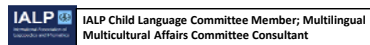




All Snowed-In: Montreal, Quebec, Canada



DISCLOSURE: Non-financial Relationship

Identification and Assessment Issues of Children with ASD & a Proposed Resource Toolkit for Speech-Language Pathologists

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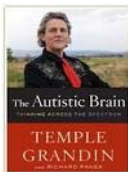
Clearing a Path to Comprehension of ASD Issues



- Autism a complex syndrome with varied manifestations: Now called *Autism Spectrum Disorder* or ASD
- ASD engulfed by many issues in all aspects of identification and treatment.
- Children with ASD end up on the Speech-Language Pathologists/Therapists (SLPs) caseload.
- Goals of Talk:
 1. Raise awareness of issues in ASD identification & differentiation from other disorders
 2. Propose development of a Resource Toolkit for SLPs to facilitate management of children with ASD and their families

Issues in ASD: Symptom Heterogeneity

- ASD manifestations are highly variable in individuals:



❖ **Temple Grandin (1984):** "Did you ever wonder what an *autistic* child is thinking?"

"I was *a partially autistic child*...at 1 1/2 to 3 I had many of the standard autistic behaviors... fixation on spinning objects, refusing to be touched or held, preferring to be alone, destructive behavior, temper tantrums, inability to speak, sensitivity to sudden noises, ...an intense interest in odors."

"At the age of 3 to 3 1/2 my behavior greatly improved ... I did not learn to speak until 3 1/2... 3 to 4 my behavior was more normal until I became tired... bouts of impulsive behavior would return."

❖ **Temple Grandin (2009):** "Some *people with autism* have pain, fear, discomfort from the same visual stimuli that I love... Many...scream when supermarket doors open quickly. I enjoyed movement of automatic doors... One child will love to play with running water, and another *autistic child* will run away scream when a toilet flushes..."

What to Call It? *The Language of Autism*

- **UK Autism community & stakeholders 3,470 persons online survey** (Kenny, 2015):
 - Disagreement about how Autism named & described.
 - **Professionals & Affected families Agreed on:**
 1. 'autism' 2. 'on the autism spectrum', 3. 'autism spectrum disorder'.
 - **Professionals Disliked 'autistic'; liked 'person with autism'**
 - **Why?** Highlighting the disability = *politically incorrect*.
 - **Affected families & friends liked 'Autistic'; disliked 'person with autism'**
 - **Why?** Autism diagnosis part of their *identity*; they form a *community*.
 - **What should SLPs do?** Accept the language clients use & Accept the *Language of Autism* used in your professional community.
 - **E.g. In Canada:** ASD Treatment & Care Research Chair (2013-2016) goal: *improve the mental health and well-being of people with Autism Spectrum Disorders (ASD) and their families.*

Diagnostic/Screening Tools: Psychometric Strength of Tests

- **Understanding clinical tests' utility** (Lalkhen & McCluskey, 2008; Charman & Gotham, 2013; McGee, 2002):
- **Sensitivity:** correctly identify those **with** the disease
 1. **True positive:** X has the disorder and the test is positive.
 2. **False negative:** X has the disease but the test is negative.
 - **Sensitivity**=True positives ÷ True positives + False negatives
- **Specificity:** correctly identify those **without** the disease.
 1. **True negative:** Y does not have the disease and the test is negative
 2. **False positive:** Y does not have the disorder but the test is positive.
 - **Specificity**= True negatives ÷ True negatives + False positives
- **Positive Predictive Value (PPV) & Negative Predictive Value (NPV):**
- ✓ **Likelihood** of finding the patient **with** the disease & **without** the disease
 - **PPV % probability:** higher the PPV > greater the diagnostic accuracy.
 - **PPVs are lower in universal screenings:** greater number of false positives;
 - **PPVs higher when sample is from a clinical population:** a greater prevalence of the disorder.

Gold Standard Instruments for ASD Diagnosis

- Many issues due to screening & diagnostic instruments (Charman & Gotham, 2013).
- **Gold Standard**= instruments ID ASD correctly 80.8% (Sensitivity):
- Autism Diagnostic Interview-Revised (ADI-R) & Autism Diagnostic Observation Schedule- ADOS & ADOS-2 (Lord et al, 2001; 2012):
 - Criteria based on DSM-IV.
 - Not validated on multicultural populations (Lord, 2015).
- **Review & Validation of diagnostic instruments** (Falkmer, et al., 2013):
- **ADI-R & ADOS:** the largest evidence based, highest Sensitivity & Specificity.
 - When used in combination: accuracy levels close to the '**gold standard**'.
- **ADI-R & ADOS Combined:** correctly Identified ASD in *Developmentally Delayed* young children (Gray, Tonge, & Sweeney, 2008).
- **ADOS with revised cut-off scores:** improved sensitivity ⇒ ID mild ASD (Kamp-Becker, et al., 2013).

Issues and Challenges in Diagnostics

- **Most common childhood neurodevelopmental disorders:** ADHD, Dyslexia, Developmental Coordination Disorder (dyspraxia), Specific Language Impairment (SLI), & ASD (Richardson & Ross, 2000):
 - All with complex etiologies & multifactorial
 - Highly **co-morbid** i.e. share symptomology
- **Reliable early age ASD identification:** desirable but difficult (Charman 2010):
 - **Regression or loss of skills a norm in Autism:** By age 2 reduced orienting to name; poorer joint attention; some early motor abnormalities & reduced emotional expression.
 - **Regression specific to ASD:** Language Impaired without ASD don't show regression.
- ❖ **A longitudinal study of ASD development found:** non-ASD siblings (toddlers) with regression in cognitive and linguistic skills (Brian et al, 2014).
 - Important to surveil such high-risk populations.

Issues and Challenges in Diagnostics...

- Great Heterogeneity in young with ASD:
- **Language, Intellectual Abilities, & Severity** (APA, 2013; Charman, et al., 2011; Dromi et al., 2016; Hambly & Fombonne, 2014; Kasari et al., 2013):
 - **Language abilities huge range:** No language ⇒ Linguistically competent in comprehension, production, and literacy
 - **Intellectual abilities huge range:** severely limited ⇒ high levels; ≈ 50% below average.
 - **Severity spans entire continuum:** Mild ⇒ Severe.

What Language to Use with ASD child?

- **Minority language Bilingual parents advised by Clinicians & Educators:** use 1 language & preferably the school language (Park, 2014; Yu, 2013).
- **Why?** Belief that 2 languages are challenging for ASD children:
 - **Impact of bilingualism on ASD language acquisition:** little known but advise on monolingual persists.
 - Demanding use of only dominant language causes distress in families (Park, 2014).
- **Is belief in monolingual use for children with ASD justified?**



What Language to Use with ASD child? ...

- Comparison of *bilingual* ASD children with *monolingual* ASD children:
 - ✓ **No significant difference on** (Ohashi, et al, 2012; Valicenti-McDermott et al 2012):
 - severity,
 - first word & phrase onset,
 - expressive-receptive-social communication scores,
 - cognitive function & autistic features:
 - ∴ Bilingual exposure not disadvantage for young children with ASD.
- **Hambly & Fombonne (2014):** ASD children L2 vocabulary acquisition
 - Larger exposure time to L2= 69% of variance in L2 acquired vocabulary +
 - Expressive L1 language= 13% of variance; Both ⇔ acquired L2 vocabulary.
- ✓ Cognitive & Social Impairment levels not significant variables in L2 vocabulary acquisition.

Differentiating ASD from Other Disorders: DSM-5

- **ASD vs Social (Pragmatic) Communication Disorder (SPCD): DSM5 Criteria** (Rosin, 2015)
- ✓ **ASD Diagnosis Requires:**
 - **Impairment in 3 features of Social Communication & Social Interaction**
 - **Impairment in 2 features in Restricted Repetitive Patterns of Behaviour (RRPB)**
 - **Noting Accompanying Problems:** presence of Language, genetic, cognitive impairment or other disorders.
 - **Symptoms:** show in early dev't & cause impaired everyday function
 - **Severity range depends on support need:**
 - **Level 1**=mild support
 - **Level 2**=substantial support
 - **Level 3** =very substantial support

DSM-5 Symptom Severity...

- **Problem with Symptom severity system** (Weitlauf, et al, 2014):
 - With varied levels in **adaptive, cognitive, and autism core domains:**
 - Not clear how to decide on severity.
 - Discrepancy between Stakeholders:
 - **Researchers:** focus on Neurobiological mechanisms Vs
 - **Clinicians:** focus on everyday function.
- ❖ Level of Support decision **should not be influenced by accompanying problems** which are not part of the ASD core symptoms (e.g. IQ).

Problems with DSM-5 RRPB ...

- **Not unique to ASD:** seen in typical dev't and other disorders (Wolff et al, 2016; Joseph et al, 20013; Kim & Lord, 2010)
 - Lam et al. (2008) examined RRPB in 2 to 22 yr olds with ASD:
- **Three subtypes:** Repetitive sensory motor (RSM), Insistence of sameness (IS), and circumscribed interests (CI):
 - Esbensen, et al. (2009):
 - *Repetitive behaviors are a heterogeneous group of behaviors,*
 - *Subtypes of RRBs have their own individual patterns across the lifespan,*
 - *Differently associated with age depending on intellectual functioning*
 - Richler, et al. (2010): The higher the Nonverbal IQ at age 2, the milder the RRPB and higher the probability it will decrease with age.

Restricted Repetitive Patterns of Behaviour (RRPB)...

- **Instrument for measuring intensity of RRPBs** (Wolff, Boyd, & Elison, 2016):
 - **The RBS-EC:** Repetitive Behaviour Scale for Early Childhood
 - **Typically developing children** from toddlerhood ⇒ early school age show:
 - Strict adherence to daily routines or insistence on sameness of environment & activities.
 - **How much of RRPB is associated with atypical dev't?**
 - **Questionnaire for quantifying RRPBs** (34 items): completed by parents, teachers, caregivers in 10 minutes); Standardized on 914 toddlers (age 2-5):
 - **RBS-EC 4 subscales:** **1.** Repetitive motor **2.** Restricted interests & behavior, **3.** Ritual & routine, **4.** Self-directed behavior (e.g. self-injury).
 - **The RBS-EC and its scoring sheet are FREELY available at:**
<http://www.cehd.umn.edu/edpsych/research/resources/rbs-ec/>
 - **Or by contacting:** Jason Wolff, PhD: jjwolff@umn.edu.
 - **Note:** For any changes or additions to RBS-EC items or for translation into other languages, contact the author J Wolff.

Differentiating ASD from Other Disorders...

- **SPCD:** Difficulties in social verbal & Non-verbal communication but **No RRPB:**
 - DSM does not specify severity levels as in ASD.
 - Impairment in 4 features:
 1. Use of language for social purposes: greeting & sharing info
 2. Match communication to context or listener needs
 3. Follow conversation & story telling rules
 4. Understanding inferences, non-literal, or ambiguous meanings
 - **Problems in Identification** (Rosin, 2015):
 - Symptoms apparent after age 4 with growth of language level.
 - Mild form: mostly apparent in early adolescence.
 - If RRPB Present → Diagnose ASD: problematic as RRPB may have been present early on but were resolved & not reported by parents (Esbensen et al, 2009).

Issue with DSM5 Categories: ASD vs SPCD

- **Brukner-Wertman, Laor, & Golan** (2016): DSM5 imposed a categorical approach to spectrum disorder with symptom continuums:
 - Independent categories not supported by research
 - **SPCD as separate category:** DSM5 provides ASD severity levels but not for SPCD
 - **Clinical standardized instruments to detect ecological pragmatic impairment:** used in research but not yet validated for clinical use.
 - **The Gold Standard Instruments:** ADI-R designed with DSM-IV criteria: mild forms missed; ADOS-2 combines SC & RRB symptoms: does not distinguish SPCD from ASD.
 - **Promising Instruments:** Diagnostic Interview for Social and Communication Disorders (DISCO); (Carrington, et al., 2015): evaluates these separately but not yet differentiates them.
 - **Norbury** (2014): SPCD diagnosis impeded by lack of reliable & culturally valid assessment measures.
 - **SPCD not shown as a separate entity:** High comorbidity of SPCD with Conduct Disorder, ADHD, & Genetic disorders.
 - Dissociation between Social Communication & Pragmatic Language
 - Pragmatic language depends on the child's language level attained.

Rethinking Asperger's: Understanding the DSM-5 Diagnosis using *Sheldon Cooper*



Sheldon Cooper



- **Tobia & Toma (2015):** The DSM-5 has eliminated *Asperger's Disorder*
 - At Rutgers Robert Wood Johnson Medical School, residents in training learn about the DSM revisions through media.
 - *Sheldon Cooper*, from *The Big Bang Theory* meets criteria in the DSM-IV for *Asperger's Disorder*.
 - Sheldon's behavior assessed across several episodes: residents re-evaluated Sheldon using the new criteria.
- With the DSM-5 criteria Sheldon Cooper was reclassified as:
 - *ASD, level 1 severity (mild support), without accompanying intellectual impairment, without accompanying language impairment.*

Differentiating ASD from Delayed Language Development (DLD)

- **ASD vs DLD (Late Talkers)** (Paul, et al., 2008; Weismer, et al., 2010): Why is it difficult to differentiate at age 2-3 even when matched on expressive language levels?
- **Similarities & Difference in Delays** (Paul & Ellis Weismer, 2013):

SKILL	ASD VS LT/SLI
Use of gaze, reciprocity	ASD = LT
Frequency of spontaneous communication	ASD = LT
Expressive language	ASD = LT
Reverential cognition	ASD < LT
Joint Attention intentions	ASD < LT
Receptive language	ASD < LT
Use conventional gestures	ASD < LT
Spontaneous pretend play	ASD < LT
Repetitive stereotyped	ASD > LT
Unusual vocalizations	ASD > LT

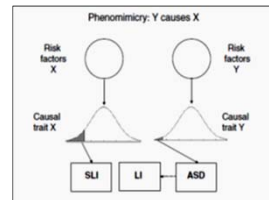
Differentiating ASD from Specific Language Impaired- SLI

- **ASD vs SLI** (Bishop, 2010; Tomblin, 2011; Weismer, 2013): seem to be comorbid conditions:
 - Both very heritable
 - Overlap on social & communicative deficits, syntax, & lexicon (Leyfer, et al., 2008; McGregor, et al., 2012)
 - **But not co-morbid:** Phenotype similar but genotype different (Bishop, 2003, 2010; Lindgren et al., 2009; Williams, et al., 2008)

Fig 5. In Bishop, 2010, p.624:



Phenimimicry:

- ✓ Phenotype of ASD can lead to Language Impairment (LI);
- ✓ Resemblance to SLI superficial:
 - Those with ASD & LI don't have SLI risk factors



Identifying ASD in Fragile X Syndrome (FXS)


- **FXS** most common heritable cause of intellectual disability & most common disorder co-morbid with ASD (Hutton, et al., 2006):
 - **FXS** diagnosis based on DNA tests; **ASD** diagnosis based on behavioral observations.
- **Klusek, Martin, & Losh (2014):** differentiating FXS with ASD comorbidity from FXS without ASD critical:
 - **FXS with ASD:** more significantly impaired:
 - More significant cognitive & expressive language impairment, and greater behaviour issues.
 - Greater social impairment.
 - Poorer adaptive functions.
 - Increased risk of developing medical issues.
 - Affected children are not likely to "out grow" their autistic behaviors without specialized intervention.
 - **ASD comorbidity should be a key factor in determining type & intensity of interventions for the affected children.**


ASD Gender Differences?


- **Girls Underdiagnosed:** 4 boys to 1 girl diagnosed with ASD: **Why?**
 - ASD boys & girls symptom differences not apparent when toddlers: show up by age ≈3.
 - ASD Different in boys and girls (Frazier, et al., 2014; Halladay, et al., 2015; Werling & Geschwind, 2013)
 - No screening instrument for girls: many go undetected (Baron-Cohen, et al., 2014; Gould & Ashton-Smith, 2011; Szalavitz, 2016):
 - ✓ ASD girls with average IQ: better social behaviour & more subtle repetitive behaviour & restricted interests.
- **Dyslexia:** No gender differences in prevalence (Jiménez, 2009)
- **ADHD:** **yes-** more boys affected (Gaub & Carlson, 1997)
 - **More ASD boys with ADHD than ASD girls:** reflection of gender differences in typical populations (May, Cornish, & Rinehart, 2016).
- **Many more FXS boys with ASD vs FXS girls:** Why? (Klusek, Martin, & Losh, 2014)
 - **Diagnosed with Gold Standard instruments ADI-R & ADOS:** these do not ID ASD in Girls easily.

Girl ASD Phenotype


- **Lai et al. (2015): No Quantitative criteria** to identify a girl ASD phenotype from standard tests.
- **Qualitative differences** between boys & girls with ASD without impaired IQ shows:
 - **A female ASD phenotype:**
 - **In social interaction:**
 - Greater awareness of the need and desire for social interaction;
 - Tend to behave in a 'shy' manner;
 - Tend to copy or imitate others and mask their problems with compensatory strategies;
 - Have only one or few close friends;
 - Tend to be 'mothered' by their peers in primary school & often bullied in high school.
 - **In communication:**
 - have better linguistic abilities;
 - Better than boys in imagination & pretend play although mostly nonreciprocal and overly structured;



Pinterest.com

Girl ASD Phenotype...

- **In RRBP interests, or activities:**
 - Interests involve people & animals VS objects & things;
 - Centre on topics & activities more typical of non-ASD girls so not recognized as an ASD behaviour.
- **In personality characteristics a tendency to be:**
 - Perfectionist;
 - Determined;
 - Controlling in play with peers;
 - Oppositional;
 - Periodically exhibit eating problems.
- The noted differences between the genders may reflect biological underpinnings and cultural expectations of girls.



<https://www.pinterest.com/mimis329/raggedy-ann-andy-images/>

Early Identification of ASD: Level 1 & Level 2 Screening

- ASD not rare anymore & Early ID at 18 & 24 months recommended (Narzisi, et al., 2013)
- **Early ID imperative as it permits early intervention** (Robbins, 2008):
 - Expedites referral to specialists for accurate ASD diagnosis.
 - ID with well-researched screening instruments found to be stable & reliable.
 - Permits early intervention: more gains in communication, social interaction, cognitive ability, & improved life quality.
- **Siu & US Preventive Services Task Force (2016) reviewed many studies:** because of potential harm from early intervention and treatment:
 - **Do not recommend early screening** for children *who have not been diagnosed* with developmental delays and *are not signalled by their caretakers*.
- ✓ *i.e. Promote Surveillance vs Universal Screening*

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Early Identification of ASD: Level 1 & Level 2 Screening ...

- **Two levels of screening** (Garcia-Primo et al., 2014):
- **Level 1 universal screening:** designed for general pediatric population
 - During early pediatric exam or well-child clinic; in primary care facility.
 - Screening instruments short & low cost since majority screened are not at risk.
- **Level 2 screening:** designed for sub-populations
 - ASD specific screening tool after developmental delay risk confirmation at a Level 1 screen.
 - More costly and time consuming & requires greater expertise in administration.

Who should screen? Child Care Workers (CCWs) & ASD Screening

- **SLPs in Day Cares:** Child Care Workers Reliable informants on an ASD screening tool:
- **Checklist for Early Signs of Developmental Disorders- CESDD** (Dereu, et al., 2010, 2012): screens ASD and delayed language development
 - Recommended level 1 screening: IDs ASD & those with high risk for language disorders.
 - The CCWs received a 3-hr training (via discussions & videos): how to ID early ASD signs & how to use the CESDD:
 - Early social-communicative skills: imitation, joint attention & pretend play.
 - An overview of the typical development of social-communicative skills.
 - A detailed explanation of each item of the CESDD.
 - The CCWs discrimination was as good as that of the parent.

Issues in ASD & SLPs Services: What Can SLPs Do?

- **ASD Evaluation:** SLPs restricted in providing diagnosis: **Why?**
 - Official constraints on who can diagnose ASD: local policy makers & turf-wars.
 - SLPs rarely trained in evaluating ASD with the *gold standard* **ADI-R & ADOS.**
- **Early ID of ASD:** SLPs **Not** Restricted in providing & participating in screening:
 - Level 1 validated instruments exist (**Caveat** instrument must match need):
- **Checklist for Early Signs of Developmental Disorders- CESDD** (Dereu, et al., 2010, 2012): high sensitivity & specificity: ASD & delayed language dev't screen; CCWs & Parents respond.
- **Children's Communication Checklist- CCC-2** (Bishop, 2006): high sensitivity & specificity; good PPV: tells Pragmatic Language Disorder from Speech-Language Impairment, & ASD risk.

More Early ID Instruments ...

- **Modified Checklist for Autism in Toddlers, Revised with Follow-Up: M-CHAT-R/F** (Robins, et al., 2001, 2009, 2014): best discriminating variables between ASD & other problems:
 - **Measures of: 1. Joint attention behaviours** (pointing, bringing things to show); **2. Social relatedness** (interest in other children, imitation); **3. Communication** (response to name).
- **Language Use Inventory- LUI** (O'Neill, 2009; Pesco & O'Neill, 2012): a standardized parent report; screen young children's pragmatic language dev't; high sensitivity & specificity.
 - High PPV for 24-47 mos. at cut-off: $\leq 1.64 \text{ SD} < M$.
- **Communication and Symbolic Behavior Scales Developmental Profile Infant-Toddler Checklist: CSBS-DP** (Wetherby & Prizant, 2002 in Pierce, et al., 2011; Wetherby, et al., 2008):
 - Screen age 6-24 mos.: High sensitivity, specificity, & PPV; profiles speech, social, & symbolic dev't.

More Early ID Instruments ...

- **Pragmatic Checklist** (Goberis, et al., 2012 & Anderson, 2013): passing % for typical age 24-60 mos mastery of objectives in 6 pragmatic domains;
 - Screen for pragmatic issues in hearing impaired.
- ✓ **YHus**: Red Flag for ASD & SPCD; works well for ID pragmatic treatment objectives in hearing children from diverse cultures & languages.
- **Child Behavior Check List- CBCL for Toddlers (1½–5)** (Narzisi, et al., 2013): Parent questionnaire for use by pediatricians
 - Screen for ASD: High Sensitivity, Specificity, PPV & NPV.
 - **Instrument has 14 scales**: Only *Withdrawn & Pervasive Developmental Problems* (PDP) subscales differentiated ASD from Typical & Other Psychiatric Disorders.

Proposed Resource Toolkit Practical & Theoretical Framework

- Model: Johnson and Myers' (2007): ASD pediatric management guide or resource toolkit.
- Based on **Transcultural Psychiatry** (Kirmayer, 2006; Kirmayer et al 2008) & A **bioecological model** of human development (Bronfenbrenner & Ceci, 1994; Bronfenbrenner & Morris, 2006)
 - **Transcultural Principles of Psychiatry** (a multidisciplinary field): *culture* and *ethnic* identity determine awareness and interpretation of disease; consider these when examining individuals.
 - **Bioecological model of Human Development**: family factors, services, school, community, and various societal resources play a vital role in determining the developmental outcomes of children with ASD (Pathways in ASD Study Team, 2016; Szatmari et al, 2015).



<http://www.asdpathways.ca/about-the-study>

ASD Identification Within Social-Cultural Context

- Researchers advocate examining children for ASD within their cultural context (Kirkovski, et al 2013; Bronfenbrenner et al 1994, 2016)
- Because Social cultural factors:
 - Impact on ASD expression;
 - Determine whether parents will report it in girls;
 - How early it is observed;
 - How it is viewed and managed;
 - How the child is socialized;
 - How many languages the child is expected to use;
 - What policies and services are provided for affected children and their families within a particular culture

SLPs Need an ASD Toolkit: Models of Universal Resource Toolkits

- **Toolkit For Pediatricians**: often the primary contact for children with ASD:
 - **Purpose**: to better equip pediatricians to care for children with ASD in an effective and timely manner
- **The American Academy of Pediatrics Resource Toolkit** (American Academy of Pediatrics, 2007; Johnson, Myers & Council on Children with Disabilities-CCD, 2007).
 - A collection of resources to educate about ASD; screening tools to ID symptoms for 3-age groups; information for families
- **Autism Speaks Canada @ <http://www.autismspeaks.ca/>**:
 - **Developed 40 toolkits**: resource for individuals & parents of children with ASD: e.g.
 - ✓ **100 day toolkit**; Advocacy; Behavioural Health; Apps to support an individual with ASD
- **ASD Pathways @ <http://www.asdpathways.ca/about-the-study> (results & publications)**
 - Largest longitudinal study in the world: examine predictors of positive outcomes in children with ASD: Started in 2004-ongoing Canadian study; Principal Investigator: Peter Szatmari.
 - Multisite cross Canada studies of children diagnosed with ASD from age 2-11 yrs.

What can SLP Community do?

- **Develop Collaboratively an ASD Universal Resource Toolkit for SLPs:**
 - **Purpose:**
 - **To support SLPs:** in efforts caring for children with ASD by providing appropriate identification and treatment options.
 - **To encourage SLPs:** in using *Evidence-Based* 'gold standard' early identification instruments VERSUS only 'clinical gut-feeling'.
 - **To empower SLPs:** in expanding their knowledge in ASD topics & advocating for a more active voice & role in all aspects of ASD needs.
 - **To guide SLPs:** in developing resource toolkits in their geographical locations
 - **For whom:**
 - For families with ASD persons
 - For educational settings
 - For daycare centres
 - Other Professionals

Resource Toolkit Contents

- **What should the Resource Toolkit contain?**
 - 1. Universal tools:** use websites and organizations around the globe to obtain fact sheets, identification tools such as check-lists, screening instruments, treatment type options, etc.
 - **Develop a repository of:** information, screening and surveillance tools, practical forms, and parent handouts to assist in identification, evaluation, and management of ASD in children.
 - **Develop Questions & Answers and Explanations of Treatment Types:** handouts to assist families with their worries and queries
 - 2. Location specific tools:** to be constructed by local SLPs and other stakeholders:
 - **Be knowledgeable** about local and national governmental policies & resources for families with children with ASD
 - **Develop Lists of Resources in your area: valuable for Families & for all SLPs:**
 - Pediatricians prepared to handle ASD
 - Centres & schools that support ASD families & Children
 - Psychiatrists & Psychologists expert at evaluating ASD with ADOS & ADI-R (Falkmer et al, 2013; Kamp-Becker, 2013)

Resource Toolkit Contents ...

- **SLPs specializing in ASD:** highlight the practice parameters i.e. severity; age group of interest;
 1. 6 months ⇔ Preschool
 2. School age Primary
 3. School age Secondary
- **Occupational Therapists** specializing in ASD
- **Educators specialized** to support children with ASD
- **Develop guidelines** for parents in **narrative construction** describing their children with ASD
- **Develop a Repository of ASD children Narratives & Screening Results:** to assist in developing culture and language specific tools & descriptions of expression of ASD in children in their communities; will help early ID of ASD in girls; clarify trajectory of bilingual exposure.
- **Collaborate with university & research centres:** to develop instruments specific to your population & to disseminate research results to the general public.
- **Develop Networks of professionals** within your geographical region: SLPs, OTs, & Psychologists Organizations, Other Stakeholders (business) partnership project.

ASD Universal Resource Toolkit for SLPs: Treatment goals

- ❖ **In Conclusion:**
 - All efforts in accurate identification & assessment of children with ASD is to provide appropriate treatment in a timely manner.
 - **Myers and Johnson (2007):** best delineated the **Fundamental treatment goals** for all children with ASD that can easily be embraced by the SLP community:
 - ✓ **The primary goals of treatment are to:** *Maximize the child's ultimate functional independence & quality of life by:*
 - *Minimizing the core ASD features,*
 - *Facilitating development and learning,*
 - *Promoting socialization,*
 - *Reducing maladaptive behaviors,*
 - *Educating and supporting families.*

References

- American Academy of Pediatrics (2007). *Autism: Caring for Children with Autism Spectrum Disorders: A Resource Toolkit for Clinicians*. Elk Grove Village, IL: American Academy of Pediatrics.
- American Psychiatric Association. (2013). DSM-5. Retrieved from <http://www.psychiatry.org/practice/dsm/dsm5>.
- Anderson, K.L. (2013). Social Communication Skills: The Pragmatic Checklist. Supporting Success for Children with Hearing Loss. Retrieved from <https://successforkidswithhearingloss.com>
- Baron-Cohen S, Cassidy S, Auyeung B, Allison C, Achoukhi M, Robertson, S., Pohl, A., Laiet, M.C. (2014). Attenuation of Typical Sex Differences in 800 Adults with Autism vs. 3,900 Controls. *PLoS ONE* 9(7): e102251.
- Bishop, D.V.M. (2006). *CCC-2: Children's Communication Checklist-2 United States Edition*. Manual. San Antonio, TX: NCS Pearson.
- Bishop, D. (2010). Overlaps between autism and language impairment: Phenomimicry or shared etiology? *Behavior Genetics*, 40(5), 618-629.
- Brian AJ, Roncadin C, Duku E, Bryson SE, Smith IM, Roberts W, Szatmari P, Drmic I, Zwaigenbaum L: Emerging cognitive profiles in high-risk infants with and without autism spectrum disorder. *Res Autism Spectr Disord* 2014; 8: 1557–1566.
- Bronfenbrenner U, Ceci SJ: Nature-nurture reconceptualized in developmental perspective: A bioecological model. *Psychol. Rev* 1994; 101(4): 568-586.
- Bronfenbrenner U, Morris PA: The bioecological model of human development; in Lerner RM (eds): *Handbook of Child Psychology*. New Jersey, John Wiley & Sons, 2006, vol 1, pp 93–828.
- Brukner-Wertman, Y., Laor, N., & Golan, O. (2016). Social (Pragmatic) Communication Disorder and its relation to the Autism Spectrum: Dilemmas arising from the DSM-5 classification. *Journal of Autism and Developmental Disorders*. DOI: 10.1007/s10803-016-2814-5.

References...

- Carrington, S., Leekam, S., Kent, R., Maljaars, J., Gould, J., Wing, L., Le Couteur, ... (2015). Signposting for diagnosis of Autism Spectrum Disorder using the Diagnostic Interview for Social and Communication Disorders (DISCO). *Research in Autism Spectrum Disorders*, 9, 45–52.
- Chair in Autism Spectrum Disorders Treatment and Care Research (2013-2016). What are Autism Spectrum Disorders? Retrieved from <http://asdmntalhealth.ca/what-are-autism-spectrum-disorders/>
- Charman, T. (2010). Developmental approaches to understanding and treating autism. *Folia Phoniatrica et Logopaedica*, 62(4), 166–177.
- Charman, T., Pickles, A., Simonoff, E., Chandler, S., Loucas, T., & Baird, G. (2011). IQ in children with autism spectrum disorders: data from the Special Needs and Autism Project (SNAP). *Psychological Medicine*, 41(3), 619-27.
- Charman, T., & Gotham, K. (2013). Measurement Issues: Screening and diagnostic instruments for autism spectrum disorders – lessons from research and practice. *Child and Adolescent Mental Health*, 18(1): 52–63.
- Dereu, M., Raymaekers, R., Warreyn, P., Schietecat, I., Meirsschaut, M. & Roeyers, H. (2012). Can child care workers contribute to the early detection of autism spectrum disorders? A comparison between screening instruments with child care workers versus parents as informants. *Journal of Autism and Developmental Disorders*, 42(5), 781-96.
- Dereu, M., Warreyn, P., Raymaekers, R., Meirsschaut, M., Pattyn, G., Schietecat, I., & Roeyers, H. (2010). Screening for autism spectrum disorders in Flemish day-care centres with the Checklist for Early Signs of Developmental Disorders. *Journal of Autism and Developmental Disorders*, 40, 1247–1258.
- Dromi, E., Rum, Y., & Florian Goldberg, J.F. (In Press). Communication, Language and Speech in Young Children with Autism Spectrum Disorder (ASD). In Bar-On, A. & D. Ravid (Eds.), *Handbook of Communications Disorders: Theoretical, Empirical, and Applied Linguistic Perspectives*. New York, NY: Mouton de Gruyter.
- Espensen AJ, Mailick Seltzer M, Lam KSL, Bodfish JW: Age-related Differences in Restricted Repetitive Behaviors in Autism Spectrum Disorders. *J Autism Dev Disord* 2009; 39(1): 57–66.

References...

- Falkner T, Anderson K, Falkner M, & Horlin C. (2013). Diagnostic procedures in autism spectrum disorders: a systematic literature review. *European Child and Adolescent Psychiatry*, 22(6):329-340.
- Frazier, T.W., Georgiades, S., Bishop, S.L., Hardan, A.Y. (2014). Behavioral and cognitive characteristics of females and males with Autism in the Simons Simplex Collection. *Journal of American Academy of Child and Adolescent Psychiatry*, 53(3), 329–340.
- Garcia-Primo, P., Hellendoorn, A., Charman, T., Roeyers, H., Dereu, M., Roge, ... Canal-Bedia, R. (2014). Screening for autism spectrum disorders: state of the art in Europe. *European Child and Adolescent Psychiatry*, DOI 10.1007/s00787-014-0555-6; retrieved from https://www.cost-essea.com/WG3_Paper_2014.pdf.
- Gaub, M., & Carlson, C.L. (1997). Gender Differences in ADHD: A Meta-Analysis and Critical Review. *Journal of the American Academy of Child & Adolescent Psychiatry*, 36(8), 1036-1045.
- Ghaaliq Lalkhen, A., & McCluskey, A. (2008). Clinical tests: sensitivity and specificity. *British Journal of Anaesthesia*: CEACCP, 8(6). 221-223.
- Goberis, D., Beams, D., Dalpes, M., Abrisch, Baca, A., & Yoshinaga-Itano, C. (2012). The missing link in language development of deaf and hard of hearing children: Pragmatic Language Development. *Seminars in Speech and Language*, 33(04), 297-309.
- Gould, J. and Ashton-Smith, J. (May 2011) Missed diagnosis or misdiagnosis? Girls and women on the autism spectrum, *Good Autism Practice*, 12(1), 34-41.
- Grandin, T. (1984). My experiences as an Autistic child and review of selected literature. *Journal of Orthomolecular Psychiatry*, 13(3), 144-174.
- Grandin, T. (2009). Commentary: Visual abilities and sensory differences in a person with Autism. *Biological Psychiatry*, 65, 15–16.

References ...

- Gray, M.K., Tonge, B.J., & Sweeney, D.J. (2008). Using the Autism Diagnostic Interview-Revised and the Autism Diagnostic Observation Schedule with Young Children with Developmental Delay: Evaluating Diagnostic Validity. *Journal of Autism and Developmental Disorders*, 38, 657–667.
- Hambly, C., & Fombonne, E. (2014). Factors influencing bilingual expressive vocabulary size in children with autism spectrum disorders. *Research in Autism Spectrum Disorders*, 8, 1079–1089.
- Halladay, A.K., Somer Bishop, S., Constantino, J.N., Daniels, A.M., Koenig, K., Palmer, K., ... Szatmari, P. (2015). Sex and gender differences in autism spectrum disorder: summarizing evidence gaps and identifying emerging areas of priority. *Molecular Autism*, 6:36. Retrieved from http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4465158/pdf/13229_2015_Article_19.pdf
- Hatton, D.D., Sideris, J., Skinner, M., Mankowski, J., Bailey, D.B. Jr., Roberts, J., & Mirrett, P. (2006). Autistic behavior in children with fragile X syndrome: Prevalence, stability, and the impact of FMRP. *American Journal of Medical Genetics*, 140A, 1804–1813.
- Jiménez, J.E., Garcia de la Cadena, C., Siegel, L.S., O'Shanahan, I., García, E., & Rodríguez, C. (2009). Gender ratio and cognitive profiles in dyslexia: a cross-national study.
- Johnson, C. P., Myers, S. M., & Council on Children with Disabilities (2007). Identification and evaluation of children with Autism Spectrum Disorders. *Pediatrics*, 120(5), 1183 –1215.
- Joseph L, Thurm A, Farmer C, Shumway S: Repetitive Behavior and Restricted Interests in Young Children with Autism: Comparisons with Controls and Stability Over Two Years. *Autism Res*. 2013; 6(6): doi:10.1002/aur.1316.
- Kamp-Becker, I., Ghahreman, M., Heinzl-Gutenbrunner, M., Peters, M., Remschmidt, H. & Becker, K. (2013) Evaluation of the revised algorithm of Autism Diagnostic Observation Schedule (ADOS) in the diagnostic investigation of high-functioning children and adolescents with autism spectrum disorders. *Autism*, 17(1), 87-102.

References ...

- Kasari, C., Brady, N., Lord, C., & Helen Tager-Flusberg, H. (2013). Assessing the minimally verbal school-aged child with Autism Spectrum Disorder. *Autism Research*, 6(6), 479–493.
- Kenny, L., Hattersley, C., Molins, B., Buckley, C., Povey, C., Pellicano, E. (2015). Which terms should be used to describe autism? Perspectives from the UK autism community. *Autism*, July 1, 1–21. DOI: 10.1177/1362361315588200.
- Kim SH, Lord C: Restricted and Repetitive Behaviors in Toddlers and Preschoolers with Autism Spectrum Disorders Based on the Autism Diagnostic Observation Schedule (ADOS). *Autism Res* 2010; 3(4): 162–173.
- Kirmayer LJ: Beyond the 'new cross-cultural psychiatry': Cultural biology, discursive psychology and the ironies of globalization. *Transcult Psychiatry* 2006; 43: 126–144.
- Kirmayer LJ, Rouseau C, Corin E, Groleau D: Training researchers in Cultural Psychiatry: The McGill-CIHR strategic training program. *Acad Psychiatr*, 2008; 32(4): 320–326.
- Lai MC, Lombardo MV, Auyeung B, Chakrabarti B, Simon Baron-Cohen S: Sex/Gender Differences and Autism: Setting the Scene for Future Research. *J Am Acad Child Adolesc Psychiatry* 2015; 54(1):11–24.
- Lalkhen, AG, McCluskey A: Clinical tests: sensitivity and specificity. *Br J Anaesth CEACCP* 2008; 8(6): 221–223.
- Leyfer, O.T., Tager-Flusberg, H., Dowd, M., Tomblin, J.B., & Folstein, S.E. (2008). Overlap between autism and specific language impairment: comparison of Autism Diagnostic Interview and Autism Diagnostic Observation Schedule scores. *Autism Research*, 1(5), 284–296.
- Lindgren, K.A., Folstein, S.E., Tomblin, B.J., & Tager-Flusberg, H. (2009). Language and reading abilities of children with Autism Spectrum Disorders and Specific Language Impairment and their first-degree relatives. *Autism Research*, 2(1), 22–38.
- Lord, C. (April 7, 2015): What can we learn about treatment and intervention for ASD from a longitudinal study from 2-22? Gold-standard diagnosis in diverse and multicultural settings [PDF]. Workshop at Donald Cohen Research, Practice, and Policy Series of McGill University, Montreal, Canada.
- Lord, C., Rutter, M., DiLavore, P., & Risi, S. (2001). *Autism Diagnostic Observation Schedule (ADOS) manual*. Los Angeles, CA: Western Psychological Services.

References ...

- Lord, C., Rutter, M., DiLavore, P.C., Risi, S., Gotham, K., & Somer L. Bishop, S.L. (2012). *Autism Diagnostic Observation Schedule, Second Edition (ADOS-2), Modules 1 through 4*. Torrance, CA: Western Psychological Services.
- Lord, C., Luyster, R.J., Gotham, K., & Guthrie, W. (2012). *Autism Diagnostic Observation Schedule, Second Edition: Toddler Module*. Torrance, CA: Western Psychological Services.
- May, T., Cornish, K., & Rinehart, N.J. (2016). Gender Profiles of Behavioral Attention in Children with Autism Spectrum Disorder. *Journal of Attention Disorders*, 20(7), 627–635.
- McGee, S. (2002). Simplifying likelihood ratios. *Journal of General Internal Medicine*, 17, 647–650.
- McGregor, K.K., Berns, A.J., Owen, A.J., Michels, S.A., Duff, D., Bahnsen, A.J., & Lloyd, M. (2012). Associations between syntax and the lexicon among children with or without ASD and language impairment. *Journal of Autism Developmental Disorder*, 42(1), 35–47.
- Myers SM, Johnson CP: Management of Children with Autism Spectrum Disorders. *Pediatrics* 2007; 120(5): 1162–1182.
- Narzisi, A., Calderoni, S., Maestro, S., Calugi, S., Mottes, E., & Muratori, F. (2013). Child Behavior Check List 1½–5 as a tool to identify toddlers with Autism Spectrum Disorders: A case-control study. *Research in Developmental Disabilities*, 34, 1179–1189.
- Norbury, C.F. (2014). Practitioner Review: Social (pragmatic) Communication Disorder conceptualization, evidence and clinical implications. *Journal of Child Psychology and Psychiatry*, 55(3), 204–216.
- Ohashi, J.K., Mirenda, P., Marinova-Todd, S., Hambly, C., Fombonne, E. Szatmari, ... Pathways in ASD Study Team (2012). Comparing early language development in monolingual- and bilingual- exposed young child with Autism Spectrum Disorders. *Research in Autism Spectrum Disorders*, 6, 890–897.
- O'Neill, D.K. (2009). *Language Use Inventory- LUI*, Manual. Waterloo, Ontario: Knowledge in Development.
- Park, S. (2014). Bilingualism and children with Autism Spectrum Disorders: Issues, research, and implications. *NYS TESOL Journal*, 1(2), 122–129.

References...

- Paul, R., Chawarska, K. & Volkmar, F. (2008). Differentiating ASD from DLD in toddlers. *Perspectives in Language Learning Education*, 15, 101–111.
- Paul, R., & Ellis Weismer, S. (2013). Late talking in context: the clinical implications. In L.A. Rescorla & P.S. Dale (Eds.) *Late Talkers: Language development, interventions, and outcomes* (pp.203–218). Baltimore, Maryland: Paul H. Brookes Publishing.
- Pesco, D., & O'Neill, D.K. (2012). Predicting later language outcomes from the Language Use Inventory. *Journal of Speech, Language, and Hearing Research*, 55, 421–434.
- Pierce, K., Carter, C., Weinfeld, M., Desmond, J., Hazin, R., Bjork, R., & Gallagher, N. (2011). Detecting, Studying, and Treating Autism Early: The One-Year Well-Baby Check-Up Approach. *Journal of Pediatrics*, 159(3), 458–465.
- Richardson, A.J., & Ross, M.A. (2000). Fatty acid metabolism in neurodevelopmental disorder: a new perspective on associations between attention-deficit/hyperactivity disorder, dyslexia, dyspraxia and the autistic spectrum disorder. *Prostaglandins, Leukotrienes and Essential Fatty Acids (PLEFA)*, 63(1–2), 1–9.
- Robins, D.L. (2008). Screening for autism spectrum disorders in primary care settings. *Autism*, 12(5), 537–556.
- Robins, D.L., Fein, D., Barton, M.L., Green, J.A. (2001). The modified-Checklist for Autism in Toddlers: An initial study investigating the early detection of autism and pervasive developmental disorders. *Journal of Autism and Developmental Disorders*, 31:131–144.
- Robins, D.L., Fein, D., Barton, M.L., Green, J.A. (2009). The Modified Checklist for Autism in Toddlers, Revised with Follow-Up (M-CHAT-R/F). Retrieved from [http: https://www.mchatscreen.com](https://www.mchatscreen.com).
- Robins, D.L., Casagrande, K., Barton, M.L., Chen, Chi-Ming A, Dumont-Mathieu, T. & Fein, D. (2014). Validation of the Modified Checklist for Autism in Toddlers, Revised With Follow-up (M-CHAT-R/F). *Pediatrics*, 133, 37–45.
- Rosin, S. (October, 4, 2015). Practical tips to differentiate Social Communication Disorder from Autism Spectrum Disorder [Streaming Video & PDF]. Course 15255. *ASHA Case Studies Professional Development Series*. Retrieved from <http://www.asha.org/Professional-Development/case-studies/>

References ...

- Siu AL, US Preventive Services Task Force (USPSTF): Screening for Autism Spectrum Disorder in Young Children US Preventive Services Task Force Recommendation Statement 2016, *JAMA*; 315(7): 691–696.
- Szalavitz, M. (2016). The invisible girls. *Scientific American: Mind*, 27(2),48–55.
- Tobia A, Toma A: Rethinking Asperger's: Understanding the DSM-5 Diagnosis by Introducing Sheldon Cooper. *Commun Disord Deaf Stud Hearing Aids* 2015; 3(146). doi:10.4172/2375-4427.1000146
- Tomblin, B. (2011). Co-morbidity of autism and SLU: Kinds, kin and complexity. *International Journal of Language & Communication Disorders*, 46(2), 127–137.
- Valicenti-McDermott M, Tarshis N, Schouls M, Galdston M, Hottinger K, Seijo R, Shulman L, Shinnar S: Language differences between monolingual English and bilingual English-Spanish young children with Autism Spectrum Disorders. *J Child Neurol* 2012; 28(7): 945–948.
- Weismer, S.E. (2013). Developmental Language Disorders: Challenges and Implications of Cross-Group Comparisons. *Folia Phoniatrica et Logopaedica*, 65(2), 68–77.
- Weismer, S.E., & Lord, C. (2010). Early Language Patterns of Toddlers on the Autism Spectrum Compared to Toddlers with Developmental Delay. *Journal of Autism and Developmental Disorder*, 40(10), 1259–1273.
- Williams, D., Botting, N., & Boucher, J. (2008). Language in autism and specific language impairment: Where are the links? *Psychological Bulletin*, 134, 944–963.
- Werling, D.M., & Geschwind, D.H. (2013). Sex differences in autism spectrum disorders. *Current Opinion Neurology*, 26(2), 146–153.
- Wetherby, A.M., Bronsnan-Maddox, S., Peace, V., & Newton, L. (2008). Validation of the Infant-Toddler Checklist as a Broadband Screener for Autism Spectrum Disorders from 9 to 24 Months of Age. *Autism*, 12(5), 487–511.
- Wolff JJ, Boyd BA, Elison JT: A quantitative measure of restricted and repetitive behaviors for early childhood. *Journal of Neurodevelopmental Disorders* 2016; 8:27; DOI 10.1186/s11689-016-9161-x
- Yu, B. (2013). Issues in bilingualism and heritage language maintenance: Perspectives of minority-language mothers of children with Autism Spectrum Disorders. *American Journal of Speech-Language Pathology*, 10, 22, 10–24.