Effective Parenting

April/May 2018
Tuesday Evening Seminars
May 1st Location = Stewart Bio S1-3
1205 Dr Penfield Ave
Slides Available Thursday: bit.ly/mcgillparent
Understanding neurodevelopmental conditions: What parents need to know

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School/Applied Child Psychology & Human Development
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neurodevelopment – very complex, dynamic process ...

during development ...

neural tube becomes brain and spinal cord (CNS)

100 billion neurons synapse at different locations in brain and SC

each make connections to ≈ 1000 target cells

at birth, the human brain ≈ 350 grams.
• year 1 ≈ 1000 grams.
• adult brain ≈ 1200-1400 grams.

different, sequential processes during cortical development :
• cellular differentiation
• axonal growth
• myelinization
• synaptogenesis - formation of synapses between neurons
stage of cortical development: nature vs nurture

structure of the brain: product of sculpting as much as growth

Synaptic exuberance and pruning - after birth, synaptic density increases dramatically but this also differs by region

- experience expectant dev't: pre-determined growth (typical critical periods)
- experience dependent dev't: experience as sculptor

critical periods of development - starting with vision, hearing and touch, periods for language and higher cognition occurring later

- associated with cognition and behaviour
What are Neurodevelopmental Disorders (NDs)?

- a group of conditions with onset in the developmental period.
- typically manifest early in development (before the child enters grade school)
- characterized by developmental deficits that produce impairments of personal, social, academic, and/or occupational functioning.
- challenges vary from the very specific (i.e., learning math, difficulty with attention, etc.) to more global (i.e., social skills or intelligence).
- frequently co-occur
- not a ND when a child is temporarily delayed in one or more milestones, then catches up to peers or "normal" range
DSM 5 : Neurodevelopmental Disorders (NDs)

Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) : the standard classification and codes of mental disorders used by mental health professionals in the United States.

- Intellectual Disabilities
- Communication Disorders
- Autism Spectrum Disorder
- Attention-Deficit/Hyperactivity Disorder
- Specific Learning Disorder
- Motor Disorders
- Other Neurodevelopmental Disorders
Common characteristics of (NDs)

• often defined in **terms of behaviour**, not **cause**
• **no single** biological cause
• **male preponderance** in most cases
• tend to **run in families**
• **co-morbidity** is the often prevalent ...
• **gene x environment** interactions
Neurodevelopmental Disorders (NDs)

- NDs with known prenatal cause of genetic or acquired origin: Down Syndrome, fetal alcohol syndrome, etc.

- NDs where atypical neurodevelopment is inferred: exact cause is complex or even unknown (most of them ...) & defined in terms of behaviour that is observed ...
Early intervention

- **Early** assessment = **Early** intervention = **best** outcomes (critical periods)

- It is easier and less costly to form strong brain circuits during the early years than it is to intervene or “fix” them later = **cortical plasticity** ...

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Pat Levitt (2009)
Specific Learning Disorders
dyslexia (reading disorder)

dyslexia in adults was first noted in the latter half of the 19th century.

developmental dyslexia in children was first reported in 1896.

dyslexic patients - seen by ophthalmologists, called the disorder “word blindness.”

James Hinshelwood, a Scottish ophthalmologist - dyslexic children were often exceptionally smart except for their inability to read.
Specific Learning Disorder (SLD) (DSM-V) ≈ dyslexia

DSM-IV (315.00) Diagnostic Criteria

Specific Learning Disorder (SLD)

A. difficulty learning / using academic skills, as evidenced by presence of at least one of following for 6 months, despite intervention..
   1. inaccurate or slow and effortful reading
   2. difficulty understanding meanings of words
   3. difficulty w spelling
   4. difficulties w written expression
   5. difficulties mastering number sense, number facts, or calculations
   6. difficulties w mathematical reasoning

B. affected academic skills below expected chron. age & cause sig interference w academic or occupational functioning (confirmed using standardized cognitive tests).

C. learning difficulties - fully manifested when demands for affected academic skills exceed individual’s limited capacity (excessively heavy academic load)

D. learning difficulties not better accounted for by intellectual delay, visual/auditory problems, educational instruction, psychosocial adversity, etc.

**specify if:**

- with impairment in reading (dyslexia), written expression (dysgraphia) and/or mathematics (dyscalculia)
SLD w impairment in reading ≈ *dyslexia*

*dyslexia* accounts for **80% of all cases of learning disorder** (alone or in comb with disorders in written expression or mathematics)

in 2006, a “limitation related to learning” affected 121,080 children aged 5 to 14, or **3.2% of all children in Canada** (includes ADHD)

60-80% of individuals diagnosed with reading disorder are male

- **2:1 to 3:1** more males - genetics?
  - is **strongly** (54 to 75%) **heritable**, occurring in up to **68% of identical twins and 50% of individuals** who have a **parent** or **sibling** with dyslexia

- may, however, be **confounded** with a **higher incidence of disruptive behavior in males** (often accompanied by ADHD)

**symptoms** - **inability** to **distinguish** among **common letters** or to associate common **phonemes with letter symbols** - may occur as early as kindergarten.

usual diagnosis after **1st grade** - but, may not be apparent until the **3rd, 4th grade** (or later).
complaints center around poor school performance.

general ontogeny - delay in speaking, did not learn letters by kindergarten, and did not begin to read by 1st grade.

child progressively falls behind

dysgraphia is often present - laborious note taking

self-esteem is frequently affected (even in adulthood)

negative test-taking experiences

given sufficient time, individuals w dyslexia score well on tests of reading comprehension.

TABLE 1. Clues To Dyslexia In School-Age Children*

<table>
<thead>
<tr>
<th>History</th>
<th>Reading</th>
<th>Language</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delayed language</td>
<td>Difficulty decoding single words</td>
<td>Relatively poor performance on tests of word retrieval</td>
</tr>
<tr>
<td>Problems with the sounds of words (trouble rhyming words, confusion of words that sound alike)</td>
<td>Particular difficulty reading nonsense or unfamiliar words</td>
<td>Relatively superior performance on tests of word recognition (point to the pictured item)</td>
</tr>
<tr>
<td>Expressive language difficulties (mispronunciations, hesitations, word-finding difficulties)</td>
<td>Inaccurate and labored oral reading</td>
<td>Poor performance on tests of phonological awareness</td>
</tr>
<tr>
<td>Difficulty naming (difficulty learning letters of alphabet and names of numbers)</td>
<td>Slow reading</td>
<td>Comprehension often superior to isolated decoding skills</td>
</tr>
<tr>
<td>Difficulty learning to associate sounds with letters</td>
<td>Comprehension often superior to isolated decoding skills</td>
<td>Poor spelling</td>
</tr>
<tr>
<td>History of reading and spelling difficulties in parents and siblings</td>
<td>Difficulty decoding single words</td>
<td>Relatively poor performance on tests of word retrieval (name the pictured item)</td>
</tr>
</tbody>
</table>

Clues most specific to young children at-risk for dyslexia

| Difficulty on tests assessing: knowledge of the names of letters, the ability to associate sounds with letters, and phonological awareness | Childhood history of reading and spelling difficulties |

Clues most specific to bright young adults with dyslexia

<table>
<thead>
<tr>
<th>Accurate but not automatic reading</th>
<th>Very slow performance on timed reading tests (eg, Nelson-Denny Reading Test)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Penalized by multiple choice tests</td>
<td>---------------------------------</td>
</tr>
</tbody>
</table>

*Clues are based on history, observations, testing, or a combination of all three.
Reprinted with permission.
Dyslexia is a persistent, chronic condition; it does not represent a transient “developmental lag” = Fig 1. Children with dyslexia who have compensated for their reading disability can become quite proficient in reading a finite domain of words that may not correlate with their knowledge and their test scores, especially on timed tests, of decoding skills, the child generally remains a slow reader. Rapid reading difficulty is not the chief complaint. From a clinical perspective, these data indicate that as children approach adolescence, a manifestation of dyslexia may be a very slow performance on timed reading tests (eg, Nelson-Denny reading test (Woodcock and Johnson 1989) and abscissa is age in years. Both children with dyslexia. Overall, the ontogeny of dyslexia is that children with dyslexia and above average Intelligence

SLD w impairment in reading (dyslexia) : diagnosis assessment

skills need to read and spell are affected at school entry

oral reading is characterized by distortions, substitutions, and/or omissions

both oral and silent reading are characterized by slowness and errors in comprehension.

dyslexia is a persistent, chronic condition; it does not represent a transient “developmental lag” = Fig

average or above average Intelligence

TABLE 2. Types of Tests Useful in Identifying Children At Risk for Dyslexia at School Entry

<table>
<thead>
<tr>
<th>Type of Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Letter identification (naming letters of the alphabet)</td>
</tr>
<tr>
<td>Letter—sound association (eg, identifying words beginning with the same letter from a list: doll, dog, boat)</td>
</tr>
<tr>
<td>Phonological awareness (eg, identifying word that would remain if a particular sound were removed: if the /k/ sound was taken away from “cat”)</td>
</tr>
<tr>
<td>Verbal memory (eg, recalling a sentence or a story that was just told)</td>
</tr>
<tr>
<td>Rapid naming (rapidly naming a continuous series of familiar objects, digits, letters, or colors)</td>
</tr>
<tr>
<td>Expressive vocabulary or word retrieval (eg, naming single-pictured objects)</td>
</tr>
</tbody>
</table>

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phonological awareness: a skill development follows a predictable developmental

Typical Age of Mastery Skill

• **3 years**: recite rhymes, rhyme by pattern, alliteration (*cat, core*)

• **4 years of age**: count syllables (50% of children)

• **5 years of age**: count syllables (90%); count phonemes (<50%)

• **6 years**: match initial consonants; blend 2 to 3 phonemes; count phonemes (70%); identify rhymes; divide onset-rimes (e.g., c-at)

• **7 years**: blend 3 phonemes, segment 3 to 4 phonemes, spell phonetically, delete phonemes

**GENERALLY**: develop from phonemic (sounding out) towards lexical (automatic) process ...

can assess using cognitive testing
phoneme: the smallest unit of speech that can be used to make one word different from another word.

### Table 1. Phonological Awareness Assessment Task Examples

<table>
<thead>
<tr>
<th>Phonological Awareness Task</th>
<th>Basic Instructions</th>
<th>Sample Item(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rhyme recognition</td>
<td>Rhymes are words that sound the same at the end... Tell me if these words rhyme.</td>
<td>ape-knee; dip-hip</td>
</tr>
<tr>
<td>Rhyme application</td>
<td>Tell me a word that rhymes with:</td>
<td>cap</td>
</tr>
<tr>
<td>Oddity tasks: Beginning sounds</td>
<td>Listen to the names of these pictures. Tell me which one has a different beginning sound.</td>
<td>nest, soap, nails</td>
</tr>
<tr>
<td>Oddity tasks: Ending sounds</td>
<td>Listen to the names of these pictures. Tell me which one has a different ending sound.</td>
<td>bell, web, crib</td>
</tr>
<tr>
<td>Oddity tasks: Middle sounds</td>
<td>Listen to the names of these pictures. Tell me which one has a different middle sound.</td>
<td>beak, cone, heel</td>
</tr>
<tr>
<td>Blending body-codas</td>
<td>I will say two parts of a word separately. You tell me the word.</td>
<td>/co/ /p/</td>
</tr>
<tr>
<td>Blending onset-rimes</td>
<td>I will say the first sound of a word and then the rest of the word separately. Tell me the whole word</td>
<td>/c/ /op/</td>
</tr>
<tr>
<td>Blending phonemes</td>
<td>I'm going to say each sound of a word slowly, then you tell me the word.</td>
<td>/s/ /a/ /ve/ -- “what is the word put together?”</td>
</tr>
<tr>
<td>Segmenting onset-rimes</td>
<td>Split the word by saying the first sound and then the rest of the word:</td>
<td>“Split the word coat by saying just the first sound and then the rest of the word.</td>
</tr>
<tr>
<td>Segmenting phonemes</td>
<td>Say each sound you hear in the word</td>
<td>job</td>
</tr>
<tr>
<td>Phoneme deletion</td>
<td>Listen to the word _____. Take away the first sound, what is left?</td>
<td>Listen to the word book. Take away the /b/ sound, what is left?</td>
</tr>
<tr>
<td>Phoneme Substitution: Beginning sounds</td>
<td>If I change the first sound in the word man to /p/, the new word is pan.</td>
<td>Change the first sound in cat to /h/. What is the new word?</td>
</tr>
<tr>
<td>Phoneme Substitution: Ending sounds</td>
<td>If I say the word rat and change the last sound to /g/, the new word is rag.</td>
<td>Change the last sound in cat to /p/. What is the new word?</td>
</tr>
<tr>
<td>Phoneme Substitution: Middle sounds</td>
<td>If I say the word pan, change the middle sound to /i/, the new word is pin.</td>
<td>Change the middle sound in the word cat to /o/, what’s the new word?</td>
</tr>
</tbody>
</table>

Note: The phonological awareness task examples are based on the structure of the SAPA. There are variations across measures on the instructions, types of items, and number of tasks assessed.
**dyscalculia**: difficulty performing **math calculations** or learning disability which affects math

- **number-specific** cognitive challenge - number concepts, combinations, and resolving word problems
- not caused by other cognitive difficulties (i.e., attention)

**young children**: difficulty w

- **counting**, trouble **recognizing** printed **numbers**, difficulty tying together the **idea number** (4) and how it exists in the world (4 **cars**), poor **memory** for numbers

**school-age children**: difficulty w

- learning **math facts**, developing **math problem-solving** skills, **long term memory** for **math** functions, **measuring** things, etc.

**teenagers/adults**: difficulty w

- **estimating costs** (i.e., groceries bills)
- **budgeting** or **balance a checkbook**,
- **concepts** of time (schedule, etc.)
Many adults have grown up feeling inadequate, attributing their difficulties to a general lack of ability.

• knowing that there is a specific reason for their difficulties can be a great relief.
• better understanding of their strengths as well as their weaknesses = important step towards building self-esteem and developing more effective coping strategies.

Many adults newly diagnosed with SLD could benefit from counselling

• personal - understand their strengths and weaknesses - self-esteem
• professional - career / adult support groups may be helpful

Many excellent support programs for the student / adults w SLD in colleges / universities

• useful for students to self-identify in order to access services and accommodations.

https://ldaamerica.org

• how to manage social-emotional issues of adults with SLDs
**interventions : school**

**Individualized Education Program (IEP):** is a written plan that describes the modification of level of instruction or adaptations to the curriculum required by a particular student.

**Modifications : changes to WHAT is taught & assessed**
- meet student needs that are substantially different from the prescribed grade level curriculum.
- Learn different material (such as continuing to work on multiplication while classmates move on to fractions)
- Get graded or assessed using a different standard than the one for classmates
- Be excused from particular projects
- alter the grade-level learning expectations (for a subject or course) from the provincial curriculum

**Accommodations : changes to HOW child is taught and assessed**
- can be environmental, physical, academic, organizational, motivational, assessment & evaluation
  - amount of work, time to complete in-class work, level of support (professionals), difficulty (problem type), output (# of words for composition), alternate expectations...
interventions : home / parents

maintain **realistic expectations** about learning skills.
• challenges does not mean that child will **always** make reading errors, but more **laborious** compared to child's peers
• reading a few pages / night – just practicing is a **short-term, tangible** goal

**celebrate** every **success** (ie., with a "good job" or "a high five")
• reward **progress** and **effort**.
• work of self-esteem !!!

**phonetic awareness / spelling** will continue to be a **challenge** for a child
• provide a **visual phoneme chart** to help with homework - helpful to pair the sounds with relevant images.
• use **dictionary, spell check, or text-prediction** software
• **read aloud** w child or use **App** that reads aloud so child can gain **understanding context/meaning** of text, help with **phonetic awareness & comprehension**
Montreal Centre for Learning Disabilities
http://www.ldmontreal.ca
• charitable organization that aims to disseminate information, promote awareness and provide innovative services and programs to the English speaking community
• adult services

Montreal Fluency Centre
http://montrealfluency.com
• specialized after-school programming that targets phonological skill development.

L’Institut des troubles d’apprentissage
http://institutta.com
• non-profit organization catering to persons with SLDs and their families.
ADHD
Early 1900s - ADHD was first mentioned in 1902 by British pediatrician Sir George Still

Children who lacked self-control and showed symptoms of overactivity / inattention in school were said to have “defective moral control”, but were intelligent

1900 - 1950 : Minimal Brain Dysfunction (damage):


1970 – 1979 : Recognition of Attentional impairment and Impulsivity

1980 : Diagnostic Criteria (DSM-III) and “ADD” with or without Hyperactivity

1987 : ADD becomes ADHD (DSM-IIIR) w/mixed criteria:

1994 : ADHD (inattentive, hyperactive, combined subtypes) in DSM-IV
Key symptoms fall under **two well-documented categories**

- Inattention
- Hyperactivity-impulsivity

Using these dimensions to define ADHD oversimplifies the disorder

- Attention and impulse control are **closely connected developmentally**

**Intellectual abilities**

- most children with ADHD have at least normal intelligence - the difficulty lies in applying intelligence to everyday life situations

**Impaired academic functioning**

- children with ADHD frequently have lower productivity, grades, and scores on achievement tests
- attention involved in many academic functions ...
Inability to sustain attention, particularly for repetitive, structured, and less enjoyable tasks

- Deficits may be seen in one or more types of attention: attentional capacity / selective attention / distractibility / sustained attention / vigilance (a core feature)

**TABLE 8.1 | Diagnostic Criteria for Attention-Deficit/Hyperactivity Disorder**

<table>
<thead>
<tr>
<th>A persistent pattern of inattention and/or hyperactivity-impulsivity that interferes with functioning or development, as characterized by (1) and/or (2):</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Inattention: Six (or more) of the following symptoms have persisted for at least 6 months to a degree that is inconsistent with developmental level and that negatively impacts directly on social and academic/occupational activities:</td>
</tr>
<tr>
<td>Note: The symptoms are not solely the manifestation of oppositional behavior, defiance, hostility, or failure to understand tasks or instructions. For older adolescents and adults (age 17 and older), at least five symptoms are required.</td>
</tr>
<tr>
<td>(a) Often fails to give close attention to details or makes careless mistakes in schoolwork, at work, or during other activities (e.g., overlooks of misses details, work is inaccurate).</td>
</tr>
<tr>
<td>(b) Often has difficulty sustaining attention in tasks or play activities (e.g., has difficulty remaining focused during lectures, conversations, or lengthy reading).</td>
</tr>
<tr>
<td>(c) Often does not seem to listen when spoken to directly (e.g., mind seems elsewhere, even in the absence of any obvious distraction).</td>
</tr>
<tr>
<td>(d) Often does not follow through on instructions and fails to finish schoolwork, chores, or duties in the workplace (e.g., starts tasks but quickly loses focus and is easily sidetracked).</td>
</tr>
<tr>
<td>(e) Often has difficulty organizing tasks and activities (e.g., difficulty managing sequential tasks: difficulty keeping materials and belongings in order; messy; disorganized work; has poor time management; fails to meet deadlines).</td>
</tr>
<tr>
<td>(f) Often avoids, dislikes, or is reluctant to engage in tasks that require sustained mental effort (e.g., schoolwork or homework; for older adolescents and adults, preparing reports, completing forms, reviewing lengthy papers).</td>
</tr>
<tr>
<td>(g) Often loses things necessary for tasks or activities (e.g., school materials, pencils, books, tools, wallets, keys, paperwork, eyeglasses, mobile telephones).</td>
</tr>
<tr>
<td>(h) Is often easily distracted by extraneous stimuli (for older adolescents and adults, may include unrelated thoughts).</td>
</tr>
<tr>
<td>(i) Is often forgetful in daily activities (e.g., doing chores, running errands; for older adolescents and adults, returning calls, paying bills, keeping appointments).</td>
</tr>
</tbody>
</table>
Inability to voluntarily inhibit dominant or ongoing behavior

- Hyperactive behaviors: fidgeting and difficulty staying seated / moving, running, touching everything in sight, excessive talking, and pencil tapping, excessively energetic, intense, inappropriate, and not goal-directed

- Impulsivity: inability to control immediate reactions or to think before acting: cognitive impulsivity includes disorganization, hurried thinking, and need for supervision
  - behavioral impulsivity: difficulty inhibiting responses when situations require it
  - emotional impulsivity: impatience, low frustration tolerance, hot temper, quickness to anger, and irritability

DSM-5 Diagnostic Criteria for ADHD - Hyperactivity & Impulsivity

1. Hyperactivity and Impulsivity
   - Six (or more) of the following symptoms have persisted for at least 6 months to a degree that is inconsistent with developmental level and that negatively impacts directly on social and academic/occupational activities:
   - The symptoms are not solely a manifestation of oppositional behavior, defiance, hostility, or a failure to understand tasks or instruction.
   - For older adolescents and adults (age 17 or older), at least five symptoms are required.

   a. Often fidgets with or taps hands or feet or squirms in seat.
   b. Often leaves seat in situations when remaining seated is expected (e.g., leaves his or her place in the classroom, in the office or other workplace, or in other situations that require remaining in place).
   c. Often runs about or climbs in situations where it is inappropriate.
   d. Often unable to play or engage in leisure activities quietly.
   e. Is often “on the go,” acting as if “driven by a motor” (e.g., is unable to be or is uncomfortable being still for extended time, as in restaurants, meetings; may be seen by others as being restless or difficult to keep up with).
   f. Often talks excessively.
   g. Often blurts out answers before a question has been completed (e.g., completes people’s sentences; cannot wait for a turn in conversation).
   h. Often has difficulty waiting his or her turn (e.g., while waiting in line).
   i. Often interrupts or intrudes on others (e.g., butts into conversations, games or activities; may start using other people’s things without asking or receiving permission; for adolescents and adults, may intrude into or take over what others are doing).
Appears **prior to age 12**

**Persists more than 6 months**

Occurs more **often** and with greater **severity** compared to children of the **same age** and sex (different thresholds for males and female - questionnaires)

**Occur across two or more settings** (home, school, activities, tassesment, etc.)

**Interferes with social or academic performance**

Not explained by another disorder
ADHD - predominantly inattentive or hyperactive-impulsive presentation

Predominantly inattentive presentation (ADHD-PI)

- Inattentive, drowsy, day-dreamy, aloof, spacey, in a fog, and easily confused
- May have co-occurring SLD: process information slowly, have trouble remembering things, and display low academic achievement
- Often anxious, apprehensive, socially withdrawn, and may display mood disorders

Predominantly hyperactive–impulsive presentation (ADHD-HI)

- Primarily symptoms of hyperactivity-impulsivity (rarest group)
- Primarily includes preschoolers and may have limited validity for older children
- May be a distinct subtype of ADHD-C
**Worldwide prevalence** of ADHD has been estimated at 5.29% (Polanczyk et al 2007)

Prevalence rates vary widely with sampling methods
- Estimates: 6-7% of school-age children and adolescents in North America and 5% worldwide have ADHD
- ADHD is one of the most common referral problems seen at clinics

5.4-fold increase in prevalence from 1979 - 1996 in US
- partially explained by changes in diagnostic criteria (DSM-III to DSM-IV)

**ADHD persists in adulthood** for about about 50 - 65% of diagnosed children (Faraone et al 2006)
- persistence related to ADHD symptom severity, number of symptoms, ADHD subtype, ADHD in relatives, psychosocial adversity, psychiatric comorbidities, and/or parental psychopathology

Many adults with ADHD are undiagnosed and untreated
ADHD - gender

ADHD occurs more frequently in **boys**
- girls with ADHD may be under-identified and undertreated - less behavioural manifestations

Ratio in clinical samples is **6:1** with boys being referred more often than girls
- ADHD in girls may go unrecognized and unreported

**Overall rates decrease in adolescence** for both sexes - ratio remains the same

**DSM criteria** (cutoffs and symptoms) may be **more appropriate** for **boys** than girls

**Girls** with ADHD may be more likely to display **inattentive/disorganized symptoms**

**Girls** with ADHD who display **impulsive-hyperactive behaviors**
- more likely to develop **eating disorder** symptoms
ADHD - comorbid diagnoses - children

Up to 80% of children with ADHD have a co-occurring psychological disorder

Oppositional Defiant Disorder (ODD) and Conduct Disorder (CD)
- common genetic contribution for ADHD, ODD, and CD
- Family connections – there is evidence for a contribution from a shared environment

Mood disorders
- ADHD at 4-6 years is a risk factor for future depression and suicidal behavior
- 20-30% of children with ADHD experience depression
  - family risk for one disorder may increase the risk for the other

Figure 1. Approximate prevalence of comorbid diagnoses in children with attention-deficit/hyperactivity disorder.
Anxiety disorders
• about 25% of children with ADHD experience excessive anxiety
• children with co-occurring anxiety
  – Display social and academic difficulties
  – Experience greater long-term impairment and mental health problems

Learning disorders
• about 25% of children with ADHD have difficulty with reading, writing and/or math

+ speech-related difficulties
• difficulty understanding others’ speech
• excessive and loud talking
• frequent shifts and interruptions in conversation
• inability to listen
• inappropriate conversations
• speech production errors

Figure 1. Approximate prevalence of comorbid diagnoses in children with attention-deficit/hyperactivity disorder.
Many children with ADHD do not outgrow problems and some can get much worse.

At least 50% of clinic-referred elementary school children continue to deal with ADHD into adolescence.

**Adult challenges** (Shaw et al., 2012)
- drug use/addictive behaviour,
- academic outcomes,
- antisocial behaviours,
- social function
- occupation

**BUT**
- Some individuals either outgrow or learn to cope with their disorder by adulthood
- ADHD is established as an adult disorder
ADHD runs in families

**Family** studies:
- sibling risk increases 2 - 5x
- 3 - 5x increased likelihood that parent is affected (9 - 35%)

**Twin studies**
- 75% heritability estimates for hyperactive-impulsive and inattentive behaviors

**Specific gene** studies
- Genes may contribute to the expression of ADHD – focus on dopamine regulation

![Figure 3](image-url) Family studies in attention-deficit/hyperactivity disorder (ADHD).

![Figure 4](image-url) Heritability of attention-deficit/hyperactivity disorder (ADHD).
**ADHD - pharmacology**

**Current models** of ADHD: **complicated** and **not completely understood**, but ..

- implication **dopaminergic** and **noradrenergic system imbalances** related to core symptoms

Consensus ... **prefrontal lobe dysfunction** and the connections between the **frontal lobe** and key **subcortical regions** underlie ADHD

**Medications** increase neurotransmission in these systems ...

- **dopaminergic**: Adderal, Ritalin, Concerta
- **noradrenergic**: Strattera
  - not a psychostimulant - selective norepinephrine reuptake inhibitor - SNRI)
  - Alternative - for kids who experience lots of irritability on stimulants

**Liberation type** i.e., immediate vs Slow-release

**Initial dose** i.e., 5mg vs 20 mg

**Duration of action** i.e., 4 vs 12 hrs

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Figure 1. Schematic representation of functional circuits involved in the pathophysiology of ADHD. Here are summarized the attentional network (green), the fronto-striatal network (yellow), the executive function network (black), the fronto-cerebellar network (red), and the reward network (blue).
# CADDRA Guide to ADHD Pharmacological Treatments in Quebec - 2018

<table>
<thead>
<tr>
<th>Medications available and dosages</th>
<th>Characteristics</th>
<th>Duration of action</th>
<th>Starting dose</th>
<th>Dose titration as per product monograph</th>
<th>Dose titration as per CADDRA</th>
<th>MAO coverage code</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AMPHETAMINE-BASED PSYCHOSTIMULANTS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Adderall®</strong> 5 mg, 10 mg</td>
<td><strong>pill</strong> can be crushed, <strong>capsule</strong> can be opened to swallow contents</td>
<td>8 h</td>
<td>1 tab 1/3 mg b.i.d. or t.i.d.</td>
<td></td>
<td>2 tab 1/3 mg at weekly intervals</td>
<td>Covered</td>
</tr>
<tr>
<td><strong>Adderall XR®</strong> 25 mg, 30 mg, 50 mg</td>
<td><strong>tablet</strong> can be crushed, <strong>capsule</strong> can be opened to swallow contents</td>
<td>12 h</td>
<td>5-10 mg q.i.d.</td>
<td></td>
<td>2 tab 1/3 mg at weekly intervals</td>
<td>Covered</td>
</tr>
<tr>
<td><strong>Focalin®</strong> 5 mg, 10 mg</td>
<td><strong>tablet</strong> can be crushed, <strong>capsule</strong> can be opened to swallow contents</td>
<td>8 h</td>
<td>2-5 mg b.i.d. or t.i.d.</td>
<td></td>
<td>2 tab 1/3 mg at weekly intervals</td>
<td>Covered</td>
</tr>
<tr>
<td><strong>Focalin XR®</strong> 5 mg, 10 mg</td>
<td><strong>tablet</strong> can be crushed, <strong>capsule</strong> can be opened to swallow contents</td>
<td>12 h</td>
<td>5-10 mg q.i.d.</td>
<td></td>
<td>2 tab 1/3 mg at weekly intervals</td>
<td>Covered</td>
</tr>
<tr>
<td><strong>New Psycho Stimulant - Selective Norepinephrine Reuptake Inhibitor</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Strattera®</strong> 10 mg, 15 mg, 25 mg, 40 mg, 60 mg</td>
<td><strong>capsule</strong> can be opened to swallowed contents</td>
<td>8 h</td>
<td>5 mg q.i.d.</td>
<td></td>
<td>5 mg at weekly intervals</td>
<td>Covered</td>
</tr>
<tr>
<td><strong>New Psycho Stimulant - Selective Alpha-2 Norepinephrine Receptor Agonist</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Intuniv®</strong> 80 mg, 120 mg</td>
<td><strong>tablet</strong> can be crushed, <strong>capsule</strong> can be opened to swallow contents</td>
<td>8 h</td>
<td>1 tab q.i.d.</td>
<td></td>
<td>2 tab 1/3 mg at weekly intervals</td>
<td>Covered</td>
</tr>
</tbody>
</table>

Note: All treatments are based on a combination of empirical and clinical evidence. The table above is intended as a guide for healthcare providers, and should not be used as the sole basis for treatment decisions. The effectiveness of these medications may vary, and healthcare providers should consider individual patient factors when making treatment decisions. The table above is updated regularly, and readers are encouraged to consult the latest version of the guide for the most current information.
ADHD - establishing diagnosis - multifactorial

There is no single test to identify ADHD

Clinical Interview
- diagnostic assessment of primary complaint
- medical, psychiatric & developmental History
- detailed educational history
- detailed family & social history

Behavioural assessment
- observation (interview/in-class, etc)
- questionnaires

Psycho-educational / Neuropsychological assessment
- intellectual functioning
- achievement
- mostly "executive functioning / frontal" tests
  - organization, attention (sustained, selective, distributed), working memory (recall / interference), inhibition, self-regulation / monitoring, etc.
Nigg (2005) in a meta-analysis identified the most common abnormalities in various neuropsychological tasks in ADHD (listed by Effect Size):

**Table 2. Selected Meta-analytic Findings in Neuropsychology of ADHD Versus Non-ADHD Children**

<table>
<thead>
<tr>
<th>Measure</th>
<th>Effect Size (d)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spatial Working Memory (Spatial Span)</td>
<td>.75&lt;sup&gt;a&lt;/sup&gt; to .85&lt;sup&gt;b&lt;/sup&gt; to 1.14&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Response Suppression (Stop Task SSRT/SSRT Slope)</td>
<td>.61&lt;sup&gt;a&lt;/sup&gt; to .64&lt;sup&gt;c&lt;/sup&gt; to .94&lt;sup&gt;d&lt;/sup&gt;</td>
</tr>
<tr>
<td>Signal Detection (CPT d-prime) Arousal</td>
<td>.72&lt;sup&gt;e&lt;/sup&gt;</td>
</tr>
<tr>
<td>Stroop Naming Speed</td>
<td>.69&lt;sup&gt;f&lt;/sup&gt;</td>
</tr>
<tr>
<td>Full Scale IQ</td>
<td>.61&lt;sup&gt;g&lt;/sup&gt;</td>
</tr>
<tr>
<td>Set Shifting (Trails B Time)</td>
<td>.55&lt;sup&gt;a&lt;/sup&gt; to .59&lt;sup&gt;g&lt;/sup&gt; to 0.75&lt;sup&gt;d&lt;/sup&gt;</td>
</tr>
<tr>
<td>Planning (Tower of London/Hanoi)</td>
<td>.51&lt;sup&gt;a&lt;/sup&gt; to .69&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Mazes</td>
<td>.58&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Verbal Working Memory</td>
<td>.51&lt;sup&gt;a&lt;/sup&gt; to .41&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Decision Speed on Go-Task</td>
<td>.49&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td>WCST Perseverations</td>
<td>.35&lt;sup&gt;g&lt;/sup&gt;/.36&lt;sup&gt;a&lt;/sup&gt; to .53&lt;sup&gt;h&lt;/sup&gt;</td>
</tr>
<tr>
<td>Fluency</td>
<td>.27&lt;sup&gt;d&lt;/sup&gt;</td>
</tr>
<tr>
<td>Stroop Interference</td>
<td>.25&lt;sup&gt;f&lt;/sup&gt;</td>
</tr>
<tr>
<td>Covert Visual Spatial Orienting</td>
<td>.20&lt;sup&gt;i&lt;/sup&gt;</td>
</tr>
</tbody>
</table>
Less than 50% of kids with ADHD receive treatment
• Of those who do many discontinue ...

The primary treatment approach combines:
• Parent management training
• Educational intervention
• Stimulant medication

<table>
<thead>
<tr>
<th>Additional Treatments</th>
<th>Focus of Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family counseling</td>
<td>Coping with individual and family stresses associated with ADHD, including mood disturbance and marital strain</td>
</tr>
<tr>
<td>Support groups</td>
<td>Connecting adults with other parents of children with ADHD, sharing information and experiences about common concerns, and providing emotional support</td>
</tr>
<tr>
<td>Individual counseling</td>
<td>Providing a supportive relationship in which the youth can discuss personal concerns and feelings</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Primary Treatments</th>
<th>Focus of Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stimulant medication</td>
<td>Managing ADHD symptoms at school and home</td>
</tr>
<tr>
<td>Parent management training</td>
<td>Managing disruptive child behavior at home, reducing parent–child conflict, and promoting prosocial and self-regulating behaviors</td>
</tr>
<tr>
<td>Educational intervention</td>
<td>Managing disruptive classroom behavior, improving academic performance, teaching prosocial and self-regulating behaviors</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Intensive Treatment</th>
<th>Focus of Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Summer treatment programs</td>
<td>Enhancing present adjustment at home and future success at school by combining many of the primary and additional treatments in an intensive summer treatment program</td>
</tr>
</tbody>
</table>
Establish / maintain structure as much as possible!
- follow a routine - Establish simple/predictable rituals for meals, homework, play, and bed.
- use clocks/timers throughout home - allow enough time for homework, getting ready in the a.m., transitional times (b/n finishing play and bedtime).
- simplify (balance) schedule - keep busy but not too many activities
- create a quiet place - quiet space with no distractions
- be neat & organized - as much as possible ...

Rules must be clear and simple
- write down rules easily understood by child - hang them up/available.
- follow up every time with a reward or consequence (+ve reinforcement !) – no food/toys, use immediate rewards, can chart rewards / point system

Homework ...
- gradually build on time expended during tasks without breaks.
- provide step-by-step instruction, specifically for longer, more laborious work.

Try to eat and sleep as well as possible ...
### GUIDE TO ADHD PSYCHOSOCIAL INTERVENTIONS

#### At Home

**Instructional**
- Make eye and/or gentle physical contact before giving one or two clear instructions. Have instructions repeated back, or confirm they were understood, before proceeding.

**Behavioral**
- Use a positive approach and calm tone of voice. Teach calming techniques to de-escalate conflict.
- Use praise, catch them being good (playing nicely).
- Set clear attainable goals and limits (homework and bedtime routines, chores) and connect them to earning privileges, special outings, etc.
- Use positive incentives and natural consequences: When you..., then you may...
- Empathy statements can be useful, such as “I understand...
- Adults should model emotional self-regulation and a balanced lifestyle (good eating and sleep habits, exercise, and hobbies).
- Choices should be limited to two or three options.

**Environmental**
- Structure and routine are essential. Parents/partners must be united, consistent, firm, fair, and follow through.
- Encourage prioritizing instead of procrastination.
- Post visual reminders (rules, lists, sticky notes, calendars) in prominent locations.
- Use timers/apps for reminders (homework, chores, limiting electronics, paying bills).
- Keep labeled, different colored folders or containers in prominent locations for items (keys, electronics).
- Find the work area best suited to the individual (dining table, quiet area).
- Break down tasks.
- Allow movement breaks.
- Allow white noise (fan, background music) during homework or at bedtime.

#### At School

**Instructional**
- Keep directions clear and precise.
- Get student’s attention before giving instructions.
- Check understanding and provide clarification as needed.
- Actively engage the student by providing work at the appropriate academic level.

**Behavioral**
- Provide immediate and frequent feedback.
- Use direct requests - solve...then...
- Visual cues for transitions.
- Allow for acceptable opportunities for movement - “walking passes”.

**Environmental**
- Preferred seating.
- Quiet place for calming down.

**Accommodations**
- Chunk and break down steps to initiate tasks.
- Provide visual supports to instruction.
- Reduce the amount of work required to show knowledge.
- Allow extended time on tests and exams.
- Provide note taker or access to assistive technology.
- Supports can include the CADDRA psychoeducational and accommodations template.
- Request school support services.

#### At Work

**Accommodations**
- Identify accommodation needs.
- Provide CADDRA workplace accommodations template.

**Counsel**
- Suggest regular and frequent meetings with manager and support collaborative approach.
- Set goals, learn to prioritize, review progress regularly.
- Identify time management techniques that work for the client, e.g., using a planner, apps.
- Declutter and create a work-friendly environment.

**Tools**
- Organizational apps and/or productivity websites: caddra.ca/medical-resources/psychosocial-information

**Relationships**
- Understand the impact ADHD can have on relationships with partners, family, friends, teachers, peers, and co-workers.
- Recognize and accept ADHD can cause unintended friction and frustration between parent and child as well as between partners (e.g., difficulties with self-regulation, time management difficulties).
- Learn how to listen and communicate effectively.
- Organize frequent time to communicate (don’t just talk) to discuss goals and plans (what works, what doesn’t) within home, educational and work environments.
- Schedule regular fun with family, partner, friends.
- Practice relaxation and mindfulness techniques: caddra.ca/medical-resources/psychosocial-information
- Stay calm, be positive, recognize/validate and celebrate strengths.

---

**Other referrals may be needed:**
- Psychologist
- Nurse, Family Therapist
- Parenting Programs
- Social Skills Program
- Occupational Therapist
- Speech and Language
- Audiology
- Learning Strategist
- ADHD Coach
- Vocational Coach

For further information, please refer to the Psychosocial Interventions and Treatments chapter, Canadian ADHD Practice Guidelines at caddra.ca

Version: October 2016
Canadian ADHD Resource Alliance (CADDRA)
http://www.caddra.ca/
CADDRA is a Canadian non-industry, not-for-profit, independent association. An alliance of healthcare professionals supporting patients with ADHD and their families.

Le Regroupement des Associations PANDA du Québec
http://www.associationpanda.qc.ca
Quebec-based association whose aim is to aid persons with ADHD and their families.
ASD
Bleuler (1911)
- described withdrawal from social relations into a rich fantasy life seen in individuals with schizophrenia
- derived from - *autos* (self) and *ismos* (condition)

Kanner (1943)
- case history of 11 children (case 1 = Donald T)
- innattention of outside world = “extreme autistic aloneness”
- social isolation, stereotyped behavior, resistance to change, echolalia
- « infantile autism »
- congenital in nature

Asperger syndrome (1943) : another form of « autism »
definition of autism (ASD)

DSM I (1952) Schizophrenic reaction, childhood type
“psychotic reactions in children, manifesting primarily autism ...”

DSM II (1968) [autism was not mentioned; the word appears only under the following category]
• 295.8 Schizophrenia, childhood type
This category is for cases in which schizophrenic symptoms appear before puberty. The condition may be manifested by autistic, atypical and withdrawn behavior...

Rutter (1968) - argued autism differed form schizophrenia
• higher M/F ratio
• absence of delusions and hallucinations
• stable course (no relapse/improvement)
• need better diagnostic criteria for research

DSM III (1980) - effect on inclusion criteria for research
• diagnostic criteria for Infantile Autism

DSM IV (1994) - in larger category of “Pervasive Developmental Disorders”
• autistic disorder
• Asperger syndrome
• pervasive developmental disorder - not otherwise specified (PDD-NOS)
• Rett’s syndrome (rare)
• childhood disintegrative disorder
CDC researchers collect health and school records for 8-year-old children who live in select U.S. counties. These researchers are part of the Autism and Developmental Disabilities Monitoring Network.
# Autism: Then and Now

## THEN (1980’s):
- Prevalence considerably low ≈ 3-4 per 10000
- Largely unknown in pop culture
- Emphasis on intellectual disability
- Few educational interventions
- One autism journal

## NOW (2015):
- Prevalence 1 in 59 children, 1 in 42 boys in US (CDC, 2018)
- Large awareness, extensive media coverage
- Little emphasis on intellectual impairment
- Recognized heterogeneity / neurodiversity
- MANY autism journals
Autism: empirical evidence vs pop culture?

**scientific journals**

- *Autism*
- *Journal of Autism and Developmental Disorders*
- *Child Development*
- *Biological Psychiatry*
- *Developmental Psychology*
- *Neuroscience*
- *NEJM*
- *JCP*
- *Mental Retardation and Developmental Disabilities*
- *Journal of Intellectual Disability Research*

**pop magazines**

- *People*
- *Time*
- *Time Out*
- *TIME Out*
- *Inside the World of Autism*
- *How I Saved My Son*
- *Autism*
- *Fighting for My Autistic Son*
- *My All-American Boy*
- *New Insights into the Hidden World of Autism*
Autism: Facts we do know

- Autism is not rare

- Neurodevelopmental condition

- Traditionally characterized as a disorder of social impairment

- Highly heritable

- No biological marker

- Outcomes are variable

- Everyone with ASD is different = heterogeneity
DSM 5 – diagnostic criteria

DSM 5

severity level
• how much support

“clinical specifiers “
• w lang impairment?
• w intel impairment?
= dimensionality

associated features
• know genetics
• epilepsy
• DD

Mottron et al., 2007
behaviors manifested in a variable manner
- often present different profiles
- ‘autisms’
- unique strengths and weaknesses

differ along three main axes:

1) **Language**
   - 10 - 20% never develop ability to communicate **verbally**
     (accompanied by severe delay)

2) **Cognitive development**
   - difficult to assess ⇒ language/social challenges interfere with cognitive assessments
   - **IQ variable**: across domains / **verbal** vs **non-verbal**
   - **savants**: co-occurrence of cognitive delay with particular ability (10%)

3) **Symptom severity**
   - **severe** to **mild**
   - profiles change as a function of development
Diagnosis: Assessment

no single test ⇒ diagnosis based entirely on behavioural manifestations

ASD ⇒ diagnosed by a multidisciplinary team using standardized instruments

Developmental history
Autism Diagnostic Interview (ADI-R)
• Semi-structured, Parent Interview

Behaviour
Autism Diagnostic Observation Schedule (ADOS-2)
• Child observation

Cognitive assessment

Clinical expertise involved ...
Diagnosis: Assessment of Symptoms

**Parent** Report

- Modified Checklist for Autism in Toddlers (M-CHAT)
- Social Communication Questionnaire (SCQ)
- Social Responsiveness Scale (SRS)

**Teacher** Report

- Autism Behavior Checklist (ABC)
- Social Responsiveness Scale (SRS)

**Child Observation and Rating**

- Childhood Autism Rating Scale (CARS)
Diagnosis: timeline

Parental concerns about child’s development emerge → ASD diagnosis given → Delayed diagnosis

BIRTH  1  2  3  4  5  6

age of child (years)
Infrequent id of **comorbid psychiatric disorders** in ASD - **diagnostic overshadowing**

**N = 112 (98 males or 7:1 ratio) mean age of 11.5 years**
- 50 : PDD; 62 : childhood autism

most **common disorders**
- **social anxiety disorder (29.2%), ADHD (28.2%),** and **oppositional, defiant disorder (28.1%).**

identify symptom constellations meeting diagnostic (DSM) criteria.
- suggest that ASD diagnosis should be followed by systematic assessment of other psychiatric conditions
- improve targeted intervention

**TABLE 1**

<table>
<thead>
<tr>
<th>Disorder</th>
<th>3-Mo Point Prevalence/100</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any disorder</td>
<td>70.8</td>
<td>58.2–83.4</td>
</tr>
<tr>
<td>Any main disorder</td>
<td>62.8</td>
<td>49.8–75.9</td>
</tr>
<tr>
<td>Any emotional disorder</td>
<td>44.4</td>
<td>30.2–58.7</td>
</tr>
<tr>
<td>Any anxiety or phobic disorders</td>
<td>41.9</td>
<td>26.8–57.0</td>
</tr>
<tr>
<td>Generalized anxiety disorder</td>
<td>13.4</td>
<td>0–27.4</td>
</tr>
<tr>
<td>Separation anxiety disorder</td>
<td>0.5</td>
<td>0–1.6</td>
</tr>
<tr>
<td>Panic disorder</td>
<td>10.1</td>
<td>0–24.8</td>
</tr>
<tr>
<td>Agoraphobia</td>
<td>7.9</td>
<td>3.0–12.9</td>
</tr>
<tr>
<td>Social anxiety disorder</td>
<td>29.2</td>
<td>13.2–45.1</td>
</tr>
<tr>
<td>Simple phobia</td>
<td>8.5</td>
<td>2.8–14.1</td>
</tr>
<tr>
<td>Obsessive-compulsive disorder</td>
<td>8.2</td>
<td>3.2–13.1</td>
</tr>
<tr>
<td>Any depressive disorder</td>
<td>1.4</td>
<td>0–3.0</td>
</tr>
<tr>
<td>Major depressive disorder</td>
<td>0.9</td>
<td>0–2.3</td>
</tr>
<tr>
<td>Dysthymic disorder</td>
<td>0.5</td>
<td>0–1.4</td>
</tr>
<tr>
<td>Oppositional or conduct disorder</td>
<td>30.0</td>
<td>14.9–45.0</td>
</tr>
<tr>
<td>Oppositional defiant disorder</td>
<td>28.1</td>
<td>13.9–42.2</td>
</tr>
<tr>
<td>Conduct disorder</td>
<td>3.2</td>
<td>0–7.1</td>
</tr>
<tr>
<td>Attention-deficit/hyperactivity disorder</td>
<td>28.2</td>
<td>13.3–43.0</td>
</tr>
<tr>
<td>Other disorders</td>
<td>24.7</td>
<td>14.1–35.3</td>
</tr>
<tr>
<td>Enuresis</td>
<td>11.0</td>
<td>4.1–17.7</td>
</tr>
<tr>
<td>Encopresis</td>
<td>6.6</td>
<td>1.8–11.4</td>
</tr>
<tr>
<td>Tourette syndrome</td>
<td>4.8</td>
<td>0.1–9.5</td>
</tr>
<tr>
<td>Chronic tic disorder</td>
<td>9.0</td>
<td>3.3–14.6</td>
</tr>
<tr>
<td>Trichotillomania</td>
<td>3.9</td>
<td>0–10.3</td>
</tr>
</tbody>
</table>

**Note:** CIs = confidence intervals.
- Includes any emotional disorder.
- Includes all anxiety disorders, phobias, and mood disorders.
- Includes anxiety disorders, panic disorder, phobias, and obsessive-compulsive disorder.
- Includes Tourette syndrome, chronic tics, trichotillomania, enuresis, and encopresis.
Interventions: behaviors and pharmacology

Common target symptoms:

**aggression / self injurious behaviour (SIB)/ irritability**
- neuroleptics, psychostimulants
- Anticonvulsant medications

**inattention and hyperactivity**
- Methylphenidate (Ritalin), neuroleptics

**anxiety and repetitive behaviors**
- Fluoxetine (Prozac - antidepressant – SSRI)
- Fluvoxamine (Luvox - antidepressant)
- **Risperidone / Aripiprazole (Risperdal/Abilify - antipsychotic)**

**Sleep disturbance, tics, depression etc**

oxytocin ???
- peptides of the human neuroendocrine system
- effects social cognition
- clinical trials ...

Mcpheeters et al., 2011
behavioral interventions

early intensive behavioral intervention
• UCLA / Lovaas model – ABA (Lovaas, 1987).
• a systematic approach to skill acquisition - discrete trial training (DTT)
• reinforcement of specific skill, broken down and learned in step-by-step manner
• Pivotal response training (PRT) targets skills that are important (or pivotal) for many other skills
• http://www.youtube.com/watch?v=iyCx-QLzgJw

school-based treatment approaches
• TEACCH (treatment and education of autistic and communication related handicapped children) : based on the « autism culture »
• “structured teaching” - delivered within special education classroom settings.
• uses strengths (usually visual ) of child
• http://www.youtube.com/watch?v=ddGLJ2r4rcw

social interventions
• social skills groups

communication interventions
• sensory integration therapy
  – brushing (touch), weighted vests (proprio), swings, spinning (vestibular)

http://www.thetransporters.com/
cognition in autism: intelligence

longstanding notion of intellectual impairment, but...

large CDC study (2014):
- 31% had intellectual disability (IQ ≤ 70).
- 23% were in the borderline range (IQ = 71-85).
- 46% had avg / above avg intellectual ability (IQ > 85).

uneven profile in ASD
- ↑ Performance-based IQ: i.e., block design
- ↓ Verbal based IQ; i.e., vocabulary

Wechsler Intelligence Scales (WIS)
- conventional
- widely available
- rely on verbal instructions

CDC, 2014, Tsatsanis, 2011
Dawson et al., 2007; Soulieres et al., 2009
Relative Strength: i.e., BD - non-verbal reasoning, perceptual organization, pattern recognition
Relative Weakness: i.e., CO - verbal, social knowledge, social observation ability, society's rules, etc.

Table 2. WISC-IV cognitive profile.

<table>
<thead>
<tr>
<th>Sample size (sex)</th>
<th>Autistic children</th>
<th>Asperger children</th>
<th>Typical children</th>
</tr>
</thead>
<tbody>
<tr>
<td>51 (49M, 2F)</td>
<td>10.6 (2.7)</td>
<td>10.6 (2.6)</td>
<td>9.6 (2.3)</td>
</tr>
<tr>
<td>Mean (SD)</td>
<td>Age</td>
<td>Age</td>
<td>Age</td>
</tr>
<tr>
<td></td>
<td>Range 7–15</td>
<td>Range 7–15</td>
<td>Range 6–15</td>
</tr>
<tr>
<td>WISC-IV FSIQ</td>
<td>90.7 (12.4)</td>
<td>98.3 (12.4)</td>
<td>103.3 (13.5)</td>
</tr>
<tr>
<td>VCI</td>
<td>85.6 (16.1)</td>
<td>110.5 (10.5)</td>
<td>103.3 (16.3)</td>
</tr>
<tr>
<td>Similarities</td>
<td>8.4 (2.4)</td>
<td>12.5 (2.0)**</td>
<td>10.6 (3.3)</td>
</tr>
<tr>
<td>Comprehension</td>
<td>5.8 (3.0)**</td>
<td>9.3 (2.0)</td>
<td>9.2 (3.0)*</td>
</tr>
<tr>
<td>Vocabulary</td>
<td>8.2 (3.6)</td>
<td>13.3 (3.2)**</td>
<td>11.7 (3.5)**</td>
</tr>
<tr>
<td>PRI</td>
<td>105.8 (13.3)</td>
<td>101.3 (15.9)</td>
<td>105.2 (11.7)</td>
</tr>
<tr>
<td>Block Design</td>
<td>11.0 (3.1)**</td>
<td>9.5 (2.5)</td>
<td>9.9 (3.2)*</td>
</tr>
<tr>
<td>Matrix Reasoning</td>
<td>11.7 (2.9)**</td>
<td>10.4 (2.7)</td>
<td>10.8 (2.5)</td>
</tr>
<tr>
<td>Picture Concept</td>
<td>10.0 (2.8)**</td>
<td>10.5 (2.0)</td>
<td>11.6 (2.3)**</td>
</tr>
<tr>
<td>WMI</td>
<td>87.8 (16.9)</td>
<td>92.7 (15.0)</td>
<td>99.4 (12.6)</td>
</tr>
<tr>
<td>Digit Span</td>
<td>7.6 (3.3)*</td>
<td>8.3 (3.1)</td>
<td>9.2 (2.5)*</td>
</tr>
<tr>
<td>Letter-Number Sequencing</td>
<td>7.8 (3.2)*</td>
<td>9.3 (1.5)</td>
<td>9.2 (2.4)</td>
</tr>
<tr>
<td>PSI</td>
<td>91.5 (14.1)</td>
<td>85.2 (9.3)</td>
<td>101.6 (13.2)</td>
</tr>
<tr>
<td>Coding</td>
<td>7.7 (2.7)*</td>
<td>6.7 (1.9)*</td>
<td>10.2 (2.5)</td>
</tr>
<tr>
<td>Symbol Search</td>
<td>9.3 (3.3)</td>
<td>8.1 (2.0)*</td>
<td>10.5 (3.0)</td>
</tr>
</tbody>
</table>

WISC-IV: Demographic characteristics and cognitive profile of autistic, Asperger and typical children who completed the WISC-IV.

*Relative weakness.
**Relative Strength.

FSIQ: Full Scale Intelligence Quotient, VCI: Verbal Comprehension Index, PRI: Perceptual Reasoning Index, WMI: working Memory Index, PSI: Processing Speed Index.

doi:10.1371/journal.pone.0144645.t002

Raven Progressive Matrices

assess fluid intelligence, reasoning & novel problem-solving abilities

self-paced

minimal verbal instructions

Pattern

Figural

Analytical

Does WISC-IV Underestimate the Intelligence of Autistic Children?

Anne-Marie Nader · Valérie Courchesne · Michelle Dawson · Isabelle Soulières

Fig. 1 For each group, performance in percentiles on WISC-IV FSIQ, the 4 WISC-IV indexes, and RPM
ASD = widespread disorder of association cortex, development of connectivity, only secondarily as a behavioral disorder

“systems-level approach”

- abnormalities in genetic code for brain development
- abnormal mechanisms of brain development
- structural and functional abnormalities of brain
- cognitive and neurologic abnormalities
- behavioral syndrome

neurogenetic condition: where polygenetic changes affect development of the neural networks underlying affect, cognition, language and perception,

- define the pathophysiology from gene to behavior
- ultimately support the development of interventions at multiple levels of the sequence (medication, cognition behaviour).
Specific challenges faced by adults with ASD in the context of job seeking and employment are many and varied;

- understanding complex job application materials
- ‘thinking on their feet’ in an interview
- acclimatizing to new procedures and routines
- remembering and following instructions
- responding flexibly to unexpected situations
- planning and juggling multiple tasks
- communicating effectively / interacting socially with co-workers;
- managing sensory sensitivities in the workplace

Employment in which adults with ASD may perform extremely well;
- work requiring visual thinking
- systematic information processing or precise technical abilities (e.g. architect, librarian, computer programmer).

Care must be taken not to stereotype the vocational interests and capabilities of adults with ASD

Studies suggest that adults with ASD exhibit many exemplary characteristics as employees;
- honesty, efficiency, precision, consistency, low absenteeism, and a disinterest in ‘office politics’

However ... are employers sensitive to abilities and challenges of adults w ASD in the workplace?
large-scale study looking into the working lives of adults who have an autism spectrum disorder with no co-occurring intellectual disability.

having a job is not simply a means to an end ($), rather, adults with AD and HFA (like many other people) view work primarily as an opportunity to apply their knowledge, skills and interests in a way that is both self-fulfilling and has intrinsic value. BUT ...

Table 2 Occupation by ANZSCO major group

<table>
<thead>
<tr>
<th>Occupation major group</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clerical and administrative workers</td>
<td>29</td>
<td>22.8</td>
</tr>
<tr>
<td>Labourers</td>
<td>29</td>
<td>22.8</td>
</tr>
<tr>
<td>Professionals</td>
<td>28</td>
<td>22.0</td>
</tr>
<tr>
<td>Technicians and trades workers</td>
<td>16</td>
<td>12.6</td>
</tr>
<tr>
<td>Community and personal services workers</td>
<td>12</td>
<td>9.4</td>
</tr>
<tr>
<td>Managers</td>
<td>7</td>
<td>5.5</td>
</tr>
<tr>
<td>Sales workers</td>
<td>3</td>
<td>2.4</td>
</tr>
<tr>
<td>Machinery operators and drivers</td>
<td>3</td>
<td>2.4</td>
</tr>
<tr>
<td>Total</td>
<td>127</td>
<td>100</td>
</tr>
</tbody>
</table>

Missing data: n = 3

Table 6 Positive experiences of employment

<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-themes</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-actualisation</td>
<td>Opportunity to apply and develop knowledge, skills and interests</td>
<td>65</td>
</tr>
<tr>
<td></td>
<td>Freedom to be independent, autonomous or creative</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sense of being accepted and valued</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Making a difference in the lives of others or in society</td>
<td></td>
</tr>
<tr>
<td>Social and collegial factors</td>
<td>Positive relationships with colleagues</td>
<td>45</td>
</tr>
<tr>
<td></td>
<td>Enjoyable interactions with clients and customers</td>
<td></td>
</tr>
<tr>
<td>Job roles and work content</td>
<td>Enjoyment of particular job roles and work tasks</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td>Favourable working conditions (e.g. physical Environment, location, hours of work)</td>
<td></td>
</tr>
<tr>
<td>Pay and benefits</td>
<td>Earning money</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>Benefits and ‘perks’ (e.g. leave allowance, company car, travel opportunities)</td>
<td></td>
</tr>
</tbody>
</table>

Table 7 Negative experiences of employment

<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-themes</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Job roles and work content</td>
<td>Dissatisfaction with job roles and work tasks (e.g. boring, repetitive or unfulfilling work)</td>
<td>49</td>
</tr>
<tr>
<td></td>
<td>Poor working conditions (e.g. physical environment, location, hours of work)</td>
<td></td>
</tr>
<tr>
<td>Working relationships</td>
<td>Misunderstanding, criticism, ill-treatment or exclusion by others</td>
<td>46</td>
</tr>
<tr>
<td></td>
<td>Difficulties in communicating with or relating to others</td>
<td></td>
</tr>
<tr>
<td>Health and well-being issues</td>
<td>ASD-specific issues (e.g. sensory sensitivities, anxiety)</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>Other physical and mental health concerns</td>
<td></td>
</tr>
<tr>
<td>Performance and development issues</td>
<td>Lack of adequate instruction, training or support</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>perceived unfair instruction or dismissal</td>
<td></td>
</tr>
<tr>
<td>Organisational factors</td>
<td>Unfavourable organisational systems and practices (e.g. bureaucracy, favouritism)</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Negative workplace culture (e.g. high turnover, excessive ‘office politics’)</td>
<td></td>
</tr>
<tr>
<td>Pay and conditions</td>
<td>Unsatisfactory pay</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Poor employment conditions (e.g. not enough leave)</td>
<td></td>
</tr>
</tbody>
</table>

- 72% of participants reported not receiving any specific support at work for ASD-related difficulties
- 66% would have liked such help (i.e., employer, agencies, etc.)
Final thoughts...development

born in 1933:
@ 2 / 3 years of age
• unusual memory for visual information
• happy when alone, avoided contact
• movement / language not spontaneous - repetitive behaviors (hands, fingers, etc.), echolalia, etc.

in 2010 was located ...
• learned to golf (23 years), drive a car (25 years), avid traveler, etc.
• spontaneous language production, routine important, etc.

protective factors influenced the nature and course of development ...
• family’s socio-economic (↑$)
• social situation - accepted as different / small circle of friends / same friends all his life, etc.

Case # 1 : « Donald T » in 2010, 77 years old

The Atlantic, 2010
Suggested Reading and Resources

Suggested Reading:

• Autism: A very brief introduction, Uta Frith
• The Autistic Brain, Temple Grandin
• Look Me in the Eye, John Elder Robison
• The Reason I Jump, Naoki Higashida & David Mitchell
• The curious incident of the dog in the night-time, Mark Haddon
• Love Anthony, Lisa Genova

Resources:

www.autismspeak.org

https://sfari.org

http://www.theabilityhub.org/
THANK YOU