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**UNDERSTANDING AND WORKING WITH STUDENTS WITH ADHD, LEARNING
DISABILITIES AND ASPERGER'S DISORDER IN THE CLASSROOM**

ST. JOHN'S PREPRATORY SCHOOL, MARCH 2, 2011

Processing and brain functioning

Brain is over 100 billion neurons and other types of brain cells in constant communication with each other.

Each neuron has connections to thousands of other cells.

How these cells communicate and coordinate determine how we process information.

Complex system in which a lot can and does go wrong.

We often look at behavior and assign a value to it, like laziness, lack of motivation or effort or stupidity because we lack the knowledge of brain structure and function, and the vocabulary and the familiarity to deal with it on that level.

Electrical and chemical signals

Electrical charges and synapses

Chemical messaging: neurotransmitters

Triggering the next neurons: Excitatory and inhibitory

Speed of electrical transmission

Frequency and amplitude

Degrees of activation

States of consciousness

Ability to shift and maintain state

Need an active brain to inhibit

Under and over activation: Arousal curve

Functional specialization

Posterior: Sensory processing

Visual cortex: visual processing

Some cells: the presence of an object, its shape, movement, purpose, familiarity

Parietal cortex: somatosensory, spatial processing

Temporal cortex: auditory processing

Association areas

Reading: visual perception, sound association, expressive language, Angular gyrus

Anterior: Frontal and prefrontal lobes

- Orchestra conductor
- Executive functioning
- Inhibition
- Motor movement
- Social self
- Self-awareness
- Awareness of other people
- Mental flexibility
- Acting on sensory information from the back of the head

Two hemispheres

Right

- New learning
- Gestalts
- Intuition
- Holistic, simultaneous, visual-spatial processing
- Social information
- Math: some aspects
- The meaning, significance of things
- Attachment, safety
- Verbal communication: prosody, the “music”

Left

- Practiced, previously learned information
- Logical, sequential processing
- Math word problems
- Some aspects of social skills
- Verbal communication, speech and language: the “words”
- Receptive and expressive language

Subcortical structures

- Communication between cortical areas, including the two hemispheres
- Primitive emotions: fear
- Approach, avoidance behaviors

Need to integrate back and front, left and right: not just take in information

Information flows from back to front, side to side and front to back: need for coherence and coordination

ADHD

What is ADHD?

Diagnostic criteria

- At least six symptoms of inattention; persisted for six months or more; maladaptive and inconsistent with developmental level
- Or at least six symptoms of hyperactivity-impulsivity
- Some symptoms that caused impairment present before age 7
- Some impairment in two or more settings
- Clear evidence of clinically significant impairment in social, academic or occupational functioning
- Symptoms do not exclusively occur or are better accounted for by another mental disorder

Vaguely defined, hard to identify, inconsistent disorder

Each symptom begins with “often”
 Differs subjectively and culturally
 Continuum: no clear dividing line between normal and abnormal
 Appearance of being unmotivated, lazy
 Symptoms do not exist all the time, in all settings and with the same intensity

Overaroused and underaroused

Underaroused: not revved up enough, those whose brains can't wake up
 Life goes by too fast for them
 Frontal lobes: deficient dopamine, elevated theta, diminished beta
 Needs more peripheral stimulation to activate nervous system
 Underaroused spacey types, hyper types

Overaroused: too revved up, those whose brains can't calm down
 They go too fast to process life
 May be increased activity in parts of the brain: norepinephrine in parietal lobes, beta spindles in frontal or parietal lobes, high beta activity
 Need less peripheral stimulation to deactivate nervous system
 Overaroused disinhibited types, oppositional types, mood dysregulation types

Arousal curve: activation and performance

Arousal/activation

Allows you to muster the energy to pay attention, filter in relevant information, filter out irrelevant information, inhibit competing thoughts, feelings, needs
 Sustaining activation: inconsistency in performance
 Brain might be activated during certain stimulus conditions (internal and external) but unable to sustain the chemical and electrical activity to continue in an activated state or to shift into that state when stimulus conditions are not optimal

Role of the frontal lobes

Orchestra conductor, executive functioning
 Brain wave activity and arousal states, processing, efficiency
 Normal brain response to academic demands
 Brain increases beta and inhibits theta activity: the brain comes more on line
 vs. ADD brain response
 Brain inhibits beta and increases theta activity: the brain goes off line

ADHD as a failure of inhibition, dysregulation of one's internal state and organizing behavior over time

Hold thoughts in **working memory**: think about things that you are not immediately experiencing, in order to consider what you should do and how things might turn out if you made one choice or another

Apply past experiences to current events

Imagine the future: how things might turn out. Impervious to reinforcement because brain can't anticipate future, can't inhibit what is immediately reinforcing to consider long term outcomes

Establish **goals** and plans of action

Avoid reacting to things that interfere with your goals

Use **internal speech**: talk to yourself

Regulate emotions and motivation

Separate emotions from information in reacting to events

Analyze and synthesize information, decisions

What is attention?

- Orienting

- Focusing: screen out distractions, internal and external

- Sustaining focus

- Dividing

- Shifting: transitions, stopping and starting

Attention Deficit is a misnomer

- These kids can and do pay attention: ask any parent of an ADHD child with a video game system

- Problems with regulation of attention

- Attend to things that have a high stimulus value, provide immediate reinforcement and provide novelty

- Have one good day and we hold it against them for the rest of their lives

Overwhelmed by the whole, lost in the details

Impulsivity: acting without thinking

- Poor ability to bring behavior under the control of long-term consequences

- Reactive to whatever grabs his attention and whatever is immediately gratifying

- No "Pause" button

- Able to state rules and consequences but not to bring behavior under their control

Hyperactivity

- Restless, fidgety

Related problems

- Poor task persistence

- Inability to anticipate the future

- Consequences of action

- Consequences of inaction

- Relate past experiences to future outcomes: makes same mistake repeatedly

- Might not understand that actions, such as effort, have to be consistent to achieve goal

- Poor emotional regulation

- On/off switch, flooded

- Poor frustration tolerance

- Affective disorders

- Depressive cognitions: negative view of self, others, world, future

- Anxiety: anticipatory and generalized

- Irritability and anger

- Poor social skills

- Doesn't know when to join in; problems observing the scene (requires inhibition)

- Control, bossiness

- Problems waiting turn

- Problems letting others talk

- Poor basic skills (hellos, goodbyes, eye contact)

- Difficulty taking another's perspective

- Disorganization

- Complete work, not hand it in

- Can't find where he put things
- Lack of consistent routines, storage
- Poor sense of time
 - Procrastination
 - Poor planning: will plan too many things for a period of time

- Processing problems
 - Learning disabilities
 - Sequential
 - What follows what
 - What will result from a series of actions
 - What has to precede another event for the desired result to happen
 - Understanding how he might have caused or contributed to a problem
 - Simultaneous
 - Integrating different types of information at once
 - Social interaction
 - Driving
 - Where am I in space, how fast am I going?

- Learned helplessness: Expecting poor results even with effort

- Working memory

- Processing speed

- Arousal/activation

- Visual-spatial deficits

- Oppositional defiant disorder

- Learned response: active avoidance, passive avoidance, excuses, lies

- OCD homologue

- Child and parent/teacher with same brain activity pattern

- Sleep disturbance

- Difficulty with transitions

- Shift in reinforcement contingencies/rules: deficit in rule-governed behavior

- Structure: set of **rules** that creates **consistent** and **repeated expectations** for our behavior and provides **reinforcement** for adjusting our behavior to those expectations

- Confusing when environment that was cueing them to behave one way now reinforces and punishes different behavior (classroom vs. free time or phys ed., group vs. individual work, art vs. math class, middle vs. end of day)

- Developing attention skills

- Orienting comments

- Eye contact, full attention

- Repeat instructions and time frame

- Improving self-monitoring

- Motor fast or slow

- Self-monitoring chart

- Engaging

- Multisensory presentations

- Movement

- Varied tone of voice

- Eye contact

- Physical proximity

- Engage in questions, comments

- Structure with flexibility

Adjusting to attentional limitations

- Brief work periods, frequent breaks, frequent feedback
- Alternate active and passive activities
- Alternate preferred and non-preferred activities

Using praise

- Immediate, frequent, specific
- Train yourself to praise ordinary, desirable behaviors
- Shift ratio of positive to negative feedback
- Activates brain
- Increases likelihood of behavior occurring again

Provide alternatives

- Don't just tell him what not to do, tell him what to do instead
- Fill the vacuum
- Identify behavior that will be reinforced
- Desired behavior should be incompatible with undesired behavior
- Be specific (not: "do your work," or "behave yourself")

Remaining calm

- Calm, measured voice
- Do not discuss issue until child is calm. Primary issue is his self-control
- Teach self-soothing strategies and get child to agree to use them in advance

Tempering impulsivity and helping with transitions

- Think ahead/think aloud
- Write down with child transitional sequence

Verbal self-guidance

- Helps child mediate task on own, execute task, focus on task, provide self with feedback
- Sequencing skills

Teaching empathy: break down process and teach it step by step

Attributions

- Dysfunctional attributions: Internal, stable, global for bad things; external, unstable, specific for good things
- Depressive attributions, effective attributions
- Changing attributions

Training task persistence: contest, stop watch

Monitoring optimal attention span

Reminder systems

- How will you remember to do this?

Adjusting sensory stimulation

- A lot of the above
- Colors
- Special cues/signals

Controlling antecedents and consequences

Antecedents

- Minimizing distractions
- Controlling the sensory and interpersonal environment
- Control choices
- Clear sequence of events
- Calming interaction

Consequences

- Immediate response to behavior
- Praise: specific, immediate, often
- Reinforcement schedule: immediate to intermittent

Frequent change of reinforcers: temporary successes

Self-monitoring

- How fast is your engine?
- Self-monitoring chart
- Visible stickers/visual cues
- “Report card”
- Optimal attention span
- Verbal mediation

Bringing time forward

- Immediate feedback
- Breaking things down
- Self-talk

Transitions: writing down script

Using every day activities to teach skills: Groups, listening to lectures, transitioning between classes

- Controlling impulsivity
- Frustration tolerance
- Coping with not understanding
- Empathy for others
- Sequencing skills
- Explore attributions

Optimal attention span: enlist student

Optimal ambient stimulation: enlist student

Visual cues

How does your engine run?

- How fast now?
- How fast would you like it?
- What do you need to do to change it?
- What help do you need?

Think ahead/think aloud

Goals: daily, hourly, by the minute

Asperger's Disorder

What is Asperger's Disorder?

Diagnostic criteria:

- Qualitative impairment in **social interaction**, as manifested by at least two of the following:
 - Marked impairment in the use of multiple **nonverbal** behaviors such as eye-to-eye gaze, facial expression, body postures, and gestures to regulate social interaction
 - Failure to develop **peer relationships** appropriate to developmental level
 - A lack of **spontaneous seeking to share** enjoyment, interests, or achievements with other people (e.g., by a lack of showing, bringing, or pointing out objects of interest to other people
 - Lack of **social or emotional reciprocity**
- Restrictive, repetitive and stereotyped patterns of behavior, interests, and activities, as manifested by at least one of the following:

- Encompassing **preoccupation** with one or more stereotyped and restricted patterns of interest that is abnormal either in intensity or focus
- Apparently **inflexible** adherence to specific, nonfunctional **routines or rituals**
- Stereotyped and repetitive **motor mannerisms** (e.g., hand or finger flapping or twisting, or complex whole -body movements)
- Persistent preoccupation with parts of objects
- Clinically significant impairment in social, occupational, or other important areas of functioning
- No clinically significant general delay in language
- No clinically significant delay in cognitive development or in the development of age-appropriate self-help skills, adaptive behavior (other than in social interaction) and curiosity about the environment in childhood
- Criteria not met for another PDD or Schizophrenia

What might be going on in the brain of an Asperger's individual?

Right hemisphere

Social processing

Subtlety and nuance

Nonverbal information

Gestalt

Simultaneous processing/integration of information

Emotional significance of information

The "music" that goes with the "words"

The capacity to form attachments to others

Reciprocity

Process faces in the part of the brain that processes objects

Right angular gyrus, temporal-parietal junction, intuition about other people, right hemisphere less active than left: sequential and emotional context comprehension, nonverbal memory

Right parietal: poor sense of orientation, apraxia, poor alignment of columns in math, shape, size, texture may be difficulty

Frontal lobes: hyperconnectivity

Failure of normal developmental pruning:

May relate to perceptual overload and subsequent social withdrawal, failure of modulation of incoming sensory information

Inability to manage perception, attention, selection, decision making, planning, problem solving, logical thinking, sequencing, inhibition, initiation, goal oriented activity, monitoring results

Inflexibility

Ventromedial and orbital prefrontal cortex: learning social interactions, left hemisphere important in figuring out what is going on in another's mind. Impairment in social problem solving associated with left anterior frontal lobe

Anterior and posterior portions of brain: hypoconnectivity

Inefficient selecting, sorting and acting on sensory information

Making sense of what one experiences

Interpreting the meaning and importance of experiences

Subcortical structures:

Reduced activation of certain structures involved with monitoring task performance, conflict monitoring and error detection.

Less activation in subcortical circuitry involved in inhibition, and poor connectivity between circuits involved in inhibitory control

Brain wave (electrical) abnormalities

Low alpha (8-10 Hz): difficulty disengaging from sensory input that is not relevant in order to engage with more relevant input

May be parietal slowing: difficulty engaging with sensory input

Beta spindling: unstable, overaroused, easily disrupted cortex

An Asperger's Child was asked: "What is your definition of Hell?" He replied, "Surprises." --
Hiking Through Asperger Syndrome by Lise Pyles

Coping with the sensory aspects of the classroom.

Sensory Integration Disorder -- difficulties with sounds, lights, smells and tactile sensations. Can complain about sensory stimulation but also seek out certain kinds of stimulation

What is on the walls might be too stimulating

The person next to him might be too stimulating

His behavior might be distracting and too stimulating for others

Need for two way communication

Might have to anticipate the problem

Initiate a dialogue

Work out a communication process

Be alert for signs of distress

Might need frequent breaks

Anticipate sensory trouble spots when you set up your room

Squeaking chairs

Humming lights

Hallway noise

Coping with transitions/changes

Anticipate transitions built into the school schedule

How will student prepare for leaving class or arriving in class?

How will student prepare differently for days with different schedules? (Monday vs. Tuesday schedules?)

Anticipate changes or disruptions in routines

Snow days

Fire drills

Substitute teachers

Unique changes

Less structured times can be overwhelming: need preparation

A menu of things to do

Coping with confusion: whom (staff or student) to turn to for clarification, what to say (scripts)

Social scripts

Give the child a job to do during unstructured times.

Can avoid eye contact, face away from others, hide their head

Enforcing eye contact can be a mistake

Need to accept this and positively reinforce any prosocial behavior

Problems with social situations, communication, poor imagination

Characteristics:

- Egocentric, seems to lack empathy or seeing another's point of view (mind blindness)
- Communication may be literal
- Thinking black and white
- Language may be odd; formal or pedantic speech
- Poor nonverbal communications
- Personal interests: unusual, narrow, intense
- Routines, rituals, repetition
- Does not see complete picture, instead focus on one detail: does not see global aspects of information, recall of piecemeal, inconsequential detail

Strategies:

- Label black and white thinking: train to self-monitor
- Identify forms of speech that might be confusing and why
- Help broaden topics of conversation (scripts)
- Help identify what someone else might be feeling (use examples, pictures, photographs, films, video, naturalistic observations of others)
- Identify islands of competence
 - Recognition in front of others
 - Help classmates recognize him for his talents
 - Help make him useful to class without isolating him further

Fear and anxiety in the classroom

Signs:

- Acting out/disruptive behaviors
- Withdrawal
- Work refusal
- Inflexible non-compliance
- Ritualistic, compulsive behavior

May be due to trying to control the situation in order to reduce anxiety.

Helps maintain psychological equilibrium

Language pragmatics, literal thinking, mind blindness contribute to anxiety

Cannot address behavior without addressing the fear

Fear interferes with learning, attention, memory

Fight or flight mode

Safety and security questions should lead the discussion

See school through the child's eyes

Be careful in placing child in a group for group work, lab partners

Coaching for how to work in a group

What is a team?

Can everybody be in charge?

What can you do if everyone has a different idea on what to do?

Should we try to lead the group right away?

Handling anger or hurt

Handling feeling confused

Why we make eye contact?

Disagreeing with someone

Asserting yourself, not being taken advantage of
Handling mistakes

Communicating with the student

Use words, not nonverbal communication
Tell child what to do rather than what not to do
Use visual cues

Academic issues

--English: difficulty seeing character motivation or author's subtext; analysis more on concrete plot details.
--Social Studies: may be good at understanding the "what" but not the "why."
--Phys Ed:
 Best activities: individual sports or repetitive movement
 Next best: team sport with simpler rules and no body contact
 Most challenging: complicated team sports involving quick decisions and many different skills

Learning Disabilities

Definitions:

The Individuals with Disabilities Education Act defines a specific learning disability as ". . . a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, that may manifest itself in an imperfect ability to listen, think, speak, read, write, spell, or do mathematical calculations, including conditions such as perceptual disabilities, brain injury, minimal brain dysfunction, dyslexia and developmental aphasia." However, learning disabilities do not include, "...learning problems that are primarily the result of visual, hearing, or motor disabilities, of mental retardation, of emotional disturbance, or of environmental, cultural, or economic disadvantage." *34 Code of Federal Regulations* §300.7(c)(10)

“. . . there is no clear and widely accepted definition of "learning disabilities. "Because of the multidisciplinary nature of the field, there is ongoing debate on the issue of definition, and there are currently at least 12 definitions that appear in the professional literature. These disparate definitions do agree on certain factors:

1. The learning disabled have difficulties with academic achievement and progress. Discrepancies exist between a person's potential for learning and what he actually learns.
2. The learning disabled show an uneven pattern of development (language development, physical development, academic development and/or perceptual development).
3. Learning problems are not due to environmental disadvantage.
4. Learning problems are not due to mental retardation or emotional disturbance.”

----www.childdevelopmentinfo.com

“A childhood disorder characterized by difficulty with certain skills such as reading or writing in individuals with normal intelligence. Learning disorders affect the ability to interpret what one sees and hears or the ability to link information from different parts of the brain. These limitations can show up in many ways -- as specific difficulties with

spoken and written language, coordination, self-control, or attention. Such difficulties extend to schoolwork and can impede learning to read or write, or to do math.

Learning disabilities can be lifelong conditions that, in some cases, affect many parts of a person's life: school or work, daily routines, family life, and sometimes even friendships and play. In some people, many overlapping learning disabilities may be apparent. Other people may have a single, isolated learning problem that has little impact on other areas of their lives." ---www.medterms.com

Dyslexia

Primary deficit: auditory

Inability to match grapheme (word) with phoneme (sound of the word)

Supramarginal and angular gyri play central roles

3 primary systems involved in processing written word

Broca's area

Left angular gyrus

Visual cortex: automatic word recognition

First two come on line first. Automatic word recognition comes later

Dyslexic reader:

less active visual cortex and left angular gyrus

more active: Broca's, dorsolateral FC

overreliance on frontal processing

Boys read primarily with left hemisphere

Girls: more bilateral pattern

Dyslexics: compensatory activation of right angular gyrus

Ordinary readers show activation of left angular gyrus when sounding out words

Poor readers fail to activate angular gyrus. Activate right rather than left frontal areas.

Well compensated dyslexics activate left hemisphere but not angular gyrus

Dyslexics: slow activity (deactivation) of left occipital area

Alpha: idling frequency of visual cortex, blocked during reading for normal readers, not for dyslexics

Good readers: left posterior activation during reading supports automatic word recognition

Poor integration of modalities

Visual and auditory

Eye-hand coordination

Complex tasks

Provide essential information

Provide information in correct sequence

Differentiate between more essential and less essential information

Listening

Note taking

Studying for exams

Verbalizing

Difficulty with subtlety, nuance, abstraction, ambiguity, humor, figurative language

Recognizing main idea, relationships between ideas

Language

Fill in the blanks

Communicate while taking the other's perspective

Ignoring less relevant stimuli

How LD affects processing and social skills

Misreading cues

Sorting out important from unimportant info

Prioritizing multiple sources of information simultaneously

Difficulty with cause and effect, predicting what will happen next, understanding how one's actions influenced the outcome

Reality perception: seeing things how others see them

Reality testing: using feedback to modify one's actions/understanding

Mining IQ test

Similarities, Picture Concepts: abstract reasoning

Use concrete examples

Build understanding from concrete to abstract

Use visual organizers

P>V

Word banks

Preteach vocab, concepts

May favor calculations over word problems: show how to convert

5 sticky notes when reading

V>P

Make visual verbal and sequential

Math processes written out and available

Identifying main idea or most important information

Poor Working Memory

Visual and auditory stimulation, not necessarily at same time

Verbal self-guidance

Poor processing speed: slow on timed tasks vs. untimed tasks

Extra time