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ABSTRACT

Objective: Social cognition does not exist within a vacuum. One's culture and surrounding social environment influence 1) development of social skills and behaviors, and 2) society's expectations regarding "normal" behavior versus behaviors consistent with the diagnosis of Autism Spectrum Disorder (ASD). Use of a comprehensive cultural framework such as Fujii's ECLECTIC model undergirds valid ASD testing by enhancing clinician awareness of potential biases during clinical decision-making and by supporting culturally relevant recommendations. **Method:** Four diverse pediatric patients presenting for concerns of ASD are described. Neuropsychological test data and salient cultural considerations are presented within the ECLECTIC framework. **Results:** The cases illustrate relevant cultural factors critical to the ASD assessment for youth with wide diversity (Southeast Asian, Deaf, Black, Hispanic/Latinx, and Chinese cultures) and varied contextual factors (adoption, underlying Down syndrome). The ECLETIC model better allows integration of salient factors such as cognition, family dynamics, behaviors, educational services, and language dominance. **Conclusions:** Unrecognized ethnocentric biases may shadow the complexities and nuances involved in ASD assessment across cultures. Such errors are minimized using a comprehensive cultural framework to guide equitable neuropsychological services. The ECLECTIC model's emphasis on cultural and contextual factors results in more accurate findings and more individualized planning for the patient. Recommendations for clinical application are provided.

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Introduction

Neuropsychologists working among heterogeneous populations in the U.S. frequently encounter culturally and linguistically diverse children for assessment of Autism Spectrum Disorder (ASD). The current prevalence rate of ASD in children in the U.S. is 1:54 (Maenner et al., 2020) with consistency across racial and ethnic groups (Pearsen & Meaden, 2018). In contrast, the global estimate is 1:160 (World Health Organization, 2019). Cultural factors may contribute to this disparity in prevalence. Further, prevalence is unknown in many low- and middle-income countries (Elsabbagh et al., 2012).

The Interagency Autism Coordinating Committee (IACC) created a Strategic Plan advising the U.S. Secretary of Health and Human Services on issues related to ASD in accordance with the Combating Autism Act (CAA) and the Autism Collaboration, Accountability, Research, Education, and Support Act (IACC, Lipkin et al., 2020). Despite these guidelines, healthcare disparities continue with ethnic minority youth often under-diagnosed or diagnosed later than White peers (Durkin et al., 2017; Mandell et al., 2009). To counter this, clinical neuropsychologists should be equipped to either recognize/diagnose ASD (accounting for culturally and linguistically diverse patient populations) or be confident in referring to a specialty clinic with experience in addressing these contextual modulators to ensure equitable service delivery.

Background

Evaluation techniques designed to account for the enormity of the impact due to cultural influences is relatively new to the field. One complicating factor is society's ever-expanding notion of culture. Our definition of *culture* has expanded from one based in geographical, racial, or religious foundations to one that includes classical and neo-classical interpretations of language, gender orientation, expression, and attraction. Further, the cultures within and affecting systemic constructs (such as family, adoption, foster care, immigration, acculturation and poverty) are particularly important to pediatric neurodevelopment. This conceptual development challenges a traditional medical system designed to test, interpret, and label aspects of mental illness across such a broad population (Bernier, Mao & Yen, 2010).

Accumulating evidence indicates that culture influences various aspects of the neuropsychological evaluation; White-centric neuropsychological evaluation methods may be biased due to disparities apparent in instrumentation and assumptions made about culturally and linguistically diverse minorities (Cory, 2021; Fujii, 2018). This leads to diagnostic error (Daugherty et al., 2017). While evolving adjustments to new concepts of culture in concert with evolution of the medical system's definition of ASD allow for diagnostic and treatment errors in this diverse population; they also allow for potential improvements.

Underdiagnosis/later diagnosis

There is broad evidence for healthcare disparities when using the Diagnostic Statistical Manual, 5th Edition (DSM-5; American Psychological Association, 2013) for diagnostic purposes in this at-risk population. Black children are 2.6 times less likely than White

children to receive an ASD diagnosis on their first specialty care visit (Mandell et al., 2007). Hispanic/Latinx children are often misdiagnosed with ASD (Hassan El-Ghoroury & Krackow, 2012) or diagnosed 2 $^1/_2$ years later than their White peers (Zuckerman et al., 2013). Additionally, recent research supports evidence of delayed diagnosis in Black children and also highlights the disproportionate burden of sequelae, including intellectual disability, as a result of missed intervention opportunity (Constantino et al., 2020). Black, Hispanic/Latinx, and other racial/ethnic and linguistically-diverse minority youth are less likely to have a documentation of ASD in their school and health records and Black youth are more likely to be misdiagnosed with conduct disorder and adjustment disorder instead of ASD (Mandell et al., 2009). Extant literature examining ASD diagnostic differences *within* cultures themselves is scarce. The higher prevalence rate of diagnosis in Hispanic/Latinx children who had two U.S.-born parents compared to two foreign-born parents has been documented (Schieve et al., 2012). These discrepancies may reflect issues of access, healthcare literacy or acculturation; they may also reflect the clinician's misdiagnosis and/or biases.

Health care literacy and inequity in psychoeducation

Referral for formal assessment of ASD requires a decision (caregiver or professional), that there is a concern. Pediatrics has been a critical leader in awareness campaigns and advocating for early screening of ASD in children under 2 years (Committee on Practice and Ambulatory Medicine, AAP Bright Futures Periodicity Schedule Workgroup, 2020; Lipkin et al., 2020). Robust evidence supports the effectiveness of early intervention in contributing to better outcomes (Landa, 2018). However, several shortcomings in awareness campaigns for ASD exist as multilingual and culturally relevant content in media is not optimal. Without a strong system of community-wide participatory methods, this limits the ability to leverage cultural 'gatekeepers' in the communities at risk.

Children on public insurance are referred for neuropsychological evaluation 3 times more often by clinicians than by caregivers. Interestingly, this disparity disappears when the concern is ASD as the referral rate becomes equal (Pittenger et al., 2019). In the U.S., Hispanic/Latinx families with lower acculturation levels have a lower likelihood of knowing someone diagnosed with ASD; therefore, they may be less likely to self-refer (Blanche et al., 2015). Primary care clinicians have been found to view Hispanic/Latinx parents as less knowledgeable about ASD; this is consistent with data suggesting poorer access for Hispanic/Latinx parents to appropriate and accurate information about ASD and other mental health disorders (Lopez et al., 2020; Zuckerman et al., 2013).

Access to care

Poverty and insurance coverage present a threat to youth in America who require ASD diagnosis and treatment (Pearson & Meadan, 2018). Other well-qualified specialists can provide ASD diagnostic services, but the combination of the increased ASD prevalence rate in the U.S., and the shortage of pediatric neuropsychologists (19.5%;

Sweet et al., 2021) represents a national crisis in terms of accessing *our* specialty for ASD diagnostics. This is especially pertinent when assessing children from high-risk populations.

Within the U.S. healthcare system, the historical mistreatment of culturally and linguistically diverse populations, especially Black Americans, has created a distrust regarding access to care, stigmatization, and diagnosis of mental health conditions. Barriers to accessing mental health services (including for ASD) include differing cultural perspectives of disability, unfamiliarity with available service delivery options, and clinicians' lack of understanding of factors such as race, social class, cultural values and experiences (Burkett et al., 2015; Mandell et al., 2007; Pearson & Meadan, 2018).

Cultural expectations of behavior

Cultural expectations regarding the behavior and social communication of children in ethnic and linguistically diverse families can vary widely. For example, some Hispanic/Latinx communities regard avoiding eye contact (what is often considered as a key diagnostic feature of ASD) as a sign of respect. White American culture teaches that this behavior may be reflective of poor nonverbal interpersonal communication skills (La Roche et al., 2018).

Variations of self-orientation within different cultures serve to complicate the diagnostic approach to ASD. U.S. White mainstream culture values *individualism* wherein one defines oneself as distinct and isolated from a group. Many other cultures emphasize *collectivism* in which one defines themselves as part of or in relation to their group. These differing adaptations of "self" within or apart from "society," can strongly influence environmental contexts, expectations, and structures of childcare/educational settings from an early age and can directly impact social interactions used in ASD assessments. Accumulating cognitive neuroscience demonstrates that those from collectivist groups process information differently because of cultural experiences. Nisbett et al. (2001) demonstrated that Westerners process central objects and organize information via rules and categories due to the individualistic focus of their culture. In contrast, East Asians jointly encode object and contextual information; relational information is prioritized over categorical information based on their collectivist culture.

Korean-American versus Anglo-American preschool social activities highlight the cultural impact of parent, teacher, and environmental influences on play. This leads to differential developmental attributes with young Korean American children focusing on more academic and less social and imaginative play than Anglo-American children who were found to participate more socially in group and competitive play (Farver et al., 1995). In addition, it has been suggested that methodical and purposeful play may be valued in White culture, while more unrestrained types of play may be valued more positively in Black culture (Harrison et al., 2017). These research findings and cultural perspectives write a cautionary tale against designing testing procedures, manipulatives, and standardized questionnaires based predominantly on Westernized or White ideals of education, social communication, and social play.

Intersection between culture and gender

Historically, girls have been more difficult to diagnose with ASD than boys and are often diagnosed later in life (Shattuck et al., 2009). The prevalence rate of ASD is 4.3 times lower in girls than boys (Maenner et al., 2020). One of the challenges in diagnosing females relates to the phenomena of "masking" in which observers rate girls as better able to hide their social deficits and restrictive and repetitive behaviors (RRBs) while better imitating social behaviors of peers (Attwood, 2006; Dean et al., 2014; Kopp & Gillberg, 1992). This camouflaging of social behaviors in girls with ASD is further highlighted in a more recent study by Dean et al. (2017) examining social play of elementary children. Lack of awareness of such differences may lead to biases which under-identify girls with ASD.

The impact of gender roles and expectations on developmental play and emotional expression has been studied within cultures. Such expectations for classic gender assignments *across* cultures and their impact on cognition remain a relatively new area of investigation. Harrison et al. (2017) demonstrate that in American society boys tend to play more actively and with construction materials, while girls more often engage in pretend play routines with dolls and house toys. Such dichotomy may have diagnostic implications when relying heavily upon specific test manipulatives. Some organic play preferences have been noted as preferential selection without undue influence; other young children's play choices are heavily influenced by the societal notions of future gender roles (Mesman & Groeneveld, 2018). Accounting for the disparate emphasis placed on gender-specific roles within other cultures allows the examiner to illuminate the expectations and influences exerted on the youth of that society and interpret play accordingly.

Various cultures value the importance of stoicism and authoritative leadership for men and deference to authority for women. These values may preempt lower scores on activity or interaction-based testing formulated to trigger social and reciprocal play for males or females within these groups. While ethnocentric testing methods can bias diagnostic results, these cultural gender expectations can also affect whether parents seek diagnostic evaluation in the first place. Without consistent attempts to understand the cultural interpretation of behavior and play for each family, bias and error in attribution can easily overwhelm an ASD assessment.

Language and communication

A discrepancy between a patient and clinician's primary language elevates the diagnostic challenges. In one study, primary care physicians found it more difficult to assess ASD in Hispanic/Latinx families whose primary language is not English (Zuckerman et al., 2013). However, the evidence on the difficulty of diagnosis in children with non-English primary languages extends beyond spoken language. In the pursuit of a diagnosis that strives to use subtle social cues and reciprocity as its basis, the assessment of children within the Deaf community raises unique challenges. These range from language-based discordance (when words are signed versus spoken) to differences in gesture and facial expression that accompany American Sign Language (ASL) (Denmark et al., 2019). Deaf culture places emphasis on facial expressions to

convey meaning and tone. Therefore, while a slightly reduced amount of facial expression may not raise ASD concerns in a hearing child, the same relative amount of facial expression in a Deaf child employing sign language may be concerning for ASD. Similarly, the RRB aspects of an ASD diagnosis must be subtly dissected from the extensive hand movements that serve as a signing child's primary method for communication (Denmark et al., 2019).

The use of interpreters adds complexity in the assessment of children and families with limited English proficiency. Interpreters often function as cultural navigators, assisting the neuropsychologist in weighing the nuances related to social, gender, and play norms as described above. While an interpreter may speak the *language* of the child and family (ex: Spanish), it is important to consider that he/she may not possess *culture or country-specific knowledge* given the cultural variation among Hispanic/Latinx subgroups. Properly trained interpreters and bilingual diagnosticians are limited. Pipeline efforts for recruitment of linguistically diverse pediatric neuropsychologists are warranted.

Variations in ASD diagnostic tools by culture

ASD diagnostic instruments are designed to identify social deficits through a comparison to an operationally defined normative social behavior. The Autism Diagnostic Observation Schedule (ADOS) is a widely used diagnostic tool to assess symptoms of ASD. While the ADOS-2 is available in other languages and with limited cultural adaptations, item level biases may exist across race and ethnicity with regards to unusual eye contact, stereotyped/idiosyncratic use of words or phrases, and immediate echolalia. Harrison et al. (2017) identified Black American children as being more likely to have higher atypical ratings on those items; Hispanic/Latinx children had higher ratings on unusual eye contact. In addition, the ADOS-2 has not been validated on children who are deaf or blind.Many consider the ADOS-2 as the gold-standard in ASD diagnosis. We suggest with case presentations below that this tool is still valid and impactful when paired with cultural considerations.

The Modified Autism Checklist for Toddlers (MCHAT), a screening instrument defined to identify children at risk for ASD, has been found to have high false positives in low socioeconomic and ethnically diverse settings within the United States (Leeuw et al., 2020). Studies of the Autism Diagnostic Interview-Revised (ADI-R), a clinical interview designed to elicit ASD symptomatology from caregivers, reported lower sensitivity and specificity on specific domains in Spanish speaking populations in the United States (Leeuw et al., 2020).

Confounders such as these can contribute to delays in diagnosis with resultant discrepancy in services for ethnic minority youth with ASD (La Roche et al., 2018). Pediatric neuropsychologists should be aware of the inherent biases within our specialty that stem from assessment conceptualized through a White-centric perspective (Cory, 2021). The American Psychological Association's (APA) multicultural guidelines (APA, 2017b), APA ethics (APA, 2017a), American Education Research Association Standards (2014), and the International Test Commission guidelines (2010) seek to

eliminate practices which may ultimately contribute to adverse outcomes for culturally diverse youth (unfair testing, invalid results, misdiagnosis, etc.) (Fujii, 2018).

Neuropsychologists who instead adhere to the ethical mandate of considering how cultural and psychological factors contribute to neuropsychological evaluations advance equitable services. A comprehensive approach to cultural conceptualization is required to eliminate potential biases while providing a context for obtaining accurate data, interpreting test data appropriately, and generating recommendations that are culturally relevant to patients and families.

ECLECTIC model as a potential tool

The ECLECTIC framework, created by Fujii (2018), conceptualizes several factors for conducting culturally informed neuropsychological assessment. Relevant aspects include:

- *Education:* the quantity and quality of education received; the literacy of the child and caregivers; the educational level of the caregivers (a strong moderator on expectations of the child, perceptions of acceptable norms, and reporting of symptoms; Nowell et al., 2015).
- *Culture and Acculturation:* the need to balance the individual characteristics of the child and family structure with that of the culture that surrounds them.
- *Language and Language Proficiency:* including but not limited to the use of instruments appropriate to their language dominance.
- *Economics:* economic instability can impact through factors such as frequent moves in households that hinder social opportunities, diminished access to both primary care screening and timely neuropsychological evaluation for children (Durkin et al., 2017; Nowell et al., 2015).
- *Communication:* culturally driven verbal and nonverbal markers such as patterns of pausing between responses and pacing, volume of speech, and use of gestures.
- *Testing Situation:* factors that assist in making the patient feel at ease including special attention to cultural familiarity with the environment and expectations during assessment.
- *Intelligence Concept:* the manner in which a culture understands intelligence and the manifestation of this as the values placed on particular behaviors, skills, and modes of interacting with others.
- *Context of Immigration:* the reasons for immigration to the U.S. as well as current documentation status, both of which have implications for referrals, assessments, co-morbid conditions, and recommendations.

The conceptual application of the ECLECTIC framework is a new model that began in the adult neuropsychological population. To our knowledge, this is the first paper to describe a broader application of the ECLECTIC framework in a pediatric population.

Aims

The aimsof this paper are:1) to demonstrate the application of the ECLECTIC framework in guiding culturally informed pediatric neuropsychological evaluationsusing fourcase examples; 2) to highlight challenges specific to the intersection of ASD and culture; and 3) to make practicerecommendations for accurate and equitable diagnosisin diverse populations.

Methods

Each of these cases was selected from patients evaluated by one of the pediatric neuropsychologists who are authors on this paper in order to highlight specific aspects relevant to the ECLECTIC model. All names have been changed and case series data are included in Table 1. Considerations of each component of the ECLECTIC framework is reported in Table 2. The first case illustrates each component of the ECLECTIC framework; subsequent cases focus on their unique considerations.

Case series

Case 1: A Hispanic/Latinx child who was initially misdiagnosed

Background and Presentation. Enrique was an 8-year, 10-month-old, right-handed, Hispanic/Latinx male with previous diagnoses of developmental delays, Mixed Receptive-Expressive Language disorder, Oppositional Defiant Disorder (ODD), Pervasive Developmental Disorder-not otherwise specified (PDD-NOS), and Attention Deficit Hyperactivity Disorder, combined presentation (ADHD). He was born prematurely at 36 weeks gestation without complications in pregnancy or delivery. Language delays were noted with his first words spoken at approximately 4 years of age. He lived with his parents and two sisters. Spanish was the primary language spoken at home. His mother noted he preferred Spanish, but also that he had difficulty speaking it. He watched television in Spanish, but received all educational interventions in English. Behavioral difficulties were the primary concern. Multiple evaluations had been conducted in English beginning at age 4 when he was diagnosed with a Language Disorder despite a behavioral presentation that would be concerning for ASD. He was subsequently evaluated by a psychiatrist in English at age 7, who diagnosed ODD and PDD-NOS with a note that he may have met criteria for ASD when younger. A second psychiatrist evaluated him in English at age 8 and added the ADHD diagnosis as well as an unspecified learning disorder. Despite these previous evaluations, the pediatrician remained concerned.

Results. Enrique did not demonstrate dominance in either English or Spanish on standardized testing, but he reported a preference for Spanish. The assessment was conducted in both languages across domains. He was noted to have below average nonverbal cognitive abilities. He had relative strengths with respect to his visual-spatial perception, visual-motor integration, fine-motor coordination, and speed. However, difficulties were seen globally across other areas of functioning including language, attention/executive functioning, memory and learning, and social perception. Secondary difficulties were also seen with adaptive functioning and mood/behavior.

Table 1. Performance profiles.

	Case 1	Case 2	Case 3	Case 4
Developmental/IQ	WISC-IV Spa	Mullen	Mullen	WISC-V
VCI/Verbal	55			87
PRI/Visual Reception	84	< 20 (18 mo)	< 20 (18 mo)	79
WMI	52			83
PSI	65			76
FSIQ	56			77
Autism Assessment				
ADOS-2 Module		1	1	4
ADOS-2 Total Score		**	Above Cutoff	Above Cutoff
NEPSY-2 Affect Recog	5			
PDDST-II	8/At Cutoff			
ASRS Total Score				68
SRS-2 Total Score				79
SCQ				15/At Cutoff
Language Proficiency	WMLS-R			
Oral Comp Spanish	61			
Oral Comp English	56			
Attention				
CPT-2/TOVA Omissions/Commissions	59/57			<40/112
BRIEF/BRIEF 2 Composite	47			60
BASC-2/3 Attention	62			59
Memory	WRAML-2			CVLT-3
Design	2			
Picture	1			
List Learning				85
Motor	Beery VMI	Mullen	Mullen	
Fine Motor	80	< 20 (17 mo)	< 20 (10 mo)	
Adaptive	ABAS-2		Vineland-3	ABAS-3
Communication	1		20	5
Daily Living/Home Living	2		38	7
Socialization/Social	1		38	8
Composite	63		33	76
Emotional/Behavioral	BASC-2			BASC-3
Hyperactivity	67			57
Anxiety	64			69
Depression	66			54
Atypicality	84			50
Withdrawal	80			73

** Clinically significant; administered for qualitative observations.

Note. IQ, Intelligence Quotient; WISC-IV Spa, Wechsler's Intelligence Scale for Children, Spanish, Fourth Edition; WISC-V, Wechsler's Intelligence Scale for Children, Fifth Edition; Mullen, Mullen Scales of Early Learning; VCI, Verbal Comprehension Index; PRI, Perceptual Reasoning Index; mo, months; WMI, Working Memory Index; PSI, Processing Speed Index; FSIQ, Full Scale Intelligence Quotient; ADOS-2, Autism Diagnostic Observation Schedule, Second Edition; NEPSY-2, Affect Recog, A Developmental NEuroPSYchological Assessment, Second Edition, Affect Recognition; PDDST-II, The Pervasive Developmental Disorders Screening Test, Second Edition; ASRS, Autism Spectrum Rating Scales; SRS, Social Responsiveness Scale; SCQ, Social Communication Questionnaire; WMLS-R, Woodcock-Muñoz Language Survey, Revised; Oral Comp, Oral Composition; CPT-2, Conners' Continuous Performance Test, Second Edition; TOVA, The Tests of Variables of Attention; BRIEF/BRIEF 2 Composite, Behavior Rating Inventory of Executive Function/ Behavior Rating Inventory of Executive Function, Second Edition Composite; BASC-2/3, Behavior Assessment System for Children, Second Edition/Behavior Assessment System for Children,Third Edition; WRAML-2, Wide Range Assessment of Memory and Learning, Second Edition; CVLT-3, California Verbal Learning Test, Third Edition; Beery VMI, Beery-Buktenica Developmental Test of Visual Motor Integration; ABAS-2/3, Adaptive Behavior Assessment System, Second Edition, Adaptive Behavior Assessment System, Third Edition; Vineland-3, Vineland Adaptive Behavior Scales, Third Edition.

Enrique did not undergo evaluation with the ADOS-2 as he already met the following DSM-5 (APA, 2013) criteria for ASD based on his current presentation and past history: In the area of social interaction, he had limited use of nonverbal gestures, failure to

Table 2. Demographics and ECLECTIC data.

	Case 1	Case 2	Case 3	Case 4
Age	8 years	4 years	6 years	18 years
Gender	Male	Male	Male	Female
Education	Third Grade	Preschool	Kindergarten	Twelfth Grade
IEP	Classification – Autism All academics in a self-contained classroom	Classifications – Non-Categorical Early Childhood, for possible Autism and Intellectual Disability, Speech Impairment, and Auditory Impairment Deaf Education in a self-contained classroom; use of picture symbols	Classifications - Language Impairment, Intellectual Disability, and Other Health Impairment All academics in a self-contained classroom	Classifications – Language Impairment and Specific Learning Disability in reading and writing until fifth grade Homeschooled since 6th grade
Therapies	School-based adapted physical education, and speech therapy No outpatient therapy	School-based speech therapy No outpatient therapy	School-based speech therapy No outpatient therapy	School-based speech therapy No outpatient therapy
Parent Education	Primary school for both parents	Unknown	Unknown	Father - Bachelor's degree Mother - some college
Culture/ Acculturation	Hispanic/Latinx	Deaf + Black	Southeast Asian + Down Syndrome	Chinese + adopted
	Parents are immigrants Collectivism versus individualism Child was born in the U.S.	Parents divorced Intergenerational involvement in caregiving	Parents are immigrants Collectivism versus individualism Child was born in the U.S.	Adopted by Caucasian family Biracial home; engaged in monocultural (American) practices Only 3% Asians in county
Stigma	Misdiagnosed due to bilingual language acquisition	Mother deaf, but father hearing	Developmental disabilities in parental country of origin Diagnostic overshadowing	Chinese Female
Acculturation	Parents have low acculturation Child has moderate acculturation	Parents have high acculturation	Parents have low acculturation	Parents have high acculturation Teen is fully acculturated
Language	Spanish at home; preference for Spanish No dominance established	Child is non-verbal Mother - ASL Father - spoken English	Child is non-verbal Parents speak Hakha Chin exclusively	Teen's first language is likely Chinese; only speaks, understands, and writes in English
	All education in English	Education in both English and ASL	All education in English	All education in English
Economics	Family has public aid insurance	Family has public aid insurance	Family has public aid insurance	Family has commercial insurance

Table 2. Continued.

	Case 1	Case 2	Case 3	Case 4
	Considered low to middle class	Considered low to middle class	Considered low to middle class	coverage Considered middle to upper-middle class
		Transportation difficulty for medical appointments	Public aid may negatively impact ability to seek diagnostic evaluation	Has access to services
Communication Style	Child speaks in both English and Spanish, echolalic, used jargon and nonsense words, variable eye contact, hugged the examiner and said "I love you", engaged in joint attention, did not know personal information	Child only uses one sign and no other spoken language Child uses varied nonverbal communication strategies, but inconsistent eye contact; occasional high-pitched vocalizations	Child communicates with unusual vocalizations, poor eye contact, uses examiner's hand as a tool	Teen has intact receptive and expressive language Teen has fleeting eye contact, limited gestures, soft voice, and responds to questions but did not spontaneously engaged in conversations
Testing Situation	Diagnostic clarification Bilingual neuropsychologist	Diagnostic clarification American Sign Language interpreter used	Diagnostic clarification Hakha Chin interpreter used	Diagnostic clarification
	Not a novel setting, but had low tolerance for frustration and motor restlessness	Novel setting for parents with unfamiliarity; high stress	Novel setting for parents with unfamiliarity; high stress	Not novel setting
Intelligence Conceptualization	Parents had higher conceptualization of his intelligence	Parents had limited conceptualization of intelligence Difficult to assess given nonverbal and deaf	Parents had limited conceptualization of intelligence	Parents had slightly higher conceptualization of herintelligence
Context of **Immigration**	Child born in U.S. Parents immigrated for work	Not Applicable	Child born in U.S. Parents immigration status is unknown	Born in China; lived in an orphanage until adopted at age 1 year; U.S. citizen

Note. IEP, Individualized Education Program; ASL, American Sign Language; U.S., United States.

develop appropriate peer relationships, and lacked social/emotional reciprocity. In the area of communication, Enrique had severe delays in his spoken language as well as repetitive use of language and echolalic, nonsense speech. Regarding restrictive, repetitive and stereotyped patterns of behavior, he was reported to previously have engaged in spinning and hand flapping, and currently engaged in repetitive play. His previous diagnoses were thought to be under the umbrella for ASD and his difficulties with language were attributed to an underlying language disorder as opposed to a problem with bilingual language acquisition.

ECLECTIC Considerations. Enrique's case will highlight all aspects of the ECLECTIC framework with subsequent cases focusing on the most salient applicable ECLECTIC

factors. Regarding *Education,* as mentioned, all of Enrique's instruction was in English with no English as a Second Language (ESL) support. He had a school classification of ASD and was in a self-contained classroom, but this educational versus medical diagnostic classification was not clearly explained to the family. The most pertinent *Culture and Acculturation* considerations for Enrique were his parents' immigration from Mexico with retention of their Spanish language and culture juxtaposed to his further U.S. acculturation as a result of school and media exposure. While he continued to prefer Spanish as this was the primary *Language* spoken at home, he himself did not demonstrate a dominant language. *Economic* issues in this case point to that while Enrique's parents received public insurance, the timing of his first evaluations at four years of age (with marked language delay) introduced the possibility of access issues for this family. Enrique's *Communication Style* was an often-confusing blend of very low proficiency scores in both English and Spanish combined with idiosyncratic and echolalic language. The ECLECTIC consideration of the *Testing Situation* brings up issues in Enrique's case that are unfortunately common. His previous evaluations were conducted in his non-preferred language. He also received testing both externally with medical providers and within the school system, without a commensurate reconciliation of resultant diagnoses for the parents. His most recent evaluation sought for dominance, which was not found, but utilized a bilingual/bicultural neuropsychologist to test him in his preferred language (Spanish). *Intelligence Conceptualization* revealed that Enrique's parents had a higher impression of his cognitive functioning than was supported in testing. Finally, the *Context of Immigration* for Enrique's family was again quite common in the U.S. While his parents immigrated from Mexico to seek work in the U.S., Enrique himself was born here.

Conclusions. While all of the above ECLECTIC model considerations were pertinent in Enrique's case, there was a dominant theme of *Language* and *Culture/Acculturation* that led to previous diagnostic errors. Upon eventual formalized testing, it was noted that Enrique did not have a dominant language in either English or Spanish. This was at the crux of his educational placement and services, his diagnostic testing in a non-preferred language, and his parents' confusion regarding the underlying cause of his difficulties. As Spanish was the primary language spoken in Enrique's home, consideration for ESL should have been included in his educational plan. Multiple evaluations conducted in English resulted in delayed diagnosis and possible misdiagnosis. In addition, Enrique's parents perceived his bilingual exposure to be at the root of his behavior difficulties and misattributed his lower functioning and cognitive skills to this. Special consideration should be given to cases where bilingual children have low language proficiency scores in both languages, a lack of language dominance, and other idiosyncratic or verbal abnormalities. In Enrique's case, simple questions of language use across settings might have revealed that while he had difficulty speaking in both English and Spanish, he preferred to speak in Spanish. This should have led the clinicians to conduct the primary evaluation in Spanish or use bilingual methods, as the use of a different language could elicit behavioral reactions of discomfort and withdrawal, impacting diagnostic accuracy. Enrique's first evaluations were at 4 years of age as he had not begun speaking until that time. It is unclear if access issues or his parents' misconceptions of intellect led to a delay in seeking evaluation. However, it is

clear that the clinicians' diagnosis of an isolated language disorder based the majority of the diagnostic conceptualization on a skewed view of language acquisition and ignored that such a vast deficit could not be accounted for by typical bilingual development. There is no bilingualism that would account for a delay of this magnitude even for children with ASD (Lund et al., 2017; Valicenti-McDermott et al., 2013).

Clinicians working with bilingual individuals or those with a dominance or preference in a language other than English, should first assess language proficiency even in an informal manner. Even if just using play-based methods, assessing proficiency should guide the language of assessment in order to assist the child in feeling at ease. Clinicians should also ask about social communication abilities across settings and languages, and pay close attention to the delineation of gesturing from RRBs. In fact, younger bilingual children with ASD have been found to utilize more vocalizations and gestures (Valicenti-McDermott et al., 2013). As both the number of bilingual children and children with developmental disabilities in the U.S. continue to climb (Kids Count Data Center, 2018; Zablotsky et al., 2019), the special considerations in Enrique's case will become paramount in determining accurate diagnoses and treatment plans.

Case 2: A Black American child from both Deaf and Hearing culture

Background and Presentation. Marc was a 4-year, 11-month-old Black male born full term with Treacher Collins Syndrome and associated micrognathia, facial dysmorphism, obstructive sleep apnea (OSA), and bilateral microtia/aural atresia with secondary conductive hearing loss. His motor milestones were acquired within normal limits as well as initial words in sign language. However, his signing stopped at age 2 years and he had not demonstrated a full sign since that time period, nor had he developed verbal language despite receiving early intervention services. His audiological evaluation revealed moderate to severe deficits in soundfield threshold in at least one ear and he wore bilateral hearing aids. He lived at home with his mother (who was deaf) and home health nurse. He had frequent contact with his father (who was hearing). Socially, Marc was reported to be slow to interact with peers. He mostly observed others' play from a distance.

Results. Marc's nonverbal problem-solving skills and fine-motor abilities were equivalent to that of a 17- to 18-month-old child. While both skill sets were delayed for his chronological age, they were areas of strength for Marc when compared to his language functioning. Administration of Module 1 from the ADOS-2 revealed symptoms consistent with ASD; however, it is noted that these were qualitative observations and interpreted with caution given the lack of validation of the ADOS-2 in this population. He was observed making limited undirected vocalizations (i.e., "mmm," "ahhhh") during the assessment. He was not observed to show items, share items with others, or to direct others' attention to items in the room that he found interesting. He particularly struggled to mimic the examiner's play. Notably, he displayed intermittent instances of appropriate eye-contact with others when they were directly in front of or close to him, a skill that is usually increased in deaf children. Additionally, Marc demonstrated atypical motor mannerisms (including one instance of hand flapping) which the interpreter noted were not American Sign Language (ASL) signs or sign-approximations.

ECLECTIC Considerations. The most salient consideration for Marc was the intersectionality of Deaf and Hearing cultures (*Language* and *Culture*). Despite his receiving very unique educational accommodations (a 1:2 teacher-to-student ratio when learning new skills and 1:3 ratio when practicing these skills), he did not have any verbal or signed language. His accommodations also allowed for use of picture symbols/pictures/photographs and other modes of expressive communication (i.e., physical prompting, sign language, core board) to aid in his communication. Further, Marc was exposed to ASL with his mother, spoken English with his father and grandmother, and both at school. Marc used other hand motions that were thought to be possible gestures, but it was unclear if these were repetitive or communicative in nature. Regarding Marc's receptive language skills, he could comprehend verbal, one-step instructions when paired with an emphatic gesture, such as "come sit" (with hand gesture) or "which one?" He reportedly did not make good eye contact, use varied communication strategies when attempting to communicate his wants and needs to others (i.e., at times he would lead a caregiver to something and point [with extended index finger], while other times he used his mother's hand as a tool to obtain something). In general, Marc attempted to gain access to items on his own and communicated only when he needed assistance to access an item.

Conclusions. Unfamiliarity with the nonverbal expectations of Deaf children could lead to diagnostic errors as highlighted by Marc's case. Within the Deaf culture, highly frequent use of facial expressions, eye contact, and attention to face are the expectation (Denmark et al., 2019; Stoll et al., 2018). Even a slight decrease in expression and eye contact for a Deaf child (as compared to a hearing child) may trigger concern, as there is heightened emphasis on this form of expression in Deaf culture (Szarkowski et al., 2014). Additionally, certain hand gestures/signs may be confused with RRBs in ASD. In Marc's case, factors such as his poor integration of nonverbal communication (including eye contact, lack of social imitation or integration, repetitive play), as well as comparison of his behaviors with developmental expectations at the 18-month level, helped to lead the clinicians to a more accurate diagnosis. Additionally, the assistance of a deaf interpreter helped to identify his motor mannerisms as more posturing and flapping that would be observed with ASD versus any specific ASL signs or sign approximations.

Clinicians evaluating a deaf child should feel comfortable asking interpreters to tell them if the signs used by a child are meaningful in any way. They should also ask teachers and caregivers explicit questions regarding facial expressions and eye contact with specific probing on the amount of time focused on making a social connection with these nonverbal markers.

Case 3: A child from Southeast Asian culture with comorbid Down Syndrome

Background and Presentation. Aquil was a 6-year-old male born full term with Trisomy 21, Tetralogy of Fallot, dysphagia, constipation, hypothyroidism, and OSA. His parents' chief complaints were his language delay and behavioral challenges including lack of functional play skills, high level of activity, and difficulty listening. Aquil did not participate in any therapies. He lived at home with his parents and his two older sisters.

Results. Aquil demonstrated non-verbal cognitive ability similar to an 18-months-old child and his adaptive functioning (rated by parents), ranged from a 5- to 19-month-old range. Administration of Module 1 from the ADOS-2 revealed symptoms above the cutoff for ASD. Aquil had little interest in playing with children. He indicated his needs through crying or taking his caregiver by the hand, and he had no use of pointing or appropriate eye contact. His behaviors included spinning items, rocking, bruxism, and fixation with lights.

ECLECTIC Considerations. The most salient ECLECTIC considerations for Aquil involve *Culture, Intelligence Conception,* and *Language.* Aquil's parents identify with a Southeast Asian culture with a relatively low influence of acculturation from Western society and a limited awareness of ASD. Individuals from a Southeast Asian culture may value collectivism as well as traditional beliefs and gender expectation roles, and may have greater stigma towards developmental disabilities (Ilias et al., 2018; Shorey et al., 2020). Aquil's parents' main concerns prompting evaluation included behavioral deviations and dysfunction in the family dynamics, suggestive of collectivistic ideals. His parents placed great emphasis on the need for discipline strategies and ways to calm his high level of activity, rather than concern for Aquil's social communication deficits.

Aquil's maladaptive and repetitive behaviors may be viewed by caregivers as secondary to his Down syndrome and intellectual disability, a phenomenon known as diagnostic overshadowing (Stein et al., 2013). The co-occurrence of Down syndrome and ASD is less researched and is less well known in the medical community. Children with Down syndrome often receive a diagnosis of ASD at a later age compared to children without Down syndrome, and this may impact availability of therapeutic and educational services. In Aquil's case, two levels of overshadowing exist; one as a child with Down syndrome, and the other as a child from a non-Western cultural upbringing. The dual nature of the diagnostic overshadowing presents an extra layer of complexity when assessing his social communication abilities and behaviors.

Aquil is largely non-verbal and demonstrates use of babbling and unusual vocalizations. Hakha Chin, a dominant language in Myanmar, is spoken exclusively in his home and English is spoken exclusively in his classroom. The discrepancy in language between school and home impacts parents' perspective of Aquil's functional communication as they attribute his language difficulties/delays to be a result of his bilingual exposure.

Conclusions. Aquil's case presents cultural and medical factors that could lead to diagnostic error: his parents' low level of acculturation to Western society with minimal exposure to ASD, the incongruence in language exposure between home and school settings, and possible bias in assessing for ASD in a child with Down syndrome.

In order to lead to a more accurate diagnosis, clinicians should evaluate the child in a routinized, non-biased way in order to avoid attributing symptoms to limited expressive language and/or cognitive impairment (Cormier et al., 2018). The clinician should assess whether or not the child's social skills match his or her developmental abilities, and whether or not the majority of his or her behaviors consist of maladaptive and/or repetitive actions. Children with Down syndrome and ASD typically exhibit poor social orienting, inconsistent social overtures, poor integration of verbal and nonverbal

behaviors, decreased joint attention, limited shared affect, and a failure to develop functional means of communication beyond maladaptive behaviors (Rachubinski et al., 2017). As described above, Aquil demonstrated poor eye contact, no use of pointing, and frequently engaged in perseverations and stereotypies. In communicating results with Aquil's family and school team, the clinician should describe Aquil's deficits according to DSM criteria and also include a discussion of the cultural factors (Deaf culture or otherwise) affecting his initial presentation.

Case 4: An adolescent adopted from China

*Background and Presentation.*Elisa was an 18-year-old Chinese female with sensory sensitivities, social communication difficulties, poor eye contact, routine rigidity, perfectionism, generalized anxiety/worries, specific phobias/fears, social anxiety, and obsessive-compulsive behaviors. Her information regarding pregnancy, delivery, and placement for adoption was unknown; however, she lived in an orphanage until her adoption at 1-year of age. Early developmental milestones for gross motor skills were generally acquired on time, however, her speech/language development was delayed. As a toddler, Elisa was not easy to discipline, and she engaged in temper tantrums. She experienced bullying in middle school, which prompted her adoptive parents to homeschool her. Current functioning includes significant social communication difficulties and limited meaningful friendships. Elisa was described as "shy or quiet" by *others*, but *she* ascribed this to difficulty engaging in conversations. She also reported "masking" and assimilating in social situations.

Results. Neuropsychological evaluation revealed low average to average cognitive abilities. Relative strengths were noted in vocabulary, general fund of information, comprehension, and auditory working memory. Relative weaknesses were noted in recreating block designs and transcribing symbols, attention, verbal analogy, mental arithmetic, and processing speed. During the ADOS-2, Elisa demonstrated poor social communication and interaction. While no significant restricted or repetitive behaviors were observed during the ADOS-2, her history revealed that she engaged in ritualized patterns of nonverbal behavior such as a need to walk within a crosswalkand adherence to strict routines. She also had fixated interestsin odd numbers and straight line-sand reported sensoryaversions to people talking close to her or others breathing on her. Based on her evaluation and history, she was diagnosed with ASD as well as ADHD, unspecified presentation and Generalized Anxiety Disorder.

ECLECTIC Considerations. Culture/Acculturation was the most salient aspect of the ECLECTIC model for Elisa. Her history was significant for cross-cultural international adoption. Her family practiced monocultural American traditions with limited exposure to Asians and Asian culture. Further, given the monocultural practices of her family, English was her only language at the time of this evaluation. It is likely that her first language exposure was in Mandarin; however, upon adoption and immigration into the U.S., she received speech therapy (in English only) from preschool to kindergarten. Subsequently, Elisa repeated first grade due to academic difficulties and "social immaturity." She had an IEP under Language Impairment and Specific Learning Disability in reading and writing until fifth grade before transitioning to homeschooling. Despite these early interventions, Elisa's ASD presentation was obscured by cultural and gender influences.

Conclusions. Elisa was evaluated in the past; however, ASD was probably overlooked due to symptom misattribution errors for her gender and culture. The labeling of her behavior as "shy" and "quiet", which is often done in young girls and seen as culturally appropriate in East Asian cultures, overlooked the detrimental social and communication deficits that were core to her ASD diagnosis and overall functioning. Similar to other girls with ASD, she has been able to mimic social behaviors of others, therefore masking her social deficits. However, research has shown that this does not lessen the impact of her social challenges (Dean et al., 2017). It is important for clinicians to remember that while ASD is a distinct condition, it coexists with many different neuro-developmental (ADHD, LD, language delays) and psychiatric disorders (anxiety, OCD, trauma-related disorders). For Elisa, her comorbid conditions (ADHD and Anxiety), coupled with the gender and cultural biases in ASD evaluation, overshadowed an accurate ASD diagnosis earlier in life.

For clinicians navigating an evaluation for an ethnic minority female, special consideration needs to be given to whether her symptoms could or should be attributed to other factors or an ASD diagnosis. Examination of factors such as RRBs in interviewing the patient and parents, combined with careful interpretation of the drivers of social deficits, can help lead to a more accurate diagnosis in this patient population.

Discussion

As demonstrated in the case studies above, cultural differences in the use of eye contact, gestures, perceptions of social and behavioral norms, as well as varying educational experiences and comfort levels with clinicians represent some of the critical barriers to neuropsychological assessment and diagnosis related to ASD. The ECLECTIC model (Fujii, 2018) applied to these cases provides a valuable framework for comprehensive assessment of children from various racial, linguistic, and ethnic groups. In addition, it serves as a reference point for entry into dialogue with patients and families when there are atypical social skills or behaviors and interests that may be indicative of ASD. Clearly the first aim of incorporating this model into the pediatric neuropsychological setting is to increase awareness of the cultural impact on testing and diagnosis for ASD. Such an approach promotes the overarching aims of early and evidence-based interventions which will optimize each unique child's functioning across family, school, and community settings. As seen above, in particular in the cases of Elisa and Enrique and the work of Constantino et al. (2020), the failure to achieve the correct diagnosis in a timely manner has profound consequences. Furthermore, we have included considerations for clinical practice as well as direct recommendations for application.

Within the first component of the Eclectic Model – *Education*, lack of understanding and careful consideration of cultural and linguistic domains may result in misdiagnosis and inappropriate educational placements as seen in the cases of Aquil, Marc, and Enrique, with a potential stagnation in learning that will complicate later assessment. Given this knowledge, best practices should include documenting the educational level attained of the child and parent in neuropsychological reports as well as including how this could influence neuropsychological testing. Attempts should be made at

understanding a family's cultural perception of behavioral and social norms that affect educational expectations. Careful exploration of the child's current educational placement can also help identify other sources for behaviors and linguistic expectations, especially in the case of bilingual children. Consider the services and interventions that children are receiving when interpreting their testing and formulating treatment plans. Racially and ethnically diverse children who are diagnosed later may require more significant intervention to compensate for previous inappropriate or insufficient services or learning environments. If these cultural and linguistic education considerations are thought to confound or negate testing, this should be directly documented and addressed in the interpretation of test data.

Concerning *Culture and Acculturation*, the process of acculturation for families will impact cognition and social/emotional expressions, thus further complicating diagnosis (Fujii, 2018; Rothe et al., 2010). Children and their parents can each vary in terms of their rate of acculturation over time, thus introducing another level of complexity such as that seen in the cases of Enrique and Elisa. As parents may not know what is maladaptive or atypical, clinicians should explicitly solicit examples of behaviors from parents as well as provide examples of possible odd behaviors. Clinicians should consider how acculturation can impact social engagement (i.e. withdrawal) with peers or could be misattributed to poor adjustment in the new environment. Clinicians should ask questions about the family's neighborhood, language, and cultural practices/connections to assess acculturation for both parent and child. Acknowledgement should be given to differences in acculturation that may exist between the parent and child as it may impact the parent's perceptions of behavior.

Language and Language proficiency, the next elements in the ECLECTIC model may serve as the basis of communication and interaction between the examiner and patient. In order to complete the required receptive prompts and derive subtle meaning regarding a child's joint attention and reciprocal interactions and patterns of interest, the child's dominant language and language proficiency must be determined. Testing a child in a non-dominant or non-preferred language could result in misdiagnosis and misattribution of symptoms to ASD or attribution of symptoms solely to bilingual acquisition. In the case of Enrique, the absence of evaluation in his preferred language, Spanish, resulted in delayed diagnosis and parental dissatisfaction with his care. Ideally, the examiner will be proficient in the native language of the family, or will utilize a professional interpreter who is also skilled in the nonverbal social constructs of the patient's particular culture (Fujii, 2018). Bilingual pediatric recommendations for neuropsychological assessment in addition to those above have been well-documented (Canas et al., 2020; Cardenas et al., 2017; Salinas et al., 2016).

Economics, the next consideration in the ECLECTIC model, shows its impact most in poverty and low socioeconomic status (SES)'s correlation with lower neurocognitive performance across multiple domains (Fujii, 2018). In the cases of Aquil and Enrique, low SES and its impact on educational resources may have contributed to their performance on certain tasks as well as their ability to access timely diagnostic evaluations. Clinicians can support this by improving access through early identification including advocating for early intervention programming and early entrance to educational programs such as Head Start. Additionally, partnering with physicians to provide

anticipatory guidance on the importance of reading and play in the first five years of life can serve as protective factors against the impact of poverty and low SES on development. Distribution of culturally relevant knowledge of the signs of ASD along with standardized screening assessments to schools and clinics that serve families lacking insurance and other resources extends the capacity for diagnosis (Dyches, 2011).

Communication Style in the ECLECTIC model, is a characteristic largely driven by culture and most prevalent in the impressions that the parent/family and the child will form of the examiner (Fujii, 2018) as well as communication struggles that patients may have. By seeking knowledge about these differences, the examiner can become more attuned and develop better rapport with the child in order to more clearly perceive the essence of what is being communicated (Fujii, 2018). In the cases presented above, communication style is compromised by concomitant speech and language deficits commonly seen in children being evaluated for ASD, such as Enrique's challenges with global language functioning, or Elisa's early speech/language delay, misarticulation, and struggles with pragmatics. Such barriers to communication merit targeted efforts on the part of the neuropsychologist to disentangle cultural differences from developmental ones. This can include seeking collateral information from teachers, other professionals, and parents. Videos of the child in other environments and perhaps in their native language can demonstrate the extent of the behaviors and social difficulties.

Testing Situation, the next component of the ECLECTIC model, emphasizes the child's comfort level and motivation during testing (which may vary based on culture). For instance, in some cultures, it is unacceptable to ask for clarification of a testing demand, and this may affect the child's performance score (Fujii, 2018). Similarly, a culture that values children being deferent and quiet around adults in authority, may result in a child appearing withdrawn and inhibited (El-Ghoroury & Krackow, 2012). This was most observed in the case of Elisa where she was frequently documented as "quiet" and "shy." In order to increase comfort in the testing environment, clinicians should explicitly ask the child and parent what may assist in making them more comfortable. This can include consideration of parents' presence in the testing room (when possible) and questioning regarding familiarity with toys/testing materials as well as specific test scenarios (i.e. ADOS-2 Birthday party) and visual manipulatives. For individuals of certain cultures, consideration should be given as to whether or not testing can be performed within a known and trusted environment such as a community center or local church. If this is not possible an attempt can be made to incorporate a cultural 'gatekeeper' from the community to cultivate trust and serve as a cultural interpreter.

The next component of the ECLECTIC model is *Intelligence Conceptualization.* Previous studies have documented the incidence of ID in individuals with ASD at 70%, but this percentage has reduced slightly with the incorporation of higher functioning individuals under the spectrum of ASD with the changes in DSM-5 (APA, 2013; Thurm et al., 2019). An individual's intelligence quotient (IQ) may be confounding for ASD depending on his or her culture. Children from a Hispanic/Latinx or Asian culture with an IQ in the intellectual disability range are less likely to be diagnosed with ASD, while for Black children the disparity in ASD diagnosis persists regardless of the IQ (Mandell et al., 2009).

For the child undergoing ASD evaluation, parental conceptualization of intelligence provides a window for what a family may consider desirable versus problematic behaviors, use of language, social skills, and play (El-Ghoroury & Krackow, 2012). For children, this has more to do with understanding a parent's eventual goals for their child and how they will fit into society. For Aquil's parents from a Southeast Asian culture, there appeared to be an emphasis on collectivism as they voiced concerns about his dysregulation in relation to others in family settings rather than about his individual social and communication challenges. Recommendations center around the importance of assessing the values of the family, expectations for independence, and job performance.

Context of Immigration, the final component of the ECLECTIC model, carries broad implications for the neuropsychological assessment of a child suspected to have ASD. The geographic, political, and economic realities of the native country influence who will have access to immigration and the particularities of the immigration journey (Fujii, 2018). The family's immigration status in the U.S. may impact parents' desire to seek evaluation for their child secondary to access to services as well as fears of how results can impact citizenship decisions. Fujii (2018) and Pearson and Meadan (2018) recommend developing an understanding of each unique family's immigration journey to avoid fixed stereotypes regarding countries of origin, prevent confounders to diagnosis, and promote receptivity to treatment. Additional suggestions for clinicians include understanding how treatment recommendations can be carried out (i.e. documentation and insurance status), determining social and community supports in place, establishing office policies to understand immigration status without fear of retribution, and partnering with social work to assist with care coordination and access to services.

Application of the ECLECTIC model in case-conceptualization assists the neuropsychologist with practicing in a culturally and linguistically inclusive manner that continues to acknowledge the uniqueness of the individual and family, and assists the clinical neuropsychologist in determining when consultation and/or referral should be sought for patient cultures truly unique to a clinician's practice. The ECLECTIC model can help frame significant clinical observations involving the child-parent dyad, wherein each of them may have a different dominant language, access to education, acculturation level, and comfort with testing (Hobson et al., 2016). Broader use of the ECLECTIC framework to guide pediatric assessment, diagnosis, and treatment plans for ASD within the appropriate cultural contexts is integral to achieving a more equitable neuropsychological service model.

References

American Education Research Association, American Psychological Association, & the National Council on Measurement in Education. (2014). *Standards for educational and psychological testing* (2nd ed.). American Education Research Association.

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.).

American Psychological Association. (2017a). *Ethical principles of psychologists and code of conduct (2002, amended effective June 1, 2010, and January 1, 2017)*. https://www.apa.org/ethics/code/

American Psychological Association. (2017b). *Multicultural guidelines: An ecological approach to context, identity, and intersectionality*. http://www.apa.org/about/policy/multicultural-guidelines.pdf

Attwood, T. (2006). *Asperger syndrome and girls: The pattern of abilities and development of girls with asperger's syndrome*. Future Horizons.

Bernier, R., Mao, A., & Yen, J. (2010). Psychopathology, families, and culture: Autism. *Child and Adolescent Psychiatric Clinics of North America*, 19, 855–867. https://doi.org/10.1016/j.chc.2010.07.005

Bernier, R., Mao, A., & Yen, J. (2010). Psychopathology, families, and culture: autism. *Child Adolesc Psychiatr Clin N Am*, 19(4), 855–867. https://doi.org/10.1016/j.chc.2010.07.005

Blanche, E. I., Diaz, J., Barretto, T., & Cermak, S. A. (2015). Caregiver experiences of Latino families with autism spectrum disorder. *American Journal of Occupational Therapy*, 69(5), 6905185010p1. https://doi.org/10.5014/ajot.2015.017848

Burkett, K., Morris, E., Manning-Courtney, P., Anthony, J., & Shambley-Ebron, D. (2015). African American families on autism diagnosis and treatment: The influence of culture. *Journal of Autism and Developmental Disorders*, 45, 3244–3254. https://doi.org/10.1007/s10803-015-2482-x

Canas, A., Bordes Edgar, V., & Neumann, J. (2020). Practical considerations in the Neuropsychological Assessment of Bilingual (Spanish-English) Children in the United States: Literature review and case series. *Developmental Neuropsychology*, 45(4), 211–231. https://doi.org/10.1080/87565641.2020.1746314

Cardenas, A., Villavicencio, L., & Pavuluri, M. (2017). Considerations in the neuropsychological evaluation and treatment of children with limited English proficiency. *The Permanente Journal*, 21(3), 16–149. https://doi.org/10.7812/TPP/16-149

Committee on Practice and Ambulatory Medicine, American Academy of Pediatrics (AAP) Bright Futures Periodicity Schedule Workgroup. (2020). 2020 recommendations for preventive pediatric health care. *Pediatrics*, 145(3), e20200013.

Constantino, J. N., Abbacchi, A. M., Saulnier, C., Klaiman, C., Mandell, D. S., Zhang, Y., Hawks, Z., Bates, J., Klin, A., Shattuck, P., Molholm, S., Fitzgerald, R., Roux, A., Lowe, J. K., & Geschwind, D. H. (2020). Timing of the diagnosis of autism in African American children. *Pediatrics*, 146(3), e20193629. https://doi.org/10.1542/peds.2019-3629

Cormier, D., Davidson, E., Young, A., & Augustyn, M. (2018). A young man with Trisomy 21 and sudden behavioral changes. *Journal of Developmental and Behavioral Pediatrics*, 39, 1–3.

Cory, J. M. (2021). White privilege in neuropsychology: An 'invisible knapsack' in need of unpacking? *The Clinical Neuropsychologist*, 35(2), 206–213. https://doi.org/10.1080/13854046.2020.1801845

Daugherty, J. C., Puente, A. E., Fasfous, A. F., Hidalgo-Ruzzante, N., & Pérez-Garcia, M. (2017). Diagnostic mistakes of culturally diverse individuals when using North American neuropsychological tests. *Applied Neuropsychology Adult*, 24, 16–22. https://doi.org/10.1080/23279095.2015.1036992

Dean, M., Harwood, R., & Kasari, C. (2017). The art of camouflage: Gender differences in the social behaviors of girls and boys with autism spectrum disorder. *Autism*, 21(6), 678–689. https://doi.org/10.1177/1362361316671845

Dean, M., Kasari, C., Shih, W., Frankel, F., Whitney, R., Landa, R., Lord, C., Orlich, F., King, B., & Harwood, R. (2014). The peer relationships of girls with ASD at school: comparison to boys and girls with and without ASD. *Journal of Child Psychology and Psychiatry*, 55(11), 1218–1225. https://doi.org/10.1111/jcpp.12242

Denmark, T., Atklnson, J., Campbell, R., & Swettenham, J. (2019). Signing with the face: Emotional expression in narrative production in deaf children with autism spectrum disorder. *Journal of Autism and Developmental Disorders*, 49, 294–306. https://doi.org/10.1007/s10803-018-3756-x

Durkin, M. S., Maenner, M. J., Baio, J., Christensnen, D., Daniels, J., Fitzgerald, R., Imm, P., Lee, L., Schieve, L. A., Braun, K. V. N., Wingate, M. S., & Yeargin-Allsopp, M. (2017, November). Autism spectrum disorder among US children (2002–2010): Socioeconomic, racial, and ethnic

disparities. *American Journal of Public Health*, *107*(11), 1818–1826. https://doi.org/10.2105/AJPH.2017.304032

Dyches, T. T. (2011). Assessing diverse students with autism and the role of SLPs: ASHA documents offer guidance. *Leader*, *16,* 11–15. www.asha.org/leader.aspx.

El-Ghoroury, N. H., & Krackow, E. (2012). Enhancing the identification of autism spectrum disorders via a model of culturally sensitive childhood assessment. *Professional Psychology: Research and Practice*, *43*(3), 249–255. https://doi.org/10.1037/a0027354

Elsabbagh, M., Divan, G., Koh, Y., Kim, Y. S., Kauchali, S., Marcin, C., Montiel-Nava, C., Patel, V., Paula, C. S., Wang, C., Yasamy, M. T., & Fombonne, E. (2012). Global prevalence of autism and other pervasive developmental disorders. *Autism Research*, *5*, 160–179. https://doi.org/10.1002/aur.239

Farver, J. M., Kim, Y. K., & Lee, Y. (1995). Cultural differences in Korean- and Anglo-American preschoolers' social interaction and play behaviors. *Child Development*, *66*, 1088–1099. https://doi.org/10.2307/1131800

Fujii, D. E. M. (2018). Developing a cultural context for conducting a neuropsychological evaluation within a culturally diverse client: the ECLECTIC framework. *The Clinical Neuropsychologist*, *32*(8), 1356–1392. https://doi.org/10.1080/13854046.2018.1435826

Harrison, A. J., Long, K. A., Tommet, D. C., & Jones, R. N. (2017). Examining the role of race, ethnicity, and gender on social and behavioral ratings within the Autism Diagnostic Observation Schedule. *Journal of Autism and Developmental Disorders*, *47*(9), 2770–2782. https://doi.org/10.1007/s10803-017-2176-3

Hobson, J. A., Tarver, L., Beurkens, N., & Hobson, R. P. (2016). The relation between severity of autism and caregiver-child interaction: A study in the context of relationship development intervention. *Journal of Abnormal Child Psychology*, *44*(4), 745–755. https://doi.org/10.1007/s10802-015-0067-y

Ilias, K., Cornish, K., Kummar, A. S., Park, M. S., & Golden, K. J. (2018). Parenting stress and resilience in parents of children with autism spectrum disorder (ASD) in Southeast Asia: A systematic review. *Frontiers in Psychology*, *9* (, 280. https://doi.org/10.3389/fpsyg.2018.00280

Interagency Autism Coordinating Committee (IACC). (2020). *IACC strategic plan for autism spectrum disorder (ASD) 2018–2019 update*. http://iacc.hhs.gov/strategic-plan/2019/.

International Test Commission. (2010). *International test commission guidelines for translating and adapting tests*. http://www.intestcom.org

Kids Count Data Center. (2018, January 11). *The number of bilingual kids in America continues to rise*. https://datacenter.kidscount.org/updates/show/184-the-number-of-bilingual-kids-in-america-continues-to-rise

Kopp, S., & Gillberg, C. (1992). Girls with social deficits and learning problems: autism, atypical Asperger syndrome or a variant of these conditions. *European Child & Adolescent Psychiatry*, *1*, 89–99. https://doi.org/10.1007/BF02091791

La Roche, M. J., Bush, H. H., & D'Angelo, E. (2018). The assessment and treatment of autism spectrum disorder: A cultural examination. *Practice Innovations*, *3*(2), 107–122. https://doi.org/10.1037/pri0000067

Landa, R. J. (2018). Efficacy of early interventions for infants and young children with, and at risk for, autism spectrum disorders. *International Review of Psychiatry*, *30*(1), 25–39. https://doi.org/10.1080/09540261.2018.1432574

Leeuw, A. D., Happe, F., & Hoekstra, R. A. (2020). A conceptual framework for understanding the cultural and contextual factors on autism across the globe. *Autism Research*, *13*(7), 1029–1022. https://doi.org/10.1002/aur.2276

Lipkin, P. H., Macias, M. M., & American Academy of Pediatrics (AAP) Council on Children with Disabilities, section on Developmental Behavioral Pediatrics. (2020). Promoting optimal development: Identifying infants and young children with developmental disorders through developmental surveillance and screening. *Pediatrics*, *145*(1), e20193449. https://doi.org/10.1542/peds.2019-3449

Lopez, K., Marroquin, J. M., & Gutierrez, C. (2020). Methods to decrease disparities in age of aut-ism diagnosis and treatment access among Latinx children. *Social Work*, *65*(2), 140–148. https://doi.org/10.1093/sw/swaa012

Lund, E. M., Kohlmeier, T. L., & Duran, L. K. (2017). Comparative language development in bilin-gual and monolingual children with autism spectrum disorder: A systematic review. *Journal of Early Intervention*, *39*(2), 106–124. doi: 10.1177/1053815117690871.

Maenner, M. J., Shaw, K. A., Baio, J., Washington, A., Patrick, M., DiRenzo, M., Christensen, D. L., Wiggins, L. D., Pettygrove, S., Andrews, J. G., Lopez, M., Hudson, A., Baroud, T., Schwenk, Y., White, T., Rosenberg, C. R., Lee, L., Harrington, R. A., et al. (2020). Prevalence of autism spec-trum disorder among children aged 8 years- Autism and Developmental Disabilities Monitoring Network, 11 Sites, United States, 2016. *MMWE Surveill Summ*, *69*(SS-4), 1–12. https://doi.org/10.15585/mmwr.ss6904a1

Mandell, D. S., Ittenbach, R. F., Levy, S. E., & Pinto-Martin, J. A. (2007). Disparities in diagnoses received prior to a diagnosis of autism spectrum disorder. *Journal of Autism and Developmental Disorders*, *37*(9), 1795–1802. https://doi.org/10.1007/s10803-006-0314-8

Mandell, D. S., Wiggins, L. D., Carpenter, L. A., Daniels, J., DiGuiseppi, C., Durkin, M. S., Giarelli, E., Morrier, M. J., Nicholas, J. S., Pinto-Martin, J. A., Shattuck, P. T., Thomas, K. C., Yeargin-Allsopp, M., & Kirby, R. S. (2009). Racial/ethnic disparities in the identification of children with autism spectrum disorders. *American Journal of Public Health*, *99*, 493–498. https://doi.org/10.2105/AJPH.2007.131243

Mesman, J., & Groeneveld, M. G. (2018). Gendered parenting in early childhood: Subtle unmistak-able if you know where to look. *Child Development Perspectives*, *12*(1), 22–27. https://doi.org/10.1111/cdep.12250

Nisbett, R. E., Peng, K., Choi, I., & Norenzayan, A. (2001). Culture and systems of thought: Holistic versus analytic cognition. *Psychological Review*, *108*, 291–310. https://doi.org/10.1037/0033-295x.108.2.291

Nowell, K. P., Brewton, C. M., Allain, E., & Mire, S. S. (2015). The influence of demographic factors on the identification of autism spectrum disorder: A review and call for research. *Review Journal of Autism and Developmental Disorders*, *2*(3), 300–309. https://doi.org/10.1007/s40489-015-0053-x

Pearson, J. N., & Meadan, H. (2018). African American parents' perceptions of diagnosis and serv-ices for children with autism. *Education and Training in Autism and Developmental Disabilities*, *53*(1), 17–32.

Pittenger, A. A., Erklin, S., & Wodka, E. L. (2019). The influence of demographic and child charac-teristics on referral for neuropsychological evaluation. *Archives of Clinical Neuropsychology*, *34*(8), 1418–1424. https://doi.org/10.1093/arclin/acy107

Rachubinski, A., Hepburn, S., Elias, E., Gardiner, K., & Shaikh, T. (2017). The co-occurrence of DS and autism spectrum disorder: Is it because of additional genetic variations? *Prenatal Diagnosis*, *37*(1), 31–36. https://doi.org/10.1002/pd.4957

Rothe, E. M., Tzuang, D., & Pumariega, A. J. (2010). Acculturation, development, and adaptation. *Child and Adolescent Psychiatric Clinics of North America*, *19*, 681–696. https://doi.org/10.1016/j.chc.2010.07.002

Salinas, C. M., Edgar, V. B., & Puente, A. E. (2016). Barriers and practical approaches to neuro-psychological assessment of Spanish speakers. In F. R. Ferraro (Ed.), *Studies on neuropsych-ology, neurology and cognition. Minority and cross-cultural aspects of neuropsychological assessment: Enduring and emerging trends* (pp. 229–258). Taylor & Francis.

Schieve, L. A., Boulet, S. L., Blumberg, S. J., Kigan, M. D., Yeargin-Allsopp, M., Boyle, C. A., Visser, S. N., & Rice, C. (2012). Association between parental nativity and autism spectrum disorder among US-born non-Hispanic white and Hispanic children, 2007 National Survey of Children's Health. *Disability Health Journal*, *5* (1), 18–25. https://doi.org/10.1016/j.dhjo.2011.09.001

Shattuck, P. T., Durkin, M., & Maenner, M. (2009). Timing of identification among children with an autism spectrum disorder: findings from a population-based surveillance study. *Journal of the American Academy of Child and Adolescent Psychiatry*, *48*(5), 474–483. https://doi.org/10.1097/CHI.0b013e31819b3848

Shorey, S., Ng, E. D., Haugan, G., & Law, E. (2020). The parenting experiences and needs of Asian primary caregivers of children with autism: A meta-analysis. *Autism*, *24*(3), 591–604. https://doi.org/10.1177/1362361319886513

Stein, D., Munir, K., Karweck, A., Davidson, E., & Stein, M. (2013). Developmental regression, depression, and psychosocial stress in an adolescent with DS. *Journal of Developmental & Behavioral Pediatrics*, *34*(3), 216–218. https://doi.org/10.1097/DBP.0b013e31828b2b42

Stoll, C., Palluel-Germain, R., Caldara, R., Lao, J., Dye, M. W., Aptel, F., & Pascalis, O. (2018, January). Face recognition is shaped by the use of sign language. *The Journal of Deaf Studies and Deaf Education*, *23*(1), 62–70. https://doi.org/10.1093/deafed/enx034

Sweet, J. J., Klipfel, K. K., Nelson, N. W., & Moberg, P. J. (2021). Professional practices, beliefs, and incomes of U.S. neuropsychologists: The AACN, NAN, SCN 2020 practice and "salary survey. *The Clinical Neuropsychologist*, *35*(1), 7–80. https://doi.org/10.1080/13854046.2020.1849803

Szarkowski, A., Mood, D., Shield, A., Wiley, S., & Yoshinaga-Itano, C. (2014). A summary of current understanding regarding children with autism spectrum disorder who are deaf or hard of hearing. *Seminars in Speech and Language*, *35*(4), 241–259. https://doi.org/10.1055/s-0034-1389097

Thurm, A., Farmer, C., Salzman, E., Lord, C., & Bishop, S. (2019). State of the field: Differentiating intellectual disability from autism spectrum disorder. *Frontiers in Psychiatry*, *10*, 526. https://doi.org/10.3389/fpsyt.2019.00526

Valicenti-McDermott, M., Tarshis, N., Schouls, M., Galdston, M., Hottinger, K., Seijo, R., Shulman, L., & Shinnar, S. (2013). Language differences between monolingual English and bilingual English-Spanish young children with autism spectrum disorders. *Journal of Child Neurology*, *28*(7), 945–948. https://doi.org/10.1177/0883073812453204

World Health Organization. (2019, November 7). *Autism spectrum disorders key facts*. https://www.who.int/news-room/fact-sheets/detail/autism-spectrum-disorders.

Zablotsky, B., Black, L. I., Maenner, M. J., Schieve, L. A., Danielson, M. L., Bitsko, R. H., Blumberg, S. J., Kogan, M. D., & Boyle, C. A. (2019). Prevalence and trends of developmental disabilities among children in the United States: 2009–2017. *Pediatrics*, *144*(4), e20190811. https://doi.org/10.1542/peds.2019-0811

Zuckerman, K. E., Mattox, K., Donelan, K., Batbayar, O., Baghaee, A., & Bethell, C. (2013). Pediatrician identification of Latino children at risk for autism spectrum disorder. *Pediatrics*, *132* (3), 445–453. doi: 10.1542/peds.2013-0383