ASSESSING THE PSYCHOMETRIC PROPERTIES OF A SOCIAL COMMUNICATION TEST FOR CHILDREN WITH AUTISM SPECTRUM DISORDER IN SAUDI ARABIA

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by

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ABSTRAK

Kajian ini menyiasat ciri psikometrik Ujian Penilaian Kemahiran Komunikasi Sosial (ASCST). Instrumen ini direka untuk menilai kemahiran komunikasi sosial kanak-kanak Autism Spectrum Disorder (ASD) yang berumur di antara 6:00 hingga 11:11 tahun di Arab Saudi. Rekabentuk kajian ini adalah rekabentuk pembangunan skala dan pengesahan berbentuk keratan rentas. Kajian itu dijalankan di bandar Jeddah, Arab Saudi. Sampel kajian terdiri daripada 240 kanak-kanak perkembangan tipikal yang dipilih secara rawak dari wilayah utara Jeddah dan 36 kanak-kanak dengan diagnosis ASD yang dipilih dari pusat pemulihan. Ujian ASCST terdiri daripada 4 sub-ujian dan merangkumi ujian reseptif serta ekspresif. Kandungan ujian ASCST dinilai oleh panel yang terdiri daripada 20 pakar (lima ahli psikologi, lima guru pendidikan khas, lima ahli patologi bahasa, dan lima ibu bapa kanak-kanak dengan ASD). Satu kajian rintis dijalankan untuk mengkaji kesesuaian dan kesahan versi awal ASCST. Analisis kesahan isi kandungan menunjukkan bahawa ASCST mempunyai tahap kesahan kandungan yang tinggi. Statistik deskriptif dan ANOVA (F) dua hala digunakan untuk menguji kesan tahap umur kanak-kanak tipikal terhadap prestasi ASCST. Penyelidikan juga menunjukkan ASCST mempunyai kesahan konstruk yang baik. Bagi kesahan diskriminasi, hasil menunjukkan terdapat perbezaan yang signifikan di antara prestasi kanak-kanak perkembangan tipikal dengan kanak-kanak ASD daripada enam kohort. Kebanyakan peserta perkembangan tipikal skor dalam julat yang tinggi, manakala peserta ASD mempunyai skor dalam julat yang sangat rendah. Kebolehpercayaan dalaman ujian

dicapai untuk semua sub-ujian dan ujian keseluruhan (r = 0.852 - 0.994). Keputusan Pearson juga menunjukkan bahawa kebolehpercayaan antara-penilai dicapai untuk semua sub-ujian dan ujian keseluruhan (r = 0.893 - 0.968). Kebolehpercayaan separuh bahagian telah diuji dan hasilnya adalah tinggi (r = 0.800- 0.880). Semua keputusan kebolehpercayaan adalah signifikan secara statistik pada ($\alpha \leq 0.01$). Profil komunikasi sosial kanak-kanak dengan ASD di Arab Saudi dari segi pembolehubah umur dan jantina dianalisis dengan menggunakan ujian bukan parametrik. Hasilnya menunjukkan bahawa tiada perbezaan yang ketara di kalangan enam kumpulan kohort ASD. Hasil juga menunjukkan tiada perbezaan di antara jantina untuk sub-ujian reseptif dan ekspresif. Ukuran sensitiviti, ketepatan dan spesifikasi ASCST telah diuji dan hasilnya menunjukkan bahawa sensitiviti, ketepatan dan spesifikasi ASCST kesemuanya adalah 1. Kajian ini juga menunjukkan hasil berkaitan dengan interaksi pendidikan ibu bapa terhadap perkembangan komunikasi sosial kanak-kanak dengan ASD di Arab Saudi. Hasil ini menunjukkan bahawa latar belakang pendidikan ibu bapa tidak signifikan secara statistik terhadap perkembangan kemahiran komunikasi sosial kanak-kanak dengan ASD. Kesimpulannya, berdasarkan hasil kajian, Ujian Penilaian Kemahiran Komunikasi Sosial (ASCST) menunjukkan kebolehpercayaan dan kesahan yang tinggi dan boleh digunakan untuk menilai kemahiran komunikasi sosial kanak-kanak dengan ASD di Arab Saudi.

ASSESSING THE PSYCHOMETRIC PROPERTIES OF A SOCIAL COMMUNICATION TEST FOR CHILDREN WITH AUTISM SPECTRUM DISORDER IN SAUDI ARABIA

ABSTRACT

The present study investigated the psychometric characteristics of the Assessment of Social Communication Skills Test (ASCST). This tool was designed to assess the social communication skills of Saudi Arabic-speaking children with Autism Spectrum Disorder (ASD) between the ages of 6:00 and 11:11 years. The research study was a scale development and validation research using a cross-sectional design. The study was conducted in the city of Jeddah in Saudi Arabia. The sample is comprised of 240 typically-developing children randomly selected from the northern region in the city of Jeddah and 36 children diagnosed with ASD selected from the rehabilitation centers. The ASCST scale is comprised of 4 subtests and include both expressive and receptive measures. The ASCST was initially evaluated by a panel of 20 validators (five psychologists, five special education teacher, five speech-language pathologists, and five parents of children with ASD). A pilot study was conducted to examine the appropriateness and validity of the initial version of the ASCST. The content validation results showed that the ASCST has a high degree of content validity. The impact of age level on the performance of the typically-developing children on the ASCST was examined using descriptive statistics and the two-way *ANOVA (F)*. Investigation also indicated that ASCST has construct validity. For discriminant validity, the results showed differences in the performance of the participants in the six cohort groups between typically-developing children and children with ASD. Most of the typically-developing

participants scored in the high range, whereas the ASD participants scored in the very low range. The test retest reliability was achieved for all subtests and total score (r = 0.852 – 0.994). The results of the Pearson demonstrated that the interrater reliability was achieved for all subtests and total score (r = 0.893 – 0.968). The split-half reliability was tested, and the results also showed that it was high (r = 0.800-0.880). All reliability results were statistically significant at (α≤0.01). The social communication profile of children with ASD in Saudi Arabia in terms of the age and gender variables were analyzed using non-parametric tests. The results revealed no significant differences among all six ASD age cohort groups. The results further showed no differences between gender on receptive and expressive subtests. The measures of sensitivity, accuracy and specificity of the ASCST were tested and the results revealed that the sensitivity, specificity, and accuracy of the ASCST were all 1. The study also provided results pertaining to the interaction of the parents' education on the development of the ASD children in Saudi Arabia. The results indicated that the educational background of the parents was not statistically significant on the development of the social communication skills of children with ASD. In conclusion, based on the results of the study, the Assessment of Social Communication Skills Test (ASCST) exhibited a high degree of reliability and validity and can be used for the assessment of social communication skills of children with ASD in Saudi Arabia.

CHAPTER 1

INTRODUCTION

1.0   Introduction

This chapter will describe and introduce the basic components of the current research study. The beginning of the chapter covers the background of the study and outlines the significant need to develop and standardize assessment test in Arabic in the area of Autism Spectrum Disorder (ASD) in Saudi Arabia. After that, the chapter provides definition of assessment, challenges of ASD assessment, tests used in the assessment of social and communication skills in children with ASD in English, available tests for assessment of ASD in general as well as for assessment of social and communication skills in particular in Arabic language. The demographic data about Saudi Arabia and the city of Jeddah where the study will be conducted in, and prevalence of ASD in Saudi Arabia will be discussed. Following that, the chapter discusses the purpose of the study, the objectives, significance of the study and research questions. The final sections of the chapter explain the limitations of the study and the definitions of the core terms of the research.

1.1   Background of Study

To date, the diagnosis of Autism Spectrum Disorder (ASD) is still challenged with the huge dearth in the availability of standardized tests in Arabic language (Salhia, Al-Nasser, Taher, Al-Khathaami, & El-Metwally, 2014). This dilemma will continue to negatively affect the provision of appropriate services for individuals with ASD in the whole Arab region. Accordingly, it is critical to develop standardized tests in Arabic language that are linguistically and culturally appropriate. Wetherby (2006)

indicated that social-communication difficulties of children with ASD received remarkable attention in the past two decades. Therefore, these skills were included in the diagnostic criteria of ASD (American Psychiatric Association, 1994). Deficits in social communication skills in children with ASD involve the following two major areas: (1) joint attention, i.e., the ability of the child to shift and coordinate attention skills between people and objects; and (2) symbolic use, "which reflects difficulty learning conventional or shared meanings for symbols and is evident in acquiring gestures, words, imitation, and play" (Wetherby, 2006, p.3). Additionally, Wetherby (2006) stated that due to the significant differences and heterogeneity of children with ASD, detailed and thorough assessment of joint attention and symbol use is important and pivotal because of the impact of these skills on language development. The treatment of individuals with ASD in Saudi Arabia depends directly on the development of scientific and sound assessment tests in Arabic language. Otherwise, the clinical practice in the field of ASD will not progress and will be way behind the level of services available in other countries, particularly in America and the west.

1.1.1 Saudi Arabia

Saudi Arabia is one of the most prominent Middle Eastern countries. The Kingdom of Saudi Arabia was founded by King Abdul Aziz bin Abdul Rahman Al Saud (known as Ibn Saud) on September 23, 1932. The capital of Saudi Arabia is Riyadh. It is the largest city in the kingdom (about 8 million people) and is located centrally in the kingdom of Saudi Arabia. The official language is Arabic. Arabic language is considered one of the top six major languages in the world. According to Watson (2002), Arabic language is the largest living member of all Semitic languages. English is also widely used in commerce and government. The dominant religion of

Saudi Arabia is Islam. It occupies four-fifth of the Arab Peninsula and the total area of the kingdom is 2,149,690 square kilometers. According to the recent statistics provided by Saudi General Authority for Statistics Saudi Arabia's population is about 31,015,999 people. Sixty-seven percent (21129960) of the total number of the population are Saudis and 33% (10391458) are non-Saudis (Saudi General Authority for Statistics, 2016).

1.1.2 Jeddah City

The present research study will take place in the city of Jeddah in Saudi Arabia. Jeddah city is located on the west coast of the Kingdom of Saudi Arabia. It is known as the Bride of the Red Sea because it is located in the middle of the eastern coast of the Red Sea. It is described as the economic and tourism city of Saudi Arabia. It is the second largest city after Riyadh. Jeddah is 5460 square kilometers and the population of Jeddah is around four million people (15% of the total population of Saudi Arabia). It is also a strategic city because it is the main passage for all the pilgrims from the whole world (sea, land and air passage). The port of Jeddah is also one of the largest ports in the world. Administratively, Jeddah is part of the Makkah Region.

1.1.3 Autism Spectrum Disorder

ASD and autism are synonymous terms. ASD is a neurodevelopmental disorder characterized by a group of heterogeneous impairments in communication skills (verbal and/or nonverbal), social interaction skills, and the presence of restricted and repetitive behaviors and interests (Diagnostic and Statistical Manual of Mental Disorders 5th ed. 2013; Salhia et al., 2014; Al-Zaid, Al-hader, & Al-Ayadhi, 2015;

Koeing, 2012; Bauminger-Zviely, 2013; Sicile-Kira, 2014; Doyle & Iland, 2004; Al-Ansari & Ahmed, 2012; Arabameri & Sotoodeh, 2015; Murshid, 2011; Zeglam & Maouna, 2012; Zakareia & Al-Ayadhi, 2013 & Alqahtani, 2012).

Due to the high and alarming incidence rate of ASD, it is becoming a world-wide disorder (Al-Ansari & Ahmed 2012). ASD occurs four times more in boys than in girls (4:1 ratio) (Murshid, 2011; Al-Zaid et al., 2015). ASD might affect a wide array of skills and abilities including social interaction skills, communication skills (verbal and nonverbal), adaptation skills, and academic skills. ASD might also be manifested in intellectual difficulties, sensory motor coordination problems, attention and behavioral problems, sleep problems, and gastrointestinal problems (Landa, 2007).

1.1.4   Prevalence of ASD in Saudi Arabia

Afifi (2005) indicated that ASD prevalence studies are scarce in the whole Middle East including Saudi Arabia. According to Murshid (2011), "the prevalence of ASD is hard to establish because of the problem of diagnosis" (P. 1630). Yazbak (2004) reported that the estimated number of ASD children in Saudi Arabia was 42,500 cases. Alqahtani (2012) stated that although there are no accurate statistics about the prevalence of ASD in Saudi Arabia, he indicated that based on the medical records, it is estimated that in 2002 there are forty thousand children diagnosed with ASD in Saudi Arabia. He added that the prevalence is on the rise and that many cases are misdiagnosed. In an article published in a Alsharq Alawsat Daily Newspaper on March 23, 2011 (A Saudi daily Newspaper), it was reported by an official from the Saudi Ministry of Health that the total number of children with ASD in Saudi Arabia is estimated to be 120,000 (8 children per thousand). On May 12, 2011 in Al-Madina

Newspaper, another daily local Saudi Newspaper, Mrs. Omaima Mograbi, the Director of Jeddah Autism Center, reported that the prevalence of ASD in Saudi Arabia is estimated at 1% of the population. She indicated that the population of Saudi Arabia in 2010 was 27,163,977 people (Saudis and Non-Saudis). Seventy percent of the population was Saudis (18,707.576) and 30% were non-Saudis (8,429,401). Mrs. Moghrabi reported in Al-Madina newspaper that the estimated number of Saudi children with ASD would be 187,075. She based her prevalence on the universal incidence rate of ASD in 2010, which was to be one child per 90-100 births. Yaser Al Fahd, an ASD specialist, reported in Okaz newspaper that the prevalence of ASD in Saudi Arabia was 322,459 children. This prevalence rate was estimated based on the global incidence rate of one child per 88 births is at risk for ASD. The total number of the Saudi population in 2013 which was 29,19,895 people. As can be seen from the information above, the prevalence of ASD are approximate estimations based on the universal incidence rate rather than on actual assessment of children with ASD.

1.1.5 Assessment of ASD

Assessment in general focuses on gathering information to reach a diagnosis. It is an ongoing and systematic process aiming at identifying not only on areas of weaknesses but also on areas of strengths. Due to the complexity of the nature and defining characteristics of ASD, assessment process of ASD has received more attention in special education. Bishop et al., (2008) stated that the diagnosis of ASD becomes more difficult when clinicians try "to distinguish between ASD and other early childhood disorders" (P. 30). They added that the diagnosis becomes more difficult when clinicians try to find out if the child meets the criteria for autism. The

diagnosis of ASD is challenging and different from diagnosis of other communication disorders, and it requires the collaboration of a group of professionals, namely, psychologist, pediatric neurologist, physician, special education teacher, regular education teacher, speech-language pathologist (SLP), parents, audiologist, applied behavior specialist, occupational therapist and physical therapist (Dolyle & Iland, 2004). It is imperative that assessment of ASD be multidisciplinary and multidimensional (Bishop et al., 2008). The assessment of ASD might take weeks or sometimes months to reach at a proper diagnosis. Information obtained during the assessment process includes background information about the child and the family, medical history, educational history, developmental history of motor development as well as speech-language milestones, social and behavioral history, play skills, and adaptive skills (Dolyle & Iland, 2004). Proper and accurate diagnosis of ASD should include assessment of several areas such as verbal and nonverbal communication skills, developmental and cognitive skills, social, behavioral and pragmatic skills, adaptive behaviors, and educational skills.

1.1.6   Available ASD Assessment Tests in Arabic

There are a few tests developed in Arabic language to evaluate the social and communication skills of children in the area of ASD. The following are the tests and screening tests available in Arabic in the area of ASD. However, these tests were translated into Arabic language but not standardized with the Arab population. The translated tests include Autistic Behavior Checklist (ABC), Checklist for Toddlers in Autism (CHAT), Gilliam Autism Rating Scale (GARS), Gilliam Autism Rating Scale, Second Edition (GARS-2), Checklist of Educational Characteristics of

Autistics and Mentally Retarded Children, Childhood Autism Rating Scale, Second Edition (CARS 2) and Childhood Autism Rating Scale (CARS). These translated tools are not necessarily culturally appropriate for the Arab population.

1.1.7 Rationale for Social Communication Assessment

Due to the fact that social and communication skills are one of the major distinctive characteristics of ASD (National Research Council, 2001), this research attempts to provide a test in Arabic language for the assessment of these skills. Gamliel and Yirmiya (2009) indicated that "the social behavior of children, adolescents, and adults with ASD differs qualitatively from that of their typically developing agemates" (as cited in Goldstein, Naglieri, & Ozonoff, 2009, p. 139). It is therefore of great importance to thoroughly assess these areas during the assessment of an ASD child. Gamliel and Yirmia (as cited in Goldstein, Naglieri, & Ozonoff, 2009) indicated that children diagnosed with ASD exhibit severe difficulties in the areas of social and communication skills, unlike typically developing children. Since the impairment of social and communication skills comprises one of the major defining criteria of ASD, all screening and assessment tests of ASD primarily focus on assessment of these skills (Goldstein, Naglieri, & Ozonoff, 2009). Accordingly, adequate and accurate assessment of social and communication skills is considered to be one of the corner stones in the assessment and diagnosis of ASD. The proposed Arabic test consists of four subtests, all designed to assess social communication skills.

Since May 2013, the criteria for ASD diagnosis were changed by the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) (American Psychiatric Association, 2013). The first criterion involves "persistent difficulties in the social use of verbal

and nonverbal communication." The second criterion is related to the functional deficits in the areas of communication, socials skills, academic skills and occupational skills. Regarding the onset of ASD symptoms, the DSM-5 criterion indicates that these symptoms might be present from "early development period." In addition, the ASD symptoms must not be related to other medical or neurological problems (American Psychiatric Association, 2013).

Proper assessment will eventually result in proper diagnosis and therefore proper, adequate and more effective intervention plans. Treatment plans and intervention programs such as Applied Behavioral Analysis (ABA) program are focused on developing and improving the social and behavioral skills of children with ASD (Haney, 2013; Koeing, 2012).

1.2   Problem Statement

The dearth in the availability of standardized assessment tests for ASD population will continue to be a big dilemma for professionals as well as parents in Saudi Arabia and in the whole Arab world (Al-Sabi, 2007). Unfortunately, to date there are no tests specifically developed in Arabic language that are culturally appropriate designed to assess the social communication skills of ASD children. Early and proper diagnosis of ASD is important and critical. Arabameri and Sotoodeh (2015) stated that "in many less developed countries, unfortunately, diagnosis of this disorder is delayed" (p. 118). The social communication skills are one of the influential criteria in the assessment and diagnosis of ASD.

The investigator designed and developed a test in Arabic language (the ASCST) that is linguistically and culturally appropriate to the Arabic-speaking population and to the Arabic culture. To make sure that the construction and development of the ASCST follows sound scientific models adopted in the development of psychometric tests, the present study investigated the psychometric properties of the ASCST as well as the predictive validity (sensitivity, specificity and accuracy). The profile of the ASD participants was further analyzed to fill the gap regarding the availability of data about the social communication characteristics of Arabic speaking ASD individuals. Additionally, the parents' educational background was researched to evaluate the impact of the parents' educational background on ASD individuals with regard to assessment, diagnosis and social communication characteristics.

The diagnosis of the social communication disorder depends solely on adequate development of speech and language skills. The speech and language skills are usually mastered by the end of the fifth year of typically developing children. This means that the proper progress of social communication skills is expected to be developed around the age of six years. Additionally, it is important to note that children with ASD exhibit severe deficit in the development of their social and communication skills. Accordingly, this research targets the children between the ages of 6:00 and 11:11 years. In accordance with most if not all the psychometric tests, this age format (6:00-6:11) will be adopted for this whole study.

Following are some of the tests that adopt the same format, just to name a few: The SEE test (Wiig E, 2008), One-Word Picture Vocabulary test (EOWPVT) (Brownell, 2000), the Comprehensive Assessment of Spoken Language (CASL) (Carrow-

Woolfolk, 1999), One-Word Picture Vocabulary test (EOWPVT) (Brownell, 2000), and Oral and Written Language Scale (OWLS) (Carrow-Woolfolk, 1999). This can be explained by the fact that counting is done in terms of one year. If a child is born in January, that whole month equals.0, because the child has not yet lived for one month. Only after it is February will the child have .1 after his age. It looks like that there is a missing month because calculation of age does not consider the missing month. In reality, the 11 months in the child's life is his/her 12th month (January = .0, February = .2, March = 3, April = 4, May = 5, June = 6, July = 7, August = 8, September = 9, October = 10, November = 11, December = 12).

The lack of assessment test that are designed to specifically assess language disorders in Arabic-speaking children makes it imperative to fill this gap to improve the service provision and intervention protocols for children with language disorders in the Saudi Arabia as well as in the whole Arab region. Alduais, Shoeib, Al-Hammadi, & Al-Malki, (2012) stated that "a certain language may lack instruments and tools for measuring particular language impairments, as in the case of the Arabic language, which lacks effective tests for identifying PLIs in children and/or adolescents" (pp. 196-197). They added that standardized tests designed for assessment of pragmatic component of language (social communication skills) are not yet available in Arabic language. They indicated that "similar standardized tests for carrying out such assessments in Arabic are, to the author's best knowledge, unavailable" (2012, p. 195). Currently, diagnosis of children with ASD is conducted primarily in hospitals by doctors using the tests developed in other languages and furthermore the information on these children is not filtered down to the educators.

1.2.1 Challenges of ASD Assessment

Doyle and Iland (2004) indicated that assessment of ASD is not easy due the existence of many challenges such as stress of the children with ASD who are defensive to changing routines. These children become more stressed during the assessment process due to the disruption in their daily routines. Children with ASD exhibit severe problems interacting with new people. The second challenge refers to the issue of trust in children with ASD. This challenge affects the assessment negatively because the assessment will not be reliable if there is no trust between the examiner and the child. Therefore, information obtained might be questionable due to poor trust relationship between child and examiner. The third challenge is related to defensiveness problem with children with ASD. These children might feel angry and defensive during the assessment process which in turn will make the assessment more difficult. The other challenge is the variability of performance of children with ASD. These children might not cooperate with the examiner because it is difficult for them to respond on demand. The poor social skills of children with ASD are also among those challenges that make assessment impossible in many cases because these children do not cooperate and persist on not responding to assessment tasks.

1.2.2 Major ASD Screening Tests

The American Academy of Pediatrics (AAP) recommended the use of The Modified Checklist for Autism in Toddlers, Revised with Follow-Up (M-CHAT-R/F) (Robins, Fein, & Barton, 2009) for screening of ASD. The major ASD screening tools frequently used in the evaluation process of ASD include the following:

Autism Spectrum Screening Questionnaire (ASSQ), Autism Spectrum Quotient (AQ), Autism Spectrum Quotient – 10 (AQ-10), Developmental Checklist-Early

Screen (DBD-ES), Developmental Behavior Checklist-Autism Screening Algorithm (DBC-ASA), Early Screening for Autistic Traits (ESAT), Modified Checklist for Autism in Toddlers (M-CHAT), Pervasive Developmental Disorders Screening Test-Second Edition (PDDST-II), Quantitative Checklist for Autism in Toddlers (Q-CHAT), Screening Tool for Autism in Toddlers and Young Children (STAT), Krug Asperger's Disorder Index (KADI), Gilliam Asperger's Disorder Scale (GADS), Asperger Syndrome Diagnostic Scale (ASDS), Social Communication Questionnaire (SCQ) and Social Responsiveness Scale (SRS). Unfortunately, professionals in the Arab world do not have valid and reliable similar to the above-mentioned tests. Therefore, professionals tend to translate these tests on their own without following scientific methods for validating these kinds of translations. Alduais et al., (2012) stated that "it seems the problem of translating instruments for assessing pragmatic language ability in children and adolescents exists for many languages, just as in the case of the Arabic language" (p. 197).

1.2.3   Assessment Tests for Social Behavioral Skills

To date, there are no diagnostic tests developed in Arabic language to measure social-behavioral skills in Arabic-speaking children with ASD. However, there are many tests available in English language for this purpose. These tests include the following: Social Emotional Evaluation test (SEE). This test was developed by Elisabeth Wiig in 2008. The SEE is designed to assess emotional and social skills in children between the ages of the six and eleven years and eleven months. The Early Social Communication Scale (ESCS), designed for children between the ages of 6 and 30 months (Gamliel & Yirmiya, 2009). Doyle and Iland (2004) listed the following tests used specifically in the assessment of social skills: Social Skills

Rating Scale (SSRS), Walker-Mconnell Scale of Social Competence and School Adjustment, School Social Behavior Rating Scales, 2nd Edition (SSBS-2), Home and Community Social Behavior Scales (HCSBS), and School Social Skills Rating (S-3). Bauminger-Zviely (2013) also listed the following measures for the assessment of social competence and social adjustment: Autism Diagnostic Interview-Revised (ADI-R), Autism Diagnostic Observation Schedule (ADOS), Behavior Assessment System for Children (BASC-2 PRS), Child Behavior Checklist (CBCL), and Pragmatic Rating Scale (PRS). It seems clear that there is a wide variety of tests designed for assessment of social communication skills available in English language, unlike Arabic language. Therefore, in order to properly and adequately assess children for ASD, it is mandatory for the Arabic-speaking professionals to have similar tests available in Arabic language. Otherwise, diagnosis of ASD will not follow a scientific approach, and thus assessment of ASD children in Arabic language will not be reliable and valid.

1.3   Research Purpose

The purpose of this study is to develop and validate a test to assess the social communication skills of children with ASD in Saudi Arabia who are between the ages of 6 years 0 months and 11 years 11 months old. In the past years, numerous studies had investigated and focused on the social communication skills of children on the ASD spectrum (Haney, 2013; Wiig, 2008 & Gallo, 2010). However, there seems to be a significant dearth of research in the Arabic region (Alduais et al., 2012 & Al-Sabi, 2007). As mentioned earlier, to date there are no standardized tests in this area. Therefore, this study attempts to develop a test which can assess the social communication skills of children with autism in Saudi Arabia. The proposed study

will help in improving the diagnostic services of Arabic speaking children with ASD in Saudi Arabia as well as in the whole Arab region. The test will be called "The Arabic Social Communication Skills for Children with Autism Spectrum Disorder Test" (ASCST). The researcher hypothesizes that children with ASD will manifest severely compromised social communication skills than typically developing children. Reliability and validity of the test will be examined. The proposed test is aimed to help in properly diagnosing children on the ASD spectrum and in designing appropriate treatment plans for them. With this test, this research also aims to profile the social communication skills of children with ASD in Saudi Arabia.

1.4 Research Objectives

The objectives of this research are:

1. To determine the content validity of the ASCST test.

2. To determine the construct validity of the ASCST test.

3. To determine the discriminant validity of the ASCST test.

4. To determine the test-retest reliability of the ASCST test.

5. To determine the interrater reliability of the ASCST test.

6. To determine the split-half reliability of the test.

7. To determine the sensitivity, specificity and accuracy of the ASCST test.

8. To profile the social communication skills of children with ASD in Saudi Arabia.

9. To determine the impact of the parents' educational background on the development of the social communication skills of children with ASD in Saudi Arabia.

1.5 Research Questions

The research questions are :

1. What is the evidence pertinent to the content validity of the ASCST test?

2. What is the evidence pertinent to the construct validity of the ASCST test?

3. What is the evidence pertinent to the discriminant validity of the ASCST test?

4. What is the evidence pertinent to the test-retest reliability of the ASCST test?

5. What is the evidence pertinent to the interrater reliability of the ASCST test?

6. What is the evidence pertinent to the split-half reliability of the ASCST test?

7. What are the sensitivity, specificity and accuracy of the ASCST test?

8. What is the social communication skills profile of children with ASD in Saudi Arabia?

9. What is the impact of the parents' educational background on the development of the social communication skills in children with ASD in Saudi Arabia?

1.6 Research Significance

It is needless to state how necessary and important this study would be for all professionals involved in the assessment and treatment of ASD population in Saudi Arabia as well as in the Arab world. The need for such a study will continue to be vital and mandatory to improve assessment processes and diagnosis of Arabic-speaking children with ASD in the Arabic language. Therefore, the results of this study will indeed increase the awareness and understanding of all professionals in these areas keeping in mind that the diagnosis of ASD is such a big challenge for all professionals. With this dilemma in mind, this study will hopefully fill a vast gap in the field of special education in the whole Arab region. Accordingly, the findings of

this study will aid special education and regular education teachers, and speech language pathologists in their decision-making regarding assessment and treatment of Arabic-speaking children with ASD. Finally, the results of this study are meant to encourage other researchers and other professionals to consider future research in the area of ASD.

1.7   Research Limitations

This research study has the following limitations. The first one is the lack of availability of other tests that would be needed for testing the concurrent validity of the ASCST. The other limitation is related to the wide disparity of dialects in Saudi Arabia such as the Hijazi dialect, Najdi dialect, and Southern dialect. The absence of norms of the social communication skills in Saudi Arabic children is another limitation. When these norms are available, the construction of tests would be more valid and more reliable. In addition, the small sample size means that the generalization of results might be limited. The limitation of sample size is bound by time and financial constraints. Most of the ASD cases were diagnosed at an old age. Another limitation was related to the fact that school population data was not regularly updated. These limitations will be discussed in depth in the following chapters.

1.8   Definition of Terms

Following below are definitions of several key terms that are pertinent to this study:

1.8.1   Autism Spectrum Disorder (ASD)

According to the DSM-5, ASD is a neurodevelopmental disorder characterized with intellectual impairment, social impairment, language and communication problems. Individuals with ASD have social, communication and language problems. They also have restricted and repetitive patterns of behavior, interests, or activities, such as flipping objects, echolalia, or excessive smelling or touching of objects. ASD may be mild or severe. All children with ASD don't have the exact same problems. Motor problems might be present such as clumsiness, odd gait, walking on tiptoes, hands flapping, and balance problems. Individuals with ASD might exhibit self-injurious behaviors including head banging, biting, and hitting (American Psychiatric Association, 2013).

In this research, children with ASD are children in the region of Jeddah. These children received diagnosis of ASD in hospital settings and private clinics and are between the ages of 6:00 and 11:11 years. These children are currently receiving intervention in school settings, governmental centers for children with ASD and in private rehabilitation centers.

1.8.2   Social-Communication Skills Test

Social communication is the key component in developing interactions and relationships. Haney (2013) indicated that "increasing social communication skills is a priority when planning interventions for individuals with ASD" (p. 264). The

interpretation of the social world depends on adequate development of pragmatic skills. Wiig (2008) added that social competence subsumes several skills such as communication, relatedness, cooperation, self-control, curiosity, and self-confidence. Children with ASD typically exhibit significant impairments in their expressive pragmatic and social skills. These children might have difficulty using appropriate facial expressions, and body language (Haney, 2013). According to Koegel et al. (2003), pragmatic skills consist of the following four areas: paralinguistic features, nonverbal features, linguistic intent and social competence. The following sections will discuss nonverbal features and social competence because the other two areas are beyond the scope of this research.

1.8.3   Nonverbal Features

Nonverbal features are sometimes referred to as extralinguistic and can be used to communicate one's ideas, thoughts, feelings, and attitudes and can promote and support verbal communication. Nonverbal features might come in different forms such as facial expressions, hand movement gestures, eye contact, distance between communication partners and posture. Inability to use or interpret nonverbal communication messages or features results in social impairment. Wiig (2008) stated that student's effective communication with family, teachers and other adults relies significantly on nonverbal communication.

The deficits in nonverbal features are one of the primary manifestations of social and communication disorder. These deficits cannot be explained by "low abilities in the domain of structural language or cognitive ability" (Diagnostic and Statistical Manual of Mental Disorders 5th ed., p. 48, 2013). For this study, assessment of these

nonverbal features is a major component in the process of the evaluation of children with ASD. The first subtest of the ASCST is designed to evaluate children's nonverbal features.

1.8.4   Social Competence

Social competence refers to the ability of expressing one's self adequately and properly using an age-appropriate verbal and nonverbal language. Typically developing children are expected to use an adult-like language by the end of age five years. Social competence feature demonstrates the ability of the speaker to interact and communicate using appropriate verbal and nonverbal communication skills. To be socially competent, communicators should not have deficits in verbal skills including for example turn-taking skills, topic initiation, topic maintenance, topic selection, providing feedback, using social expressions properly, and using appropriate vocabularies and expressions in social contexts (Haney, 2013). In this research, the social competence will be tested through the following subtests of the ASCST: Identifying Facial expressions and Feelings, Identifying and Describing Social and Communication Responses, Comprehending Social Complications, and Expressing Social Expressions.

1.8.5   Social Competence Profile of Children with ASD

Children with ASD exhibit severe difficulty in their social skills. Their social competence is usually delayed and some of children with ASD will continue to present with social challenges through their whole life. These challenges are "manifested by deficits in understanding and following social rules of verbal and nonverbal communication in naturalistic contexts, changing language according to

the needs of the listener or situation, and following rules for conversation and storytelling" (Diagnostic and Statistical Manual of Mental Disorders 5th ed. 2013). In the context of this research, the ASCST will be used to refer to the Arabic Social and Communication Skills for Children with Autism Spectrum Disorder test. The ASCST consists of the following sub-tests:

1.8.5(a) Recognizing Facial Expressions and Emotions

The first subtest of the ASCST test is designed to evaluate facial expressions. This subtest consists of nineteen different emotional expressions such as surprised, scared, upset, bored, worried, punished, excited, relaxed, frowning, preoccupied, comfortable, tired, etc. According to Wiig (2008), facial expressions are one of the major elements of nonverbal communication. As cited in Wiig (2008), Barrett and Wager (2006) added that there are six universal emotions are biologically based. These universal emotions include the following: fear, happiness, sadness, disgust, anger, and surprise.

1.8.5(b) Identifying and Describing Social and Communication Responses

The second subtest of the ASCST test is designed to evaluate the child's ability to identify and describe social and communication responses. It is critical for children and students in elementary grades to possess adequate social and communication skills. The development of adequate social and communication skills is mandatory for establishing and maintaining appropriate relationships (Wiig, 2008). Furthermore, students with appropriate social and communication skills do well at school in terms of social integration with peers in addition to proper interaction in the community. This subtest consists of seventeen items.

1.8.5(d) Dealing with Social Situations

The ability of children and student in dealing with social problems constitute a major component in establishing and maintain appropriate relationships with peers and others in the community (Wiig, 2008). According to the correlational hypothesis, social skills and academic skills are significantly associated (Gresham, 1992). The third subtest of the ASCST is designed to evaluate children's ability in dealing with inappropriate social situations. This subtest consists of twenty items.

1.8.5(e) Using Social Expressions

The ability of children to use appropriate social expressions in appropriate contexts constitutes a major component for effective communication (Owens, 2001). According to the sociolinguistic theory everyday social interactions are considered to be a critical element for language development (Owen, 2001). Haney (2013) stated that "pragmatic language encompasses the social rules or conversation for communication (pp. 43-44). Even when children with ASD have good vocabulary, they might have problems using appropriate expressions in an adequate social manner (Haney, 2013). It is therefore imperative to assess social expressions of children with ASD. The ASCST will test the ability of children on using appropriate language needed in specific social contexts. For example, children will be requested to answer questions that are socially relevant such as what do you say on Eid for your parents? This subtest consists of eleven social situations.

1.8.6   Psychometric Properties

These are the features used to characterize and test the standardized instruments including scales, questionnaires, and tests (Diagnostic and Statistical Manual of

Mental Disorders 5th ed. 2013). The major psychometric properties investigated in the current study include reliability and validity. The definitions of these terms are provided below:

1.8.6(a) Reliability

Reliability is one of the major characteristics of tests. It refers to the consistency and stability of the test when given more than one time. That means the scores remain stable from time one to time two, indicating that the scores of the phenomenon being investigated are not changed. Reliability might be tested using one or more of the following types: test-retest reliability, alternate-form reliability, split-half reliability, and scorer or interrater reliability (Fisherman & Galguera, 2003). In this research, the reliability of the ASCST was tested using the test-retest reliability, interrater reliability, and split-half reliability. These methods will be discussed further in chapter three.

1.8.6(b) Validity

Validity is linked to reliability. Validity means that the test measures what it is designed for to measure. For a test to be valid, the researcher must make sure that the test must be solid and all of the items of the test as well as the test design are based on sound theory and on sound previous research. The following types of validity might be used to measure validity: content validity, criterion-related validity, and construct validity (Fisherman & Galguera, 2003). These methods of validity will be described and explained in depth in chapter three.

1.8.6(c) Predictive Validity

It refers to a type of criterion-related validity "when one wishes to infer from a test score an individual's most probable standing on some other variable called a criterion" (AERA, 2013, p. 179). In this research as there are no established tests in Arabic language in the area of social communication skills, the predictive validity of the ASCST can be determined through calculating "percentages of specificity, sensitivity, and total correctly identified" (Wiig E, 2008, p. 110).

1.8.7 Sensitivity

Sensitivity refers "to the proportion of cases in which a disorder is detected when it is in fact present" (AERA, 2013, p. 182). According to Baratloo, Hosseini, Negida and El Ashal (2015), sensitivity refers to the ability of a test "to determine the patient cases correctly." In this research, sensitivity is mathematically obtained by calculating the percentage of proportion of true positive in-patient cases. True positive is the number of cases correctly identified with the disorder.

1.8.8 Specificity

"In classification of disorders, the proportion of cases for which a diagnosis of disorder is rejected when rejection is warranted" (AERA, 2013, p. 182). Specificity refers to the ability of a test to determine the healthy cases, i.e., the cases that do not present with a disorder. In this research, specificity is obtained by calculating the percentage of true negative in healthy cases. The true negative is the percentage or proportion of cases that are properly identified as healthy, not presenting with the disorder.

1.8.9 Accuracy

Accuracy refers to the ability of the test to identify individuals with a disorder from others without the disorder. For this research, accuracy is computed by calculating the proportion of true positive and true negative in all cases evaluated (Baratloo, Hosseini, Negida and El Ashal, 2015).

1.9 Conclusion

This chapter provided introductory background explanation about the critical need for developing and validating assessment tests for Arabic-speaking children with ASD in

the area of social communication skills in Saudi Arabia. Demographic and prevalence data about ASD in Saudi Arabia were discussed in the chapter. Other sections of the chapter highlighted the definition of ASD, the focus on social communication skills in the assessment of ASD, tests available for the assessment of social communication skills in English as well as in Arabic language. The chapter also targeted the problem statement, purpose of the study, the research objectives, research questions, significance of the study, and limitations of the study. The final section of the chapter discussed the key terms of the study.