Neuropsychology of Emotional Disturbance

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Lecture Overview

• Challenges of emotional disturbance in children.
  • The neural architecture of temperament and emotional functioning.
  • The neurobiology of empathy.
  • The neurobiology of internalizing behaviors.
  • The neurobiology of externalizing behaviors.
  • The merits of school wide positive behavioral supports.

Behavioral Trends

• The percentage of schools that recorded incidents of violent crime, serious violent crime, theft, and other incidents varied by school characteristics. For example, by school level, primary schools recorded lower percentages of these types of crimes than middle schools and high schools: 64% of primary schools recorded violent incidents of crime compared with 91% each of middle schools and high schools (Digest table 229.30).

• A lower percentage of primary schools recorded serious violent incidents of crime (13%) than middle or high schools (19 and 28%, respectively), a lower percentage of primary schools recorded incidents of theft (26%) than middle or high schools (65 and 83 percent, respectively), and a lower percentage of primary schools recorded other incidents (57%) than middle or high schools (82 and 92%, respectively).

(National Center for Education Statistics – Indicators of School Crime & Safety, 2013)
A strong relationship exists between committing violent acts and social-emotional disorders in children and adolescents (Swanson, Holser, & Ganju 1990; Eronen, Tiihonen, & Hakola, 1996; Valliant et al., 1999; Worling, 2001; and Wicks-Nelson & Israel, 2015).

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; Wicks-Nelson & Israel, 2015).

Approximately 1/3rd of ED children receive homebound instruction - more than any other disability group.
**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 (Wicks-Nelson and Israel, 2015).

**Developmental Pathways and Processes of influencing Emotional Stability and Disturbance** (Wicks-Nelson and Israel, 2015)

- Path 1: Stable Adaptation
  - Few environmental adversities; few behavior problems; good self-worth.

- Path 2: Stable Maladaptation
  - Chronic environmental adversities.
  - Example: aggressive, antisocial behavior maintained.

- Path 3: Reversal of Maladaptation
  - Important life change creates new opportunity.
  - Example: military career affords opportunity.

- Path 4: Decline of Adaptation
  - Environmental or biological shifts bring adversity.
  - Example: family divorce contributes to maladaptation.

- Path 5: Temporal Maladaptation
  - Can reflect transient experimental risk taking.
  - Example: use of illegal drugs.
1. 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. **WHY?**

2. **Other-Health Impaired** coding used as an umbrella term to capture any child on medication.

3. School IEP teams comprised mainly of non-mental health professionals determining mental health code.

4. Federal definition of ED rather vague with few parameters given (i.e. *inappropriate feelings under normal circumstances*?).

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

- There is no DSM V diagnosis of “emotional disturbance”. This is an educational code.
- Most children with emotional disorders, whether internalizing conditions such as anxiety or depression, or externalizing conditions such as conduct disorder or explosive mood disorders, lumped into one educational diagnostic category: SED.
- Behavior incentive plans most common educational intervention.
Behaviorism: The good, the bad, and the ugly

• Meta-analysis demonstrated behavior modification and behavior contingency managements one of the most effective intervention strategies for managing classroom behavior (Lloyd, Forness, & Kavale, 1998, and Wicks-Nelson & Israel, 2015).

• 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.

Behaviorism: The good, the bad, and the ugly

• Dismisses 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 treatment paradigms; namely, a behavior plan utilized despite the presenting condition.

• Goal is to induce task specific performance, as opposed to the internalization of self-regulatory behaviors (Cicerone, 2002).
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.
• 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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Temperament

- Temperament refers to basic disposition or makeup. Temperament is viewed as individual differences in behavioral style that are thought to develop into later personality through environmental interaction. (van de Akker et al, 2010).

- Early temperament is moderately stable over time and can predict later temperament and adult personality. The role of biology in temperamental differences (Schwartz et al, 2010).

- Also parenting practices have been associated with changes in temperament, demonstrating the role of environmental processes. (Akker et al, 2010).

Temperament Theories

(Wicks-Nelson and Israel, 2015)

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<thead>
<tr>
<th>THOMAS AND Chess</th>
<th>ROTHEART</th>
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<tbody>
<tr>
<td><strong>Dimension</strong></td>
<td><strong>Description</strong></td>
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<tr>
<td>Activity level</td>
<td>Ratio of active periods to inactive ones</td>
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<tr>
<td>Rhythmicity</td>
<td>Regularity of body functions, such as sleep, wakefulness, hunger, and excretion</td>
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<tr>
<td>Distractibility</td>
<td>Degree to which stimulation from the environment alters behavior—for example, whether crying stops when a toy is offered</td>
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<td>Approach/withdrawal</td>
<td>Response to a new object, food, or person</td>
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<tr>
<td>Adaptability</td>
<td>Ease with which child adapts to changes in the environment, such as sleeping or eating in a new place</td>
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<td>Attention span and persistence</td>
<td>Amount of time devoted to an activity, such as watching a mobile or playing with a toy</td>
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<td>Intensity of reaction</td>
<td>Energy level of response, such as laughing, crying, talking or gross motor activity</td>
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<td>Threshold of responsiveness</td>
<td>Intensity of stimulation required to evoke a response</td>
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<td>Quality of mood</td>
<td>Amount of friendly, joyful behavior as opposed to unpleasant, unfriendly behavior</td>
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<td><strong>Dimensions</strong></td>
<td><strong>Description</strong></td>
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<tr>
<td>Reactivity</td>
<td>Level of gross motor activity</td>
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<tr>
<td>Attention span/persistence</td>
<td>Duration of orienting or interest</td>
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<td>Fearful distress</td>
<td>Wariness and distress in response to intense or novel stimuli, including time to adjust to new situations</td>
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<td>Inhibitory distress</td>
<td>Extent of fussing, crying, and distress when desires are frustrated</td>
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<td>Positive affect</td>
<td>Frequency of expression of happiness and pleasure</td>
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Self-regulation

Effortful control | Capacity to voluntarily suppress a dominant, reactive response in order to plan and execute a more adaptive response |
**Temperament**

**Four Temperament Types:**
1. **Introversion vs. Extraversion** – approach or withdrawal to social novelty (right hemispheric sensitivity related to withdrawal).
2. **High Reactivity vs. Low Reactivity** – our emotional intensity in how we react to stimuli (amygdala sensitivity dictates intensity of emotional reaction).
3. **Positive vs. Negative Affect** – the reward circuitry of the brain in determining mood valence (nucleus accumbens is reward center of brain).
4. **Behavioral Persistence** – the tenacity a student demonstrates in the pursuit of a cognitive or emotional goal (anterior cingulate gyrus is motivation center of brain).

**What is an Emotion?**

*Temperament, language, and culture all determine how a feeling is appraised!!*

**3 Key Components of an Emotion:**
1. Private Feelings of sadness, joy, anger, disgust, and the like;
2. Autonomic nervous system arousal and bodily reactions such as rapid heartbeat; and
3. Overt behavioral expressions such as smiles, scowls, and drooping shoulders.
Emotional Terminology:

- **Feelings** – consciously recognizing a bodily state of change often characterized by a physiological response pattern.
- **Emotions** – verbally tagging a particular feeling. The verbal label limited by language and culture.
- **Moods** – duration of an emotion.
- **Affect** – positive or negative valence.

Three Main Subcortical Brain Regions:

1. **Amygdala** – plays a role in evaluating the emotional significance of situations (Pinel, 2014)
   - Has a specific role in fear.
   - 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.
Three Main Subcortical Brain Regions:

2. Hippocampus - located in medial temporal lobe and responsible for laying down new memories in a sense of space a time, and retrieving older ones.

- Chronic stress from abuse or neglect releases cortisol which reduces hippocampal volume and leads to memory loss and clouded thinking.
- Emotional learning (classical conditioning) can take place outside of conscious control with paired association between amygdala and hippocampus .......a phobia!!
Hippocampus

Let's Meet the Cerebral Orchestra of Emotions

Three Main Subcortical Brain 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.
Nucleus Accumbens

Striatum
(Caudate nucleus)

VTA &
Substantia Nigra
(not shown)

Nucleus accumbens
Amygdala
Hippocampus

Let’s Meet the
Cerebral Orchestra of Emotion

Dopamine Pathways
Serotonin Pathways

Functions
- Reward (motivation)
- Pleasure, euphoria
- Motor function
  (fine tuning)
- Compulsion
- Perseveration

Frontal cortex

Functions
- Mood
- Memory processing
- Sleep
- Cognition

Nucleus accumbens
VTA
Hippocampus
Raphe nucleus
Three Main Cortical Brain 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. Also, is thought to mediate the emotional response to odors (Pinel, 2014).
2. **Ventrolateral prefrontal cortex** - responsible for response inhibition and emotional regulation.
3. **Anterior Cingulate Cortex** - motivation and reward based decision making. Key brain region in developing “theory of mind”.

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Frontal Lobe Circuitry

1. Lateral Orbitofrontal
2. Dorsolateral
3. Medial orbitofrontal
4. Limbic system
5. Anterior Cingulate
Summary of Emotions

- Emotions are actually complex cognitive machinations that are interpreted from core physiological experiences (Posner, Russell, & Peterson, 2005; Pinel, 2014).
- Limbic regions of the brain generate a rudimentary feeling, but higher level brain regions, such as the orbitofrontal cortex, interpret these feelings in an adaptive or maladaptive manner (i.e. Fear vs. Excitement).
- The cognitive interpretations are based upon language, culture, and core temperament traits.

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“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

Though individual temperaments dictate our personality development, cooperative behavioral functioning, so vital for school success, often stems from developing an empathetic moral code. Can this code have a neurobiological basis?
1. Schwann Cells (PNS)/Oligodendrocytes (CNS):
   dictates both the timing and degree of completion of white matter pathways, a critical prerequisite for the ultimate emergence of the social brain network (Yeates et al., 2007; Pinel, 2014).
   • Early stressful experiences such as neglect and abuse can alter brain chemistry through atypical release of cortisol. Elevated cortisol levels can destroy brain cells in cortico-limbic circuits and hinder the development of higher level social skills (Gunnar & Quevado, 2008).
   • Johnson et al., (2005) and Pinel, (2014) found white matter aberrations in autistic children correlated with failure to develop early social skills such as eye gaze cuing and joint attention.
   - Ramachandran claimed mirror neurons may be the single most important discovery in neuroscience in last decade.
   - Located in the ventral premotor cortex.
   - 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!
2. **Mirror Neurons:**
   - Keysers and Gazzola (2006) and Pinel (2014) 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 (Ramachandran & Oberman, 2006; Pinel 2014).

3. **Spindle Cells:** Found in great apes, whales, and human beings (Goldberg, 2005).
   - Forges long distance connections to allow multiple brain regions to cast their signals in a spontaneous instead of modular manner (Dehaene et al., 2003).
   - Clustered in right hemisphere near anterior cingulate cortex and insular cortex. Each region important in self awareness and mental state attributions (Keenan et al., 2003).
3. **Spindle Cells:**
   - At 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).

3 Components of Empathy

1. **Affective Sharing** - the ability to share and fully experience the emotional experiences of another through shared sensory perceptions (MIRROR NEURONS).
2. **Self-Other Awareness** - a clear and distinct representation between the thoughts, actions, and feelings of another with the thoughts, actions, and feelings of oneself (SPINDLE CELLS).
3. **Mental Flexibility** - the ability to adopt the subjective perspective of another, or what is sometimes referred to as “theory of mind”, by the development of an internal frame of reference (ORBITOFRONTAL CORTEX).
**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, Pinel 2014).

- **Mirror Neurons** - plays a crucial role in the affective development of a child by mapping the bodily feelings of others to ourselves in order to foster empathetic behavior (Rizzolatti et al, 2006; Pinel, 2014)

- **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).

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**3 Components of Empathy**

- **Affective Sharing**
  - (Mirror Neurons)

- **Self-Other Awareness**
  - (Spindle Cells)

- **Mental Flexibility**
  - (theory of mind)
  - (Orbitofrontal Cortex)
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Emotional Disturbances

Bipolar disorder, depression, and anxiety disorders are truly clinical emotional conditions that can manifest in a variety of behaviors hindering academic and social development.
• Many children in ED classes may have emotional impulsivity, poor behavioral self-control, and are prone to reactive aggression. However, they do not necessarily have a clinical emotional condition.

• Nevertheless, effective school performance requires successful social and emotional management through a milieu of interpersonal encounters and challenges, where frustration and anger must be tempered for the pursuit of goal attainment (Barkley, 2001).
Bipolar and Related Disorders (DSM-V)

**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. Typically involves a history of major depression.

**Bipolar II** - diagnosed when a manic episode lasts under four days with noticeable symptoms, though not necessarily severe impairment in functioning. Includes a history of depression and hypomania.

**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 other day) aspect of bipolar disorder. Now called Disruptive Mood Dysregulation Disorder is among the DSM-5 diagnosis related to depression (Wicks-Nelson & Israel, 2015).

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Four 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; Pinel, 2014).
   * 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 (Caetano, et al., 2005; Pinel, 2014). The hippocampus lies in close proximity to the amygdala and is primarily responsible for consolidating new memories and retrieving older ones.
3. **Cingulate Gyrus** - The anterior portion of the cingulate gyrus provides constraint over emotion and cognition, and is also involved in task motivation. Numerous studies have noted the left anterior cingulate in bipolar patients being significantly smaller in volume (Drevets et al., 1997; Kaur et al., 2005, Pinel, 2014).

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 (Kloss et al., 2008: Pinel, 2014).

Bipolar Disorder and Reactive Aggression

Bipolar children often misinterpret neutral faces, and rate them as more hostile and fear producing, and often require intense displays of facial expression to identify a particular emotion (Rich et al., 2006; Wicks-Nelson and Israel, 2015).
Bipolar Disorder and Reactive Aggression

• Damage to the orbitofrontal or ventromedial prefrontal cortex is associated with an increased display of reactive aggression in both children and adults (Rolls, 2004; Blair et al., 2004; Pinel, 2014).

• The orbitofrontal cortex basically functions as a higher-level decision making mechanism fueled by emotional feelings engendered from previous experiences (Dolan, 1999; Pinel, 2014).

Bipolar Disorder Treatments (NIMH)

• Lithium, the first mood-stabilizing medication with FDA approval for treatment of mania, is very effective in manic and depressive episodes. Acne, hair loss, and weight gain common side effects.
**Bipolar Disorder Treatments (NIMH)**

- **Anticonvulsant medications**, such as Depakote or Tegretol, can also have mood-stabilizing effects and may be especially useful for difficult-to-treat bipolar episodes. Newer anticonvulsant medications, such as Lamictal, Neurontin, and Topamax, are being studied to determine how well they work in stabilizing mood cycles. Interacts with GABA to inhibit neural firing.

- **Atypical antipsychotics** include Abilify, Respirdal, Clozapine, and Seroquel. Functions to enhance dopamine solely in mesocortical regions, and not other dopamine areas.

- **Antidepressants** (SSRI’s) include Zoloft and Prozac. Functions to enhance serotonin, though can increase mania.

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**DSM-V**

**Disruptive mood dysregulation disorder** is included in DSM-5 to diagnose children who exhibit persistent irritability and frequent episodes of behavior outbursts three or more times a week for more than a year. (DSM-V, 2013, p.156).

The diagnosis is intended to address concerns about potential over-diagnosis and overtreatment of bipolar disorder in children. Will children now stop being diagnosed with bipolar disorder, which has been a recurring concern among many clinicians and researchers? We will see.
Oppositional Defiant Disorder from DSM-IV-TR to the development related to the DSM V (Initial Proposal)

- It is proposed that the eight symptoms of Oppositional Defiant Disorder should be divided into the following categories: Angry/Irritable Mood; Defiant/Headstrong Behavior; and Vindictiveness.
- However, just as in the DSM-IV-TR, four of these symptoms need to be present to meet diagnostic criteria. The minimum four symptoms can come from all (or even just one or two) of the three categories.
- It is proposed that a section be added to the diagnostic criteria for Oppositional Defiant Disorder stating that for children under 5 years of age, oppositional behavior "must occur on most days for a period of at least six months".
- For children 5 years or older, oppositional behavior "must occur at least once per week for at least six months". The current criteria states that four or more symptoms must be present for at least 6 months. The proposed change adds the criterion of frequency of symptoms and also delineates required frequency by the age of the... (Please see DSM-V for details)

Disruptive, Impulse-Control and Conduct Disorder, DSM-V (Please see DSM-V for details)

- A pattern of angry/irritable mood, argumentative/defiant behavior, or vindictiveness lasting at least 6 months as evidenced by at least four symptoms from any of the 8 categories, and exhibited during interaction with at least one individual who is not a sibling.

- For children younger than 5 years, the behavior should occur on most days for a period of at least 6 months unless otherwise noted. For individuals 5 years or older, the behavior should occur at least once per week for at least 6 months, unless otherwise noted.
- **Generalized Anxiety Disorder (GAD):** Children with GAD go through school filled with exaggerated worry and tension, and are overly concerned about health issues. This disorder rarely occurs in isolation, and most children often complain of fatigue, frequently request to use the bathroom, experience muscle tension, and are often uncomfortable in school.

- **Separation Anxiety Disorder (SAD):** Children with SAD become extremely distressed when separated from a parent, and may refuse to be separated from important attachment figures. In addition, children with SAD may be afraid to sleep alone, worry excessively their parents may die, and often develop school refusal.
Pediatric Anxiety Disorders

• **Social Anxiety Disorder (Social Phobia):** Children with social anxiety disorder, or what is often referred to as social phobia, have a persistent fear of social performance that may be humiliating or embarrassing.

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 orbitofrontal cortex is housed within the frontal lobes and plays a crucial role in ascribing a reward value on emotional stimuli which ultimately guides behavior through reinforcement contingencies (Rolls, 2004). May be contributing to **automatic negative thoughts (ANTS)**.

• 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, Pinel 2014).
Etiology of Anxiety

Biological Influences

Genetics may contribute
- Aggregation of anxiety disorders in families
- Risk for developing anxiety disorders likely inherited
  - Possibly different patterns inherited, or tendency is inherited rather than specific disorder
- Serotonin, GABA, CRH-Corticotropin-Releasing Hormone
- Limbic system, particularly the amygdala

Biological influences for OCD
- Higher heritability
- Studies link OCD to problems in basal ganglia, frontal lobes

PANDAS

(Wicks-Nelson and Israel, 2015)

What is PANDAS?

• PANDAS is short for Pediatric Autoimmune Neuropsychiatric Disorders Associated with Streptococcal Infections
• The symptoms of OCD or tic symptoms suddenly become worse following a strep infection.

• A child may be diagnosed with PANDAS when:
  • Obsessive compulsive disorder (OCD) and/or tic disorders suddenly appear following a strep infection (such as strep throat or scarlet fever).

(NIMH, 2015)
• The symptoms are usually dramatic, happen “overnight and out of the blue,” and can include motor and/or vocal tics, obsessions, and/or compulsions.

• In addition to these symptoms, children may also become moody, irritable, experience anxiety attacks, or show concerns about separating from parents or loved ones.

Children with PANDAS are initially diagnosed with Obsessive Compulsive disorder or a tic disorder. OCD and tic symptoms in PANDAS are similar to those in the classic forms of childhood OCD and tic disorders (NIMH, 2015).

PANDAS first appears in childhood from age 3 to puberty. In addition to OCD or tics, these children may have some or all of the following symptoms:

• Sudden unexplainable rages (also called emotional lability)
• Personality changes
• ADHD (Attention Deficit Hyperactivity Disorder) that is new or dramatically worse.
• Anorexia (often because of a fear of choking, or fear of throwing-up)
• Nervous system disorders such as tics or other rapid, jerky movements
• Age inappropriate behaviors (such as bedtime fears/rituals, loss of impulse control)
• Separation anxiety
• Defensiveness caused from hyperactive senses (such as sensitivity to clothing, noise, light, taste, etc.)
• Noticeable decrease in handwriting or math skills
• Frequent urination (especially when the child has an active infection)
Etiology of Anxiety

Psychosocial influences

Three pathway theory (Rachman)
- Fear begins with exposure to trauma or threat
- Fear modeled by parents, who also reinforce it
- Fear acquired through transmission of information

Parenting styles and practices
- Avoidant solutions
- Overprotective, intrusive
- Insecure attachments

ASSESSMENT

Interviews & self-report instruments
- State Trait Inventory for Children
- Revised Children’s Manifest Anxiety Scale
- Multidimensional Anxiety Scale
- Negative Affect Self-Statement Questionnaire

- Direct observations
- Physiological recordings
- Neuropsychological Tools-Assess for Attention, Memory, Processing Speed,
- Problem-Solving, etc.
Interventions

Psychological treatments - exposure to anxiety-provoking situation central to treatment
- Relaxation
- Desensitization/systematic desensitization
  - Relaxation training paired with exposure
- Modeling
  - Participant modeling
- Contingency Management
  - Stop reinforcing for avoidance
  - Reinforce improvement

(Wicks-Nelson and Israel, 2015)

Interventions (continued)

Psychological treatments (continued)
- Cognitive-behavioral treatments (CBTs) - goals:
  - Recognize signs of anxious arousal
  - Identify cognitive processes associated with anxious arousal
  - Employ strategies, skills for managing anxiety
- For OCD - CBTs first treatments of choice.
  - Central aspect to these approaches: exposure with response prevention
- Pharmacological
  - Strongest evidence for efficacy is for SSRIs, but because of side effects these may not be first choice for treatment of anxiety in youth
  - For OCD - medications also are an option, but CBTs still preferred

(Wicks-Nelson and Israel, 2015)
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, Pinel, 2014). 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 (Goosens 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).
Obsessive-Compulsive and Related Disorders (DSM-V)
Obsessive Compulsive Disorder (OCD)

- 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).

The frontostriatal systems (connections between the basal ganglia and the frontal lobes) tend to be implicated in OCD with children (Pinel, 2014, Wicks-Nelson and Israel, 2015)

- 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. The putamen has connections with the premotor strip, and may be implicated in compulsory types of behaviors (Carter, 1998).
Post-Traumatic Stress Disorder (DSM-V Update, pgs. 271-272)

- Two Criteria according to age older than 6 to adulthood and under 6. Please see DSM-V for details).
- PTSD develops in response from exposure to a traumatic experience such as direct physical or sexual abuse or witnessing the abuse of a loved one.
- There are three responses to trauma that children often experience:
  1. re-experiencing the trauma through repetitive play or flashbacks.
  2. avoidance of stimuli associated with the trauma.
  3. persistent symptoms from trauma that increases arousal and interferes with school functioning (Najjar et al., 2008).

Post-Traumatic Stress Disorder

- The hippocampus, a key memory center of the brain, and the cerebellar vermis, both contain a high density of glucocorticoid receptors that are stimulated by stress (Anderson et al., 2002, Pinel, 2014).
- Alterations to the amygdala and cerebellar vermis in severely maltreated children may result in impulsive violence as these children tend to attribute hostility to situations that are relatively benign, have increased levels of fear, and often develop overly negative self perceptions (Ayoub & Rappolt-Schlichtmann, 2007, Pinel, 2014).
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).

Four 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).
2. Exposure therapy and systematic desensitization can quiet an overactive amygdala in more “*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).
4. Cognitive behavior therapy is equally as effective, or in some cases, can surpass medication (Pine, 2008).
5. Structured class settings that minimize unpredictability best for kids with anxiety disorders.
• Benzodiazepines: fast acting drugs that elevate GABA, an inhibitory neurotransmitter. Examples include:
  • Halcion
  • Xanax,
  • Valium
  • Librium
  • Klonopin
  • Ativan

• SSRI’s:
  • Blocks reuptake of serotonin into the presynaptic cell.
  • Shortage of serotonin is associated with: anxiety, panic, phobias, posttraumatic stress disorder, obsessions, compulsions or eating disorders.
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.

Depression (Stahl, 2008)

- 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??
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.

(Wicks-Nelson and Israel, 2015)

Treatment for Depression

**SSRI’s**
- Zoloft
- Paxil
- Luvox
- Celexa
- Lexapro
**Treatment for Depression**

**Side effects:** Examples of side effects generally consist of: nausea, difficulty sleeping, drowsiness, anxiety, nervousness, tremors, dry mouth, diarrhea, decreased sexual drive.

**Potential benefits:** The positive aspects of SSRIs are their potential to increase concentration, attention, mood, receptiveness to learning, and interpersonal skills (Stahl, 2000, 2008).

**MAO Inhibitors:** monamine oxidase inhibitors (Marplan, Nardate, Pardate) prevent mop activity following cell transmission and allow for more monoamines (5HT, NE, DA) to be present in the synapse.

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**Therapeutic Treatments for Children**

**Counseling Games and Activities for Children**

- Listen to Your Body
- A to Z with Feelings
- Feelings Go-Fish
- Mood Journals
- Paint a Metaphor
- Feelings Menu
- Empty Chair
- Map it to the Absurd
- Music Selections
- Exercise it Away
**Neuropsychological Correlates to Internalizing Disorders**

- See Miller, J. A. (2009) for a complete review of the neurological deficits associated with internalizing disorders.

<table>
<thead>
<tr>
<th></th>
<th>Sensory-Motor</th>
<th>Attention</th>
<th>Visual-Spatial</th>
<th>Language</th>
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**Psychological Wellness**

What is Psychological Wellness?

- Community
- Schools
- Individual
- Wellness
Lecture Overview

- Challenges of emotional disturbance in children.
- The neural architecture of temperament and emotional functioning.
- The neurobiology of empathy.
- The neurobiology of internalizing behaviors.
- The neurobiology of externalizing behaviors.
- The merits of school wide positive behavioral supports.

Neurological Bases to Externalizing Behaviors

The growing neuropsychological literature on violent and antisocial behavior is confirming beyond a reasonable doubt what some have argued for a long time – that antisocial and violent offenders have neuropsychological impairments (Bartol & Bartol, 2014; Schug & Fredella, 2014).
The term “externalizing behavior” describes chronically impulsive, oppositional, aggressive, destructive, or delinquent behavior.

Externalizing Disorders in children often are grouped into two subtypes, consisting of impulsive disorders such as Attention-Deficit/Hyperactivity Disorder (ADHD), versus disruptive conditions such as Oppositional-Defiant Disorder (ODD) and Conduct Disorder (CD).

The number of child delinquents seen in U.S. juvenile courts increased 33% from 1991 to 2001 (Snyder, 2001), with offense patterns reflecting more serious crimes, and child offenders being 2-3 times more likely to become serious, violent, and chronic offenders than “late starters.”
Lahey et al. (2003) conducted and reviewed 10 years of research and proposed two subtypes of youths engaging in externalizing behaviors, defined as “life-course persistent” (LCP) offenders, versus “adolescence-limited” (AL) offenders. (LCP) offenders' antisocial behavior has its origins in neurodevelopmental processes, begins in childhood, and continues persistently thereafter. In contrast, (AL) offenders' antisocial behavior has its origins in social processes, begins in adolescence, and desists in young adulthood.

Externalizing Behaviors-Related to Delinquency

- Earlier Starters, primarily developmentally disabled:
  - Medical/neurological factors resulting in neurocognitive deficits.
  - Poor familial attachments, dysfunctional verbal interactions, and maltreatment.
  - Family distress
  - School failures
  - Negative peers
  - Difficulty with planning, and with subterfuge (more likely to be caught).
Externalizing Behaviors Related to Delinquency

- **Later Starters, primarily personality disordered:**
  - Medical/neurological factors resulting in low autonomic nervous system arousal.
  - Poor attachments, inconsistent discipline, and maltreatment.
  - Dysfunctional beliefs about self and others.
  - Deficits in empathy, more likely to use others for their own purposes.
  - Able to plan, and to engage in subterfuge.

Externalizing Behaviors

- Several aspects of externalizing behavior have shown a link to neurocognitive factors (Riggs, Greenberg, Kusche, & Pentz, 2006), such as frontal lobe function (ability to exert executive control over one’s behavior), speech/language centers (ability to use language effectively for both inner speech and interpersonal communication), and areas of the brain involved in visuospatial processing (ability to perceive and express nonverbal information). Moreover, some research suggests that social experience and environment can alter neurobiological function (Fishbein, 2000; Pinel 2014), as well as neurocognition (Dowsett & Livesey, 2000; Pinel, 2014).
Neurocognitive Deficits Associated with Externalizing Behaviors

- Difficulty with effortful control
- Difficulty with self management
- Specific cognitive deficits (see Jiron, 2009 for a complete review).
- Difficulty with socio-emotional functioning and affective regulation. (Bartol & Bartol, 2014; Schug & Fredella, 2014).

Lecture Overview

- Challenges of emotional disturbance in children.
- The neural architecture of temperament and emotional functioning.
- The neurobiology of empathy.
- The neurobiology of internalizing behaviors.
- The neurobiology of externalizing behaviors.
- The merits of school wide positive behavioral supports.
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.

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.
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.
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.

Six Indicators of Mental Health Disorders (Doll, 2008)

1. Emotional Disturbances: including excessive worry, fearfulness, sadness or pessimism. More intense than those of typical peers, leaving children unable to regulate their actions in response to these emotions.

2. Avoidance behaviors: actively avoiding certain places, people, or activities to the point where it is life-impairing.

3. Self injurious behaviors: children jeopardize their own physical well-being. These include suicidal behaviors, cutting behaviors, and eating disorders.
Six Indicators of Mental Health Disorders (Doll, 2008)

4. **Peer relationships**: social isolation or peer bullying.

5. **Impulsive behavior**: carelessly act without thinking. Often described as immature and acting like younger children.

6. **Rules and authority**: frequently disobey adults' rules and often defiant or even hostile towards authority figures.

School-Wide Positive Behavior Support

**School-Wide Positive Behavior Support (SWPBS)**

- Proactive response to antisocial and problematic behaviors.
- Three components include:
  1. Prevention
  2. Multi-tiered support
  3. Data-based decision making
- Data-based decision often uses web-based software for collecting and analyzing student discipline data. This is called **School-Wide Information System (SWIS)**.
- Re-conceptualize behavioral climate in schools through **Social-Emotional Academic Learning (SEAL)**.
School-Wide Positive Behavior Support

**Tier 1** - All students receive instruction in and acknowledgement for social, emotional, and academic learning skills. The goal is to support most students in the development of the basic skills necessary to participate fully in regular education and to prevent the development of problem behaviors that become nonacademic barriers to learning. Screening measures include:
School-Wide Positive Behavior Support

**Tier 2** - Students who may be "at-risk" or show signs of emerging problems that may negatively impact the development of social, emotional, or academic learning receive mildly to moderately intensive skill reinforcement, strategies, and/or interventions to build their skills and to prevent any existing problems from becoming worse. Tests that assist with progress monitoring include:

<table>
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<tr>
<th>TEST</th>
<th>AGE RANGES</th>
<th>PROGRESS MONITOR</th>
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<tbody>
<tr>
<td>Beck Youth Inventory, Second Edition (BYI-II)</td>
<td>7 - 18</td>
<td>Discrete behavior or emotional skills</td>
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<tr>
<td>Functional Assessment and Intervention System (FAIS)</td>
<td>Children &amp; Adolescents</td>
<td>Decrease challenging behaviors/ increase prosocial behaviors</td>
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<tr>
<td>BASC-3 Progress Monitor</td>
<td>Children &amp; Adolescents</td>
<td>Decrease challenging behaviors/increase prosocial behaviors</td>
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<tr>
<td>Social Skills Improvement System (SSIS)</td>
<td>3 - 19</td>
<td>Social skill development</td>
</tr>
</tbody>
</table>

**Tier 3** - Students who have developed serious problems or emotional disorders that negatively impact social, emotional, and academic learning receive intensive interventions and supports to reduce the effects of these barriers to learning and to prevent the problem from getting worse. The following are examples of commonly used social and emotional measures:
School-Wide Positive Behavior Support

<table>
<thead>
<tr>
<th>TEST</th>
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<th>AUTHORS</th>
</tr>
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<tbody>
<tr>
<td>BASC-III</td>
<td>2-21</td>
<td>Randy Kamphaus &amp; Cecil Reynolds</td>
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<td>Conners Comprehensive Behavior Rating Scales (DSM-5 Update)</td>
<td>6-18</td>
<td>Keith Conners</td>
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<td>Achenbach System of Empirically Based Assessment (ASEBA) (DSM-5 Oriented Scales)</td>
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<td>Thomas Achenbach &amp; Leslie Rescorla</td>
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<td>Devereux Behavior Rating Scale</td>
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<td>Jack Naglieri, Paul LeBuffe, Steven Pfeiffer</td>
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<td>Beck Youth Inventory II</td>
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<td>Judith &amp; Aaron Beck</td>
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<td>Children’s Depression Inventory-2</td>
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<td>Maria Kovacs</td>
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<td>Revised Children’s Manifest Anxiety Scale - 2</td>
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<td>Cecil Reynolds &amp; Bert Richmond</td>
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<td>Bruce Bracken</td>
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<td>RCDS-2/RADS-2</td>
<td>Grades 3 &amp; up</td>
<td>William Reynolds</td>
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<td>Philip Saigh</td>
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<tr>
<td>Millon Adolescent Clinical Inventory</td>
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<td>Theodore Millon</td>
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Concluding Thoughts

1) Emotional dysfunction is not 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. Furthermore, these scales are limited by the range of observable behaviors capable of manifesting from a specific biological state.

3) Not all behavior has a rational function (teleology). Antecedent Behavior → Consequence should be: Antecedent → Executive Functioning → Behavior → Consequence.

4) Medication in combination with therapy and environmental supports key to success.
References


