Ventrolateral prefrontal cortex - responsible for *response inhibition* and *emotional regulation*.

- * Has rich interconnections with the limbic system.
- * Also involved with *emotional executive functioning*.
- * Situated adjacent to orbitofrontal cortex and involved in the ability to take another's perspective on an emotional event (*theory of mind*).

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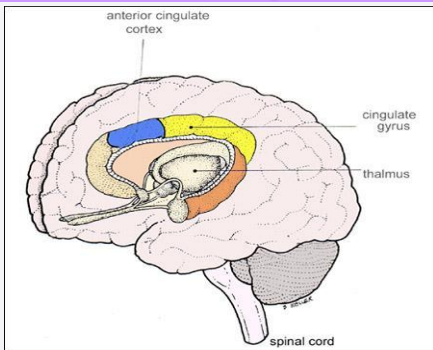
The Cerebral Orchestra of Emotions: Cortical Regions

(3) Anterior Cingulate Cortex – task motivation and reward based decision making.

- * Selective attention allows us to shift our focus from the outside world of objects and events toward the inside world of thoughts and ideas (*self awareness*).
- * Helps provide constraint over behavior.
- * The brain's gear shifter between cognition and emotion. When stuck, can result in obsessive and ritualistic types of behaviors, as well as cognitive inflexibility (Swingle, 2007).
- * Key brain region in developing "theory of mind".

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The Cerebral Orchestra of Emotions: Cortical Regions



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Vignette #1

*Brianna is celebrating her 5th birthday and is brimming with excitement now that the time has come to open gifts (**nucleus accumbens**). Her first gift is from Megan, her best friend, and is a Cinderella dress, slippers, and crown. She responds with intense excitement (**amygdala/ orbitofrontal cortex**).*

*Brianna races to Megan and impulsively gives her a huge hug (**ventrolateral prefrontal cortex**). After opening the rest of the presents, Brianna realizes that Megan's birthday is next week and wonders how Megan would feel if she bought her the new Disney Leapster (**anterior cingulate cortex**).*

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The Neurobiology of Empathy

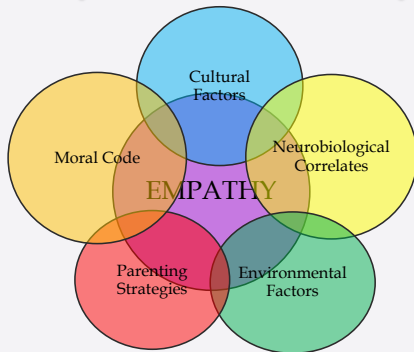
"Empathy is at the heart of my moral code. It is how I understand the golden rule, not simply as a call to sympathy or charity, but as something more demanding, a call to stand in somebody else's shoes and see through their eyes"

-Barack Obama, 2006

* Can this code have a neurobiological basis?

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Multiple Variables of Empathy



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The Building Blocks of Empathy: The Right Hemisphere

RIGHT HEMISPHERE:

- * The prefrontal regions in both hemispheres provide a temporal organization of emotions and behavior. Frontal lobe dysfunction almost always leads to *social-emotional agnosia* (the loss of insight into self and others).
- * The right hemisphere is primarily responsible for modulating novelty and adaptive emotional functioning.
- * Damage to the right hemisphere results in disinhibition and an inability to modulate negative affect. This is accompanied by egocentrism and limited empathy.
- * There is a greater concentration of dopamine receptors in the left hemisphere....noradrenergic receptors in the right. Noradrenaline modulates flight or fight response and sympathetic nervous system.

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The Neurobiological Architecture of Empathy

(1) **Schwann Cells (PNS)/Oligodendrocytes (CNS):** dictate both the timing and degree of completion of **white matter** pathways, particularly in the right hemisphere (**social novelty**). These pathways create the neurobiological architecture of the social brain network (Yeates et al., 2007).

* Johnson et al. (2005) found white matter aberrations in autistic children correlated with failure to develop early social skills such as eye gaze cuing and joint attention.

* According to Fields (2008), abnormal myelin formation (Schwann cells) in the right hemisphere may contribute to a variety of mental illnesses including bipolar disorder and schizophrenia.

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The Neurobiological Architecture of Empathy

(2) **Mirror Neurons :** Present in the prefrontal cortex of most mammalian brains (Decety & Jackson, 2004).

* V.S. Ramachandran claimed mirror neurons may be the single most important discovery in neuroscience in last decade.

* Mirror neurons fire when experiencing an emotion or when observing others engaged in self-same emotion (*i.e. crying at the movies*)

* May be neurobiological signature for **Empathy!**

* Mirror neuron system dysfunctional in Autism.

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The Neurobiological Architecture of Empathy

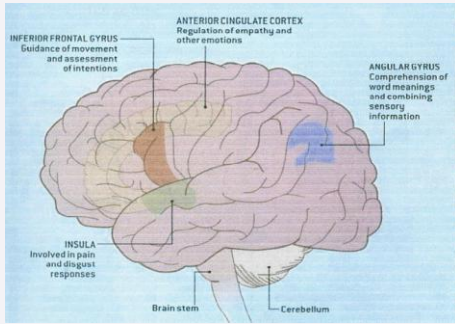
(2) **Mirror Neurons :**

* Keysers and Gazzola (2006) reported that persons demonstrating high levels of empathic behavior tend to have stronger activations in the mirror system for emotions.

* Conversely, persons with more dysfunctional mirror neuron systems, such as **autistic children**, have a litany of social-emotional limitations including poor self-awareness, a lack of introspection, the inability to imitate when young, and poor affective matching (Ramacandran & Oberman, 2006).

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Mirror Neurons in the Brain



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The Neurobiological Architecture of Empathy

- (3) **Spindle Cells**: Found in great apes, whales, and human beings (Goldberg, 2005).
- * Forges long distance neural connections to allow multiple brain regions to contribute to “higher level” adaptive emotional responses (Dehaene et al., 2003).
 - * Clustered in **right hemisphere** near anterior cingulate cortex and insular cortex. Each region important in self awareness and reading our own emotions, as well as mental state attributions of others (Keenan et al., 2003).

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The Neurobiological Architecture of Empathy

- (3) **Spindle Cells**:
- * 18 months of age children begin to demonstrate an emerging awareness of other’s emotions and break the shackles of their own egocentric perspective taking by placing psychological distance between themselves as well as others (Decety & Jackson, 2004).
 - * **Spindle cell** transmission tends to be under-activated with certain disorders impacting consciousness and the development of a sense of self, such as in adult schizophrenics as well as high functioning autistic individuals (Happe et al., 1996).

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Neurobiological Summary: Developing an Empathetic Brain!

Schwann Cells - white matter pathways connecting bodily sensations to limbic regions to higher brain centers to form the building blocks of our social brain network (Yeates et al, 2007).

Mirror Neurons - plays a crucial role in the affective development of a child by the ability to share and fully experience the emotional experiences of another.

Spindle Cells - fosters self- awareness and breaks the shackles of egocentric perspective taking by placing psychological distance between ourselves and others ("theory of mind") (Decety & Jackson, 2004). 34

Vignette #2

Madison was invited to her best friend Ruby's house for a sleep over. However, Ruby also invited Victoria, who happens to be Madison's main nemesis at school. When Madison arrived at Ruby's house and saw Victoria as well, an initial barrage of negativity swept over her (amygdala stimulating noradrenaline). However, when Madison's eyes met Ruby's, she saw the disappointment in her eyes and did not want to hurt her best friend's feelings (mirror neurons). Madison then considered Ruby's feelings from another perspective (spindle cells) and empathized with her friend. She decided to take both girls' hands and march straight for the television to make the best of the situation (orbitofrontal cortex). 35

Bipolar Disorder

Bipolar I - diagnosed when a full manic episode occurs for more than seven days with symptoms resulting in marked impairment of function. A mood disorder vacillating between **manic** and depressive states. Six subtypes.

Bipolar II - diagnosed when a manic episode lasts under four days with noticeable symptoms, though not necessarily severe impairment in functioning. Thus, hypomania, as opposed to mania is required along with a **depressive** episode.

Severe Mood Dysregulation - characterized by more chronic irritability, **hyperarousal**, and hyper-reactivity to negative stimuli. Often difficult to distinguish from rapid cycling (mood swings every day) aspect of bipolar disorder. 36

Mood Dysregulation Disorders (Calkins & Bell, 2010)

- * Mainly stems from over-arousal in lower brain regions (RAS & limbic regions) coupled with under-aroused higher brain regions (prefrontal cortex) leading to poor emotional self-regulation skills.
- * Behaviorally, top-down cognitive control occurs between 3-6 yrs of age and continues through adulthood.
- * Language is a necessary, but not sufficient condition for younger children to regulate emotion. *Therefore, can talk therapy really address an arousal issue????*
- * Children with emotional regulation disorders often have authoritarian parents who are more likely to make negative motivational attributions to others.
- * Security of attachment at 24 mos predicts social cognitive abilities at 54 months and less likely to make negative motivational attributions to peers.
- * Inability to delay gratification evidence of emotional impulsivity.

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4 Brain Regions Involved with Bipolar Disorder

- (1) **Amygdala** - Smaller amygdala size is a consistent neuroanatomic finding in children with bipolar disorder (DelBello et al., 2006). The amygdala plays a role in the perception of threatening information, the *appraisal of social signals* that convey a threat, and the acquisition of fear conditioned responses (LeDoux, 2003).
 - * Kagan (2007) argued that the amygdala responds to **unexpected** and **unfamiliar** events.
- (2) **Hippocampus** - Studies in children have suggested smaller hippocampal volume is evident in *depression*, as well as prolonged periods of emotional stress (Caetano et al., 2005). The hippocampus and amygdala are interdependent emotional memory systems.

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4 Brain Regions Involved with Bipolar Disorder

- (3) **Cingulate Gyrus** - The anterior portion of the cingulate gyrus provides constraint over emotion and cognition, and is also involved in *task motivation* and *effortful control*. Numerous studies have noted the left anterior cingulate in bipolar patients being significantly smaller in volume (Drevets et al., 1997; Kaur et al., 2005).
- (4) **Basal Ganglia** - Recent studies have suggested bipolar children have an enlarged right nucleus accumbens, an area housed within the basal ganglia (Ahn et al., 2007). The nucleus accumbens has rich interconnections with the limbic system, and plays a central role in the reward circuit of the brain and *manic behavior* (Kloos et al., 2008).

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Neurofeedback

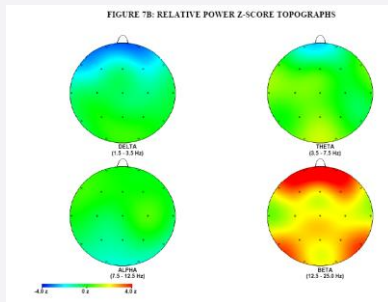
Delta Waves	1 - 4 hz deep sleep
Theta Waves	4 - 8 hz drowsy, dreamlike, hypnagogic state
Alpha Waves	8 to 12 hz. ... calm, relaxed focus
* Lo Beta(SMR)	12 - 15 hzcalm and alert
Beta Waves	15 to 18 hz .. active, alert
High Beta	19 hz and above.. hyper alert to panic and fear

- * An EEG reads the electrical activity of approximately 100,000 neurons. Goal is to change the *amplitude* of each wave.
- * The power of a wave is expressed as *amplitudes*, which represent a microvolt (uv), or millionth of a volt. The frequency is expressed in hertz.
- * Operant conditioning is the learning paradigm used to restore the sensorimotor (SMR) rhythm of the brain to 13-15hz and normalize arousal. Typical response is seen within 15-20 sessions.

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Neurofeedback and Autism

9 year-old boy with high Beta activity



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Neurofeedback and Emotional Disorders

- Autism** - too much beta (overactive) in anterior cingulate (Cz to Fz) associated with obsessive, cognitively rigidity, and self-absorbed behaviors.
- ADHD:**
 - 1) too much theta (slower waves) at Cz, brain is underactive and seeking stimulation. Attention regulation issues.
 - 2) too much alpha (slow waves) over left prefrontal cortex, poor organizational and planning skills, too talkative and flightiness.
- PTSD/Trauma** - poor alpha response (50%) with eyes closed in occipital regions, thus over-visualize the event.
- Emotional volatility** - too much beta (fast waves) throughout cortex.
- Depression:** - hypoactive left prefrontal cortex (30%) when compared to right. Once again, the left hemisphere modulates positive emotions, and the right more negative emotions.
- * **Anxiety:** - too much beta activity (fast waves) in back of brain. T/B ratio less than two, the brain cannot quiet itself. Very common in sleep disorders as well as substance abuse disorders, particularly with alcohol (Peniston protocol)
- Bipolar** - too much alpha in front, beta in back, and poor Cz balance.

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Neurofeedback Summary

- * Neurofeedback provides an excellent way to treat the underlying causes of emotional dysregulation from an inside-to-outside fashion.
- * Neurofeedback differs from medication in that the child learns to self-regulate their own brain functioning. With respect to medication, there is no learning involved.
- * Neurofeedback allows the brain to re-set itself in an optimal emotional state, thereby opening the door for other therapies and behavioral interventions to be successful.
- * Should neurofeedback be used in schools?????

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Neurofeedback Summary

- * Research for using neurofeedback on a range of disorders ranging from anxiety disorders, emotional regulation, ADHD, autistic symptoms, mood disorders, depression, TBI, migraines, and tics is extremely promising, though admittedly incomplete (Lubar, 1995; Sterman, 2000; Demos, 2005; Swingle, 2007; Budzynski, et al., 2009).
- * International Society for Neurofeedback & Research (ISNR) at www.isnr.org is an excellent source of information as well as the **Journal of Neurotherapy** for research in this field.

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Generalized Anxiety Disorders

- * Generalized Anxiety Disorder (GAD) may have elevated *amygdala* activity at the core of the disorder, especially when attention is constrained to our own internal emotional states (McClure et al., 2007).
- * The *anterior cingulate cortex* primarily functions as the brain's gear shifter, and allows children to shift between cognition and emotion in order to adopt a more adaptive response to emotionally significant events (Allman et al., 2001) Children may be too fixated monitoring their own internal states.

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Social Anxiety Disorders: Two Fears

- * The *amygdala* is the primary brain region for fear processing and also functions to generate a behavioral response to fear (Goossens et al., 2007). It is the principal brain region activated during the initial flash of fear, which is primarily reflexive.
- * The second fear functions to keep the first fear alive and occurs at a more cerebral, than reflexive level, through *automatic negative thoughts* (ANTS). Higher level brain regions such as the *orbitofrontal cortex* and *anterior cingulate cortex*, both of which have rich interconnections with the amygdala, comprise the second fear circuit (Goossens et al. 2007).
- * Medication management of anxiety disorders should begin with SSRI's to address the first fear system. Cognitive behavior therapy can assist children in reducing automatic negative thoughts by addressing the second fear system (Mancini et al., 2005).

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Cognitive Behavioral Therapy Techniques

- Cognitive Rehearsal** - the child recalls a problematic situation and discussion ensues regarding the best way to handle the situation.
- Validity Testing** - the child attempts to defend a faulty interpretation of a situation. The goal of therapy is to render these interpretations invalid.
- Writing in Journal** - maintain a journal rating the intensity of a situation as well as maladaptive thoughts that accompanied the situation. Eventually, the child should begin to accumulate a repertoire of positive thoughts to replace the maladaptive ones.
- Modeling** - role play and demonstrate specific relaxation techniques in various anxiety producing situations.
- Breathing Techniques** - focus on breathing from the diaphragm, not the chest, and exhaling on longer slower breaths. Strive for 6-8 breaths per minute. Practice breathing techniques when visualizing an anxiety provoking situation.
- Homework** - assign a task for the child involving a specific situation likely to induce anxiety, and a more adaptive cognitive thought.

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Interventions for Social Anxiety Disorder

(Khalid-Rhan et al., 2007)

- * Cognitive Behavior Therapy (CBT) is the treatment of choice for youth with social anxiety disorder. The most effective type of CBT involves:
 1. **Psychoeducation** - provide information about the disorder to student and parents.
 2. **Exposure Therapy** - systematic confrontation of fearful situation.
 3. **Skill Building Tasks** - relaxing training coupled with cognitive restructuring techniques and assertiveness building.
 4. **Homework Assignments** - refine skills each day so eventually a specific technique is habituated.
- side note:** Use CBT for mild impairment for 4 months. If 50% reduction in symptoms is not observed, SSRI meds recommended.

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Obsessive Compulsive Disorder

• OCD occurs in 2% to 4% of the pediatric population, has a mean onset range between 7 and 12 years old, and has a slight male predominance of 3:2 male-to-female ratio (Geller, 2006).

- OCD SUBTYPES:**
- * Washing hands (Contamination)
 - * Counting objects for fear of losing them (Hoarding)
 - * Constant reassurance from parents (Fear of loss)
 - * Obsessions with ordering and arranging

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Obsessive Compulsive Disorder

* The *anterior cingulate cortex* often tells the orbitofrontal cortex what to pay attention to (selective attention) and also helps to disengage attention. This area is often overactive in OCD and leads to cognitive inflexibility.

* The *caudate nucleus* connects to the *orbitofrontal cortex* and often triggers this brain region when something may be wrong leading to obsessions (Carter, 1998). Sometimes, this brain region becomes stuck leaving us in a persistent state of worry that something is wrong.

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Obsessive Compulsive Disorder

4 TREATMENTS:

- * Zoloft and Luvox have FDA approval for children with OCD.
- * Exposure & Ritual Prevention (ERP) - some symptom reduction for 63-83% of participants (Anthony, 2010).
 1. The therapist and the child would agree on a plan of specific exposure exercises (e.g. touching a clean sink or tap).
 2. Touching the feared object is the exposure part of therapy.
 3. Response prevention to resist the urge to hand wash and reduce the levels of discomfort that they feel in the long run.
- * CBT and medication equally effective for short-run, CBT more effective in long run.
- * Neurofeedback reducing beta wave activity over the anterior cingulate gyrus (Cz to Fz)

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Bottom-Up vs. Top-Down Anxiety Disorders

Bottom-Up Anxiety Disorders: PTSD, Panic Attacks, and Phobias repeatedly show atypical neural mapping characterized by relative *under-activity* of the prefrontal cortex and over-activity of subcortical regions of the brain such as the amygdala (Berkowitz et al., 2007).

Top-Down Anxiety Disorders: Disorders such as generalized anxiety disorder and obsessive-compulsive disorder may be more **top-down** types of anxiety disorders, and are characterized by *over-activity* of the prefrontal cortex leading to worry, doubt, and fear (Berkowitz et al., 2007).

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Vignette #3

Brendan, a natural thrill seeker, and Sam, his rather shy best friend, set out for a spine tingling adventure to ride the Millennium Force roller coaster standing some 310 feet in height. This ominous steel structure is simply the tallest roller coaster in North America (nucleus accumbens). As the coaster elevated upward in a slow, methodical fashion, Sam became paralyzed with fear and the impending doom awaiting. His sweaty palms, racing heart, and choppy breathing (sympathetic nervous system triggered by amygdala) intensified as the coaster was reaching its pinnacle. Meantime, a sudden calm had transfixed Brendan just before the sudden drop and loss of gravity (anterior cingulate cortex- not paying attention to bodily signs). After a series of twists, turns, and loops, the ride came to an abrupt end and Brendan exclaimed "Let's do that again" (orbitofrontal cortex). Meantime, Sam raced to find the nearest restroom in sight (you do not want to know).

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Treatments for Anxiety Disorders

- 1) SSRI's may be the most effective treatment for *bottom-up* disorders which occur outside of conscious control (Reinblatt & Riddle, 2007). Shortage of serotonin is associated with: anxiety, panic, phobias, PTSD, obsessions, compulsions and eating disorders
- 2) Exposure therapy can also quiet an overactive amygdala in "*bottom-up*" types of anxiety disorders (Goossens et al. 2007)
- 3) Children with strong interpersonal attachments to caregivers can develop far greater resiliency to stress than children with insecure attachments (Adams et al., 2007).

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Treatments for Anxiety Disorders

- 4) Cognitive behavior therapy is equally as effective, or in some cases, can surpass medication (Pine, 2008). Most useful with "top-down" disorders, and allow 4 months for 50% reduction in symptoms (Khalid-Khan et al., 2007).
- 5) Structured class settings that minimize unpredictability best for kids with anxiety disorders.
- 6) Neurofeedback aimed at diminishing arousal (beta waves) while simultaneously increasing the amplitude of alpha waves holds much promise for many anxiety conditions.

side note: "Thought Stopping" largely ineffective, though "thought substitutions" more effective.

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Depression (Stahl, 2008)

- * Depression is twice as likely in women, three times higher in families with positive history, and highest for unmarried males and married females.
 - * Not terribly common for younger children, though more common in adolescence (5%), thus implicating the role of the prefrontal cortex.
 - * 35-50% of depressed patients make a suicide attempt.
 - * 15% of severely depressed patients commit suicide (300,000 attempts per year with 30,000 suicides per year)
 - * Two out of three patients respond to medication.
 - * Prozac (SSRI) is only FDA approved antidepressant for children over age 8.
- *4% of children on Prozac have suicide ideation, twice that of a placebo.....WHY??**

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Theories of Depression

Biological - depletion of the monoamine neurotransmitters including dopamine, serotonin, and norepinephrine.

Neuropsychological - under-activity in the prefrontal cortex, particularly in the motivation regions of the brain (*anterior cingulate gyrus*) and positive reward centers of the brain (*nucleus accumbens*).

Psychodynamic - a sense of loss, either by death of loved one, or rejection of loved one, where self loathing emerges due to an overwhelming sense of being responsible for the loss.

Cognitive behavioral - failure and hopelessness becomes an accepted way of life.

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Preschool vs. Adolescent Depression

Depression exists along a continuum:



Adjustment Disorder
 ↓
 Dysthymic Disorder
 ↓
 Major Depression

Preschool Depression (Luby, 2009):

- 1) Anhedonia
- 2) Excessive guilt and compliance
- 3) Fatigue
- 4) Diminished cognitive abilities

* More a manifestation of **temperament**
 (right-frontal activation mediates negative moods)

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Temperament and Depression

* "Each infant enters the world with an innate set of reactions to their environment"
 (Posner & Rothbart, 2007).

(1) Introversion vs. Extraversion - internalizing feelings of despair and hopelessness leads to depression and withdrawal.

* Fox (2004) noted that preschool children who were behaviorally inhibited had far greater right frontal EEG activity.
 (An under-active right hemisphere... Phineus Gage!!)

(2) High Reactivity vs. Low Reactivity - our emotional intensity in how we react to stimuli (*amygdala sensitivity dictates intensity of emotional reaction*). Overzealous amygdala in depression and anxiety (Zalsman et al., 2006).

(3) Positive vs. Negative Affect - the **nucleus accumbens** is reward center of brain, and often underactive in depression leading to anhedonia (Cole et al., 2008).

(4) Behavioral Persistence - the tenacity a student demonstrates in the pursuit of a cognitive or emotional goal (**anterior cingulate gyrus**). The motivation center of brain.

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Preschool vs. Adolescent Depression

Adolescent Depression (Rao & Chen, 2009):

* Often triggered by environmental stressors such as loss of one's status in a social group, stressful home environment, or personal disappointment.

* 36% of chronically depressed persons experience significant abuse during childhood.

3 Environmental Factors (Klein et al., 2009):

- 1) Maternal indifference
- 2) Paternal over-control
- 3) Maternal abuse

Interpersonal Therapy (IPT) short term supportive therapy targeting interpersonal relations empirically valid for adults and adolescents.

Cognitive reappraisal- empirically valid for children (Zalsman et al., 2006).

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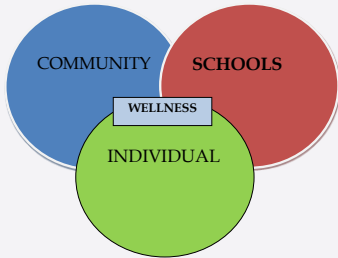
5 Therapeutic Treatments for Depression

- 1) Cognitive behavioral therapy aimed at replacing ANT's (automatic negative thoughts) with more adaptable cognitions.
- 2) Play therapy techniques teaching young children how to identify their feelings and better ascribe verbal labels to them, as well as monitoring feelings with homework assignments.
- 3) Utilizing neurofeedback techniques aimed at diminishing the amplitude of theta (slow) waves in the cortex.
- 4) Psychopharmacological approaches (SSRI's).
- 5) Increasing the number of interpersonal connections in a child's life.

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Psychological Wellness

What is Psychological Wellness?



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Why School Mental Health?

- * Children spend 15,000 hours in school from kindergarten through high school.
- * Children are most successful academically, personally, and socially when they have supportive relationships with caring adults (Doll & Lyon, 1998; Pianta, 1999).
- * School mental health services should focus upon maximizing wellness by promoting positive interpersonal interactions.
- * Building "resiliency" through satisfying relationships and feelings of connectedness is the key to overcoming obstacles and achieving psychological wellness.

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Seven Strategies to Promote School Mental Health (Doll, 2008)

- 1) Foster and promote respectful relationships between adults and children in the building. School success clearly linked to supportive relationships with adults .
- 2) Foster and promote respectful peer relationships by learning activities that require student teamwork (Cooperative learning activities).
- 3) Develop conflict resolution and peer mediation . Most childhood disagreements are between friends.
- 4) Have children set their own learning goals and expectations and encourage them to set the bar high.

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Seven Strategies to Promote School Mental Health (Doll, 2008)

- 5) Allow children the opportunity to take more responsibility for decision making in school. This may include choosing their own schedule and courses, being included in setting goals on their IEP, and have them track and collect data on their own behavior in school.
- 6) Explicitly teaching social skill behaviors for “at-risk” children. The skill should be taught in context, and immediate feedback is needed from adults in those situations.
- 7) Use CBT to re-program maladaptive social scripts. Should be administered by mental health practitioners and include community services as well.

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Social Emotional Academic Learning

What Does SEAL Address?

~ 5 Big Ideas



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School-Wide Positive Behavior Support

TEST	AGE RANGE	AUTHORS
BASC-II	2-21	Randy Kamphouse & Cecil Reynolds
Conners Comprehensive Behavior Rating Scales	6-18	Keith Conners
Achenbach System of Empirically Based Assessment (ASEBA)	6-18	Thomas Achenbach & Leslie Rescorla
Devereux Behavior Rating Scale	5-18	Jack Naglieri, Paul LeBuffe, Steven Pfeiffer
Beck Youth Inventory II	7-18	Judith & Aaron Beck
Children's Depression Inventory	7-17	Maria Kovacs
Revised Children's Manifest Anxiety Scale - 2	6-19	Cecil Reynolds & Bert Richmond
Clinical Assessment of Behavior	2-18	Bruce Bracken
RCDS/RADS	Grades 3 & up	William Reynolds
Children's PTSD Inventory	6-18	Philip Saigh
Millon Adolescent Clinical Inventory	13-19	Theodore Millon

Concluding Thoughts

- 1) Emotional dysfunction is not necessarily rooted in immorality but rather in neurobiology. Nevertheless, we are all to be held accountable by the choices we make.
- 2) Caution against over-relying on behavior rating scales. They are an opinion from observers not schooled in assessing mental health.
- 3) Not all behavior has a rational function (teleology).
Antecedent → Behavior → Consequence should be:
Antecedent → Executive Functioning → Behavior → Executive Reinforcement.
- 4) Medication in combination with cognitive behavioral therapy and environmental supports key to success. Neurofeedback may be the *wave* of the future.

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