ADHD/ADD in the Montessori Environment

Presented by Julie Armstrong

CMTEI

Workshop Agenda

- What is ADHD/ADD ?
- Let's look at some brains.
- The two words that describe how to best meet the needs of all the children in our environments…
- Strategies for success, tips from Montessori teachers around the globe.
- Your stories and successes.


Over stimulating environment
Traumatic life event
Sleep disturbances
Dehydration
diet
Prenatal exposure to toxins
genetics
ADHD behaviours
Preterm birth
Academic expectations
Screen time
Other psychological conditions
Acquired Attention Deficit Disorder
Lack of Physical activity opportunities
Developmental level
Lack of consistency between home and school

ADHD/ADD now commonly referred to as:

- Attention-Deficit/Hyperactivity Disorder (ADHD)

  3 subtypes

  1. hyperactive-impulsive
  2. inattentive (formerly ADD)
  3. combined (both 1 and 2)

Criteria for diagnosis
DSM-V

(Diagnostic and Statistical Manual of Mental Disorders – fifth edition)
(Diagnosis only by a licensed health professional)

predominantly hyperactive – impulsive type

6 or more of the following:

- Often **blurts out** answers **before questions** have been **completed.**
- Often has **difficulty awaiting** their turn.
- Often **interrupts** or **intrudes** on others (e.g. Butts into conversations or games.
- Often **fidgets** or squirms in chair.

- Often **leaves seat** when remaining seated is expected.
- Often **runs** or **climbs excessively.**
- Often has **difficulty** with playing or **engaging** in leisure activities **quietly.**
- Often 'on-the-go'/acts as if **driven by a motor.**
- Often **talks excessively.**

Criterion for diagnosis

(by a licensed healthcare professional)

Predominantly Inattentive type

6 or more of the following:

- Often fails to give close **attention to details** or makes **careless mistakes** in schoolwork, work or other activities.
- Often has **difficulty sustaining attention** with tasks or activities.
- Often does not **seem to listen** when spoken to directly.
- Often does not **follow through** on instructions and **fails to complete** schoolwork or chores.
- Often has **difficultly organizing** tasks and activities.

- Often **avoids/dislikes/is reluctant** to engage in tasks that require **sustained mental effort.**
- Often **loses things** necessary for tasks or activities (e.g. pencils, book, tools etc..).
- Often is **easily distracted** by extraneous stimuli.
- Often **forgetful** in daily activities.

A child is recommended for a referral to a specialist if behaviours:

- Have persisted for at least 6 months
- Are **inconsistent with developmental level**
- Are present before age 12 (DSM-V)
- Are not better accounted for by another disorder

Checklist courtesy of the National Center on Birth Defects and Developmental Disabilities.

"The American Psychiatric Association states in the Diagnostic and Statistical Manual of Mental Disorders (**DSM-5**) that approximately **5%** of children have ADHD.

However, studies in the US have estimated higher rates in community samples. Approximately **11%** of children 4-17 years of age (6.4 million) have been diagnosed with ADHD as of 2011." http://www.cdc.gov/ncbddd/adhd/data.html

Executive Function

"The executive functions are a set of processes that all have to do with managing oneself and one's resources in order to achieve a goal. It is an umbrella term for the neurologically-based skills involving mental control and self-regulation." p. 56. Late, Lost and Unprepared.

Let's look at Executive Functions:

- **Inhibition**—The ability to stop one's own behavior at the appropriate time, including stopping actions and thoughts. The flip side of inhibition is impulsivity; if you have weak ability to stop yourself from acting on your impulses, then you are "impulsive."

- **Shift**—The ability to move freely from one situation to another and to think flexibly in order to respond appropriately to the situation.

- **Emotional Control**—The ability to modulate emotional responses by bringing rational thought to bear on feelings.

- **Initiation**—The ability to begin a task or activity and to independently generate ideas, responses, or problem-solving strategies.

- **Working Memory—**The capacity to hold information in mind for the purpose of completing a task.

- **Planning/Organization**—The ability to manage current and future-oriented task demands.
- **Self-Monitoring**—The ability to monitor one's own performance and to measure it against some standard of what is needed or expected.

- **Organization of Materials**—The ability to impose order on work, play, living and storage spaces.

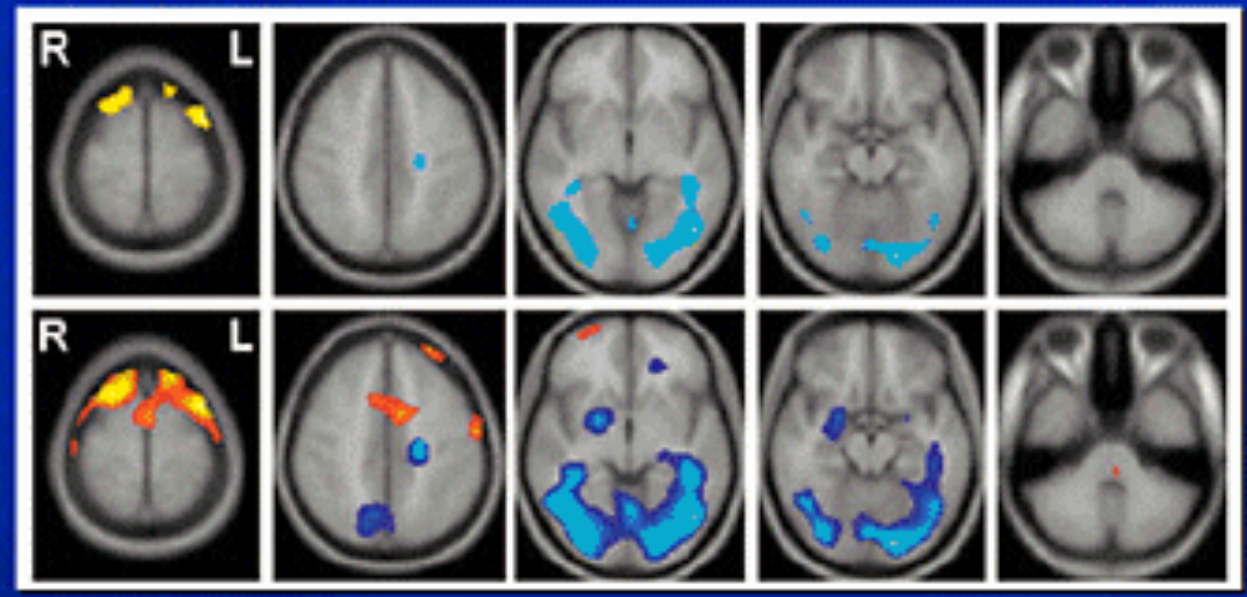
http://ecocatlady.blogspot.ca

Gioia, Gerard A., Peter K. Isquith, Steven C. Guy, and Lauren Kenworthy. Behavior Rating Inventory of Executive Function, Professional Manual. Odessa, FL: Psychological Assessment Resources, 2000.

Let’s look at some brains….

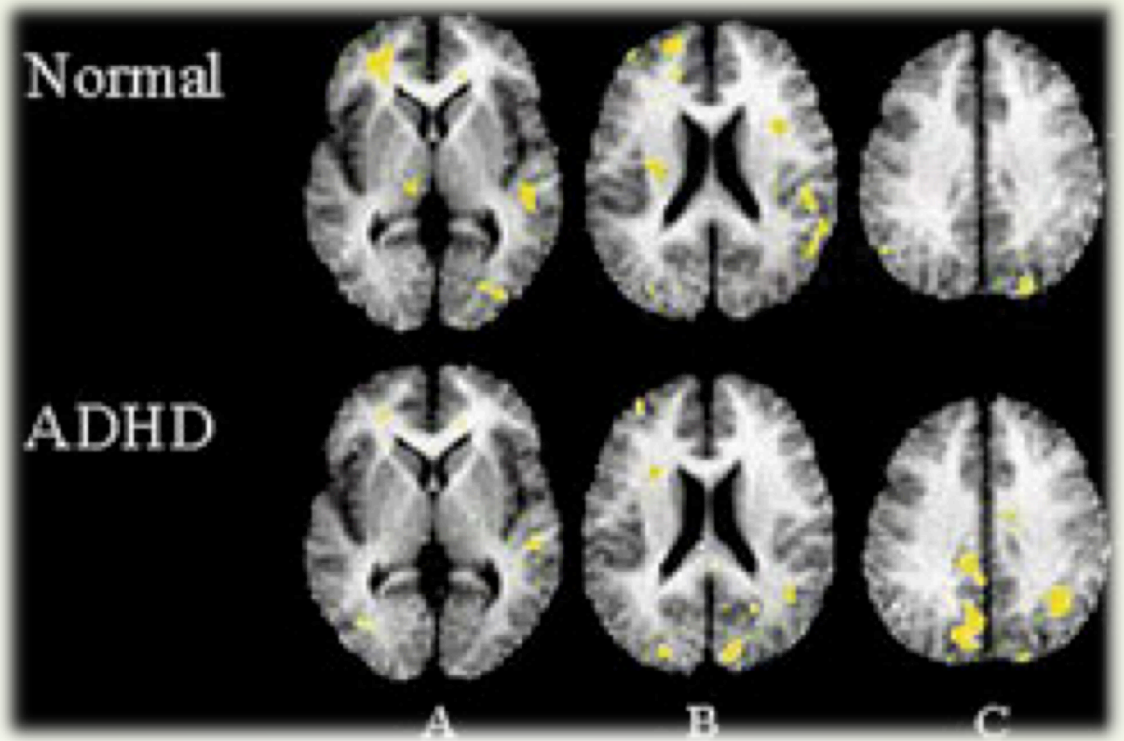
Regional Cerebral Blood Flow in Children with ADHD

Comparison Before and After Methylphenidate Treatment



Lee JS, et al. *Hum Brain Mapping* 2005;24:157.

Results of a study **where participants completed mathematical calculations** while receiving a PET (positron emission tomography) scan

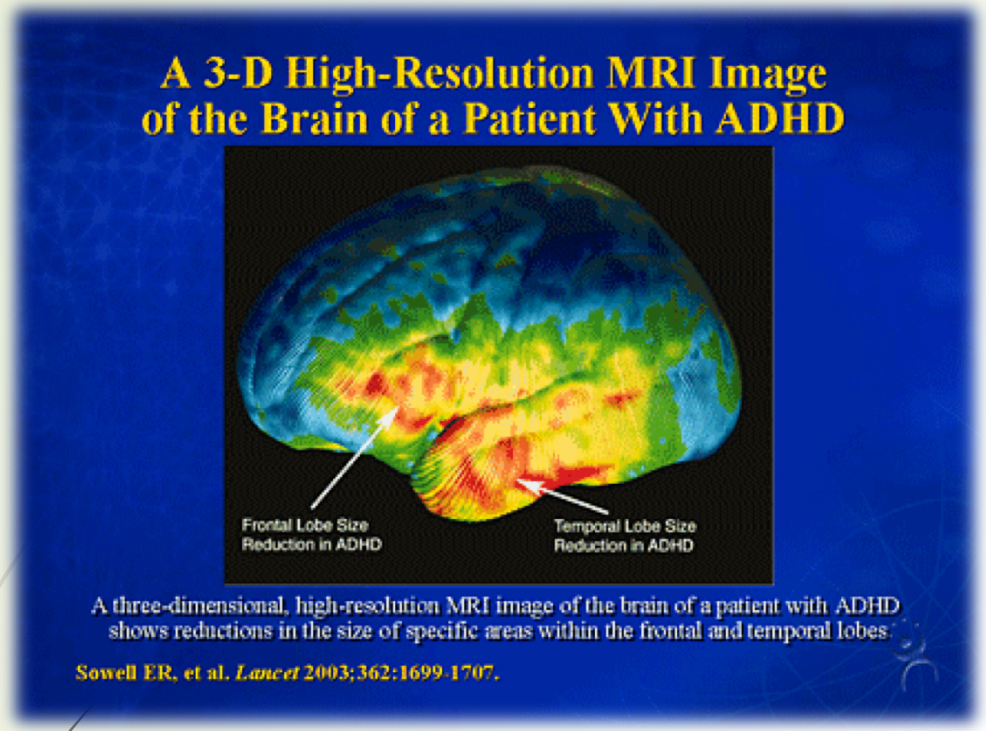


Images of brain scans taken while subjects performed mathematical calculations.
—Courtesy of the Maryland Psychiatric Research

The subjects **without ADHD** showed more activity in the **frontal part** of the brain that is **associated with attention**. Also, those subjects used the middle regions of their brains associated with **processing verbal strategies**. The researcher, Julie Schweitzer, says that is because the **subjects without ADHD** seemed to **hear the auditory prompt** and **talk** themselves **through the problem** using words.

In contrast, the subjects **with ADHD** used **different parts** of their brains, associated with **visualization**. Schweitzer says some of the subjects diagnosed with the disorder told her after the test that they had **pictured images** in their heads—for example, a chalkboard with numbers written on it—to help in doing the calculations.

The data were collected between 1997 and 1999. The study appeared in the February 2000 issue of the *American Journal of Psychiatry*.

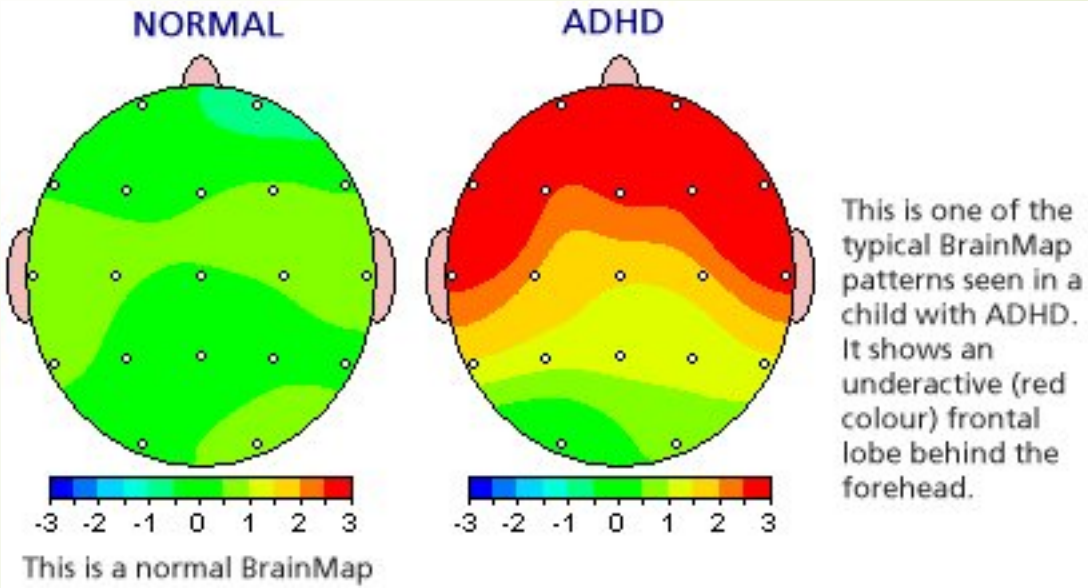


http://www.medscape.org/viewarticle/530193

The **frontal lobe** is where Executive Functions are performed. This part of the brain regulates decision making, problem solving, control of purposeful behaviors, consciousness, and emotions.
The **temporal lobe** regulates memory, emotions, hearing, language, and learning.

The ADHD brain is typically 3 years less developed than a non-ADHD brain. People with ADHD tend to reach full maturation in their mid 30's to 40's.

http://www.sydneydevelopmentalclinic.com.au/brain_scanning.htm



Positive Aspects of ADHD

Ability to find alternate paths to **overcome obstacles.** Able to take on large situations. **Adaptive**/collaborative. **Adventurous**, courageous**, lives outside of boundaries**. Always **willing to help others**. Ambitious – you want to **be everything** when "you grow up". **Artistic**. Attractive personality – **magnetic** due to high energy. Being able to see the **big picture**. Being able to see the patterns in the chaos. Broad focus – can see more, **notice things** more. Can create **order from chaos**. Can do many projects at once. Can **make people feel they are heard**. Can talk about several things at one time. Can **think on their feet**. Career variety. Centre of attention. **Comfortable** talking **in front of groups**. Comfortable with change and chaos. **Compassion** for others and for themselves. **Conceptualizes** well. Confidence. Constantly **evolving**. **Courageous**. **Creative writer**. Creative – musical, artistic, "**dramatic**". Good in a crisis. Good at **customer relations.** **Dedicated**. Detail-oriented. Determined to gain more control. **Eager** to make friends. Eager to **try new things**. Empathetic. **Sensitive.** Energetic. Entrepreneurial. Excellent organizers using journals and reminders (notes etc.) **Flexible** – changes as the situation requires. Fun guy to be around. **Goal-oriented**. Good at **motivating** self and **others**.

Good at **problem solving**. Good at **public speaking**. Good at **understanding others**/mind reading. **Good conversationalist**. Good **delegator** and good at organizing others. **Good in emergency** situations. Good listener. **Good looking** and aware of it. **Good people skills.** Good self esteem. Great brain-stormer. Great **multitasker**. Great self-company. Great **sense of humour.** Great storyteller. **Great with kids** (central figure around kids). Hands-on workers. **Hard worker**. Has friendly relations with their family. Has the gift of gab. Helpful. **Helps others** who are also in trouble. **High energy** – go, go, go. Humour. **Quick** at generating ideas. **Hyper focus !!** Hypersensitive – very **empathetic** and good at non-verbal communications. **Imaginative**. Impulsive (in a good way) not afraid to act. Initiators. **Intelligent**. Intuitive. Learning as much as I can to **help children and others with ADHD**. Like to talk a lot. **Likes learning** new things. **Looks at multidimensional sides** to a situation. Lots of interests. Magnetic. Master idea generator. **Mentoring others/helpful**. Mentoring people with low self esteem. Modesty. **Move on fast** – never hold a grudge. Multitasks well. Never bored and **rarely boring**. Never intimidated to try new things. Non-linear, multi-dimensional/edge of chaos. Not afraid to **speak mind**.

Not contained by boundaries. On stage and ready. **Optimistic**. Outgoing. **Passionate**. Persistent. Philosophical. **Holistic thinking**. Playful. Pragmatic. **Problem solver**. Profound. Quick thinking. **Quick witted**. Relates to people easily. Resistant. Resourceful. Saves money in the short term by forgetting to file tax returns. **See and remember details** – recount them later. Sees the big picture. **Socially adaptive** and flexible. **Spontaneous**. Stabilizer during difficult situations. Stable. **Successful**. Takes initiative. Tenacious. Theoretical. **Think outside the box**. Thinks 2 meters ahead of the world. **Thinks big, dreams big**. Thorough. Tolerant. Unconventional. **Unlimited energy**. Unorthodox. **Versatile**. Very creative, able to generate a lot of ideas. Very hard working to compensate – workaholic. Very intuitive. Very resourceful. Very successful. **Visionary**. Visual learner. Willing to explore. **Willing to take risks**. Willingness to help others. Witty. **Won't tolerate boredom**. Works well under pressure. **Worldly**. **Zealous**.

http://www.addcoach4u.com/positivesofadd.html

How do we meet the needs of children with ADHD type behaviours in the Casa classroom?

Two words

It depends.

What is our greatest tool in helping to meet the needs of the children in our environments?

Observation, of course

"As soon as children find something that interests them they lose their instability and learn to concentrate."

Maria Montessori The Secret of Childhood, The Random House Publishing Group, 1966, p. 145

What a Montessori classroom does to support these children:

- Provides a **carefully prepared**, **orderly environment** which includes:
- **Freedom of movement**, to work, sit, observe and **socialize** within a 2-3 hour work period.
- Has 3 year mixed-age groupings, allowing opportunities for younger children to **learn from their older peers** and consequently, opportunities for **older children to teach** younger children.

- Didactic materials that provide **self-directed learning** opportunities, the control of error lies in the material and students **exploration** of it.
- Opportunities to use purposeful materials as **often** as they like for **as long as they like** in order to achieve **mastery**.
- A **loving**, **consistent** guide (teacher) that **clearly** defines and demonstrates (and follows) **boundaries** and behaviour **expectations**.

"Knowing when to push and when to back off, having a variety of approaches and the flexibility to shift among them, and feeling genuine and deep affection for each child as he or she is at a given moment are basic requirements for adults who aspire to assist children in their dynamic self-

- Opportunities to develop and practise **vestibular balance** and **coordination** through daily exposure to walking on the line activities as well as rhythm and movement.

http://www.bw.edu/academics

- Opportunities to practise and **cultivate silence and meditation** through the ‘silence game’ and related activities, such as yoga and serenity activities.

- Opportunities to observe and practise **appropriate social responses** through grace and courtesy lessons and peace education (peace table, peace rose etc..).

- Opportunities to **cultivate concentration**, refinement of the muscles of the hand, logical sequencing, hand-eye coordination, **refinement of the senses** and independence in all avenues of the environment.

- Provides freedom to move and explore in **indoor and outdoor** environments.

Plus countless other ways, I’m sure you might add….

Please tell me something I don't already know.

You are what you eat

Making hummus and cutting cucumbers
Image courtesy of Near North Montessori

- **Serotonin** and **Dopamine** are neurotransmitters that influence behaviour.
- **Serotonin** helps regulate mood – it's known as the 'feel good' neurotransmitter, it influences memory, learning and social interactions but we need a precursor, an amino acid called **tryptophan** in order to increase serotonin levels in the brain .
- There is debate among researchers whether dietary sources of tryptophan actually elevate serotonin levels due to how it is delivered in the brain. Regardless, foods that are high in serotonin tend to have high levels of magnesium. **Magnesium deficiency** has been linked to ADHD behaviours.
- Magnesium is a mineral found in dark leafy green vegetables, fruits, nuts, legumes and whole grains.
- **Foods** that are purported to **increase serotonin levels** also include brown rice,

Dopamine and **Tyrosine**

- **Tyrosine** is an important amino acid (a building block of protein) found in dairy products, meats, poultry and nuts. It encourages your brain to release **dopamine** and **norepinephrine**.
- These neurotransmitters act as **stimulating** substances to the brain and can help perk you up by making you feel more alert and sharpening your thinking.
- In addition to meats and dairy products, other specific tyrosine-rich foods that help **increase dopamine levels** are almonds, walnuts, brazil nuts, avocados, bananas, lima beans, pumpkin seeds, apples, strawberries, blueberries, prunes and sesame seeds.
- **Choline** is a precursor of **acetylcholine**, a neurotransmitter vital to nerve and muscle

www.ami-global.org

Now that we have some suggestions for **snack** and **meal time**,
what about strategies for those **hyperactive**, **impulsive** and **inattentive *behaviours*** in the classroom?

(As I am from Canada, that is PRECISELY how to spell behaviour.)

The child who has **impulsive reactions**:

- provide visual cues for behaviour expectations
  Examples include sequential pictures in specific areas -
  sequence of dressing for outdoor time (etc…)

- Provide ample outdoor, gross motor activity time. Some Montessori teachers suggest before the work period, others preferring to end the work period with outdoor time.
- retractable lanyard with pictures of positive behaviours

- Gentle touch or hand signals (tap the table, touch your nose etc…).
  (for interrupting behaviours, like Sasha in circle time or Taylor who needs a pair of eyes on them ‘at all times’.)

- Re-enforce the expectation that when the guide is involved in a lesson, the child will place their hand on the guide’s shoulder when needing to speak with them.

- Modelling appropriate movements to use when staying in one place is necessary (Brain Gym® for example).

- Modelling rapid renewal activities like the building of, or travelling through a labyrinth, rainbow stones* (see next slide), meditation cards etc..

- This slide added after the conference.

I forgot to mention what rainbow stones are. This is a reflective/renewal activity I learned from an article written by Jonathan Wolff.

When the classroom flows into those frenetic '**false fatigue**' moments, I'll unroll a floor mat and place upon it a small satchel that holds **7 semi-precious** stones (**violet, indigo, blue, green, yellow, orange and red** in colour.)
I'll line these stones up **vertically** (red being on the top, in the order above, with violet at the bottom) on the lower corner of the left hand side of the mat.
Using my right hand I'll move the stones in a **large sweeping motion** (one by one) in an arc to the other side of the mat (like a **rainbow**, hence the name).
Once all the stones are lined up vertically (in the same order as before), I'll move them back over with my left hand.
After replacing the materials there is always an eager observer waiting for their turn.
Although this activity was first demonstrated by an elementary teacher, I find that even the youngest children enjoy it.
It's a wonderful, calming, centering activity.

- Provide multi-sensory PURPOSEFUL activities like washing a table, tending a garden, classroom messenger...and/or anything that incorporates the child's interests.

- Karen Mangham suggests 'science experiments, linear measurement lessons and the factoring board'.

- Margaret Robertson suggests 'large projects like the water cycle that s/he can spread out over a large area utilizing a lot of movement…cut, paste, drawing use of the metal insets! This kept one of my most challenging students engaged and content for days and (the student) was so proud of the work.'

What about those inattentive behaviours?

- Have the child repeat back a verbal instruction to check for understanding
  i.e. “I’m not sure if I said that clearly, will you please tell me what I said?”
  Or “What are you bringing from the bank?” etc…

- Provide ‘avenue binders’.

  i.e. Binders for each avenue of the curriculum that have pictures of every material on the shelf. Children who are having challenges engaging in an activity can ‘browse’ and choose their ‘menu of activities’ for that work cycle.

- “Provide a work area that has minimal visual distractions until the child can engage in concentration.” (Anonymous)

- Stand side-by-side when conversing with a ‘male-brain’ type of child and eye-to-eye with a ‘female-brain’ type of child, or when re-directing a challenging behaviour.

- Make accommodations for the child that masters a concept with less repetition than most children (i.e. Taylor who only builds 3 words with the movable alphabet, perhaps because he finds the work redundant).

- “Allow for plenty of ‘cause and effect’ discoveries for these children in social interactions (grace and courtesy and logical sequencing cards)”. (Anonymous)

- Use a sand timer to help prepare the child for an upcoming transition.

- “Allow them many opportunities to teach other children”.
(Anonymous)

What have you observed to be successful in your environments?

* This slide added after the conference.

Thank you to everyone for your thoughtful questions and comments. I'm so sorry that I didn't think to write down the name of everyone who gifted us with a suggestion (I did mention that I have working memory issues, didn't I?).

- Using a mystery bag that contains images of activities found on the shelves, the child reaches in and chooses an activity to do (great when initiation is a challenge).

- Having a snack basket available at schools where children bring their own food. The basket holds a variety of fruits and vegetables that the children prepare for themselves. (Wonderful suggestion Sasha!)

- Understand that observing and identifying these **behaviours** can be beneficial at this age because it helps the child and family get the help and resources they need to be successful. The disadvantages of 'labelling' a child (again stressing that we are not diagnosticians but observers) might distract us from seeing their whole beautiful picture.

juliearmstrongadd@gmail.com

Thank you for attending.

Resources:

Montessori, Maria. (1995). *The Absorbent Mind.* Henry Holt And Company, New York.

Montessori, Maria. (1967). *The Discovery Of The Child.* The Random House Publishing Group, New York.

Montessori, Maria. (1966). *The Secret Of Childhood.* Ballantine Books, New York.

Additional resources:

Charach, A. MD., Dashti, B. MD., Carson, P. MD., Booker, L. MD., Lim, C. G. MD., Lillie, E. MD., Yeung, E. MD., Ma, J. MD., Raina, P. MD., Schachar, R. MD. (2011), Attention Deficit Hyperactivity Disorder: Effectiveness of Treament in At-Risk Preschoolers; Longterm Effectiveness in all ages: And Variability in Prevalence, Diagnosis And Treatment. *Effective Health Care Program*, Number 44. October. pp. 1-366.

Cooper-Kahn, Joyce Ph.D. and Dietzel, Laurie Ph.D. (2008). *Late, Lost, And Unprepared: A Parents Guide to Helping Children With Executive Functioning*. Woodbine House, Bethesda.

Cossentino, Jacqueline. (2010). Following All Children: Early Intervention And Montessori. *Montessori Life*, Winter 2010. pp. 1-8.

Dennison, Paul E., & Dennison, Gail E. (2007). *Brain Gym 101: Balance For Daily Life*. Edu-Kinesthetics, Inc., Ventura.

Doidge, Norman. (2007). *The Brain That Changes Itself*. Penguin Books, New York.

Fidler, Wendy (2003). Attention Deficit Hyperactivity Disorder: A Practical Montessori Response. *Montessori International*, October – December, 2003. pp. 20-23.

Hanh, Thich Nhat. (2012). *A Handful Of Quiet: Happiness In Four Pebbles*. Plum Blossom Books, Berkeley.

Giler, J. Z. Ph.D. (2011) *Socially ADDept, Revised Edition.* Jossey-Bass, San Francisco.

Goertz, Donna, Bryant. (2001). *Children Who Are Not Yet Peaceful: Preventing Exclusion In The Early Elementary Classroom.* Frog Books, Berkeley.

Gurian, Michael and Stevens, Kathy. (2011). *Boys & Girls Learn Differently: A Guide For Teachers and Parents.* Jossey-Bass, San Francisco.

Gurevitz, M., Geva, R., Varon, M., & Leitner, Y. (2014). Early Markers In Infants And Toddlers For Development Of ADHD. *Journal of Attention Disorders.* Vol. 18 (1), pp.14-22.

Helfrich, M. Shannon. (2011) *Montessori Learning in the 21st Century: A Guide for Parents and Teachers.* NewSage Press, Troutdale.

Quinn D., Wigal S., Swanson J., Hirsch S., Ottolini Y., Dariani M., Roffman M., Zeldis J., Cooper T. Comparative pharmacodynamics and plasma concentrations of d-threo-methylphenidate hydrochloride after single doses of d-threo-methylphenidate hydrochloride and d,l-threo-methylphenidate hydrochloride in a double-blind, placebo-controlled, crossover laboratory school study in children with attention-deficit/hyperactivity disorder. Journal of the American Academy of Child & Adolescent Psychiatry 2004 Nov; 43(11):1422-9

Kozielec, T. & Starobrat-Hermelin, B. (1997) Assessment of Magnesium Levels in Children With Attention Deficit Hyperactivity Disorder (ADHD). *Magnesium Research.* (1997) June: 10(2). PP. 143- 148.

Sonnack, M. & Brenneman, A. (2014). Treatment Strategies For ADHD in Preschool and School Age Children. *JAAPA*. Vol.27(10). October 2014. pp. 22-26.

Stephenson, Susan. (2006). *ADHD and Montessori: A Case Study*. The Michael Olaf Company, Arcata.

Stoll-Lillard, Angeline. (2007). *Montessori: The Science Behind The Genius*. Oxford University Press, New York.

Tokuhama-Espinosa, Tracey. (2014). *Making Classrooms Better: 50 Practical Applications of Mind, Brain and Education Science*. W. W. Norton and Company, New York.

Tong, J. H., Cummins, T. D., Johnson, B. P., McKinley, L. A., Pickering, H. E., Fanning, P., Stefanac, N. R., Newman, D. P., Hawi, Z., & Bellgrove, M.A. (2015) An Association Between Dopamine Transporter Gene (SLC6A3) Halotype and ADHD Symptom Measures in Nonclinical Adults. AJMGBNG. February 5. doi: 10.1002/ajmg.b.32283. [Epub ahead of print].

Wolf, Aline D. (1996). Nurturing The Spirit In Non-Sectarian Classrooms. Parent Child Press, Hollidaysburg.

Wolff, Jonathan. (2015). Slowing Down…To Smell The Rose Of Learning. *Canadian Association of Montessori Teachers: Talk*. January 2015. pp. 6-7.

Young, Simon, N. (2007). How To Increase Serotonin In The Human Brain Without Drugs. Journal of *Psychiatry & Neuroscience*. 2007 Nov. 32(6). Pp. 394-399.

Resources:
Ted Talks

ADHD - approach with science: Tracey Sweetapple at TEDxRockyViewSchoolsED

ADHD As A Difference In Cognition, Not A Disorder: Stephen Tonti at TEDxCMU

Ted Talks: Juan Enriquez: Will our kids be a different species?

Rebecca Hession Not Wrong Just Different ADHD as Innovators

ADHD - A case of over diagnosis? : Dr. David A. Sousa

Youtube video: Dr. Dan Siegel - "Flipping Your Lid:" A Scientific Explanation

With Gratitude:

A heartfelt Thank You to the families, staff and students of

Our Lady Queen Of Peace Montessori Bilingual School;

you continue to be a source of inspiration and joy!

Special thanks to 'Miss Pam' and Miss Erin, your assistance with the photos was wonderful and tremendously appreciated.