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A VALIDATION STUDY OF A JORDANIAN VERSION
OF THE AUTISM BEHAVIOR CHECKLIST (ABC)
OF THE AUTISM SCREENING INSTRUMENT
FOR EDUCATIONAL PLANNING (ASIEP)

presented by

Jamil Mahmoud Smadi

has been accepted towards fulfillment
of the requirements for

Ph.D. degree in Counseling, Educational
Psychology, and Special
Education

Major professor

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**A VALIDATION STUDY OF A JORDANIAN VERSION
OF THE AUTISM BEHAVIOR CHECKLIST (ABC)
OF THE AUTISM SCREENING INSTRUMENT
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By

Jamil Mahmoud Smadi

A DISSERTATION

**presented to
Michigan State University
in partial fulfillment of the requirements
for the degree of**

DOCTOR OF PHILOSOPHY

**Department of Counseling,
Educational Psychology, and Special Education**

1985

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ABSTRACT

The purpose of this study was to adapt and validate the Autism Behavior Checklist (ABC) for use in the country of Jordan. A back-translation procedure was used to obtain an equivalent Jordanian (Arabic) version. Validation of the Jordanian version was then conducted, and a comparison of the Jordanian data and the original American data was also reported.

A total of 192 Jordanian individuals served as subjects of two data sets used in the study. The validity data set consisted of 32 individuals diagnosed as autistic, 38 severely mentally retarded, and 42 non-handicapped. The reliability data set consisted of 80 individuals diagnosed as moderately to mildly mentally retarded. Teachers or parents of the subjects completed the checklist about the subjects.

Major findings of the study were the following:

1. ANOVA results indicated that there were significant differences in the total score and the subscores across the three diagnostic groups.

2. Scheffe results indicated that the three diagnostic groups were significantly different from each other by total scores as well as all subscores.
3. Discriminant analysis results indicated that the total score of the Jordanian version separates the three diagnostic groups effectively (100%). Discriminant analysis results of the subscores indicated that they can predict the three diagnostic group's membership from 86.61% to 94.54%.
4. Internal consistency reliability using coefficient alpha was .834 and .808.
5. Inter-rater reliability results indicated that the mean percentage of agreement between raters without using item weight was 95.95%. The mean percentage of rater agreement using item weight was 96.11%.
6. The generalizability or intra-class correlation coefficient was .965.
7. There were significant differences between the mean scores of the Jordanian autistic group and the autistic group of the original American standardization study across all symptom areas.
8. There were significant differences between the mean scores of the Jordanian severely mentally retarded group and the severely mentally retarded group of the original standardization study in mean total score and two subscores (sensory and relating). No significant differences were found for other subscores.

9. There were significant differences between the mean scores of the Jordanian non-handicapped group and the non-handicapped group of the original American standardization study in the mean total scores and two subscores (relating and social and self-help). No significant differences were found in the mean scores of other subscores.

Based upon the results of this study, a valid and reliable Jordanian version of the ABC was achieved. Within certain parameters, the author can confidently recommend the ABC to Jordanian professionals who work with severely handicapped populations. These parameters include (a) the accuracy of the Arabic translated version, (b) the small number of subjects, and (c) the accuracy of the diagnosis of the groups.

DEDICATION

To the memory of my daughter

Rania

(1973 - 1980)

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**IN THE NAME OF ALLAH
THE MERCIFUL THE COMPASSIONATE**

CHAPTER I

THE PROBLEM

Introduction

Autism is frequently considered to be one of the most severe disabilities affecting a child, and the disorder crucially impacts on the child's family and extended environment as well. Diagnosis of autism is dependent upon the presence of certain behaviors displayed by the child, including social withdrawal, obsessive desire for maintenance of sameness, repetitive behaviors and movements, unusual motoric activity, immediate or delayed echolalia, inappropriate use of objects, and other behaviors (Rutter, 1974, 1978; Wing, 1976). Although there is general agreement among diagnosticians about the most crucial behaviors necessary for diagnosis, differences might be expected among them when evaluating some of the other behaviors associated with autism (Morgan, 1982; DeMeyer, Churchill, Pontius, & Gilkey, 1971).

In the case of psychiatric disorders, Schopler (1973) indicated that

There may be three major reasons for diagnostic classification: (1) if a clear and specific cause is known for the disorder, which is distinguishable from other disorders. In the case of autism no such single cause is known. (2) the existence of a specific treatment not applicable to other disorders even when the specific cause is unknown. For autism some success has been reported for many different treatments. Therefore, this second basis does not apply either. (3) when certain and observable characteristics can be identified and described behaviorally. Current effort with diagnostic classification is mainly at this third level. (p. 2)

Accordingly, most leading scholars and researchers have attempted to describe and diagnose autism in terms of behavioral characteristics (Morgan, 1981; Wing, 1976).

Although autism is considered to be a distinct disorder, there are some other disorders which share behaviors commonly associated with autism. These include mental retardation, aphasia, schizophrenia, hearing and vision impairments, and others. Accordingly, Ornitz and Ritvo (1976) state, " . . . autism must always be included in the differential diagnosis when one is evaluating any child with developmental disability" (p. 609).

Autism is found throughout the world. A growing body of literature suggests that autistic individuals are found in all countries and cultures (NSAC, 1978). Professionals in many countries differ, however, in terms of their understanding of the autistic syndrome and their abilities to identify and serve the autistic population. These differences exist primarily because of such factors as the development of special education services for areas of handicapping conditions, the presence of professionals interested in autism, the availability of advocacy sources, the priority of services for the handicapped, and legislation.

Quality educational services for autistic students should take into consideration the nature of the disability (autism) as well as the individual needs of students. Most authorities feel that it is essential to distinguish autism from other handicapping conditions in order to establish appropriate services. Those services require intensive settings and curriculum designs that utilize repetition, methods for generalization, and a strong language base. These requirements are frequently not available or may not be needed for other handicapping conditions (Maltz, 1982).

Statement of Need

It would be unusual to find many autistic students in developing countries. The reasons for this lack of identification include (a) the recent awareness of the

need for services to all special needs' populations, (b) the difficulty in identifying and diagnosing all types of handicapped persons, and (c) the relatively low incidence of autistic children as a specific group in need of diagnosis and service. Moreover, behaviors associated with autism often overlap or can be confused with other handicapping conditions, frequently complicating the problem. It should also be mentioned that even in more advanced countries, the provision of specific educational services for autistic students began less than two decades ago (DeMeyer, 1979).

In spite of problems with the identification procedures currently being used, as well as concerns about the quality of special education services, Jordan has begun to identify and serve the following groups of handicapped students: mentally retarded, deaf, blind, and physically disabled. Jordan is also providing some services for the acute and chronically mentally ill through hospitals and institutions. Currently, autistic students are not being identified and classified differently from other groups, and there is no assessment instrument for this purpose. Because of the frequent overlap between autism and severe mental retardation, it would be expected that some autistic students are misdiagnosed and placed in programs for the mentally retarded. The services for low-functioning autistic students are negligible because some programs for the mentally retarded do not accept the most severely handicapped individuals. Accordingly, it can be assumed that some severely impaired and autistic children remain at home without any specialized educational or mental health services.

Appropriate identification of Jordanian autistic students is essential. The reasons supporting the need for the accurate identification, diagnosis, and subsequent development of appropriate services for the autistic population include the following.

1. Autism is reported to exist in all parts of the world with an incidence of four to five per 10,000 births (Ritvo & Freeman, 1978). Given the population of Jordan (about three million) it would be expected that 1,200 - 1,500 autistic persons exist in that country. Although this number is small in comparison to the total number of handicapped persons, "the impact of one autistic child who receives no services or less than adequate service is great!" (Schopler & Olley, 1980, p. 462). Autism is one of the most severe handicapping conditions and should have priority to be identified for an appropriate intervention.
2. No formal specialized services exist for autistic students in Jordan. Even though a population of autistic students exists, it is very likely that these students are being misdiagnosed or not identified at all.
3. The need exists for establishing services for the severely handicapped. Some schools or other programs do not accept severely handicapped students.
4. It has been established that early identification is critical to long-term prognosis for students. (Ullman & Kausch, 1979)
5. Autism is a unique disorder, different from other handicapping conditions. Language disorders are included in the basic criteria of autism (Radke, 1981; Churchill, 1978; Rutter, 1974, 1978). Any program developed for autistic students should include extensive language intervention approaches in the programming effort (Callias, 1978). No such interventions are being carried out in programs for the mentally retarded in Jordan. Moreover, strategies, curricula, and interventions for autistic students as a

group might be different from the programs being provided for other handicapping conditions.

6. It is expected that Jordan will continue to have rapid growth in special education within the coming years. Currently, autism is one of the most neglected groups of handicapping conditions.

Statement of the Problem

In all quality special education programs for the autistic population, as well as for any handicapped groups in any society, the first necessary step is to identify the group(s) to be served. Accurate identification and diagnostic classification are essential procedures needed to plan effectively for intervention strategies and to have high quality educational services (Ullman & Dausch, 1979). For autism, establishing an accurate diagnosis requires a comprehensive evaluation including medical, neurological, psychological, and educational assessment (Freeman & Ritvo, 1984). From a special education perspective, the need for a functional, valid educational assessment device is extremely important. As Krug, Arick, and Almond (1979) suggest, "Requirements for an educationally useful tool include ease of use, time involvement, and valid and reliable information which supports educational placement" (p. 1). Currently, no instrument has been developed or adapted for the purpose of screening and identifying autistic students in Jordan. Moreover, to the researcher's knowledge, no such instrument is available in other Arab countries that could be slightly adapted for use in Jordan. Psychiatrists, psychologists, and special education teachers in Jordan are in need of an easy, quick, and practical instrument to identify autistic individuals.

Based on these factors, one of the first priorities for the country of Jordan is to develop an instrument or standard procedure which could accurately screen

and identify autistic students in order to begin establishing special education services for them. This instrument should be used with other clinical procedures needed for the purpose of identification, classification, and placement decisions. An instrument of this type would help professionals in all fields of special education and would properly be used with other information obtained about the handicapped individuals.

Since it is generally recognized in the fields of special education and psychology that autism is a behaviorally defined syndrome, any instrument used in the identification of the autistic population should concentrate on observable behaviors displayed by autistic individuals with no reference to any causative agents or assumptions that may not have common professional agreement. For these reasons, most methods for diagnosing an autistic population have been developed to include behavior checklists and observational keys.

In the United States, several instruments have been developed for the purpose of screening and identifying of autistic students, many of which could be adapted to the Jordanian culture. Examples of these instruments are Rimland's Diagnostic Checklist for Behavior Disturbed Children, Behavior Rating Instrument for Autistic and Atypical Children, Behavior Observation Scale for Autism, Childhood Autism Rating Scale, and Autism Behavior Checklist (Parks, 1983). Each of these instruments is independent, except for the Autism Behavior Checklist which is a component of a comprehensive instrument known as the Autism Screening Instrument for Educational Planning.

The present study consisted of a plan to adapt the Autism Behavior Checklist (ABC) section of the Autism Screening Instrument for Educational Planning (ASIEP) for the following reasons.

1. The ABC is a major component of the entire instrument which could initially be adapted independently. Further efforts to

adapt the entire instrument would be useful in the future for a comprehensive assessment of autism, particularly for the purpose of educational programming decisions.

2. The definitions of autism have recently been revised to reflect the most common behavioral characteristics of this disorder (Freeman & Ritvo, 1984). The categories of the ABC include assessments of behaviors which relate to the most widely utilized and accepted definitions of autism.
3. Behaviors in the various categories of the ABC were selected from a variety of influential sources. (Krug, Arick, & Almond, 1980)
4. Grouping the behaviors into five symptom areas (sensory, relating, body and object use, language, and social and self help) covers many areas reported in the literature as essential in diagnosing autism.
5. The behaviors in the checklist are statistically weighted. When some behaviors (items) are present, they are not only treated as present versus absent in the individual, but are also considered differently according to their weights. Behaviors that are more predictive of autism are given more weight in the result than are the behaviors that are frequently associated with autism but not as predictive. This attribute of the ABC is not associated with any of the other behavior checklists frequently used for diagnosing autism. (Krug et al., 1980)
6. The ABC provides a profile for autistic behaviors versus a profile for other handicapping conditions such as severe mental retardation, deafness-blindness, and severe emotional

disturbances versus profile for normals. Cut points are drawn to differentiate among autistic students, those with other handicapping conditions, and non-handicapped students.

7. The ABC is relatively easy to administer and interpret by teachers and other diagnostic professionals.

The purpose of this study was to develop an adaptation of the ABC to be used in Jordan as a primary tool for screening and identifying of Jordanian autistic persons. For this purpose, the consent of the senior author of the ABC was obtained (see Appendix C). The adaptation included the following components:

1. translation of the ABC items from the English language (the original language of the instrument) into the Arabic language (the native language of Jordan);
2. changes in the translated version needed to make this instrument appropriate for the Jordanian culture;
3. conducting reliability and validity coefficients for the Jordanian version of the ABC; and
4. administration of the Jordanian version of the ABC to samples of the following groups: autistics, severely mentally retarded, and non-handicapped, and comparing the results obtained with those reported for the standardization sample of the original American version.

Autism Behavior Checklist

The Autism Behavior Checklist (ABC) is an important part of a complete instrument called the Autism Screen Instrument for Educational Planning (ASIEP) developed by Krug, Arick, and Almond in 1978. The first edition of the ASIEP was copyrighted in 1980 (Krug et al.). The entire ASIEP consists of five components, the first of which is the Autism Behavior Checklist. Components two through five are Sample of Vocal Behavior, Interaction Assessment, Educational Assessment of Functional Skills, and Prognosis of Learning Rate.

The ABC consists of a list of non-adaptive behaviors to be checked if present. The rest of the components are direct observation procedures in which the individual is observed while performing certain tasks in a standardized setting. Although the five components complement each other for a comprehensive evaluation, each component can stand independently (Krug et al., 1979).

The Autism Behavior Checklist is considered one of the main components of the ASIEP. It was developed for the purpose of differential diagnosis of autistic individuals from other handicapping conditions and non-handicapped persons. The ABC consists of 57 behavioral descriptions, each of which is considered a non-adaptive behavior assumed to be displayed by severely handicapped/autistic individuals (see Appendix A). The items (behaviors) were chosen from the following resources: Rimland's Form E-2, the nine points of the British Working Party's Checklist, the Behavior Rating Instrument for Autistic Children (BRLAC), Rendle-Short and Clancy's Checklist, and Kanner's original descriptions of the syndrome. The descriptors were then reviewed and grouped according to symptom characteristics. The symptom areas are sensory, relating, body and object use, language, and social and self help (Krug et al., 1980; Krug, Rosenblum, Almond, & Arick, 1981).

A chi-square analysis indicated that 55 out of 57 behaviors were significant predictors of autism. By using the proportioned reduction in error statistical analysis, every item in the list was weighted according to its predictive value of autism. Number values one through four were assigned as weights. An item with a weighted score of four was considered to be the highest predictor of autism, and an item with a weight of one the lowest. Scores can be obtained by the sum of the weighted items checked in each symptom area. The scores of the ABC can be plotted on a profile chart and can be easily compared with each other and with other profiles (Krug et al, 1979, 1980).

A standardization sample of the ABC consisted of 1,049 subjects selected randomly by professionals throughout the United States and Canada familiar with the disorder. Subject ages ranged from 18 months to 35 years. The ratio of males to females was 2.5. The sample consisted of the following sub-groups: 172 individuals previously diagnosed as autistics, 423 diagnosed as severely mentally retarded, 254 diagnosed as emotionally disturbed, 100 deaf-blind, and 100 non-handicapped.

Validity and reliability of the ABC were reported by the primary authors (Krug et al., 1980). Content validity was demonstrated by the result of the behavior descriptors which were reviewed by experts. A chi-square procedure was used to demonstrate content validity, and the result indicated that 55 of 57 behavior descriptors were significant ($p = 0.001$) predictors of the diagnosis of autism when autism was compared with the other groups included in the standardization sample.

A sample of 62 individuals previously diagnosed as autistic was used to conduct a criterion-related validity. Results indicated that 86% of this sample obtained scores within one standard deviation of the standardization sample. Discriminant validity was established for the ABC by its ability to discriminate among symptom area profiles for the autistic, severely mentally retarded, emotionally disturbed, deaf-blind, and non-handicapped.

When inter-rater reliability data for the ABC were completed using 42 independent raters of 14 children, the agreement was 95%. Internal consistency reports using split-half procedures for the whole standardization sample indicated a Pearson product-moment correlation of .87, and the expected reliability of the entire test (Spearman-Brown formula) was .94.

Significance of the Study

This study will provide professionals in the field of special education, psychiatry, and psychology in Jordan with a useful tool to assess individuals with autism and other severe handicapping conditions. The usefulness of this tool comes from its practical, quick, and easy use. When used with other evaluation tools, the ABC will help Jordanian professionals accurately identify autistic individuals and differentially diagnose them from people with other handicapping conditions. This study will also offset the shortage of available assessment instruments in special education and, more specifically, the lack of instruments which would be helpful for autistic students in Jordan.

CHAPTER II

REVIEW OF RELATED LITERATURE

Historical Introduction

Kanner (1943) was the first to identify the category of autism as a childhood disorder. Since that time, many different labels have been used to refer to the same disorder: early infantile autism, early childhood autism, childhood psychosis, symbiotic psychosis, atypical development, and atypical ego development (Ornitz & Ritvo, 1968; Anthony, 1958; Mahler, 1952; Goldfarb, 1961). These different labels reflect the historical development of autism and professionals' differences in areas of interest when dealing with the disorder. In addition, many different labels have been used because of the ambiguity and complexity of the differential diagnoses of autism.

Historically, autism as a label was first established in psychiatry when schizophrenia was defined. At that time, autism was used as an adjective to describe withdrawn schizophrenics. Later, the same term was used as a noun to capture an entire disorder (Maltz, 1982).

The lack of social interaction and the isolation exhibited by an autistic child were believed to be evidence of early severe pathology in the mother-child relationship and parents' negative attitudes. Labels such as childhood psychosis, severe emotional disturbance, atypical ego development, childhood schizophrenia, and symbiotic psychosis were used in this regard (Bettleheim, 1956; Freeman & Ritvo, 1984). Accordingly, parents of autistic children were blamed and stigmatized as being a primary cause of their children's disorder: mothers were supposedly cold, rigid, and non-nurturing; fathers were

characterized as restrictive (Cantwell, Baker, & Rutter, 1978; Victor, 1983). As a result of this theory, considerable research was devoted to the study the characteristics of parents of autistics in order to relate these characteristics to "producing" autism.

At present, as a result of recent research and clinical experience findings, early assumptions about autism are being questioned. The psychogenic theory, which related autism to parental characteristics, is no longer accepted as valid. The emphasis has shifted from parental pathology to the cognitive and developmental deficits of the children (Lansing & Schopler, 1978). This shift was a result of pressures from advocacy groups including professionals and parents of autistic persons and was supported by Public Law 94-142, covering the right of handicapped students to a free, appropriate education (Wolthuis, 1983).

For the purpose of determining specific cause(s) for autism, autistic persons have been the subjects of neurological, biological, and environmental studies. No specific cause has been identified as an absolute causative agent; however, a central nervous system dysfunction caused by unknown factor(s) is thought to exist in autistic persons (Wing, 1976; Maltz, 1982). Recently, descriptions of behaviors and symptoms associated with autism are considered of most importance when identifying and diagnosing autistic persons. Accordingly, autism as a clinical entity is now viewed as a syndrome (Maltz, 1982; Coleman, 1976).

Many definitions have been developed for the syndrome of autism. The National Society for Autistic Children's (NSAC) definition (1978) has been widely accepted by professionals. This definition states that autism is a behaviorally defined syndrome, the essential features of which are typically manifested prior to 30 months of age and include disturbances of (a) developmental rates and/or

sequences; (b) responses to sensory stimuli; (c) speech, language, and cognitive capacities; and (d) capacities to relate to people, events, and objects.

Professionals and parents of autistic students are now becoming concerned about the quality of services which should be provided to these students and their families. NSAC has been a powerful advocacy group for educational movements (Lansing & Schopler, 1978). More accomplishments have been achieved throughout the United States in terms of rules and regulations regarding educational services for autistic students. No longer are they considered "unteachable" and candidates for placement in institutions. In 1975, when the United States' definition of developmental disabilities was revised, autism was included in the category. In 1980, when the federal regulation was again revised, autism was removed from the category of severely emotionally disturbed. This change occurred because of the historical confusion of autism and its relationship to mental illness. Moreover, when the American Psychiatric Association's Diagnostic and Statistical Manual, Revision III (1980), was issued, autism was defined as a pervasive developmental disorder instead of an emotional disorder, the category under which it had been categorized in previous editions of the DSM.

The state of Michigan is considered to be a leader in rules and educational provisions for the benefit of autistic students and their families. In July, 1983, the state's Joint Administrative Rules Committee unanimously approved new autism rules, including (a) an autism determination rule, (b) an autism programming rule, and (c) a new endorsement standard for teachers of autistic students.

Identification and Diagnosis of Autism

Any attempt to identify and diagnose the autistic population should appreciate Kanner's (1943) effect in this regard. In his original paper, Kanner reported several characteristics of 11 children with an unrecognized syndrome; his findings based on systematic and careful observation. The purpose of that study was to identify the behavior characteristics of his subjects and to differentiate them from characteristics displayed by children with other psychiatric disorders. These characteristics included an inability, from birth, to relate to oneself, other people, and situations; a delay in speech acquisition; noncommunicative use of speech after it had developed; echolalia; obsessive desire for maintaining sameness in the environment; pronoun reversal; repetitive and stereotyped play activities; a lack of imagination; a good rote memory; and a normal physical appearance. Most of these features were reported in many other clinical studies later as characteristics of autistic populations. In recent studies, however, the suggestion that these individuals have normal cognitive potentialities has been found to be inaccurate. Ritvo and Freeman (1978) reported that 60% of the autistic population score below 50 on IQ tests. Although Kanner provided rich clinical descriptions for the autistic population, Freeman and Ritvo (1981) pointed out that Kanner " . . . never attempted to develop an objectively based diagnostic system . . . " (p. 17).

A progress report of the British Working Party (1961) suggested a list of nine diagnostic points (known as Creak's Nine Points) to be used in diagnosing "schizophrenic" children. The list included (a) gross and sustained impairment of emotional relationships with people; (b) apparent unawareness of his/her own personal identity to a degree inappropriate to his/her age; (c) pathological preoccupation with particular objects or certain characteristics of them, without regard to their accepted functions; (d) sustained resistance to change in the

environment and a striving to maintain or restore sameness; (e) abnormal perceptual experience (in the absence of discernible organic abnormality); (f) acute, excessive, and seemingly illogical anxiety is a frequent phenomenon; (g) speech may have been lost or never acquired, or may have failed to develop beyond a level appropriate to an earlier stage; (h) distortion in mobility patterns; and (i) a background of serious retardation in which islets of normal, near normal, or exceptional intellectual function or skill may appear.

These nine points from the British Working Party were accepted by professionals as a basis for diagnosis of "childhood psychosis" during the 1960s (Freeman & Ritvo, 1981). However, Rutter (1966) and Rutter and Lockyer (1967) criticized using these points in diagnosis, pointing out that there is overlapping among these points with no specific information to specify how many of the nine points are necessary to establish the diagnosis. Instead of these points, they used a checklist in their studies to compare case histories of 63 psychotic children with emotional and behavior problems. The checklist they used covered relationships, speech compulsions, motor phenomena, concentration, self-injury, response to pain, and behavior problems. Werry (1972), however, suggested that the items of the checklist were unclear, general, and undefined; therefore, its reliability was questioned.

Using the term "childhood schizophrenia," Goldfarb (1964) identified two categories, organic and non-organic, and reported three major behavioral deviations of diagnostic significance that discriminated between the two categories and normal children to include (a) abnormal receptor behavior in which the central finding is auditory and visual inattention (exclusion of distance receptors), (b) deficient self-awareness, and (c) deficient communication. These criteria, however, have not been objectively defined.

Ornitz and Ritvo (1968) indicated that autism should be identified by observable behavior patterns. These behaviors occur as clusters of symptoms reflecting abnormal development and involve the areas of (a) perceptual integration, (b) mobility patterns, (c) capacity to relate, (d) language, and (e) developmental rate. Although they agree that autism should be defined as a behavioral syndrome, Ornitz and Ritvo add that, at the same time, autism should be considered a disease. This position was suggested because no one symptom alone or cluster of symptoms occurring together comprised the syndrome. Moreover, no one symptom or group of symptoms defined the disease. They also suggested that developmental failures in autistics were caused by a breakdown of homeostatic regulation of sensory input. It should be noted that abnormal development as a way of perceiving autism was new and basic for further investigations by later professionals. Still, Ornitz and Ritvo did not offer objective methods to establish a diagnosis of autism.

Ward (1971) suggested the following criteria in establishing a diagnosis for autistic populations: (a) lack of objective relations, (b) lack of use of speech for communication, (c) maintenance of sameness in stereotypic behavior, and (d) lack of neurological dysfunction. Ward also pointed out that many individuals labeled as autistic have organic causes of their characteristics.

Kolvin (1971), based on a review of literature, suggested that childhood psychosis can be separated as categories according to age of onset: onset under three years (infantile psychosis) and over three years (late onset psychosis). The criteria for infantile psychosis were (a) age of onset before the age of three years, (b) a self-isolating pattern of social behavior, and (c) at least one of the following: (1) catastrophic reactions to environmental changes; or (2) gross stereotypes either of a global class such as headbanging, pirouetting or rocking, or of the idiosyncratic type such as finger flicking, specific motor patterns, and

self-stimulation. These criteria were based on the early formulation of Kanner (1943). Kolvin also addressed the problems of establishing objective diagnostic criteria in establishing a diagnosis of autism.

In 1974, Call presented a detailed table of developmental disability in infancy. While he was not concerned with objective diagnostic criteria, he pointed out the importance of considering the course of development when establishing the diagnosis. From this perspective, his work is considered important (Freeman & Ritvo, 1981).

In 1978, the National Society for Autistic Citizens adopted a definition of autism proposed by Ritvo and Freeman (1978). This definition is the one most widely accepted by professionals and includes characteristics and features exhibited by individuals prior to 30 months of age: (a) disturbances of developmental rates and/or sequences; (b) disturbances of responses to sensory stimuli; (c) disturbances of speech, language, and cognitive capabilities; and (d) disturbances in capacity to relate appropriately to people, events, and objects.

The most recent edition of the American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders (DSM-III, 1980) has established two diagnostic categories of infantile autism: (a) infantile autism, full syndrome present; and (b) infantile autism, residual state. The diagnostic criteria for infantile autism, full syndrome present, are (a) onset before 30 months of age; (b) pervasive lack of responsiveness to other people (autism); (c) gross deficits in language development; (d) if speech is present, peculiar speech patterns such as immediate and delayed echolalia, metaphorical language, and pronoun reversal; (e) bizarre responses to various aspects of the environment, e.g., resistance to change, peculiar interest in or attachment to animate or inanimate objects; (f) absence of delusions, hallucinations, loosening of associations, and incoherence as in schizophrenia. The diagnostic criteria for

infantile autism, residual state, are (a) once had an illness that met the criteria for infantile autism; or (b) the current clinical picture no longer meets the full criteria for infantile autism, but signs of the illness, such as oddities of communication and social awkwardness, have persisted to the present.

The criteria offered by DSM-III are considered a guideline for making a diagnosis by clinicians. These criteria are based on subjective clinical judgment, as is the case of most criteria proposed by professionals discussed above. This situation can be related to the ambiguity of the disorder, the difficulty of determining specific causes for autism, and the overlapping of autistic symptoms with the symptoms of other disorders. Furthermore, since autism is a relatively "new" disorder, much more needs to be learned about its nature.

Despite the fact that autism has been a subject of many studies for more than two decades,

. . . much confusion exists in the literature not only regarding the necessary and sufficient conditions to establish the diagnosis, but also over the term autism. One solution to the problem is to develop an objective diagnostic schema. Such a tool would not only shed light on the perplexing clinical problem of diagnosis, but might also aid in answering other questions. (Freeman & Ritvo, 1981, pp. 40-41)

Differential Diagnosis of Autism

"Diagnosis continues to be a major problem in the field of autism . . . " (Maltz, 1982, p. 9). This is because the characteristics of the disorder often resemble those of other disorders; therefore, accurate data should be obtained in order to differentially diagnose autistic individuals from others. Most researchers interested in diagnosis of autism address the issue of other disorders that share behaviors associated with autism. These disorders are reported to include mental retardation, childhood schizophrenia, hearing impairment, language/communication disorder, and others (Regan, 1982; Maltz, 1982; Morgan, 1981; American Psychiatric Association, 1980; Wing, 1976; Ornitz & Ritvo, 1976).

Mental Retardation and Autism

When Kanner (1943) proposed a diagnostic criteria for autism, he claimed that autistics have good cognitive abilities; therefore, mental retardation was excluded from this population. Later, Ritvo and Freeman (1978) reported that about 75% of autistics function in the range of the mentally retarded. Although the overall functioning of the mentally retarded and mentally retarded autistics is similar, in mental retardation flat developmental delay across different areas is reported, while mentally retarded autistics are reported not to have flat performance. Instead, they score highest on tasks involving short-term memory or perceptual-motor skills and lowest on verbal tasks (Sindelar, Meisel, Bur, & Klein, 1981).

The confusion between autism and mental retardation came from the fact that there are some characteristics of mental retardation which are similar to behaviors seen in autistics. A careful investigation of the syndrome of autism will lead to points that distinguish autism from mental retardation. The following differences are reported in the literature.

1. Mentally retarded persons are reported to relate; they are relatively socially aware. Conversely, the capacity of autistics, even those with average intelligence, to relate is not evident. (Maltz, 1982)
2. The ability to perform nonverbal tasks, especially spacial-motor, visual-spacial, and manipulative skills, is evident in the mentally retarded autistic population, while it is not evident in the mentally retarded population. (Morgan, 1981; Regan, 1982)
3. Language and communication ability are different between the two groups. The amount and use of language to communicate is appropriate to the level of intelligence in the mentally retarded;

while in mentally retarded autistics, language may either be absent or, if present, unusual and atypical. (Maltz, 1982; Wing, 1976)

4. Autistic persons have a much lower incidence of physical abnormality than persons with mental retardation (Morgan, 1981). This finding supports the early formulation of Kanner (1943) when he pointed out that autistic children tend to be physically attractive.
5. The autistic population exhibits special skills (splinter skills), including rote memory, music, and art, which are not typically reported for the mentally retarded population. (Maltz, 1982; Morgan, 1981)
6. Common stereotypic motor behaviors of autistic persons involve arm and hand motions in front of the eyes as well as gross-motor movements such as rocking. Mentally retarded individuals, on the other hand, are more prone to confine their stereotypic motor behaviors to those which involve vestibular and motor simulation such as rocking, headbanging, etc. (Regan, 1982; Morgan, 1981)

It is clear from these findings that early childhood autism is not synonymous with general mental retardation, and that mental retardation does not explain autism, any more than it explains, for example, cerebral palsy, which can also be associated with any level of intelligence. (Wing, 1976, p. 40)

Autism and mental retardation can be distinguished; but, according to Maltz (1982), the diagnosis will be difficult in cases of very low-functioning autistics and the mentally retarded when they display similar behaviors.

Childhood Schizophrenia and Autism

Autism as a concept was first established in psychiatric practices. At that time, autism was used to describe one of the major symptoms in schizophrenia, withdrawal, or loneliness. Accordingly, similarities between the two disorders were assumed, to the degree that some researchers (Creak, 1961; Goldfarb, 1964) label autistics as schizophrenics. "Only within the last five to ten years has the issue of autism and its relationship to schizophrenia been clarified" (Maltz, 1982, p. 11). Following are some research findings regarding the differences between autism and schizophrenia.

1. Schizophrenics are capable of using symbols and they use them extensively, while autistics are incapable of using such symbols. (Maltz, 1982)
2. Autistics never develop social relationship with others and they refuse to respond to people and the environment, while schizophrenics may develop relationships with others, in a cyclic way, and may often appear anxious and confused about their environment. (Rimland, 1964)
3. Hallucinations, delusions, and loosening of associations or incoherence are present in schizophrenia, while they are absent in autism. (American Psychiatric Association, 1980)
4. In autism it is reported that the age of onset is 30 months or less, while the onset of schizophrenia is usually in early adolescence. Autism never develops after 30 months of age; therefore, the early onset of autism is the best factor in distinguishing autism from schizophrenia. (Schopler & Dalldorf, 1980)

5. Epidemiological findings are reported to be different for both disorders. The male-female ratio of autism is reported to be approximately four to one, while in schizophrenia it is equal. Genetics are reported to explain schizophrenia more than autism. (Maltz, 1982; Schopler & Dalldorf, 1980).

"It is fair to say, on these findings, that it is possible to differentiate between these types of childhood psychoses on the evidence from history and present behavior that there is independent evidence for the validity of this differentiation . . ." (Wing, 1976, p. 39).

Language/Communication Disorder and Autism

Since disturbances of speech, language, and cognitive capacities are essential features of the syndrome of autism, it is expected that there will be similarities between autistics and others who display language disorders. Because of these similarities, autism may be confused with different types of language disorders.

Receptive developmental language disorders are reported to be similar to the language disorders displayed by autistics; therefore, confusion in diagnosis may occur. The results of several studies on this issue clarify that, although there might be similarities between autism and receptive developmental language disorders, it is possible to distinguish between the two disorders (Morgan, 1981; Wing, 1976; Maltz, 1982; Regan, 1982).

Children with receptive language problems try to communicate with gestures and facial expressions to compensate for their speech problems (American Psychiatric Association, 1980), while children with autism do not show any appropriate emotional expressions or accompanying non-verbal messages.

Both groups may display echolalia; however, more frequently echolalia, especially the delayed form, is reported with autism (Morgan, 1981; Wing, 1976).

Children with autism fail to use the function of language as a tool for communication with others. On the other hand, children with language problems learn to understand basic language concepts and non-spoken symbols and try to communicate with others. Accordingly, the capacity to learn and manipulate symbols is considered to be a major difference between the two groups.

Disorders of Hearing and Vision and Autism

Social withdrawal, becoming upset by changes in routine, and other behaviors that may be exhibited by children with undiagnosed congenital deafness are somewhat similar to behaviors exhibited by autistics. These behaviors are considered secondary for deaf children and due to their disorder, while they are primary in autistic children. Most classically autistic children are not deaf (Wing, 1976). A child suspected of being autistic should be checked by an audiologist to rule out deafness when possible.

Blind or partially sighted children may exhibit self-stimulation and stereotyped movement similar to that exhibited by autistic children. Moreover, autistic children's abnormality in responding to visual stimuli may indicate autism at the first impression (Wing, 1976).

Methods of Assessment of Autism

Regan (1982) pointed out three major goals for the assessment of autism: (a) diagnosing or confirming the disability condition, i.e., autism; (b) determining the most appropriate educational setting; and (c) selecting and developing instructional procedures and materials. Regan also suggested four reasons for testing: (a) educational placement, (b) program planning, (c) individual progress, and (d) program evaluation.

Newsom and Rincover (1981) pointed out that traditional inferential methods have been used for assessing autistic children. These methods include interviews and conventional intelligence tests carried out in clinical practice. Besides these procedures, Newsom and Rincover suggested that assessment of autistic children include global "whole child" assessment procedures, including (a) informal observation during which information can be gathered about the child in different settings such as a screening interview, a pre-placement classroom, or a home. Information is gathered by informal observation when an observer tries to answer questions regarding a child's behavior in different settings; (b) intelligence tests, which can be used for two purposes: (1) as a rough predictor of scholastic aptitude and (2) reported for long-term follow-up or comparative treatment outcome; (c) two major behavioral checklists used for assessing autism: (1) the first type consists of diagnostic checklists which have been designed to distinguish autistic children from other disorder groups, and (2) the second type consists of descriptive checklists which have been designed to identify the presence and absence of behaviors important in normal functioning; (d) educational tests designed to provide an assessment of autistic children in classroom settings and to provide information about the acquisition of educational skills; and (e) structured observational procedures involving direct observation and the recording of behaviors displayed by autistic children in controlled situations.

Behavioral Instruments

Behavioral instruments have been developed, including behavior rating scales, checklists, and observations. These instruments were designed to serve many purposes, dependent on the goal for using each instrument. Smith, Grimes,

and Freilinger (1982) classified these instruments according to their primary purposes and functions:

1. screening tools to identify children suspected of being autistic. Due to the low incidence of autism, a screening tool is helpful in school or clinical settings, particularly where professionals are unfamiliar with or infrequently see an autistic child. The children identified through the screening may then be referred for more extensive diagnostics;
2. diagnostic tools to define development criteria for the diagnosis of autism and to measure the relative severity of the impairment. Diagnosis of autism is frequently complex and has been complicated by disagreement and subjective opinions. By using standardized instruments, the difficult process of diagnosis can become more objective and consistent between professionals;
3. prescriptive measures to determine which behavior(s) the child is exhibiting that are problematic. This information helps to prioritize and identify behaviors in need of immediate intervention. Further assessment of these particular behaviors is usually necessary before specific intervention can be selected;
4. recording progress and change to provide a record of how the child's behavior has changed over time. Children with autism, like all children, change as they grow older. Some problems are more pronounced at certain ages and diminish as the child matures. Other behaviors need specific intervention for improvement to occur. A behavior checklist administered at six months or yearly intervals can record this change, and programming priorities can be adjusted accordingly; and
5. facilitating communication to help compare the different behaviors a child is exhibiting in different environments. They can be a useful, objective way for parents and professionals to discuss areas of disagreement or differing perceptions of the problem and/or the severity of a particular behavior.

Review of Prior Behavior Checklists

Behavior checklists are considered to be one of the most common instruments used by professionals in the field of behavioral science. They have been designed to provide helpful information in the assessment of children with maladaptive behaviors. Behavior checklists can be used for all purposes mentioned earlier and are typically easy to administer and interpret.

Polan and Spencer (1959) are considered to have been the first to establish a checklist in the area of autism (Freeman & Ritvo, 1981). They established a checklist of symptoms displayed by the five autistics they studied. They grouped these symptoms into five areas: (a) language distortion, (b) social withdrawal, (c) activities that lack integration, (d) obsessiveness and nervousness, and (e) family characteristics. In their checklists, Polan and Spencer did not provide objective definitions and cut scores to determine the disorder.

In 1964, Rimland developed a diagnostic questionnaire which was designed to be answered by parents. Form E-1 consisted of 76 questions and was intended for children above seven years of age, and Form E-2 consisted of 80 questions and was developed to cover children younger than age five. This checklist was designed to differentially diagnose autistics from other autistic-like children. A recent form (E-3) consists of questions related to the children's behavior and medical information such as blood types and drugs taken during pregnancy. This checklist is used mostly in medical research (Rimland, 1971, 1974).

Freeman and Ritvo (1981) reported that Rimland's diagnostic checklist suffers from the following weaknesses: (a) it relies on parental reporting of symptoms and does not incorporate observations of the children, (b) it does not provide objective definitions of behaviors the parents rate, (c) a scoring key that would allow other investigators to use the checklist scientifically has not been published, (d) it only differentiates autistic from non-autistic children and does not really provide a precise description of the non-autistic child, and (e) it begins with an apriori definition of the syndrome rather than letting the data divide the children into different categories.

Wing (1969) used a checklist to be completed by parents in her study. The purpose of her study was to compare the behaviors of autistic children with behaviors displayed by children with sensory, perceptual, and executive

disorders. The validity of this checklist has been questioned because it depends primarily on parents' reports and does not include information gathered on the children's current behaviors.

Makita and Umezu (1973) developed a checklist called Checklist for Autistic Children. This checklist was designed to measure the child's progress during behavior therapy. It consists of 28 items covering 11 areas of behavior displayed by autistic children daily. A diagram is plotted as a result of parents' reports about their children. No objective definitions of behaviors are provided. Methodological problems also exist.

Review of Current Available Instruments Used for Differential Diagnosis of Autism

Childhood Autism Rating Scale (CARS)

This scale was developed in 1974 by Schopler to be used with the psycho-educational profile (PEP). It consists of 15 separate subscales, items of the subscales adapted from Kanner's (1943) criteria for autism, and the nine points of the British Working Party (1961). A continuum of seven points is used for every scale ranging from "normal" to "severely abnormal" with a definition of every point. The CARS can be administered by observing a child in a structured session. Intensity, frequency, and peculiarity of behavior displayed by the child being assessed influence the ratings. The age of the child must be considered in interpretation of the CARS (Schopler, Reichler, DeVellis, & Daly, 1980).

A sample of 537 children was used to construct the criteria that should be used. The scores ranged from 15 to 60 with a cut point of 30. Children who obtained a score of 30 or less were considered not autistic. Children who scored above 36 were considered severely autistic. Children who scored between 30 and 36 were considered mildly to moderately autistic (Schopler et al., 1980).

Parks (1983) pointed out the strengths of the CARS as follows: (a) empirically derived scoring criteria, although construction of the sub-scales is based on diagnostic schemes rather than on direct sampling of behaviors; (b) the provision of detailed anchor points for the sub-scales; (c) consideration of the important influence of the child's age; and (d) good inter-rater reliability using a large number of cases. Further evaluations of criterion validity and a more complete investigation of discriminant validity using autistic and other developmentally disabled children are indicated.

Rimland's Diagnostic Checklist for
Behavior Disturbed Children (E-2)

The purpose of this checklist is to identify and differentiate early infantile autism from the broader range of autistic cases. The form (E-2) consists of behaviors displayed by the child. Parents are expected to respond to every item, with the checklist covering the child's development from birth through five years. This instrument involves two major scales: behavior and speech. Both scales yield a total score. The higher the score, the more symptoms of classical autism are exhibited by the child (Rimland, 1971).

The validity of E-2 is determined in terms of percentage of agreement without using correlation formulas. A high percentage of agreement was reported between identified infantile autistic children using the E-2 form and Kanner's criteria. No test of reliability has been reported. This instrument also lacks discriminant validity. Accordingly, it has been suggested that this instrument should be used only for screening purposes (DeMeyer, 1971; Parks, 1983).

Behavior Observation Scale (BOS)

This scale was designed to objectively diagnose autism through observation. The BOS consists of 67 objectively defined behaviors in a checklist form. The child is observed in a playroom situation. Each observation involves recording the occurrence of the behaviors in nine three-minute intervals. Recording procedures involve recording whether or not the behavior is present; if a behavior is present, frequency of occurrence is also recorded. Standardized stimuli such as a flashing light are introduced during the first 10 seconds of seven intervals (Parks, 1983; Freeman, Ritvo, Guthrie, Schroth, Ball, 1978).

The BOS has been subjected only to preliminary studies of reliability and validity. No information is available about criterion validity, and no other disability group was included in discriminant validity. The BOS is, however, a useful scale in the sense of using behaviorally defined variables (Parks, 1983).

Muskegon Index of Autistic Behavior Checklist (MIAB)

This checklist was developed to be used as a screening tool to assist school or clinical staffs in identifying children suspected of being autistic. The MIAB is designed to provide ratings of autistic behavior in six areas: marked aloneness, severe language problems, perceptual distortions, cognitive dysfunction, bizarre emotional reactions, and maladaptive behaviors. Each item of the checklist is scored according to the presence of the behavior and its frequency (Regan, 1982).

No appropriate statistical information is provided for validity. The data for all groups are combined; therefore, specific information on rater agreement is obscured. Reliability coefficients are inflated by the great amount of variability. However, the checklist is easy to use and score and presents the major characteristics of autism. The overall evaluation of this instrument,

however, is that it does not appear to serve the primary purpose for which it was designed (Regan, 1982).

Autism Behavior Checklist (ABC)

The ABC is one component of the Autism Screening Instrument for Educational Planning (ASIEP) which was designed to be used in the schools for the identification and placement of autistic children. The other components of the ASIEP are (a) Sample of Vocal Behavior which includes samples of 50 spontaneous utterances or speech scored in terms of repetitiveness, non-communication, intelligibility, and babbling; (b) Interaction Assessment, including social response between child and adult; (c) Educational Assessment, which includes quantitative interpretation of in-seat behavior, receptive and expressive language, body concepts, speech limitation, and repertoire of adaptive behaviors; and (d) Prognosis of Learning Rate, which involves learning acquisition rate as measured by a sequencing task (Krug et al., 1979; Regan, 1982).

The ABC consists of 57 items of non-adaptive behaviors designed to discriminate non-handicapped children from autistic children as well as children with the following handicapping conditions: severely mentally retarded, severely emotionally disturbed, and deaf-blind. The ABC has been standardized on autistic subjects of all ages (18 months - 35 years) and the other handicapped groups and non-handicapped persons. Descriptions were selected from the following sources: Rimland's Form E-2, the nine points of the British Working Party, the Behavior Rating Instrument for Autistic and Atypical Children, and Kanner's criteria (Krug et al., 1980).

The standardization study consisted of 1,049 completed checklists. A chi-square analysis was conducted for the standardization sample in order to provide weight scores assigned to each behavior listed. The items of the ABC have been

grouped into five symptom areas: sensory, relating, body and object use, language, and social and self-help. Sums of the weighted item checked can be plotted on a profile chart and compared with data profiles for the entire standardization sample and by chronological age (Krug et al., 1980; Parks, 1983).

Regan (1982) stated that, "The Autism Behavior Checklist was found to have excellent content, concurrent, was predictive of autism at the .001 level when compared to severe mental retardation, severe emotional disturbance, deaf-blind, and normal populations" (p. 203). Regan also reported the desirable features of the entire instrument to be:

1. the instrument discriminates between autistics and other severely handicapped populations and, therefore, is a useful diagnostic tool for making educational placement decisions for autistic children;
2. standardization is meticulous and complete;
3. each sub-test can be used separately; and
4. the instrument is an excellent screening tool for assessing the behavioral characteristics of autistic students.

Since the ABC is a major component of the AISEP and is considered to be one of the "most useful components" (Smith et al., 1982, p. 59), what is applicable for the entire AISEP as desirable features will apply for ABC except for educational placement decisions which require the administration of the entire instrument.

Parks (1983), in her review of several behavior instruments used with autism, pointed out that the ABC is reported to discriminate autistic children from other groups of handicapped and non-handicapped children. Split-half and inter-rater reliability have been reported to be high. However, these procedures were based on a very small number of children. Parks (1983) also suggested that investigations of validity need replication using blind raters and a wider range of diagnostic groups.

Smith et al. (1982) indicated that many children diagnosed autistic by other means do not receive scores in the autistic range for the ABC. "Only young autistic children or low functioning children receive scores in the criterion range" (p. 63). This claim, however, has not been supported by other investigators.

In a recent study, Teal and Wiebe (1984) investigated the effectiveness of three instruments to discriminate autistic from trainable mentally retarded. The Autism Screening Instrument for Educational Planning (AISEP), Childhood Autism Rating Scale (CARS), and the Diagnostic Checklist for Behavior Disturbed Children, Form E-2, were used. The result indicated that all three instruments were found to separate the two samples of children. The CARS and the AISEP, however, provided for a greater separation of groups.

The ABC and two other components of the AISEP (IA and EA) were found to be the significant variables for the discriminant analysis used in Teal and Wiebe's (1984) study. The result of this study indicated that, with the three subtests as predictor variables, autistic group membership was predicted at 100% and trainable mentally retarded group membership was correctly predicted at 95% with a pooled group accuracy of 97.5%.

Because the ABC is a relatively new instrument, it has not been developed for use in different cultures. However, through the researcher's personal contact with the senior author of the checklist, it was learned that ABC has been translated into the Spanish language. It should be noted that the present study is the first attempt to develop a version of the ABC for use in a different culture (Jordan).

Translation of Materials for Cross-Cultural Research

In order to complete research in one language and culture on materials developed for another language, it is necessary to translate these materials. To achieve a valid translated version, the goal of translation should be toward developing an equivalent version of the original version. Developing an equivalent version is not an easy task because the major problem in translation is to make certain that the translated version is equivalent to the original. Secherest, Fay, and Zaidi (1972) pointed out the following aspects of equivalence and the problems related to each aspect:

1. **vocabulary equivalence:** for many words it is difficult to find an equivalent word in the second language. Using a dictionary is not always helpful because frequently more than one definition is offered for one word;
2. **idiomatic equivalence:** idioms which are found in one culture may not be found in another culture. This problem presents difficulty in developing an equivalent translation. Accordingly, equivalent meaning may be needed to solve this problem;
3. **grammatical-syntactical equivalence:** since different languages frequently use different grammar and syntax, these differences might have an impact on translation in terms of meaning;
4. **experimental equivalence:** the use of different terms by various cultures to refer to certain items or experiences may affect the equivalence of translation. These situations require a type of translation called "cultural translation"; and
5. **conceptual equivalence:** some concepts may be interpreted as having different meanings in different cultures. To achieve conceptual equivalence, it is necessary to know what each concept means in the culture for which the translation is being made.

To achieve a total equivalent translation, an effort should be made to determine all aspects of equivalence. Each aspect should be verified to develop a truly equivalent translation.

Translation Techniques

Several techniques and procedures have been used to translate materials to be used in different cultures. Following are some of the recommended techniques:

1. direct translation, a technique commonly used by many researchers, in which bilingual translators translate materials from one language to another (Secheres et al., 1982);
2. pretest, a technique requiring a field-test procedure to ensure that materials are understood by individuals in the other culture. It should be noted that this procedure is necessary even after careful translation (Brislin, 1970);
3. de-centering, a technique referring to the process of modifying the translated materials in terms of content when there are differences in content between the two languages (Secheres et al., 1972); and
4. back-translation, a technique involving using at least two bilingual translators. The first person translates the materials directly to the second language, while the other translates back from the second language to the original one. The second translator should do the back-translation blindly (without reading the original materials). The two versions should be checked to determine if they are identical (equivalent) (Brislin, 1970).

Brislin reported that many researchers have used the back-translation technique for cross-cultural research. It has been suggested that it is possible to develop a more accurate equivalent form through the use of a back-translation technique than by the use of other techniques.

CHAPTER III

METHODOLOGY

The primary purpose of this study was to develop a Jordanian adaptation of the Autism Behavior Checklist (ABC) which could then be used as a screening and identification instrument for Jordanian autistic persons. The adaptation process included the following tasks:

1. translation of ABC items from the English language (the original language of the instrument) to the Arabic language (the native language of Jordan);
2. systematic review of the Arabic translation version to make necessary changes for use in the Jordanian culture;
3. administration of the Jordanian version of the ABC to Jordanian samples of the following groups: autistics, mentally retarded, and non-handicapped persons;
4. determination of validity and reliability coefficients for the Jordanian version of the ABC; and
5. comparison of the results of Jordanian samples with the results reported for the standardization sample of the original American version.

Subjects

A total of 192 individuals diagnosed as autistic, severely mentally retarded, moderately and mildly mentally retarded, and non-handicapped persons served as subjects of the study. This number included 113 males and 79 females; the age range was 4-18 years with a mean of 9.39 years (see Table 1). A total of 142 subjects were enrolled in the mentally retarded schools and care-homes in the cities of Amman, Zarka, and Irbid in Jordan; 42 subjects were students enrolled

in regular schools in Amman and Zarka; and eight individuals were clients in either psychiatric or pediatric clinics in Amman.

Table 1
Subjects' Categories and Gender

<u>Data Type</u>	<u>Categories</u>	<u>M</u>	<u>F</u>	<u>T</u>
Validity	Autistics	24	8	32
	Severely mentally retarded	22	16	38
	Non-handicapped	24	18	42

Reliability	Mild to severe mental retardation	43	37	80
TOTALS:		113	79	192

For the purpose of data analysis, two groups of subjects were selected and treated differently. They were used to obtain either validity or reliability data. The sample used to determine validity data consisted of 112 individuals, including 32 autistic persons, 38 severely mentally retarded students, and 42 non-handicapped students. This data set included 70 males and 42 females; the age range was 4-18 years with a mean of 8.96 years. In selecting the autistic group, the researcher visited all mental retardation schools and care-homes in Amman, Zarka, and Irbid to identify autistic students who were enrolled in these schools. Twenty-four students who had been diagnosed by psychiatrists and/or pediatricians were identified in five schools and one care-home and were included in the autistic group. The diagnosis of autism for these students was reported in their school records. The rest of the autistic individuals were located through psychiatric or pediatric out-patient private and military clinics in Amman.

To obtain severely mentally retarded students, one or more of the following criteria were used: a full scale IQ of 50 or less on the adapted Stanford-Binet, evidence that the individual met AAMD-ABS criterion measures, and verification of nominated individuals as being severely mentally retarded by a professional in the field of special education. All the severely mentally retarded students were selected from mental retardation schools and care-homes in Amman, Zarka, and Irbid. Students who met the criteria of being severely mentally retarded (IQ score, AAMD-ABS, or professional nomination) were included in the severely mentally retarded group. The students were initially nominated by the principals of their schools, and their records were then checked to determine if they had either IQ scores or met the AAMD-ABS criterion for severe retardation. In situations where either of these data were not available, a professional in the field of special education served as a judge to verify or reject nominated students. Very rarely were IQ or AAMD-ABS data available in students' files. In most instances, the main criterion used was the nomination of a school principal verified by a professional knowledgeable of the American categorization system of determining the level of severity of mental retardation.

Non-handicapped subjects were students selected from various schools: 16 from a public school in Amman, 13 from the University of Jordan Model School, eight from a private school in Zarka, and five from a nursery school in Amman. Selection of students from various schools was made to obtain a wide range of ages and to minimize as much bias from the sample as possible. Within each school, selection was made by having teachers choose students whom they felt they knew well enough to complete valid responses to the checklist.

To obtain subjects for the reliability data set, 80 students from several schools for the mentally retarded in the cities of Amman, Zarka, and Irbid were included. This group consisted of 43 males and 37 females in the age range of

five to 15, with a mean age of 9.98 years. The students selected included persons across various severity levels of mental retardation as well as autistic students. This situation would likely approximate conditions where the ABC would be used as a screening device. Eight pairs of special education teachers from seven schools for the mentally retarded in Amman, Zarka, and Irbid rated the 80 students. Each pair of teachers independently rated 10 different students.

Delimitations

Based on the characteristics of the subject population of this study, generalization of the results is affected by the following limitations:

1. Jordanian individuals diagnosed as autistics, severely mentally retarded, and non-handicapped;
2. Jordanian autistic students in schools for the mentally retarded and care-homes and autistic clients in an out-patient psychiatric clinics, severely mentally retarded students in schools for the mentally retarded and care-homes, and non-handicapped students in public and private schools; and
3. autistic individuals, severely mentally retarded students, and non-handicapped students, aged 4-18 years.

Translation of the Autism Behavior Checklist (ABC)

The ABC was translated from English (the original language) into Arabic (the native language of Jordan). To obtain an equivalent translation, the following procedures were employed.

1. The researcher directly translated all items of the ABC into the Arabic language (the native language of the researcher).
2. The initial Arabic translation was reviewed by two Jordanian graduate students, one from the University of Michigan and the other from Ohio State University. These graduate students were selected because their area of speciality included linguistics and

special education. These persons reviewed the translation individually according to the following criteria:

- a. the total number of items in the translated version should be equal to the number of items on the original checklist,
- b. the content of each item should be the same as the original, and
- c. each item in the checklist should be clear and understandable by all.

The reviewers suggested slight changes in wording of some items. The researcher reviewed and discussed the recommended changes with the reviewers and, as a result of this discussion, some of the changes were incorporated while all agreed that the others should be disregarded.

3. The revised translation version was then reviewed by a faculty member from the Department of Education at Yarmouk University in Jordan who suggested minor changes in a few items. No major content changes in this revision were suggested.
4. The researcher reviewed the final translated version item by item to determine whether each was appropriate for the Jordanian culture. Since the items of the ABC consist of behaviors which reflect symptom areas, and since these symptoms are reported to exist in all countries, no evidence of cultural concern was noted and no changes in terms of content were made. In item 15, however, the American names (Joe, Bill,

Mary) were changed to common Jordanian names (Mohammad, Ahmad, Waleed).

5. To obtain an accurate equivalent translation, the reviewed version was then back-translated into English by two faculty members in the Department of Education at Yarmouk University. The two faculty members are fluent in the English language.
6. The back-translation version was reviewed by two faculty members in the College of Education at Michigan State University who are native English speakers. These two persons were asked to compare the back-translation version with the original English version to determine if there were any differences in the meaning of each item on the list. They indicated that, overall, there were no significant differences in item content between the two versions. However, slight differences in a few items were noted as a result of the use of a literal translation process in the back-translation. The differences were judged as having no impact on the content of the individual items.
7. A final technical and wording review of the translation was made by the dean of the Faculty of Education at the University of Jordan. The final version was then used for a pilot study (see Appendix B).

Pilot Study

The pilot Jordanian version was submitted to five special education teachers from three different schools for the mentally retarded in Amman. They

were asked to read the directions and every item on the list and to circle each item or any part of the directions they found difficult to understand. In addition, they were asked to write out a suggested alternative wording for any item they had circled. As a result of the pilot study, since the directions and individual items were determined to be clear, the Jordanian version was judged ready to be administered to the subjects of the study.

Administration Procedures

The researcher coordinated the administration procedure of the ABC. All the subjects were rated by teachers who had known them for at least three months, except for four autistic subjects who were rated by their mothers since the children were not enrolled in school programs.

The teachers of the autistic group and the severely mentally retarded group were asked to rate each student (fill out the checklist). Each student was rated by his/her own classroom teacher. For non-handicapped students, several teachers were asked to rate one or more of their students whom they felt they knew very well.

For the reliability data, eight pairs of special education teachers in seven schools for the mentally retarded in Amman, Zarka, and Irbid rated 80 students. The teachers were selected by their principals on the basis that each pair knew 10 different students well. Each pair of teachers rated 10 students independently. Each student was rated twice by (a) his/her classroom teacher and (b) his/her second classroom teacher or (c) a teacher s/he had had previously or (d) a teacher s/he currently knew through shared classroom activities. In those situations where there were fewer than 10 students in one class, each pair of teachers was asked to agree with each other on rating students within the school whom they knew well enough to complete independent ratings.

The administration was completed by some teachers in one session or one day while others were given more time (two or three days). The time needed to complete a checklist for one subject ranged from 10 to 20 minutes.

Statistical Analysis

Since the purpose of this study was to develop a Jordanian version of the ABC, an equivalent Jordanian (Arabic) translation needed to be developed. It was also necessary to identify validity and reliability of the Jordanian version. For further information, a comparison was made between the results of the Jordanian version and the results of the original instrument. Accordingly, the statistical analysis for this study was concentrated into validity, reliability, and comparison procedures.

Validity

To identify the validity of the Jordanian version of the ABC, the following statistical procedures were employed:

1. one-way analysis of variance (ANOVA) to test the differences among the means of the three diagnostic groups (autistics, severely mentally retarded, and non-handicapped) across each of the symptom areas of the checklist (sensory, relating, body and object use, language, and social and self-help). This procedure was chosen for its ability to test the effects of the different categories of one independent variable on a dependent variable. The F-ratio was considered statistically significant when found to be larger than the tabled F-value for alpha ($\alpha = .05$);
2. a Scheffe test as a type of post-hoc multiple comparison procedure was used, when the F-value for alpha .05 was found to be statistically significant in the ANOVA results. This test was

chosen because it could be used with unequal Ns which was the case in this study;

3. an investigation of the effectiveness of the Jordanian version of the ABC to discriminate between diagnostic groups across each symptom area by using discriminant analysis. The ability of the instrument to separate the three groups across each symptom area was reported as percentages of predicted group membership; and
4. the calculation of a table of means and standard deviations for the three diagnostic groups across symptom areas. A profile chart was also drawn for a quick comparison.

Reliability

To obtain reliability tests for the Jordanian version of the ABC, the following procedures were employed.

1. Internal consistency reliability for the instrument using coefficient alpha was calculated. Coefficient alpha was chosen for this purpose because it fits the study better than the other split-half coefficients of equivalence. Coefficient alpha is a generalized procedure producing good estimates of reliability when the test is homogeneous in content (Glass & Stanley, 1970), and this is the situation with the ABC. Alpha is the mean of all possible split-half coefficients (Cronbach, 1967).

Internal consistency reliability was used because the ABC is not intended to measure static traits or behaviors; the items of the ABC were developed to reflect a sample of behaviors present at the time of filling out the checklist. The non-adaptive

behaviors of the ABC are symptoms displayed by an individual that are supposed to be changed (become better) over time due to psychological and emotional intervention. Accordingly, one of the purposes in administering the ABC more than once a year is to measure the improvement (change) of the client for follow-up goals (plan for the future).

2. To determine inter-rater reliability, inter-rater agreement for the eight pairs of teachers was calculated. The percentage of agreement for the eight pairs of teachers who rated a total of 80 students was computed. Two percentages were computed, one without item weights and the other with items weighted. In this procedure, each pair of scores had an agreement score calculated for each item (S1 to S57). If the two scores agreed for an item, their agreement score (S) was one. If they did not agree, their score was 0. The unweighted percentage was calculated by summing the agreement scores and dividing by the number of items (57). The weighted score was calculated by multiplying each agreement score (0, 1) by the weight given to the item (1, 2, 3, 4), then dividing by the highest possible score--the sum of the item weights (158).
3. A generalizability coefficient or intra-class correlation coefficient was computed using reliability data in which eight pairs of teachers have rated a total of 80 students, with each pair rating 10 students independently. This procedure was used to overcome the problem of having more than one source of variation (i.e., teachers, pairs of teachers).

In a real life situation, it is impossible to find two raters (teachers) whom a large number of subjects (students) might know well enough to have each teacher rate every student. If this happened, theoretically a correlation coefficient could be calculated between the ratings of the two raters. But since each pair of raters, practically, knows well and can rate only a limited number of the same students, a generalizability or intra-class correlation coefficient can solve the problem. In this procedure, one looks for a component of variance to obtain ratio variances which are true variations being compared to error variations. A generalized analysis of variance (GENOVA), a computer program for generalizability theory, was used to obtain the generalizability coefficient (Brennan, 1983).

Jordanian Scores Versus American Scores

A t-test was used to test for differences between the mean total score for each diagnostic group across all symptom areas of the Jordanian sample on the Jordanian version of the ABC and the mean total score of the diagnostic groups across all symptom areas of the American original standardization study.

Limitations of the Study

Based upon the design, the procedures, and the instrument used in this study, the results are subject to the following limitations:

1. the accuracy of obtaining an equivalent Jordanian (Arabic) translation for the original American ABC,
2. the relatively small number of subjects used in the study,
3. the accuracy of diagnosis of the groups used in the study,
4. the selection procedures used to obtain subjects for the study,
5. the cooperation of teachers and persons rating subjects in the study, and
6. the ability of the statistical procedures used for analyzing the data obtained.

CHAPTER IV

RESULTS

The purpose of this study was to develop a Jordanian adaptation of the Autistic Behavior Checklist (ABC). The data collected after administering the Jordanian version of the ABC to the subjects of the study were analyzed. The data analysis was directed toward three main issues: validity of the Jordanian version of the ABC, reliability of the Jordanian version, and the differences between the scores on the Jordanian version and the original American standardization study. The total score of the Jordanian version of the ABC as well as the five symptom areas were considered when reporting the results.

Validity

The scores of the three diagnostic groups in the first sample (autistic, severely mentally retarded, and non-handicapped persons) were calculated. Table 2 consists of means and standard deviations of the total scores and the subscores of the symptom areas of the three groups. The means of the total scores and subscores were plotted in a profile as shown in Figure 1.

Table 2
Means and Standard Deviations of the Total Scores and the Symptom Areas for the Autistic, Severely Mentally Retarded, and Non-Handicapped Groups

		<u>S y m p t o m A r e a s</u>				
<u>Groups</u>	<u>Total Scores</u>	<u>Sensory</u>	<u>Relating</u>	<u>Body and Object Use</u>	<u>Language</u>	<u>Social and Self-Help</u>
<u>Autistic</u>						
$\bar{X}$	123.81	17.84	31.66	32.91	23.41	18.00
Sx	13.21	4.41	3.31	3.52	5.50	4.03
<u>SMR</u>						
$\bar{X}$	37.47	4.79	10.32	7.74	7.26	7.37
Sx	12.89	3.57	6.24	4.96	4.30	4.38
<u>Non-Handicapped</u>						
$\bar{X}$	1.81	.31	.29	.43	.26	.52
Sx	2.24	.78	.89	.83	.83	1.06

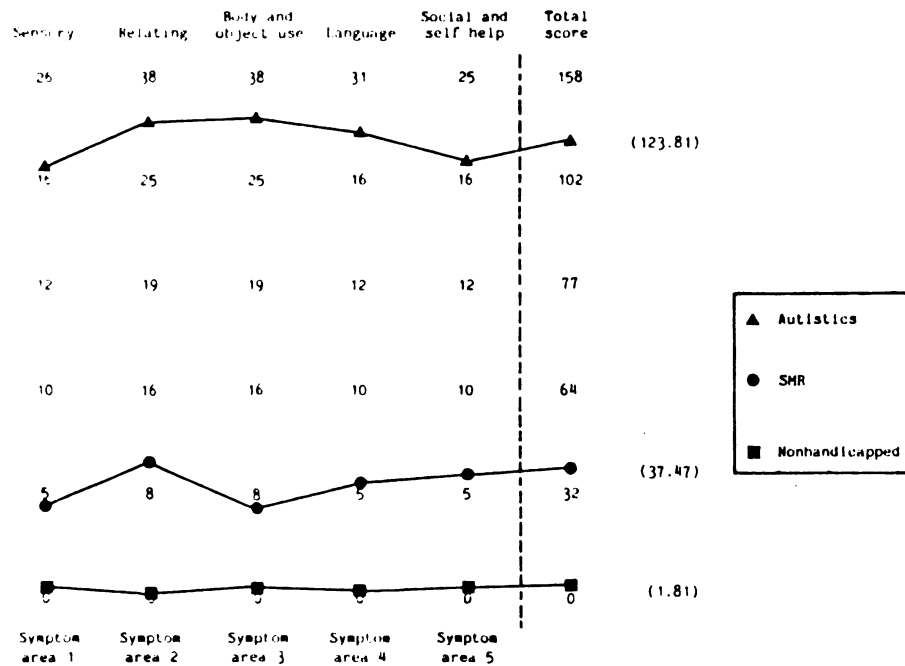


Figure 1. Profile chart of mean symptom area scores and total scores for each diagnostic group.

No mean total scores or symptom area scores were overlapping among the three diagnostic groups. One-way analysis of variance (ANOVA) was used to differentiate among the mean total scores of the three diagnostic groups. ANOVA was also used to differentiate among mean scores of each of the symptom areas of the ABC (sensory, relating, body and object use, language, and social and self-help). Table 3 contains the results of the ANOVA mean total scores of the three diagnostic groups on the Jordanian version of the ABC.

Table 3
ANOVA Results Comparing Diagnostic Groups by Total Scores

<u>Groups</u>	<u>N</u>	<u>$\bar{X}$</u>	<u>Sx</u>	<u>F</u>	<u>P(F)</u>
Autistic	32	123.81	13.21	1286.9	.0000*
SMR	38	37.47	12.89		
Non-handicapped	42	1.81	2.24		

*significant at the alpha = .05 level

The results indicated that there were significant differences in the total scores among the three groups.

Tables 4 through 8 contain the results of ANOVA mean scores of each of the symptom areas across the three groups.

Table 4
ANOVA Results Comparing Diagnostic Groups by Mean Subscore: Sensory

<u>Groups</u>	<u>N</u>	<u>$\bar{X}$</u>	<u>Sx</u>	<u>F</u>	<u>P(F)</u>
Autistic	32	17.84	4.41	288.760	.0000*
SMR	38	4.79	3.57		
Non-handicapped	42	.31	.78		

*significant at the alpha = .05 level

Table 5
ANOVA Results Comparing Diagnostic Groups by Mean Subscore: Relating

<u>Groups</u>	<u>N</u>	<u>$\bar{X}$</u>	<u>Sx</u>	<u>F</u>	<u>P(F)</u>
Autistic	32	31.66	3.31	546.42	.0000*
SMR	38	10.32	6.24		
Non-handicapped	42	.29	.89		

*significant at the alpha = .05 level

Table 6
ANOVA Results Comparing Diagnostic Groups by Mean Subscore: Body and Object Use

<u>Groups</u>	<u>N</u>	<u>$\bar{X}$</u>	<u>Sx</u>	<u>F</u>	<u>P(F)</u>
Autistic	32	32.91	3.52	835.24	.0000*
SMR	38	7.74	4.96		
Non-handicapped	42	.43	.83		

*significant at the alpha = .05 level

Table 7
ANOVA Results Comparing Diagnostic Groups by Mean Subscore: Language

<u>Groups</u>	<u>N</u>	<u>$\bar{X}$</u>	<u>Sx</u>	<u>F</u>	<u>P(F)</u>
Autistic	32	23.41	5.50	328.60	.0000*
SMR	38	7.26	4.30		
Non-handicapped	42	.26	.83		

*significant at the alpha = .05 level

Table 8
ANOVA Results Comparing Diagnostic Groups by Mean Subscore: Social and Self-Help

<u>Groups</u>	<u>N</u>	<u>$\bar{X}$</u>	<u>Sx</u>	<u>F</u>	<u>P(F)</u>
Autistic	32	18.00	4.03	240.61	.0000*
SMR	38	7.37	4.83		
Non-handicapped	42	.52	1.06		

*significant at the alpha = .05 level

The results of Tables 4 through 8 indicated that there were significant mean differences among the three diagnostic groups across all symptom areas (subscores).

A Scheffe statistic as a post-hoc procedure was used to compare mean total scores and mean symptom areas among the three diagnostic groups. The Scheffe comparisons were used for the purpose of identifying where statistical differences were specifically located. Table 9 contains the results of the Scheffe contrasts on the total score across the three diagnostic groups.

Table 9
Scheffe Contrasts (Mean Differences) for Total Scores Across Groups

<u>Group</u>	<u>SMR</u>	<u>Non-Handicapped</u>
Autistic	86.34*	122.00*
SMR	--	35.66*

*significant at the alpha = .05 level

The results indicated that the three diagnostic groups were significantly different from each other. Table 10 contains the results of Scheffe contrasts on the subscores (symptom areas) across the three diagnostic groups.

Table 10
Scheffe Contrasts (Mean Differences) by All Symptom Areas (Subscores) Across Groups

<u>Group</u>	<u>Group and Subscore</u>									
	<u>Sensory</u>		<u>Relating</u>		<u>Body and Object Use</u>		<u>Language</u>		<u>Social and Self-Help</u>	
	<u>SMR</u>	<u>N-H</u>	<u>SMR</u>	<u>N-H</u>	<u>SMR</u>	<u>N-H</u>	<u>SMR</u>	<u>N-H</u>	<u>SMR</u>	<u>N-H</u>
Autistic	13.05	17.53	21.35	31.37	25.61	32.48	16.14	23.14	10.63	17.48
SMR		4.48		10.03		7.31		7.00		6.84

All numbers are significant at the alpha = .05 level.

These results indicated that all three diagnostic groups were significantly different from each other across all subscores (symptom areas) of the checklist.

Discriminant analysis was used to investigate the effectiveness of the Jordanian ABC to discriminate among the three diagnostic groups: autistics, SMR, and non-handicappers. Table 11 contains the classification results by the total scores.

Table 11
Classification Results by Total Score

<u>Actual Group</u>	<u>No. Cases</u>		<u>Predicted Group Membership</u>		
			<u>1</u>	<u>2</u>	<u>3</u>
Autistic	1	32	32 100.0%	0 0.0%	0 0.0%
SMR	2	38	0 0.0%	38 100.0%	0 0.0%
Non-Handicapped	3	42	0 0.0%	0 0.0%	42 100.0%

Percent of "grouped" cases correctly classified: 100.0%

The results of the discriminant analysis indicated that the ABC total scores separate the three diagnostic groups effectively.

Tables 12 through 16 contain results of the classification by each subscore.

Table 12
Classification Results by Subscore: Sensory

<u>Actual Group</u>	<u>No. Cases</u>		<u>Predicted Group Membership</u>		
			<u>1</u>	<u>2</u>	<u>3</u>
Autistic	1	32	32 100.0%	0 0.0%	0 0.0%
SMR	2	38	3 7.9%	28 73.7%	7 18.4%
Non-Handicapped	3	42	0 0.0%	5 11.9%	37 88.1%

Percent of "grouped" cases correctly classified: 86.61%

Table 13
Classification Results by Subscore: Relating

<u>Actual Group</u>	<u>No. Cases</u>		<u>Predicted Group Membership</u>		
			<u>1</u>	<u>2</u>	<u>3</u>
Autistic	1	32	32 100.0%	0 0.0%	0 0.0%
SMR	2	38	0 0.0%	30 78.9%	8 21.1%
Non-Handicapped	3	42	0 0.0%	0 0.0%	42 100.0%

Percent of "grouped" cases correctly classified: 92.86%

Table 14
Classification Results by Subscore: Body and Object Use

<u>Actual Group</u>	<u>No. Cases</u>		<u>Predicted Group Membership</u>		
			<u>1</u>	<u>2</u>	<u>3</u>
Autistic	1	32	32 100.0%	0 0.0%	0 0.0%
SMR	2	38	0 0.0%	31 81.6%	7 18.4%
Non-Handicapped	3	42	0 0.0%	0 0.0%	42 100.0%

Percent of "grouped" cases correctly classified: 93.75%

Table 15
Classification Results by Subscore: Language

<u>Actual Group</u>	<u>No. Cases</u>		<u>Predicted Group Membership</u>		
			<u>1</u>	<u>2</u>	<u>3</u>
Autistic	1	32	30 93.8%	2 6.3%	0 0.0%
SMR	2	38	0 0.0%	34 89.5%	4 10.5%
Non-Handicapped	3	42	0 0.0%	0 0.0%	42 100.0%

Percent of "grouped" cases correctly classified: 94.54%

Table 16
Classification Results by Subscore: Social and Self-Help

<u>Actual Group</u>	<u>No. Cases</u>		<u>Predicted Group Membership</u>		
			<u>1</u>	<u>2</u>	<u>3</u>
Autistic	1	32	30 93.8%	2 6.3%	0 0.0%
SMR	2	38	0 0.0%	34 89.5%	4 10.5%
Non-Handicapped	3	42	0 0.0%	0 0.0%	42 100.0%

Percent of "grouped" cases correctly classified: 94.54%

The classification results of subscores indicated that all subscores were found to separate the three diagnostic groups. There was a slight difference between the subscores in classifying the group. Subscores in the sensory, relating, and body and object use were found to separate the autistic group from the other two groups perfectly. Language and social and self-help subscores had somewhat lower predicted classification.

Reliability

To identify internal consistency reliability for the Jordanian version of the ABC, the data on 80 subjects (reliability data) were used. For accurate results, coefficient alpha was calculated twice, once for the first rating of the 80 students and the other for the second rating. The results of the first rating were .834 and for the second .808. These results indicated that the Jordanian version of the ABC had relatively high internal consistency reliability.

Inter-rater reliability was obtained by calculating the percentage of agreement between raters. The mean percentage of raters' agreement without item weight was 95.95%. The mean percentage of raters' agreement with item weight was 96.11%. These results indicated that the Jordanian version of the ABC has a high inter-rater reliability.

A generalizability or intra-class correlation coefficient was calculated. Table 17 contains the estimates of variance components.

Table 17
Estimates of Variance Components

<u>Effect</u>	<u>DF</u>	<u>Estimated Variance Components</u>	<u>Standard Error</u>
P	7	46.01	36.85
S:P	72	306.33	51.23
T:P	8	.50	.71

ST:P	72	10.51	1.73

P = pair of teachers			
S = student			
T = teacher			

Assuming that higher interaction terms were negligible, then the generalizability coefficient (ratio of variances which would be true variation compared to error variation, analogous to a reliability coefficient) was equal to .965. This result indicated that the Jordanian version of the ABC had a very high generalizability or intra-class correlation coefficient. The results suggested that the variances of the subjects' scores were mostly related to their true variation, not to variation among teachers within a pair or among pairs of teachers (error).

Jordanian Scores Versus American Scores

A t-test was used to compare the scores on the Jordanian version of the ABC with the original American results. This test was calculated for the total score and each subscore (symptom area) across the three diagnostic groups. Table 18 contains the results of the comparison for the autistic group in total scores and the subscores.

Table 18
Comparisons of Jordanian and American Scores for the Autistic Group

<u>Score</u>	<u>Com- parison</u>	<u>Jordanian</u>	<u>American</u>	<u>T for Mean Difference</u>
Total score	M	123.8	77.5	16.6*
	SD	13.2**	20.0**	
	N	32	172	
Sensory	M	17.8	12.7	5.3*
	SD	4.4	5.2	
	N	32	172	
Relating	M	31.7	24.0	9.2*
	SD	3.3**	7.8**	
	N	32	172	
Body and Object Use	M	32.9	15.8	19.3*
	SD	3.5**	8.3**	
	N	32	172	
Language	M	23.4	12.2	8.8*
	SD	5.5	6.8	
	N	32	172	
Social and Self-Help	M	18.0	12.8	4.9*
	SD	4.0	5.7	
	N	32	172	

*significant mean differences at alpha = .05 level

**significant variance differences at alpha = .05 level

NOTE: the appropriate t-test was used, depending upon whether the variances were equal or unequal

The results indicated that there were significant differences between the mean scores of the Jordanian autistic group and the autistic group of the original standardization study across all symptom areas.

Table 19 contains the results of the comparison for the SMR group in total score and subscores.

Table 19
Comparisons of Jordanian and American Scores for the SMR Group

<u>Score</u>	<u>Com- parison</u>	<u>Jordanian</u>	<u>American</u>	<u>T for Mean Difference</u>
Total score	M	37.5	44.0	-2.8*
	SD	12.9**	18.9**	
	N	38	423	
Sensory	M	4.8	7.0	-3.11*
	SD	3.5	4.2	
	N	38	423	
Relating	M	10.3	14.3	-3.11*
	SD	6.2	7.7	
	N	38	423	
Body and Object Use	M	7.7	7.2	.7
	SD	4.7	5.2	
	N	38	423	
Language	M	7.3	7.3	.0
	SD	4.3	3.5	
	N	38	423	
Social and Self-Help	M	7.4	4.4	1.3
	SD	4.4	3.6	
	N	38	423	

*significant mean differences at alpha = .05 level

**significant variance differences at alpha = .05 level

NOTE: the appropriate t-test was used, depending upon whether the variances were equal or unequal

The results indicated that there were significant differences between the mean scores of the Jordanian SMR group and the SMR group of the original American standardization study in the mean total score and two subscores--sensory and relating. However, no significant differences were found in the mean scores for the other subscores--body and object use, language, and social and self-help.

Table 20 contains the results of comparison for the non-handicapped group in total scores and subscores.

Table 20
Comparisons of Jordanian and American Scores for the Non-Handicapped Group

<u>Score</u>	<u>Com- parison</u>	<u>Jordanian</u>	<u>American</u>	<u>T for Mean Difference</u>
Total score	M	1.8	3.9	-3.4*
	SD	2.2**	5.1**	
	N	42	100	
Sensory	M	.3	.7	-1.6
	SD	.8**	1.8**	
	N	42	100	
Relating	M	.3	1.0	-2.8*
	SD	.9**	2.0**	
	N	42	100	
Body and Object Use	M	.4	.5	- .6
	SD	.8	.9	
	N	42	100	
Language	M	.3	.6	-1.4
	SD	.8**	1.6**	
	N	42	100	
Social and Self-Help	M	.5	1.2	-2.9*
	SD	1.1	1.7	
	N	42	100	

*significant mean differences at alpha = .05 level

**significant variance differences at alpha = .05 level

NOTE: the appropriate t-test was used, depending upon whether the variances were equal or unequal

The results indicated that there were significant differences between the mean scores of the Jordanian non-handicapped group and the non-handicapped group of the original American standardization study in the mean total scores and two subscores--relating and social and self-help. However, no significant differences were found in the mean scores of the other three subscores: sensory, body and object use, and language.

CHAPTER V

SUMMARY AND DISCUSSION

Summary

The purpose of this study was to adapt and validate the Autism Behavior Checklist (ABC) for use in the country of Jordan. Since autism is one of the most neglected groups of handicapping conditions in Jordan, autistic persons are frequently not properly identified and differentially diagnosed from other handicapping conditions. The identification of a handicapped person as being autistic is considered an essential first step for the provision of needed psychological and educational services. Since no screening or identification instrument for autistic persons is available in Jordan, the development of such an instrument is considered essential.

Autism is a behaviorally defined syndrome which should be diagnosed and described through the specification of behavioral characteristics. Accordingly, most methods for diagnosing the autistic population which have been developed include behavior checklists and observational keys. In the United States, several instruments have been developed for the purpose of screening and identifying autistic persons, many of which could be adapted to the Jordanian culture. The study consisted the adaptation of the Autism Behavior Checklist which is a major component of a large, comprehensive instrument entitled the Autism Screening Instrument for Educational Planning (ASIEP). The ABC was selected for the following reasons: (a) the ABC's categories include assessments of behaviors which relate to the most widely used and accepted definition of autism, (b) the items of the ABC were selected from a variety of influential

sources, (c) categories of the ABC cover many areas reported in the literature as essential in diagnosing autism, and (d) the behaviors in the checklist are statistically weighted with more weight given to items that are more predictive of autism.

The first step of the adaptation process was obtaining an equivalent Arabic translation version of the ABC. In this process, the items of the ABC were translated directly from English to the Arabic language, and then the Arabic version was back-translated to the English language. Both the Arabic translated version and the original version were reviewed, and no content differences were noted.

A pilot study was conducted for the Jordanian adaptation of the ABC before the checklist was administered to the subjects of the study. Five special education teachers reviewed the pilot version of the ABC and indicated that the directions and individual items were clear. The pilot version of the ABC was then determined to be ready for administration to the subjects of the study.

Subjects in the study included 192 individuals diagnosed as autistic, severely mentally retarded, moderately and mildly mentally retarded, or non-handicapped. This number included 113 males and 79 females whose age range was four to 18 years, with a mean age of 9.39 years. A total of 142 subjects were students enrolled in schools for the mentally retarded or care-homes in the cities of Amman, Zarka, and Irbid, Jordan; 42 subjects were students enrolled in regular schools in Amman and Zarka; and eight individuals were clients in psychiatric clinics in Amman.

For the purpose of data analysis, two groups of subjects were selected and treated differently to obtain validity or reliability data. The sample used to collect validity data consisted of 112 individuals, including 32 autistic persons, 38 severely mentally retarded students, and 42 non-handicapped students. This sample included 70 males and 42 females. The age range was four to 18 years,

with a mean age of 8.96 years. The reliability data set consisted of 80 students from several schools for the mentally retarded. It included 43 males and 37 females with an age range of five to 15 years and a mean age of 9.98 years.

The equivalent Jordanian (Arabic) translated version of the ABC was administered to all subjects of the study. The administration procedures included completion of the checklist by teachers or parents of the subjects.

Data analysis for the study included the establishment of validity and reliability for the Jordanian version of the ABC and the comparison of the results of those measures with the results of the original standardization study. To identify validity, one-way analysis of variance (ANOVA) was used to test for differences among the means of the three diagnostic groups (autistic, severely mentally retarded, and non-handicapped) across each of the symptom areas of the checklist (sensory, relating, body and object use, language, and social and self-help). A Scheffe contrast was also used as a type of post-hoc multiple comparison when the F-value was found to be statistically significant. Discriminant analysis was used to investigate the ability of the checklist to separate the three diagnostic groups across each of the symptom areas.

Reliability was determined using a reliability data set. Coefficient alpha was used to identify the internal consistency reliability of the instrument, and inter-rater agreement was used to identify inter-rater reliability of the instrument. A generalizability or intra-class correlation coefficient was also used.

The results of this study were compared with the results of the original standardization study. A t-test was used to test for differences between the mean total score of each diagnostic group across all symptom areas.

The major findings of the study were the following.

1. ANOVA results indicated that there were significant differences in the total score and the subscores across the three diagnostic groups.
2. Scheffe results indicated that the three diagnostic groups were significantly different from each other by total scores as well as all subscores.
3. Discriminant analysis results indicated that the total score of the Jordanian version separates the three diagnostic groups effectively (100%). Discriminant analysis results of the subscores indicated that they can predict the three diagnostic group's membership from 86.61% to 94.54%.
4. Internal consistency reliability using coefficient alpha was .834 and .808.
5. Inter-rater reliability results indicated that the mean percentage of agreement between raters without using item weight was 95.95%. The mean percentage of rater agreement using item weight was 96.11%.
6. The generalizability or intra-class correlation coefficient was .965.
7. There were significant differences between the mean scores of the Jordanian autistic group and the autistic group of the original American standardization study across all symptom areas.
8. There were significant differences between the mean scores of the Jordanian severely mentally retarded group and the severely mentally retarded group of the original standardization study in

mean total score and two subscores (sensory and relating). No significant differences were found for other subscores.

9. There were significant differences between the mean scores of the Jordanian non-handicapped group and the non-handicapped group of the original American standardization study in the mean total scores and two subscores (relating and social and self-help). No significant differences were found in the mean scores of other subscores.

Discussion

Establishing a valid and reliable Jordanian version of the ABC was the main purpose of the present study. In order to adapt this instrument for the Jordanian culture, the first step was to translate the ABC items from the English to the Arabic language. The next step was to determine the validity and reliability of the translated version. The last step was to compare results of this study to the results of the original American standardization study.

Developing an equivalent, translated version of material for the purpose of cross-cultural research is unusually complicated because of language and cultural factors. Materials differed from each other, however, in terms of the degree of difficulty in translation. Since the ABC items consist of behaviors which can be observed and operationally defined, it was possible to obtain an equivalent Arabic translated version. While it was difficult to match some English words with their exact equivalents in Arabic, content equivalence was achieved.

The results of this study, through the use of a variety of statistic procedures, demonstrated that the Jordanian version of the ABC was both valid and reliable. Inspection of Table 2 and Figure 1 (page 48) indicate that the mean total and subscores of the three diagnostic groups were significantly different

from each other. The significant differences among the three diagnostic groups were determined through the use of one-way analysis of variances (ANOVA). The results of Scheffe contrasts for the mean total score and subscores indicated that all three diagnostic groups were different from each other.

Classification results, using discriminant analysis, indicated clearly that the Jordanian version of the ABC mean total score separates the three diagnostic groups effectively (100%). It should be noted, however, that even though the separation among subscores was relatively high, they were not perfect (86.61 -94.54%). This result justifies using the whole instrument instead of using parts of it. Language and social and self-help subscores had the same percentage of classification (94.54%). It could be concluded that using one of these would be sufficient to predict group membership. In general, discriminant analysis results support and go along with the results of the ANOVA and Scheffe post-hoc comparisons.

Reliability results were obtained through using different measures. All the results obtained indicated that the Jordanian version of the ABC is reliable. Internal consistency reliability, using coefficient alpha, was .834 or .808. This is relatively high, but it could be higher since the reliability sample used was a relatively homogeneous group which maintained a small range of scores.

The percentage of agreement among raters both without using item weight and with item weight were high (95.95 - 96.11%) and close to each other. Although inter-rater agreement using item weight was justified, since the weight of items contributes to the total score, it could be misleading. For instance, two raters may obtain 100% agreement between total scores while they might be totally different.

The use of a generalizability or intra-class correlation coefficient was another procedure conducted to determine the reliability of the Jordanian

version of the ABC. The high generalizability coefficient (.965) supported previous indications regarding inter-rater reliability.

The findings of comparing the Jordanian results with the original American standardization study for the three diagnostic groups indicated significant differences in mean total scores. The Jordanian autistic group obtained a very high mean total score (123.2) compared to the mean total score for the autistic group in the original study (77.5). This high mean cannot be explained only by the ability of the instrument to discriminate among the diagnostic groups; the fact that the Jordanian autistic subjects were low-functioning autistics who displayed active symptoms must also be taken into consideration. If the Jordanian sample had included higher functioning autistic individuals, the mean total score would likely have been lower. In addition to mean total score differences, all subscores of the Jordanian autistic subjects were significantly different from the scores reported for the original study.

The Jordanian severely mentally retarded mean total score and two mean subscores were also significantly different from mean scores reported for the severely mentally retarded group used in the original study. Similar differences were noted for the Jordanian non-handicapped group. These differences may be due to the small number of subjects in the Jordanian severely mentally retarded and non-handicapped groups.

Implications and Recommendations

Taking into consideration the limitations of the study (accuracy of the Arabic translated version, small number of subjects, and accuracy of the diagnosis of the groups), the results of this study would suggest the following implications and recommendations for future research.

1. An equivalent Jordanian (Arabic) translated version of the ABC was achieved.
2. The Jordanian version of the ABC appears to be valid and reliable; therefore, it can be used with confidence as a screening tool to identify Jordanian autistic persons.
3. It is recommended that a future standardization study be conducted which would use more and other diagnostic groups.
4. It is recommended that future research efforts be devoted to the adaptation of the entire ASIEP to develop a complete assessment instrument for autistic persons.

APPENDIX A

THE ORIGINAL AMERICAN VERSION OF THE AUTISTIC BEHAVIOR CHECKLIST (ABC)

AUTISM BEHAVIOR CHECKLIST

Student's Name _____
 Date _____
 Examiner _____

INSTRUCTIONS: Circle the number to indicate the items that most accurately describe the child.

	Sensory 1	Relating 2	Body and Object Use 3	Language 4	Social and Self-Help 5					
Whirls self for long periods of time			4		2					
Learns a simple task but "forgets" quickly		4								
Child frequently does not attend to social/environmental stimuli				1						
Does not follow simple commands which are given once (sit down, come here, stand up)			2							
Does not use toys appropriately (spins tires, etc.)										
Poor use of visual discrimination when learning (fixates on one characteristic such as size, color or position) ?	2									
Has no social smile		2								
Has pronoun reversal (you for I, etc.)				3						
Insists on keeping certain objects with him/her			3							
Seems not to hear, so that a hearing loss is suspected	3									
Speech is atonal and arrhythmic				4						
Rocks self for long periods of time			4							
Does not (or did not as a baby) reach out when reached for		2								
Strong reactions to changes in routine/environment					3					
Does not respond to own name when called out among two others (Joe, Bill, Mary)				2						
Does a lot of lunging and darting about, interrupting with spinning, toe walking, flapping, etc.			4							
Not responsive to other people's facial expressions/feelings		3								
Seldom uses "yes" or "I"				2						
Has "special abilities" in one area of development, which seems to rule out mental retardation					4					
Does not follow simple commands involving prepositions ("put the ball on the box" or "put the ball in the box")				1						
Sometimes shows no "startle response" to a loud noise (may have thought child was deaf)	3									
Flaps hands			4							
Severe temper tantrums and/or frequent minor tantrums					3					
Actively avoids eye contact		4								
Resists being touched or held		4								
Sometimes painful stimuli such as bruises, cuts and injections evoke no reaction	3									
Is (or was as a baby) stiff and hard to hold		3								
Is flaccid (doesn't cling) when held in arms		2								
Gets desired objects by gesturing				2						
Walks on toes			2							
Hurts others by biting, hitting, kicking, etc.					2					
Repeats phrases over and over				3						
Does not imitate other children at play		3								
Often will not blink when a bright light is directed toward eyes	1									
Hurts self by banging head, biting hand, etc.			2							
Does not wait for needs to be met (wants things immediately)					2					
Cannot point to more than five named objects				1						
Has not developed any friendships		4								
Covers ears at many sounds	4									
Twirls, spins and bangs objects a lot			4							
Difficulties with toilet training					1					
Uses 0-5 spontaneous words per day to communicate wants and needs				2						
Often frightened or very anxious		3								
Squints, frowns or covers eyes when in the presence of natural light	3									
Does not dress self without frequent help					1					
Repeats sounds or words over and over				3						
"Looks through" people		4								
Echoes questions or statements made by others				4						
Frequently unaware of surroundings, and may be oblivious to dangerous situations					2					
Prefers to manipulate and be occupied with inanimate things					4					
Will feel, smell and/or taste objects in the environment			3							
Frequently has no visual reaction to a "new" person	3									
Gets involved in complicated "rituals" such as lining things up, etc.			4							
Is very destructive (toys and household items are soon broken)			2							
A developmental delay was identified at or before 30 months of age					1					
Uses at least 15 but less than 30 spontaneous phrases daily to communicate				3						
Stares into space for long periods of time	4									
TOTALS	1	+	2	+	3	+	4	+	5	=

APPENDIX B

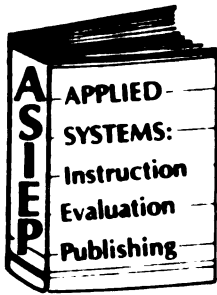
THE JORDANIAN TRANSLATED VERSION OF THE AUTISTIC BEHAVIOR CHECKLIST (ABC)

AUTISM BEHAVIOR CHECKLIST

Social and Self-Help	Language	Body and Object Use	Relating	Sensory	الاسم :
					العمر :
					التاريخ :
					الشخص :
					القاص :
					تعليمات : ضع دائرة حول الرقم المقابل للعبارة التي تصف سلوك الطفل بكل دقة .
					=====
					يدور حول نفسه لفترات طويلة من الوقت
					يتعلم مهارات سهلة ولكنه يتساها بسرعة
					في كثير من الاحيان لا ينتبه الطفل الى المثيرات الاجتماعية او المثيرات في البيئة
					لا يتفقد اوامر بسيطة اذا اُعطيت له لمرة واحدة مثل (اجلس، نعال، قم)
					لا يلعب يلعب الاطفال بشكل مناسب مثل (عدوير اولف مجلاتها ... الخ)
					استعمال التمييز البصري عند التعلم ضعيف (يثبت عند صف واحد كالحجم واللون او الوضعيه)
					ليس عنده ابتسامة اجتماعيه
					يمكس الضمائر في حديثه (يستخدم انت بدل أنا ... الخ)
					يصر أن يحتفظ بأشياء معينة عنده
					يدوا انه لا يسمع، حتى انه يشك بأن لديه نقص في السمع
					كلامه خال من النغم او الايقاع
					يورجح جسمه لفترات طويلة من الوقت
					لا يد ذراعيه عند ما يمد احد هم له ذراعيه (اولم يفعل ذلك عندما كان طفلا)
					يبدى ردود فعل شديده للتغيرات في الروتين او في البيئة التي حوله
					لا يستجيب لاسمه اذا نادى بين اسمي شخصين آخرين مثل (احمد ، احمد ، وليد)
					كثيرا ما يندفع في الجري كالسهم ثم يقف فجأة ويدور حول نفسه او يمشي على رؤوس اصابع قدميه أو
					يورجح جسمه
					غير حساس لتعبير وجوه الآخرين او مشاعرهم
					نادرا ما يستعمل كلمة " نعم " او كلمة " آنا "
					لديه قدرات خاصه في احد مجالات نموه، فيبدو انها تستند كونه متعلقا غلبا
					لا يتفقد اوامر بسيطة تتضمن حروف الجر مثل (ضع الكره على الصندوق ، او ضع الكره في الصندوق
					احيانا لا تظهر عليه استجابة الغزع او الحفول للصوت العالي اما يجعلها شك بأنه اهم
					يزحف بيديه
					عادة ما نصيبه نوبات شديده من حدة الطبع او نوبات حفيقه متكرره ، او كلاهما
					يتجنب جاهدا أن يلتقي بصره بصر احد ما
					يقاوم ان يحمله أو أن يلمسه احد
					لا تظهر عليه احيانا ردود فعل للمثيرات المؤلمه كالرضوض والحروق او الحف " سحق دواء "
					يتصلب فيصعب حمله (او كان كذلك عندما كان طفلا صغيرا)
					يرتخي حين يحمله أحد بين ذراعيه
					يستعمل الاشارة في الحصول على الأشياء التي يريد ها
					يمشي على اصابع قدميه
					يؤذي الآخرين بعنقه او بصرهم او برفسهم ... الخ

APPENDIX C

APPROVAL LETTER FROM ASIEP TO USE THE ABC



ASIEP Education Company, 3216 N.E. 27th, Portland, Oregon 97212 telephone: (503) 281-4115

March 5, 1985

Jamil Smadi, Doctoral Candidate
1540-D Spartan Village
East Lansing, MI 48823

Dear Mr. Smadi,

You may use the Autism Behavior Checklist, as published by ASIEP Education Company, Inc., for purposes of your doctoral research study.

All publication, distribution and marketing rights of the Autism Behavior Checklist (in English and Arabic) remain the sole property of ASIEP Education Company.

Sincerely,

David A. Krug, President
ASIEP Education Co., Inc.

P.S. ASIEP would like to have a copy of your research.

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BIBLIOGRAPHY

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