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Cross Cultural Variation in the Neurodevelopmental Assessment of Children – The Cultural and Neurological to 2nd Language Acquisition and Children with Autism

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1. Introduction

With the increased incidence of autism on an international level (1), early detection and diagnosis of children with autism is of paramount importance and key to providing early intervention. Research indicates the outcome for academic success is significantly enhanced by early identification and intervention (2). Researchers have identified that early identification and intervention of communicative disorders have given children the opportunity to decrease later academic and literacy difficulties, and experience success in the school setting (3). Many times children see various health providers that do not provide the appropriate diagnosis of a child with autism, thus delaying the process of that child to receive appropriate services. Consequently, a significant lag between the parents' first concerns regarding their child and the eventual diagnosis exists, which in turn postpones the onset of appropriate treatment and as a result precious time is lost.

Screening toddlers represents the first level of evaluation for early detection of autism. However, very few screenings exist that tap into the early identification of children with autism. The value of identifying children with autism utilizing the M-CHAT by neurodevelopmental pediatricians in Poland and the US has recently been reported by us. The efficacy of the M-CHAT screener has been documented as an adequate standard in identifying 18 month old toddlers who are at risk for autism. Results obtained in Krakow, Poland have been compared with those obtained in San Diego, California, USA. The M-CHAT has been found to be an adequate tool in screening 18 month old toddlers, as it was able to retrospectively identify children who already received a diagnosis of autism with statistical significance (4). This tool has value on the international level allowing comparisons of both similarities and differences in the results in different countries that may be important in identifying children with autism at an early age. In addition to the communicative behaviors screened by the M-CHAT, neurobiological and socio-cultural

variables and "red-flags" should be carefully considered before giving a child definitive diagnosis of autism.

Neurological aspects related to brain development both in-utero and after-birth play an important role in children with autism also known as a 'disconnected syndrome', related to neuronal migration, synaptogenesis, mirror neurons, myelination, and epigenetic effects (5). Biological variations include differences in the areas of motor processes (motor maturity, tone, head control, defensive movements, and vigor of movement), and regulation of states (habituation, irritability, consolability, and self-quieting), and motor-sensory skills (6).

Cross-cultural factors also need to be taken into consideration in order that a missed diagnosis or mis-diagnosis does not occur. One of the most significant considerations is the importance of ethnographic interviewing (7) highlighting social and cultural differences and the utilization of parent interviewing and parental input into their child's behavior (8).

In a world where more than one language may be spoken in the home, second language development studies have revealed that a child that is exposed to a second language may go through a normal developmental "silent period" in language development that may be labeled as a disorder or an autistic behavior. This and other factors related to second language development should also be taken into consideration before looking at specific behaviors exhibited by a child before a definitive diagnosis is given to the child.

This chapter will identify the important factors that need to be taken into consideration for the early identification and diagnosis of children with autism, addressing early neuro-biological development and socio-cultural variables. Utilization of developmental testing, behavioral observations, along with parental input can provide an accurate profile of the child's abilities and disabilities. The use of ethnographic interviewing strategies using culturally relevant questions and the importance of parental input for an accurate and early diagnosis of autism will also be discussed.

Autism is a developmental disorder likely caused by a central nervous system abnormality or injury during initial stages of brain growth and development. It results in lifelong impairments, of social interaction and communication, in addition to restricted and repetitive patterns of behavior and concentration. Behaviors manifest usually include problems with poor or limited eye contact and facial expressions, repetitive behaviors, repetitive motor mannerisms (flapping and/or rocking) which likely result in reinforcing self-stimulatory behaviors. They also can manifest preoccupation with parts of objects or the alignment of objects, and adherence to nonfunctional routine. Development of speech is usually delayed with a paucity of words until after 24 months of age and usually phraseology until after 36 months which tends to develop as monotone and tangential. A majority of children with ASD never achieve language capabilities. Up to 75% of children with ASD have associated developmental delay. Children with ASD tend to have minimal interest in other children and a higher frequency of parallel play. Of the interaction that does occur it is most often related to behaviors that will result in specific needs being met as opposed to actual interaction with peers or others.

The incidence of ASD has now exceeded that of diabetes, cancer, spina bifida, and Down syndrome in children (9). In 2002, the incidence of autism was 10-12 people per 10,000 (10). With the increase also related to the changes in how autism is diagnosed. According to the Center for Disease Control, an average of 1 in 110 children in the United States has an Autism Spectrum Disorder (ASD). While the median age for earliest diagnosis is between 4.5 and 5.5 years, developmental concerns have been recorded for children younger than three years for

51-91 percent of children diagnosed with ASD (11). Early identification is critical for early treatment. The American Academy of Pediatrics is a strong advocate for early and continuous surveillance and screening for ASD in children to increase the likelihood of early identification and intervention (12). Although there is a rising awareness of ASD, caution must be taken in diagnosis. The M-CHAT is a valuable screening tool but it is important to note the many factors that can contribute to a positive diagnosis in order to be aware of the potential for false positive and false negative diagnosis. Since the primary goal of the M-CHAT was to maximize sensitivity, there is a high false positive rate and not all children who score at risk for ASD will be diagnosed with ASD. (13) In fact, the M-CHAT also identifies children with language and developmental delays who do not have an ASD. (14) Socio-cultural factors that can contribute to a false positive diagnosis with the M-CHAT screening tool include: multilingualism, shared cultural beliefs, and parental interpretation of the child's behavior. Because the M-CHAT has language assessment components, a child who is exposed to multiple languages may not be equally developed in all languages. If the child is being assessed for English language understanding but the primary language spoken at home is something other than English, then the child may be labeled "at risk." Children raised in a multilingual environment may develop skills in one language at a different rate than the other language, putting them in a unique situation for ASD screening. Despite the distinct circumstance, they are expected to develop language skills in a similar rate as their monolingual peers (15). Additionally, there is great room for interpretation of the child's behavior and the responses to the M-CHAT questionnaire can vary depending on which parent completes the survey. Cultural beliefs play a role in the interpretation of the child's behavior, and may influence the likelihood of excusing a child's lack of development as being normal. Even without having a clear understanding of the age that certain milestones are reached, a parent may notice that his or her child is unlike his or her peers. The culture may promote silence or it may promote a parent to voice his or her concerns to the physician during a routine visit. Many factors, including social, cultural, and biological, may influence ASD diagnosis. Boys are more likely to be diagnosed with an ASD than girls. A recent study also found that young mothers and mothers of first-born children were less likely to have a child diagnosed with an ASD. Additionally, maternal depression before and during the presentation of the child's autistic difficulties was found to inhibit ASD diagnosis (16).

Given the increased incidence of autism on an international level (Autism Society, 2010), (17–23), determining the prevalence of ASD outside of the US is problematic. There is a report from the EAIS that looks at Prevalence Data and Accessibility to Service in European Countries. However, because the diagnosis of ASD is based upon behavioral characteristics and, other than the DSM IV R and the WHO Classification Systems) there are a limited amount of appropriate diagnostic tools available, many of which are simply translations which may not reflect cultural relevance, determination of the prevalence remains an issue. In the United States, the rate of diagnosis varies with race. (United States Department of Education, 2003) and the percentage of Asian/Pacific (0.13%) children identified with autism is disproportionately high. This begs the question as to an actual difference in the rate of ASD based upon racial/cultural variables, which is unlikely, versus diagnostic error on the part of the therapists, their experience and skill sets, and the screening exams being utilized. Additionally, are certain behaviors which do not fit within the spectrum of ASD found to be abnormal amongst parents of differing cultures which may result in the increased referral of the children for evaluation.

2. Early detection and diagnosis

Early detection accompanied by early intervention provides the best scenario for improved long-term outcome in children with ASD (24, 25). Rapid detection must be based upon the implementation of specific, evidence-based batteries. Yet given that the significant experience in early detection has been in Caucasian children, the accuracy of low incidence of ASD in Peru, Argentina, Brazil, and Venezuela, Kenya, India, and Hungary (26 – 28) may represent more of a compromise in the actual testing as opposed to a true decrease in incidence. Additional, cultural variances in incidence of ASD are also well documented in the US.

In 1999 The Child Neurology Society and American Academy of Neurology proposed Practice Parameters for the Diagnosis and Evaluation of Autism by a multidisciplinary Consensus Panel and recommended a dual-level approach to improve the rate of early suspicion and diagnosis of autism (29, 30).

In the Report of the Quality Standards Subcommittee of the American Academy of Neurology and the Child Neurology Society it was noted that early identification of children with autism and intensive, early intervention during the toddler and preschool years improves outcome. They recommend a dual approach including 1) routine developmental surveillance and screening specifically for autism to be performed on all children to first identify those at risk for any type of atypical development, and to identify those specifically at risk for autism; and 2) to diagnose and evaluate autism, to differentiate autism from other develop- mental disorders (31).

Very few screenings exist that tap into the early identification of children with autism. It is well known that early evaluations by interventionists may not reflect the cultural and linguistic diversity of the population they work with (32).

The interaction or partnership between professionals and families in the evaluation and subsequent treatment of children with ASD is likely defined by the socio-cultural environment in which it exists. The impact of this environment may not only effect the therapeutic intervention and relationship itself, but also change over time. Iglesias and Quinn (33) state, "the challenge posed to early interventionists is how to provide intervention programs that are consistent with the research literature, based on professional knowledge, and at the same time respect the culture of the families who are served."

3. Cultural validity of the assessment instruments

Autism knows no racial, ethnic, or social boundaries (Autism Society of America, 2000). Given the significant cultural diversity of the United States, assessment tools utilized for the early detection of ASD are of both national and global importance (34-36). As the number of children from diverse cultural backgrounds increases, the need for culturally sensitive tools becomes more important. In a world where more than one language may be spoken in the home, second language development studies have revealed that a child that is exposed to a second language may go through a normal developmental "silent period" in language development that may be labeled as a disorder or an autistic behavior. This and other factors related to second language development should also be taken into consideration before looking at specific behaviors exhibited by a child before a definitive diagnosis is given to the child.

In February 2005, the European Commission for Health and Consumer Protection Directorate-General stated that due to methodological limitations, the high prevalence rates reported in the EU and USA cannot be used to derive absolute conclusions. Rather An ASD response policy was necessary in the EU and More complex monitoring systems were required to accurately reflect the prevalence of ASD. The European Autism Alliance (EAA), initiated the European Autism Information System Project (EAIS) to better understand those impacted with an ASD in the EU by better understanding the services related to public health, educational system, social service and the problems associated with determining prevalence in the participant countries of Bulgaria, Czech Republic, Denmark, England, France, Italy, Malta, Poland, Portugal, Scotland Highland Region and Spain) (37).

The EAIS is attempting to explore and measure the ASD prevalence in 11 European countries of which nearly 48 million are below 14 years old using a questionnaire focused on services and data access. The questionnaire (Q-EAIS) allows for the recording of the most common diagnostic criteria and subtypes used, existing registries and/or prevalence studies, services provided by health, educational and social systems in addition to parental organizations to children with ASD country. As expected, the results support the variability of the services provided by different countries and intra-country differences. Roughly there are 288,000 children with an ASD diagnosis in these eleven countries (prevalence rate of 6 cases per 1,000). The data also notes differences in socio-demographic characteristics and social organizations. Based upon the answers in the Q-EAIS certain summary data can be defined to address the question of whether the rising ASD prevalence represents a true increase or is the result of other explanations (38). Given the concern for diverse multicultural issues, future harmonized prevalence studies need to be designed to address these differences.

To date, prevalence studies are difficult given the paucity of services involved in ASD management, the complexity of the diagnosis, the variability or lack of services provided, and the lack of data. The collection of data from different service providers in each country is required as is the validation of the data. The Q-EAIS questionnaire is a relatively new epidemiological tool used to obtain preliminary data of the ASD services and accessibility in various countries. The Q-EAIS Modified facilitates aggregated data analysis.

The four most common Assessment Instruments include the Vineland Adaptive Behavior Scales (39), The Checklist for Autism in Toddlers, the Modified Checklist for Autism in Toddlers, and the Childhood Autism Rating Scale. The Vineland Adaptive Behavior Scales which are used for routine screening contain sections concerning social relationships and language which may help to establish a basic understanding of whether the child has delays or deviant behavior. The Checklist for Autism in Toddlers consists of 2 parts, with each assessing parallel functioning in three main areas including proto-declarative pointing, gaze monitoring, and pretend play . The Modified Checklist for Autism in Toddlers (M-CHAT) developed by Robins, Fein, Barton, and Green (40) in the United States, adds an additional 9 questions from the original CHAT and an additional 14 questions which address core symptoms present among young children with autism and may be more resistant to cultural bias. It is a simple screening tool for the identification of children with ASD up to 24 months of age. The parental questionnaire with has 23 yes/no questions, with 9 questions from the original CHAT and an additional 14 questions addressing core symptoms present among young children with autism. The M-CHAT addresses areas of social relatedness (interest in other children and imitation), joint attention (proto-declarative pointing and gaze

monitoring), bringing objects to show parents, and responsiveness to name responses to calling. Joint attention was addressed in the original CHAT, whereas the other areas are addressed only in the M-CHAT. Another tool is the Childhood Autism Rating Scale (41). Some of these do not function as well as others in the screening of children with autism from a cultural standpoint.

4. Addressing early neuro-biological development and socio-cultural variables

Neurological aspects related to brain development both in-utero and after-birth play an important role in children with autism. Important factors that need to be taken into consideration for the early identification and diagnosis of children with autism, must address early neuro-biological development and socio-cultural variables. Utilization of developmental testing, behavioral observations, along with parental input can provide an accurate profile of the child's abilities and disabilities. We have found the use of the M-CHAT as a culturally sensitive screening tool which has been helpful in our experience (as noted above). This in addition to other ethnographic interviewing strategies using culturally relevant questions and parental input can potentially result in an accurate and early diagnosis of ASD. We emphasize the use of culture and ethnographic interviewing to get the most amount of information needed, as well as parental attitudes, and the importance of understanding how culture affects the way autism is perceived by the family.

Kliewer et al used ethnographic methods to examine literacy development in nine children with disabilities over two years. Teachers fostered the citizenship of all children in the literate communities of these classrooms (42, 43). The utilization of developmental testing, behavioral observations, along with parental input can provide an accurate profile of the child's abilities and disabilities. The variables of culture, values, belief, family units, and primary language contribute to a family's attitudes and beliefs about child rearing, disability, and assessment. While it is understood that a child and family, and/or communities' background with regard to methodologies of communication can impact how a child interacts with their peers, family, adults, or strangers. It can additionally impact the manner in which the child interprets or utilizes the process of communication itself. Additionally, the toys available to a child or resources available to a child and family can influence early cognitive and linguistic experiences (44). The primary issue in the U.S, and most European Countries is that the developers of the assessment tools and the therapists, and educators are for the most part White and middle class (45). This coupled with the fact that most research on the early identification of ASD has been in predominately Caucasian populations, cultural diversity represents a significant cofounding variable resulting in an increased false negative rate in the identification of children with ASD. It is important to note that cultural variables may not only impact the identification of children with ASD but also the initiation of resources to the children and their families. Of the utmost importance is that children are diagnosed appropriately (46). Testing must not only be modified or integrated differently based upon cultural diversity but the interpretation of the results must also be completed in a culturally competent. The goal is the accurate assessment and subsequent intervention to children with ASD and their families in a culturally competent way by therapists and professionals 'culturally proficient' in their understanding of the families' socio-cultural practices and values (47).

5. Culture vs. cross-cultural competence

There are Basic assumptions about culture influence exiting and potential cross-cultural models, approaches, methods, and strategies used in the therapeutic approach to children that we must expand upon (48).

Cross-cultural competence refers to the ability to relate and communicate effectively when the individuals involved in the interaction do not share the same culture, ethnicity, or language, Cross, Bazron, Dennis, and Isaacs (1989): stated that such competency is "a set of congruent behaviors, attitudes, and policies that come together in a system, agency, or amongst professionals and enables that system, agency, or those professionals to work effectively in cross-cultural situations" (49). Barrera and Kramer define cultural competence as "the ability of service providers to respond optimally to all children, understanding both the richness and the limitations of the socio-cultural contexts in which children and families, as well as the service providers themselves, may be operating" (50). Data on early interventionists implies that they do not reflect the cultural diversity of the population they serve which may impact not only their interaction with patients and families but also with other health care providers. The likely conclusion is that interactions that are culturally similar are more likely to be of benefit and reinforcing of one another in culturally and linguistically diverse children with special needs to maximize interactive and learning behaviors, socio-cultural experiences, and language usage and proficiency (51).

Harry (52) noted the challenge of early intervention in children and families whose cultural beliefs are different from that of the therapist. Five areas are addressed to maximize impact of therapy including the meaning of disability, concepts of family structure and identity, parenting style, goals of early childhood intervention, communication styles, and views of professionals' roles.

The video, Essential Connections: Ten Keys to Culturally Sensitive Care supports the concept of how the natural process of culture impacts feelings of belonging, family and personal history, and community in child development. It suggests ways to structure programs for infants and toddlers to strengthen their connections with family and home culture. It recommends that programs (a) provide cultural consistency, (b) work toward representative staffing, (c) create small groups, (d) use the home language, (e) make environments relevant, (f) uncover your cultural beliefs, (g) be open to the perspectives of others, (h) seek out cultural and family information, (i) clarify values, and (j) negotiate cultural conflicts (53).

Other approaches include strategies to develop cultural competence, and improve home/school relationships and encouraging greater participation of families who are not part of the mainstream culture (54). A primary goal of therapeutic intervention is the integration of children with disabilities with normal developing peers, developing collaborative relationships with families, and understanding the importance of diversity among children and their families. (55).

Conceptually, the approach to therapeutic interventions in culturally diverse environments must take into consideration family definitions, roles, relationships, and child-rearing techniques; health, illness, and disability beliefs and traditions; and communication and interactional styles. The publication Serving Culturally Diverse Families of Infants and Toddlers with Disabilities addresses how to maximize therapeutic interactions in effective, culturally sensitive, early intervention programs for infants and toddlers with disabilities and their families (56).

6. Maximizing the competence of testers

It is obvious that there is, to date, inadequate preparation for culturally and linguistically diverse children and families. Manoleas (57) noted that "the single most important factor involved in any practitioner's ability to effectively help clients from other cultural groups is prolonged exposure to people of that group" (58). Dyches has noted that "When students with ASDs are from culturally or linguistically diverse families, the professionals assessing and providing services to the students need the additional dimension of how cultural and linguistic differences may affect identification, assessment, and treatment strategies" (59). Cross et. al described a developmental continuum ranging from cultural destructiveness, cultural incapacity, cultural blindness, cultural precompetence, cultural competence, to cultural proficiency with each component representing the response of an individual to diversity. Whereas cultural competence represents the ability of the tester to accept and respect differences, cultural proficiency represents the goal of learning more about diverse groups through research (60). All stage-based models assume a continuum through which therapists improve their cross-cultural competence, which is ongoing.

Serving Culturally Diverse Families of Infants and Toddlers with Disabilities (61) was one of the initial publications to focus on the issue of unmet needs among families from diverse cultural and linguistic groups when considering programs of early identification and intervention. Sue's work is frequently referenced and the basis for many of the assessment tools in the field (62–64). Subsequently, cross-cultural sensitivity was suggested to be less sensitive to the changes required to enhance diagnosis and therapeutic interactions to children and families from diverse cultural and linguistic backgrounds (65). This resulted in broad systemic and programmatic changes which were more specific (66-68). In the long-term, how can one accurately assess cross-cultural competence in individual providers? (69). Tools to allow for such assessment include the CCCI-R; MCAS:B; MCI; and MAKS(counseling) and CSES (nursing) though all are limited in scope as a result of all but one (CCCI-R) being based upon self review (70, 71).

Established models utilized in multi/intercultural communication, counseling, and education in nursing (72), social work (73), and bilingual education (74) can be utilized to modify existing methodologies by which children are evaluated (75–82). Such models have been included as standards in numerous professional organizations (83–86). Surveys have also been used to assess students within the context of individual supervision and mentoring in clinical settings (87–93). These results also suggest that ongoing support for students in practicum situations is important (94). The validity of the model in which students have direct experiences with diverse populations has been verified graduates from counseling and clinical psychology programs (95), What remains problematic is the perception by students that their learning was neither meaningful nor adequate for them to really develop a practical approach for working with culturally diverse children…" (96).

In conclusion, numerous strategies have been proposed to increase the cultural competence of individuals despite the paucity of peer-reviewed literature. To date, impact has been measured as been self-reported changes in approach, by those receiving training, albeit over short durations. We still are unsure as to the impact of education on participants' education base, skills, or social interactions. While it is likely that stage-based and competency-based models are efficacious, more long-term follow-up is required to document efficacy. A potential solution is that the existing model needs to be modified so that the 'providers' embrace the culture of the recipients (97-99). The

diagnostic and therapeutic approach must be consistent with increasingly diverse populations and integrate in a culturally consistent fashion. The development of such will likely be the result of increased education and/or the recommendations of relevant professional societies (100-101). Despite this, few universities have modified their curricula to adequately address multicultural course (102).

Preparing therapists and personnel to interact effectively with culturally and linguistically diverse populations remains a primary goal. To maximize efficacy, training of cultural awareness or sensitivity needs to be further developed. While transformation and activism approaches are potentially viable future approaches, there is little research to support which techniques work best in developing cross-cultural competence in individuals or institutions (103-104). Evaluation of individual training activities which is based upon self-report needs the support of long-term follow-up. The availability of individuals and organizations that have progressed from cultural competence to cultural proficiency is a primary goal. Especially in the setting of complex and developing cultures (105). Educational resources will likely require the interaction of universities and professional organizations in addition to communities and families. Better education and cultural immersion continue to improve early therapeutic detection and intervention for ASD (106-107). We now understand that not only the methodologies of education and determination of efficacy need to be improved but cultural immersion with continued and long-term exposure to backgrounds, traditions, and languages needs to be a continued goal.

7. Continued problems

Despite continued improvement in both the training of professionals involved in the diagnosis and early intervention in children with ASD and the instruments they use, even in culturally diverse groups completely integrated into the concept of society as a whole. Zhang has recently reported on cultural issues found when utilizing current assessment instruments (108) in Chinese children being evaluated in the U.S. They evaluated the diagnostic capabilities of four Assessment Instruments from a Chinese Cultural Perspective including The Vineland Adaptive Behavior Scales, The Checklist for Autism in Toddlers, the Modified Checklist for Autism in Toddlers, and the Childhood Autism Rating Scale. They noted that the Vineland Adaptive Behavior Scales which are used for routine screening contain sections concerning social relationships and language which may help to establish a basic understanding of whether the child has delays or deviant behavior but may result in an incomplete evaluation of a typical traditional Chinese child who may miss many culturally-based questions. The Checklist for Autism in Toddlers consists of 2 parts, with each assessing parallel functioning in three main areas including proto-declarative pointing, gaze monitoring, and pretend play. The CHAT can also result in spurious results based upon culturally distinct questions. The Modified Checklist for Autism in Toddlers adds an additional 9 questions from the original CHAT and an additional 14 questions which address core symptoms present among young children with autism and may be more resistant to cultural bias.

The Childhood Autism Rating Scale also may not be optimal as a screening indicator of children with autism. As Zhang notes "the child may avoid looking the adult in the eye to show his/her respect to the adult; or the child may be quiet because he/she is waiting politely for his/her turn." This may also be confounded by the fact that children with autism do not typically make eye contact. He elucidates that "question 18 from the

communication domain (indicates preference when offered a choice), question 23 (opens and closes scissors with one hand), question 26 (cuts across a piece of paper with scissors), question 30 (cuts paper along a line with scissors), question 34 from motor skills domain (cuts out complex items with scissors), question 41 from the daily living skills domain (assists in food preparation requiring mixing and cooking), and question 38 from the daily living skills domain (clears table of breakable items)" may all be ineffective in discerning children with ASD given the potential cultural lability of the questions. The significance of such research is that it can only positively impact the approach and tools utilized to better evaluate children with ASD and further improve our understanding of such.

Dyches has noted that pertinent questions related to potential culturally based impact on diagnosis includes reluctance of families to pursue a diagnosis, advocacy for a preferential diagnosis of ASD as opposed to other potential diagnosis, cultural relevance of certain behaviors that normally would be indicative of ASD, and the lack of information of developmental milestones and symptoms, and economic capability to pursue an evaluation (109).

Racial, cultural and linguistic diversity can impact referral rate and clinical diagnosis and create additional challenges in the diagnosis of these children (110-111). The approach of multidisciplinary teams to the diagnosis of ASD likely strays from being culturally responsive given the demographics of team members (112). African American or Asian/Pacific Islanders are classified at approximately twice the rate as students who are American Indian/Alaskan or Hispanic (113). In addition, mis-diagnosis and delayed intervention may be the result of the patient receiving a symptom based diagnosis (developmental delay, mental retardation, speech-language impairment, emotional disorder) as opposed to a diagnosis that is more culturally relevant (114). One of ASHA's core principles for serving students with ASDs states that speech-language pathologists should "form partnerships with families of individuals with ASDs in assessment and intervention, while incorporating family preferences, honoring cultural differences, and respecting the challenges associated with limited resources." Valuing families as important members of multidisciplinary teams will facilitate the accurate identification of culturally or linguistically diverse—and, in fact, all—students with ASDs.

Broad-based screening of children for ASD is not universal across cultures. The detailed screening algorithm promoted by the American Academy of Pediatrics (115-116) is based more upon subjective than comprehensive evaluations which may result in a missed diagnosis of ASD if the deficits noted are considered to be culturally related. Additionally, limited access to health care services related to lack of parental recognition (117-118). Cultural or economic variables may also result in a missed diagnosis (119). Cultural awareness can only maximize diagnostic potential given that three primary diagnostic characteristics of autism, social interaction, communication, and restricted behavioral repertoire appear to be universal across cultures (120-121).

Comprehensive evaluations for ASD include an interview, period of observation, and testing. In current settings, cultural barriers such as language need to be minimized (123). Interviews should be conducted in the family's native language amongst members of the same cultural definitions. The use of social language should also be observed to identify deficiencies as opposed to differences. Observations should be made in a culturally consistent environment while utilizing both primary and secondary languages to assess for

language impairment which will likely impact both languages. Multidisciplinary teams can then make a diagnosis and recommendations based upon testing that is technically sound, valid, and reliable using a variety of tools including dual language scoring. Tests must be free from racial/cultural bias (both on the part of the exam and examiner(s)) and administered in a format and language that will maximize efficacy (124). Tests must assess basic interpersonal communication skills and cognitive academic language proficiency. Expected disparities in learning second languages as noted between BICS (6 to 24 months) and CALP (> 60 months) may differ for children with ASD with more rapid CALP development (Aspergers), global delay in development (intellectual delay or culturally diverse student with ASD).

No single measure can be used to determine the presence of ASD. Level 1 screening measures are used by physicians to differentiate children with potential ASD from their peers. Level 2 tools are used in schools or developmental clinics to differentiate ASDs from developmental disabilities from their peers. Asperger Syndrome Diagnostic Scale (ASDS), Autism Behavior Checklist (ABC), Childhood Autism Rating Scale (CARS), Gilliam Autism Rating Scale – 2nd Edition (GARS-2), Autism Spectrum Quotient (AQ) – Adolescent Version, and Social Communication Questionnaire (SCQ). Only a paucity of screening measures have been documented to be applicable in the evaluation of bilingual children with disabilities (125), though some exiting instruments have been modified to more accurately assess to cultural differences (126-129). Despite this, any screening tool, including the M-CHAT, must be scrutinized for reliability when cross-cultural evaluations are being implemented in toddlers. Culturally relevant variables include responses related to pointing touch, vocalization, gestures, and/or eye contact among others.

8. Current roles

ASHA states that, "Speech and language professionals have the expertise to distinguish a language disorder from 'something else' (130) which can be related to 'cultural and linguistic differences, socioeconomic factors, lack of adequate prior instruction, and the process of acquiring the dialect of English used in the schools" (131). It also states that "speech-language pathologists should form partnerships with families of individuals with ASD in assessment and intervention, while incorporating family preferences, honoring cultural differences, and respecting the challenges associated with limited resources." A companion document, Guidelines for Speech-Language Pathologists in Diagnosis, Assessment, and Treatment of Autism Spectrum Disorders Across the Life Span notes that "Clinicians and educators need to determine which different strategies are effective with students/clients presenting varying developmental levels; social, linguistic, and cultural backgrounds; learning styles; behavior repertoires; and communication needs," while also considering family resources and cultural values.

In the setting of continuing cultural diversity, our approaches must be based upon methodologies that culturally competent in order to maximize our diagnostic capabilities for culturally distinct children with ASD. In addition to our understanding of the requisite approaches we must continue to educate both educators and students of how culturally distinct variables can impact both verbal and nonverbal communication, and which tests are most sensitive to discern ASD in culturally based nonverbal behavior.

9. Summary and conclusion

Given the significant socio-economic impact of ASD on families and society, in addition to the profound impact on children falling into the spectrum, early detection and early intervention remain primary goals in addressing this disease process. The corollary to this is not only the reliability of the testing tools utilized but also the individuals involved in the initial diagnosis and subsequent therapeutic interventions. High-quality, evidence-based interventions must be continuously developed, scrutinized, and improved to approach such a lofty goal. The consideration of the cultural diversity of the children and their families' backgrounds in addition to that of the therapists must be included in all discussions concerning the efficacy of diagnosis and intervention. Additionally, it is essential to take into consideration the various factors that may impede diagnosis or contribute to mis-diagnosis. As we have discussed, current research has shown that diagnosis rates vary by race and, thus, it is of value to explore factors that may play a role in such variance such as the effectiveness of exams and examiners. Suggestions for improved diagnosis rates are presented, such as minimizing cultural barriers and conducting interviews in the family's native language. Such measures will contribute to earlier diagnosis for individuals of any ethnic or cultural group. By pressing for the re-evaluation of culturally competency in ASD screening and assessment methods, we hope to increase the early diagnosis rates of ASD among all populations and subsequently the timeliness and impact of an earlier intervention.

10. Acknowledgement

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