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Comparison of Knowledge and Diagnostic Practices Relating to Autism Spectrum Disorder between the United States and Mexico

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COMPARISON OF KNOWLEDGE AND DIAGNOSTIC PRACTICES RELATING TO AUTISM SPECTRUM DISORDER BETWEEN THE UNITED STATES AND MEXICO

A Thesis

by

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ABSTRACT

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The present study examined and compared the knowledge, screening, and diagnostic practices of health care practitioners from Mexico and the United States (U.S.) as they relate to autism spectrum disorder (ASD). The participants included 56 healthcare professionals from the U.S. and 16 healthcare professionals from Mexico. Data was collected via an online survey. Overall, participants achieved a mean knowledge accuracy of 0.58 (SD=0.13). The mean accuracy of knowledge in Mexico was 0.52 (SD=0.13) and the mean accuracy of knowledge in the U.S. was 0.60 (SD=0.13). Location, years of experience, patient contact, and comfort level, were found to have a significant effect on the accuracy of knowledge. The screening and diagnostic practices in both the U.S. and in Mexico were found to differ in areas such as screening and diagnostic tools used, criteria, healthcare practitioners involved, observation of children in multiple settings, assessment setting, and others. The limited knowledge of healthcare practitioners found in this study is alarming and indicates a need for continuing education related to ASD. An understanding of the screening and diagnostic practices currently being used in Mexico and in the U.S. provides both researchers and clinicians with a better understanding of what is being implemented by different healthcare practitioners. Additionally,

an understanding of these practices Mexico will allow for improved diagnostic and intervention practices for individuals with ASD in the U.S. as the majority of immigrants are from Mexico.

Keywords: autism spectrum disorder, knowledge, screening, diagnosis, Mexico, United States of America

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CHAPTER I

INTRODUCTION

Autism spectrum disorder (ASD) is a neurodevelopmental disorder characterized by deficits in social interaction and communication and restricted and/or repetitive behaviors (American Psychiatric Association, 2013). Leo Kanner first identified ASD in the 1940's, and at this point the prevalence rate was estimated to be about 4-5 in 10,000 individuals (Kanner, 1943). Currently, in the U.S. 1 in 59 children receive a diagnosis of ASD with males being four times more likely than females to be identified as having ASD (Centers for Disease Control and Prevention, 2018). In addition, prevalence is noted to be higher for non-Hispanic white children compared with non-Hispanic black children, and both groups are more likely to be identified with ASD compared with Hispanic children (Centers for Disease Control and Prevention, 2018).

While we know the prevalence rate of ASD in the U.S., in Mexico, the prevalence rate of ASD is unknown (Harris & Barton, 2017). In 1996, it was estimated that approximately 1.43 per 1,000 children in Mexico were being diagnosed with ASD (Tuman, Roth-Johnson, Baker, & Vecchio, 2008). In 2014 another estimate was released, suggesting that between 1-4 per 1,000 inhabitants of Mexico were being diagnosed with ASD (Bravo oro, Esmer, & Navarro-Calvillo, 2014). In 2016, a study was conducted examining the prevalence of ASD in Guanajuato, Mexico. This study estimated that approximately 1 in 115 individuals in Guanajuato, Mexico are born with ASD (Fombonne, Marcin, Manero, Bruno, Diaz, Villalobos,…& Nealy, 2016).

ASD first appeared on the Diagnostic and Statistical Manual of Mental Disorders III (DSM-III) in 1980 (APA, 1980). The term 'Infantile Autism' was classified under the pervasive developmental disorders (PDD) with additional disorders including residual autism, childhood onset pervasive developmental disorder, and atypical pervasive developmental disorder (APA, 1980). Since the release of the DSM-III, the terminology and classification of ASD has undergone considerable change. The current most updated version of the DSM (the DSM-5) was published in 2013. In the DSM-5 the term 'autism spectrum disorder' is utilized and is described as a neurodevelopmental disorder marked by impairments in social communication and interaction and restricted and/or repetitive behaviors, patterns, and movements (APA, 2013).

The multiple changes in definition and classification of ASD that have occurred can be a cause for concern as healthcare practitioners may not be using the most current recommendations or criteria when diagnosing ASD. Additionally, this has the potential to negatively impact healthcare practitioner's accuracy of knowledge relating to ASD which in turn has the potential to negatively impact referral, screening, diagnostic, and subsequent intervention(s). Few researchers have examined the current status of knowledge of healthcare practitioners as it relates to ASD.

Just as we have limited information about the current knowledge relating to ASD of healthcare practitioner in the U.S., we also have limited knowledge about healthcare practitioner's knowledge relating to ASD in Mexico. Furthermore, we know little about the screening and diagnostic practices currently being practiced in Mexico. The purpose of the present study is to investigate the knowledge, screening, and diagnostic practices currently being

implemented in Mexico and in the U.S. in regard to ASD. This information will not only provide fundamental knowledge, but it will allow for improved diagnostic and intervention practices for individuals with ASD in the U.S. as the majority of immigrants are from Mexico.

CHAPTER II

BACKGROUND

History of ASD

The term 'autism' comes from the Greek word for self, 'autos'. This term was first used by Eugene Bleuler, a Swiss psychiatrist, to describe symptoms of schizophrenia. In 1912, Dr. Bleuler wrote a paper titled "The Theory of Schizophrenic Negativism" which was published in The Journal of Nervous and Mental Disease (Bleuler, 1912). In this paper, Bleuler described schizophrenia and the following theories of negativism: 1) *inner negativism* and 2) *external negativism*.

Bleuler described *inner negativism* as the "contrary tendency opposed to the will and intellectually opposed to the right thoughts" (Bleuler, 1912, p. 2). *External negativism* was described as 'the negation of external influences and what one would normally expect the patient to do' (Bleuler, 1912, p.2). The following causes for *external negativism* were identified:

a) Autistic withdrawing of the patient into his own phantasies;
b) The existence of a hurt which must be protected from contacts;
c) The misunderstanding of the surroundings and their purpose;
d) Direct hostile relations to the surroundings;
e) The pathological irritability of the schizophrenic;

f) The pressure of thought and other difficulties of action and of thought, through which every reaction becomes painful;

g) The sexuality with its ambivalent feeling tones.

In 1943, Leo Kanner, an Austrian-American psychiatrist and physician, conducted a study examining 11 children (eight boys and three girls) under the age of 11, who displayed unique characteristics with individual differences in the extensity of their disorder. In his paper titled, "Autistic Disturbances of Affective Contact", Kanner described individuals that presented with rare features of a "syndrome" that had not yet been identified but which he predicted as probably more frequent than had been indicated. The children in the study were described by their parents as being "self-sufficient", "in a shell", "happiest when left alone", "acting as if people weren't there", "perfectly oblivious to everything about him", "giving the impression of silent wisdom", "failing to develop the usual amount of social awareness", and "acting almost as if hypnotized" (Kanner, 1943). Kanner (1943) described these children as having an outstanding "pathognomonic" fundamental disorder characterized by the inability to relate themselves in an ordinary way to people and/or situations, from the beginning of life. He classified these individuals as having 'Infantile Autism' (Kanner, 1943).

Kanner (1943) reported that the children with Infantile Autism appeared to disregard, ignore, and shut out anything that comes from the outside. Eight of the eleven children he observed had the ability to speak either at the typical age or after some delay, and the remaining three children had not acquired language. Many of the children that were able to speak struggled with conveying meaningful speech. Parents reported that the language of their children consisted

mainly of naming nouns and identifying objects, adjectives, colors, and numbers. The children were described to have parrot-like repetitions of word combinations, delayed echolalia, and literalness of words. Interruptions that disrupted the children in the study were noted to be food, loud noises and moving objects which the children reacted to with horror (Kanner, 1943). Kanner describes the children's speech as monotonously repetitious, and their behavior as controlled by an "anxiously obsessive desire for the maintenance of sameness" and a "limitation in the variety of spontaneous activity" (Kanner, 1943 p. 245-246). Kanner further described that although these children were often seen as "feebleminded", he determined that they were all competent and with good "cognitive potentialities" (Kanner, 1943 p. 247).

In 1944, Hans Asperger, an Austrian pediatrician, published his thesis "Autistic Psychopathy in Childhood". The paper described four boys that presented with an "autistic psychopathy" known as Asperger's syndrome. The children Asperger initially described, did not portray the language characteristics that Kanner (1943) described, such as echolalia, but instead had "clever-sounding" language, new invented words, and would typically speak more like adults than children (Frith, 1991). Asperger was the first to report the impaired characteristics of non-verbal communication such as eye gaze, gestures, posture, voice quality, prosody, and word choice. He considered these aspects to be of fundamental importance in the clinical understanding of autism.

In the 1960's and 1970's, Dr. Arn Van Krevelen and his colleague introduced Hans Asperger's work to English readers and argued for the separation of the two syndromes described by Kanner (1943) and Asperger (1944), Early Infantile Autism and Autistic

Psychopathy (Asperger's) respectively (Van Krevelen & Kuipers, 1962; Van Krevelen, 1971). Van Krevelen (1971) believed that early infantile autism and autistic psychopathy (Asperger's) were two entirely different syndromes and listed the major differentiating features of the two. These are summarized in Table 1.

Table 1

Comparison of Early Infantile Autism and Autistic Psychopathy

Early Infantile Autism	Autistic Psychopathy
• Manifestation age: first month of life.	• Manifestation age: third year of life or later.
• Child walks earlier than he speaks; speech is retarded or absent.	• Child walks late, speaks earlier.
• Language does not attain the function of communication.	• Language aims at communication but remains "one-way traffic."
• Eye contact: other people do not exist.	• Eye contact: other people are evaded.
• The child lives in a world of his own.	• The child lives in our world in his own way.
• Social prognosis is poor.	• Social prognosis is rather good.
• A psychotic process.	• A personality trait.

Definition and Classification of ASD

The Diagnostic and Statistical Manual of Mental Disorders (DSM) is one of the most common tools used to classify and diagnose ASD (APA, 2013). In 1980, the third edition of the DSM was released (DSM-III) (APA, 1980). This was the first time that ASD was included in the DSM and the first time that ASD was distinguished from childhood schizophrenia.

The DSM-III used the term 'Infantile Autism (IA)' for what is known today as ASD. Infantile Autism was classified under the pervasive developmental disorders (PDD). Additional disorders classified under this category included: residual autism, childhood onset pervasive

developmental disorder (COPDD), and atypical pervasive developmental disorder (APDD) (APA, 1980). The diagnoses residual autism and COPDD were to be used to diagnose individuals that once met the full criteria for infantile autism, but no longer did. APDD was a term used for children with multiple developmental distortions in social skills and language that did not meet the criteria for either IA or COPDD.

The DSM-III defined infantile autism (IA) as an early onset disorder occurring prior to 30 months of age. Additionally, IA was characterized by pervasive lack of responsiveness to other people, gross deficits in language development, peculiar speech patterns, bizarre responses to the environment, and an absence of delusions, hallucinations, loosening of associations, and incoherence as in schizophrenia (APA, 1980). COPDD differs from IA with an onset of after 30 months of age and before 12 years of age. It is characterized by impaired social relatedness, absence of delusions or hallucinations, and at least three of the following: resistance to change, inappropriate or constricted affect, sudden excessive anxiety, peculiar movements, abnormal speech patterns, under or oversensitivity to sensory stimuli, and self-mutilation (APA, 1980).

In 1987, the DSM III-Revised (DSM III-R) was released with revised diagnostic criteria for ASD and introduced the term ‘autistic disorder’. Autistic disorder continued to be classified under the category Pervasive Developmental Disorders (Axis II). Additional disorders classified under Pervasive Developmental Disorders (Axis II) included Pervasive Developmental Disorder Not Otherwise Specified (PDD-NOS). In order to meet criteria for a diagnosis of autistic disorder, at least eight of sixteen listed symptoms must be present (APA, 1987). Of these, the individual must present with at least two impairments listed under reciprocal social interaction

(see Table 2 below), a minimum of one impairment listed under verbal and nonverbal communication and imaginative activity (see Table 2 below), and a minimum one impairment listed under restricted repertoire of activities and interests (see Table 2 below).

Table 2

DSM III-R Diagnostic criteria for autistic disorder.

A. Qualitative impairment in reciprocal social interaction as manifested by the following:
    1. Marked lack of awareness of the existence or feelings of others.
    2. No or abnormal seeking of comfort at times of distress.
    3. No or impaired imitation.
    4. No or abnormal social play.
    5. Gross impairment in ability to make peer friendships.
B. Qualitative impairment in verbal and nonverbal communication and in imaginative activity.
    1. No mode of communication, such as: communicative babbling, facial expression, gesture, mime, or spoken language.
    2. Markedly abnormal nonverbal communication, as in the use of eye-to-eye gaze, facial expression, body posture, or gestures to initiate or modulate social interaction.
    3. Absence of imaginative activity, such as play-acting of adult roles, fantasy character or animals; and lack of interest in stories about imaginary events.
    4. Marked abnormalities in the production of speech, including volume, pitch, stress, rate, rhythm, and intonation.
    5. Marked abnormalities in the form or content of speech, including stereotyped and repetitive use of speech.
    6. Marked impairment in the ability to initiate or sustain a conversation with others, despite adequate speech.
C. Markedly restricted repertoire of activities and interests as manifested by the following:
    1. Stereotyped body movements.
    2. Persistent preoccupation with parts of objects.
    3. Marked distress over changes in trivial aspects of environment.
    4. Unreasonable insistence on following routines in precise detail.
    5. Markedly restricted range of interests and a preoccupation with one narrow interest.
D. Onset during infancy or early childhood. Specify if childhood onset is after 36 months of age.

In 1994, the DSM-IV included multiple additional disorders under the category Pervasive Developmental Disorders. These included: Autistic Disorder, PDD-NOS, Asperger's Disorder, Rett's Disorder, and Childhood Disintegrative Disorder. Per the DSM IV, in order to meet criteria for a diagnosis of autistic disorder, at least six or more items of the listed symptoms must be present (APA, 1994). Of these, the individual must present with a minimum of two impairments listed under qualitative impairment in social interaction (see Table 3 below), one impairment under qualitative impairments in communication (see Table 3 below) and another impairment under restricted, repetitive, and stereotyped patterns of behavior, interests, and activities (see Table 3 below).

Table 3

DSM IV Diagnostic criteria for autistic disorder.

A. Qualitative impairment in social interaction, as manifested by at least two of the following:
   1. Marked impairment in the use of multiple nonverbal behaviors such as eye-to-eye gaze, facial expression, body postures, and gestures to regulate social interaction.
   2. Failure to develop peer relationships appropriate to developmental level
   3. A lack of spontaneous seeking to share enjoyment, interests, or achievements with other people
   4. Lack of social or emotional reciprocity

B. Qualitative impairments in communication, as manifested by at least one of the following:
   1. Delay in, or total lack of, the development of spoken language
   2. Marked impairment in the ability to initiate or sustain a conversation with others.
   3. Stereotyped and repetitive use of language or idiosyncratic language
   4. Lack of varied, spontaneous make-believe play or social imitative play appropriate in developmental level

C. Restricted, repetitive, and stereotyped patterns of behavior, interests, and activities as manifested by at least one of the following:
   1. Encompassing preoccupation with one or more stereotyped and restricted patterns of interest that is abnormal either in intensity or focus
   2. Apparently inflexible adherence to specific, nonfunctional routines or rituals
   3. Stereotyped and repetitive motor mannerisms

4. Persistent preoccupation with parts of objects Delays or abnormal functioning in at least one of the following areas, with onset prior to age 3 years: (1) social interaction, (2) language as used in social communication, or (3) symbolic or imaginative play. The disturbance is not better accounted for by Rett's disorder or childhood disintegrative disorder.

The characteristics observed in Asperger's syndrome cause clinically significant impairments in social, occupation, or other important areas of functioning (see Table 4 below). There is no clinically significant general delay in language, cognitive development, or in the development of age-appropriate self-help skills, adaptive behavior, and curiosity about the environment in childhood. Criteria are not met for another specific pervasive developmental disorder or schizophrenia (APA, 1994).

Table 4

DSM-IV Diagnostic criteria for Asperger's Syndrome.

A. A qualitative impairment in social interaction, as manifested by at least two of the following: 1. Marked impairment in the use of multiple nonverbal behaviors, such as eye-to-eye gaze, facial expression, body postures, and gestures to regulate social interaction. 2. Failure to develop peer relationships appropriate to developmental level 3. A lack of spontaneous seeking to share enjoyment, interests, or achievements with other people. 4. Lack of social or emotional reciprocity B. Restricted, repetitive, and stereotyped patterns of behavior, interests, and activities, as manifested by at least one of the following: 1. Encompassing preoccupation with one or more stereotyped and restricted patterns of interest that is abnormal either in intensity or focus 2. Apparently inflexible adherence to specific, nonfunctional routines or rituals 3. Stereotyped and repetitive motor mannerisms 4. Persistent preoccupation with parts of objects

In 2013 the DSM-5 was published. This is the most current version of the DSM to date. ASD is no longer classified under the category 'Pervasive Developmental Disorders' and is

listed as a single diagnosis. Additionally, the diagnoses Asperger's and PDD-NOS are no longer valid. The DSM-5 suggests that severity levels be specified when diagnosing ASD. There are three specified levels: requiring support, requiring substantial support, and requiring very substantial support (APA, 2013). A description of the social communication skills and restricted, repetitive behaviors associated with each level is provided in Table 5.

Table 5

Severity levels suggested by the DSM-5 for ASD

Severity Level	Social Communication	Restricted, Repetitive behaviors
Level 1: Requiring Support	Without supports in place, deficits in social communication cause noticeable impairments. Difficulty initiating social interactions, and clear examples of atypical or unsuccessful responses to social overtures of others. May appear to have decreased interest in social interaction. For example, a person who is able to speak in full sentences and engages in communication but whose to-and-fro conversation with others fails, and whose attempts to make friends are odd and typically unsuccessful.	Inflexibility of behavior causes significant interference with functioning in one or more contexts. Difficulty switching between activities. Problems of organization and planning hamper independence.
Level 2: Requiring Substantial Support	Marked deficits in verbal and nonverbal social communication skills; social impairments apparent even with supports in place; limited initiation of social interactions; and reduced or abnormal responses to social overtures from others. For example, a person who speaks simple sentences, whose interaction is limited to narrow special interests, and who has markedly odd nonverbal communication.	Inflexibility of behavior, difficulty coping with change, or other restricted/ repetitive behaviors appear frequently enough to be obvious to the casual observer and interfere with functioning in a variety of contexts. Distress and/ or difficulty changing focus or action.

Level 3: Requiring Very Substantial Support	Severe deficits in verbal and nonverbal social communication skills cause severe impairments in functioning, very limited initiation of social interactions, and minimal response to social overtures from others. For example, a person with few words of intelligible speech who rarely initiates interaction and, when he or she does, makes unusual approaches to meet needs only and responds to only very direct social approaches.	Inflexibility of behavior, extreme difficulty coping with change, or other restricted/ repetitive behaviors markedly interfere with functioning in all spheres. Great distress/ difficulty changing focus or action.

Prevalence of ASD in the U.S. and Mexico

In the U.S., the prevalence rate of ASD has increased exponentially since researchers began tracking it in 2000 (CDC, 2018). Currently, it is estimated that 1 in 59 children are born with ASD (CDC, 2018). This prevalence has more than doubled since the initial prevalence rate detected in 2000 of 1 in 150 individuals (CDC, 2018).

In Mexico, the prevalence rate of ASD remains unknown (Harris & Barton, 2017); however, studies have attempted to estimate the prevalence rate. In 1996, it was estimated that approximately 1.43 per 1,000 children in Mexico were being diagnosed with ASD (Tuman et al., 2008). In 2014, another estimate suggested that between 1-4 per 1,000 inhabitants of Mexico were being diagnosed with ASD (Bravo oro et al., 2014). More recently, Fombonne et al. (2016) conducted a study examining the prevalence of ASD in Guanajuato, Mexico. The study estimated that approximately 1 in 115 individuals in Guanajuato, Mexico are born with ASD (Fombonne et al., 2016). It appears that the prevalence of ASD in Mexico has increased recently

at a rate of 10-17% per year (Tuman et al., 2008); however more research needs to be conducted related to the prevalence of ASD in Mexico.

The limited information related the prevalence rate of ASD in Mexico has been attributed to an absence of consistent and systematic tracking of ASD and irregularities in identification procedures throughout the country (Marquez-Caraveo & Albores-Gallo, 2011). Estimates of prevalence rates have also been found to vary significantly based upon geographic area and inaccurate reporting procedures (Bravo oro et al., 2014).

Screening and Diagnostic Practices in the U.S.

In the U.S., ASD must be diagnosed by a medical doctor (CDC, 2018). Common medical doctors providing diagnoses of ASD include: Pediatricians, Neurodevelopmental Pediatrician, Child Neurologist, Child Psychiatrist, and Developmental-behavioral Pediatrician (CDC, 2018).

While it is acceptable for an individual medical doctor to provide a diagnosis of ASD, it is currently recommended that diagnoses be made by a multidisciplinary team consisting of a variety of health care professionals including, but not limited to medical doctors, pediatricians, neurologists, psychiatrists, neuropsychologists, psychologists, early childhood professionals, teachers, counselors, speech and language pathologists, and occupational therapists (CDC, 2018).

When an individual is suspected of presenting with ASD, there are two main processes that are typically conducted: 1) Screening for ASD and 2) a comprehensive diagnostic evaluation (CDC, 2018). These processes are described in detail in the sections below.

Screening for ASD

The American Academy of Pediatrics recommends that all children be screened for ASD at their 18- and 24-month well-child visits (APA, 2013). It is important to note that screening tools do not provide conclusive evidence of ASD and do not provide a diagnosis (CDC, 2018). If any characteristics associated with ASD are observed during the screening process, a comprehensive diagnostic evaluation should be performed (APA, 2013). Some commonly used screening tools used for the screening of ASD include: the Modified Checklist for Autism in Toddlers (M-CHAT) (Barton, Fein, & Robins, 2001; 2009), the Screening Tool for Autism in Toddlers and Young Children (STAT) (Stone & Ousley, 2000; 2004), Ages and Stages Questionnaires, Third Edition (ASQ-3) (Bricker & Squires, 2009), Communication and Symbolic Behavior Scales (CSBS) (Prizant & Wetherby, 2003), and Parents' Evaluation of Developmental Status (PEDS) (Glascoe, 1997).

The M-CHAT is a questionnaire that the parent of the child completes, and it is designed to identify children in the general population that are at risk for autism (Barton, Fein, & Robins, 2001; 2009). The STAT is an interactive screener that is designed for children that are suspected to have developmental problems. The screener is made up of 12 activities that assess play, communication, and imitation skills (Stone & Ousley, 2000; 2004). The ASQ-3 is a general developmental screening tool which the parent of the child completes (Bricker & Squires, 2009). It consists of a series of 19 age-specific questionnaires that screen communication, gross motor, fine motor, problem-solving, and personal adaptive skills. This screener results in a pass/fail score (Bricker & Squires, 2009). The CSBS is a standardized tool that screens communication

and symbolic abilities up to 24 months of age (Prizant & Wetherby, 2003). This screener also includes an Infant Toddler Checklist which the parent of the child completes (Prizant & Wetherby, 2003). The PEDS is a general developmental screening tool for all ages which screens for developmental and behavioral problems that require further evaluation (Glascoe, 1997).

Comprehensive Diagnostic Evaluation

Current recommendations for ASD diagnostic evaluations in the U.S. include an evaluation(s) conducted by a multidisciplinary or transdisciplinary team of healthcare professionals (CDC, 2018). These healthcare professionals include but are not limited to: speech-language pathologists, occupational therapists, psychologists, psychiatrists, neurologists, pediatricians, and social workers.

The Centers for Disease Control and Prevention (2018) states that no single tool should be used as the basis for diagnosing ASD during a diagnostic evaluation. Diagnostic tools usually rely on two sources of information, the parents' or caregivers' descriptions of the child's development and a professional's observation (CDC, 2018). This evaluation may also include a hearing and vision screening, genetic testing, neurological testing, and other medical testing (CDC, 2018).

Some examples of diagnostic tools include the Autism Diagnosis Interview-Revised (ADI-R) (Rutter, LeCouteur, & Lord, 2003, 2008), the Autism Diagnostic Observation Schedule, Second Edition (ADOS-2) (Lord, Rutter, DiLavore, Risi, Gotham, & Bishop, 2012), the Childhood Autism Rating Scale, Second Edition (CARS-2) (Schopler, Bourgondien, Wellman

2010), and the Gilliam Autism Rating Scale, Third Edition (GARS-3) (Gilliam, 2013). Additionally, the DSM-5 provides standardized criteria to help diagnose ASD (CDC, 2018).

The ADI-R is used for the diagnosis of ASD, planning treatment, and differentiating ASD from other developmental (Rutter et al., 2003). This is assessment can be used with both children and adults and he scores provide results in the areas of language/communication, reciprocal social interactions, and repetitive behaviors/interests (Rutter et al., 2003). The ADOS-2 allows for accurate assessment and diagnosis of ASD across age, developmental level, and language skills. This assessment can be used with individuals who are 12 months old through adulthood (Lord et al., 2012). The CARS-2 aids in the identification of children with ASD and determines symptom severity through quantifiable ratings based on direct observation (Schopler, & Bourgondien, 2010). The assessment can be administered on individuals of 2 years and up. The GARS-3 is a rating scale that helps identify and diagnose ASD in children and young adults (Gilliam, 2013). The assessment can be administered on individuals ranging from 3 to 22 years old.

International best practice guidelines for ASD diagnosis include a "gold standard" diagnostic evaluation which would follow a rigorous assessment practice which includes gathering information from more than one setting involving a multi-disciplinary team of healthcare providers including a pediatrician, psychologist, speech and language pathologist and occupational therapist (Taylor et al., 2016). This would provide information about a child's strengths and difficulties in distinct areas which are important for intervention planning (Taylor et al., 2016). However, studies show that while some clinicians work in a multidisciplinary

assessment team, others practice independently and seldom collaborate with other professionals to diagnose the individual (Taylor et al., 2016).

Screening and Diagnostic Practices in Mexico

Little information is available pertaining to the screening and diagnostic practices relating to ASD currently being practiced in Mexico. According to the 2012 Mexican Public Health Service's Clinical Guide to Diagnosing and Managing ASD, in Mexico, ASD can be diagnosed by a family doctor, a medical psychiatrist, or a developmental psychiatrist with primary focus on infants and adolescents (Secretaria de Salud, 2012). It is stated that pediatric nurses and pediatricians have not yet incorporated a practical system for monitoring the development of the child that would allow for early and reliable diagnosis of ASD (Secretaria de Salud, 2012). Additionally, the Mexican Public Health Service's Clinical Guide to Diagnosing and Managing ASD recommends that there are multiple instruments and classifications systems available to aid in the screening, assessment, and diagnosis of ASD.

Screening for ASD in Mexico

In Mexico, screening practice recommendations are stated in the 2012 Mexican Public Health Service's Clinical Guide to Diagnosing and Managing ASD. This manual recommends that there are multiple instruments that can be utilized for screening individuals for ASD. These include the Checklist for Autism in Toddlers (CHAT), the Quantitative Checklist for Autism in Toddlers (Q-CHAT), and the M-CHAT (Secretaria de Salud, 2012). A relatively few number of researchers have examined the screening practices related to ASD in Mexico or if the

recommendations stated in the Mexican Public Health Guide are being followed consistently throughout healthcare disciplines in Mexico.

As of 2014, it was found that many families first began to suspect ASD around the age of 4 (Albores, et al., 2008). Bravo Oro et al., 2014 found that parents are often the first individuals in Mexico to express concerns with their child's development and either seek the assistance of physicians or school personnel. Most frequently reported parent concerns in this study were that their child had not learned to speak, was struggling with speaking, or seemed to have lost language abilities. Secondary concerns included behavioral challenges and social issues. In regards to the referral process subsequent to a failed screening, Harris and Barton (2017) found that the most common referral for a comprehensive evaluation was coming from a medical professional (Harris &, Barton, 2017).

Comprehensive Diagnostic Evaluation in Mexico

According to the 2012 Mexican Public Health Service's Clinical Guide to Diagnosing and Managing ASD, in Mexico, ASD can be diagnosed by a family doctor, a medical psychiatrist, or a developmental psychiatrist with primary focus on infants and adolescents (Secretaria de Salud, 2012). Additionally, it is recommended that two systems be used to classify and diagnose ASD including: 1) the most recent and revised version of the DSM and 2) the World Health Organization (WHO) manual (Secretaria de Salud, 2012). A study conducted by Harris and Barton (2017) found that the majority of healthcare practitioners in Mexico reported use of the DSM-IV for ASD diagnosis, an outdated version.

In a study conducted by Harris and Barton (2017), it was observed that most children in Mexico received a diagnosis of ASD at a later age than children in other countries (Harris & Barton, 2017). These children often receive a diagnosis after 4 years of age, although there is reliable and valid diagnostic assessments that can identify ASD in children by the age of 2 (Harris & Barton, 2017). It was noted that family beliefs and perceptions toward having a child with ASD could impact the child's age of diagnosis. A study conducted by Campbell & Duarte (1993) found that families raising children with ASD face multiple challenges such as potential social stigma, feelings of isolation, possible distance from family members, and depression. In regard to parenting responsibilities, gender roles in Mexico generally leave parenting to mothers and there is a prevalent notion that deficits in the child are caused by the mother (Santana & Santana, 2001).

According to the Harris and Barton (2017) study the health care provider that most commonly diagnoses ASD in Mexico is a psychologist, followed by a medical doctor. Bravo oro and colleagues (2014) found that in regards to ASD diagnostic practices, families in Mexico are often referred to specialized clinics where neuropsychologists conduct diagnostic assessments. Other professionals may be involved for differential diagnosis. Bravo et al. (2014), also reported that professionals in Mexico often use the DSM-IV-TR for diagnostic purposes along with the M-CHAT, CARS, ADOS, and ADI-R screening and diagnostic assessments. However, the ADI-R has not been validated in Mexico (Harris & Barton, 2017).

Immigration

According to the most recent U.S. Census released in 2010, 11.7 million individuals from Mexico immigrate into the U.S. every year. This ranked them the largest immigrant group from one country into the U.S. and made them the highest percentage of the total foreign-born population from one country with 29% (U.S. Census Bureau, 2010).

As of July 2016, Mexican Americans comprised 63.2% of all Hispanics and Latinos residing in the U.S. (U.S. Census Bureau, 2017). Individuals from Mexico are the largest foreign-born population, accounting for 25% of the 44.5 million immigrants as of 2017 (U.S. Census Bureau, 2017).

According to the U.S. Department of Education, National Center for Education Statistics, Common Core of Data (CCD), as of 2018 there were a total of 50.7 million students enrolled in U.S. public schools. Out of those 50.7 million students, 14 million are Hispanics ranking them the second largest population in the U.S. after the white population. The Hispanic population of students enrolled in U.S. public schools is the largest minority population. This number is projected to continue to increase as the white and black populations are projected to continue to decrease.

The fact that Mexican Americans comprised 63.2% of all Hispanics and Latinos residing in the U.S. in 2017 (U.S. Census Bureau, 2017) and that the Hispanic population of students enrolled in US public schools is the largest minority population indicates that healthcare practitioners working in the U.S. will encounter individuals from Mexico in their daily practice.

Understanding the knowledge level, screening and diagnostic practices of ASD in Mexico can help better understand and work with these individuals and their families.

Summary

ASD is a neurodevelopmental disorder characterized by deficits in social interaction and communication and restricted and/or repetitive behaviors (American Psychiatric Association, 2013). The term 'autism' was first used to describe symptoms of schizophrenia (Bleuler, 1912). In 1943, Leo Kanner studied children who were characterized by the inability to relate themselves in an ordinary way to people or situations from an early stage and were classified as having 'Infantile Autism' (Kanner, 1943). In 1944, Hans Asperger described children who did not portray the same language characteristics described by Kanner, but instead described the children as speaking more like adults and portraying impaired non-verbal communication (Frith, 1991). Asperger described these children as having 'Autistic Psychopathy' (Frith, 1991). The need for a differentiation between these two syndromes was introduced by Dr. Arn Van Krevelen and his colleague in the 1960's and 1970's (Van Krevelen & Kuipers, 1962; Van Krevelen, 1971). Van Krevelen (1971) described Early Infantile Autism and Autistic Psychopathy (Asperger's) as two entirely different syndromes and listed the major differentiating features of the two.

ASD first appeared in the DSM in its third edition, the DSM-III, in 1980 (APA, 1980). This was the first time that ASD was distinguished from childhood schizophrenia. In the DSM-III, the term 'Infantile Autism' was classified under PDD with the following additional disorders: residual autism, childhood onset pervasive developmental disorder, and atypical pervasive developmental disorder (APA, 1980).

Since the release of the DSM-III, the terminology and classification of ASD has undergone considerable change. In 1987, the DSM-III-R was released and the terminology and criteria for ASD was changed from 'infantile autism to 'autistic disorder' (APA, 1987), In 1994 the terminology and classification for ASD was changed yet again with the release of the DSM-IV. The term 'Autistic Disorder' was introduced, remaining under the PDD category with the following additional disorders: Asperger's Disorder, Rett's Disorder, Pervasive developmental disorder, not otherwise specified (PDD-NOS), and Childhood Disintegrative Disorder (APA, 1994).

The current most updated version of the DSM was published in 2013. The DSM-V introduced the term 'autism spectrum disorder' and no longer classified this disorder under the category PDD. ASD is listed as a single diagnosis (APA, 2013), encompassing Asperger's disorder and PDD-NOS. Additionally, three severity levels were introduces including: level one (requiring support), level two (requiring substantial support), and level three (requiring very substantial support) (APA, 2013).

In the U.S. the prevalence rate of ASD has more than doubled since the initial prevalence rate detected in 2000 of 1 in 150 individuals (CDC, 2018). Currently, it is estimated that 1 in 59 children are born with ASD with males being four times more likely than females to be identified as having ASD (CDC, 2018). Prevalence estimates are noted to be higher for non-Hispanic white children compared with non-Hispanic black children, and both groups were more likely to be identified with ASD compared with Hispanic children (CDC, 2014). In Mexico the prevalence rate of ASD remains unknown (Harris & Barton, 2017).

A relatively few number of researchers have examined the estimated prevalence, screening and diagnostic practices related to ASD in Mexico. In 1996, it was estimated that approximately 1.43 per 1,000 children in Mexico were being diagnosed with ASD (Tuman, Roth-Johnson, Baker, & Vecchio, 2008), in 2014 another estimate was released suggesting that between 1-4 per 1,000 inhabitants of Mexico were being diagnosed with ASD (Bravo oro et al., 2014), and in 2016, Fombonne et al. (2016) estimated that approximately 1 in 115 individuals in Guanajuato, Mexico are born with ASD.

In 2014, Bravo oro et al. (2014) examined the diagnostic and intervention practices of ASD in Mexico. They found that families were most likely to present complaints about a child's language skills to physicians or school personnel and that vhealthcare practitioners in Mexico use the DSM-IV-TR (APA, 2000) for diagnostic purposes and the M-CHAT, CARS, ADOS, and ADI-R screening and diagnostic tools. Other studies have found that Mexican children typically receive a diagnosis of ASD around 4 years of age (Albores, Hernandez, Diaz, & Cortex, 2008), even though reliable and valid diagnostic assessments are available to identify children with ASD as young as 2 years of age (Kleinman et al., 2007).

Considering there is limited information available regarding the prevalence rate of ASD in Mexico and the screening and diagnostic practices currently implemented by healthcare practitioners, researching screening and diagnostic practices currently being implemented in Mexico would be useful for healthcare practitioners working in the U.S. as the majority of immigrants are from Mexico. In addition, frequent changes made to the criteria of ASD diagnosis, can be a cause of concern as there is limited information on whether healthcare

practitioners of different disciplines are consistently following the most current recommendations and criteria for diagnosing ASD. Understanding the knowledge relating to ASD of healthcare practitioners in Mexico and in the U.S. would be highly beneficial in order to understand how it relates to screening and diagnostic practices.

CHAPTER III

RESEARCH QUESTIONS AND HYPOTHESIS

The purpose of the present study is threefold: 1) to investigate the knowledge as it relates to ASD for healthcare practitioners in the U.S. and in Mexico, 2) to investigate the screening and diagnostic practices as they relate to ASD in Mexico and the U.S., and 3) compare the screening and diagnostic practices relating to ASD of healthcare practitioners in the U.S. and Mexico. More specifically, the following research questions will be addressed:

1. What is the accuracy of knowledge regarding ASD for healthcare practitioners in Mexico and in the U.S.?
2. What are the current screening practices for ASD in Mexico and the U.S.?
3. What are the current diagnostic practices for ASD in Mexico and the U.S.?

It is hypothesized that:

1. Healthcare practitioners in both the U.S. and Mexico will have an accuracy of knowledge of less than 100%. Additionally, it is hypothesized that the participants from Mexico will have a lower accuracy of knowledge thank participants from the U.S. It is hypothesized that healthcare practitioners in both the U.S. and Mexico will have a limited accuracy of knowledge due to the consistent revisions of classification of ASD in the DSM. It is hypothesized that the healthcare practitioners in Mexico will have a lower accuracy of knowledge relating to ASD due to a lack of consistency in terms of classification of ASD in this country, limited access to resources, and the fact that the Mexican Public Health

Guide has not been updated since 2012. Additionally, there is no knowledge as to whether this guide is being used or not.

2. It is hypothesized that there will be a difference between Mexico and the U.S. in regards to screening practices. It is hypothesized that in Mexico, participants will report use of the following screening practices and instruments: physicians, school personnel, and neuropsychologists will be involved in screening practices and the CHAT, Q-CHAT, M-CHAT will be used as a screening assessment. This is due to results from the Harris & Barton (2017) in addition to recommendations from the Mexican Public Health Guide (Secretaria de Salud, 2012). Additionally, it is hypothesized that in the U.S. participants will report use of the following screening practices and instruments: children are screened for ASD at their 18- and 24- month well-child visits, the M-CHAT, STAT, ASQ-3, CSBS, and PEDS will be used as screening tools. This is due to recommendations from the American Academy of Pediatrics (AAP, 2013) and the Centers for Disease Control and Prevention (CDC, 2018).
3. It is hypothesized that there will be a difference between Mexico and the U.S. in regards to diagnostic practices. It is hypothesized that in Mexico, participants will report use of the following diagnostic practices and instruments: ASD will be diagnosed by a family doctor, medical psychiatrist, or a developmental psychiatrist. This is due to recommendations from the Mexican Public Health Guide (Secretaria de Salud, 2012). In addition the DSM-IV-TR or the most recent and revised version of the DSM, and the WHO manual will be used for diagnostic purposes. This is due to results obtained from a

study conducted by Harris and Barton (Harris & Barton, 2017) and recommendations stated on the Mexican Public Health Guide (Secretaria de Salud, 2012). The CARS, ADOS, and ADI-R will be used as diagnostic tools and healthcare practitioners in Mexico will use diagnostic tools not validated in Mexico. This information derives from the study conducted by Harris and Barton (Harris & Barton, 2017). It is hypothesized that in the U.S., participants will report use of the following diagnostic practices and instruments: the evaluation will be conducted by a multidisciplinary or transdisciplinary team of healthcare practitioners, ASD will be diagnosed by a medical doctor, parents will be involved in diagnostic process, children will be observed in multiple settings, the ADI-R, ADOS-2, CARS-2, and GARS-3 will be used as diagnostic tools, and the DSM-5 will be used as criteria to diagnose ASD. This is due to recommendations stated by the Centers for Disease Control and Prevention (CDC, 2018).

For the first research question, the null hypotheses will be tested with an *F* distribution at the .05 level of significance.

CHAPTER IV

METHOD

Participants

Recruitment of participants began after permission was obtained from the University of Texas at Rio Grande Valley's Social and Behavioral Sciences Institutional Review Board (IRB) (See Appendix A). An e-mail list was compiled consisting potential healthcare practitioners in Mexico and the U.S. that may want to participate in the study. An e-mail was sent to these healthcare practitioners describing the research study and requesting their participation (See Appendix B). If an individual healthcare practitioner was interested in participation, he/she was sent an e-mail containing a link to complete consent to participate in the study and the survey questions through Qualtrics. The following healthcare professionals were recruited for participation in this study:

1. Medical Doctors
2. Pediatricians
3. Neurologists
4. Psychiatrists
5. Neuropsychologists
6. Psychologists
7. Early childhood professionals

8. Teachers
9. Counselors
10. Speech and Language Pathologists
11. Occupational Therapists
12. Behavior Analysts

The decision was made to include these specific professionals in the present study because medical doctors (including pediatricians, neurologists, psychiatrists, and neuropsychiatrists) are currently the only professionals able to provide a medical diagnosis of ASD; however, a multidisciplinary team containing other professionals (e.g. psychologists, early childhood professionals, teachers, counselors, speech and language pathologists and occupational therapists) is currently being recommended as the gold standard for diagnosis of ASD (CDC, 2018).

Below are the inclusion criteria for participation in the study.

1. Licensed health care professional in one of the following medical fields: general medicine, pediatrics, neurology, psychiatry, neuropsychology, psychology, early childhood, education, counseling, speech and language pathology, occupational therapy, and behavior analysis.
2. Current Practice in Mexico or the U.S.
3. Encounter individuals diagnosed with ASD in their practice and/or diagnose ASD.

A total of 80 participants participated in this study. A total of 18 from Mexico and 62 participants from the U.S. Six participants from the U.S. and two participants from Mexico either

did not meet inclusion criteria or did not complete the survey in its entirety. Therefore, the final sample consisted of a total of 72 healthcare practitioners, 16 from Mexico and 56 from the U.S. In the U.S. participants resided in a variety of states including: Tennessee, California, Utah, Texas, Washington D.C., Pennsylvania, Michigan, Minnesota, Florida, Mississippi, New Mexico, North Dakota, Wisconsin, Ohio, Georgia, Hawaii, Nevada, Connecticut, and Illinois. In Mexico, participants resided in the following states: Toluca, Jalisco, Tamaulipas, Guerrero, Nuevo Leon, San Luis Potosi, and Estado de Mexico. See table 6 for the number of participants from each healthcare profession and table 7 for demographic information.

Table 6

The number of participants from each healthcare profession in the U.S. and in Mexico.

	U.S. (n=56)	Mexico (n=16)
Speech Language Pathologists	35	2
Psychologists	8	4
Occupational Therapists	3	0
Board Certified Behavior Analysts	4	0
Teacher/Early Childhood Specialists	5	4
Medical Doctors	1	5
Pedagogy Therapist	N/A	1

Table 7

Demographic information for participants in the U.S. and Mexico.

	U.S. n=56	Mexico n=16
Gender		
Female	53	14
Male	3	2
Age		
18-25	5	4
26-30	13	3
31-35	10	3
36-40	4	3
41-45	8	2
46-50	5	0
50+	11	1
Education		
Bachelor's degree	1	6
Master's degree	41	6
Ph.D.	9	2
M.D.	1	2
Psy.D.	4	0
Years of Experience		
0-5 years	12	7
5-10 years	13	5
10-15 years	11	2
15-20 years	10	1
>20 years	10	1
Setting		
Private practice	20	8
Hospital	9	4
School	22	2
University	7	5
Clinic	11	1
Other	10	0
Patient Contact with ASD		
<10%	14	8
10-25%	14	6
25-50%	13	1
50-75%	6	0

>75%	8	1
Comfort Level		
Not comfortable	1	1
Minimal to moderately comfortable	2	2
Moderate	12	5
Moderate to very comfortable	15	4
Very comfortable	26	4

Note. Participants were able to select more than one answer for the question regarding setting.

Procedure and Stimulus Material

Data for the current study was collected via an online survey (See Appendix C). The Qualtircs software was utilized to distribute the survey. The survey was provided in English or Spanish dependent on the participants primary language and was divided into four different sets of questions: Demographic information, Knowledge, Screening Practices, and Diagnostic Practices. All survey questions were developed after an extensive literature review of screening and diagnostic practices for individuals with ASD in both the U.S. and Mexico.

Once participants consented to participate in the study, they were directed to the first set of questions, demographics. There was a total of 15 questions in this section relating to background and demographic information such as gender, job title, age, highest level of education, years of experience, location, work setting, patient contact, comfort level, and whether or not the participant was involved in screening or diagnosing patients for ASD. After completion of this section participants were directed to questions pertaining to knowledge of ASD.

The second set of questions pertaining to knowledge of ASD included a total of 20 multiple choice and true false questions. Participants answered questions regarding the history of ASD, valid diagnosis, current gold standard recommendations regarding screening and diagnostic practices, ASD classification in the DSM, appropriate screening and diagnostic tools, levels of severity associated with ASD, criteria required for a diagnosis of ASD, and prevalence rate of ASD in the U.S. and Mexico. These questions were selected based on the following: the most recent and current version of the DSM published in 2013 (DSM 5) (APA, 2013), current gold standard recommendations for screening and diagnosing individuals with ASD found on the American Academy of Pediatrics (AAP, 2013), the Centers for Disease Control and Prevention (CDC, 2018), recent studies regarding screening and diagnostic practices in Mexico (Harris & Barton, 2017), and information provided in the 2012 Mexican Public Health Service's Clinical Guide to Diagnosing and Managing ASD (Secretaria de Salud, 2012). After completion of this section participants were directed to questions pertaining to their screening practices of ASD.

The third set of questions pertaining to the participants' screening practices included a total of 11 multiple choice and fill in the blank questions. The very first question asked the participant if he/she is currently involved in the screening process for ASD. If the participant selected Yes, the participant could proceed to answering the questions in this section. However, if the participant selected No, they were instructed to skip the section and continue to the fourth set of questions, diagnostic practices. Participants answered questions regarding which screening tools were used in their setting, whether the screening tool was validated for English or Spanish speakers, healthcare practitioners involved in the screening process, which healthcare

practitioners' individuals were referred to after the screening, parent involvement, primary concerns, routine screening of children, and age range of most frequent population screened. These questions were selected in order to provide a description of the screening practices of healthcare practitioners across different disciplines and to compare screening practices between healthcare practitioners in Mexico and the U.S. In addition, these questions allowed for an observation of whether or not healthcare practitioners across different disciplines, states, and countries follow the recommended gold standards for screening individuals with ASD. After completion of this section, participants were directed to answer the fourth and last set of questions pertaining to diagnostic practices of ASD.

The fourth set of questions pertaining to the participants' diagnostic practices of ASD included a total of 17 multiple choice and fill in the blank questions. The very first question asked the participant if he/she is currently involved in the diagnosis of ASD. If the participant selected Yes, the participant could proceed to answering the questions in this section. However, if the participant selected No, they were instructed to skip the section and continue to the last page of the survey and exit. Participants that were involved in the diagnostic process answered questions regarding number of children evaluated for ASD a month, common referrals, evaluation of ASD with a multidisciplinary team, observations of children in multiple settings, assessment setting, healthcare practitioners involved, diagnostic tools used, validation of diagnostic tools for English and Spanish speakers, criteria used to diagnose ASD, length of evaluation, parent involvement, healthcare practitioners individuals are referred to after a diagnosis of ASD. Similar to the third set of questions, these questions were selected in order to

provide a description of the diagnostic practices of healthcare practitioners across different disciplines and to compare screening practices between healthcare practitioners in Mexico and the U.S. In addition, these questions allowed for an observation of whether or not healthcare practitioners across different disciplines, states, and countries follow the recommended gold standards for diagnosing individuals with ASD.

CHAPTER V

RESULTS

Accuracy of Knowledge Relating to ASD

In order to answer the first research question, what is the accuracy of knowledge regarding ASD for healthcare practitioners in Mexico and in the U.S.**,** participants were placed into three groups based on their healthcare profession. The decision was made to place the participants into three groups due to small sample sizes in individual groups. Group 1 consisted of therapists (N=57), Group 2 consisted of medical doctors (N=6), and Group 3 consisted of teachers (N=9). More specifically, in the U.S., Group 1 consisted of 35 speech-language pathologists, 8 psychologists, 3 occupational therapists, and 4 board certified behavior analysts. Group 2 consisted of 1 psychiatrist. Group 3 consisted of 3 early childhood specialists, and 2 teachers. In Mexico, Group 1 consisted of 2 speech-language pathologists, 3 psychologists, 1 neuropsychologist, and 1 pedagogy specialist (pedagoga), Group 2 consisted of 5 pediatricians. Group 3 consisted of 4 teachers. See table 8.

Table 8

Participant group break downs for accuracy of knowledge analysis.

	Mexico (n=16)	United States of America (n=56)
Therapists (n=57)		
Speech Pathologists	2	35
Psychologists	3	8
Neuropsychologist	1	0
Pedagogy specialist	1	0
Occupational therapists	0	3
Behavior Analysts	0	4
Medical Doctors (n=6)		
Psychiatrist	0	1
Pediatricians	5	0
Teachers (n=9)		
Early Childhood Specialists	0	3
Teachers	4	2

An accuracy of knowledge was determined for all participants combined (overall accuracy of knowledge), for participants from U.S., and for participants from Mexico. Accuracy of knowledge was calculated by determining the number of correct responses and dividing by the total number of questions. The mean overall accuracy of knowledge relating for ASD for all participants combined was 0.58 (0.13). In the U.S. the mean accuracy was 0.60 (0.13) and in Mexico the mean accuracy was 0.52 (0.13). See table 9.

Table 9

Participants accuracy of knowledge relating to ASD.

	Overall n=72	U.S. n=56	Mexico n=16
Mean accuracy	0.58	0.60	0.52
Standard deviation	0.13	0.13	0.13

Range	0.25-0.85	0.25-0.80	0.30-0.85

A series of between subjects analysis of variance (ANOVA) were utilized to determine what independent variables were effecting accuracy of knowledge of ASD. The following variables were examined for their effect on accuracy of knowledge: location, profession, age, education, years of experience, and patient contact.

There was a significant effect of location on accuracy of knowledge relating to ASD ($F(1, 70)=5.16$, $p=0.03$). Participants in the U.S. had significantly higher accuracy of knowledge ($M=0.60$, $SD=0.13$) than those in the Mexico ($M=0.52$, $SD=0.13$). See table 10.

Table 10

ANOVA results for the effect of location on accuracy of knowledge.

Source of Variation	SS	df	MS	F
Location	0.09	1	0.09	5.16*
Within group error b	1.23	70	0.02	
Total	1.32	71		

*$p<.05$.

Years of experience was found to have a significant effect on accuracy of knowledge relating to ASD ($F=2.90$, $p=0.03$). Post hoc comparisons indicated that the mean accuracy was significantly different between healthcare practitioner that had 0-5 years of experience ($M=0.51$, $SD=0.13$) and healthcare practitioners with 15-20 years of experience ($M=0.66$, $SD=0.14$) ($p=0.03$), with the participants in the latter group scoring significantly higher on the accuracy of knowledge variable. See table 11.

Table 11

ANOVA results for the effect of years of experience on accuracy of knowledge.

Source of Variation	SS	df	MS	F
Years of experience	0.19	4	0.05	2.89*
Within group error b	1.12	67	0.02	
Total	1.32	71		

*p<.05.

Patient contact was found to have a significant effect on accuracy of knowledge relating to ASD (F=3.58, p=0.01). Post hoc comparison indicated that the mean accuracy was significantly different between healthcare practitioners that had >10% patient contact with individuals with ASD (M=0.51, SD=0.13) healthcare practitioners that has >75% patient contact with individuals with ASD (M=0.66, 0.11) (SD=p=0.03). The difference between healthcare practitioners that ad >10% patient contact with individuals with ASD and healthcare practitioners that 50-75% patient contact with individuals with ASD was nearing significance (p=0.08). See table 12.

Table 12

ANOVA results for the effect of patient contact on accuracy of knowledge.

Source of Variation	SS	df	MS	F
Patient contact	0.23	4	0.06	3.58*
Within group error b	1.05	66	0.02	
Total	1.27	70		

*p<.05.

Comfort level was found to have a significant effect on accuracy of knowledge relating to ASD (F=3.56, p=0.01). Post hoc comparison indicated that the mean accuracy was significantly different between healthcare practitioners that were minimally-moderately comfortable with

ASD (M=0.45, SD=0.09) and healthcare practitioners that were very comfortable with ASD (M=0.63, SD=0.02) (p=0.02). See table 13.

Table 13

ANOVA results for the effect of comfort level on accuracy of knowledge.

Source of Variation	SS	df	MS	F
Comfort level	0.23	4	0.06	3.56*
Within group error b	1.09	67	0.02	
Total	1.32	71		

*p<.05.

There was not a significant effect of profession (F=2.61, p=0.081), age (F=1.49, p=0.20) or education (F=1.99, p=0.11) on accuracy of knowledge relating to ASD. However, it should be noted that the effect of profession and education on accuracy of knowledge relating to ASD was nearing significance. See tables 14, 15, and 16.

Table 14

ANOVA results for the effect of profession on accuracy of knowledge.

Source of Variation	SS	df	MS	F
Profession	0.09	2	0.05	2.61
Within group error b	1.23	69	0.02	
Total	1.32	71		

*p<.05.

Table 15

ANOVA results for the effect of age on accuracy of knowledge.

Source of Variation	SS	df	MS	F
Age	0.16	6	0.03	1.49
Within group error b	1.16	65	0.02	
Total	1.32	71		

*p<.05.

Table 16

ANOVA results for the effect of education on accuracy of knowledge.

Source of Variation	SS	df	MS	F
Education	.14	4	0.04	2.00
Within group error b	1.18	67	0.02	
Total	1.32	71		

*p<.05.

Screening Practices

In order to answer the second research question, what are the current screening practices for ASD in Mexico and the U.S., participants were not placed into groups as we did in the knowledge section. This was due to limited number of responses. As you will recall from the Procedure and Stimulus Section above, participants only answered this set of questions if they were currently involved in screening practices in either the U.S. or Mexico. In the U.S. a total of 30 participants indicated that they currently participated in screening practices associated with ASD. This included 18 speech pathologists, 7 psychologists, 2 early childhood professionals, 1 teacher, 1 psychiatrist, and 1 BCBA. In Mexico, a total of 5 participants indicated that they currently participated in screening practices associated with ASD. This included 1 speech pathologist, 2 pediatricians, 1 neuropsychologist, and 1 psychologist.

Respondents in both Mexico and the U.S. were asked questions relating to the following:

- Screening instruments used
- Healthcare professionals involved in screening process
- Referral process
- Parent involvement

- Primary concern(s)
- Screening for ASD

Screening instruments used.

With regards to the screening instruments used participants had the option to select more than one appropriate answer as a variety of screening instruments are often used dependent multiple factors. In Mexico, the most frequently reported screening tool used was M-CHAT (n=5, 100%), followed by CHAT (n=3, 60%), and the Q-Chat (n=1, 20%). One participant (20% of the sample) indicated use 'other screening instruments not listed' (n=1, 20%). The following were indicated as 'other screening instruments': ADOS, and TASI. In the U.S. the most frequently reported screening tool used was also the M-CHAT (n=18, 60%), followed by the ASQ (n=6, 20%), CSBS (n=3, 10%), CHAT (n=3, 10%), STAT (n=2, 6%), Q-Chat (n=2, 6%), and PEDS (n=1, 3%) . A total of 16 participants (53%) indicated use of 'other screening instruments' screening instruments not listed. These included: the Battelle screener, CASL-Pragmatics Subtest, ADOS, Social Communication Questionnaire (SCQ), informal screenings with guidelines learned from ADOS, Children's Communication Checklist-2 (CCC-2), DIAL, Developmental History Questionnaire a measure based off ADOS questions which is clinic specific, GARS-3, M-CHAT R/F, CARS, social and emotional learning competencies, student interview, and teacher input, and pragmatic informal assessment, informal and formal observations, teacher interview, parents interview and language/pragmatic questionnaires and checklist. See figure 1.

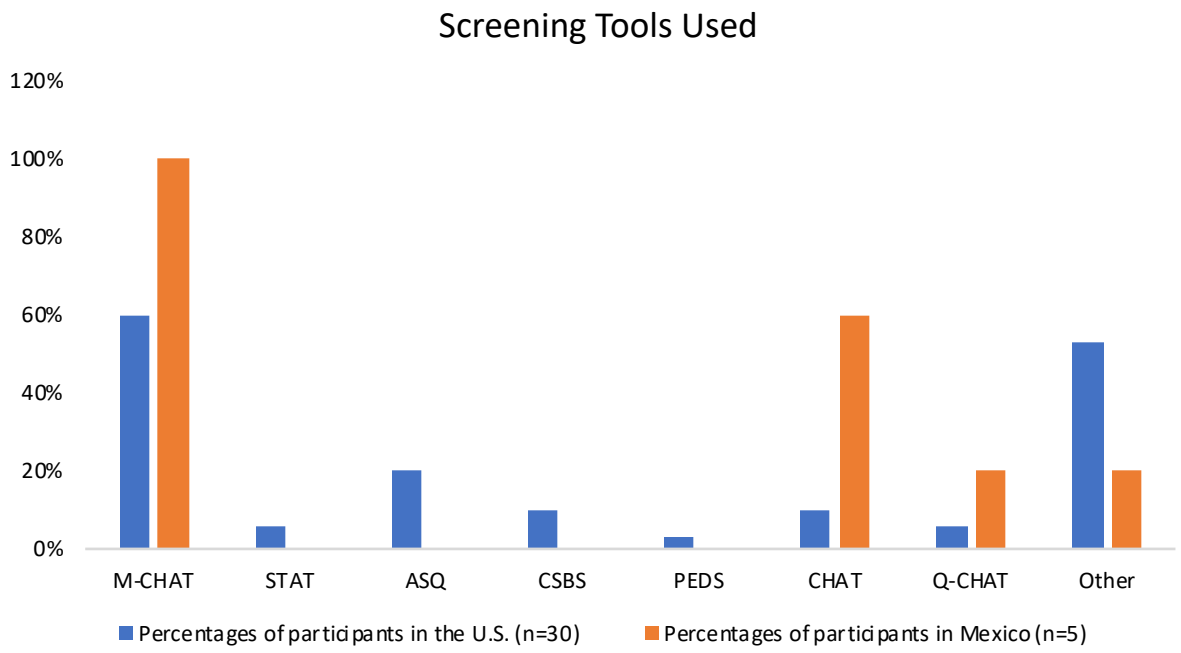

Figure 1. Reported percentages of participants reporting use of screening instruments.

Healthcare professionals involved in screening process.

With regards to the healthcare practitioners involved in the screening process participants had the option to select more than one appropriate answer as a variety of healthcare practitioners are often used due to this being the gold standard recommendation. In Mexico, the most frequently reported healthcare practitioner involved pediatricians (n=5, 100%), followed by neuropsychologists (n=4, 80%), speech pathologists (n=4, 80%), medical doctors (n=3, 60%), neurologists (n=3, 60%), psychiatrists (n=3, 60%), early childhood professionals, (n=3, 60%), parents (n=3, 60%), teachers (n=2, 40%), counselors (n=2, 40%), psychologists (n=1, 20%), and occupational therapists (n=1, 20%). Participants did not indicate the participation of other healthcare practitioners. In the U.S. the most frequently reported healthcare practitioner involved

was a speech pathologist (n=21, 70%), followed by parents (n=20, 66%), psychologists (n=19 63%), early childhood professionals (n=16, 53%), teachers (n=14, 46%), pediatricians (n=10, 33%), occupational therapists (n=9, 30%), counselors (n=6, 20%), medical doctors (n=4, 13%), other healthcare practitioners not listed (n=4, 13%), psychiatrists (n=3, 10%), neurologists (n=1, 3%), and neuropsychologists (n=1, 3%). Participants also indicated the participation of the following healthcare practitioners not listed: diagnostician, school psychologist, and other trained/qualified study personnel. See figure 2.

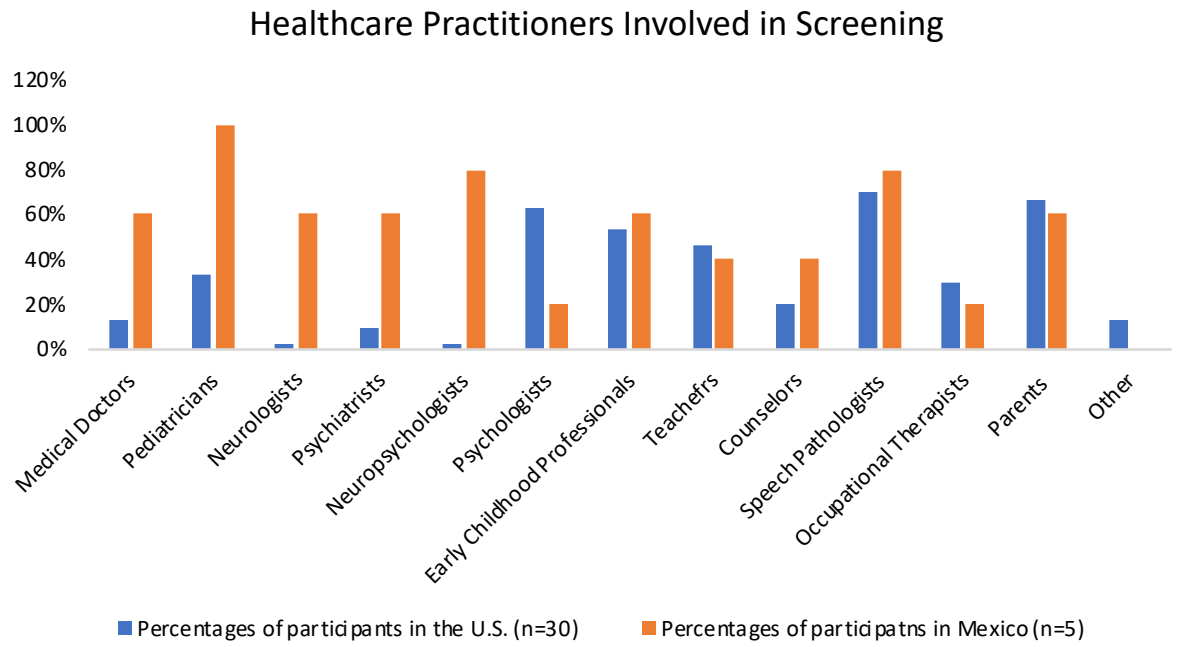

Figure 2. Reported percentages of healthcare practitioners involved in screening.

Referral process.

When participants were asked which healthcare professional(s) they refer individuals that fail screenings, they were allowed to select more than one answer as a variety of healthcare practitioners are often used. In Mexico, the most frequently reported healthcare practitioners an individual was referred to for a diagnostic evaluation were neurologist (n=3, 60%) and a speech pathologists (n=3, 60%), followed by the participant themselves (n=2, 40%) and psychologists (n=2, 40%). Only one participant reported referral to psychiatrists (n=1, 20%), occupational therapists (n=1, 20%) and other healthcare practitioners not listed (n=1, 20%). Additionally, participants indicated the following as other healthcare practitioners that individuals are referred to for a diagnostic evaluation: pedopsychiatrist/child psychiatrist. In the U.S. the most frequently reported healthcare practitioner an individual was reported to be referred to for a diagnostic evaluation was a psychologist (n=19, 63%), followed by the participant themselves (n=10, 33%), medical doctors (n=8, 26%), pediatricians (n=8, 26%), other healthcare practitioners not listed (n=8, 26%), neurologists (n=7, 23%), speech pathologists (n=6, 20%), psychiatrists (n=5, 16%), neuropsychologist (n=4, 13%), early childhood professionals (n=4, 13%), and occupational therapists (n=3, 10%). Participants indicated the following as other healthcare practitioners that individuals can be referred to for a diagnostic evaluation: community mental health, special education, LSSP, developmental pediatrician. U.S. participants also expressed that "it depends on the context/situation, as well as the resources available and the complexity of the case." See figure 3.

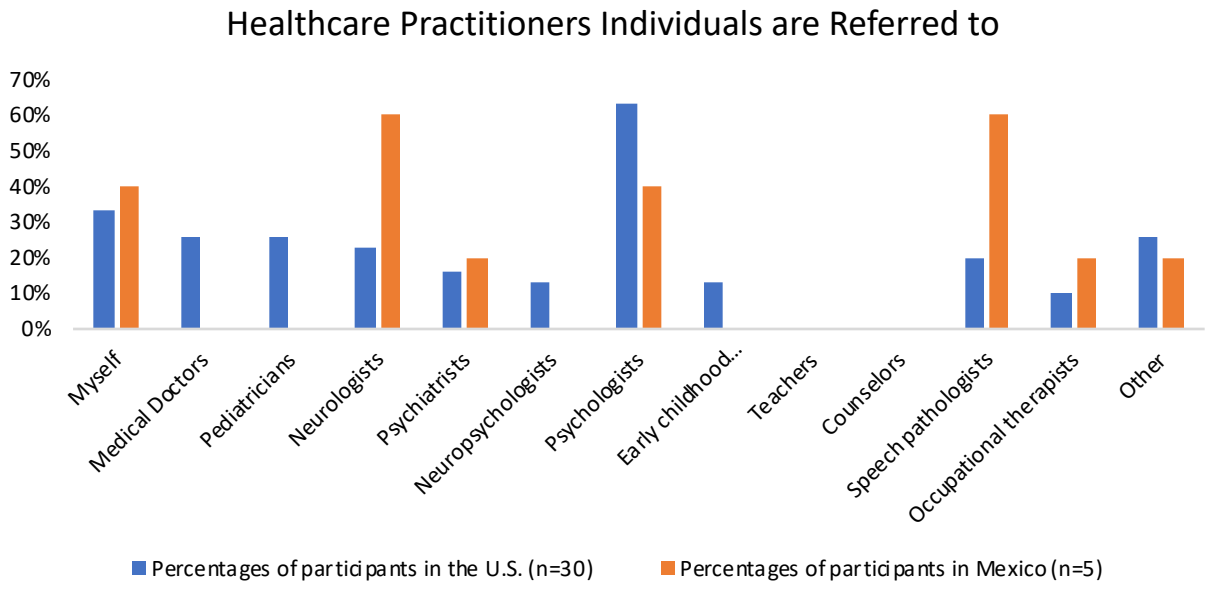

Figure 3. Reported percentages of healthcare practitioners' individuals are referred to.

Parent involvement.

With regards to parent involvement in screening practices, participants in Mexico reported 100% (n=5) of parent involvement. In the U.S. participants reported 96% (n=29) of parent involvement and only 3% (n=1) reported no parent involvement. See figure 4.

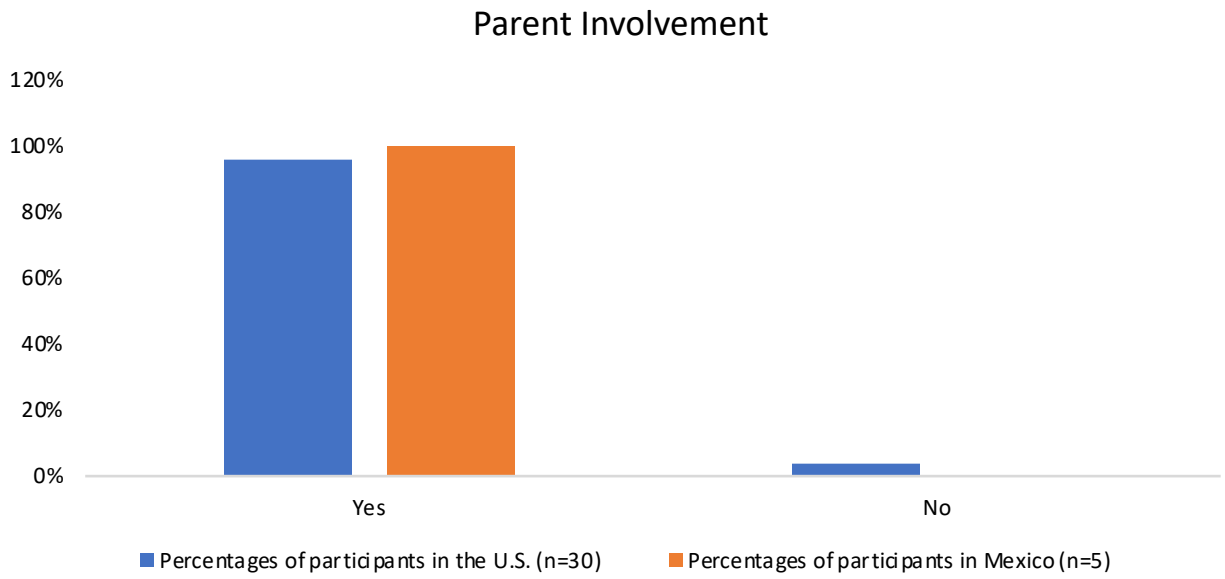

Figure 4. Reported percentages of parent involvement.

Primary concern(s).

With regards to the individual's or family's primary concern at the time of the screening, participants in Mexico reported language as the primary concern (n=4, 80%), followed by behavior (n=1, 20%). Participants in the U.S. also reported language as the primary concern (n=14, 46%) followed by behavior (n=10, 33%), social skills (n=4, 13%), and other concerns not listed (n=2, 6%). Participants in the U.S. indicated speech as other primary concerns reported. In addition, participants expressed "it's different for every family, but most are worried about their child's future and what kind of life they will have." See figure 5.

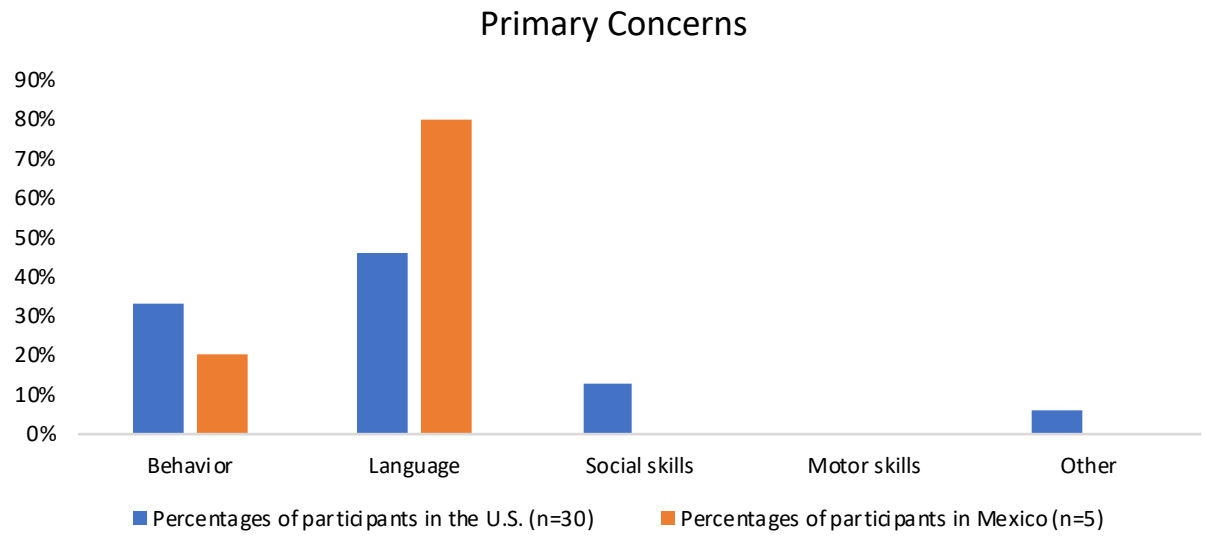

Figure 5. Reported percentages of primary concern.

Screening for ASD.

In regard to participants completing routine ASD screenings for children, 20% of participants in Mexico reported yes (n=1) and 80% reported not to routinely screen children for ASD (n=4). In the U.S. 33% of participants reported yes to routinely screen children for ASD (n=10) and 66% reported not to (n=20). See figure 6.

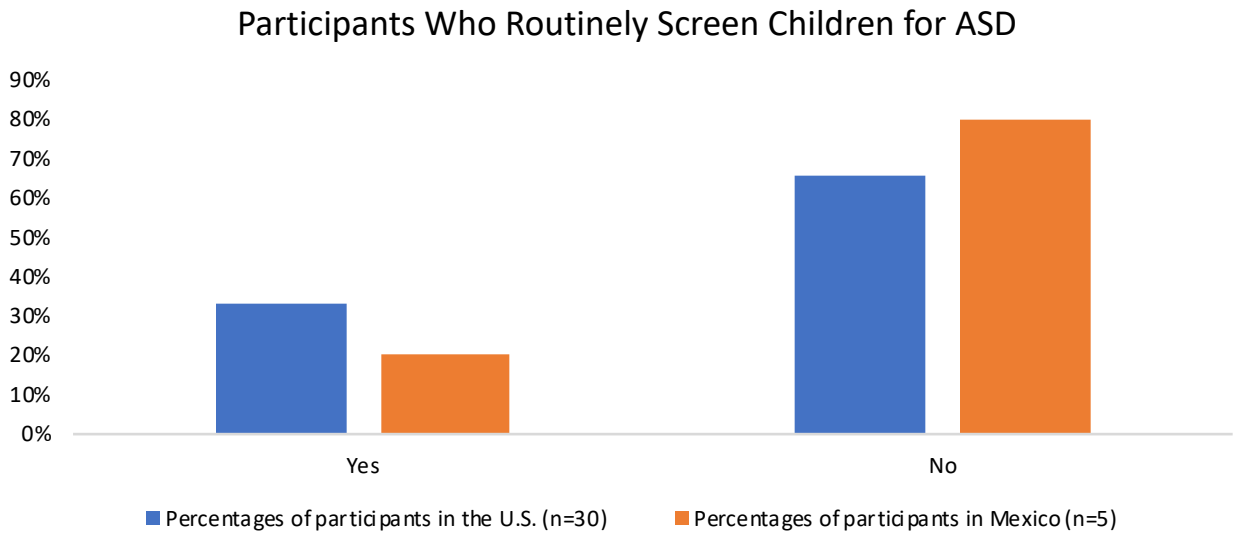

Figure 6. Reported percentages of participants who routinely screen children for ASD

Age range most frequently screened.

In regards to the age range most frequently screened, participants in Mexico reported the age range 2-4 years (n=4, 80%), followed by >8 years (n=1, 20%) as the most frequently screened. In the U.S., participants reported the most frequent age range screened, 2-4 years (n=17, 56%), followed by 4-6 years (n=7, 23%), 6-8 years (n=2, 6%), and >8 years (n=2, 6%). See figure 7.

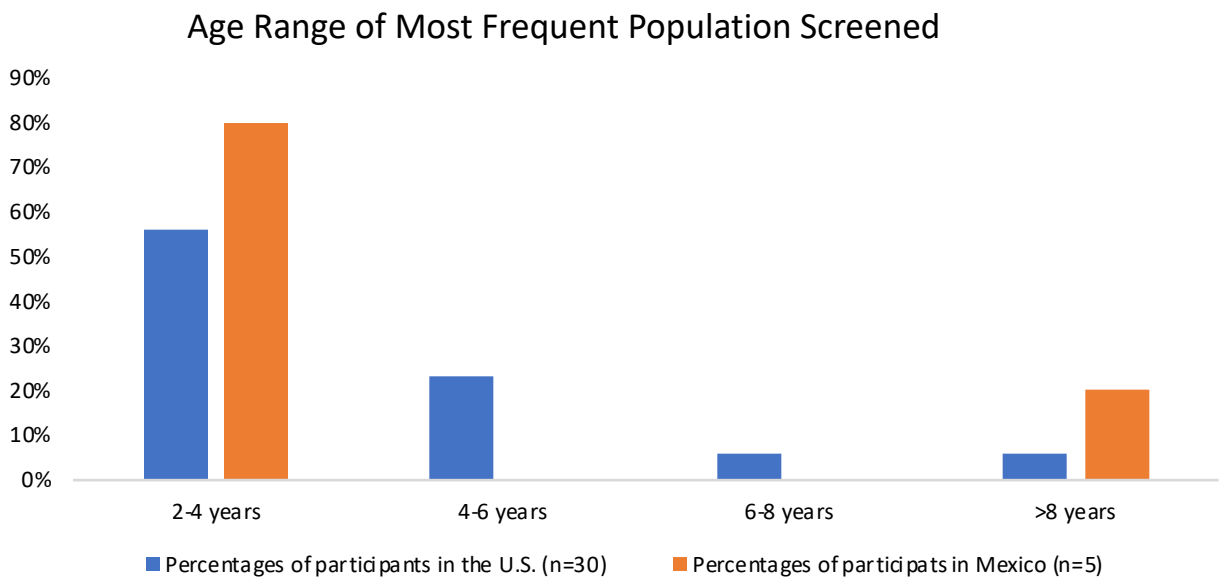

Figure 7. Reported percentages of the age range most frequently screened

Diagnostic Practices

In order to answer the third research question, What are the current diagnostic practices for ASD in Mexico and the U.S., participants were once again not placed into groups as we did in the knowledge section. This was due to limited number of participants reported to be participating in the diagnostic process. As you will recall from the Procedure and Stimulus Section above, participants only answered this set of questions if they were currently involved in diagnostic practices in either the U.S. or Mexico. In the U.S. a total of 29 participants indicated that they currently participated in diagnostic practices associated with ASD. This included 19 speech pathologists, 7 psychologists, 1 teacher, 1 psychiatrist, and 1 BCBA. In Mexico, a total of 7 participants indicated that they currently participated in diagnostic practices associated with

ASD. This included 2 pediatricians, 2 psychologists, 2 speech pathologists, and 1 neuropsychologist.

Respondents in both Mexico and the U.S. were asked questions relating to the following:

- Referral source
- Multidisciplinary team
- Assessment setting(s)
- Healthcare professionals involved in diagnostic process
- Diagnostic tool(s) used
- Diagnostic criteria used
- Length of diagnosis
- Parents involvement
- Referral subsequent to diagnosis

Referral source.

With regards to how children are commonly referred for an evaluation, participants in Mexico reported by the parent (n=6, 86%), followed by the teacher (n=1, 14%). In the U.S. participants reported children are also most commonly referred by the parent (n=10, 34%), followed by the pediatrician (n=7, 24%), other not listed (n=6, 20%), a teacher (n=5, 17%), and child psychologist (n=1, 3%). Participants in the U.S. who indicated other, reported the following: speech pathologist when child is a "speech only", care coordinators, pediatrician tells parent to call B23, child is referred from birth-to-three or child find screenings, and parent request or teacher referral. See figure 8.

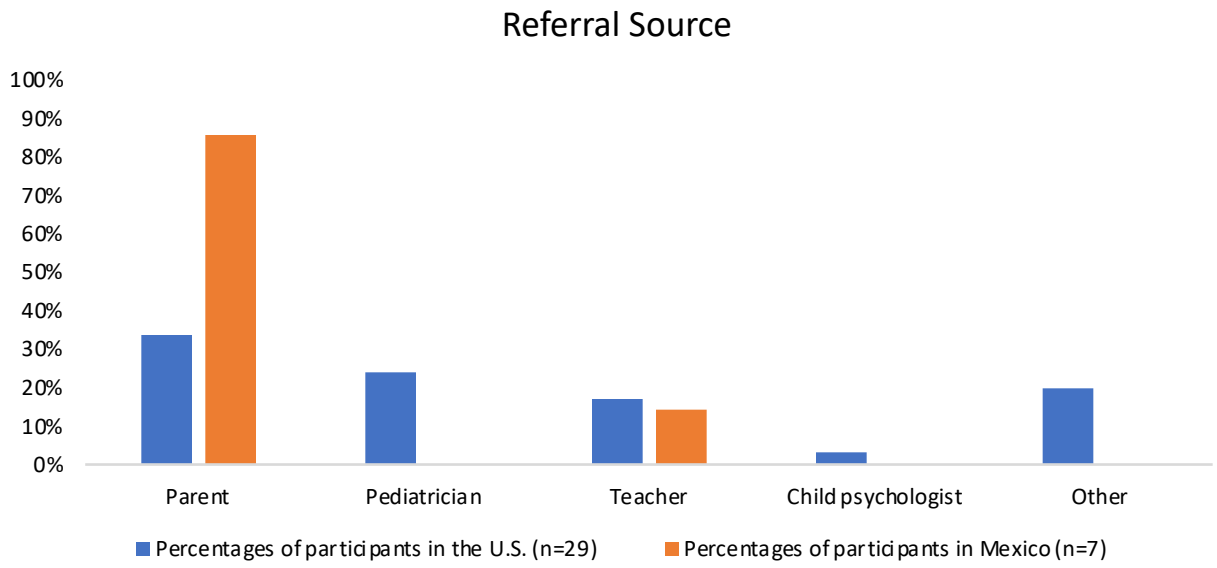

Figure 8. Reported percentage of participants

Multidisciplinary team.

In regard to current gold standard recommendations, participants in Mexico and the U.S. indicated whether or not it is recommended for ASD evaluations to be conducted in a multidisciplinary or transdisciplinary team. In Mexico 72% (n=5) of participants indicated yes to current recommendations for ASD evaluations be conducted by a multidisciplinary or transdisciplinary team, 14% (n=1) reported no, and 14% (n=1) reported not knowing. In the U.S. 87% (n=25) of participants reported yes to current recommendations for ASD evaluations be conducted by a multidisciplinary or transdisciplinary team, 10% (n=3) reported no, and 3% (n=1) reported not to know. See figure 9.

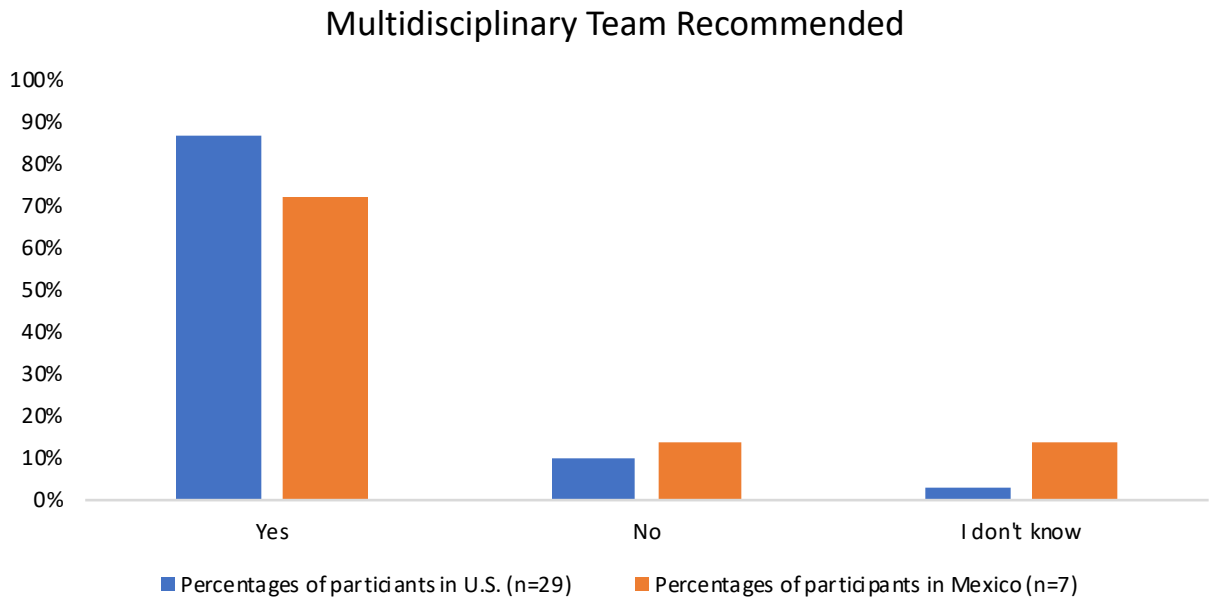

Figure 9. Reported percentage of participants that indicated multidisciplinary team recommendation.

In regard to the question of whether or not healthcare practitioners diagnose ASD individually or in a multidisciplinary team, 29% (n=2) of participants in Mexico reported to diagnose ASD individually, and 71% (n=5) reported to diagnose ASD in a multidisciplinary team. In the U.S. 14% (n=4) of participants reported to diagnose ASD individually, 83% (n=24), reported to diagnose ASD in a multidisciplinary team, and 3% (n=1) reported to diagnose in an alternate method not listed. This participant did not indicate which alternate method of diagnosis was used. See figure 10.

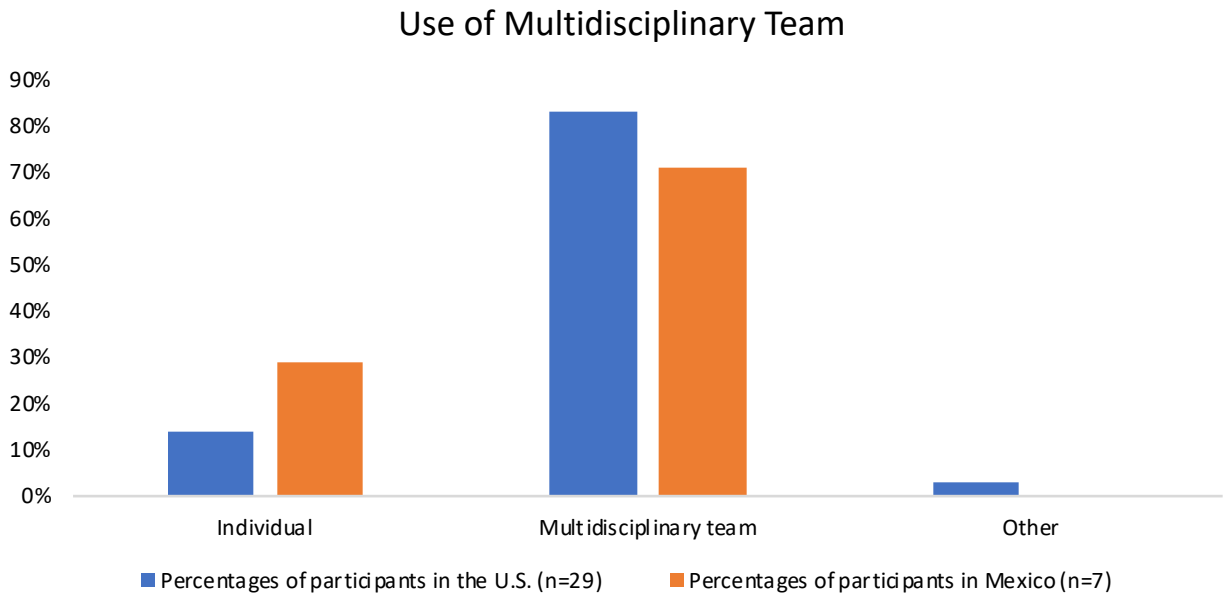

Figure 10. Reported percentage of participants who diagnose individually or in a multidisciplinary team

Assessment setting(s).

In regard to healthcare practitioners following current recommendations of observing children in multiple settings, 29% (n=2) of participants in Mexico reported yes to observing children in multiple settings, 42% (n=3) reported not to, and 29% (n=2) reported to do so only sometimes. In the U.S. 55% (n=16) of participants reported yes to observing children in multiple settings, 24% (n=7) reported not to, and 21% (n=6) reported to do so only sometimes. See figure 11.

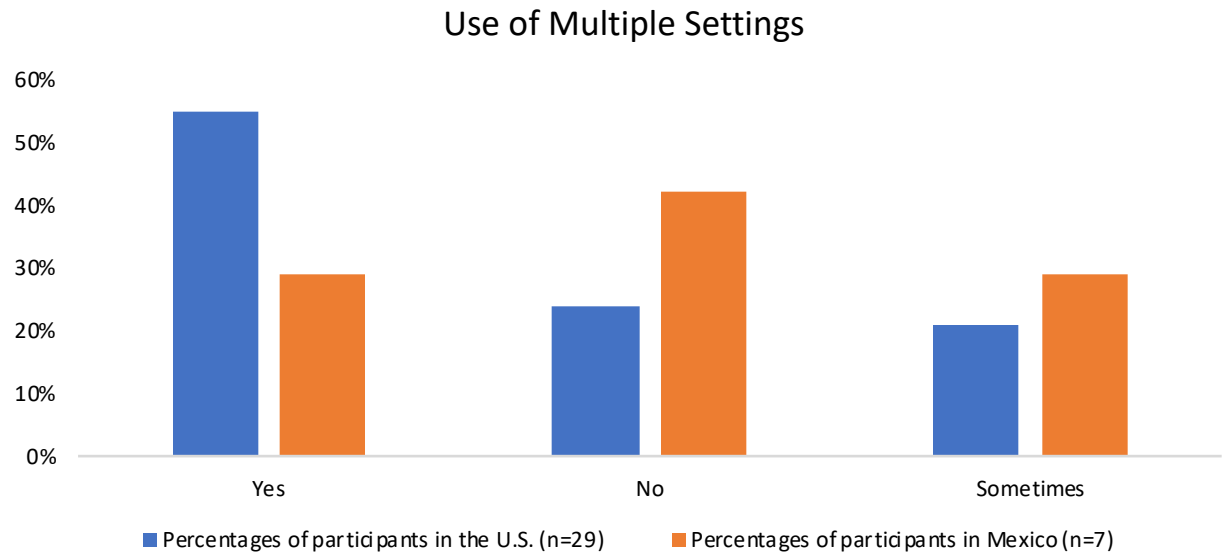

Figure 11. Reported percentage of participants who observe children in multiple settings

With regard to the assessment setting(s) used by healthcare practitioners, participants had the option to select more than one appropriate answer as children are often observed in a variety of settings due to this being the gold standard recommendation. In Mexico, the most frequently reported setting was the medical office (n=4, 58%), followed by the home (n=1, 14%), day care (n=1, 14%), and other setting not listed (n=1, 14%). One participant in Mexico who reported other indicated their own private clinic as another setting. In the U.S., the most frequently reported setting was other setting not listed (n=22, 76%), followed by the home (n=8, 28%), day care (n=8, 28%), and the medical office (n=3, 10%). Participants in the U.S. who reported other indicated the following settings: private clinic, classroom, informal setting, formal setting for formal evaluation, speech therapy room, school office, psychologist office, rehab, clinic office,

mental health office, private practice, community, program office, church, library, or wherever the family goes. See figure 12.

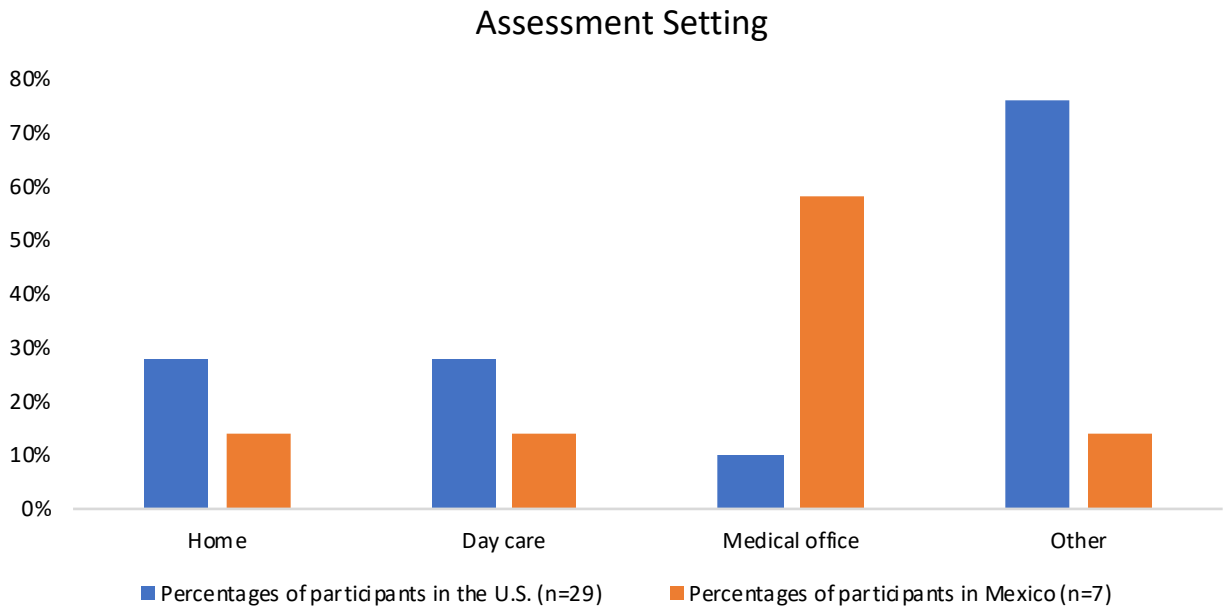

Figure 12. Reported percentage of assessment setting

Healthcare professionals involved in diagnostic process.

With regards to the healthcare practitioners involved in the diagnostic process participants had the option to select more than one appropriate answer as a variety of healthcare practitioners are often used due to this being the gold standard recommendation. In Mexico, the most frequently reported healthcare practitioner involved psychologists (n=6, 85%), followed by neurologists (n=5, 71%), speech pathologists (n=4, 57%), medical doctors (n=3, 42%), pediatricians (n=3, 42%), neuropsychologists (n=3, 42%), psychiatrists (n=2, 28%), early childhood professionals (n=2, 28%), teachers (n=2, 28%), counselors (n=1, 14%), and

occupational therapists (n=1, 14%). Participants in Mexico did not indicate the participation of other healthcare practitioners. In the U.S. the most frequently reported healthcare practitioner also involved psychologists (n=26, 89%), followed by speech pathologists (n=18, 62%), pediatricians (n=12, 41%), early childhood professionals (n=11, 37%), teachers (n=11, 37%), occupational therapists (n=10, 34%), medical doctors (n=9, 31%), psychiatrists (n=9, 31%), other healthcare practitioners not listed (n=8, 27%), neurologists (n=5, 17%), neuropsychologists (n=3, 10%), and counselors (n=3, 10%). Participants from the U.S. also indicated the participation of the following healthcare practitioners not listed: diagnostician, social worker, LSSP, developmental pediatrician, BCBA, LBAs, and MSWs. See figure 13

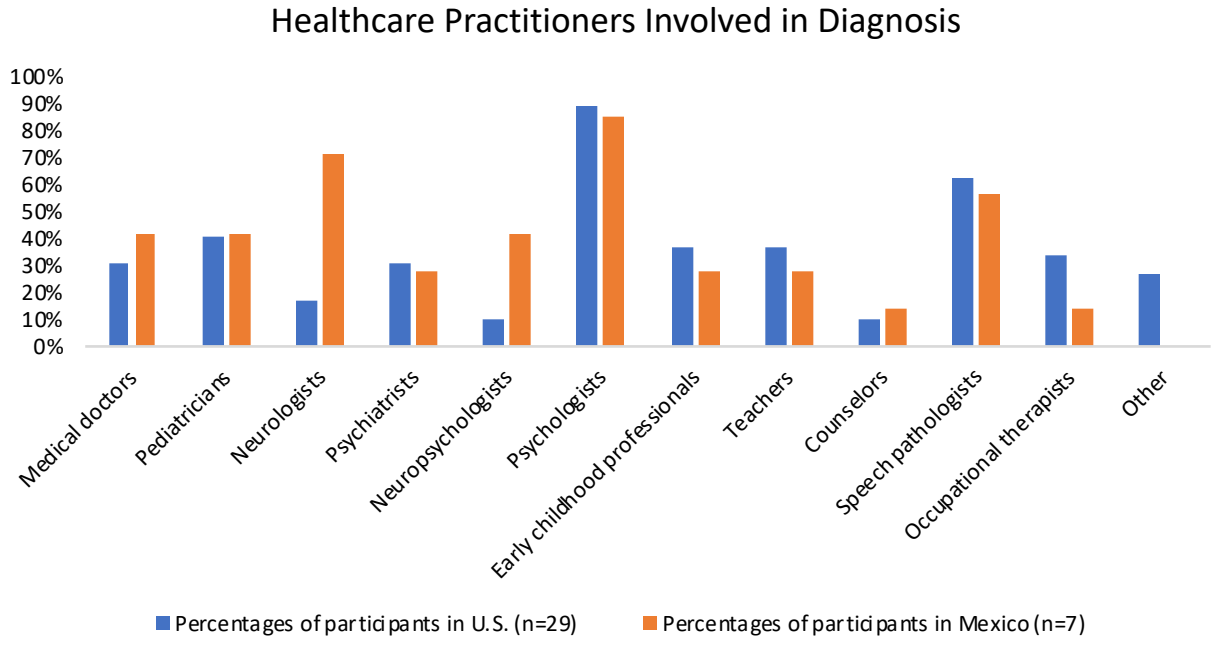

Figure 13. Reported percentage of healthcare practitioners involved in the diagnostic process

Diagnostic tool(s) used.

With regards to the diagnostic tools used participants had the option to select more than one appropriate answer as a variety of diagnostic tools are often used dependent multiple factors. In Mexico, the most frequently reported diagnostic tool used was the CARS (n=3, 42%), followed by the ADOS-G (n=2, 28%), other diagnostic tools not listed (n=2, 28%), ADI-R (n=1, 14%), DISCO (n=1, 14%), and GARS-2 (n=1, 14%). Participants from Mexico indicated use of the following as other diagnostic tools: ADOS-2, TASI, and ABAS-2. One participant indicated that there are no diagnostic tools available and uses the DSM IV as an alternate method. In the U.S. the most frequently reported diagnostic tool used was the ADOS-G (n=22, 75%), followed by ADI-R (n=14, 48%), CARS (n=10, 34%), other diagnostic tools not listed (n=10, 34%), and GARS-2 (n=8, 27%). Participants also indicated use of the following as diagnostic tools: checklists, questionnaires, interviews for pragmatics, Social Language Development test, parent interview, teacher input, student interview, Vineland adaptive behavior scales 3, VBMAPP, Children's Communication Chiecklist-2 (CCC-2), GARS-3, SRS-2, GADS, SSIS, ASRS, SRS, and ADOS-2. See figure 14.

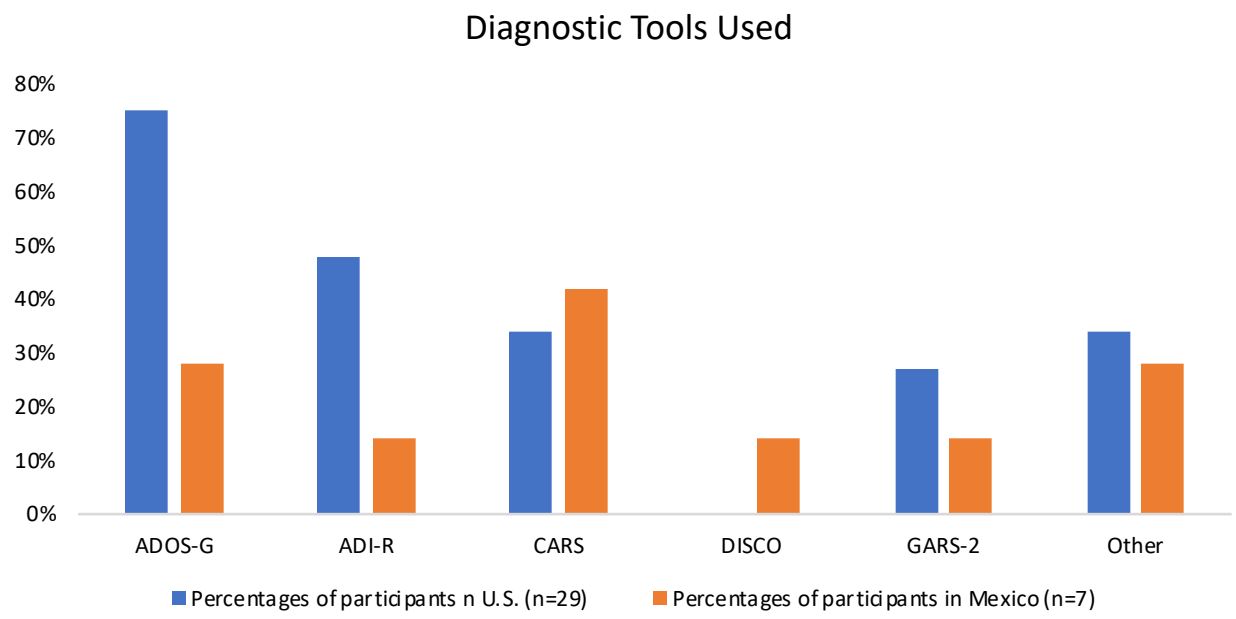

Figure 14. Reported percentage of diagnostic tools used

Diagnostic criteria used.

With regards to the criteria used as a basis for diagnosing ASD participants had the option to select more than one appropriate answer as a variety of criteria could be used dependent on multiple factors. In Mexico, the most frequently reported criteria used was the DSM 5 (n=6, 85%) followed by the DSM IV-TR (n=4, 57%), WHO (n=2, 28%), DSM IV (n=1, 14%), and the Mexican Public Health Services Clinical Guide (n=1, 14%). Participants in Mexico did not report the use of any other criteria. In the U.S., the most frequently reported criteria used was the DSM 5 (n=20, 68%), followed by other criteria not listed (n=7, 24%), ICD-10 (n=1, 3%), and DSM IV (n=1, 3%). Participants in the U.S. who indicated the use of other criteria reported the use of the following: child psychologist, Michigan guidelines for ASD

eligibility, Texas Education Agency criteria, WI DPI Autism checklist, and one participant reported not to be sure of what criteria is used. See figure 15.

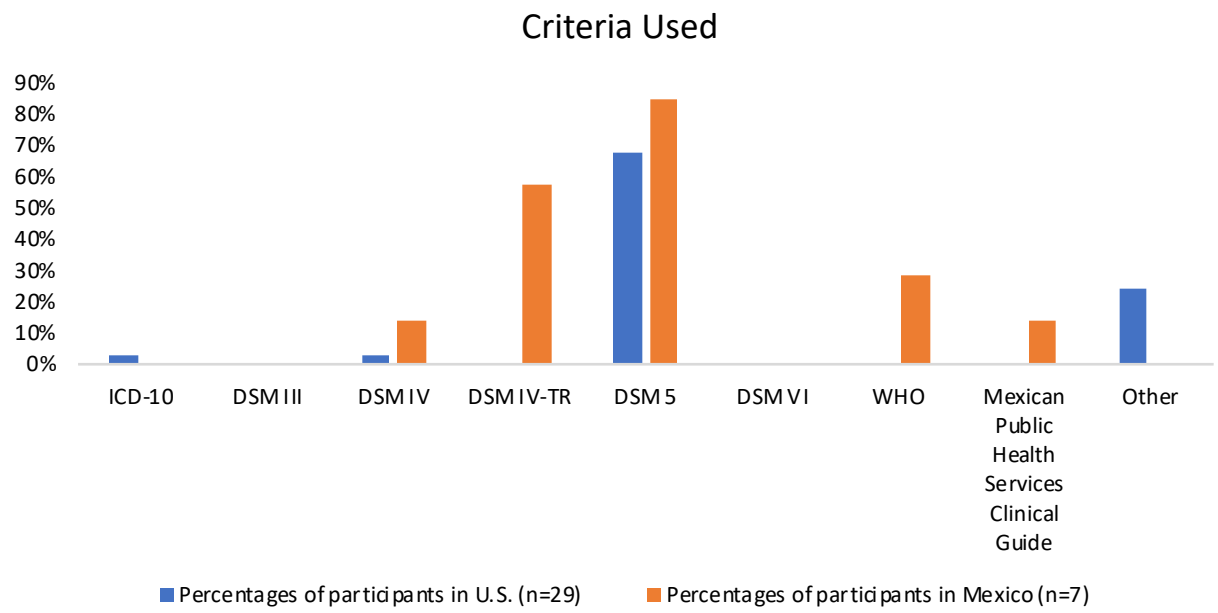

Figure 15. Reported percentage of criteria used

Length of assessment.

With regards to the length of evaluation process, 57% (n=4) of participants in Mexico reported to take 2-3 sessions in the evaluation process, 29% (n=2) reported to take hours, and 14% (n=1) reported to take more than 3 sessions to evaluate individuals for ASD. In the U.S. 36% (n=10) reported to take hours evaluating individuals for ASD, 32% (n=9) reported to take 2-3 sessions, 25% (n=7) reported to take more than 3 sessions, and 7% (n=2) reported to take one hour. See figure 16.

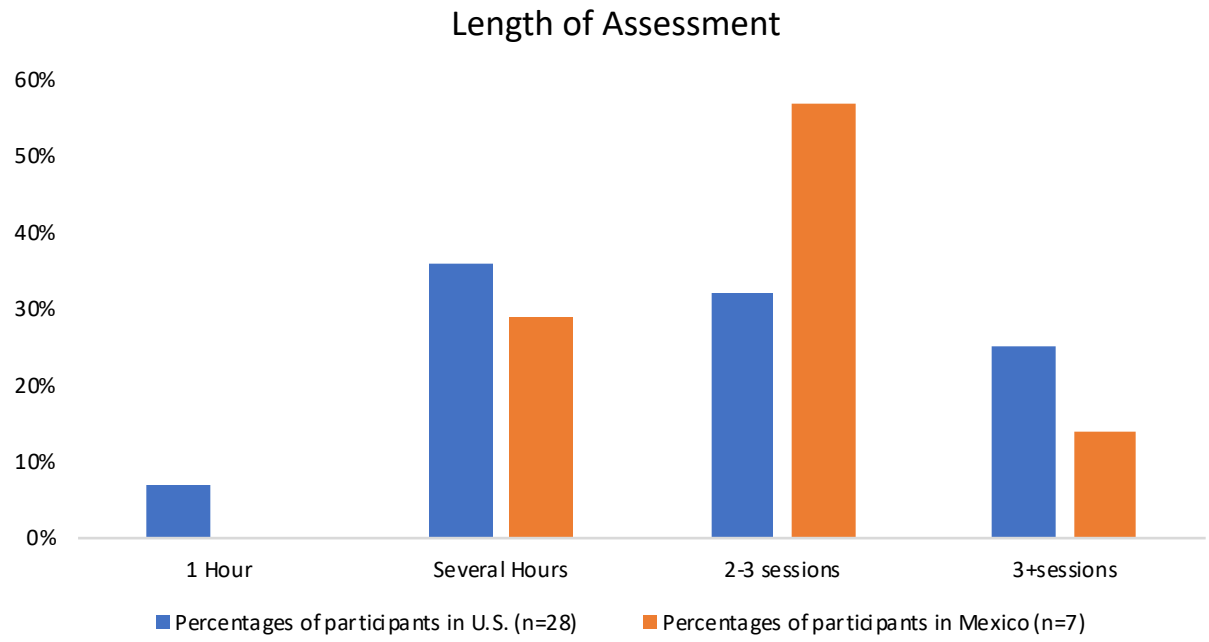

Figure 16. Reported percentage of length of evaluation

Parent involvement.

With regards to parent involvement in the diagnostic process, 100% (n=7) of participants in Mexico reported parent involvement in the diagnostic process. In the U.S. 93% (n=27) reported parent involvement in the diagnostic process, and 7% (n=2) of having parents involved sometimes. See figure 17.

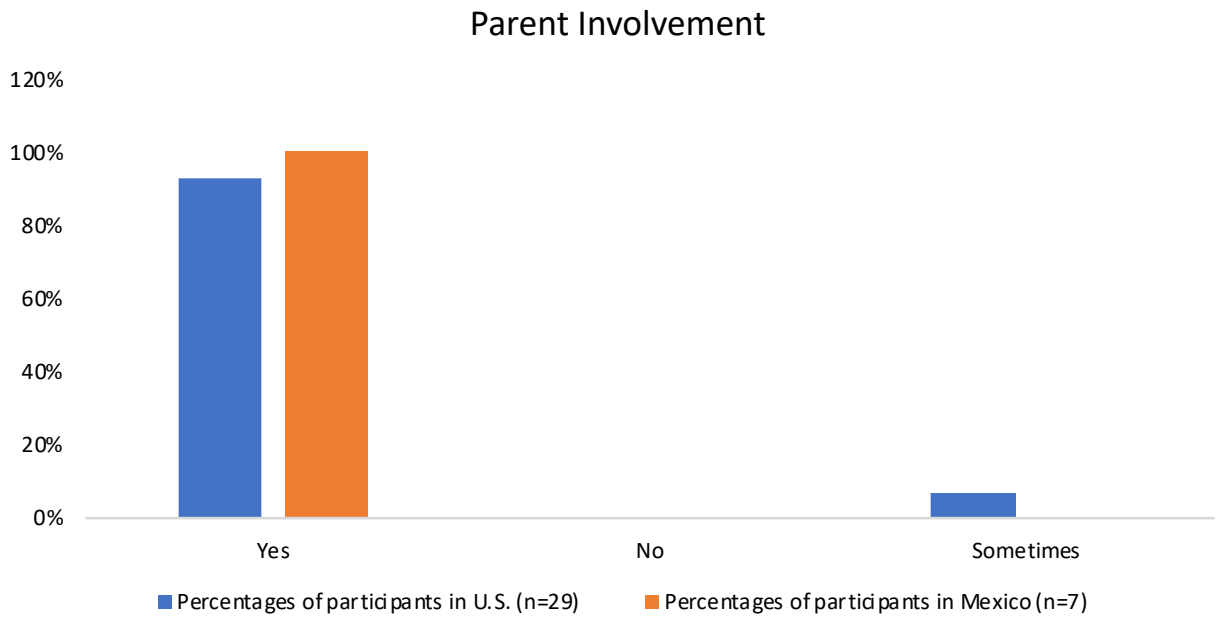

Figure 17. Reported percentage of parents involved

Referral subsequent to diagnosis.

With regards to which healthcare practitioners individuals are referred to after a diagnosis of ASD participants had the option to select more than one appropriate answer as a variety of healthcare practitioners are often used. In Mexico, the most frequently reported healthcare practitioner individuals are referred to was the speech pathologist (n=5, 71%), followed by psychologist (n=4, 57%), neurologist (n=4, 57%), neuropsychologist (n=3, 43%), pediatrician (n=2, 29%), psychiatrist (n=2, 29%), occupational therapist (n=2, 29%), medical doctor (n=1, 14%), early childhood professional (n=1, 14%), teacher (n=1, 14%), and other not listed. Participants in Mexico that indicated other healthcare practitioners reported the following: a school that allows for inclusion and therapies where available. In the U.S. the most frequently reported healthcare practitioner individuals are referred to after a diagnosis of ASD was also the

speech pathologist (n=18, 62%), followed by occupational therapist (n=16, 55%), BCBA (n=15, 52%), early childhood professional (n=14, 48%), other healthcare practitioner not listed (n=13, 45%), psychologist (n=11, 38%), pediatrician (n=7, 24%), psychiatrist (n=5, 17%), teacher (n=5, 17%), counselor (n=5, 17%), medical doctor (n=2, 7%), neurologist (n=2, 7%), and neuropsychologist (n=1, 3%).

Participants in the U.S. that indicated other healthcare practitioners reported the following: community mental health which assesses need for BCBA, special education, ARD meeting for eligibility and placement, social work, intensive behavior therapy, and comprehensive part C teams. In addition, some participants expressed the following: any necessary referrals are based on clinical presentation, referral depends on severity of individual and their needs, doctors should be the ones to diagnose, referral is not typical but services are provided at school, and location is very rural if diagnosis is made from team at school documents are recommended to be shared with pediatrician, if parent asks for additional recommendations help will be provided. See figure 18.

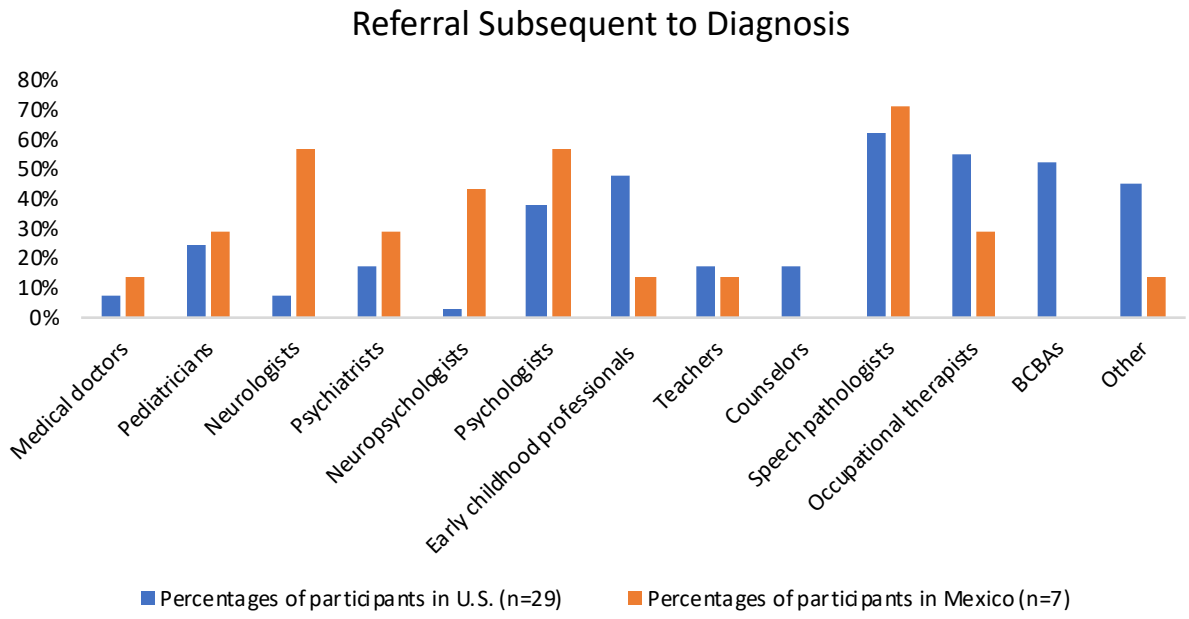

Figure 18. Reported percentage of healthcare practitioners individuals are referred to after diagnosis of ASD

CHAPTER VI

DISCUSSION

The purpose of the current research study was to examine the accuracy of knowledge as it relates to ASD as well as investigate and compare the current screening and diagnostic practices in both Mexico and the U.S. Understanding this information is important because it provides healthcare practitioners with crucial information with regard to accuracy of knowledge and factors that affect accuracy of knowledge relating to ASD. In addition, the results obtained in this study provide descriptive information pertaining to screening and diagnostic practices being implemented across different healthcare disciplines in Mexico and the U.S. This information demonstrated similarities and differences across healthcare practitioners from the U.S. and Mexico as well as healthcare practitioners from different and similar disciplines. These results will allow for improved services for individuals with ASD in the U.S. as the majority of immigrants are from Mexico.

The first research question addressed the accuracy of knowledge of healthcare practitioners as it relates to ASD. It was hypothesized that overall, healthcare practitioners would have a low accuracy of knowledge, with participants from Mexico having lower accuracy of knowledge than participants from the U.S. due to lack of consistency in terms of classification of ASD in this country, limited access to resources, and the Mexican public Health Guide not being updated since 2012. This study found that healthcare practitioners as a whole had a relatively low accuracy of knowledge relating to ASD with participants from the U.S. obtaining

significantly higher accuracy of knowledge scores than participants from Mexico. Additionally, it was found that location, years of experience, patient contact, and comfort level had a significant effect on the accuracy knowledge pertaining to ASD.

These results support the findings related to knowledge of ASD in Mexico reported by Harris and Barton (2017) of differences being due to lack of access to valid and reliable diagnostic tools, and effective services. This information is reinforced by the fact that 79% of participants from Mexico reported to access materials out of pocket, and only 36% of participants in Mexico reported to have diagnostic tools provided at work. These findings also support the findings reported by Bravo et al. (2014) which indicated that professionals in Mexico often times use an outdated DSM, more specifically in their study they reported that professionals in Mexico use the DSM-IV-TR (APA, 2000). This was observed with lack of accuracy and inconsistency in participants' answers to questions pertaining to the current valid diagnosis of ASD, how ASD is classified in the DSM-V, severity levels associated with ASD, and diagnostic requirements for ASD.

The second research question addressed the screening practices currently being practiced by healthcare practitioners in Mexico and in the U.S. It was hypothesized that in Mexico, healthcare professionals would be following recommendations provided by the 2012 Mexican Public Health Service's Clinical Guide to Diagnosing and Managing ASD (Secretaria de Salud, 2012) and in the U.S., healthcare professionals would be following recommendations provided by the American Academy of Pediatrics (AAP, 2013) and the Centers for Disease Control and Prevention (CDC, 2018).

In both Mexico and the U.S. the most frequently reported screening tool was the M-CHAT which is consistent with recommendations from both the Mexican Public Health Guide (2012), the American Academy of Pediatrics (AAP, 2013), the Centers for Disease Control and Prevention (CDC, 2018) and results obtained from a study conducted by Harris and Barton (2017) (Harris & Barton, 2017). However, in both Mexico and the U.S., participants reported use of standardized diagnostic assessments used as screeners such as the ADOS, GARS-3, and inappropriate assessment tools, such as the Teen Addiction Severity Index (TASI) which is a tool used to assess addiction in teenagers. In addition, participants in the U.S. indicated the use of informal observations, pragmatic checklists, and parent/teacher interviews, without the use of an appropriate screener used as well. The results demonstrate lack of consistency in using recommended screening tools specific to ASD throughout healthcare practitioners not only across disciplines but within the same discipline. This is of great concern as in order to appropriately screen children for ASD, we must be using appropriate instrumentation.

In Mexico the most frequently reported healthcare practitioners involved in the screening process were pediatricians followed by neuropsychologists and speech pathologists. This finding was consistent with recommendations stated in the Mexican Public Health Guide (2012), as it recommends that ASD be diagnosed by a family doctor, a medical psychiatrist, or a developmental psychiatrist with primary focus on infants and adolescents (Secretaria de Salud, 2012). These findings also support the results obtained from a study conducted by Harris and Barton (2017) which found that psychologists followed by medical doctors and

neuropsychologists were most commonly involved in screening and diagnostic assessments (Harris & Barton, 2017).

In the U.S., the most frequently reported healthcare practitioners involved in the screening process were speech pathologists, followed by parents, and psychologists. This finding was interesting as the American academy of pediatrics (2013) currently recommends that all children be screened for ASD at their 18- and 24 -month well visits. Primary health care providers, such as pediatricians, are currently the ones in the position to screen children at an early age for developmental delays and disabilities during regular well-child doctor visits (CDC, 2018). However, it should be noted here that the majority of participants from the U.S. were in fact speech pathologists, so this may have skewed the results.

These findings are a cause for concern as they suggest that medical doctors may not be detecting signs of ASD during well visits or completing the recommended universal screening for ASD released by the United States Preventive Services Task Force in February, 2016 (CDC, 2018). This delay has the potential to cause children to not be screened until they are much older when they begin speech and language interventions. A delay in screening and diagnosis has the potential to result in children not receiving the appropriate treatment and resources needed (CDC, 2018).

In both Mexico and the U.S. over 90% of the participants indicated that parents were involved in the screening process. These results are consistent with recommendations stated by the Centers for Disease Control and Prevention (2018) as parent information is critical to the screening process. In both Mexico and the U.S. the primary concern reported by parents was

language followed by behavior. These results are consistent with the results obtained from the Bravo oro et al (2014) study in which language and then behavior challenges were the primary concerns reported in Mexico.

Results obtained regarding routine screening and age range of most frequent population that is screened, showed that in both Mexico and U.S. more than 60% of the participants reported not to routinely screen individuals for ASD. This could be due to the healthcare discipline most of the participants were in as only a small amount were medical doctors who are required to routinely screen for ASD. The participants that indicated to routinely screen were speech pathologists, psychologists, behavior analysis, teachers, and early intervention specialists. It was interesting to observe that participants in the medical field who are required to screen for ASD did not indicate to do so.

In regard to age range most frequently screened the majority of participants from Mexico and the U.S. reported screening between the ages of 2 and 4 years most frequently. These results are inconsistent with recommendations stated by the American Academy of Pediatrics (2013) which indicate that all children be screened for ASD at their 18- and 24-month well-child visits (APA, 2013). In regard to Mexico, these results are consistent with results obtained from the Harris and Barton study (2017) which state that as of 2014, it was found that families in Mexico first began to suspect of ASD around the age of 4 (Albores, et al., 2008). It is important to note that the Mexican Public Health Guide states that pediatric nurses and pediatricians have not yet incorporated a practical system for monitoring the development of the child that would allow for early and reliable diagnosis of ASD (Secretaria de Salud, 2012). This information is of great

concern as the earlier a child can be screened and diagnosed the earlier they can begin to receive services for ASD which is crucial for their development.

With regards to the referral in Mexico, when individuals failed their screenings for ASD, the most frequently reported healthcare practitioners an individual was referred to for a diagnostic evaluation was a neurologist, followed by speech pathologists, and psychologists. These results are consistent with results obtained by the study conducted by Harris and Barton (2017) which indicated that the health care provider that most commonly diagnoses ASD in Mexico is the psychologist, followed by medical doctors. These results are somewhat consistent with recommendations stated on the National Institute of Neurological Disorders and Stroke (NIH), the National Research Council, and the CDC, which state that if screening instruments indicate the possibility of ASD, a more comprehensive evaluation by a multidisciplinary team including a psychologist, neurologist, psychiatrist, speech therapist, and other professionals is recommended. However, it is not consistent with the recommendations stated on the 2012 Mexican Public Health Guide (Secretaria de Salud, 2012) nor the recommendations of the CDC, DSM, and the National Institute of Mental Health (NIH), which state a medical diagnosis of ASD must be made by a medical doctor.

In the U.S. when individuals failed their screening for ASD, the most frequently reported healthcare practitioners an individual was referred to for a diagnostic evaluation was a psychologist, followed by medical doctors, and pediatricians. These findings are somewhat consistent with recommendations stated by the CDC (2018), the NIH, and the National Research Council, as medical doctors and pediatricians are currently able to diagnose ASD. Although

psychologists form part of the multidisciplinary team recommended for a comprehensive evaluation, they are currently not able to provide a medical diagnosis of ASD (National Institute of Mental Health, 2018).

The final research question addressed the diagnostic practices currently being practiced by healthcare practitioners in Mexico and in the U.S. It was hypothesized that in Mexico, healthcare professionals would be following recommendations provided by the 2012 Mexican Public Health Service's Clinical Guide to Diagnosing and Managing ASD (Secretaria de Salud, 2012), and in the U.S., Healthcare professionals would be following recommendations provided by the American Academy of Pediatrics (AAP, 2013) and the Centers for Disease Control and Prevention (CDC, 2018).

Results indicated that in both Mexico and the U.S. the most frequently reported diagnostic tools were the ADOS-G, CARS, and ADI-R, and the most frequently reported diagnostic criteria was the DSM-V. These results are consistent with recommendations from the Centers for Disease Control and Prevention (2018) and the Mexican Public Health Guide (2012). In addition, the results support the findings reported by Harris and Barton (2017) who reported that professionals in Mexico used the CARS, ADOS, and ADI-R. However, in both Mexico and the U.S., participants reported use of alternate diagnostic tools, criteria, and inappropriate assessment tools, such as the TASI which is a tool used to assess addiction in teenagers, the Adaptive Behavior Assessment System Second Edition (ABAS-2) which uses criteria from the DSM IV-TR, and the Children's Communication Checklist-2 (CCC-2) which is not ASD

specific. Additionally, there was one participant in Mexico that reported there were no diagnostic tools available and relied on criteria from the DSM-IV as an alternate method.

In regard to criteria used, when participants did not indicate use of the DSM-V participants in the U.S. and Mexico reported use of outdated versions of the DSM and alternate criteria such as the Michigan guidelines for ASD eligibility, Texas Education Agency criteria, and one participant reported not to be sure of what criteria is used. The results demonstrate a lack of consistency in using recommended gold-standard diagnostic tools, and updated ASD specific diagnostic tools and diagnostic criteria. This was observed throughout healthcare practitioners across different disciplines and within the same discipline. This matter is of great concern as in order to appropriately diagnose children with ASD and provide the necessary treatment and services required, healthcare practitioners must be using appropriate and the most updated instrumentation.

With regards to using a multidisciplinary team during the diagnostic process, the majority of participants from both Mexico and the U.S. reported that in their country's current recommendations include using a multidisciplinary team to evaluate for ASD, and the majority of participants in Mexico and the U.S. reported to diagnose ASD in a multidisciplinary team in their current practice. However, some participants from the U.S. and Mexico indicated that evaluation in a multidisciplinary team was not currently recommended in their country or they did not know if it was. Additionally, some participants in both Mexico and the U.S. reported to diagnose ASD individually in their current practice. This is important to note as these recommendations are stated by the CDC, the NIH, and the National Research Council. In

Mexico these recommendations have been reported in the Mexican Public Health Guide as it states to follow the recommendations from the DSM. Diagnosing ASD in a multidisciplinary team is recommended by the CDC, NIH, the National Research Council, and the DSM-5. A multidisciplinary team diagnosis is important due to the complexity of the disorder, the variety of functioning aspects that are affected, and the need to differentiate ASD from other disorders or medical conditions.

With regards to assessing ASD in multiple settings, the majority of participants in the U.S. reported to assess individuals in multiple settings. This is consistent with current recommendations stated by the Centers for Disease Control and Prevention (2018). However, some participants did report that assessment in multiple settings was not being practiced or only practiced sometimes. The majority of participants from Mexico however, reported not to assess individuals in multiple settings. Assessment of participants in multiple settings is important because it helps the evaluator observe and document an individual's behavior and functional use of language across social situations and failure to do so can result in inaccurate assessment results. Gold-standard recommendations set forth by the National Research Council Committee on Educational Interventions for Children with Autism (2001) state that best practice diagnostic tools should assess social functioning in a developmental context and evaluators should take into account the variability of the individual's behavior across settings (Huerta & Lord, 2012). An observational assessment of the individual's current functioning in a context in which social-communicative behavior and play or peer interaction can be observed (Huerta & Lord, 2012).

With regards to referral subsequent to a diagnosis of ASD participants in Mexico and the U.S. indicated speech pathologists as the most frequent referral for intervention or treatment followed by occupational therapists and BCBAs in the U.S. and neurologists and psychologists in Mexico. The results obtained by participants in the U.S. are consistent with recommendations stated by the CDC (2018). According to reports by the American Academy of Pediatrics and the National Research Council, therapy approaches that focus on behavior and communication that benefit individuals with ASD include those that provide structure, direction, and organization in addition to participation by the family (CDC, 2018). These can include applied behavior analysis (ABA) therapy, occupation therapy, and speech therapy among others (CDC, 2018). Results obtained from participants in Mexico are somewhat consistent with these recommendations. This is interesting as one of the core deficits of ASD is impairments in social communication and interaction and research shows that early intervention treatment services can greatly improve a child's development (CDC, 2018).

In conclusion, accuracy of knowledge related to ASD in both the U.S. and in Mexico is in need of improvement and was found to be effected by the following variables: location, years of experience, patient contact, and comfort level. With regards to screening practices in Mexico and in the U.S., many similarities were evident. These included using the M-CHAT screening tool, parent involvement, language reported as the primary concern, lack of routine screening for ASD, and screening individuals between the ages of 2 and 4 years. However, many differences were also evident. Differences included: healthcare practitioners involved in the screening process, and healthcare practitioners referred to for a diagnostic evaluation. With regard to

diagnostic practices in Mexico and in the U.S., many similarities were evident. These included use of the ADOS-G, CARS, and ADI-R as diagnostic tools, criteria used for diagnosis, use of a multidisciplinary team, and referring individuals to a speech therapist following a diagnosis of ASD. However, many differences were also evident. Differences included: assessing ASD in multiple settings. Additionally, in both Mexico and the U.S. many healthcare practitioners were found to be following current best practice guidelines; however, there were instances where this was not the case. For example: use of inappropriate assessment tools for screening ASD, lack of routine screening, inconsistent referral to medical doctors for a diagnostic evaluation, use of inappropriate diagnostic tools, use of outdated versions of the DSM, diagnosing ASD individually, and evaluating individuals in one setting.

Results of this study are important as limited accuracy of knowledge and failure to adhere to current recommendations can result in inaccurate diagnoses of individuals. Additionally, inconsistencies in screening and diagnostic practices between Mexico and the U.S. across healthcare disciplines has the potential to result in misdiagnoses of individuals, prolongation of comprehensive evaluations and diagnosis, and delay of intervention and treatment services.

Clinical Implications

The results of this study have clinical implications for practitioners in both the U.S. and in Mexico. The low accuracy of knowledge relating to the ASD has the potential to effect diagnostic, screening, and intervention practices in both the U.S. and in Mexico. The fact that the accuracy of knowledge relating to ASD was significantly lower for healthcare practitioners in

Mexico has clinical implications in the U.S. as the majority of immigrants coming into the U.S. are from Mexico and this limited knowledge could mean that the individuals have been provided with incorrect information and/or inaccurate diagnoses. Additionally, families of individuals with a diagnosis of ASD in Mexico may not have been provided accurate information or recommendations.

The variables found to have an effect on accuracy of knowledge such as location, years of experience, patient contact, and comfort level can be used clinically because we should be aware of this when referring children for evaluations. As healthcare practitioners working in a setting that diagnoses ASD we can consider our own years of experience, patient contact, and comfort level in order to further understand what can be done to increase the accuracy of knowledge of ASD and overall our screening and diagnostic practices.

The differences found in screening and diagnostic practices between healthcare practitioners in the U.S. and in Mexico indicate the inconsistencies of screening and diagnostic practices across different healthcare disciplines. These inconsistencies in screening and diagnostic practices across healthcare disciplines have the potential to misdiagnose an individual, prolong a comprehensive evaluation and diagnosis, and delay early intervention and treatment services that are crucial to the individual's development in helping them learn new skills and reduce their difficulties.

Limitations of the Present Study

A major limitation of the present study was the small sample size, especially from Mexico. A small sample size can affect generalization of results and the ability to use stronger

statistical analysis. If the sample size could have been greater and more participants from different healthcare professions could have participated, the study could have had different results.

Additionally, a limited number of medical doctors participated in this study which interferes with the validity of the current findings regarding knowledge, screening, and diagnostic practices related to ASD. Medical doctors are currently the only healthcare professionals able to provide medical diagnoses of ASD, their inclusion in the study could have resulted in more accurate reliable results and interpretations.

The design of the survey could possibly be a limitation of the study. Some participants appeared to have trouble following the instructions provided and answered questions even when they indicated not to participate in screening and diagnostic practices. Furthermore, additional questions could have been asked to better validate the findings and reason for conducting the study. Questions for the U.S. participants such as "how often do you screen/diagnose individuals from Mexico?" and questions for Mexican participants such as "how often do individuals/families seek further services in the U.S.?" could have provided more information on the importance of researching this topic.

Implications for Further Research

Further research in this topic should include reduplication of the study with larger number of participants so results can be more conclusive, especially with participants from Mexico. Additionally, a larger sample of medical doctors should be obtained as this is the only profession able to provide a medical diagnosis and obtain a more diverse sample size with a

larger number of participants in each of the healthcare disciplines listed as this would improve the validity and provide a better generalization and understanding of the findings.

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APPENDIX

APPENDIX A

IRB APPROVAL

The University of Texas Rio Grande Valley

Office of Research Compliance
Institutional Review Board for Human Subject Research

Date: September 21, 2018

PI: Maria Valdez

Dept: Communication Sciences and Disorders

Title: Comparison of Knowledge and Diagnostic Practices Relating to Autism Spectrum Disorder Between U.S.A. and Mexico

Re: IRB Exempt Determination for Protocol Number 1316542-1

Dear Maria Valdez,

A University of Texas Rio Grande Valley IRB reviewer has approved the proposal referenced above. The approval is effective as of September 21, 2018 within the exempt category of:

Category 2. Research involving the use of educational tests, survey procedures, interview procedures, or observation of public behavior, unless: (a) information obtained is recorded in such a manner that the human subjects can be identified, directly or through identifiers linked to the subjects; and (b) any disclosure of the human subjects' responses outside the research could reasonably place them at risk of criminal or civil liability or be damaging to their financial standing, employability, or reputation.

Research that is determined to be Exempt from IRB review is not exempt from ensuring protection of human subjects. The Principal Investigator (PI) is responsible for the following through the conduct of the research study:

1. Assuring that all investigators and co-principal investigators are trained in the ethical principles, relevant federal regulations, and institutional policies governing human subjects research.
2. Disclosing to the subjects that the activities involve research and that participation is voluntary during the informed consent process.
3. Providing subjects with pertinent information (e.g. risks and benefits, contact information for investigators, and IRB/ORC) and ensuring that human subjects will voluntarily consent to participate in the research when appropriate (e.g. surveys, interviews).
4. Assuring the subjects will be selected equitably, so that the risks and benefits of the research are justly distributed.
5. Assuring that the privacy of subjects and confidentiality of the research data will be maintained appropriately to ensure minimal risk to subjects.

Exempt research is subject to the ethical principles articulated in The Belmont Report, found at the Office of Human Research Protections (OHRP) Website:
www.hhs.gov/ohrp/humansubjects/guidance/belmont.html

Unanticipated Problems: Any unanticipated problems or complaints must be reported to the IRB/ORC promptly. Further information concerning unanticipated problems can be found in the IRB procedures manual.

Continuing Review: Exempt research is not subject to annual review by the IRB.

Modifications: Any change to your protocol requires a Modification Request for review and approval prior to implementation. The IRB may review the exempt status at that time and request an application for approval as non-exempt research.

Closure: Please notify the IRB when your study is complete through submission of a final report. Upon notification, we will close our files pertaining to your study.

If you have any questions please contact the Office of Research Compliance by phone at (956) 665-2093 or via email at irb@utrgv.edu.

Sincerely,

Laura D. Seligman

Laura Seligman, Ph.D.
Institutional Review Board Chair

APPENDIX B

RECRUITMENT E-MAIL

To Whom It May Concern:

My name is Maria Fernanda Valdez, I am a student from the Department of Communication Sciences and Disorders at the University of Texas Rio Grande Valley (UTRGV). I would like to invite you to participate in my research study which consists of comparing the knowledge, screening, and diagnostic practices relating to autism spectrum disorder between the U.S.A. and Mexico.

This research study has been reviewed and approved by the Institutional Review Board for the Protection of Human Subjects (IRB) at the University of Texas Rio Grande Valley.

In order to participate you must be 18 years or older. Participation in this research is completely voluntary, you may choose not to participate without penalty.

As a participant, you will be asked to complete an online survey which should take no more than 20 minutes of your time. We will not be collecting any personal identifying information. Your participation is completely voluntary and anonymous.

If you would like to participate in this research study, please click on the survey link below. If you do not wish to participate, please disregard this e-mail.

Thank you very much for your time and consideration. If you have any questions please contact the following:

Jessica Stewart, Ph.D., CCC-SLP
jessica.stewart@utrgv.edu
956-665-3405

Maria Fernanda Valdez, B.S.
maria.valdez05@utrgv.edu

APPENDIX C

PARTICIPANT SURVEY

Survey Questionnaire

First Set of Questions: Demographics

1. What is your gender?
    - Female
    - Male
    - Other (If other please specify)

2. What is your primary position/job title?
    - Medical Doctor
    - Pediatrician
    - Neurologist
    - Psychiatrist
    - Neuropsychologist
    - Psychologist
    - Early childhood professional
    - Teacher
    - Counselor
    - Speech and Language Pathologist
    - Occupational Therapist
    - Other (If other please specify)

3. Do you currently hold appropriate licensure to practice in your field?
    - Yes
    - No
    - Other (If other please specify)

4. What is your age?
    - 20-25
    - 26-30
    - 31-35
    - 36-40
    - 41-45

- 46-50
- 50+

5. What is your highest level of education?
    - No high school diploma or equivalent
    - High school diploma or equivalent
    - Associates degree or some college
    - Bachelor's degree
    - Master's degree
    - Ph.D
    - M.D.
    - Other (If other please specify)

6. How many years of experience/in practice do you have?
    - 0-5 years
    - 5-10 years
    - 10-15 years
    - 15-20 years
    - >20 years

7. Where do you currently practice?
    - Mexico
        - Which state:_____
    - U.S.A.
        - Which state: _____

8. What setting do you work in?
    - Private practice
    - Hospital
    - School
    - University
    - Clinic
    - Other (If other please specify)

9. In your current practice, do you provide services to individuals who are diagnosed with ASD and/or diagnose this disorder?
    - Yes
    - No

10. Approximately what percent of your patient contact involves individuals diagnosed with ASD?
    - <10%
    - 10-25%
    - 25-50%
    - 50-75%
    - >75%

11. What is your comfort level servicing individuals diagnosed with Autism Spectrum Disorder?
    - Not comfortable
    - Minimal to moderately comfortable
    - Moderate
    - Moderate to very comfortable
    - Very comfortable

12. Are you currently involved in the diagnosis of ASD?
    - Yes
    - No
    - Other (If other, please specify)

13. Are you currently involved in screening patients for ASD?
    - Yes
    - No
    - Other (If other, please specify)

14. How do you ensure that your knowledge related to ASD is current?
    - Online
    - At work
    - Annual conventions
    - Continued Education Courses
    - Other (If other, please specify)

15. How do you access materials and instruments used to screen and evaluate patients suspected of having ASD?
    - They are provided at work
    - Out of pocket
    - Other (If other, please specify

Second set of questions: Knowledge

1. Which of the following are currently valid diagnosis (select all that apply)?
    - Autism spectrum disorder (ASD)
    - Childhood onset pervasive developmental disorder (COPDD)
    - Asperger
    - Infantile Autism (IA)
    - Atypical pervasive developmental disorder (APDD)
    - PDD-NOS
    - Pervasive Developmental Disorder (PDD)
    - Residual Autism
    - None

2. T/F Autism is caused by parenting.

3. T/F Screening tools can provide a diagnosis of ASD

4. T/F Autism is associated with schizophrenia

5. T/F Screening tools can provide conclusive evidence of ASD

6. T/F Asperger's is a valid diagnosis.

7. T/F PDD-NOS is a valid diagnosis.

8. T/F ASD is classified under the Pervasive Developmental Disorders in the DSM.

9. Which of the following are appropriate screening tools for ASD? Select all that apply
    - Modified Checklist for Autism in Toddlers (M-CHAT)
    - Ages and Stages Questionnaires: Social- Emotional (ASQ: SE)
    - Childhood Autism Rating Scale (CARS)
    - Gilliam autism Rating Scale-Second Edition (GARS-2)
    - Ages and Stages Questionnaires (ASQ)
    - Preschool Language Scales-5th Edition Screening Test (PLS-5th Edition Screener)
    - Communication and Symbolic Behavior Scales (CSBS)
    - Parents' Evaluation of Developmental Status (PEDS)
    - Preschool and Kindergarten Behavioral Scales-Second Edition (PBKS-2)

- Checklist for Autism in Toddlers (CHAT)
- Quantitative Checklist for Autism in Toddlers (Q-CHAT)

10. T/F Current recommendations for ASD diagnostic evaluations include evaluations conducted by a multidisciplinary or transdisciplinary team of healthcare professionals.

11. T/F A single tool should be used as the basis for diagnosing ASD during a diagnostic evaluation.

12. T/F Diagnostic tools usually rely on two sources of information, the parents' or caregivers' descriptions of the child's development and a professional's observation.

13. What are some common diagnostic tools used for diagnosing ASD? Select all that apply
    - Modified Checklist for Autism in Toddlers (M-CHAT)
    - Behavior Assessment System for Children, Second Edition (BASC-II)
    - Autism Diagnosis Interview-Revised (ADI-R)
    - Infant Toddler Social Emotional Assessment (ITSEA)
    - Brief Infant Toddler Social Emotional Assessment (BITSEA)
    - Childhood Autism Rating Scale (CARS)
    - Oral and Written Language Scales (OWLS)
    - Gilliam autism Rating Scale-Second Edition (GARS-2)
    - Autism Diagnostic Observation Schedule-Generic (ADOS-G)
    - Preschool Language Scales (PLS-5th Edition)
    - Ages and Stages Questionnaires (ASQ)
    - Communication and Symbolic Behavior Scales (CSBS)
    - Parents' Evaluation of Developmental Status (PEDS)
    - Goldman-Fristoe 3 (GFTA-3)

14. T/F There are 3 levels of severity associated with ASD

15. Which of the 3 levels is associated with the most severe impairment?
    - Level 1
    - Level 2
    - Level 3

*Only be taken to questions 15 and 16 if they answer true to number 14

16. Which of the 3 levels is associated with the least severe impairment?

- Level 1
- Level 2
- Level 3

17. Which of the following are required for a diagnosis of ASD (select all that apply)
    - Restricted/repetitive behaviors
    - Poor eye contact
    - Deficits in social communication and interaction
    - Echolalia
    - Speech delay
    - Lack of Attention
    - Other (If other please specify)

18. Who can diagnose ASD?
    - Medical Doctors
    - Pediatricians
    - Neurologists
    - Psychiatrists
    - Neuropsychologists
    - Psychologists
    - Early childhood professionals
    - Teachers
    - Counselors
    - Speech and Language Pathologists
    - Occupational Therapists
    - Other (If other please specify)
    - Do not know

19. What is the prevalence rate of autism in the US?
    - 1 in 64 children
    - 1 in 59 children
    - 1 in 80 children
    - 1 in 115 children
    - There is no current prevalence rate
    - Do not know

20. What is the prevalence rate of autism in Mexico?
    - 1 in 59 children

- 1 in 64 children
- 1 in 115 children
- 1 in 80 children
- There is no current prevalence rate
- Do not know

Third set of questions: Screening practices

1. Are you involved in the screening process for ASD?
    - Yes
    - No
    - Other

if not involved then skip to 4th set of questions

2. What screening instruments/tools do you currently use? Select all that apply.
    - Modified Checklist for Autism in Toddlers (M-CHAT)
    - Screening Tool for Autism in Toddlers and Young Children (STAT)
    - Ages and Stages Questionnaires (ASQ)
    - Communication and Symbolic Behavior Scales (CSBS)
    - Parents' Evaluation of Developmental Status (PEDS)
    - Checklist for Autism in Toddlers (CHAT)
    - Quantitative Checklist for Autism in Toddlers (Q-CHAT)
    - Other (If other specify)

3. Is the screener that you currently use validated or standardized for English speaking individuals?
    - Yes
    - No
    - I don't know
4. Is the screener that you currently use validated or standardized for Spanish speaking individuals?
    - Yes
    - No
    - I don't know

5. Who is typically involved in your screening process? (Select all that apply)
    - Medical Doctors

- Pediatricians
- Neurologists
- Psychiatrists
- Neuropsychologists
- Psychologists
- Early childhood professionals
- Teachers
- Counselors
- Speech and Language Pathologists
- Occupational Therapists
- Parents
- Other (If other please indicate)

6. When an individual does not pass his/her ASD screening, which healthcare professional(s) do you refer them to? Select all that apply
    - Myself
    - Medical Doctors
    - Pediatricians
    - Neurologists
    - Psychiatrists
    - Neuropsychologists
    - Psychologists
    - Early childhood professionals
    - Teachers
    - Counselors
    - Speech and Language Pathologists
    - Occupational Therapists
    - Other (If other please indicate)

7. Are parents involved in the screening process?
    - Yes
    - No

8. In your opinion, when an individual is suspected of having ASD, what are the majority of the families' or individuals primary concerns?
    - Behavior
    - Language
    - Social

- Motor skills
- Other (If other specify)

9. Are you required to routinely screen children for ASD in your practice?
    a. Yes
    b. No

10. At what age(s) are you required to screen children for ASD?
    a. Fill in the blank

11. What age range represents the most frequent population that you screen?
    - 2-4 years
    - 4-6 years
    - 6-8 years
    - >8 years old

Fourth set: Diagnostic practices

1. Are you involved in the diagnostic process for ASD?
    - Yes
    - No
    - Other (If other please specify)

if no, do not proceed

2. Approximately how many children do you evaluate for ASD a month
    - <5
    - 5-10
    - 10-15
    - 15+

3. How are children most commonly referred for evaluation for autism spectrum disorder?
    - The parent is referred by the parent
    - The child is referred by the pediatrician.
    - The child is referred by the teacher.
    - The child is referred by the child psychologist.
    - Other (If other, please specify)

4. In your country, do current recommendations for ASD diagnostic evaluations include evaluations conducted by a multidisciplinary or transdisciplinary team of healthcare professionals?
    - Yes
    - No
    - I don't know

5. Do you diagnose ASD individually or in a multidisciplinary team?
    - Individual
    - Multidisciplinary team

6. Do you observe the children in multiple settings?
    - Yes
    - No
    - Sometimes

7. Where do you conduct your assessment of ASD? (Select all that apply)
    - Home
    - Day care
    - Medical office
    - Other-please indicate

8. What health care professionals are typically involved when evaluating for ASD? (Select all that apply)
    - Medical Doctors
    - Pediatricians
    - Neurologists
    - Psychiatrists
    - Neuropsychologists
    - Psychologists
    - Early childhood professionals
    - Teachers
    - Counselors
    - Speech and Language Pathologists
    - Occupational Therapists
    - Other (If other please specify)

9. Which of these diagnostic tools do you currently use to diagnose ASD? Select all that apply
    - Autism Diagnostic Observation Schedule-Generic (ADOS-G)
    - Autism Diagnosis Interview-Revised (ADI-R)
    - Childhood Autism Rating Scale (CARS)
    - Diagnostic Interview for Social and Communication Disorders (DISCO)
    - Gilliam Autism Rating Scale-Second Edition (GARS-2)
    - Other (If other please specify)

10. Is the diagnostic tool(s) that you currently use validated or standardized for English speaking individuals?
    - Yes
    - No
    - I don't know
11. Is the diagnostic tool(s) that you currently use validated or standardized for Spanish speaking individuals?
    - Yes
    - No
    - I don't know

12. If not, what precautions, modifications, or additional considerations do you implement when diagnosing the child?

13. How often do you seek other health care professionals to aid in evaluating the individual with ASD?
    - Never
    - Sometimes
    - Most of the time
    - Always

14. Which of the following do you currently use to diagnose ASD (select all that apply)?
    - ICD-10
    - DSM-III
    - DSM-IV
    - DSM IV-TR
    - DSM-5
    - DSM-VI

- World Health Organization Manual (WHO)
- Mexican Public Health Service's Clinical Guide
- Other: (If other please indicate)

15. How long does your diagnosis process take?
    - 1 hour
    - hours
    - 2-3 sessions
    - 3+ sessions

16. Are parents involved in the diagnostic process?
    - Yes
    - No
    - Sometimes

17. When a child receives a diagnosis of ASD, where do you refer them? Select all that apply
    - Medical Doctors
    - Pediatricians
    - Neurologists
    - Psychiatrists
    - Neuropsychologists
    - Psychologists
    - Early childhood professionals
    - Teachers
    - Counselors
    - Speech and Language Pathologists
    - Occupational Therapists
    - Board Certified Behavior Analyst
    - Other(If other please specify)

APPENDIX D

SPSS OUTPUT FOR KNOWLEDGE RESULTS

```
[DataSet0] C:\Users\qwm684\Documents\LocationAccuracy.sav
```

Between-Subjects Factors

		N
Location	1.00	16
	2.00	56

Tests of Between-Subjects Effects

Dependent Variable: Accuracy

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	.090[a]	1	.090	5.162	.026
Intercept	15.863	1	15.863	904.972	.000
Location	.090	1	.090	5.162	.026
Error	1.227	70	.018		
Total	26.228	72			
Corrected Total	1.317	71			

a. R Squared = .069 (Adjusted R Squared = .055)

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT Accuracy
  /METHOD=ENTER Location.
```

Regression

```
[DataSet0] C:\Users\qwm684\Documents\LocationAccuracy.sav
```

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Location[b]	.	Enter

a. Dependent Variable: Accuracy

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.262[a]	.069	.055	.13239

a. Predictors: (Constant), Location

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.090	1	.090	5.162	.026[b]
	Residual	1.227	70	.018		
	Total	1.317	71			

a. Dependent Variable: Accuracy

b. Predictors: (Constant), Location

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.437	.069		6.372	.000
	Location	.085	.038	.262	2.272	.026

a. Dependent Variable: Accuracy

```
UNIANOVA Accuracy BY Profession
  /METHOD=SSTYPE(3)
  /INTERCEPT=INCLUDE
  /CRITERIA=ALPHA(0.05)
  /DESIGN=Profession.
```

Univariate Analysis of Variance

```
[DataSet0] C:\Users\qwm684\Documents\LocationAccuracy.sav
```

Between-Subjects Factors

		N
Profession	1.00	57
	2.00	6
	3.00	9

Tests of Between-Subjects Effects

Dependent Variable: Accuracy

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	.093[a]	2	.046	2.609	.081
Intercept	9.572	1	9.572	539.204	.000
Profession	.093	2	.046	2.609	.081
Error	1.225	69	.018		
Total	26.228	72			
Corrected Total	1.317	71			

a. R Squared = .070 (Adjusted R Squared = .043)

```
UNIANOVA Accuracy BY Age
  /METHOD=SSTYPE(3)
  /INTERCEPT=INCLUDE
  /CRITERIA=ALPHA(0.05)
  /DESIGN=Age.
```

Univariate Analysis of Variance

```
[DataSet0] C:\Users\qwm684\Documents\LocationAccuracy.sav
```

Between-Subjects Factors

		N
Age	1.00	9
	2.00	16
	3.00	13
	4.00	7
	5.00	10
	6.00	5
	7.00	12

Tests of Between-Subjects Effects

Dependent Variable: Accuracy

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	.159[a]	6	.026	1.486	.197
Intercept	22.515	1	22.515	1263.141	.000
Age	.159	6	.026	1.486	.197
Error	1.159	65	.018		
Total	26.228	72			
Corrected Total	1.317	71			

a. R Squared = .121 (Adjusted R Squared = .039)

```
UNIANOVA Accuracy BY Education
  /METHOD=SSTYPE(3)
  /INTERCEPT=INCLUDE
  /CRITERIA=ALPHA(0.05)
  /DESIGN=Education.
```

Univariate Analysis of Variance

```
[DataSet0] C:\Users\qwm684\Documents\LocationAccuracy.sav
```

Between-Subjects Factors

		N
Education	4.00	7
	5.00	47
	6.00	14
	7.00	3
	8.00	1

Tests of Between-Subjects Effects

Dependent Variable: Accuracy

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	.140[a]	4	.035	1.988	.106
Intercept	5.841	1	5.841	332.302	.000
Education	.140	4	.035	1.988	.106
Error	1.178	67	.018		
Total	26.228	72			
Corrected Total	1.317	71			

a. R Squared = .106 (Adjusted R Squared = .053)

```
UNIANOVA Accuracy BY YearsOfExperience
```

```
  /METHOD=SSTYPE(3)
  /INTERCEPT=INCLUDE
  /CRITERIA=ALPHA(0.05)
  /DESIGN=YearsOfExperience.
```

Univariate Analysis of Variance

```
[DataSet0] C:\Users\qwm684\Documents\LocationAccuracy.sav
```

Between-Subjects Factors

		N
YearsOfExperience	1.00	19
	2.00	18
	3.00	13
	4.00	11
	5.00	11

Tests of Between-Subjects Effects

Dependent Variable: Accuracy

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	.194[a]	4	.049	2.894	.029
Intercept	24.231	1	24.231	1445.131	.000
YearsOfExperience	.194	4	.049	2.894	.029
Error	1.123	67	.017		
Total	26.228	72			
Corrected Total	1.317	71			

a. R Squared = .147 (Adjusted R Squared = .096)

```
UNIANOVA Accuracy BY YearsOfExperience
  /METHOD=SSTYPE(3)
  /INTERCEPT=INCLUDE
  /EMMEANS=TABLES(OVERALL)
  /EMMEANS=TABLES(YearsOfExperience) COMPARE ADJ(BONFERRONI)
  /PRINT=OPOWER ETASQ HOMOGENEITY DESCRIPTIVE
  /CRITERIA=ALPHA(.05)
  /DESIGN=YearsOfExperience.
```

Univariate Analysis of Variance

```
[DataSet0] C:\Users\qwm684\Documents\LocationAccuracy.sav
```

Between-Subjects Factors

		N
YearsOfExperience	1.00	19
	2.00	18
	3.00	13
	4.00	11
	5.00	11

Descriptive Statistics

Dependent Variable: Accuracy

YearsOfExperience	Mean	Std. Deviation	N
1.00	.5105	.12536	19
2.00	.6139	.12344	18
3.00	.5846	.06887	13
4.00	.6636	.14158	11
5.00	.6091	.18003	11
Total	.5882	.13622	72

Levene's Test of Equality of Error Variances[a]

Dependent Variable: Accuracy

F	df1	df2	Sig.
2.210	4	67	.077

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + YearsOfExperience

Tests of Between-Subjects Effects

Dependent Variable: Accuracy

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	.194[a]	4	.049	2.894	.029	.147
Intercept	24.231	1	24.231	1445.131	.000	.956
YearsOfExperience	.194	4	.049	2.894	.029	.147
Error	1.123	67	.017			
Total	26.228	72				
Corrected Total	1.317	71				

Tests of Between-Subjects Effects

Dependent Variable: Accuracy

Source	Noncent. Parameter	Observed Power[b]
Corrected Model	11.575	.753
Intercept	1445.131	1.000
YearsOfExperience	11.575	.753
Error		
Total		
Corrected Total		

a. R Squared = .147 (Adjusted R Squared = .096)

b. Computed using alpha = .05

Estimated Marginal Means

1. Grand Mean

Dependent Variable: Accuracy

		95% Confidence Interval	
Mean	Std. Error	Lower Bound	Upper Bound
.596	.016	.565	.628

2. YearsOfExperience

Estimates

Dependent Variable: Accuracy

			95% Confidence Interval	
YearsOfExperience	Mean	Std. Error	Lower Bound	Upper Bound
1.00	.511	.030	.451	.570
2.00	.614	.031	.553	.675
3.00	.585	.036	.513	.656
4.00	.664	.039	.586	.742
5.00	.609	.039	.531	.687

Pairwise Comparisons

Dependent Variable: Accuracy

(I) YearsOfExperience	(J) YearsOfExperience	Mean Difference (I-J)	Std. Error	Sig.[b]	95% Confidence [b]... Lower Bound
1.00	2.00	-.103	.043	.179	-.227
	3.00	-.074	.047	1.000	-.209
	4.00	-.153*	.049	.027	-.296
	5.00	-.099	.049	.486	-.241
2.00	1.00	.103	.043	.179	-.020
	3.00	.029	.047	1.000	-.108
	4.00	-.050	.050	1.000	-.194
	5.00	.005	.050	1.000	-.139
3.00	1.00	.074	.047	1.000	-.061
	2.00	-.029	.047	1.000	-.166
	4.00	-.079	.053	1.000	-.233
	5.00	-.024	.053	1.000	-.178
4.00	1.00	.153*	.049	.027	.011
	2.00	.050	.050	1.000	-.094
	3.00	.079	.053	1.000	-.075
	5.00	.055	.055	1.000	-.106
5.00	1.00	.099	.049	.486	-.044
	2.00	-.005	.050	1.000	-.149
	3.00	.024	.053	1.000	-.130
	4.00	-.055	.055	1.000	-.215

Pairwise Comparisons

Dependent Variable: Accuracy

(I) YearsOfExperience	(J) YearsOfExperience	95% Confidence [b]... Upper Bound
1.00	2.00	.020
	3.00	.061
	4.00	-.011
	5.00	.044
2.00	1.00	.227
	3.00	.166
	4.00	.094
	5.00	.149
3.00	1.00	.209
	2.00	.108
	4.00	.075
	5.00	.130
4.00	1.00	.296
	2.00	.194
	3.00	.233
	5.00	.215
5.00	1.00	.241
	2.00	.139
	3.00	.178
	4.00	.106

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

b. Adjustment for multiple comparisons: Bonferroni.

Univariate Tests

Dependent Variable: Accuracy

	Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Contrast	.194	4	.049	2.894	.029	.147
Error	1.123	67	.017			

Univariate Tests

Dependent Variable: Accuracy

	Noncent. Parameter	Observed Power[a]
Contrast	11.575	.753
Error		

The F tests the effect of YearsOfExperience. This test is based on the linearly independent pairwise comparisons among the estimated marginal means.

a. Computed using alpha = .05

```
UNIANOVA Accuracy BY PatientContact
  /METHOD=SSTYPE(3)
  /INTERCEPT=INCLUDE
  /EMMEANS=TABLES(OVERALL)
  /PRINT=OPOWER ETASQ HOMOGENEITY DESCRIPTIVE
  /CRITERIA=ALPHA(.05)
  /DESIGN=PatientContact.
```

Univariate Analysis of Variance

```
[DataSet0] C:\Users\qwm684\Documents\LocationAccuracy.sav
```

Between-Subjects Factors

		N
PatientContact	1.00	22
	2.00	20
	3.00	14
	4.00	6
	5.00	9

Descriptive Statistics

Dependent Variable: Accuracy

PatientContact	Mean	Std. Deviation	N
1.00	.5091	.13151	22
2.00	.6025	.12511	20
3.00	.5964	.13793	14
4.00	.6667	.08756	6
5.00	.6611	.11118	9
Total	.5852	.13480	71

Levene's Test of Equality of Error Variances[a]

Dependent Variable: Accuracy

F	df1	df2	Sig.
.323	4	66	.862

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + PatientContact

Tests of Between-Subjects Effects

Dependent Variable: Accuracy

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	.227[a]	4	.057	3.582	.011	.178
Intercept	20.726	1	20.726	1308.888	.000	.952
PatientContact	.227	4	.057	3.582	.011	.178
Error	1.045	66	.016			
Total	25.588	71				
Corrected Total	1.272	70				

Tests of Between-Subjects Effects

Dependent Variable: Accuracy

Source	Noncent. Parameter	Observed Power[b]
Corrected Model	14.327	.847
Intercept	1308.888	1.000
PatientContact	14.327	.847
Error		
Total		
Corrected Total		

a. R Squared = .178 (Adjusted R Squared = .129)

b. Computed using alpha = .05

Estimated Marginal Means

Grand Mean

Dependent Variable: Accuracy

Mean	Std. Error	95% Confidence Interval	
		Lower Bound	Upper Bound
.607	.017	.574	.641

```
UNIANOVA Accuracy BY PatientContact
  /METHOD=SSTYPE(3)
  /INTERCEPT=INCLUDE
  /EMMEANS=TABLES(OVERALL)
  /EMMEANS=TABLES(PatientContact) COMPARE ADJ(BONFERRONI)
  /PRINT=OPOWER ETASQ HOMOGENEITY DESCRIPTIVE
  /CRITERIA=ALPHA(.05)
  /DESIGN=PatientContact.
```

Univariate Analysis of Variance

[DataSet0] C:\Users\qwm684\Documents\LocationAccuracy.sav

Between-Subjects Factors

		N
PatientContact	1.00	22
	2.00	20
	3.00	14
	4.00	6
	5.00	9

Descriptive Statistics

Dependent Variable: Accuracy

PatientContact	Mean	Std. Deviation	N
1.00	.5091	.13151	22
2.00	.6025	.12511	20
3.00	.5964	.13793	14
4.00	.6667	.08756	6
5.00	.6611	.11118	9
Total	.5852	.13480	71

Levene's Test of Equality of Error Variances[a]

Dependent Variable: Accuracy

F	df1	df2	Sig.
.323	4	66	.862

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + PatientContact

Tests of Between-Subjects Effects

Dependent Variable: Accuracy

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	.227[a]	4	.057	3.582	.011	.178
Intercept	20.726	1	20.726	1308.888	.000	.952
PatientContact	.227	4	.057	3.582	.011	.178
Error	1.045	66	.016			
Total	25.588	71				
Corrected Total	1.272	70				

Tests of Between-Subjects Effects

Dependent Variable: Accuracy

Source	Noncent. Parameter	Observed Power[b]
Corrected Model	14.327	.847
Intercept	1308.888	1.000
PatientContact	14.327	.847
Error		
Total		
Corrected Total		

a. R Squared = .178 (Adjusted R Squared = .129)

b. Computed using alpha = .05

Estimated Marginal Means

1. Grand Mean

Dependent Variable: Accuracy

Mean	Std. Error	95% Confidence Interval	
		Lower Bound	Upper Bound
.607	.017	.574	.641

2. PatientContact

Estimates

Dependent Variable: Accuracy

PatientContact	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1.00	.509	.027	.456	.563
2.00	.603	.028	.546	.659
3.00	.596	.034	.529	.664
4.00	.667	.051	.564	.769
5.00	.661	.042	.577	.745

Pairwise Comparisons

Dependent Variable: Accuracy

(I) PatientContact	(J) PatientContact	Mean Difference (I-J)	Std. Error	Sig.[b]	95% Confidence ... [b] Lower Bound
1.00	2.00	-.093	.039	.191	-.206
	3.00	-.087	.043	.464	-.212
	4.00	-.158	.058	.084	-.326
	5.00	-.152*	.050	.033	-.297
2.00	1.00	.093	.039	.191	-.020
	3.00	.006	.044	1.000	-.121
	4.00	-.064	.059	1.000	-.234
	5.00	-.059	.051	1.000	-.205
3.00	1.00	.087	.043	.464	-.038
	2.00	-.006	.044	1.000	-.133
	4.00	-.070	.061	1.000	-.249
	5.00	-.065	.054	1.000	-.221
4.00	1.00	.158	.058	.084	-.011
	2.00	.064	.059	1.000	-.106
	3.00	.070	.061	1.000	-.108
	5.00	.006	.066	1.000	-.187
5.00	1.00	.152*	.050	.033	.007
	2.00	.059	.051	1.000	-.088
	3.00	.065	.054	1.000	-.091
	4.00	-.006	.066	1.000	-.198

Pairwise Comparisons

Dependent Variable: Accuracy

(I) PatientContact	(J) PatientContact	95% Confidence [b]... Upper Bound
1.00	2.00	.020
	3.00	.038
	4.00	.011
	5.00	-.007
2.00	1.00	.206
	3.00	.133
	4.00	.106
	5.00	.088
3.00	1.00	.212
	2.00	.121
	4.00	.108
	5.00	.091
4.00	1.00	.326
	2.00	.234
	3.00	.249
	5.00	.198
5.00	1.00	.297
	2.00	.205
	3.00	.221
	4.00	.187

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

b. Adjustment for multiple comparisons: Bonferroni.

Univariate Tests

Dependent Variable: Accuracy

	Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Contrast	.227	4	.057	3.582	.011	.178
Error	1.045	66	.016			

Univariate Tests

Dependent Variable: Accuracy

	Noncent. Parameter	Observed Power[a]
Contrast	14.327	.847
Error		

The F tests the effect of PatientContact. This test is based on the linearly independent pairwise comparisons among the estimated marginal means.

a. Computed using alpha = .05

```
UNIANOVA Accuracy BY ComfortLevel
  /METHOD=SSTYPE(3)
  /INTERCEPT=INCLUDE
  /EMMEANS=TABLES(OVERALL)
  /EMMEANS=TABLES(ComfortLevel) COMPARE ADJ(BONFERRONI)
  /PRINT=OPOWER ETASQ HOMOGENEITY DESCRIPTIVE
  /CRITERIA=ALPHA(.05)
  /DESIGN=ComfortLevel.
```

Univariate Analysis of Variance

```
[DataSet0] C:\Users\qwm684\Documents\LocationAccuracy.sav
```

Between-Subjects Factors

		N
ComfortLevel	1.00	2
	2.00	4
	3.00	17
	4.00	19
	5.00	30

Descriptive Statistics

Dependent Variable: Accuracy

ComfortLevel	Mean	Std. Deviation	N
1.00	.4500	.07071	2
2.00	.4125	.14930	4
3.00	.5618	.13173	17
4.00	.5947	.14327	19
5.00	.6317	.11256	30
Total	.5882	.13622	72

Levene's Test of Equality of Error Variances[a]

Dependent Variable: Accuracy

F	df1	df2	Sig.
.678	4	67	.610

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + ComfortLevel

Tests of Between-Subjects Effects

Dependent Variable: Accuracy

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	.231[a]	4	.058	3.562	.011	.175
Intercept	7.852	1	7.852	484.251	.000	.878
ComfortLevel	.231	4	.058	3.562	.011	.175
Error	1.086	67	.016			
Total	26.228	72				
Corrected Total	1.317	71				

Tests of Between-Subjects Effects

Dependent Variable: Accuracy

Source	Noncent. Parameter	Observed Power[b]
Corrected Model	14.249	.846
Intercept	484.251	1.000
ComfortLevel	14.249	.846
Error		
Total		
Corrected Total		

a. R Squared = .175 (Adjusted R Squared = .126)

b. Computed using alpha = .05

Estimated Marginal Means

1. Grand Mean

Dependent Variable: Accuracy

Mean	Std. Error	95% Confidence Interval	
		Lower Bound	Upper Bound
.530	.024	.482	.578

2. ComfortLevel

Estimates

Dependent Variable: Accuracy

ComfortLevel	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1.00	.450	.090	.270	.630
2.00	.413	.064	.285	.540
3.00	.562	.031	.500	.623
4.00	.595	.029	.536	.653
5.00	.632	.023	.585	.678

Pairwise Comparisons

Dependent Variable: Accuracy

(I) ComfortLevel	(J) ComfortLevel	Mean Difference (I-J)	Std. Error	Sig.[b]	95% Confidence [b]...
					Lower Bound
1.00	2.00	.038	.110	1.000	-.283
	3.00	-.112	.095	1.000	-.388
	4.00	-.145	.095	1.000	-.420
	5.00	-.182	.093	.549	-.452
2.00	1.00	-.038	.110	1.000	-.358
	3.00	-.149	.071	.387	-.355
	4.00	-.182	.070	.114	-.386
	5.00	-.219*	.068	.019	-.416
3.00	1.00	.112	.095	1.000	-.165
	2.00	.149	.071	.387	-.056
	4.00	-.033	.043	1.000	-.156
	5.00	-.070	.039	.751	-.182
4.00	1.00	.145	.095	1.000	-.130
	2.00	.182	.070	.114	-.021
	3.00	.033	.043	1.000	-.090
	5.00	-.037	.037	1.000	-.145
5.00	1.00	.182	.093	.549	-.088
	2.00	.219*	.068	.019	.022
	3.00	.070	.039	.751	-.042
	4.00	.037	.037	1.000	-.071

Pairwise Comparisons

Dependent Variable: Accuracy

(I) ComfortLevel	(J) ComfortLevel	95% Confidence [b]... Upper Bound
1.00	2.00	.358
	3.00	.165
	4.00	.130
	5.00	.088
2.00	1.00	.283
	3.00	.056
	4.00	.021
	5.00	-.022
3.00	1.00	.388
	2.00	.355
	4.00	.090
	5.00	.042
4.00	1.00	.420
	2.00	.386
	3.00	.156
	5.00	.071
5.00	1.00	.452
	2.00	.416
	3.00	.182
	4.00	.145

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

b. Adjustment for multiple comparisons: Bonferroni.

Univariate Tests

Dependent Variable: Accuracy

	Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Contrast	.231	4	.058	3.562	.011	.175
Error	1.086	67	.016			

Univariate Tests

Dependent Variable: Accuracy

	Noncent. Parameter	Observed Power[a]
Contrast	14.249	.846
Error		

BIOGRAPHICAL SKETCH

Maria Fernanda Valdez was born in Reynosa Tamaulipas, Mexico and raised in Mission, Texas. Maria obtained her Bachelor of Science degree with a major in Communication Sciences and Disorders from the University of Texas at Austin. In May of 2019, Maria obtained her Master of Science degree with a major in Communication Sciences and Disorders from the University of Texas, Rio Grande Valley. Maria is bilingual in Spanish and English and she is currently interested in: research, neurodevelopmental disorders, autism spectrum disorder, dysphasia, aphasia, neuromotor speech disorders, multicultural populations, and immigration. Maria has presented at one national level conference and one state level conference. Maria plans to obtain her certificate of clinical competence from the American Speech Language Hearing (ASHA) Association and become a licensed speech and language pathologist subsequent to completing her clinical fellowship.

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