

DEVELOPMENT OF INDEPENDENT BEHAVIOUR
ASSESSMENT SCALE (IBAS)
AND CONSTRUCTION OF NORMS FOR USE IN
BANGLADESH

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JUNE 1997

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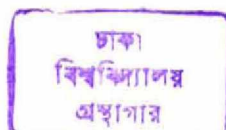
UNIVERSITY OF DHAKA

The undersigned certify that they have read the thesis entitled DEVELOPMENT OF INDEPENDENT BEHAVIOUR ASSESSMENT SCALE (IBAS) AND CONSTRUCTION OF NORMS FOR USE IN BANGLADESH, submitted by Shirin Zaman in partial fulfillment of the requirements for the degree of Doctor of Philosophy and recommend to the University of Dhaka for its acceptance.

382465

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ACKNOWLEDGEMENT

I wish to acknowledge and express my sincere appreciation to all the people who contributed to the completion of this research.

A sincere appreciation is extended to Dr. Sultana S. Zaman, Professor of Psychology and Chairman, Department of Special Education, Institute of Education and Research, Dhaka University who served as supervisor for this research and provided guidance throughout the period of working on this research.

A special thanks and appreciation is extended to my co-supervisor Dr. Sultana Banu, Professor, Department of Psychology, Dhaka University for her constant guidance and conscientious reading of the manuscript.

Heartfelt thanks are extended to members of the research team Dr. Zena Stein, Maureen Durkin, Leslie Davidson, Patrick Shrout, Lillian Belmont and Shanta Dixit from Gertrude Sergievsky Center, Columbia University, USA for their contribution in the base study of the present research "Rapid Epidemiological Assessment of Childhood Disability in Bangladesh".

A special appreciation goes to Mr. Quazi Shamsuddin Md. Illyas, Associate Professor, Department of Psychology, Dhaka University for his guidance in the statistical analysis of the data.

A special thanks and appreciation is extended to John Martin of Save the Children - UK for helping in statistical analysis, computer programming of the data and final formatting of this dissertation. I remain indebted to Mrs. Moushumi Martin wife of Mr. John Martin and their only son Wrivu for their co-operation and patience during formatting this dissertation.

A special thanks is also extended to Dr. Maureen Black, Associate Professor of Paediatric Psychology, Maryland School of Medicine, USA for her valuable advice and guidance in writing the dissertation.

A heartfelt thanks are extended to Mr. M.A. Arefeen, Social Worker, Ms Kamrunnagar, Special Education Teacher of Kalyani, Bangladesh Protibondhi Foundation and Ms Lutfi Ara Begum, Ex-teacher of Kalyani for helping in administering the test.

A sincere thank is extended to all the children and mothers who participated as subjects in the present study from all over Bangladesh.

A special appreciation and acknowledgement is extended to Mr. Babul K. Datta for the painstaking effort taken in typing the draft of the dissertation.

A final expression of gratitude is extended to my husband, Dr. Badrul Munir for his patient understanding, encouragement and inspiration which helped me in completing this dissertation.

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ABSTRACT

The purpose of the present study was to develop a scale named "Independent Behaviour Assessment Scale" (IBAS) for measuring the adaptive behaviour or skills required for independent functioning of 2 to 9 year old children of Bangladesh. The scale was developed on the basis of 2 studies conducted in 2 phases.

Phase-I included construction of the items and selection of items through items analysis and Phase-II included determining the reliability, validity and construction of norms.

In the first phase 304 items for the scale were constructed in the form of tasks to be rated on a 4 point scale in the 4 main skill areas - motor, socialization, communication, and daily living activities which were termed as the main scale and 10 sub-skill areas gross motor, fine motor, social interaction, language comprehension, language expression, eating, toileting, dressing, self care and domestic skill within the 4 main skill areas, termed as sub-scales. These tasks if taught would allow the individual child to function independently and adapt in the community according to their age level.

After a thorough scrutiny 82 items were eliminated; the face validity of the remaining 222 items were determined by 5 judges and 188 items were retained. These items were administered on a sample of 154 urban and rural children between 1 to 10 year olds selected from a mixed socio-economic-status to determine item validity. The corrected item-to-total correlation for each item within the 10 sub-scales met the criteria of significance ($P < .05$) to be included in the final scale. The alpha coefficient obtained for the 10 sub-scales ranged from .92 to .97 providing evidence of high internal consistency of the items within each sub-scale. The obtained high variance of the 10 sub-scales ranged from 181.89 to 387.89 were also an indication of the high discriminative ability of the items.

In the 2nd phase the reliability and validity of the scale was determined through administration of the final form of the scale on a sample selected from 1626 children between 2 to 9 year old drawn from a larger sample of a nationwide research on epidemiology of childhood disability. The reliability of the Independent Behaviour Assessment Scale (IBAS) was estimated by test-retest method and inter-rater reliability technique. The test-retest reliability coefficient for the 4-main scales and the full scale at each level ranged from .64 to .99 (N=68). The inter-rater reliability coefficient for all the 4 main scale and the full scale scores at each age level ranged from .64 to .96 (N=46).

The correlation between IBAS and Stanford Binet Intelligence Scale, were found to be low to moderate ranging from .06 to .46 indicating construct validity of IBAS. It was also found that IBAS measures similar traits like Denver Developmental Screening Test and Childhood Disability Questionnaire. A moderate to high correlation ranging from .20 to .56 and .21 to .77 between IBAS and External Validity Questionnaire when rated by community worker and by the psychologist respectively also confirmed the construct validity of the IBAS. The construct validity of the IBAS was further demonstrated by the increase of score with the increase in age and by demonstrating the difference in performance by the contrasted group (normal children and children with disability).

Finally two types of norms were constructed from the scores obtained by 1404 normal sample selected from the 1626 children for the interpretation of the raw scores. Mean (M) and Standard Deviation (SD) of the 4-main scale and 10 sub-scale scores were computed. Percentile ranks were also computed for evaluating the individual child's level of performance in the skills required for independent functioning.

CHAPTER ONE

INTRODUCTION

Due to limited research in the area of disability in developing countries reliable statistical data on the prevalence of disabled persons in general and mentally retarded person in particular are not available. However, the magnitude of the problem could be deduced from global estimate available through international organization.

According to the estimate of World Health Organization (WHO) one out of 10 of the World's Population an estimate of 514 million people are born or acquire a disability. It has also been estimated that 80% of the World's disabled population live in developing countries of which an estimated 150 million are children (UNICEF REPORT, 1993).

Poverty and its social manifestation - illiteracy, inadequate nutrition, poor sanitation, faulty birth practices, inadequate treatment of infections and communicable diseases, accidents, inequitable distribution of social services are the major causes of disability (Marfo, 1986). All these conditions exist in Bangladesh as a result the picture of the disabled children is pathetic.

Very little services have been developed for the care, education, training, welfare and rehabilitation of the disabled population in Bangladesh which constitute a big force for social progress. To provide appropriate services for any categories of disabled children some with severe problems, the following goals should be attained:

- (a) Identification of high risk children, children with special needs and the special services they require.
- (b) Classification of children with special needs which would help in making decision regarding education of the child and the most appropriate type of programmes suited to the child's needs.

- (c) Drawing up a profile of the child's relative strength and weaknesses with a view to design and implement an intervention programme leading to training and rehabilitation.
- (d) To determine what to teach and the best method for teaching and providing an objective measure of monitoring the progress of the child.
- (e) To develop an 'Individualized Education Programme' which would function like a contract to identify goal objective and timetable for developing services.

To attain the above goals appropriate assessment tools are required. Assessment involves the systematic collection, organization and interpretation of various information about an individual to enable decision about him (Sundberg and Taylor, 1962; Fisks and Pearson, 1970). Assessment further involves the question as to what to assess. The assessment of adaptive behaviour has become increasingly important in recent years as legislation, litigation and professional guidelines have mandated the use of adaptive behaviour instruments for diagnosing and screening a wide variety of disability including mental retardation.

Adaptive behaviour and functional independence refers to an individuals ability to effectively meet social and community expectations for personal independence, maintenance of physical needs and accepted social norms in relation to age, stage of development within the context of the environment where the individual comes from or belongs (Coulter and Morrow, 1978; Grossman, 1977, Harber, 1961 : Meyers, Nihira and Zeltin, 1979). Adaptive behaviour or functional independence is not a static individual attribute, but must be understood within a developmental context. It has been found that the skills and abilities assessed by a test vary with both age and intellectual level to some extent (Grossman, 1983; Lambert, 1979; Leland, 1978; Mercer, 1978; Nihira, 1976). This definition may be influenced by distinctive norms of an individual's racial-ethnic group, since the construct emphasizes the capacity to respond to demands of immediate environment and community. The nature of these demand also changes as an individual progresses through the life cycle. For a young child adaptive behaviour encompasses skills

such as: walking, talking, and basic self-care; for the school age child it reflects the capacity to understand and follow appropriately to the various rules of various settings, including school, community and home; for the adult it includes the ability to hold a job, maintain a house and contribute to family life and so forth.

Therefore, adaptive behaviour is a construct influenced by consideration of place and time. A person judged as "adaptive in one setting may not necessarily be evaluated similarly in another place. Similarly adaptive behaviour at one developmental level are qualitatively different from those at another level. In short adaptive behaviour is relative and dynamic, rather than absolute and static.

The concept of "adaptive behaviour" and "mental retardation" have been intertwined in meaning and use throughout most of the history of special education and their services to people with disabilities (Kanner, 1964, Scheerenberger, 1983). Although initial conceptions and definitions of "mental retardation" relied heavily on the concept of intelligence and ability to learn, actual adjustment difficulties experienced by individuals in one environment or another, were never completely eliminated from consideration. Despite continuing evolution of the terminology and definitional criteria related to mental retardation, the emphasis given to adaptive behaviour difficulties has continued to increase in developed as well as in developing countries (Clarke, & Clarke, 1974; Holman and Bruininks, 1985; Meyers, Nihira and Zetlin 1979).

ADAPTIVE BEHAVIOUR AND THE HISTORY OF MENTAL RETARDATION

A brief historical account of the care and treatment of person with mental retardation, emphasizing the role that the concept of "adaptive behaviour" has played in assessing and treating this group of handicapped persons will contribute to a clearer understanding of adaptive behaviour and greater appreciation of its potential importance in the assessment as well as training of mentally retarded individuals. Therefore a brief account of the historical development of special education needs to be envisaged.

The history of special education for the mentally retarded could be traced to time periods of four stages: Early history (prior to 1820), middle nineteenth century (1820 to 1890), early twentieth century (1890 to 1940s) and middle twentieth century to the present.

EARLY HISTORY OF THE CARE OF THE MENTALLY RETARDED (PRIOR TO 1820).

Review of the literature reveals that in earliest part of 19th Century the society was aware of the existence of severely retarded person but did not understand of the causes of the handicapping condition. Second, mental retardation usually was associated with physical abnormalities, there seemed to be scant recognition of mild retardation (Kanner, 1964). Third, mentally retarded people typically were neglected or abused. Finally, although there were associated attempts to provide care for retarded individuals, these sporadic efforts were unsystematic and typically amounted to little more than the providing shelter and protection from harm for those unable to survive in a harshly competitive society (MacMillan, 1982). During this period persons with mental retardation were found to be a matter of great of concern to general population.

In the early historical period, "adaptive behaviour" might have been used informally to identify those unable to function adequately in the society. Since there was insufficient understanding of and no formal method for assessing intelligence it was reasonable to assume that behavioural deviation and physical deformity were important characteristics, for defining mental retardation. Once an individual was identified, custodial care, rather than rehabilitation and education was provided (MacMillan 1982).

CARE AND EDUCATION OF THE MENTALLY RETARDED DURING MIDDLE NINETEENTH CENTURY (1820 TO 1890).

During the mid nineteenth century American and European Societies still were in the Age of Revolution: The Zeitgeist of this time stressed the role of government in helping citizens maximize their potential growth while safeguarding their inalienable rights to life, liberty and the pursuit of happiness. Related to such sentiment was an optimistic belief in

the malleability of intelligence and an expectation that handicapped persons could achieve normal functioning and integration into society (Bruininks & Warfield, 1978).

A number of individuals exerted a powerful, long lasting effect on the treatment of mentally retarded persons. Among these pioneers in the field of mental retardation were Itard and Seguin of France, Guggenbuhl of Switzerland and Howe of America. Seguin's unwillingness "to wait for medicine to cure the retarded, but rather to give them the benefit of education." (MacMillan, 1982) was shared by each of these leaders.

Although their pioneering work did not reflect on understanding of the medical course of retardation or comprehension of learning characteristics of retarded persons, their effort provided direct service to such people as an exemplary model for treatment programme for a long time (MacMillan, 1982).

In the treatment programme developed by these leaders, we see the central role of "adaptive behaviour" for the first time. Although not specifically identified as such, skills necessary for coping with social demand represented a large part of the content of their training programme (Talbot, 1964). Itard's training of Victor (the wild boy of Aveyron), for example, emphasized the acquisition of skill such as eating with utensils, personal hygiene and social communication. Seguin expanded and systematized many method developed by Itard. Seguin's procedures stressed the importance of direct instruction in sensory motor functioning and "moral education" (Patton, 1986) which included numerous skills that are associated closely with contemporary programme of training social competence and adaptive functioning. Howe established an experimental school whose primary objective was to reintegrate mentally retarded children into the community as productive citizens (Patton, 1986). In each of these model programmes the content of instruction was geared towards the enhancement of pupil's coping skills required for ultimate integration into the wider community. "Adaptive Behaviour" was also used in the middle nineteenth century, as in early historical era, to identify those who are unable to function independently in the society.

CONDITION OF MENTALLY RETARDED PERSON DURING EARLY TWENTIETH CENTURY (1890 TO 1940)

During the 1890 and the 1940's large number of institutions were built for the retarded which were isolated from the communities. At that time public people did not realized that the mentally retarded people could be reintegrated into the community. The population targeted for such cures were severely handicapped people who, we know today are capable of acquiring numerous skills, but are not capable of the kinds of transformation necessary to become 'normal' and fully integrated in the society (Maloney & Ward, 1978). By the end of nineteenth century the public's disillusionment changed to alarm. Increasingly, mentally retarded persons were seen as breeder of mental incompetence and as violent and dangerous to others (Kanner, 1964). Three factors were found to precipitated this state of alarm especially in United States:

(a) Eugenic Movement : Mental retardation came to be viewed as the manifestation of a unitary recessively inherited trait. This view of mental retardation were supported by some studies (e.g. Dugdale, 1975; Goddard, 1912) which postulated that mental retardation resulted exclusively from genetic influences running in families. Consequently a strong eugenic movement started in America with the objective to control feeble mindedness through sterilization and selective breeding procedure.

(b) Immigration : Aggravating the apparent utility of the eugenic movement was the immigration of large number of people from Southeastern Europe in the early 1990's to America. The English, Scandinavians, and German immigrants who earlier predominated were outnumbered by the Italian, Polish, Russian and Jewish immigrants. During that period a public clamour arose for some form of "quality control" over the flow of immigrants, which took the form of a demand for literacy tests. Intelligence testing assumed this function of literacy tests.

(c) Mental Testing : Alfred Binet and Theophile Simon developed a forerunner of the modern intelligence tests. Binet and Simon's 1908 scale was brought to United States by

Goddard, who standardized the instrument on 2000 American children. In America, the mental testing movement quickly gained strong support and was associated with a wide range of test development activities. By 1915 intelligence tests were generally accepted as the most suitable way to identify mentally retarded persons (Kauffman & Payne, 1975).

In 1916 Lewis Terman of Stanford University standardized the 1908 Binet-Simon scale and published the Stanford Binet Intelligence Scale which became the standard against which all other tests of intelligence were compared. The intelligence quotient, or I.Q. (determined by dividing the Mental age by chronological age and multiplying by 100) scores, was introduced which seemed to represent a scientific objective index to identify students who were not benefiting from general education (MacMillan 1982). Widespread use of mental tests like the Stanford-Binet resulted in the establishment of a new category of retardation, known today as mild mental retardation (Patton, 1986).

In this era adaptive behaviour appeared to have a minor role in the identification and treatment of mental retardation. For the first time, identification and labeling of persons as mentally retarded were based primarily, if not exclusively on IQ scores (Robinson and Robinson, 1976). On the basis of these scores, mentally retarded children were removed from educational mainstream. Such removal was believed to facilitate adoption of standard curricula and instructional procedures, thereby permitting school to run more effectively and efficiently (Callahan, 1962).

Children identified as mentally retarded were placed in relatively restrictive settings such as large custodial institution (Robinson & Robinson 1976). If employed at all in the training and education of the mentally retarded children, adaptive behaviour was used narrowly. Educational settings were usually removed from the mainstreaming society that skills required to behave adaptively in them were often very different from skills needed in mainstream culture (Drew, Logan & Hardman, 1984).

MID TWENTIETH CENTURY TO PRESENT - REVIVAL OF POSITIVE ATTITUDE TOWARDS THE MENTALLY RETARDED

In the 1950's great interest were taken for the mentally retarded persons in the Western Societies. This was due to the economic prosperity, parental advocacy, professional enthusiasm and socio-political climate (Hewelt and Forness, 1977).

Economic Prosperity : In the United States after the World War II competition in the labour market was released and individuals previously dependent on society for support no longer viewed as a threat to the middle class for what had been limited financial resources (Farber, 1968). As a result many citizens believed that the federal government should assume greater responsibility for the less advantaged people (MacMillian 1982). National policies reflecting a commitment to the needs of mentally retarded persons were developed. By 1952, 46 state out of 48 had enacted legislation for educating children with mental retardation, which resulted in the development of innumerable and often qualitatively superior training programmes (Patton, 1986).

Parents Movement : Parent of mentally retarded children contributed to the grassroots sentiment that more should be done for handicapped persons. Increased parent activism was related to the past World War II baby boom and advancement in medical technology. The increased birth rate produced a large number of severely mentally retarded children among educated and articulate parents, and improvements in medical technology increased the survival rate and longevity of these severely handicapped children (Farber, 1968). Many parents began to advocate actively for training and rehabilitation service for their children.

Professional Enthusiasm : Increased government support for the education and training of mentally retarded persons generated more programmes and a concomitant need for greater numbers of professionals to work in these newly developed programmes. But there were very few individuals with appropriate training and experience to work in these programmes and there were only a few training programme for the professional (Patton,

1986). To address this personnel shortage, fellowships and grant-in-aid were offered to encourage individuals to train and work in the area of mental retardation (Mayo, 1962).

Training programme for practitioners grew substantially in size and number. Additionally, federal legislation in the U.S. provided support for multidisciplinary research on various facets of retardation, including etiology, method of care and rehabilitation, assessment and learning (Blackhurt and Berdine, 1981).

Sociopolitical Climate : When President Kennedy assumed office in 1961, he seemed to symbolize America's new attitude toward Mental Retardation. Kennedy who had a retarded sister, helped focusing attention on the needs of mentally retarded people. The sociopolitical climate also supported the rights of mentally retarded individuals, since they were viewed as targets of discrimination (Patton, 1986). During the decade following Kennedy's election advocacy group repeatedly went to court to protest the civil rights of mentally retarded citizens (Blackhurt & Berdine, 1981).

In connection with this litigious activity, questions were raised about quality of life for mentally retarded individuals. Litigation and legislation from the late 1950's through early 1970s resulted in a new emphasis on training rather than minimal custodial care, for severely handicapped individuals. This new focus was evident in mandate from the federal government requiring educational programming for all handicapped children (eg P.L. 94-142) and training regiments in state supported residential facilities (PL 94-103). Moreover, these laws required educational and residential agencies to account for the skill level of their clients that is to provide evidence of improvement in skills from one reporting period to the next.

EMERGENCE OF ADAPTIVE BEHAVIOUR AS AN IMPORTANT CONSTRUCT IN MENTAL RETARDATION

During the past 20 years, many parents, practitioners, researchers and court officials have challenged the process used to identify students for inclusion in special classes. Dunn

(1968) was the first person to draw attention to the disproportionately high representation of minority children in public school programme for mentally retarded students. He also charged that this representation was due to widespread use of middle class biased intelligence tests. Although persuasive empirical evidence was yet to be generated to support this assertion (Fuchs; 1985; Jensen, 1980; Reynolds, 1983); Dunn's charge of test bias was supported by a large segment of lay public, several courts, and many professionals. Inclusion of adaptive behaviour as a necessary criterion for the diagnosis of mental retardation was perceived by many as a correction factor, that is, it was viewed as broadening the range of behaviour addressed by traditional tests of intelligence and introducing behaviours that were more sensitive to racial-ethnic differences among sub-groups of the school age population.

Another factor supporting the use of adaptive behaviour measures in assessing intelligence was rejection of a long standing view that social incompetence was entirely due to sub-normal intelligence (eg. Doll, 1953). Traditional acceptance of this belief contributed to a reliance on I.Q. scores as the sole criterion of mental retardation (Leland, 1972). However, in the early 1970s it was acknowledged that many people with I.Q. scores below 70 failed to display any remarkable adaptive impairment (Leland, 1972).

A more recent conceptualization of adaptive behaviour holds that, although it may be related strongly to intelligence, the nature and quality of an individuals behaviour was determined by many other nonintellectual factors (MacMillan 1982). This revised view of adaptive behaviour led to the position that low-intelligence was a necessary, but insufficient indication of mental retardation. Use of adaptive behaviour, in conjunction with a general intelligence test, was seen by many to contribute to a more complete and valid diagnosis of mental retardation.

By 1975 all major definition of retardation included concept such as social competence or social adaptation (Robinson and Robinson, 1976). The current (Grossman, 1983) and previous (1973/1977, 1959/1961) definition of mental retardation by the American

Association on Mental Deficiency (AAMD) states that there must be a deficit of adaptive behaviour "associated with (1959/1961) or "existing concurrently" (1973/1977, 1983) with subaverage general intelligence. Deficit of adaptive behaviour was defined as "significant limitation in an individuals effectiveness in meeting the standard of maturation, learning, personal independence, and/or social responsibility that are expected for his or her age level and cultural group" (Grossman, 1983 p 11).

The age-related nature of adaptive behaviour places the focus of adaptive behaviour deficit in different broad skill area at different age level. Deficit associated with infancy and early childhood include sensorimotor skills, communication skill, self-help skills and socialization. Adaptive behaviour deficits associated with childhood and early adolescence are broadened to include the application of academic skills to daily life, the application of reasoning and judgment to environmental situation, and development of group and interpersonal social skills. At the late adolescence and adult stages of life, adaptive behaviour deficit increasingly are associated with vocational adjustment and performance as well as social adjustment in the community (Grossman, 1983).

Two basic concepts emerged from an analysis of adaptive behaviour deficit defined within these broad age groups. The first is a focus on personal skill development, ranging from early development to the appropriate application of skills in community environment. The second is a focus on social behaviour ranging from early socialization to the adequacy with which social behaviour conform to community expectations. These two concepts personal independence and social responsibilities, are often emphasized as the main component of adaptive behaviour (Grossman, 1983; Meyers et al 1979).

Therefore, by the late 1970's adaptive behavior had emerged as an important construct in mental retardation. It had a formalized role in assessment specially in the identification of mildly handicapped person (Patton, 1986). Moreover, it continued to be an effective means of structuring the content of training and education programme for severely handicapped persons. **Since personal independence and social responsibilities were**

considered as an important component of adaptive behaviour (Grossman, 1983, Meyers et al, 1979) throughout the rest of the sections of this paper adaptive behaviour and independent behaviour would be used synonymously.

Researchers (Keith, Harrison and Ehly 1988) have also suggested that adaptive behaviour has an important effect on academic achievement. This clearly supports the fact that adaptive behaviour is important in making educational decision concerning exceptional children.

One of the main objective of all educational programme for the mentally handicapped is to help the person become socially competent as possible and become as socially acceptable as possible. Therefore, these functional assessments have obvious advantages over I.Q. measures because of their relationship to teaching programme. The I.Q. tests only measure a person's skill against the level of skills which is exhibited by a group of peers (usually defined by age comparison) and provides an indication of a person's intelligence quotient of mental age. However, the finding of these tests cannot be related to a teaching programme (especially for teaching the mentally handicapped) as the test items are not generally selected because of their practical value in developing a person's skills or independence. The test item may provide a good indication of a person's mental age, they may not necessarily provide good indicator of a person's current practical skill (Hughes 1986). In order to obtain reliable information about everyday functioning and social adaptation of handicapped person an assessment of functional/practical skills is needed.

Functional skills fall within the construct of functional competency. Probably due to lack of research in this area, a universally agreed upon definition of the construct is not available, and those which are available are highly unspecific. Some definitions encompass general skill areas (basic skills, living skills, etc) as an indication of a functionally competent person, whereas others concentrate on specific skills, such as: reading, writing and mathematics. Before the 1870s, the construct was synonymous with literacy, in that it was defined once again as the ability to sign one's name. Over the years, the construct has

been expanded into a more complex form. By 1965, the definition assessed by the United States Office of Education (USOE) included the abilities to read, write and count along with a general understanding of everyday life.

Northcutt (1975) has divided functional competency into three levels on the basis of adult performance: **(1)** functional competency is a construct which is meaningful only in a specific societal context, **(2)** it is two dimensional in that a set of specific skills (reading) is applied to a set of general knowledge areas (health) and **(3)** a person is functionally competent only when he/she can meet the requirements existing at a given time.

Functional competency is a dynamic rather than a static state and is related directly with success in adult life. There is an expected repertoire of skills that has to be mastered by an individual to become functionally competent depending on his/her age, developmental stage, and community he/she belong. Much work has been done to delineate the succession of skills acquisition over a person's life span. Havighurst (1972) has provided an extensive list of developmental tasks to be mastered at different developmental stages of the life span of an individual. The underlying implication of Havighurst's developmental tasks is that the timely appearance of the different skills representing a normal behavioural and cognitive growth of the individual.

The items in an adaptive behaviour scale appears like Havighurst's developmental stage. Essentially, such a scale is an ecological inventory of functional skills sequentially drawn up from their first rudimentary indication of their ultimate manifestation in a independent, complex, and adult task. According to Baine (1988) Ecological inventories are used to identify the common daily functional tasks of non-handicapped and handicapped persons, in particular environment, required to perform. The list of the identified tasks forms an ecological inventory. A comprehensive list of functional skills has several uses. Firstly it can be used with children for assessment and diagnostic purposes, as it provides a screening device to distinguish the handicapped individuals from the non-handicapped one. Secondly, inherently extractable from such lists are the curricula for handicapped and

under-privileged individual. The approach in developing instructional programmes is particularly appropriate for group who lack the ability to function adequately as normal adults. In this context, it can be added that the ultimate goal of assessment is the "remediation of perceptual, cognitive, linguistic social and behavioural disorders, as well as related disabilities". (Swanson and Watson, 1982).

Functional skills not only differ in terms of age and gender, but also according to the ecological, socio-economic and cultural characteristics of the geographic area concerned. Therefore, when constructing a scale based on functional skills, it is necessary to keep in mind that even with a minor changes in the community, the scale changes. Although the tendency is to device tests which are applicable to larger populations consisting of varied sub-population, many researchers are coming to the conclusion that each tests measures abilities required for success in the culture in which they are developed (Wing, Prashad, and Verma, 1974; Sattler, 1982). In other words, no test is truly culture fair and in case of adaptive behaviour scales, they are particularly culturally loaded.

REVIEW OF THE MEASURES OF ADAPTIVE BEHAVIOUR

The inclusion of adaptive behaviour in the definition and assessment of mental retardation has led to the development of numerous adaptive behaviour scales. During the past decade a wide variety of scales have been developed in the Western countries for measuring the adaptive behaviour or functional independence of children and adult. As noted by Meyers, Nihira and Zetlin (1979) there are well over 100 instrument available today that could be called measures of adaptive behaviour. Most of them are not formally published and are used by various agencies to meet specific programming needs, and would more appropriately be labeled as behaviour inventories than adaptive behaviour scales. They typically were developed in response to the pressing need for behaviour-based training programmes and documentation of their effectiveness. Some simply provide specific target behavior and others include programme packages designed to remediate the identified behaviour deficits. However, Meyers, Nihira and Zetlin (1979) included only 17 instruments with normative data sufficient to be called scales. The only significant addition

since then is the latest revision of the Vineland Adaptive Behaviour Scales (Sparrow, Balla, and Cicchetti, 1984). Almost all these scales were designed and normed for specific purpose with specific populations and were not intended as global measures of adaptive behaviour. There are only a few instrument available that are designed for use with a broad population as indicated by the current widespread use of the AAMD Adaptive Behaviour Scale.

The review of some of the widely used adaptive behaviour scales have been presented in the following paragraphs.

(i) AAMD ADAPTIVE BEHAVIOUR SCALE FOR CHILDREN AND ADULTS (AAMD ABS)

The scores from the AAMD ABS are useful for programme planning and design and programme evaluation. The scale consists of two parts. Part-1 contains 66 items that rate skill use in ten domain like independent functioning, physical development, economic activity, language development, number and time, domestic activity, vocational activity, self direction, responsibility and socialization. Part-2 consists of 44 items grouped into 14 domains for assessing maladaptive behaviour like vocational and destructive behaviour, antisocial behaviour, rebellious behaviour, untrustworthy behaviour, withdrawal, stereotyped behaviour and odd mannerism, inappropriate interpersonal manners, unacceptable vocal habits, unacceptable or eccentric habits, self-abusive behaviour, hyperactive tendencies, sexually aberrant behaviour, psychological disturbance and use of medication.

The scale may be administered to a third person, who is asked about the subjects performance. The scale may also be completed directly by a diagnostician if they are sufficiently familiar with the subject.

The estimation of stability and internal consistency of the scale are not provided, and evidence of validity is very limited. The scale is best suited for experimental purpose.

(ii) AAMD ADAPTIVE BEHAVIOUR SCALE, SCHOOL EDITION

The AAMD Adaptive Behaviour Scale, School Edition (ABS-SE) (Lambert and Windmiller, 1981) is the latest edition of the scale. Teachers are the preferred respondents. Three domains (Domestic Activity, Self-Abusive Behaviour, and Sexually Aberrant Behaviour) which are not readily observed or pertinent to school were deleted.

The specimen kit includes an Administration and Instructional Planning manual, a Diagnostic and Technical Manual, and Instructional Planning Profile, a Diagnostic Profile, and a Parents Guide. Using the Adaptive Behaviour Scale to Identify Children's Special Needs the scale is intended to provide information about students "personal independence and social skills and to reveal areas of functioning where special programme planning" is needed (Lambert, Windmiller, 1981).

Part-1 of the scale consists of nine domains intended to assess development of personal independence in daily living; Part-2 consists of twelve domains assessing personality and behaviour disorders. If the scale is administered as an adjunct in instructional planning or programme evaluation, the authors recommend combining the domains from Part 1 into clusters: physical development, cognitive development, personal independence, vocational skill and socialization (Lambert et al, 1981). If a more general overview of adaptive behaviour is desired, one can construct a "Diagnostic" profile that consists of five clusters of domain: personal self-sufficiency, community self-sufficiency, personal-social responsibility, social adjustment, and personal adjustment. However, the norming of the school edition of the AAMD Adaptive Behaviour Scale are fast becoming dated, do not appear representative, and, in some of the norm groups, have two limited number of children to provide stable interindividual comparisons. Although the purpose of the instrument is to aid in placement and programme planning decisions, the reliability of the scale is not adequate for these purpose. Validity for the interpretation of the various scores are also suspected.

(iii) VINELAND ADAPTIVE BEHAVIOUR SCALE

The Vineland Adaptive Behaviour Scale (VABS) (Sparrow, Balla & Cicchetti 1984) is an individually administered norm-referenced device intended to assess the adaptive and maladaptive behaviour of individuals under 19 years of age. The Vineland Adaptive Behaviour Scale has been termed as the 1984 revision of the Vineland Social Maturity Scale (VSMS).

The VABS is available in three forms having three separate technical manuals. Two forms are termed interview edition of the Expanded Form (Sparrow, Balla & Cicchetti, 1984s) and the Survey Form (Sparrow, Balla, Cicchetti, 1984b). The third form is the Classroom Edition.

The three forms vary in the number and types of items included as well as in the person who complete the form. The Survey Form contains 297 items and is intended to provide a general appraisal of the individual; it requires about 20 to 60 minutes to administer to a parents or caregiver. The Expanded Form contains 577 items and is intended to provide a comprehensive appraisal suitable for planning educational programme, requires 60 to 90 minutes to administer to a parent or caregiver. The Classroom Edition contains 244 items and requires about 20 minutes for a teacher to complete.

Individual items forms the sub-domains and the sub-domain form domains. All three editions assess skills required for Communication, Daily Living, Socialization and Motor domains. The two interview editions also assess maladaptive behaviour.

The Vineland Adaptive Behaviour Scale (Sparrow et al 1984) also has supplementary norms for the Survey and Expanded Form for several groups of handicapped individuals including non-ambulatory mentally retarded adult of 18 year or even older. These norms are useful for the more severely physically impaired adults because they provide a means of comparison with similar individual. Reliability of the scale varies considerably, validity

data are adequate. However, the domains and sub-domains are suitable for use in making important individual decisions.

(iv) ADAPTIVE BEHAVIOUR INVENTORY (ABI)

The Adaptive Behaviour Inventory (ABI) developed by Brown and Leigh, (1986a) is a norm-referenced scale appropriate for use with students whose age range from 6-0 to 8-11. The ABI is intended to provide information about adaptive behaviour during the diagnosis of mental retardation, to make interindividual comparisons among different components of adaptive behaviour and to evaluate instructional programmes designed to affect a students adaptation through the ratings of the student's teacher

The ABI consists of five subtests each can be administered independently within five minutes each. The sub-tests are self-care skills, communication skills, social skills, academic and occupational skills.

The norm of the scale appears to be adequate, and the device appears to have adequate reliability and validity.

(v) SCALES OF INDEPENDENT BEHAVIOUR (SIB)

The Scales of Independent Behaviour (SIB) (Bruininks, Woodcock, Weatherman, & Hill, 1984) is an individually administered norm-referenced device suitable for use with individuals ranging in age from infancy through adulthood. the SIB's primary aim is "to identify individuals who lack adaptive functional independence in particular settings" (Bruininks, Woodcock, Weatherman, & Hill, 1985, p 3).

This scale is also used for the development of individualized education plans (IEPs) and individually prescribed programme (IPPs) in the selection and placement of individuals within programme of education and training, in guidance, in the assessment of individual gains following intervention in programme management and evaluation and in research.

The SIB includes four clusters of adaptive behaviour (Motor Skills, Social Interaction and Communication Skills, Personal Living skills, and Community Living Skills) and four maladaptive behaviour indices : General Maladaptive Behaviour, Internalized Maladaptive Behaviour, Asocial Maladaptive Behaviour, and Externalized Maladaptive Behaviour. Finally, two short form options are available, the Short form Scale and the Early Primary Scale. The clusters can be combined into a total score called "Broad Independence."

The norm of the SIB appear to be representative of the general U.S. population. The subscales and full scale often have relatively poor reliability, although Broad Independence is highly reliable at all ages. Evidence for the validity for the scale is excellent.

The review of the different form of adaptive behaviour scales revealed that most of the scales are based on "typical developmental model" (White, 1985) they are not suitable for use in assessing children with physical disability and communication problem. A child with motor disability may never develop the fine motor skill e.g. to button small button because he or she has not attained the skills in the normal developmental sequence, but with other similar techniques like a velcro he/she may be able to dress and undress quite adequately. Similarly a cerebral palsy child may not be able to tell the use of a common object like a 'cup' or glass' but with a communication board he/she may be able to narrate any sequence of events.

Adaptive behaviour instruments, may not be sensitive to the discrepancies of alternative skill development sequence due to the test construction and scoring procedures. The scoring procedures of most adaptive behaviour scales do not allow opportunities to indicate whether a skill is performed independently or with support. It is important to note that an essential factor in assessing a child's level of skill is the degree of prompting required (verbal, physical or gestural prompt). For example, a child may be able to pour water in a glass if physically assisted. The child may have achieved maximum independence possible, but may not receive credit for the item if scored on a pass/fail

basis. Therefore, instead of saying "no" it is better to say he/she can pour water if he is assisted, this would help in determining from where the training should begin.

Most of the adaptive behaviour scales use a respondent format. The examiner interviews parents, teachers or caregivers to obtain information about an individual's daily performance of adaptive behaviour activities. The informant bases his or her answer on the "typical" performance of the individual, and is not confined to a simple performance sample. Assessment should be regarded as the basis for any educational programme for children who has low level of independence or children at risk. To make a correct estimate of the individual's need, his/her strength and weaknesses must be known first. A profile of the child's skill and disability cannot be found out without the direct observation by the person who is assessing. Their systematic observations are critical to any decision on present educational needs and the treatment required (Hughes 1981). The available adaptive behaviour assessments mentioned above however, rely on indirect assessment techniques (interview with parents or caregiver). A third party assessments is only useful for persons who desire a quick rating of a child's behaviour (screening). Alternatively persons who requires a more accurate measure of a clients behaviour for pinpointing and designing intervention must directly assess the client.

The assessment tools available in the developed countries is inappropriate for use in developing countries as the environment, cultural milieu and the adaptive skills required for a child are different in these countries. Most of the developing countries are using the Adapted and Standardized version of the different form of Adaptive Behaviour Scale developed in the developed countries for the Behaviour Assessment and Adaptive Behaviour of the children and adults. However, some of the South Asian countries like India has developed their own assessment tools for programming and training the mentally handicapped children along with the adapted version of the scales developed in the Western countries. The review of Behaviour Assessment tools that are being used in India are presented in the following paragraphs :

(vi) MADRAS DEVELOPMENTAL PROGRAMMING SYSTEM (MDPS)

The MDPS designed by Jeyachandran, P., and Vimala V., (1985) provides information about the functional skills of mentally handicapped persons in order to facilitate individualized programme planning.

The scale consists of 360 items grouped under 18 functional domains, such as gross motor, fine motor, eating, dressing, grooming, toileting, receptive and expressive language, social interaction, reading, writing, numbers, time, money, domestic, community orientation and vocational respectively. Each domains lists twenty-items in an ascending order of developmental difficulty and along with the dependance-independence continuum. The MDPS also provides an Adaptive Behavioural Assessment Kit comprising of materials to be used in the assessment of each child with mental handicap.

The current level of the child's functioning on different skills are obtained through direct observation of the child, testing the child during observation and interviewing the parents/caretaker. The child's performance level on each item is rated along two dimensions, for example 'A' indicating the child's ability to perform and 'B' indicating the child's inability to perform the target behaviour listed on the scale.

The desired score from MDPS helps the teacher to set goals and draw behavioural profiles of each child. This also helps in the evaluation of a child's progress over a period of time. Information on the reliability, validity, field testing or standardization of this scale were not available.

(vii) ASSESSMENT OF THE MENTALLY RETARDED INDIVIDUALS FOR GROUPING AND TEACHING

A series of Checklists to facilitate programme planning in each child with mental handicap were developed by the Department of Special Education, National Institute for the Mentally Handicapped, Secunderabad. There are five checklists in this series. Each checklist is addressed to different levels of the child's functioning, eg preprimary, primary,

secondary, pre-vocational and vocational. The skills required at each level have been selected carefully and written as objectively as possible. At each age level, the checklist cover a broad domain of skills, such as, motor, self care, communication, social and pre-academic/academic respectively. There are 370 items in all the levels of the checklist and the number of items within each domain varies from 5 to 20.

Each item on the checklist are rated along a descriptive scale: Independent (I), Needs Cueing (C), Needs Verbal Prompting (VP), Needs Physical Prompting (PP), Totally Dependent (TD), and Physically Incapable (PI) respectively. If a child achieve 80% success in a given level he/she may be considered suitable for promotion to the next level.

The checklists are used for entry level assessment, periodic assessment, and final evaluation. Information on the reliability, validity and field testing or standardization of the scale are not known.

(viii) FUNCTIONAL ASSESSMENT TOOLS

The Functional Assessment Checklist have been designed designed by the research division of National Society of Equal Opportunities for the Handicapped (NASEOH), 1990) for use with four levels of children with mental handicap: preprimary level, primary level, secondary and pre-vocational. At each level, the Functional Assessment Checklists covers at least five broad domains - motor skills, self-care skills, communication skills, social skills and pre-academic skills respectively. The number of items within each domain varies ranging from 1 to 20 items.

The performance of each child is assessed along a descriptive scale: Independent (I), Needs Cueing (C), Needs Verbal Prompting (VP), Needs Physical Prompting (PP) and Totally Dependent (TD) respectively.

When the child achieves 80% of the skills listed in the checklist for any level, he qualifies for promotion into the next higher level. A periodic evaluation of each child on atleast

three occasion, i.e. entry level, formative level and summative level is recommended. Information on the reliability, validity, field testing or standardization of this scale is not available.

(ix) CURRICULUM GUIDELINES FOR SCHOOLS FOR CHILDREN WITH MENTAL RETARDATION

The Curriculum Guidelines were developed as a part of a project initiated under the aegis of Secretary, Department of Social Welfare, Government of Maharashtra to facilitate the special teacher to target specific behaviour for teaching children with mental handicap. These guideline consist of 100 skills covering five important areas of human development ie motor, self-help, psycho-social, communication and cognitive skills respectively. The items in each skill area are sequenced in a pattern from simple to complex and are used for assessing children from pre-Nursery, Nursery, Primary, Pre-vocational and Vocational groups.

Each child with mental handicap is assessed on every item in the curriculum guidelines based on information derived from observation, assessment of actual performance during testing and information from parents. Six categories of ratings are used for rating ie "Independent", "Require Verbal Prompting", "Requires Gestural Prompting", "Requires Physical Prompting", "Unable to Perform", or "Not Applicable". These ratings are recorded on a profile chart before specific teaching objectives are formulated for each child being assessed. Besides an annual evaluation a periodic quarterly assessment is suggested once every three months. Information on the reliability, validity field testing on standardization of this scale is not available.

(x) PROBLEM BEHAVIOUR CHECKLIST

The Problem Behaviour Checklist is designed to identify specific problem behaviour in children with mental handicap in the school or home settings. There are 88 items distributed along 12 domain such as physical harm towards others, damages property, misbehaves with others, temper tantrums, self-injurious behaviours, repetitive or

stereotyped behaviour, odd behaviour, antisocial behaviour, rebellious behaviour, hyperactive behaviour, fears, and any other respectively. Each items is to be rated on a three point descriptive rating scale, such as never (n), occasionally (o) and frequently (f) respectively.

Information on reliability, validity, field testing or standardization of this scale is not available (A Peshwaria, Naidu and Venkatesan, 1990).

(xi) BEHAVIOUR DISORDER CHECKLIST (CHILD)

This checklist has been designed for the assessment of behaviour disorders in children. The checklist consists of 162 items distributed along six domains eg disorders associated with face (mouth, nose, ears and eyes), head, personal hygiene and other habits respectively.

Each item in scored on a five point descriptive scale such as, Profound (P), Severe (S), Moderate (Md), Mild (M) and/or Absent (A) respectively. A recording sheet is also appended alongwith the Checklist to be used for sessionwise assessments of each child. Information on the reliability, validity, field testing or standardization of this scale is not available (Mishra, H.P).

**(xii) BEHAVIOURAL ASSESSMENT SCALES FOR INDIAN CHILDREN
WITH MENTAL RETARDATION (BASIC-MR)**

The Behavioural Assessment Scales for Indian Children with Mental Retardation (BASIC-MR) has been designed by Reeta Peshawaria and S. Venkatesan in 1992 to elicit systematic information on the current level of behaviours in school going children with mental handicap between 3 to 16 or 18 years. This scale was found to be useful even for older severely retarded individual. The scale is relevant for behavioural assessment and can also be used as a curriculum guide for programme planning and training based on the individual needs of each mentally handicapped child.

The BASIC-MR comprises of two parts: Part-A consists of 280 items grouped under seven domains: Motor, Activities of daily living (ADL), Language, Reading-Writing, Number-Time, Domestic-social, and Prevocational-Money. The items included in this part helps to assess the current level of skill behaviours in the child.

Part-B consists of seventy five items grouped under ten domains: Violent and destructive behaviour, Temper tantrums, Misbehaves with others. Self injuries behaviour, Repetitive behaviour, Odd behaviours, Hyperactive behaviour, Rebellious behaviours, Antisocial behaviour, and Fears. The items included helps to assess the current level of problem behaviours in the child.

The BASIC-MR Part-A and B is to be administered individually on each child with mental handicap and scored on a 4 point scale.

Information on the reliability and validity of the scale was adequate. The scale is indeed sensitive to behavioural change over time even within three months at a statistically highly significant level, both overall as well as within each domain.

Although the behavioural assessment tools in the Indian setting continues to serve a useful purpose. However, there are certain limitations of these tests which should be carefully dealt with. Most of the assessment tool discussed above are lacking information on the technical aspects such as reliability validity, field testing and standardization details. Almost all the behavioural assessment tools lack quantitative measures of observed performance. Some of the scales or checklists lack a material kit to be used while making objective behavioural assessment of children with mental handicap. Some of the items included in these tools/checklists are not behaviourally worded. Lastly, most of these tools/checklists do not elicit a complete comprehensive information of the current level of both, skill behaviour as well as problem behaviours. Emphasis is laid more on the assessment of skill behaviours alone.

TEST DEVELOPMENT IN BANGLADESH

In Bangladesh extensive research has not been carried out in the area of test construction. However, a handful of professional from the University of Dhaka had taken an attempt to standardize and developed the following tests for use in Bangladesh.

In the year 1963 Abdus Sobhan determined the predictive validity of the translated version of the "Verbal Reasoning" and "Numerical Ability" subtests of the "Differential Aptitude Test" (DAT) through correlating the test scores with the marks obtained in English and Bengali Literature, Social Studies and Mathematics by the students of 9th grade. Followed by this Matinuddin (1963) determined the predictive validity of the "Verbal Reasoning" and Numerical Ability" subtests of both the original and translated version of the Differential Aptitude Test (DAT) and found the original English version to be the useful predictor of success of the 12th grade boys. Later in the year 1964 and 1965 Azizullah and Siddique also conducted research related to the item analysis and adaptation of the two subtests of the DAT.

Quazi Anwara Mansur (1965) developed a Scholastic Reading Test for the Pre and Early school children of the then East Pakistan. This test was based on the Metropolitan Reading Test and the California Test of Mental Maturity. This test was initially tried out but standardization has not been done. Late in 1965 Ghulam Mustafa developed an Analogies Test of Verbal Reasoning which was proved to be a good instrument for measuring the Scholastic Aptitude of the Higher Secondary and the College students during that period.

In the year 1967 Dr. Mazharul Haque developed an Individual Performance Scale of Intelligence for 5 to 11 years old children of East Pakistan. Validity and reliability of the scales were determined subsequently for measuring the intelligence of children.

In the year 1977 the Wechsler Intelligence Scale for Children-Revised (WISC-R) was translated, adapted and standardized for use in Bangladesh by Sharmin Huq and others

from the Department of Psychology, Dhaka University. In 1980 the Denver Developmental Screening Test (DDST) was standardized on 1100 Bangladeshi children from birth to 6 years for use in Bangladesh by Sultana Ferial. In 1991 the reliability and validity of the 5-non-verbal tests of the Standard-Binet Intelligence Scale was determined and the norm were constructed for both urban and rural children of Bangladesh by Sharmin Huq.

From the brief discussion of the test development in Bangladesh it has been revealed that the work related to test development has been confined to standardization of the Western Scale for the assessment of intelligence or developmental milestones and were used for diagnostic purpose. But no work has so far been carried out in the area of development of a device for the assessment of adaptive behaviour or functional skill required for independent functioning.

Tests for assessment of adaptive behaviour or functional independence must be designed according to the demands faced by the various groups in a population. Therefore, the requirement for the development of an appropriate tool for the assessment of functional independence or adaptive behaviour were as follows :

- (a) The scale must be suitable for use in the intervention programme of children with special needs.
- (b) The scale should have a provision of administering in a variety of setting including the home, school and community. For instance a physically handicapped individual frequently displays varying levels of performance depending on his or her environment. Therefore, the adaptive devices used at home or in the training centre that enables a physically handicapped individual to perform a task independently should be included in the assessment.
- (c) While constructing items for the scale, functional skill designed to increase maximum independent functioning in the natural environment should be targetted, as the result of the assessment would be directly applied to individual training programme.

- (d) The scoring procedure for each item should allow a multipoint scale rather than pass/fail, this would help in designing the training programme for the children with special needs.

Keeping in mind the above points the present study attempted to develop a scale named "Independent Behaviour Assessment Scale" (IBAS) for assessing the functional independence and adaptive behaviour of children of Bangladesh with age ranging from 2 to 9 years which would serve the following purpose :

- (a) The scale would provide an index of the child's current level of performance in different skill area as well as informations on those skills yet to be mastered.
- (b) The scale would provide guideline for developing curriculum of functional education for handicapped children and make decision regarding their placement in the training programme.
- (c) To be used as evaluation of the on-going training programme in which the children have been placed.
- (d) To be used in research where individual's level of independent functioning or development of functional skills need to be investigated.

The development of the IBAS consisted of two studies conducted in two phases: Phase-I included item construction and selection of items through item analysis. Phase-II included the determination of the reliability, validity and Construction of Norms for the scale.

CHAPTER TWO

PHASE - I

ITEM CONSTRUCTION AND ITEM ANALYSIS STUDY

INTRODUCTION

Item development and item analysis are important steps involved in scale construction. The process of developing appropriate items further involves item writing, editing, tryout and revision which are repeated until satisfactory items are developed. Items retained after initial screening are pre-tested on samples with the objective to obtain information on how the sample reads to the item. This process is called item analysis. The result of the item analysis are used to select the items for the final form of the test. The present study dealt with construction of items and the final selection of the items through item analysis for a scale for the measurement of skills required for functional independence or adaptive behaviour.

The initial items for the scale was developed on the basis of the functional skills - "functional skills are skills required in the environment in which a person currently performs or in which he/she will perform in the future" (Baine, 1988). Based on this definition and ideas taken from the "Vineland Adaptive Behaviour Scale" (Sparrow et al, 1984) and "Scale of Independent Behaviour" (Bruininks et al, 1984), four broad categories of functional skill areas were identified which were interlinked with each other - Motor, Socialization, Communication and Daily Living Skills. Under this broad classification 10 sub-areas were identified Gross motor, Fine motor, Social interaction, Language comprehension, Language expression, Eating and meal preparation, Toileting, Dressing, Self care and Domestic skill. These skills were however, "universal skill area" representing behaviour of children or adults occurring in all societies in different forms and were essentially required for survival in the community.

METHOD**Subjects****Subjects For Pretesting:**

A total of 40 subjects, (30 normal and 10 handicapped) were selected for pretesting of the initial items constructed. These subjects were randomly selected from different parts of the Capital City of Dhaka and a village close by the city, from a population of mixed socio-economic status (starting from slum dwellers to children living in well to do residential areas). The age range of the subjects were 1 to 10 years (an average of four children were selected from each age group). The handicapped children were selected from a special school for the mentally and physically handicapped children located in Dhaka city. Distribution of the subjects according to age, gender and condition has been presented in Table-1.

TABLE - 1
Distribution Of The Subjects For Pretesting The Items According
To Age, Gender And Condition

Age	Normal		Handicapped		
In Years	Male	Female	Male	Female	Total
1	2	1	0	0	3
2	2	1	0	0	3
3	2	1	1	0	4
4	2	1	1	0	4
5	2	1	1	1	5
6	2	1	1	1	5
7	2	1	0	1	4
8	2	1	1	0	4
9	2	1	1	1	5
10	2	1	0	0	3
TOTAL	20	10	6	4	40
	30		10		

Out of the 10 handicapped children selected for pretesting the items 4 were Down Syndrome, 1 child with Turner's Syndrome, 2 children with Cerebral Palsy and 3 children with mild to Moderate Mental Retardation and Speech problem. Diagnosis of the handicapped children with associated problems of the subjects and their I.Q. range has been presented in Table-2.

TABLE - 2
Frequency Distribution And IQ Range Of The Different
Type Of Handicapped Children Selected For Pretesting The Items

DIAGNOSIS	NO. OF CHILDREN	IQ RANGE
1. Downs Syndrome With Mental Retardation	4	36-50
2. Turners Syndrome With Mental Retardation	1	58
3. Cerebral Palsy With Mental Retardation	2	36-50
4. Mild To Moderate Mental Retardation With Speech Problem And One With Hearing Problem	3	50-65
TOTAL	10	

Subjects For Item Analysis:

A total number of 154 children with age ranging from 1 to 10 years were randomly selected from the Capital City of Dhaka and from a village name Balitha, Dhamrai located 45 km from the Dhaka City. 15 subjects at an average were selected for each age group

from 1 to 10 years. 52.59% of the children were from the urban areas and 47.40% from the rural areas. Subjects age, place of residence and gender has been presented in Table-3.

TABLE - 3
Distribution Of Subjects According To Age, Area
Of Residence And Gender Selected For Item Analysis

Age	URBAN		RURAL		
In Years	Male	Female	Male	Female	Total
1	2	7	2	6	17
2	5	5	3	7	21
3	6	7	5	6	23
4	4	6	3	4	17
5	5	5	4	3	17
6	2	3	3	3	11
7	2	4	3	3	12
8	4	3	3	3	13
9	2	3	4	2	11
10	3	3	2	4	12
	35	46	32	41	
TOTAL	81		73		154
	52.59%		47.40%		

Total monthly income of the family, parents occupation and education were used as an index for determining the socio-economic status of the family. Families having an income of Taka ten thousand and above Tk. 10,000 and above per month (US\$ 250 and above per month) in addition to other immovable and movable properties constituted to be upper class, families having income between taka two thousand to taka five thousand Tk. 2,000/- to Tk. 5,000/- per month (US\$ 50 to US\$ 150 p.m.) in addition to small movable and

immovable properties constituted to be middle class family, and families having income of taka two thousand or less (Tk. 2,000 per month US\$ 50 or less p.m.) in addition to very little property like a rent from sub-letting a room of a house or income from a small shop which added another one thousand taka (US\$ 25 p.m.) constituted to be families having low socio-economic status. In the urban area 45.67% of the children were from the upper class, 23.45% from the middle class families and 30.86% from low socio-economic status. In the rural area 41% of the children were from the middle class families 58% from the low socio-economic status and non-from the upper class group. The distribution of the subjects for the item analysis according to the socio-economic status has been presented in Table-4.

TABLE - 4
Distribution Of The Subjects According To The Socio-Economic
Status Used For Item Analysis

Age In Years	Urban			Rural		
	Upper	Middle	Lower	Upper	Middle	Lower
1	4	2	3	0	2	6
2	4	3	4	0	7	3
3	8	2	2	0	5	6
4	6	2	2	0	4	3
5	5	2	3	0	3	4
6	2	2	1	0	2	4
7	2	2	2	0	2	4
8	3	1	3	0	2	4
9	1	2	2	0	1	5
10	2	1	3	0	2	4
TOTAL	37	19	25	0	30	43
%TAGE	45.47%	23.45%	30.86%	0	41%	58%

TABLE - 5

**Percentage Distribution Of The Parents Occupation According To The
Socio-Economic-Status Of The Urban Sample**

SES Occupation	HIGH		MIDDLE		LOW	
	Father	Mother	Father	Mother	Father	Mother
	%	%	%	%	%	%
1. Business/Land Owner	37.83	-	-			
2. Executive Service	43.24	13.50	-			
3. Skilled Professional	8.12	18.75	-			
4. Small Business	10.81	10.00	39.13	-	5.88	
5. Service/Clerical/ Small Property Owner	-	5.85	52.17	22.18	7.35	2.68
6. Skilled Mecha- nical/Technical Jobs	-	-	8.69	3.75	16.18	3.20
7. Semi-Skilled Worker	-	-	-	5.12	22.06	5.12
8. Unskilled Worker/ Housewife	-	51.85	-	68.95	48.52	89.00

TABLE - 6
Percentage Distribution Of The Parents Occupation According To The
Socio-Economic-Status Of The Rural Sample

SES Occupation	HIGH		MIDDLE		LOW	
	Father Mother		Father Mother		Father Mother	
	%	%	%	%	%	%
1. Business/Land Owner	-	-	-	-	-	-
2. Executive Service	-	-	-	-	-	-
3. Skilled Professional	-	-	-	-	-	-
4. Small Business	-	-	38.06	-	-	-
5. Service/Clerical/ Small Property Owner	-	-	40.94	-	-	-
6. Skilled Macha- nical/Technical Jobs	-	-	21.00	-	-	-
7. Semi-Skilled Worker	-	-	-	10.85	25.86	-
8. Unskilled Worker/ Housewife	-	-	-	89.15	74.14	100

TABLE - 7

Percentage Distribution Of The Education Level Of The Parents According To The
Socio-Economic-Status Of The Urban Sample

SES Education	HIGH		MIDDLE		LOW	
	Father Mother		Father Mother		Father Mother	
	%	%	%	%	%	%
Graduate And Above	64.86	10.81	39.13	8.69	-	-
Higher Secondary	21.62	29.72	19.56	23.91	-	-
Secondary	5.41	45.95	23.91	39.13	19.11	2.94
Primary	5.41	5.40	6.52	13.04	33.82	17.64
No Education	2.70	8.10	10.86	15.21	47.05	79.41

TABLE - 8

Percentage Distribution Of The Education Level Of The Parents According To The
Socio-Economic-Status Of The Rural Sample

SES Education	HIGH		MIDDLE		LOW	
	Father Mother		Father Mother		Father Mother	
	%	%	%	%	%	%
Graduate And Above	-	-	1.59	-	-	-
Higher Secondary	-	-	3.17	-	-	-
Secondary	-	-	22.22	2.85	-	-
Primary	-	-	28.02	15.73	7.85	-
No Education	-	-	45.00	81.42	92.15	100

Measures Used :

The following standardized assessment scales were used as guidelines for having a clear understanding of the different assessment procedure and rationale behind the design for construction of items for measuring behaviour required for independent functioning :

1. The Progress Assessment Chart (Gunzburg, 1974).
2. The Portage Guide to Early Education Checklist (CESA-12, 1975).
3. The Vineland Adaptive Behaviour Scale (Sara, Sparrow and others, 1984).
4. Objective Behavioural Assessment of the Severely and Moderately Handicapped. The OBA (Larry Hardy, Garry, M. and others 1981).
5. Scale of Independent Behaviour (Robert Bruininks and others, 1984).
6. Basic Assessment Chart for the Mentally Retarded in Sri Lanka (Hughes J.M., 1986).

The following locally available materials and equipments were used for directly assessing the children's ability of performing the tasks under different domains and sub-domains of independent behaviour:

1. Football.
2. Pan/Container which could be filled with any load weighing 5 KG.
3. Tennis ball, small wood apple, guava.
4. Small pillow/bean bag.
5. Tennis bat, shuttle cork, ping pong ball.
6. Pea nuts, puffed rice, beans.
7. Jar with twisting lid.
8. Candy wrapped in paper.
9. Pieces of paper/cloth.
10. Clay, playdough.
11. Paper, pencil.
12. Small bead/flower

13. Thread.
14. Wooden reel/spool for winding thread
15. Thin rope.
17. Bolts and nuts.
18. Screw Driver.
19. Nail cutter, small knife, scissors.
20. Small take-apart toys.
21. Pots and pans.
22. Toy household goods.
23. Doll, doll-house and dresses.
24. Story books.
25. Series of pictures in a sequence describing events.
26. Pictures of familiar objects.

Along with the materials for direct testing of children, test booklet, record booklet and interviewer's manual developed were used.

I. Test Booklet :

The booklet contained items or tasks grouped under four main behavioural domains and ten sub-domains within the main domains which are essentially required to function independently in the community. The tasks under each behavioural domains were sequenced in an order from simple to difficult level according to order of complexity described as follows :

1. Motor Skill :

A. Gross-Motor :

It included tasks to assess the skill using large muscles of the entire body or tasks involving balance, coordination, strength and endurance eg sitting, walking, jumping or doing strenuous work independently.

B. Fine Motor :

The tasks in this area measured performance that required eye-hand coordination using small finger, hand and arm muscles e.g. using finger and hand to do certain tasks independently.

2. Socialization Skill :

C. Social Interaction : The tasks mainly concerned with skills necessary to meet the social need of an individual. The tasks in this area evaluated social interaction of the child with the family members and outside the family e.g. the ability to use social courtesies appropriately and independently.

3. Communication Skill : Included tasks which enable an individual to provide and to extract information from others.

D. Language Comprehension :

The tasks in this area evaluated performance involving understanding of signs, signals, symbols, speech, expression and in deriving information from spoken/written language.

E. Language Expression :

The tasks in this area evaluated performance involving talking and other forms of expressions (expression through sign, symbol, gesture and printing).

4. Daily Living Skill : Skills required to meet the basic physical needs of an individual without which an individual could not survive.

F. Eating And Meal Preparation :

The items or tasks in this area measured skills related to eating, drinking and preparation of simple meals. Preparing one's own meal is considered to be a significant step towards independence.

G. Toileting :

This area included tasks that measured performance related to toilet functioning starting from showing signs of discomfort when wet to finding a toilet in an unknown place and performing the job independently. The ability to exhibit either partial or complete

independence in terms of toileting is an important step towards improving the adaptive behaviour.

H. Dressing :

This section included tasks or skills required for dressing independently from the ability to cooperate while dressing to repairing minor damage to own clothing and taking care of one's clothing.

I. Self Care :

The tasks in this area evaluated skills required for independently washing, bathing, grooming, personal hygiene, health care and home safety.

J. Domestic Skills :

The task in this area evaluated skills that were required in day-to-day living in a home and community be it in the urban, rural or slum. This included the ability to clean the homestead to maintenance of the home and surrounding including simple shopping and small money transaction.

Each of the ten areas of the scale mentioned above were composed of functional and, practical skills which were required to take care of ones ownself and the family and were expected to be incorporated into the behaviour repertoire of all children between 1 year to 11 years with normal development.

II. Record Booklet :

The second booklet was for use by the interviewer/ examiner to record the raw scores obtained in each item on the space provided under each domain and sub-domain. At the end of each sub-domain there was a space to enter the total raw score for each sub-domain. On the front cover page there was a space for recording information about the client being assessed, and the interviewer (parent and caretaker), date on which the test was administered etc. The back cover page was used for the summary scores and profiling of the derived scores. It also contained a summary report for parents to provide meaning of the test scores.

III. Interviewer's Manual :

The interviewers manual contained detail description about test administration as well as scoring and interpretation of test results. The manual also contained a section providing information about the criteria for scoring specific items, materials to be used for testing and how to administer different items. At the end there was a list of materials that could be used for testing (ideas taken from Gunzburg, PAC, 1974).

Procedure :

The following paragraphs will discuss the procedure followed in constructing items and item analysis for a scale measuring the child's attainment of functional and practical skills (mobility, communicating with others, socializing, eating, toileting, dressing, self-care and domestic activities) which if taught would allow the individual to exercise and extend his/her degree of independence. In other words to develop items for a scale for measuring the level of skills the child attained towards independent functioning. The items were constructed in four stages as follows :

Stage-i. Relevant literature on different assessment scales and checklists like Vineland Adaptive Behaviour Scale (Sara, Sparrow and others 1984); The Progress Assessment Chart (Gunzburg, 1974); Portage Guide to Early Education Checklist (CESA-12, 1975); Objective Behaviour Assessment of the Severely and Moderately Mentally Handicapped; The OBA (Larry Hardy, et al 1981); Scale of Independent Behaviour (Robert Bruininks and others 1984); Basic Assessment Chart for the Mentally Retarded developed in Sri Lanka (Hughes, 1986) were consulted as guidelines in construction of items and other aspects of the present scale.

Stage-ii An ecological inventory was also made by the following method and steps based on modification and extension of the procedures described by Brown, Branston, Hamre-Nietupaski, Pumpia, Certo and Gruenwald (1979), Brown, Shiraga, York, Zenella and Rogan (1984), and Wilcox and Bellamy (1982) and suggested by David Baine in his

book entitled "Handicapped Children in Developing Countries: Assessment, Curriculum and Instruction" Pg 30. The ecological inventory was developed by the author herself through :

- (a) observation of the activities of a large number of children between birth to 12 years (normal and children with disabilities, of both gender) while they were at play, work, school or doing regular chores at home.
- (b) by being friendly with the children and talking to them.
- (c) by visiting and directly interviewing the children and parents from different socio-economic class (e.g. slum dwellers, lower class, middle class and upper class); different religion (Hindu, Muslim, Christian and other religion); residing in the urban and rural areas and involved in different professions to obtain a first hand impression and idea of the functional and age appropriate skills one required to live independently in the environment and society a person lived and might live in future.

Based on the literature review and ecological survey 304 items described in terms of tasks for assessment of behaviour required for independent functioning were constructed. These items/tasks were grouped under four (4) major behavioural domains (Motor, socialization, communication and Daily Living Skill) termed as main scales and 10 sub-domains (Gross motor, fine motor, social interaction, eating and meal preparation, toileting, dressing, self-care and domestic skill) under the four major domains termed a sub-scales. Skills grouped under these scales were considered necessary for independent and effective living in the present social context of the urban and rural areas of Bangladesh.

Stage-iii The draft form of the scale was tried out on a small sample to see how the items discriminated between children. After the first tryout several items were found to be either too difficulty or too easy for a particular age and therefore were dropped from the list. Moreover, items in scale like gross motor were found to be overloaded with tasks usually performed by the males and scales like domestic skill and self-care were overloaded with tasks mostly performed by females. Therefore, without changing the original items,

alternate items were added for urban male and female children as well as rural male and female children whenever it was required.

At this stage the scoring system was also determined based on the degree and type of support the child required to perform each task independently. The scoring of items were as follows : Score of three (3) indicated the child's ability to perform a particular task independently without any help or supervision; score of two (2) indicated the child's ability to do the task with little help or supervision; a score of one (1) indicated the child's ability to do the task with constant support (physical and verbal) and no score (zero) indicated child's inability to do the task even when helped. Therefore, on each item of the scale, a child may obtain any score ranging from 0-3 depending upon the level of performance for that particular item. The maximum possible score for the motor scale consisting of 43 items, socialization consisting of 22 items, communication consisting of 38 items and daily living skill domain consisting of 85 items were 129, 66, 114 and 225 respectively. The total raw scores for all the four scales were added and expressed it as the full-scale score. Mean and Standard Deviation were calculated for interpreting the raw score. A higher score thus indicating high level of independent functioning of the child.

Stage-iv. For the purpose of judging the face validity and content validity of the items of the scale, the list of items were given to a panel of judges comprising of five judges: two developmental psychologists who were professors in the Department of Psychology of Dhaka University; two Physiotherapist one from within the country and one from U.K. (and had experience in working in Bangladesh) to check the items included in the motor domain; one speech therapist from U.K. (who also had experience in working in Bangladesh & knowledge about the culture of Bangladesh) to check the items in the communication domain and a statistician for his opinion on the content and the psychometric properties of the scale. The items which obtained high degree of disagreement among judges were regarded as ambiguous and were dropped; the items which were considered as difficult and complex for a particular age group by the judges were reconstructed; some of the items were rephrased; few new items were added as

suggested by the judges; while the order of some items were rearranged as it was found that even after three consecutive failures some children scored 1 or 2 in the items following these.

The items in each sub-scale within the main scale were sequenced in a manner from simple to complex and focused on those behaviours considered important in developing skills required for personal independence. The final scale was named "Independent Behaviour Assessment Scale (IBAS)."

An interviewer's manual was also developed at this stage with description of the administration and scoring procedure. The test items were put together in a book form and a record form was developed for recording the scoring of each item in the scale.

Item Analysis:

Item analysis was done to improve the efficiency and judge the quality of the test items. For conducting the item analysis the scale was administered on a total number of 154 children with age ranging from 1 year to 10 years in the rural and urban areas of Bangladesh (Table-3).

In both the urban and rural areas the scale was administered by two psychology graduates who had long experience in working with the mentally handicapped and cerebral palsy children. In the rural area the test was administered in a Maternity and Child Health Centre (MCH) in Balitha, Dhamrai (45 km from the capital city of Dhaka) and also in the homes of the children who refused to come to the centre.

The whole test was administered through a semi-structured interview of the parents, caretaker or a person familiar with the child and by direct testing of the child, with both mother and child sitting face to face of the examiner on a mat on the floor or ground (sometimes child playing around or surrounded by other family members and neighbours).

The following procedures was applied for each child :

- a) To gain the child's attention and to make the child comfortable both physically and emotionally a box full of testing materials both for boys and girls were placed on the mat. These items were also used to keep the child engaged for a prolonged period and to determine the child's repertoire of skills in certain areas while manipulating the toys.
- b) As the child entered the room the examiner greeted him/her and waited for a response. Right from the moment the child entered, the examiner started observing the child and recording if necessary (her/his gait, how she/he walked, talked and the reaction after seeing so many colorful toys).
- c) Examiner then asked the child's name, father's and mothers name, address, parents occupation and other questions to establish rapport with the child and tried to fill the front cover page of the response booklet. The child's response helped the examiner in assessing the communication as well as socialization areas of the scale to some extent. The main objective was to elicit the behaviour from the child, when the child refused to cooperate or did not do any task or when there were no opportunity to observe the child performing some tasks the mother was interviewed.
- d) Throughout the whole testing session the examiner talked to the child and did not let them feel that the child was being assessed. The interview and direct testing event went on simultaneously.
- e) During the testing session the examiner started from a item of the scale which was simple and the child could easily do the task depending on the child's age and continued within that sub domain of the scale until she/he failed to do four consecutive tasks. On the basis of the child's performance and parent's response the examiner used her own judgement to rate the child on a four point scale. The rating was based on the degree of prompt/help/ supervision the child needed to perform the task.

RESULT AND DISCUSSION

Initially 304 items were constructed based on literature review of similar scales, ecological survey and observation of children. The items comprised of tasks defining the skills considered necessary for independent and effective living in the present social context of the urban and rural areas of Bangladesh. These items were grouped under four main behavioural domain and ten sub-domains under the main domains termed as scales and sub-scales.

The items were thoroughly scanned and tried out on 40 children between 1 to 10 years old from a mixed socio-economic status living in urban and rural areas. Through this process 82 items from the gross motor, 12 from the fine motor, 10 from socialization, 12 from language comprehension, 15 from the language expression, 4 from eating and meal preparation, 1 from toileting, 4 from dressing, 8 from self-care and 6 from the domestic skill sub-domains) which were found to be inappropriate or not suitable for measuring the functional skills among children were eliminated. The items eliminated from the language comprehensive and language expression sub-domains mostly dealt with tasks required reading and writing skills and higher level of thought process like problem solving. On the other hand the items eliminated from the gross and fine-motor sub-domains were related to readiness skills and not functional.

According to Northcutt (1975) adaptive behaviour or functional competence is a construct which is meaningful in a specific societal context. Witt and Martens (1984) described adaptive behaviour as a function of both development and cultural expectation. Therefore, the societal context and cultural expectation of adaptive behaviour and functional competence of urban children differs from the rural children as well as male and female children. For example in an urban city it is very important to know how to cross a busy road but in a rural village it is essential to learn how to cross a bamboo bridge. Therefore, 23 alternate items describing tasks generally performed by male and female children residing in the urban and rural areas were added to the original items (Table 9).

TABLE - 9

**Distribution Of The Items Within Different Scales And Sub-Scales (Skill Areas)
After The First Try-Out**

Scales	NO. of Items Initially Constructed Within Each Scale & Sub-Scales	No. of Items Eliminated From Each Scale	No.of Alternate Items Constructed within Scale
1. Motor:			
A. Gross-Motor	32	10	1
B. Fine-Motor	36	12	4
2. Socialization:			
C. Social Interaction	35	10	3
3. Communication:			
D. Language Comprehension	39	12	0
E. Language Expression	46	15	1
4. Daily Living Skill:			
F. Eating & Meal Preparation	19	4	1
G. Toileting	15	1	0
H. Dressing	21	4	1
I. Self Care	32	8	1
J. Domestic Skill	29	6	12
	304	82	23

The face validity were obtained for the retaining 222 and 23 newly constructed items. The items obtaining high degree of agreement (if 4 out of 5 judges agreed) among judges regarding the appropriateness of the items were retained. Items having high degree of disagreement (if 3 out of 5 judges disagreed) among judges were eliminated. Following this process 46 items were eliminated because of having high degree of disagreement among the judge regarding the appropriateness of the item. 35 items which were considered as difficult and complex were reconstructed, rephrased and rearranged as the order did not seem to be appropriate. 12 new items were constructed according to the judges suggestion which were rechecked by the judge (Table 10). The items therefore retained to 188.

TABLE - 10

**Distribution Of The Items Within Different Scales And Sub-Scales After The
Assessment Of The Face Validity**

Scales	No. Of Items Retained After First Tryout	No. Of Items Eliminated After Assessment Of Face Validity	No.Of Items Rephrased And Reconstructed	No Of New Items Developed
1. Motor Skills:				
A. Gross Motor	22	1	3	1
B. Fine Motor	24	3	4	0
2. Socialization:				
C. Social Interaction	25	4	1	1
3. Communication Skill:				
D. Language Comprehension	27	10	3	1
E. Language Expression	31	13	4	2
4. Daily Living Skill:				
F. Eating & Meal Preparation	15	2	3	3
G. Toileting	14	1	3	1
H. Dressing	17	3	5	1
I. Self Care	24	4	5	0
J. Domestic Skill	23	5	4	2
	222	46	35	12

The components of the scale and number of items in each scale and sub-scale has been presented in Figure-1 and Table-II.

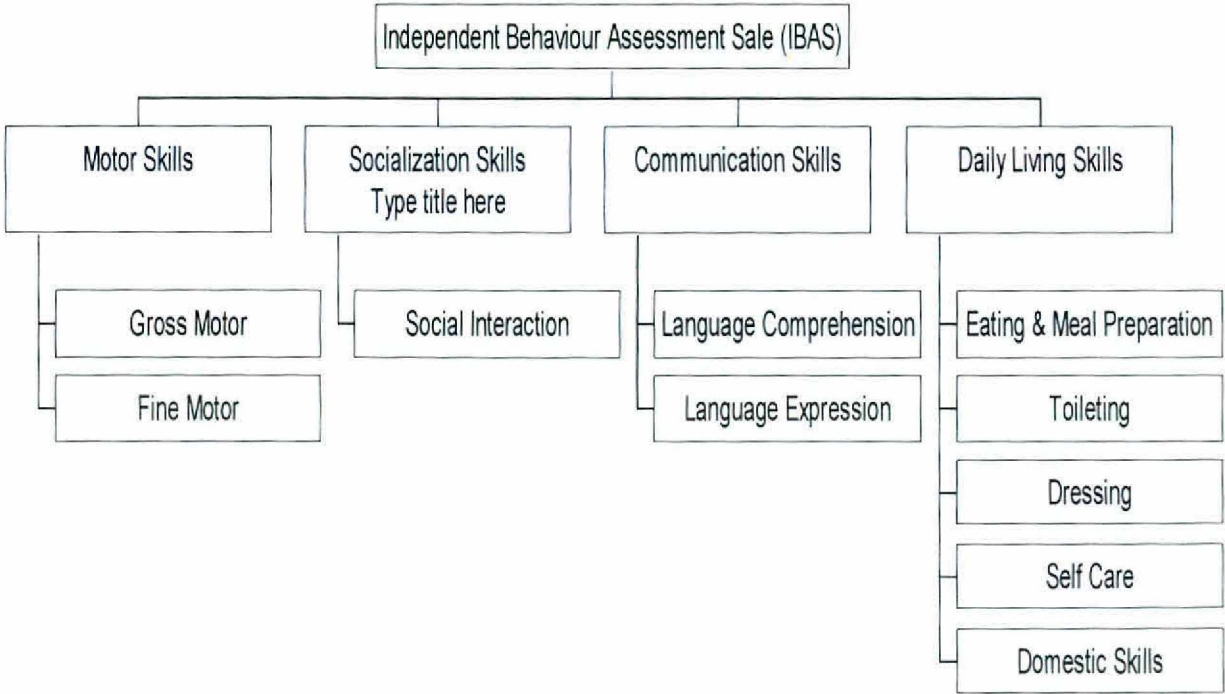


Figure - 1 Components Of The Independent Behaviour Assessment Scale (IBAS)

TABLE - II

Table Showing The Four Main Scales, Ten Sub-Scales And Number Of Item In Each Scale Of The Independent Behaviour Assessment Scale (IBAS)

Main Scales And Sub-Scales Of IBAS	No. Of Items In Each Sub-Scales	No. Of Items In Main Scales
1. Motor Skill:		
A. Gross Motor	22	
B. Fine Motor	21	43
2. Socialization Skill:		
C. Social Interaction	22	22
3. Communication Skill:		
D. Language Comprehension	18	38
E. Language Expression	20	
4. Daily Living Skill:		
F. Eating And Meal Preparation	16	
G. Toileting	14	
H. Dressing	15	
I. Self Care	20	
J. Domestic Skill	20	85
Total Number Of Items		188

The reliability and validity of a scale depends on the quality of each individual items. The quality of an item is judged by the procedure of item analysis. Therefore item analysis is considered to be one of the important step in scale construction.

From the statistical point of view the internal consistency and discriminative power of the scale item were considered as two major criteria for determining the validity of the scale item. The corrected item to total correlation coefficient (r_s), the alpha coefficient (Cronbach, 1951, Novich and Lewis, 1967) and the scale variance were the statistical procedures used for measuring the internal consistency and discriminative power of the items of the scale for the sample according to the place of residence, gender as well as the total sample (Table 12, 13, 14, 15, 16 and 17).

TABLE - 12

The Corrected Item-To-Total Correlation (rs) The Scale Variance And The Alpha Coefficient Of The Items Within The Different Sub-Scales Of The Urban Sample (N= 81)

SUB-SCALES	ITEM NO.	CORRECTED ITEM-TO-TOTAL CORRELATION rs	SCALE VARIANCE	ALPHA COEFFICIENT α
GROSS MOTOR	1	.23	201.17	.9362
	2	.23		
	3	.23		
	4	.32		
	5	.32		
	6	.33		
	7	.34		
	8	.48		
	9	.52		
	10	.66		
	11	.68		
	12	.77		
	13	.76		
	14	.82		
	15	.84		
	16	.86		
	17	.84		
	18	.81		
	19	.84		
	20	.78		
	21	.77		
	22	.72		
FINE-MOTOR	1	.27	216.54	.9358
	2	.29		
	3	.29		
	4	.39		
	5	.54		
	6	.62		
	7	.70		
	8	.68		
	9	.70		
	10	.74		
	11	.73		
	12	.80		
	13	.79		
	14	.78		
	15	.81		

	16	.71		
	17	.64		
	18	.68		
	19	.52		
	20	.37		
	21	.62		
	1	.27		
	2	.27		
	3	.40		
	4	.46		
	5	.45		
	6	.70		
	7	.73		
	8	.71		
	9	.84		
	10	.78		
	11	.78		
SOCIALIZATION	12	.81	344.88	.9561
	13	.83		
	14	.82		
	15	.82		
	16	.74		
	17	.64		
	18	.79		
	19	.77		
	20	.77		
	21	.81		
	22	.69		
	1	.21		
	2	.22		
	3	.46		
	4	.51		
	5	.52		
	6	.66		
	7	.72		
LANGUAGE	8	.74		
COMPREHENSION	9	.82	219.68	.9468
	10	.82		
	11	.82		
	12	.85		
	13	.84		
	15	.69		
	16	.75		
	17	.78		
	18	.72		

LANGUAGE EXPRESSION	1	.21	302.44	.9647
	2	.21		
	3	.21		
	4	.50		
	5	.63		
	6	.89		
	7	.89		
	8	.89		
	9	.89		
	10	.88		
	11	.93		
	12	.93		
	13	.93		
	14	.90		
	15	.87		
	16	.89		
	17	.81		
	18	.73		
	19	.68		
	20	.65		
EATING AND MEAL PREPARATION	1	.20	138.27	.9237
	2	.29		
	3	.37		
	4	.55		
	5	.60		
	6	.69		
	7	.79		
	8	.79		
	9	.85		
	10	.84		
	11	.77		
	12	.78		
	13	.64		
	14	.55		
	15	.54		
	16	.54		
TOILETING	1	.31	185.90	.9495
	2	.41		
	3	.51		
	4	.67		
	5	.73		
	6	.84		
	7	.83		
	8	.85		
	9	.85		
	10	.88		

	11	.82		
	12	.81		
	13	.85		
	14	.78		
DRESSING	1	.43		
	2	.68		
	3	.72		
	4	.78		
	5	.84		
	6	.88		
	7	.87		
	8	.87	203.93	.9528
	9	.87		
	10	.82		
	11	.68		
	12	.68		
	13	.78		
	14	.73		
	15	.21		
SELF-CARE	1	.38		
	2	.46		
	3	.59		
	4	.69		
	5	.72		
	6	.79		
	7	.78		
	8	.79		
	9	.83		
	10	.88	355.16	.9638
	11	.85		
	12	.84		
	13	.83		
	14	.75		
	15	.74		
	16	.71		
	17	.77		
	18	.73		
	19	.73		
	20	.80		
	1	.64		
	2	.71		
	3	.72		
	4	.68		
	5	.81		
	6	.80		
	7	.74		
	8	.84		

	9	.80		
	10	.84		
	11	.79		
	12	.83		
DOMESTIC	13	.80	309.93	.9645
SKILL	14	.81		
	15	.79		
	16	.72		
	17	.69		
	18	.74		
	19	.75		
	20	.44		

p<.05 (rs.19 - .22)

p<.02 (rs.23 - .24)

p<.01 (rs.25 - .31)

p<.001 (rs.32 & ABOVE)

The corrected item-to-total correlation for the urban sample in the sub-scales of Gross-motor, Fine motor, Socialization, Language comprehension, Language expression, eating and meal preparation, Toileting, Dressing, Self-care, and Domestic skill ranged from .23 to .86, .27 to .81, .27 to .83, .21 to .87, .21 to .93, .20 to .85, .31 to .88, .21 to .88, .38 to .88 and .44 to .84 respectively.

The obtained rs of item No. 1 to 3 of the gross motor sub-scale were found to be significant p<.02 level, rs of item No. 1 to 3 of fine motor, item No. 1 and 2 of socialization, item No. 2 of eating and meal preparation and item No. 1 of toileting sub scales were found to be significant p<.01 level. The rs of Item No. 1 and 2 of language comprehension, item No. 1 to 3 language expression, item No. 1 of eating and meal preparation and item No. 15 of dressing sub-scales were significant at p<.05 level. The rest of the items within the ten sub-class were found to be significant at p<.001 level.

The variance of the 10 sub-scales were 202.17, 216.54, 344.88, 219.68, 302.44, 138.27, 185.90, 203.93, 355.16 and 309.93 respectively.

The Alpha Coefficient (α) for the ten 10 sub-scales were found to be .94, .95, .96, .95, .96, .92, .95, .95, .96 and .96 respectively which were very high.

TABLE - 13
The Corrected Item -To -Total Correlation (rs) The Scale Variance
And The Alpha Coefficient Of The Items Within The Different
Sub -Scales Of The Rural Sample (N = 73).

SUB-SCALES	ITEM NO.	CORRECTED ITEM-TO-TOTAL CORRELATION rs	SCALE VARIANCE	ALPHA COEFFICIENT α
GROSS MOTOR	1	.25	168.56	.9249
	2	.25		
	3	.25		
	4	.25		
	5	.25		
	6	.27		
	7	.25		
	8	.31		
	9	.29		
	10	.49		
	11	.56		
	12	.76		
	13	.75		
	14	.82		
	15	.86		
	16	.86		
	17	.87		
	18	.87		
	19	.84		
	20	.77		
	21	.65		
	22	.73		
FINE MOTOR	1	.20	184.45	.9340
	2	.20		
	3	.20		
	4	.21		
	5	.42		
	6	.47		
	7	.58		
	8	.58		
	9	.58		
	10	.77		
	11	.79		
	12	.80		
	13	.80		
	14	.85		
	15	.85		

	16	.84		
	17	.73		
	18	.74		
	19	.73		
	20	.53		
	21	.65		
SOCIALIZATION	1	.22		
	2	.21		
	3	.44		
	4	.44		
	5	.47		
	6	.68		
	7	.73		
	8	.80		
	9	.80		
	10	.76		
	11	.80	198.90	.9394
	12	.82		
	13	.75		
	14	.74		
	15	.73		
	16	.76		
	17	.75		
	18	.73		
	19	.60		
	20	.47		
	21	.34		
	22	.22		
LANGUAGE COMPREHENSION	1	.40		
	2	.40		
	3	.41		
	4	.47		
	5	.52		
	6	.58		
	7	.63		
	8	.75		
	9	.85	.178.82	9.9405
	10	.82		
	11	.86		
	12	.84		
	13	.86		
	14	.82		
	15	.74		
	16	.76		
	17	.64		
	18	.66		

LANGUAGE EXPRESSION	1	.26	244.62	.9547
	2	.26		
	3	.26		
	4	.43		
	5	.43		
	6	.73		
	7	.81		
	8	.86		
	9	.90		
	10	.91		
	11	.92		
	12	.92		
	13	.92		
	14	.92		
	15	.89		
	16	.82		
	17	.74		
	18	.66		
	19	.51		
	20	.47		
EATING AND MEAL PREPARATION	1	.29	158.72	.9263
	2	.29		
	3	.29		
	4	.44		
	5	.43		
	6	.56		
	7	.75		
	8	.80		
	9	.84		
	10	.88		
	11	.86		
	12	.85		
	13	.88		
	14	.79		
	15	.71		
	16	.64		
TOILETING	1	.31	179.87	.9480
	2	.40		
	3	.51		
	4	.66		
	5	.65		
	6	.78		
	7	.83		
	8	.85		
	9	.87		
	10	.89		
	11	.83		

	12	.88		
	13	.84		
	14	.75		
DRESSING	1	.39		
	2	.57		
	3	.63		
	4	.82		
	5	.88		
	6	.93		
	7	.92		
	8	.90	280.01	.9685
	9	.93		
	10	.93		
	11	.89		
	12	.88		
	13	.87		
	14	.84		
	15	.53		
SELF-CARE	1	.34		
	2	.40		
	3	.58		
	4	.76		
	5	.82		
	6	.87		
	7	.86		
	8	.87		
	9	.88	426.33	.9715
	10	.90		
	11	.92		
	12	.90		
	13	.81		
	14	.80		
	15	.79		
	16	.83		
	17	.83		
	18	.67		
	19	.84		
	20	.75		
DOMESTIC SKILL	1	.72		
	2	.80		
	3	.81		
	4	.80		
	5	.82		
	6	.87		
	7	.89		
	8	.90		
	9	.90		

10	.86	365.42	.9779
11	.88		
12	.89		
13	.89		
14	.88		
15	.88		
16	.80		
17	.79		
18	.80		
19	.77		
20	.58		

p<.05 (rs.19 - .22)

p<.01 (rs.25 - .31)

p<.001 (rs.32 & ABOVE)

The corrected item-to-total correlation of the rural sample within the sub-scales of gross-motor, fine motor, socialization, language comprehension, language expression, eating and meal preparation, toileting, dressing, self-care and domestic skill ranged from .25 to .87, .20 to .85, .21 to .82, .40 to .86, .26 to .92, .29 to .88, .31 to .93, .39 to .93, .34 to .90 and .58 to .90 respectively.

The obtained item-to-total correlation (rs) of item No. 1 to 9 of the gross-motor, item 1 to 3 of the language expression, item 1 to 3 of eating and meal preparation and item No. 1 of toileting sub-scales were significant at p<.01 level. The rs of item No. 1 to 4 of fine-motor and item No. 1 and 2 of socialization sub-scales were significant at p<.05 level. The rest of the items within the ten sub-scales were found to be significant at p<.001 level.

The variance of the 10 sub-scales of the rural sample were 168.56, 184.45, 198.90, 178.82, 244.62, 158.72, 179.87, 280.01, 426.33 and 365.42 respectively.

The alpha coefficient (α) of the 10 sub-scales were .92, .94, .95, .94, .95, .94, .95, .97, .97 and .98 respectively.

TABLE - 14

**The Corrected Item-To-Total Correlation (rs) The Scale Variance
And The Alpha Coefficient Of The Items Within The Different Sub-Scales Of The
Male Sample (N = 67).**

SUB-SCALES	ITEM NO.	CORRECTED ITEM-TO-TOTAL CORRELATION rs	SCALE VARIANCE	ALPHA COEFFICIENT α
GROSS MOTOR	1	.27	201.00	.9375
	2	.27		
	3	.27		
	4	.27		
	5	.27		
	6	.47		
	7	.36		
	8	.45		
	9	.46		
	10	.64		
	11	.66		
	12	.76		
	13	.79		
	14	.85		
	15	.86		
	16	.88		
	17	.89		
	18	.84		
	19	.86		
	20	.81		
	21	.75		
	22	.73		
FINE-MOTOR	1	.30	213.48	.9379
	2	.32		
	3	.30		
	4	.39		
	5	.50		
	6	.59		
	7	.65		
	8	.64		
	9	.73		
	10	.76		
	11	.71		
	12	.79		
	13	.82		
	14	.81		
	15	.83		

	16	.74		
	17	.65		
	18	.69		
	19	.71		
	20	.46		
	21	.63		
	1	.28		
	2	.28		
	3	.48		
	4	.52		
	5	.46		
	6	.70		
	7	.71		
	8	.75		
	9	.79		
	10	.79		
SOCIALIZATION	11	.78	296.57	.9544
	12	.86		
	13	.76		
	14	.76		
	15	.81		
	16	.78		
	17	.62		
	18	.82		
	19	.79		
	20	.74		
	21	.71		
	22	.65		
	1	.26		
	2	.22		
	3	.47		
	4	.51		
	5	.54		
	6	.65		
	7	.66		
	8	.70		
	9	.86		
LANGUAGE	10	.83		
COMPREHENSION	11	.85	227.57	.9496
	12	.86		
	13	.85		
	14	.88		
	15	.74		
	16	.83		
	17	.78		
	18	.73		

LANGUAGE EXPRESSION	1	.21	273.03	.9601
	2	.21		
	3	.21		
	4	.48		
	5	.56		
	6	.86		
	7	.86		
	8	.88		
	9	.87		
	10	.90		
	11	.92		
	12	.91		
	13	.91		
	14	.91		
	15	.89		
	16	.86		
	17	.77		
	18	.71		
	19	.63		
	20	.53		
EATING AND MEAL PREPARATION	1	.35	139.75	.9175
	2	.35		
	3	.35		
	4	.57		
	5	.61		
	6	.67		
	7	.78		
	8	.80		
	9	.82		
	10	.86		
	11	.76		
	12	.73		
	13	.69		
	14	.59		
	15	.53		
	16	.45		
TOILETING	1	.38	188.25	.9503
	2	.41		
	3	.51		
	4	.70		
	5	.70		
	6	.74		
	7	.82		
	8	.86		
	9	.85		
	10	.88		

	11	.79		
	12	.81		
	13	.83		
	14	.77		
DRESSING	1	.46		
	2	.67		
	3	.69		
	4	.80		
	5	.88		
	6	.91		
	7	.91		
	8	.91	247.93	.9624
	9	.92		
	10	.88		
	11	.75		
	12	.77		
	13	.79		
	14	.78		
	15	.36		
SELF-CARE	1	.43		
	2	.48		
	3	.61		
	4	.75		
	5	.75		
	6	.84		
	7	.81		
	8	.83		
	9	.86		
	10	.89		
	11	.89	392.09	.9676
	12	.86		
	13	.86		
	14	.80		
	15	.76		
	16	.73		
	17	.76		
	18	.61		
	19	.80		
	20	.75		
	1	.71		
	2	.77		
	3	.77		
	4	.75		
	5	.81		
	6	.82		
	7	.75		
	8	.82		

DOMESTIC SKILL	9	.87	246.57	.9582
	10	.86		
	11	.74		
	12	.77		
	13	.71		
	14	.72		
	15	.73		
	16	.66		
	17	.61		
	18	.54		
	19	.63		
	20	.31		

<.05 (rs.19 - .22)

<.01 (rs.25 - .31)

<.001 (rs.32 & ABOVE)

Table 14 shows that the corrected item-to-total correlation (rs) of the items within the 10 sub-class - gross motor, fine motor, socialization, language comprehension, language expression, eating and meal preparation, toileting, dressing, self-care and domestic skills for the male sample ranged from .27 to .89, .30 to .83, .28 to .86, .26 to .88, .21 to .92, .35 to .86, .38 to .88, .46 to .91, .43 to .89 and .31 to .86 respectively.

The rs of item No. 1 to 5 within gross-motor, item No. 1 and 2 of social skill, item No. 1 of language comprehension and item No. 1 and 3 within the fine motor sub-scales were significant at $p < .01$ level, item No. 2 of the language comprehension and item No. 1, 2 and 3 of the language expression sub-scales were significant at $p < .05$ level. Rest of the items within all the 10 sub-scales were found to be significant at $p < .001$ level.

The variance of the 10 sub-scale when administered on male sample were 201.00, 213.48, 296.57, 227.57, 273.03, 139.75, 188.25, 247.93, 392.09 and 246.57 respectively.

The alpha coefficient (α) of the 10 sub-scales were .94, .94, .95, .95, .96, .92, .95, .96, .97 and .96 respectively.

TABLE - 15

The Corrected Item-To-Total Correlation (r_s) Scale Variance
And Alpha Coefficient Of The Items Within The Different Sub-Scales Of The
Female Sample (N = 87).

SUB-SCALES	ITEM NO.	CORRECTED ITEM-TO-TOTAL CORRELATION r_s	SCALE VARIANCE	ALPHA COEFFICIENT α
GROSS MOTOR	1	.28	168.37	.9241
	2	.28		
	3	.28		
	4	.28		
	5	.28		
	6	.28		
	7	.28		
	8	.44		
	9	.42		
	10	.55		
	11	.61		
	12	.75		
	13	.73		
	14	.81		
	15	.86		
	16	.84		
	17	.82		
	18	.82		
	19	.80		
	20	.73		
	21	.66		
	22	.71		
FINE MOTOR	1	.19	190.93	.9319
	2	.19		
	3	.26		
	4	.26		
	5	.48		
	6	.52		
	7	.64		
	8	.63		
	9	.60		
	10	.76		
	11	.78		
	12	.79		

	13	.77		
	14	.81		
	15	.83		
	16	.79		
	17	.70		
	18	.74		
	19	.52		
	20	.44		
	21	.63		
	1	.19		
	2	.27		
	3	.33		
	4	.37		
	5	.41		
	6	.68		
	7	.74		
	8	.74		
	9	.82		
	10	.77		
	11	.75		
	12	.79		
	13	.77		
SOCIALIZATION	14	.78	279.75	.9470
	15	.79		
	16	.75		
	17	.74		
	18	.75		
	19	.68		
	20	.64		
	21	.64		
	22	.58		
	1	.39		
	2	.39		
	3	.39		
	4	.46		
	5	.49		
	6	.59		
	7	.68		
	8	.79		
LANGUAGE	9	.82	188.00	.9390
COMPREHENSION	10	.82		
	11	.84		
	12	.82		
	13	.86		
	14	.84		
	15	.69		
	16	.69		

	17	.68		
	18	.67		
LANGUAGE EXPRESSION	1	.21		
	2	.21		
	3	.23		
	4	.46		
	5	.53		
	6	.77		
	7	.84		
	8	.87		
	9	.90	276.77	.9590
	10	.89		
	11	.93		
	12	.93		
	13	.92		
	14	.89		
	15	.86		
	16	.85		
	17	.78		
	18	.69		
	19	.57		
	20	.54		
EATING AND MEAL PREPARATION	1	.31		
	2	.31		
	3	.31		
	4	.43		
	5	.44		
	6	.58		
	7	.77		
	8	.80	178.25	.9306
	9	.85		
	10	.87		
	11	.85		
	12	.85		
	13	.81		
	14	.73		
	15	.69		
	16	.68		
TOILETING	1	.25		
	2	.38		
	3	.50		
	4	.65		
	5	.66		
	6	.78		
	7	.83	232.89	.9471
	8	.84		
	9	.86		

	10	.89		
	11	.85		
	12	.86		
	13	.84		
	14	.76		
	1	.37		
	2	.57		
	3	.65		
	4	.79		
	5	.83		
	6	.90		
	7	.89		
DRESSING	8	.87	232.89	.9595
	9	.89		
	10	.88		
	11	.80		
	12	.78		
	13	.86		
	14	.79		
	15	.43		
	1	.29		
	2	.39		
	3	.57		
	4	.71		
	5	.79		
	6	.82		
	7	.84		
SELF-CARE	8	.84	389.09	.9679
	9	.86		
	10	.89		
	11	.88		
	12	.88		
	13	.80		
	14	.75		
	15	.77		
	16	.80		
	17	.82		
	18	.78		
	19	.77		
	20	.79		
	1	.67		
	2	.75		
	3	.77		
	4	.75		
	5	.83		
	6	.85		
	7	.84		

	8	.90		
	9	.85		
DOMESTIC	10	.86	410.07	.9773
SKILL	11	.88		
	12	.90		
	13	.91		
	14	.91		
	15	.88		
	16	.80		
	17	.79		
	18	.87		
	19	.81		
	20	.57		

p<.05 (rs.19 - .22)

p<.02 (rs.23 - .24)

p<.01 (rs.25 - .31)

p<.001 (rs.32 & ABOVE)

The ranges of the corrected item-to-total correlation (rs) for each items within the 10 sub-scales for the female sample were .28 to .86, .19 to .83, .19 to .79, .39 to .86, .21 to .93, .31 to .87, .25 to .89, .37 to .90, .29 to .89 and .67 to .91 respectively.

The rs of item No. 1 to 7 of the gross motor, item No. 3 and 4 of the fine motor, item No. 2 of socialization, item No. 1, 2 and 3 of eating and meal preparation, item No. 1 of toileting and item No. 1 of self-care sub-scales were found to be significant at p<.01 level. The rs of item No. 1 and 2 of fine motor, item No. 1 of socialization and item No. 1 and 2 of language expression sub-scales were found to be significant at p<.05 level, rs of item No. 3 of the language expression were found to be significant at p<.02 level. Rest of the rs of the items within the 10 sub-scales were found to be significant at p<.001 level.

The variance of the 10 sub-scales were 168.37, 190.93, 279.75, 188.00, 276.77, 178.25, 232.89, 232.89, 389.09 and 410.07 respectively.

The alpha coefficient (α) of the 10 sub-scales were .92, .93, .95, .94, .96, .93, .95, .96, .97 and .98 respectively.

TABLE - 16
The Corrected Item-To-Total Correlation (rs) , Scale Variance
And Alpha Coefficient Of The Items Within The Different
Sub-Scales Of The Total Sample (N = 154).

SUB-SCALES	ITEM NO.	CORRECTED ITEM-TO-TOTAL CORRELATION rs	SCALE VARIANCE	ALPHA COEFFICIENT α
GROSS MOTOR	1	.30	185.03	.9307
	2	.30		
	3	.30		
	4	.30		
	5	.30		
	6	.30		
	7	.30		
	8	.41		
	9	.43		
	10	.59		
	11	.63		
	12	.75		
	13	.76		
	14	.82		
	15	.85		
	16	.86		
	17	.86		
	18	.88		
	19	.84		
	20	.77		
	21	.71		
	22	.72		
FINE MOTOR	1	.20	200.03	.9343
	2	.21		
	3	.21		
	4	.32		
	5	.49		
	6	.55		
	7	.65		
	8	.64		
	9	.65		
	10	.75		
	11	.75		
	12	.80		
	13	.80		

	14	.81		
	15	.83		
	16	.77		
	17	.67		
	18	.71		
	19	.61		
	20	.44		
	21	.63		
SOCIALIZATION	1	.28		
	2	.28		
	3	.40		
	4	.43		
	5	.43		
	6	.69		
	7	.73		
	8	.74		
	9	.80		
	10	.77		
	11	.76	285.80	.9503
	12	.82		
	13	.77		
	14	.77		
	15	.79		
	16	.76		
	17	.68		
	18	.78		
	19	.73		
	20	.69		
	21	.68		
	22	.59		
LANGUAGE COMPREHENSION	1	.42		
	2	.42		
	3	.42		
	4	.48		
	5	.51		
	6	.61		
	7	.67		
	8	.75		
	9	.83	205.09	.9439
	10	.82		
	11	.84		
	12	.84		
	13	.86		
	14	.86		
	15	.72		
	16	.76		
	17	.73		

	18	.70		
	1	.22		
	2	.22		
	3	.22		
	4	.47		
	5	.54		
	6	.81		
	7	.85		
LANGUAGE	8	.88	273.48	.9594
EXPRESSION	9	.89		
	10	.89		
	11	.93		
	12	.92		
	13	.92		
	14	.90		
	15	.87		
	16	.85		
	17	.77		
	18	.70		
	19	.59		
	20	.56		
	1	.32		
	2	.32		
	3	.33		
	4	.50		
	5	.52		
	6	.62		
EATING AND	7	.77	147.02	.9241
MEAL PREPARATION	8	.80		
	9	.84		
	10	.86		
	11	.81		
	12	.80		
	13	.76		
	14	.67		
	15	.63		
	16	.59		
	1	.31		
	2	.40		
	3	.50		
	4	.67		
	5	.69		
	6	.81		
	7	.83		
	8	.85		
TOILETING	9	.86	181.89	.9483
	10	.89		

	11	.83		
	12	.84		
	13	.84		
	14	.77		
	1	.41		
	2	.62		
	3	.67		
	4	.80		
	5	.85		
	6	.91		
	7	.89		
	8	.88		
DRESSING	9	.90	238.63	.9606
	10	.88		
	11	.77		
	12	.77		
	13	.83		
	14	.79		
	15	.79		
	1	.36		
	2	.43		
	3	.59		
	4	.73		
	5	.77		
	6	.83		
	7	.83		
SELF-CARE	8	.83	387.89	.9677
	9	.86		
	10	.89		
	11	.88		
	12	.86		
	13	.82		
	14	.77		
	15	.76		
	16	.77		
	17	.79		
	18	.70		
	19	.78		
	20	.72		
	1	.68		
	2	.75		
	3	.77		
	4	.74		
	5	.81		
	6	.83		
	7	.81		
	8	.87		

DOMESTIC	9	.85	338.73	.9712
SKILL	10	.84		
	11	.83		
	12	.86		
	13	.85		
	14	.85		
	15	.83		
	16	.76		
	17	.72		
	18	.77		
	19	.75		
	20	.76		

p<.05 (Rs.19 - .22)

p<.01 (Rs.25 - .31)

p<.001 (Rs.32 & ABOVE)

The corrected item-to-total correlation coefficient (rs) of each item within the 10 sub-scales of the total sample were computed. The rs for the items within each sub-scales ranged from .30 to .86, .20 to .81, .28 to .82, .42 to .86, .22 to .93, .32 to .86, .31 to .89, .41 to .90, .36 to .89 and .68 to .87 respectively. It was found that the rs of the item No. 1 to 7 of the gross-motor item No. 1 and 2 of socialization and item No. 1 of the toileting sub-scale were significant at p<.01 level. Item No. 1, 2 and 3 within the fine motor and item No. 1, 2 and 3 within the language expression sub-scales were significant at p<.05 level. The rest of the items within the 10 sub-scales were found to be significant at p<.001 level.

The scale variance of the 10 sub-scales ranged from 181.89 to 387.81 which were very high.

The alpha coefficient (α) of the 10 sub-scales were .93, .93, .95, .94, .96, .92, .95, .96, .96 and .97 respectively were also very high.

The variance of the 10-sub-scales ranged from 181.89 to 387.89 (Table - 17).

FORMULA OF VARIANCE :

$$S_x^2 = \sum_i^n S_i^2 + 2 \sum_{i,j}^{n(n-1)/2} r_{ij} S_i S_j$$

TABLE - 17

Variance Of The Ten Sub-Scales Within The Main Scales

Subscales	Scale Variance
A. Gross Motor	185.03
B. Fine Motor	200.03
C. Socialization	285.80
D. Language Comprehension	205.09
E. Language Expression	273.09
F. Eating And Meal Preparation	147.02
G. Toileting	181.89
H. Dressing	238.63
I. Self Care	387.89
J. Domestic Skill	338.73

The corrected item-to-total correlation for the urban and rural, male and female as well as the total sample were found to be significant for all the items within the ten sub-scales. The items within all the sub-scales for all the samples met the criteria of ($p < .05$) for inclusion in the scale.

A large variance of a particular item in a scale tends to have greater contribution to the variance of the test as a whole. Therefore, a difficulty value between .30 and .70 of an item were set to be the criteria for inclusion of the item in a test. The obtained variance of the ten sub-scales ranged from 181.89 to 387.89 were also found to be quite high indicating the high discriminating ability of the scale, thus meeting the criteria of inclusion of the items in the scale (Table 17).

Moreover, the Alpha coefficient through which the internal consistency were estimated; ranged from .92 to .97 indicating high internal consistency and further confirmed the appropriateness of the items for measuring individual differences in independent functioning (Table 12, 13, 14, 15, 15 and 16). Therefore, all the items were retained on the basis of the three criteria.

Finally all the 188 items within the sub-scales were rearranged in an order from easy to difficult. For rearranging the items the weighted mean of each item within the sub-scales were computed following the method presented in Appendix-A.

CHAPTER THREE

PHASE-II

RELIABILITY, VALIDITY AND NORM CONSTRUCTION STUDY

INTRODUCTION

Determining the reliability and validity of the test is an integral part of the process of establishing the usefulness of scientifically constructed tests. Reliability refers to the consistency of the scores obtained by the same person when re-examined with the same test on different occasion, or with different sets of equivalent items, or under variable examining conditions. Through reliability the extent to which individuals differences in test scores are attributable to "true" differences in the characteristics under consideration and the extent to which they are attributable to chance errors are indicated (Anastasi, 1982). The concept of test reliability has been used to cover several aspects of score consistency. Reliability of a test is its ability to consistently measure the traits which it intends to measure throughout a series of measurement. When a test is reliable, scores obtained by the members of the group will differ very little from the scores obtained by repeated application of the same test. Without the evidence of the degree of consistency of a measurement (reliability) little faith on the occurring of the test scores can be placed. Of the different methods of reliability testing the Test-Retest and the Inter-Rater reliability method were used to determine the reliability of IBAS.

Similarly without evidence of the validity of a test, what the test actually measures would not be known. A test is valid when it can measure exactly what it is designed to measure. The validity of any measuring scale depends upon the fidelity with which it measures what it purports to measure. Three important procedure for testing the validity has been recommended by the psychometricians, such as Content, Criterion-related and construct validity. The type of validity and the procedure of estimating it are to be selected on the basis of the nature and purpose of the test. In order to test the validity of the Independent Behaviour Assessment Scale (IBAS) the construct validity was determined. The construct related validity of a test is the extent to which the test may be said to measure a theoretical

construct or trait. Any data throwing light on the nature of the trait under consideration and conditions affecting its development and manifestation represent appropriate evidence for this validation (Anastasi 1982). Therefore, the construct validity of the scale was demonstrated by showing that the results corresponds to the theories of adaptive or independent behaviour in terms of having positive correlation with other tests measuring similar traits, internal consistency of the scale; scores discriminating among groups expected to differ in adaptive behaviour or independent functioning; and scores increasing with ages (developmental changes).

Finally test scores by themselves have no meaning unless compared with those of other individual who have taken the tests. Therefore test norms should be constructed for interpreting the test scores. Norm is the average or typical score of a particular test obtained by a specified population. Reference to a table of norm, the rank of an individual's performance related to his own and other group are determined. Norms are empirically established by determining what a representative group of persons actually do on the test. Commonly used type of norms are Percentile, Decile, Standard score, Normalized standard score, T-score, Stanine score etc. Percentile norm and Mean and Standard Deviation have been calculated for the present scale. Percentile rank of a score represents the percent of cases in a comparison group who falls below a given raw score. Thus a percentile indicates the individual's relative position in the standardization sample and are also useful in comparing individual's own performance on different test. Percentile norms has the following advantages than any other norms. It could easily be calculated, easily understood by untrained persons; there is no need of making assumption with regard to the characteristics and to the total distribution; it has universal applicability. Therefore, percentile norm was thought to be the most appropriate norm for the interpretation of the test score.

The present study was conducted for determining the reliability, validity and construction of norms for the IBAS.

METHODS

Subjects For Determining Reliability, Validity And Norm Construction

The subjects for determining the reliability validity and norm construction of the scale were selected from a nationwide research entitled "Epidemiological Study on Childhood Disability in Bangladesh" conducted in 1987 and 1988 by the Department of Psychology, Dhaka University in collaboration with the Gertrude Sergievsky Centre, Columbia University, New York, USA.

Epidemiological Study on Childhood Disability followed a two-staged modified cluster sampling technique of the Expanded Programme of Immunization (EPI) (Lemeshaw and Stroh, 1988). The subjects were selected from the five areas of the four divisions of Bangladesh - Dhaka, Chittagong, Khulna and Rajshahi. The primary selection of sites (division was done on the basis of the following three factors : 1. Urban or rural, 2. Regional topography such, as, plains, costal area or hilly region, 3. Iodine deficient zone. The list of the five sites chosen from the four divisions and the reason for selecting the sites have been presented in Table-18.

TABLE - 18**List Of The Five Sites By Division And Reasons For The Selection**

Divisions Of Bangladesh	Site No.	Name Of The Sites	Reason For Selection
Dhaka	1	Dhaka City	Plain, Urban
	2	Dhamrai Union	Plain, Rural
Barisal	3	Babuganj Union	Coastal, Rural
Rajshahi	4	Ulipur Union	Iodine Deficient Area, Rural
Chittagong	5	Chittagong City	Hilly Region, Urban

Sampling Technique

A two-stage design was followed in selecting the sample. In the first stage updated list of Mahallas/cluster (census enumeration units 1981 census) and numbers of household in each cluster (constituting the primary sampling unit PSU) were prepared based on information from the Bangladesh Bureau of Statistics with the help of faculty members of the Department of Statistics, Dhaka University. Following the list 10 or 15 cluster were systematically selected from the total number of cluster in each of the five areas of Bangladesh: two urban towns (Dhaka and Chittagong) and three villages (Dhamrai in Dhaka District, Babuganj in Barisal district and Ulipur in Kurigram district).

At this stage for selecting children between 2-9 years from each clusters the following steps of the EPI method was followed.

1. The first household or sampling unit was randomly selected from within each of the 10/15 cluster.
2. The selected household was visited by the community workers to determine if there were any children between 2 to 9 years living in that household.
3. If 'yes' then the required informations regarding the family and the child were collected by the Community Workers. Three questionnaires were used by the Community Workers such as : I Household Form (HF), II Mother Child Form (MCF) and III The Ten Question with Probes (TQP).
4. If the first house did not have a target child then the next nearest household was visited and so forth. This procedures continued until a total of 100 to 170 children were included from each cluster. The same procedure were followed for all the five sites. The final sample included a total number of 10,229 children.

In the second stage, all the children screened by the TQP as positive i.e. having any one of the disabilities (visual impairment, hearing impairment, motor disability, mental retardation

and seizures) or problems and an 8.2% random sample with negative screening results i.e. children having no problem or disability, were professionally evaluated by the physician and the psychologist. In total 1626 children were examined by the paediatrician and tested by the psychologist.

Of the 1626 children examined/assessed by the professionals (paediatrician and psychologists) 1404 children were diagnosed as normal while 222 children were found to be suffering from some kind of disability. The subjects for determining the validity, reliability and Construction of Norms for the Independent Behaviour Assessment Scale (IBAS) were randomly selected from this 1626 subjects. Out of the 1626 subjects 46.37% were from the urban and 53.63% from the rural areas. 55.60% of the total sample were male and 44.40% were female. The distribution of the sample of subjects according to the age, gender and place of residence has been presented in - Table-19.

TABLE - 19

Distribution Of The Sample According To Age Gender And Area Of Residence

Age In Years	Urban		Rural		Total
	Male	Female	Male	Female	
2	42	35	29	34	140
3	42	47	46	49	184
4	50	40	56	43	189
5	48	39	81	66	234
6	58	42	50	37	187
7	65	51	98	70	284
8	55	44	50	37	186
9	52	44	85	41	222
	412	342	495	377	1626
	754		872		
	(46.37%)		(53.63%)		

Of the total samples 13.65% had some kind of disabilities. Of these disabled population 48.65% were from the urban area and 51.35% from the rural areas. The distribution of the sample according to the age, place of residence and condition of the subjects (normal and disabled) has been presented in Table-20.

TABLE - 20
Distribution Of The Sample According To Age,
Area Of Residence And Condition Of The Subject

Age In Years	Urban		Rural		Total
	Normal	Disabled	Normal	Disabled	
2	63	14	55	8	140
3	77	12	83	12	184
4	82	8	93	6	189
5	75	12	137	10	234
6	91	9	73	14	187
7	100	16	137	31	284
8	80	19	73	14	186
9	78	18	107	19	222
	646	108	758	114	1626
	(46.01%)	(48.65%)	(53.98%)	(51.35%)	

Subjects For Determining The Reliability

A total number of 68 children (32 males and 36 females) of whom only 3 were having some kinds of disability were randomly selected from the total sample of 1626 for determining the Test-retest and Inter-rater reliabilities of the scale. Distribution of the subjects included in reliability studies have been presented in Table-21.

TABLE - 21
Distribution Of Subjects According To Age, Gender And
Diagnosis Selected For Reliability Testing

Age Range	Gender		Diagnosis	
	Male	Female	Normal	Disabled
2-3 Years	8	12	19	1
4-5 Years	8	7	14	1
6-7 Years	10	9	19	0
8-9 Years	6	8	13	1
	32	36	65	3
Total	68		68	

Subjects For Determining The Validity

The construct validity of the scale was determined by comparing the IBAS scores with the scores obtained by the same subjects on the following tests and questionnaires, administered at the same time.

- (a) Stanford Binet Intelligence Scale-IV (Standardized for use in Bangladesh).
- (b) Denver Developmental Screening Test (DDST)
- (c) (Standardized for use in Bangladesh).
- (d) Childhood Disability Questionnaire (CDQ).
- (e) External Validity Questionnaire.

(a) Subjects For Comparing IBAS Vs Stanford Binet Intelligence Scale Score

For the estimation of the construct validity of IBAS through comparison of the IBAS Scores with the scores of Stanford Binet Intelligence Scale, 1391 subjects were randomly selected from the total sample of 1626 subjects. Of these subjects 642 from the urban area and 749

from the rural area. Both the IBAS and the Stanford Binet Intelligence Scale were administered on these subjects at the same time. Distribution of the subjects according to the age and place of residence has been presented in Table-22.

TABLE - 22

Distribution Of The Subjects According To Age, And Place Of Residence Selected For Determining The Construct Validity Through Comparing Scores Of IBAS And Stanford Binet Intelligence Scale

Age In Years	Urban	Rural	Total
2	63	52	115
3	74	85	159
4	82	91	173
5	87	125	212
6	87	77	164
7	91	143	234
8	81	69	150
9	77	107	184
Total	642	749	1391

(b) Subjects For Comparing The IBAS Vs Denver Development

Screening Test (DDST) Scores

For determining the construct validity of IBAS through comparison of the IBAS scores with the scores of DDST, 60 subjects on whom DDST were administered were selected. Of these subjects 27 were male and 33 female. Independent Behaviour Assessment Scale (IBAS) and the Denver Developmental Screening Test (DDST) were administered on these subject at the same time. Distribution of the subjects according to age and gender has been presented in Table-23.

TABLE - 23

Distribution Of Subjects According To Age And Gender Selected For Determining The Validity Of The IBAS Using Scores From The Ddst For Comparison

Age In Years	Gender		Total
	Male	Female	
2	26	30	56
3	1	3	4
Total	27	33	60

(c) Subjects For Comparing The IBAS Vs Rating On

Childhood Disability Questionnaire (CDQ)

Scores obtained by 183 subjects on Childhood Disability Questionnaire (CDQ) were randomly chosen for comparison with the scores obtained on the Independent Behaviour Assessment Scale (IBAS) by the same subjects for determining the construct validity. Distribution of the subjects according to gender and place of residence has been presented in Table-24.

TABLE - 24

Distribution Of The Subjects According To Gender And Place Of Residence Selected For Determining The Construct Validity Using Scores Of CDQ For Comparison

Area Of Residence	Gender		Total
	Male	Female	
Urban	43	43	86
Rural	56	41	97
Total	99	84	183

**(d) Subjects For Comparing The IBAS Vs Scores On External
Validity Questionnaire**

The construct validity of IBAS was further determined by comparing the scores of IBAS with the scores obtained on the External Validity Questionnaire. A total number of 233 subjects were randomly selected from the total sample of 1626 for the comparison. The distribution of the subjects according to age and gender has been presented in Table-25.

TABLE - 25
Distribution Of Subjects According To The Age, And Gender
For Determining The Construct Validity Using The Scores
Of External Validity Questionnaire

Age In Years	Gender		Total
	Male	Female	
2	10	11	21
3	10	24	34
4	14	13	27
5	13	15	28
6	15	16	31
7	21	13	34
8	11	16	27
9	18	13	31
Total	112	121	233

Subjects For Contrasted Group Validity :

For determining the construct validity of the IBAS by the method of contrasted group, the scores on the scale obtained by 222 subjects between 2-9 years who were diagnosed by professionals (Paediatrician and Psychologists) as having some kind of disability were compared with the scores obtained by 1404 children who were diagnosed as normal by

the professionals. Distribution of the subjects according to the diagnosis, gender and place of residence has been presented in Table-26.

TABLE - 26

Distribution Of Subjects According To The Diagnosis Gender And Area Of Residence For Determining The Construct Validity Through Contrast Method

Diagnosis	Urban		Rural		Total
	Male	Female	Male	Female	
Normal	352	294	436	322	1404
Disabled	60	48	59	55	222
Total	412	342	495	377	1626

Subjects For Construction Of Norms

A total number of 1404 children diagnosed as normal by the paediatrician and psychologists with age ranging from 2 to 9 years were chosen from the sample of 1626 subjects for construction of norms. Out of the total sample 46.01% were from the urban and 53.99% from the rural areas. Of the urban sample 54.49% were male and 45.51% were female and 57.12% of the rural sample were male and 42.87% were female.

An average of 175 children were representing each age group from 2-9 years. Distribution of the subjects used for norm construction has been presented in Table-27.

TABLE - 27

**Distribution Of Subjects According To Age, Gender
And Area Of Residence For Construction Of Norms**

Age In Years	Urban		Rural		Total
	Male	Female	Male	Female	
2	36	27	25	30	118
3	34	43	39	44	160
4	45	37	53	40	175
5	43	32	75	62	212
6	51	40	46	27	164
7	57	43	78	59	237
8	45	35	45	28	153
9	41	37	75	32	185
	352	294	436	322	1404
Total	(54.49%)	(45.51%)	(57.52%)	(42.48%)	
	646		758		
	(46.01%)		(53.99%)		

Measures Used

The sample of subjects used for determining the reliability, validity and construction of norm of the Independent Behaviour Assessment Scale (IBAS) were drawn from the Epidemiological Studies on Childhood Disability. In the original study of epidemiology a two stage design was followed. In stage-I the following four questionnaires were administered on the mothers by the Community Workers.

1. Household Form (HF) :

This form was used to collect socio-demographic data from each household having children aged 2-9 years. The form consisted of informations regarding occupation,

education of the head of the family types of house the family possessed or lived and other facilities the families were provided with.

2. Mother Child Form (MC) :

This form comprised of questions, regarding the age, education, occupation, consanguinity, history of pregnancy of the mother and birth history of the child.

3. Ten Questions With Probes (TQP) :

The questionnaire comprised of Ten Questions with Probes - one question each concerning the child's vision, hearing, movement and seizures, six questions concerning cognitive competence, and one extra question regarding other serious health problems. The probe questions were asked only if a problem was reported in response to a main question. The questionnaire was in a Yes/No format developed by A.M. Clarke, L. Belmont, H.S. Narayana and H. Sell in 1981.

4. External Validity Questionnaire - For Measuring The

Functional Level Of The Child In Ten Skill Areas

382465

This questionnaire consisted of additional ten questions to be rated on a three (3) point scale, each question concerning the child's level of independent functioning in gross-motor, fine-motor, socialization, language comprehension, language expression, eating and meal preparation, toileting, dressing, self-care and domestic skill. The external validity questionnaire were initially rated by the Community Workers on administration of the questionnaire on a person familiar with the child in stage I and later by the professional on administering the questionnaire on the mother or caretaker in stage II during the professional evaluation.

In stage-II for the professional evaluation along with the Independent Behaviour Assessment Scale (IBAS) the following measures were used.



1. Medical Assessment Form (MAF) :

MAF was developed by Leslie Davidson, Naila Khan, M. Thoburn and Z. Hasan in 1986. The MAF comprised of the medical history, observation of function, physical examination, neurological examination, anthropometric measurement, vision test and audiometry.

2. Psychological Assessment :

(a) Childhood Disability Questionnaire (CDQ) :

The revised version (1986) of the original CDQ developed by Lillian Belmont, and Ann M. Clarke in 1980 which was used for detecting severe mental retardation and associated disabilities in the developing countries. The CDQ comprised of 22 questions concerning features of mental retardation, developmental milestones, toilet and feeding habits, dressing, language and domestic skills and interviewers observation of the child. The CDQ focused heavily on cognitive competence.

(b) Denver Developmental Screening Test (DDST)

A screening test developed by Frankenburg and Dodds (1967), adapted and standardized (Ferial, 1980) for use in Bangladesh for detecting developmental delays in infancy and childhood in the area of personal social, gross motor, language and fine motor development.

(C) Stanford Binet Intelligence Scale (Forth Edition)

The five nonverbal sub-tests (Pattern Analysis, Copying, Quantitative, Bead-memory and Memory for Digits) from the Stanford Binet Intelligence Scale, 1986 revision by Thorndike, Hagen and Sattler were used to measure the cognitive skills of children. The sub-tests were selected in consultation with the authors because these non-verbal sub tests appeared to be less culture-bound and attempted to measure specific factor of quantitative reasoning, abstract/visual reasoning and short-term memory which were used as a measures of intellectual ability.

Procedure :

The study for determining the reliability and validity and norm construction was again conducted in two phases. In the first phase samples were selected followed by a two-stage

design, and in the second phase the validity, reliability of the scale were determined and the Norms were constructed.

In stage-I of the first phase of the study a group of six (6) trained community workers were hired for each site who visited the households door to door and administered the Household Form (HF), Mother Child Form (MC) and the Ten Questions with Probes (TQP) on mothers having children between 2-9 years of age.

Along with three forms (HF, MC and TQP) the External Validity Questionnaire which was developed for measuring the functional independence of the children of different skill area were also administered by the Community Workers on persons who knew the child well (an aunt, grand parents, other relatives or a neighbour).

In stage-II all the children who were having any disability and a random sample of normal children screened by the TQP by the community workers were evaluated by the professional.

The professional evaluation was simultaneously carried out by two paediatricians, and four psychologists who were trained in conducting the Medical Assessment Form and Psychological assessment such as CDQ, Stanford Binet Intelligence Test, Independent Behaviour Assessment Scale (IBAS), Denver Developmental Screening Test (DDST) and the External Validity Questionnaire.

A thorough Medical Assessment were carried out for these children which comprised of medical history taken from the parents to obtain detailed information of the child's any perceived problems, age of onset, events associated, treatment received, family history, birth history, parental consanguinity, post and perinatal problems, nutritional status, developmental milestone etc. Physical examination for detecting goiter and Xerophthalmia, observation of function, neurological examination, anthropometric measurement, visual acuity test and audiometry were also done by Landholf Chart and picture chart by the paediatrician.

The Childhood Disability Questionnaire (CDQ) which heavily focused on cognitive competence were administered on the subjects by two trained psychologists. The five non-verbal tests Pattern Analysis, Copying, Quantitative, Bead Memory and Memory for digit) of the Stanford Binet Intelligence Scale 1986 revised edition were also administered on these children by the psychologists following standard instructions included in the respective manuals of each tests. The External Validity Questionnaire was at this stage administered on the mother by the professional.

The final form of the Independent Behaviour Assessment Scale (IBAS) was administered on the sample of 1626 children by two trained psychologists and the author herself. While administering the IBAS the examiner strictly followed the Interviewer's Manual containing specific information about the criteria for scoring each items in the test booklet, as to how to administer each item/task be administered by using different materials like toys, story book etc.

For determining the Test-Retest reliability of the IBAS 68 children from the total sample were randomly selected and re-assessed by the same raters for the second time after a gap of 14 days to one month. Two weeks was considered optimal for minimizing the likelihood that raters would remember previous rating. The Pearson Product - moment correlation coefficient was applied to measures the reliability.

For estimating the inter-rater reliability, two raters (one psychologist trained for administering the scale and the author herself) rated 46 children randomly selected from the subjects selected for test retest reliability separately at the same time following the interviewers manual. The ratings of the two raters were then compared. The pearson product moment correlation coefficient was applied to compare the ratings of the two raters.

The construct validity of the IBAS was determined by the following methods :

1. Correlation with other tests.
2. Internal consistency.

3. Contrasted group validity.
4. Developmental changes.

1. Correlation with other tests : The construct validity of the IBAS was determined by correlating the scores obtained in different traits with the following standardized tests and questionnaires measuring similar or different traits which were administered at the same time.

- (a) Stanford Binet Intelligence Scale.
- (b) Denver Developmental Screening Test (DDST).
- (c) Childhood Disability Questionnaire (CDQ).
- (d) External Validity Questionnaire.

a) IBAS vs Stanford Binet Intelligence Scale

Person Product moment correlation were computed for finding the relationship between the full scale scores obtained in IBAS and the Partial Composite Standard Age Scores (PCSAS) of the Stanford Binet Intelligence Scale.

b) IBAS vs Denver Developmental Screening Test

Construct validity of a test or scale is demonstrated through the convergent and discriminant validation - a process through which it is demonstrated that tests correlates with other variables with which it should theoretically correlate, and does not correlate with variables from which it should differ (D.T. Cambell, 1960). The method suggested by Campbell and Fiske (1959) for determining the convergent and discriminant validation is the multitrait - multimethod matrix. The Campbell and Fiske's criteria for convergent and discriminant validity were applied to four major scales (Socialization cum Daily living skill, Gross motor, fine motor and Communication) measuring the 4 major skill areas that were common to both the IBAS and DDST.

c) IBAS vs Childhood Disability Questionnaire

The scores of different sub-scales of the IBAS were also compared to the scores on different questions of CDQ concerning skills similar to the IBAS for determining the test

validity. To analyze the data pearson-product moment correlation coefficient were computed.

d) IBAS vs External Validity Questionnaire

The construct validity was further determined by comparing the scores of the IBAS with the scores obtained in the External Validity Questionnaire when rated by the Community Workers and reported by a third person other than the mother; and when rated by the psychologists and reported by the mother about the child's performance. For the data analysis pearson product moment correlation coefficient were computed.

2. Internal Consistency : The construct validity of the IBAS was also determined by the method of internal consistency. The criterion of internal consistency involves the correlation of the subtest scores with the total score of the scale. The internal consistency of the sum of scores computed on the basis of the domain scores were assessed by Alpha Coefficient (Cronbach, 1951).

Correlation between the total score and their respective domains were computed in order to determine the extent to which each domain measured the same characteristics as the total score. To avoid spuriously inflated coefficient, each domain score was removed from the total score with which it was correlated.

3. Contrasted Group Validity : Another method for testing the validity of the IBAS were the method of contrasted group. Thus in validating the IBAS the performance of the normal children were compared to the performance of the children with disability.

4. Developmental Changes : To test the construct validity of IBAS the test scores were checked against chronological age to determine whether the scores show a progressive increase with the increase of age.

Universality Of The Scale

For determining the universality of the nature of the items of the scale (i.e. if there was any difference in performance between the children according gender i.e. male, female and

place of residence i.e. rural, urban) the scores obtained by the 907 male children (of which 412 were residing in the urban and 495 in the rural area) and 719 female children (of which 342 were residing in the urban and 377 residing in the rural area) were compared at each age level from 2 to 9 years. t test was applied for the comparison.

Construction Of Norms

Each items on the Independent Behaviour Assessment Scale (IBAS) were scored on a 4 point scale eg 3,2,1 and 0 (zero). Scores for all the items on the four major scale (motor, socialization, communication and daily living skill) and ten sub-scales (gross motor, fine motor, language comprehension, language expression, eating and meal preparation, toileting, dressing, self-care and domestic skill) within the major scales were added together to obtain a separate raw score for the ten sub-scales within the major domain and a composite of the four major scale i.e. Motor, Socialization, Communication and Daily Living Skill.

These raw scores were transformed into percentile rank. These percentile ranks were then plotted on the profile summary sheet at the back cover page of the record booklet to provide a visual representation of the individual child's level of independent functioning. A summary report for parents and teachers were given at the end to provide meaning to the test scores.

The Mean and Standard Deviation of the raw scores on the four (4) main scale - Motor, Socialization, Communication and Daily Living Skill and 10 sub-scales within the main scale as well as the total composite scores for all the scale were calculated for interpreting the derived functional level for each age group from 2-9 years. The scores were interpreted as follows: high (more than two standard deviation above the mean); moderately high (between one and two standard deviation above the mean); adequate (between one standard deviation above and one standard deviation below the mean); moderately low (between one and two standard deviation below the mean); and low (more than two standard deviation below the mean).

RESULT AND DISCUSSION

The final form of the test was administered on the sample of 1626 subjects selected from the Epidemiological Study for determining the reliability, validity and construction of Norm.

Reliability

The reliability of the Independent Behaviour Assessment Scale (IBAS) was established by the following methods.

1. Test-Retest Reliability
2. Inter-Rater Reliability

1. Test-Retest Reliability : Product-moment co-efficient of correlation was computed between the scores obtained by the subjects on the full-scale and the 4 main scales by age in the first and second administration. The obtained reliability coefficient has been presented in Table-28 and 29.

TABLE - 28
Test-Retest Reliability Coefficient Of The Independent
Behaviour Assessment Scale (IBAS) For Each Age Group

Age in Years	N	First Testing		Second Testing		Reliability Coefficient
		X	SD	X	SD	
2	8	214.50	72.60	228.50	71.33	.99
3	10	305.70	66.53	314.30	89.92	.97
4	12	307.00	42.03	335.58	45.53	.64
5	7	358.42	105.27	377.71	102.94	.98
6	9	456.88	58.88	472.75	43.06	.91
7	8	458.88	25.25	473.11	21.44	.91
8	9	486.22	58.72	501.88	48.44	.98
9	5	513.60	48.32	520.40	39.55	.94

*** $p < .001$

TABLE - 29
Test-Retest Reliability Coefficient Of The 4-Main Scales
(Motor, Socialization, Communication And Daily Living)
Of IBAS By Age

Age in Years	N	Reliability Coefficient			Daily Living
		Motor	Socialization	Communication	
2	8	.98	.86	.96	.99
3	10	.86	.78	.95	.92
4	12	.70	.73	.75	.81
5	7	.96	.95	.98	.97
6	9	.83	.85	.88	.78
7	8	.77	.78	.89	.89
8	9	.89	.98	.92	.95
9	5	.94	.99	.91	.92

*** $p < .001$

2. Inter-Rater Reliability :

Product-moment co-efficient of correlation was computed between the ratings of the two raters on the full scale and each of the 4-main scales by age. The obtained reliability coefficient between the two raters rating has been presented in Table-30 and 31.

TABLE - 30

Inter-Rater Reliability Coefficient Of The Independent
Behaviour Assessment Scale (IBAS) For Each Age Group

Age In Years	N	Rater - 1		Rater - 2		Reliability Coefficient
		X	SD	X	SD	
2	3	257.00	74.64	260.00	101.23	.99
3	8	301.12	83.07	306.62	99.88	.98
4	8	339.62	41.83	339.37	47.47	.98
5	4	388.00	88.72	390.50	109.65	.99
6	8	454.22	51.15	460.60	42.63	.96
7	5	462.12	23.15	471.62	22.42	.86
8	6	502.00	26.87	507.83	29.13	.93
9	4	517.50	41.31	515.75	44.06	.99

*** p<.001

TABLE - 31

Inter-Rater Reliability Coefficient Of The 4 Main-Scale (Motor,
Socialization, Communication & Daily Living) Of IBAS By Age

Age in Years	N	Reliability Coefficient			Daily Living
		Motor	Socialization	Communication	
2	3	.99	.71	.99	.98
3	8	.97	.95	.98	.96
4	8	.78	.81	.96	.96
5	4	.93	.99	.99	.99
6	8	.72	.64	.71	.82
7	5	.81	.85	.83	.89
8	6	.90	.72	.86	.93
9	4	.98	.97	.99	.99

*** p<.001

Result indicated a high correlation between the rating of the independent functioning of the child when rated by two individual rater. The inter-rater reliability coefficient for all the 4-main scales and the full-scale score at each age level were found to be significantly high ranging from .64 to .99.

The Independent Behaviour Assessment Scale's (IBAS) Interviewers Manual provided a section (containing information about the criteria for scoring each items as well as description of specific materials to be used and techniques of using) for the raters to be followed while assessing the children. Moreover, the person who rated or assessed the children had extensive training in administering the IBAS which attributed to the high inter-rater as well as test retest reliability coefficient of the scale. Extensive training of the raters also might helped in gaining more consistency among raters.

Validity

The construct validity of the scale was determined through the following procedure :

1. Comparing the IBAS scores with the following tests and questionnaires :

- a. Stanford Binet Intelligence Scale-IV
- b. Denver Developmental Screening Test (DDST)
- c. Childhood Disability Questionnaire (CDQ) &
- d. External Validity Questionnaire.

It was hypothesized that the correlation between the IBAS score and the above tests and questionnaire would be from low to moderately high depending on the type of tests being used for comparison.

2. Internal Consistency

3. Comparing the scores obtained on IBAS by the normal children and children with disability. (contrasted group validity)

4. Showing that scores increase with the age. (Developmental Changes).

1 a. IBAS vs Stanford Binet Intelligence Scale

The assumption for the correlation between the IBAS and Stanford Binet Intelligence Scale was that the intelligence scores and the scores on IBAS would differ slightly. It was hypothesized that both the instrument would measure a similar but different construct.

The full scale scores of the IBAS were compared to the Partial Composite Standard Age Scores (PCSAS) of the five non-verbal subtests of the Stanford Binet Intelligence Scale using the Pearson Product moment correlation. The Mean and Standard Deviation for the IBAS and the Stanford Binet Scale for age ranging from 2-9 years were presented in Table-32.

TABLE - 32
Mean And Standard Deviation For The IBAS And
Stanford Binet Intelligence Scale By Age

Age in Years	N	Instruments			
		IBAS		Stanford Binet	
		X	SD	X	SD
2	115	232.75	55.95	41.73	44.96
3	159	293.31	95.01	63.10	33.69
4	173	353.12	65.95	66.42	25.85
5	212	395.17	64.89	69.71	19.88
6	164	430.39	61.59	67.73	21.73
7	234	468.17	51.61	65.74	17.34
8	150	495.92	41.98	65.88	17.33
9	184	516.73	35.18	66.28	14.24
N =	1391				

The obtained correlation between the IBAS and Stanford Binet Intelligence Scale for the age ranging from 2-9 years were $[r(115) = .45, p < .001]$, $[r(159) = .41, p < .001]$, $[r(173) =$

.30, $p < .01$], $[r(212) = .33, p < .001]$, $[r(164) = .19, p < .05]$, $[r(234) = .15]$, $[r(150) = .32, p < .001]$ and $[r(184) = .06]$ respectively. The obtained correlation between the two measures ranged from low to moderate level (TABLE-33).

TABLE - 33

**Pearson Product-Moment Correlation Of The Full-Scale Score
Of IBAS And PCSAS Of The Stanford Binet Intelligence Scale**

AGE IN YEARS	N	COEFFICIENT OF CORRELATION
2	115	.46 ***
3	159	.41 ***
4	173	.30 **
5	212	.33 ***
6	164	.19 *
7	234	.15
8	150	.32 ***
9	184	.06

* $p < .05$

** $p < .01$

*** $p < .001$

The result of the present analysis revealed a consistent low to moderate correlation of .06 to .46 between the IBAS and Stanford Binet Intelligence Scale. Correlation between adaptive or independent behaviour scale with test of intelligence or achievement should not be too high but moderately high indicating less similar construct are being measured. Therefore, the low to moderate correlation between the two measures were an evidence that the IBAS and Stanford

Binet were measuring a construct that were less similar. However, an important question concerns about the relationship between intelligence and adaptive or independent behaviour whether these two constructs are independent of each other or a part of a more general construct of developmental level (Reschly, 1982).

A moderate correlation would be expected between intelligence and adaptive behaviour since there are mentally retarded and developmentally delayed children who show potential for high level of adaptive or independent behaviour. Therefore, a scale designed to measure independent behaviour should yield score indicating the assessment of a construct that is different from but related to intelligence since both measures provide evidence of psychological development (Lambert, 1981). Thus a moderate correlation between I.Q. and independent behaviour scores would indicate that a common construct underlies the development of intelligence and independent functioning. The finding of the present study was in favour of the suggestion provided by Lambert.

The obtained correlation between the PCSAS of the Stanford Binet Intelligence Scale and the 4 Main Scales of the IBAS (motor, socialization, communication and daily living skill) measuring the level of independent functioning for children with age ranging from 2-9 years ranged from (.19 to .44), (.04 to .27), (.19 to .42) and (.06 to .34) respectively which were from very low to moderate level (TABLE-34).

TABLE - 34
Correlation Of The 4-Main Scale Scores Of The IBAS With
The PCSAS Of The Stanford Binet Intelligence Scale

Age in Year	N	Scale	Independent Behaviour Assessment Scale (IBAS)			
		Stanford Binet	Motor	Socializatio n	Communicatio n	Daily Living Skill
2	115	PCSAS	.44	.18	.49	.34
3	159	PCSAS	.37	.20	.38	.23
4	173	PCSAS	.32	.27	.36	.20
5	212	PCSAS	.35	.27	.45	.23
6	164	PCSAS	.30	.14	.31	.07
7	234	PCSAS	.23	.13	.25	.02
8	150	PCSAS	.43	.18	.44	.21
9	184	PCSAS	.19	.04	.19	.06

p<.05 (rs.19 - .22)

p<.02 (rs.23 -.24)

p<.01 (rs.25 - 31)

p<.001 (rs .32 & ABOVE)

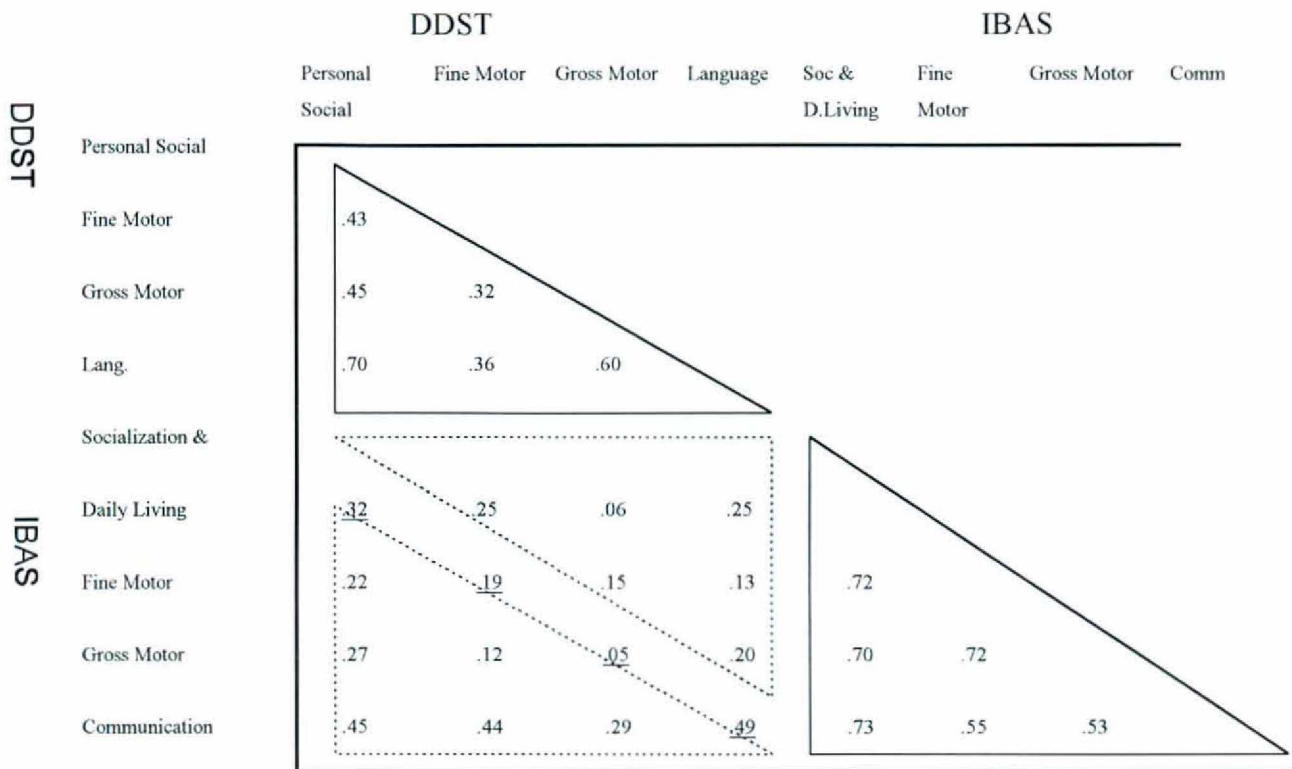
1 B. IBAS Vs Denver Developmental Screening Test (DDST)

The multitrait-multimethod approach suggested by Campbell and Fiske (1959) to examine the convergent and discriminant validity for measuring the construct validity of IBAS were applied. The subjects score on the four main-scales measured by the two instruments (IBAS and DDST) were intercorrelated. Mean and Standard Deviation for the 4-main scale and the full scale for IBAS and DDST has been presented in Table-35.

TABLE - 35
Mean And Standard Deviation Of The 4-Main Scales
And The Full Scale Scores Of IBAS DDST

Scales	Instruments			
	IBAS		DDST	
	X	SD	X	SD
Gross Motor	40.50	6.96	12.20	3.91
Fine Motor	24.86	8.56	20.68	3.77
Communication	54.70	19.43	21.25	5.17
Socialization Plus Daily Living Skill	96.86	33.85	21.70	4.68
Full Scale	217.00	61.54	20.76	3.44

The matrix of correlation between the 4 scales were presented in figure-2.

**Figure : 2**

Correlation Between The Sub-Scales Of The Independent Behaviour Assessment Scale (IBAS) And Denver Developmental Screening Test (DDST).

- NOTE :**
- * Underlined Values Are The Validity Coefficient.
 - * Each Heterotrait-Monomethod Triangle Is Enclosed By Solid Line —————
 - * Each Heterotrait-Heteromethod Triangle Is Enclosed By Broken Line - - - - -

Result showed that the validity Coefficient i.e. the correlation between the socialization cum daily living skill, fine motor, gross motor and communication skill areas when measured by the IBAS and DDST ranged from .05 to .49 (underlined values within the diagonal entries) with mean ranging from 24.86 to 96.86 and 19.20 to 21.70 respectively were significant at a low to moderate level (Table-35, Figure-2).

diagonal entries) with mean ranging from 24.86 to 96.86 and 19.20 to 21.70 respectively were significant at a low to moderate level (Table-35, Figure-2).

It was also found that the intercorrelation within the scores of the four main scales of the DDST and IBAS (presented within the solid triangle) ranged from .32 to .70 with mean ranging from 12.20 to 21.70 and .53 to .73 with mean ranging from 24.86 to 96.86 respectively were significant from moderate to high. Moreover, the obtained correlation of the score between different scales when measured by both the DDST and IBAS (presented within the broken triangles) with the correlation of two scales examining the gross motor skill ranged from .06 to .45 were also significant at a low to moderate level.

The comparison between the correlation within the hetro-trait monomethod (within the solid triangle) and hetro-trait-hetromethod (within the broken triangle) revealed that the correlation of all the other traits ranged from moderate to high excepting few correlation within the gross and fine motor traits (within the broken triangle) which were quite low .12, .06, .15 and .13 (Figure 2).

The obtained result revealed a significant correlation of .32, .49 and .19 for the socialization cum daily living, communication and fine motor skill area though at a moderate and low level when measured by the IBAS and DDST. This type of correlation which was significantly different from zero and of sufficient size to encourage examination, fulfilled the criteria of convergent validity set by Campbell and Fiske (1959).

The result also revealed that the validity coefficient (underlined values within the diagonal entries) were less than the correlation (presented within the solid triangles). This correlation failed to meet the first criteria of discriminant validity set by Campbell and Fiske (1959).

Result further showed that the validity coefficient of the communication skill were .49, exceeded all the correlation value (presented within the broken triangle) thus able to fulfill the second criteria of discriminant validity.

Finally the pattern of correlation for all the other scales (presented within the solid triangle and values presented within the broken triangle) ranged from moderate to high excepting for the scales measuring gross and fine motor traits which were quite low. Therefore, the pattern of correlation were found to be almost similar. However, it may be concluded from the result that the IBAS and DDST measured the traits which were quite similar.

1 c. IBAS Vs Childhood Disability Questionnaire (CDQ)

Pearson Product-moment correlation were computed between the four main scales of IBAS (measuring the motor, socialization, communication and daily living skills of the children) with the ratings on the questions of the Childhood Disability Questionnaire (CDQ) which provided information on development of skills similar to IBAS. It was hypothesized that there would be a moderate to high correlation between the traits. The Mean and Standard Deviation of the IBAS and CDQ has been presented in Table-36.

TABLE - 36
Mean And Standard Deviation Of The - 4 - Main Scale
Of The IBAS And CDQ

Skills Areas	Measures Used			
	IBAS		CDQ	
	X	SD	X	SD
Motor Skill	112.70	11.32	2.90	.34
Socialization Skill	54.33	10.05	2.72	.49
Communication Skill	104.96	13.67	13.61	3.43
Daily Living Skill	211.57	36.62	11.55	1.17

The obtained correlation in the 4 skill areas were $[r(183) = .57, p < .001]$, $[r(183) = .29, p < .01]$, $[r(183) = .14]$ and $[r(183) = .62, p < .001]$. The correlation matrix were presented in Table-37.

TABLE - 37
Correlation Matrix Of The Four Main Scale
Scores Of IBAS And Ratings On The CDQ

IBAS Scores	Ratings On CDQ			
	Motor Skills	Socialization Skills	Communication Skills	Daily Living Skills
Motor Skill	.57 **	.50 **	.62**	.63 **
Socialization Skills		.29*	.35*	.29*
Communication Skills			.14	.25*
Daily Living Skill				.62 **

* $p < .01$

** $p < .001$

The obtained correlation of the score between the 4-main scales(motor, socialisation, communication and daily living skills) and the scores obtained ion the questionnaire appraising the same skill area where .57, .29,.14 and .62 respectively. The Correlation of motor, socialization and daily living scale were significant at a moderate to high level except for the communication scale which were relatively low. The reason being that the question in the CDQ measuring the communication scale were not suitable and could not measure the area appropriately. However, it was clearly evident that both the IBAS and CDQ measured similar traits or domains.

1 d. IBAS Vs External Validity Questionnaire

Pearson product-moment correlation were obtained between the scores of the IBAS and the ratings on the External Validity Questionnaire-1 (when rated by the Community Workers) and External Validity Questionnaire-2 (when rated by the professional). It was hypothesized that the correlation between the IBAS scores and the scores on external validity rating would be moderate to high. It was also hypothesized that the correlation between the IBAS score and scores on External Validity rating when rated by psychologists and reported by the parents would be comparatively higher than when rated by the Community Workers and reported by a third person. The mean scores obtained for the IBAS and the External Validity Questionnaire 1 and 2 has been presented in Table-38.

TABLE - 38
Mean Scores By Age For The IBAS And External
Validity Questionnaire 1 & 2

Age in Years	N	Mean of IBAS	External Validity 1	External Validity 2
2	21	216.00	12.42	12.52
3	32	289.78	16.80	16.13
4	27	337.67	18.36	17.67
5	28	416.14	19.78	19.82
6	31	446.87	20.67	20.41
7	34	477.05	20.68	20.87
8	27	515.96	20.69	20.87
9	31	522.00	20.90	20.97

The obtained correlation between the IBAS Scores and External Validity Questionnaire-1 ranged from .20 to .56 Table-39.

TABLE - 39
Pearson Product-Moment-Correlation Coefficient Of The IBAS Scores
And The Ratings Of The External Validity Questionnaire-1

Age in Age	N	Coefficient Of Correlation
2	21	.56 **
3	32	.45 **
4	27	.40 **
5	28	.26 **
6	31	.32 **
7	34	.20 *
8	27	.26 **
9	31	.53 **

* $p < .05$

** $p < .001$

The obtained correlation between the IBAS Scores and External Validity Questionnaire-2 ranged from .21 to .77 (Table-40). The obtained correlation between the IBAS rating and External Validity 2 were found to be higher than the correlation between IBAS and External Validity 1.

TABLE - 40
Pearson Product-Moment Correlation Coefficient Of IBAS Scores
And The Ratings On External Validity Questionnaire-2

Age In Years	N	Coefficient Of Correlation
2	21	.77 ***
3	32	.47 ***
4	27	.46 ***
5	28	.36 ***
6	31	.42 ***
7	34	.21 *
8	27	.22 *
9	31	.58 ***

* $p < .05$

*** $p < .001$

The obtained correlation between the IBAS scores and the ratings on the External Validity Questionnaire 1 (when rated by the community worker and reported by a third person other than mother) ranged from .20 to .56 which were significant from moderate to high (Table 39). On the other hand the correlation between the IBAS scores and the rating on the External Validity Questionnaire 2 (when rated by the psychologist and reported by the mother) ranged from .21 to .77 which were also significant from moderate to high (Table 40). It was also found that the correlation between the IBAS and rating on the External Validity Questionnaire 2 were comparatively higher than the correlation between the IBAS and rating on External Validity Questionnaire 1. (Table 39, 40).

From this result it was evident that the IBAS could successfully assess the functional independence or adaptive behaviour of children and the mother was the appropriate

person for judging the child's performance than a person who is familiar with the child be it a grandmother, close relative or neighbour.

2. INTERNAL CONSISTENCY

The internal consistency assessed by the Coefficient Alpha (Cronbach, 1951) equaled to .81. The Correlation coefficient between the total scores and their respective domains were .88, .87, .86 and .91 for the motor, socialization, communication and daily living scales respectively (Table-41).

TABLE - 41
The Domains-To-Total Correlation (R) Of The Four Main Domains (Motor, Socialization, Communication & Daily Living Skill) With The Alpha Coefficient

Domains	Domains-To-Total Correlation	Coefficient Alpha
Motor Skill	.88	.81
Socialization Skill	.87	
Communication Skill	.86	
Daily Living Skill	.91	

The high internal consistency of IBAS assessed by the Coefficient Alpha (Cronbach, 1951) and the resultant correlation between the total scores and its consistent domain which were also high lent support to the construct validity of the Independent Behaviour Assessment Scale (IBAS).

Contrasted Group Validity

The contrasted group validity of the IBAS was also determined by comparing the scores obtained by the children diagnosed as normal and children having any disability. The assumption underlying such procedure was that children with disability would differ from

the normal children in their ability to learn the skills required for independent functioning. The rationale for this was the difference in the performance by the disabled and normal children. t-test was applied for finding the significant difference between the disabled and the normal children. The obtained t value between the mean scores of the two contrast group at each age level from 2 to 9 years were found to be significantly different at .001 with df 138, df 182, df 187, df 232, df 285, df 282, df 184 and df 220 ($p < .001$) respectively (Table 42).

TABLE - 42
Mean, SD And T-Value Obtained Between The Normal
Subjects And Subjects With Any Disability By Age

Age in Years	Subject	N	X	SD	T-value
2	Normal	118	232.02	55.81	7.84 ***
	Disabled	22	123.73	76.64	
3	Normal	160	293.03	54.96	7.04 ***
	Disabled	24	196.12	102.21	
4	Normal	175	353.45	65.84	5.82 ***
	Disabled	13	244.43	86.17	
5	Normal	212	395.17	64.89	5.42 ***
	Disabled	22	306.14	130.73	
6	Normal	164	430.39	61.59	3.77 ***
	Disabled	23	372.13	110.96	
7	Normal	237	468.27	51.37	4.27 ***
	Disabled	47	430.64	71.96	
8	Normal	153	495.41	42.34	5.92 ***
	Disabled	33	427.94	108.48	
9	Normal	185	516.44	35.32	5.61 ***
	Disabled	37	467.43	89.53	

*** $p < .001$

T-test was also computed between the scores obtained by the normal subjects and the subjects with different types of disability - any cognitive disability, any motor disability and hearing difficulty, any vision problem and any seizure problem). The obtained t-value between the mean scores of the normal subjects and subjects with any cognitive and motor disability were significant at .001 with df 1494 and df 1497 ($p < .001$) respectively. The t-value obtained between the mean score of the normal subject and subject with any hearing and vision problem were significant at .01 with df 1477 and 1433 ($p < .01$) respectively. The t-value obtained between the mean scores of the normal subjects and subject with seizure were not significant (Table 43).

TABLE - 43
Mean, SD And T-Value Obtained Between The Normal Subjects
And Subjects With Different Types Of Disability

Subjects	N	X	SD	T-Value
Normal	1404	407.97	102.66	12.55 **
Any Cognitive Disability	92	265.66	138.61	
Normal	1404	407.97	102.66	13.34 **
Any Motor Disability	55	214.91	155.82	
Normal	1404	407.97	102.66	2.77*
Any Hearing Disability	75	441.89	109.62	
Normal	1404	407.97	102.66	2.45*
Any Vision Disability	41	367.71	134.83	
Normal	1404	407.97	102.66	1.60
Seizure Problem	19	369.95	106.67	

* $p < .01$

** $p < .001$

Therefore, the evidence of construct validity was demonstrated by showing the discriminating ability of the scale scores among group expected to differ in adaptive behaviour or independent functioning. The present study also provided evidence of construct validity by demonstrating the difference in performance on different domain by the normal children and children with different types of disability (cognitive, motor, hearing and vision).

4. Developmental Changes :

A major criterion employed in validation of a test is age differentiation. Since abilities are expected to increase with age during childhood, it is argued that the test scores should likewise show such an increase if the test is a valid one (Anastasi, 1982).

The scores obtained by the normal subjects at each age level demonstrated a gradual increase with an increase in the age of the children (Table 44, Figure-3).

TABLE - 44
Mean Score And SD Obtained By The Normal Subjects By Age

Age In Years	N	X	SD
2	118	232.02	55.81
3	160	293.03	54.96
4	175	353.45	65.84
5	212	395.17	64.89
6	164	430.39	61.59
7	237	468.27	51.37
8	153	495.41	42.34
9	185	516.44	45.32

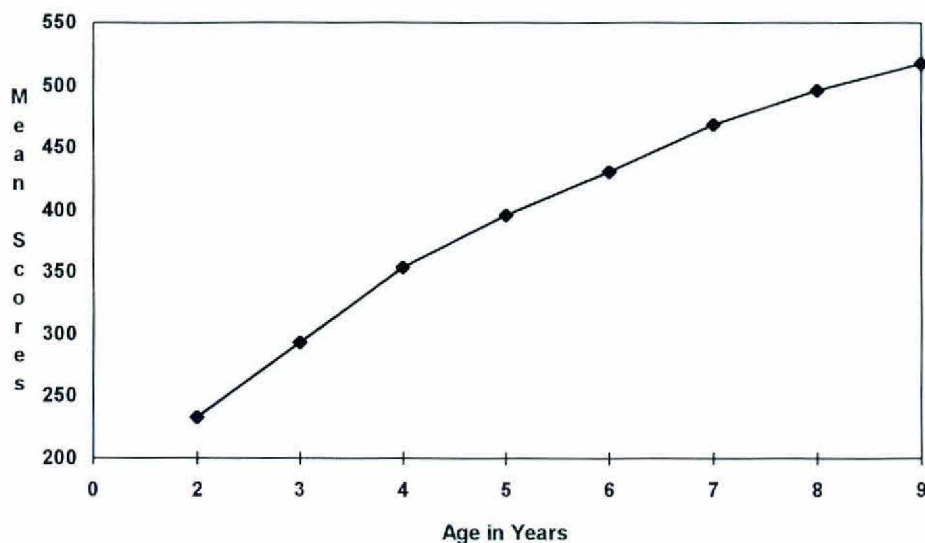


Figure: 3 Curve Showing The Increase Of The Scores With An Increase In Age (Following Table-44)

The findings of the study therefore demonstrated the construct validity by showing that the result corresponds to the theories of adaptive behaviour in terms of scores increasing with age.

Universality Of The Scale

The universality of the nature of the scale items were determined by computing t-test between the scores obtained by the subjects according to the place of residence (rural and urban) and gender (male and female) at each age level. No significant differences were found in the obtained t-value between the scores obtained by the male subjects according to the place of residence (urban, rural) at each level from 2-9 year (Table 45).

TABLE - 45

Mean, SD And T-Value Obtained Between The Urban
And Rural Male Subjects At Each Age Level

Age In Years	Subjects	N	X	SD	T-Value
2	Urban Male	42	200.74	66.49	-1.54
	Rural Male	29	225.79	67.63	
3	Urban Male	42	265.04	68.27	- .92
	Rural Male	46	279.28	77.01	
4	Urban Male	50	342.76	74.25	-.21
	Rural Male	56	345.78	74.84	
5	Urban Male	48	386.29	81.77	.65
	Rural Male	81	377.00	72.51	
6	Urban Male	58	417.38	67.44	- .74
	Rural Male	50	426.58	61.65	
7	Urban Male	65	461.67	52.31	.48
	Rural Male	98	457.55	56.61	
8	Urban Male	55	477.85	55.82	.00
	Rural Male	50	477.80	73.89	
9	Urban Male	52	504.36	58.23	- .22
	Rural Male	85	506.42	43.15	

The obtained t-value between the scores obtained by the female subjects according to the place of residence (rural, urban) at each age level from 2 to 9 years were also found to be insignificant (Table-46).

TABLE - 46
Mean, SD And T-Value Obtained Between The Urban
And Rural Female Subjects At Each Age Level

Age In Years	Subjects	N	X	SD	T-Value
2	Urban Female	35	207.14	71.33	- 1.35
	Rural Female	34	231.50	77.76	
3	Urban Female	47	288.17	71.97	.07
	Rural Female	49	287.12	65.38	
4	Urban Female	40	338.57	71.27	- .99
	Rural Female	43	354.18	72.86	
5	Urban Female	39	392.84	92.72	.16
	Rural Female	66	395.63	71.19	
6	Urban Female	42	431.61	55.16	.70
	Rural Female	37	418.35	102.87	
7	Urban Female	51	457.31	64.06	- 1.33
	Rural Female	70	472.14	55.83	
8	Urban Female	44	489.25	71.56	- .23
	Rural Female	37	492.43	54.98	
9	Urban Female	44	509.00	64.27	- .61
	Rural Female	41	516.26	45.10	

Construction Of Norm :

Two types of norms - Mean (M) and Standard Deviation (SD) and Percentile Rank (PR) were computed for an easy understanding and interpretation of the derived scores even by technically untrained person. Since the items of the scale were constructed according to the place of residence (urban, rural) and gender (male, female) no significant variation were found between the performance level of the male and female children residing in the urban and rural areas. Therefore, norm tables for the total sample irrespective of place of residence and gender were constructed. The Mean (M) and Standard Deviation (SD) has been presented in Appendix - D for the 4 main scales, 10 sub-scales and full scale scores by age. The percentile rank for the total sample for each age group from 2-9 years were also computed for the 10 sub-scales and the 4-main scales and presented in the Appendix - D. The norm of the scale were easy to understand and interpret.

CHAPTER FOUR

GENERAL DISCUSSION

The present study aimed at developing a scale named "Independent Behaviour Assessment Scale" (IBAS) for measuring the adaptive behaviour or skills required for independent functioning of 2 to 9 year old children of Bangladesh.

Adaptive Behaviour is considered to be an ecological measure of the fit between the children and his or her significant environment. An understanding of how well the child functions within his or her community and cultural group is sought for the purpose of providing a profile of the whole child. Therefore, the scale was developed on the basis of ecological theory which is concerned with the child and his or her interaction with various social and physical environment. Accordingly, 4 major category and 10 sub-categories of functional skills (Motor, Socialization, Communication, Daily Living Skills. Gross motor, Fine motor, Social interaction, Language Comprehension, Language Expression, Eating and meal preparation, Toileting, Dressing, Self-Care and Domestic Skill) were identified.

The steps followed in the development of the IBAS were, item-construction, pre-testing of the items, determining the face validity of the items, determining the scoring procedure of the scale, item analysis, determining the reliability and validity of the scale and construction of norms.

The items were constructed on the basis of observation of the child's behaviour in varied situation, interviewing parents and consultation of relevant literature. The item analysis for final selection of the items were done through administration of the scale on a sample of

154 subjects on the basis of the following 3 criterion measure, the corrected item-to-total correlation, scale variance and Alpha Coefficient.

All the items within the 10 sub-scales irrespective of place of residence (rural, urban) and gender (male, female) were found to be significant at $P < .05$ level and met the criteria for inclusion in the scale (Table 12, 13, 14, 15 and 16).

The larger the variance of the scale the more accurately the scale discriminates or shows variation between those individual to whom it could be appropriately administered (Ferguson, 1981). The high variance on the ten sub-scales which ranged from 181.89 to 387.81 indicating high discriminative ability of the scale also met the criteria of inclusion of the item in the scale (Table 17).

Through the measure of Alpha coefficient the internal consistency based on the average correlation among item within the sub-scales were estimated. This provided an estimate of the extent to which a sub-scale consistently samples a given attribute (Nunnally, 1967). A criteria of .70 is often used to indicate acceptable internal consistency (Cronbach, 1951). The obtained Alpha coefficient for the sub-scales of the Independent Behaviour Assessment Scale (IBAS) ranged from .92 to .97 indicating excellent internal consistency i.e. items within different sub-scales measured the same respective attribute (Table 12, 13, 14, 15 and 16). Therefore the internal consistency assessed by alpha coefficient also indicated the appropriateness of the 188 item of the scale. On the basis of these three indices all the 188 items were retained.

The reliability of IBAS was estimated by two methods. The test-retest and inter-rater reliability methods. The test-retest reliability coefficient for all the 4 major scales by age as well as the full scale when administered after a gap between two weeks to one month were

found to be significantly high ranging from .64 to .99 (N=68) (Table 29). The result indicated the stability of the rating over time.

Although stable ratings were provided by the raters, often times result of independent functioning might vary significantly due to factors like: (a) lack of training in administering the scale and interviewing people, (b) the person providing information about the child, (c) amount of time spent on observing the child, (d) variation of the child's mood and behaviour during assessment. However, a precise evaluation criteria for assessment of particular assessment would provide precise result. Since these criteria has been presented in the Interviewer's Manual of IBAS a stable rating over time has been obtained.

Moreover, the study also indicated high correlation in the ratings of the independent functioning of the children when rated by two individual raters separately with the IBAS. The inter-rater reliability coefficient in all the four scales and the full scale for both the raters were significantly high ranging from .64 to .96 (Table 31). Salvia and Ysseldyke (1985) suggested a correlation of .90 would be minimum for tests used in eligibility decision for individual children. Aiken (1985) suggested a correlation of .85 were satisfactory. Guilford (1978) preferred .90 but noted that this standard would rarely be attainable. Therefore a correlation of .85 was employed in evaluating adequacy of the reliability of a scale. Thus, from the point of view of the above criteria, result obtained for both test-retest and inter-rater reliability of the scale ensured that the Independent Behaviour Assessment Scale (IBAS) was a reliable instrument for measuring the functional independence and adaptive behaviour of children.

The validity of the IBAS was estimated by correlation with other standardized tests and questionnaire. A consistent low to moderate correlations ranging from .06 to .46 were obtained between the IBAS and the Partial Composite Standard Age Score (PCSAS) of

Stanford Binet Intelligence Scale 1986 version (Table 33) supporting the contention that functional independence, adaptive behaviour and intelligence were simply different aspects of the same general construct.

This finding was supported by the finding of Platt, Kamphaus, Cole and Smith (1991) who found a moderate correlation of (.39, .37 and .38) between the Vineland Adaptive Behaviour Scale, the Stanford Binet Intelligence Scale IV and the Weschler Intelligence Scale for Children Revised (WISC-R). Reschly (1982) summarized the results of studies on correlation between Vineland Social Maturity Scale (VSMS) (Doll, 1965) and Children's Adaptive Behaviour Scale (CABS) Richmond and Kichlighter, (1980) and found that they correlate at a moderate level. Study by Keith, Fehrman, Harrison and Pottebaum (1987) about the relationship between intelligence and adaptive behaviour using confirmatory factor analysis confirmed that intelligence and adaptive behaviour are separate but related construct also in support of the present finding.

The present study also revealed that the communication area of the IBAS was an indicator for measuring intellectual ability of the children because of having high correlation with the Stanford Binet Intelligence Scale.

This finding was supported by the findings of Lambert and Windmiller (1981) who found a correlation ranging from .18 to .63 between Part-I AAMD Adaptive Behaviour Scale - School Edition (ABS-SE) and Intelligence test scores of regular, EMR and TMR students. The highest value were reported for Language Development ($r=.33$ to $.62$). Such correlation would be expected since these skills reflect cognitive functioning that correlates with intelligence.

Using the Multitrait-multimethod matrix suggested by Campbell and Fiske (1959) the convergent and discriminant validity was determined for demonstrating the construct validity of IBAS by correlating the scores obtained by the subject on different traits when measured by IBAS and DDST. For the inspection of the matrix for evidence of convergent validity, convergent validity would be evident when correlation between scores for the same traits measured by different instruments would be significantly different from zero and of sufficient size to encourage examination. The validity coefficient (underlined values within diagonal entries) indicated that when socialization cum-daily living skill and communication skills were measured by the IBAS and DDST, they significantly correlated though at a moderate level (.32 and .49 respectively) Figure-2. However, the matrix of intercorrelation showed that with the exception of the gross-motor score ($r=.05$) the validity coefficient of other domain or scale indicated a consistent pattern of positive correlation of more than .100. This type of positive correlation appeared to indicate that the scores on the socialization cum daily living skill, fine motor and communication skill when measured by IBAS and DDST were intercorrelated. The intercorrelation between the fine motor skill measured by the IBAS and DDST was significant, though at a relatively low level ($r=.19$).

The first criteria of the discriminant validity was that the correlation between the corresponding traits measured by different test (values presented in the validity diagonal, figure 2) should be higher than the correlation between different traits measured by same test (values presented within solid triangle Figure-2).

Result showed that the validity coefficient of the socialization cum daily living skill, fine motor, gross motor and communication skill which were .32, .19, .05 and .49 were less than its comparison value (presented within the solid triangle, figure 2). This correlation failed to meet the criteria due to high correlation between traits.

Secondly, the correlation between the corresponding traits measured by different tests (values within the validity diagonal) should be higher than the correlation between different traits measured by different tests (values within the broken triangle). It was evident from the result that the validity coefficient of the communication skill traits which was .49 exceeded all the comparison value in the row and column (presented within the broken triangle). Therefore, the results suggested that the communication domain were able to satisfy the second criteria of discriminant validity and thereby shared the common method variance.

Thirdly, the pattern of correlation in the heterotrait-monomethod (values within the solid triangle) and other hetero-trait hetero-method (values within the broken triangle) should be comparable. The correlation of all other domain/traits ranged from moderate to high excepting the fine and gross motor domain which were comparatively low. Thus the pattern of correlations were almost similar for different domains. The reason behind the low correlation of these two domain may be that DDST was basically a screening test administered within a short period. The items for assessing different domain were insufficient and the scoring based mainly on parents report with very little opportunity to observe the child. Moreover, the scoring were on a pass fail basis, which does not provide the exact level of the child's development on each domain. Therefore, the comparison between the two instruments may not be highly comparable. Campbell and Fiske's suggestion were only used as a guideline for determining the convergent and discriminant validity. These method were basically used for validating attitudes or personality traits. Therefore, the traits in a adaptive behaviour or developmental test which were termed as heterotraits infact were not hetero-trait.

However, in summary it can be said that the correlation between the Independent Behaviour Assessment Scale (IBAS) and Denver Developmental Screening Test (DDST)

indicated that both the instruments measured similar domain. From the perspective of Campbell and Fisk's (1959) criteria for convergent and discriminant validity the most valid scale of IBAS were the Social cum Daily Living and Communication Scale.

It was further revealed from the comparison of the IBAS with the Childhood Disability Questionnaire (CDQ) that IBAS seemed to be a valid measure of the functional skills. The validity of the scale was also determined by correlating the IBAS scores and rating on a Questionnaire measuring the child's functional ability on the same skills measured by the IBAS. For obtaining a reliable measure the Questionnaire was first rated by the community worker and reported by a third person and secondly it was rated by a psychologist and reported by the mother. In both the cases the correlation were found to be moderate to high .20 to .56 and .21 to .77 (Table 39, 40), but comparatively higher when reported by the mothers.

The validity of the IBAS was also carried out by the method of contrasted group. The contrasted group were the normal children and the children with different types of disability. Result showed significant difference in performance level between the two contrasted group depending on the types of disability (Table 42, 43). It was further revealed that the difference in performance were more significant between the children with vision and hearing disability. The reason for this could be attributed to the fact that the child with vision and hearing problem could function quite independently excepting for activities requiring visual or hearing skills which are not absolutely essential for survival. But children with motor disability or cognitive problem will always be lacking in skills required for independent functioning which are essential for ones survival.

Moreover, the difference in independent functioning or adaptive behaviour between normal children and children with cognitive disability further confirms the definition of Mental Retardation.

A major criteria employed in the validation of a test has been the age differentiation. Since abilities were expected to increase with age; the test scores should likewise show an increase. Therefore, the validity of the IBAS was proved by the increase of the scores obtained by the subjects with an increase of the age (Table 44, figure 3).

The internal consistency correlation were essentially the measures of homogeneity. Because, it helped to characterize the behaviour domain or traits sampled by the tests, the degree of homogeneity of a test had some relevance to its construct validity (Anastasi, 1982). The high internal consistency of the IBAS assessed by the Coefficient Alpha (Cronbach, 1951) and the correlation between the total score and its domain score was an evidence of having a high degree of homogeneity further supporting the construct validity of the scale.

Test score by themselves had little meaning. They attain meaning only when an individuals score was compared with scores of other person who had taken the test. By comparing the individual child's score with the score of a norm group the relative performance of the child could be determined. Therefore, it was essential that the sample upon which the test norms are based be representative of the population for which the scale was devised. The sample used for construction of the norm for the IBAS were a true representative of children residing in Bangladesh. The norm was constructed in respect of gender and residence. The norm of the scale were easy to understand and interpret.

Mean (M) and Standard Deviation (SD) of the different sub-scales and the full scales of Independent Behaviour Assessment Scale (IBAS) were computed to see how widely the individual scores were scattered for construction of Norms. Based on this Mean (M) and Standard Deviation (SD) the scores would be functionally interpreted in terms of the individual child's level of independent or adaptive functioning. This kind of score

interpretation would permit statements like: "A child obtaining score above more than two standard deviation above the mean were able to function at a higher level required for his/her age in a respective skill area; a child obtaining score falling between one and two standard deviation above the mean were able to function at a moderately higher level required for the age; a child obtaining a score falling between one standard deviation above and one standard deviation below the mean were able to function adequately required for the age, a child obtaining scores falling between one and two standard deviation below the mean were able to function at a moderately lower level, and a child obtaining scores falling more than two standard deviation below the mean were able to function at a low level. This kind of interpretation helps describe test performance in absolute and familiar tests that are easily transmitted and understood. The tables of Norms of the IBAS were presented in Appendix D (Table 1,2,3,4 and 5).

Percentile scores were easy to compute, readily understood even by untrained person and suitable for any types of test. For a country like Bangladesh where the literacy rate were 32%, percentile rank were thought to be the appropriate norm for interpretation of the scale scores. Parentile ranks (PR) are essentially self interpreting and are used for making relative types (i.e. normative) of evaluation of the individual's performance. Through the PR the relative position of the child's functional level could be simply explained to the parents through a profile or graph. All the scores were arranged in order of performance level and fitted to rank from 0 to 100. The highest score would be at the 100th percentile, and the half way at the 50th percentile. A child whose level of performance was better than the three quarter of the group would be at or above 75th percentile. Percentile Ranks were computed for the total sample for all the ten sub-scales and full scale at each age level and presented in Appendices D. (Table 6-29).

Coulter (1980) stated that adaptive behaviour scale or scale for measuring functional skill were typically used for two primary purpose:

- (a) to obtain data for the identification of children with special needs and placement in the special education programme.
- (b) to obtain information for planning educational and intervention programme for children with special need. The finding of the present study clearly showed that IBAS could generally discriminate normal children from children with cognitive, motor, hearing and vision problems (Table 37). Therefore, the IBAS were found to be suitable for use in identifying of children with different types of disability. The finding of the present study also revealed that adaptive behaviour or functional independence was related to but different from intelligence. Therefore, I.Q. measures were not enough for identification of mentally handicapped children. Along with I.Q. scores, scores for functional independence would be required for identification and placement.

Secondly, the present study also provided a profile of scores on different domain and sub-domain of IBAS which would help in determining relative strength and weaknesses of the children in those areas that needs to be addressed in designing intervention programme. Moreover, the items under each behavioural domain were presented in terms of tasks based on which the curriculum for training skills required for independent living could be developed for children with special needs. A curriculum based on IBAS would help teach essential survival skills rather than specific abilities useful only in restricted environment. This scale could also help in evaluating the effectiveness of intervention programme at the end of training.

In Bangladesh, no test has yet been developed which could help in programme planning for children with special needs. Few western scale were standardized and used for screening purpose. Therefore, the Independent Behaviour Assessment Scale (IBAS) could be considered as opening up a new avenue for development of other scales and tests in the field of disability in Bangladesh.

In view of the experiences gained from the studies conducted for developing the present scale and considering its usefulness in diagnosis, training and evaluation of the progress made by the children with special needs, some recommendations and suggestions for conducting further studies to improve and refine the "INDEPENDENT BEHAVIOUR ASSESSMENT SCALE (IBAS) " have been forwarded in the following paragraphs :

1. Since the current definition of Mental Retardation evolved by the AAMD, Grossman 1983 and accepted by WHO states that there must be a "deficit" of adaptive behaviour associated with or existing concurrently with sub-average general intellectual ability, and manifested during the developmental period", any scale developed to assess deficits in adaptive behaviour or intelligence should cover the developmental period from birth to 18 years of age. Therefore, the IBAS needs to be extended downwards to "0" age level and upwards upto 18 years.
2. As deficits in intellectual ability and adaptive behaviour are the two main components used to determine whether a person is mentally retarded or not (Grossman, 1983) it should be kept in mind that the adaptive behaviour scale could only provide information about functional abilities of an individual and not intellectual abilities. Therefore, the IBAS should also be validated against other available standardized intelligence scales like WISC-R to determine that adaptive behaviour and intelligence are different but related constructs for determining Mental Retardation.

3. As current working definition of Mental Retardation has moved away from a clinical model to educational one, importance needs to be given on training the mentally retarded to overcome their deficits in adaptive behaviour. But in addition to deficits in adaptive behaviour many mentally retarded persons have problem behaviour. Therefore elimination of problem behaviour also becomes part of the training programme and for this purpose, the problem behaviours needs to be assessed. Therefore a list of items for assessing most frequently observed problem behaviours should be included in the assessment scale.
4. The objective of the scale construction for behavioural assessment was to make the scale exhaustive by covering as many behavioural domains as possible to lead mentally retarded children from dependence to independence. Therefore, it is suggested that research should be carried out to cover more items in the scale in the pre-vocational and vocational areas.

Finally mention has to be made that application of the present scale in diagnosis, training and evaluation of progress made by the mentally retarded children would indicate its usefulness and further development thereby needed.

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APPENDIX

APPENDIX—A

METHODS USED FOR SEQUENCING THE ITEMS
IN ORDER OF DIFFICULTYAN EXAMPLE OF CALCULATING THE WEIGHTED
MEAN FOR ITEM NO. 20 WITHIN
THE GROSS-MOTOR SUB-SCALE

$$N = 154$$

SCORE VALUE		FREQUENCY (NO. OF CASES OBTAINED THE SCORE)	WEIGHTED TOTAL (SCORE VALUE X FREQUENCY)	WEIGHTED MEAN (WEIGHTED TOTAL X TOTAL NO. OF CASES)
PERFORMED THE ITEM INDEPENDENTLY	= 3	25	75	
PERFORMED WITH LITTLE ASSISTANCE	= 2	9	18	
PERFORMED WITH LOT OF ASSISTANCE	= 1	7	7	(100 ÷ 154) = .65
UNABLE TO PERFORM THE ITEM	= 0	113	0	
WEIGHTED		TOTAL	=	100

APPENDIX — B

Weighted Mean Of Each Item Within The Ten Sub-Scales (Gross-Motor, Fine Motor, Socialization, Language Comprehension, Language Expression, Eating, Toileting, Dressing, Self-Care & Domestic Skill) Of IBAS

Item No.	Gross Motor	Fine Motor	Socialization	Language Comprehension	Language Expression	Eating & Meal Preparation	Toileting	Dressing	Self-Care	Domestic Skill
1	2.98	2.96	2.97	2.82	2.86	2.89	2.86	2.73	2.77	1.88
2	2.98	2.98	2.97	2.82	2.98	2.89	2.82	2.48	2.69	1.66
3	2.97	2.98	2.80	2.82	2.98	2.89	2.69	2.36	2.44	1.59
4	2.98	2.89	2.77	2.76	2.85	2.68	2.51	2.08	2.10	1.65
5	2.98	2.69	2.76	2.71	2.82	2.60	2.46	1.93	1.96	1.39
6	2.98	2.58	1.94	2.58	2.53	2.20	2.07	1.67	1.85	1.29
7	2.94	2.18	1.79	2.49	2.47	1.89	1.62	1.61	1.73	.79
8	2.90	2.28	1.87	2.06	2.41	1.59	1.82	1.64	1.69	.81

9	2.87	2.08	1.95	1.79	2.36	1.54	1.59	1.50	1.63	.75
10	2.67	1.59	1.80	1.51	2.31	1.37	1.42	1.42	1.41	.76
11	2.61	1.23	1.61	1.62	2.29	1.04	1.32	.96	1.20	.79
12	2.41	1.09	1.42	1.34	2.25	1.08	1.46	.95	1.00	.63
13	2.32	.94	1.58	1.36	2.21	.85	1.36	1.01	.90	.57
14	2.14	1.07	1.55	1.25	2.11	.54	1.11	.95	.74	.58
15	1.75	1.00	1.16	.77	2.02	.43	-	.95	.75	.49
16	1.69	.77	1.00	1.00	1.82	.41	-	-	.67	.39
17	1.49	.42	.71	.75	1.51	-	-	-	.86	.38
18	1.32	.48	.88	.87	1.35	-	-	-	.67	.42
19	1.23	.43	.64	-	.98	-	-	-	.88	.35
20	.92	.17	.62	-	.89	-	-	-	.87	.36
21	.88	.40	.65	-	-	-	-	-	-	-
22	.99	-	.49	-	-	-	-	-	-	-

APPENDIX - C

INDEPENDENT BEHAVIOUR ASSESSMENT SCALE (IBAS) ITEMS

MAIN SCALE-1- MOTOR

A - GROSS MOTOR

Item
No.

- 1 Sits straight.
- 2 Rocks back and forth on hand and knees.
- 3 Crawls a distance of 8 ft or more.
- 4 Stands from sitting.
- 5 Stands alone.
- 6 Walks holding on to furniture.
- 7 Walks unsteadily 8 to 10 steps.
- 8 Climbs up chair, bed, verandah.
- 9 Kicks objects (ball) without falling.
- 10 Walks up and down stairs using alternate feet holding rail.
- 11 Runs smoothly with change in speed and direction.
- 12 Jumps off the ground with both feet.
- 13 Kicks football without losing balance.
- 14 Walks on balance board/narrow surface.
- 15 Catches objects with both hands.
- 16 Throws ball/objects a distance of 12 ft and catches them with one hand.
- 17 Skips alternately with a skipping rope.
- 18 Runs, jumps and gallops.
- 19 Picks and carries liquid weighing 10/12 liters in open container (bucket).
- 20 Climbs tree, wall, roof top.

- 21 Push, pull and lift object requiring physical strength.
- 22 Takes part in strenuous physical activities on regular basis requiring strength and endurance

Urban male : Walks to school or place about a mile or more; playing football, basketball, tennis, volleyball, cricket; badminton; cycling and swimming.

Urban female: Walk to school or place about a mile or more; dancing, playing tag game; badminton, gymnastics, swimming and cycling.

Rural male : Playing football; kabadi; walking to a distance more than 2 miles; swimming, rowing boats; carrying heavy load; ploughing field.

Rural female: Playing tag game; walking to a distance more than 2 miles; swimming; husking rice and washing clothes.

B-FINE MOTOR

Item
No.

- 1 Reaches and grasp objects with hand.
- 2 Hold objects using palm grasp with one hand and both hands.
- 3 Picks up objects using fingers and thumb.
- 4 Picks small objects using pincer grasp.
- 5 Transfer objects from one hand to another.
- 6 Unwraps objects.
- 7 Pulls lid off box or container.
- 8 Turns door knob/water tap to open.
- 9 Unscrew bottle/container lids.
- 10 Folds paper/cloths
- 11 String large beads.
- 12 Wind thread on to a spool
- 13 Make objects with clay/playdough.
- 14 Drives and pulls screws, nuts using screw driver.
- 15 Open locks with key.
- 16 Make braids on hair (female). Make ropes with jute yarn/straw/wool (male and female).
- 17 Stitches on a straight line with big running stitch.
- 18 Threads sewing needle.
- 19 Cuts different shapes or pictures from books with scissors/cuts or slices with sharp knife.
- 20 Stitches different motifs with small running stitch, weaves mats, punch holes and staples papers (urban and rural females) punches holes and staples papers, makes play equipments using fine finger dexterity eg making kites, toys etc (urban and rural male).

- 21 Drawing, tracing, painting using pencil or paint brush, knitting wool (urban male & female). Making fishing nets, paper packets, weaving mats or baskets (rural male & female). Making home made cakes, chapati's (rural females).

MAIN SCALE 2 SOCIALIZATION C - SOCIAL INTERACTION
--

Item
No.

- 1 Reaches/smiles at known person.
- 2 Imitates action of others (clapping playing peek-a-boo).
- 3 Gives objects to others if asked to do so.
- 4 Enjoys being with children of same age or even older.
- 5 Shares own toys or possessions with others.
- 6 Enjoys going out and/or visiting people.
- 7 Behaves appropriately when taken in public places.
- 8 Engages in make belief games with children of same age.
- 9 Cooperates with/carry out adult request.
- 10 Plays cooperatively with children of same age or older.
- 11 Enjoys having guests at home.
- 12 Greets when being introduced to others.
- 13 Sympathetic to others, young children, pets adults.
- 14 Showing concern about problems of others (eg during sicknesses, pain & sorrow of parents, sibling, friends and neighbours).
- 15 Entertains, accompanies and/or take care of guests and relatives.
- 16 Shows appreciation when and where appropriate (eg saying thank you, please, or by expression of smiles or other gesture, expressing gratitude if anyone is hurt).
- 17 Volunteers to help others when required (eg opening the door for someone whose arms are full, picking up things for others fell on floor, help neighbour finding a lost chicken or goat).
- 18 Shows respects to elders (eg standing up from sitting, offering a chair to sit).

- 19 Apologize for making mistakes or error.
- 20 Takes permission for using things belongs to others.

Urban male/female : for playing in front of house or yard, of others; entering one's room or house; using pencil, errasor or dress item.

Rural male/female : Using household goods eg axe, buckets, pitchers, using fence or yards for drying clothes or crops etc.

- 21 Respects for public or community properties :

Urban male/female : refrain from throwing liters on the street, yards, on common stairs; picking flowers or fruits, breaking branches of trees from public place like park, street or garden.

Rural male/female : refrain from picking fruits, flowers and vegetable, from gardens or yards belonging to others, breaking branches of trees, spitting on crops etc.

- 22 Volunteers in taking part in social activities :

Urban male/female : actively participate in sports activities dance, music, recitation & other competitions.

Rural male/female : actively participates in social affairs eg marriage, funerals, religious or family festivals.

MAIN SCALE - 3 COMMUNICATION D - LANGUAGE COMPREHENSION
--

Item
No.

- 1 Turns to familiar voice.
- 2 Responds to familiar situation (eg sounds associated with feeding, bathing etc).
- 3 Recognizes the names of familiar objects.
- 4 Understands meaning of "NO" and "YES".
- 5 Comprehends simple commands associated with gestures (clap hands, come here, give the spoon to maa etc).
- 6 Points to body parts.
- 7 Identify picture in books when named.
- 8 Follows instruction requiring two or more successive commands (eg give the paper to daddy and call apu).
- 9 Understands familiar stories, drama, movies.
- 10 Can sort by colours and shapes.
- 11 Can name and identify the primary colours.
- 12 Understands direction in order of difficulty (eg. right left, forward, backward, east, west, north, south and locations).
- 13 Understands oppositional concepts in/out, up/down, open/shut, on/off etc.
- 14 Tells how common objects are different (shirt and frock, TV and radio etc).
- 15 Tells time by associating with action and events (have breakfast in the morning, lunch in the afternoon etc).
- 16 Knows the days of the week, months of the year in Bangla or English, tells days of National festivals.
- 17 Understands use of money and identifies 1,2,5,10,20,50 and 100 taka notes.
- 18 Understands verbal/written instructions :
 - rules of a game
 - messages received from someone
 - homework received from school
 - shopping list
 - letters
 - instructions for taking medicine.

written notice

E - LANGUAGE EXPRESSION

Item
No.

- 1 Cries loudly when hungry and uncomfortable, laughs when happy.
- 2 Utters two syllable babble Boo Boo; ma ma; da da.
- 3 Babbles four syllables ma ma ma ma; da da da da.
- 4 Imitates single words for objects in the environment (eg Mum for water, Mew for cat).
- 5 Names familiar objects when presented (eg doll, fan, shoes frock).
- 6 Says atleast 20 recognizable words.
- 7 Name all body parts.
- 8 Expresses needs, emotions and problems in simple sentence.
- 9 Asks "where", "who", "what", "how" and "why" type questions.
- 10 Speaks in full sentence containing 4-7 syllables.
- 11 Tells name of father/mother other family members and address when asked.
- 12 Tells about parents occupation when asked.
- 13 Recites nursery rhymes.
- 14 Uses complex sentences.
- 15 Describes events of past experience.
- 16 Requests for goods or items at a shop (eg cookies, chocolate etc).
- 17 Answers telephone and give messages (urban male and female). Delivers message to neighbours (rural male and female).
- 18 Ask questions about persons and things; Tells names of important personalities.
- 19 Tells stories/jokes/quizes/acts out stories or dramas.
- 20 Participates in conversation.

MAIN SCALE 4 - DAILY LIVING SKILL F - EATING AND MEAL PREPARATION
--

Item
No.

- 1 Swallows soft food.
- 2 Picks up and puts food in mouth with fingers.
- 3 Drinks from cup/glass.
- 4 Indicates preferences for food.
- 5 Chews solid food.
- 6 Uses finger to pick and eat food.
- 7 Eats food (rice mixed with curry) with hand/spoon.
- 8 Eats a complete meal using regular dishes.
- 9 Pours water/drinks from jug, pitcher or bottle.
- 10 Takes the required amount of food when food is given in front.
- 11 Gets own food items what she/he wants (curry, salt, sugar etc).
- 12 Makes cold drinks (lemon drink).
- 13 Warms water, milk, curry or boils egg, potato.
- 14 Lights the oven/stove with matches or lighter.
- 15 Cuts and peels fruits/vegetables with knife or bothi (eg apple, mango, potatoes etc).
- 16 Prepares simple food item (chapati, rice, omlets, dal, smashed potatoes).

G - TOILETING

Item
No.

- 1 Indicates discomfort when wet or soiled.
- 2 Indicates when needs to go to toilet.
- 3 Seats on the toilet or specific place for toileting.
- 4 Gets off when finished toileting.
- 5 Controls bladder during day.
- 6 Goes to the toilet alone.
- 7 Dry most night if lifted.
- 8 Open pants and perform the toilet function.
- 9 Washes self thoroughly well after defecating and washes hands.
- 10 Flushes the toilet after use/pours enough water to clean the place/cover it with mud or ashes.
- 11 Close bathroom door to maintain privacy.
- 12 Perform toilet function before journey or going out to places where it is not easy to go to toilet (eg picnic, shopping).
- 13 Finds the location of the toilet by asking in a new place.
- 14 Controls urine where and when there is no scope of going to the toilet (eg while traveling in a bus).

H - DRESSING

Item
No.

- 1 Cooperates while being dressed and undressed.
- 2 Selects own dress item.
- 3 Takes off simple dresses (eg panty, pants, front open blouse, vest or loose T-shirts).
- 4 Undresses completely.
- 5 Unbuttons/unzips clothing.
- 6 Puts on simple clothings (pant/T-shirt or loose frock, blouse, skirts etc).
- 7 Puts shoes/sandal on correct feet.
- 8 Dresses completely except for buttoning, fastening and zipping.
- 9 Dresses and buttons using correct button holes (eg shirt, blouse).
- 10 Puts on shoes and ties shoe laces or buckles (urban male and female).
Puts on sandal/shoe buckles if required (rural male and female).
- 11 Open back button/zip or dresses.
- 12 Closes back button/zips or dresses.
- 13 Selects proper dress according to weather (light dress for warm weather, warm clothes for cold weather).
- 14 Matches dress or clothes that goes together with regards to colour, design and wears (eg shirt, pant or lungi, frock and panty, skirt and tops, shalwar and kameez, saree and blouse).
- 15 Selects and wears complete sets of clothes appropriate for different occasion (at home, school, going out, or going to a party).

I - SELF CARE

Item

No.

- 1 Cooperates while being washed and cleaning teeth.
- 2 Cooperates while combing/brushing hair and cutting nails.
- 3 Washes hands under running water.
- 4 Wipes faces with towels/piece of cloths.
- 5 Brushes teeth with finger/brush/majan/datan.
- 6 Dries body after bathing.
- 7 Washes hands and face with soap.
- 8 Brushes teeth.
- 9 Bathes and dries self.
- 10 Washes hands before and after eating.
- 11 Keeps safe distance from fire, animals, insects, equipment that might cause accident.
- 12 Handle sharp objects, carefully (eg. knife, blade, scissor, electrical appliances).
- 13 Combs/brushes hair/applies oil regularly and when necessary.
- 14 Washes hair with soap/shampoo.
- 15 Cuts and cleans finger nails.
- 16 Takes care of minor cuts, burns and bruises.
- 17 Walks across street or at roadside facing traffic (urban male & female). Crosses bamboo bridge, ditch or walks on uneven walkway (rural male & female).
- 18 Takes care of own belonging (eg. own clothes, toys, books, shoes etc).
- 19 Covers food items or drinks to protect from dust, flies and spoilage.
- 20 Seeks help for minor health problems (headache, stomach pain etc).

J - DOMESTIC SKILL

Item
No.

- 1 Brings in items when asked (eg newspaper, mail, lungi, sandal etc).
- 2 Picks up rubbishes and throws them away in proper place (eg nut shells, waste papers etc).
- 3 Keeps own belonging in proper place after being used (eg toys after playing, school bag, shoes, socks after coming from school).
- 4 Dusts and wipes tables or other household goods (urban and rural female). Cleans own toys, tools or play equipment (urban and rural male).
- 5 Puts dirty and clean clothings in appropriate places.
- 6 Carries dishes with food one at a time and place them on the table or floor mat where people will have their meal.
- 7 Removes dishes at the end of the meal.
- 8 Washes simple items (eg plastic or metal plate and glass, tiffin boxes, water bottle etc).
- 9 Serves food to others (urban and rural female).
Runs errands outside home (urban and rural male).
- 10 Helps in domestic task :
Urban and rural female: helps mother or adults in cleaning, sweeping dusting and making food.
Urban and rural male: helps father or adults in washing car, other equipments, gardening, polishing shoes or other maintenance work.
- 11 Washes clothes (eg. handkerchief, panty, socks, blouse, frock, shirt, gengi, lungi, school uniform, shoes etc).
- 12 Takes own tiffin and water, arrange school bag while going to school (urban male and female).

Takes own food while going to school/going out/at home (rural male and female).

- 13 Keeps book bag/school uniform/socks and shoes in order after coming from school or dress item after coming from outing.

- 14 Cleans and tidies own room/yards/house (urban and rural female/male).

Cleans own book rack, reading table (urban male and female).

- 15 Hangs wet cloth and pick dried cloths on/from line or fence (urban and rural female and rural male).

Hangs or folds own pressed cloths (urban male and female).

- 16 Makes bed before going to bed (eg hanging mosquito nets, spreading sheets, placing pillows etc).

- 17 Irons simple clothing (urban male and female). Folds and keeps own clothing under pillow to keep it smooth and stretched (rural male and female).

- 18 Warms food items eg curry milk (urban and rural female). Goes to shop or store involving crossing road and purchase specific items (urban and rural male).

- 19 Does minor repairing :

Urban male : fixing button, mending broken toys
or household goods.

Urban female : fixing button, rejoining broken seams,
stitching torn books, covering books
or changing torn covers of book.

Rural male repair garden fence, replacing worn
out straws of the roof.

Rural female : repairing torn dresses or quilt etc.

20 Takes minor responsibilities at home when required :

Urban male : going to bazar or shop to fetch items according to list, throwing garbage, checking the door locks, windows, gas oven, water tap, light switch before going to bed or going out, gives prescribed medicine to parents or younger.

Urban female : Sets table for lunch or dinner, cleans dishes after breakfast, lunch, dinner, help in cooking and cleaning, watering pot plants, given prescribed medicine to parents or younger, taking care of younger brothers or sisters.

Rural male : taking the cows or goats for grazing, collecting fire woods, feeding domestic animals & pets (cows, goats, chicken & ducks), protects crops from goat, chicken or birds, weeds jute, paddy field or vegetable garden.

Rural female : prepares meal, takes care of younger brothers/sisters, scraps and washes utensils, wetmop floor and yards with mud and cowdung.

APPENDIX – D
NORM TABLES

Mean And Standard Deviation Of Each Scales By Age For The Total Sample

Scale	AGE - 2		AGE - 3		AGE - 4		AGE - 5		AGE - 6		AGE - 7		AGE - 8		AGE - 9	
	N = 118		N = 160		N = 175		N = 212		N = 164		N = 237		N = 153		N = 185	
	X	SD	X	SD	X	SD	X	SD	X	SD	X	SD	X	SD	X	SD
Motor	69.72	12.78	81.05	11.69	89.62	11.64	96.05	11.74	102.29	11.08	108.48	11.07	114.59	7.79	118.25	8.18
A. Gross Motor	42.19	6.48	47.25	6.69	51.50	5.27	53.96	5.44	56.72	5.53	59.01	5.31	61.29	4.02	62.87	3.83
B. Fine Motor	27.28	7.08	33.99	7.50	38.24	7.44	42.09	7.50	45.57	7.09	49.45	7.04	53.32	4.95	55.38	5.50
C. Socialization	26.52	6.61	32.47	7.95	38.20	10.34	42.44	10.10	47.46	10.13	51.07	9.53	55.60	8.58	58.04	7.98
Communication	56.74	18.84	75.80	14.31	86.92	13.17	94.22	10.35	98.77	9.16	103.19	7.55	107.43	7.34	109.27	4.77
D. Language Comprehension	26.09	6.62	32.27	6.07	37.85	6.52	40.93	6.48	43.71	5.58	46.42	5.65	49.45	4.62	50.64	3.49
E. Language Expression	30.95	13.70	43.46	10.12	49.12	7.88	53.20	5.38	55.20	4.14	56.68	2.96	57.98	3.86	58.51	1.86
Daily Living Skill	79.11	26.33	104.31	30.26	138.47	40.00	162.91	40.73	183.42	36.68	205.47	31.43	217.80	25.92	231.05	21.29
F. Eating & Meal Preparation	20.50	4.75	24.07	5.13	28.28	6.26	31.89	6.48	34.15	6.36	37.45	5.83	39.56	5.56	42.20	5.02
G. Toileting	16.27	6.61	21.85	7.48	29.59	8.97	34.76	7.56	38.16	6.04	40.00	3.84	41.05	2.50	41.58	1.34
H. Dressing	17.05	6.26	22.21	6.99	28.30	7.62	31.85	8.01	35.38	6.16	38.96	4.78	40.33	3.94	41.72	2.94
I. Self Care	16.05	7.12	22.13	8.64	31.65	11.48	37.85	11.64	43.74	10.92	49.75	9.33	53.44	7.34	56.36	5.27
J. Domestic Skill	9.80	6.59	13.86	8.34	20.86	12.43	26.32	13.68	31.67	13.80	39.55	13.69	43.65	12.52	49.28	11.69
Full Scale	232.01	55.81	293.03	54.95	353.44	65.84	395.17	64.89	430.39	61.59	468.27	51.37	495.40	42.34	516.43	35.32

TABLE-2

Percentile Rank and Corresponding Scores Of The
Main Scales And Full Scale Of IBAS For Age 2

(N = 118)

Percentile Ranks	Derived Scores In Motor Scale	Derived Scores In Socialization Scale	Derived Scores In Communication Scale	Derived Scores In Daily Living Scale	Derived Scores In Full Scale
5	47-50	16	30-32	40-43	150-157
10	51-53	17-18	33-36	44-52	158-168
15	54-58	19-20	37	53-56	169-177
20	59-60	21	38	57-62	178-192
25	61-62	22	39-42	63-65	193-200
30	63	23	43	66	201-208
35	64-65	24	44-46	67-71	209-213
40	66-69	25	47-52	72-73	214-221
45	70	26	53-54	74-77	222-227
50	71-72	26	55-57	78-82	228-238
55	73-74	27	58-60	83-84	239-249
60	75-76	27	61-65	85-86	250-252
65	77-78	28	66-69	87-88	253-258
70	79	29	70-71	89-91	259-263
75	80	30	72-73	92-98	264-273
80	81-82	31-32	74-79	99-102	274-286
85	83-84	33-35	80-82	103-108	287-299
90	85-87	36-38	83-88	109-130	300-336
95	88	39	89	131	337

TABLE-3

Percentile Rank And Corresponding Scores Of The
Sub Scales (A,B,C,D, & E) Of IBAS For Age - 2

Percentile Ranks	Derived Scores In Gross Motor Scale A	Derived Scores In Fine Motor Scale B	Derived Scores In Social Inter- Action Scale C	Derived Scores In Language Comprehension Scale D	Derived Scores In Language Expression Scale E
5	30-32	15-16	16	14	12-13
10	33-34	17	17-18	15-18	14
15	35-36	17-18	19-20	19	15
20	37	19-21	21	20	16-17
25	37-38	22-23	22	21-22	18
30	39	24	23	23-24	19-20
35	40	24-25	24	25	21-23
40	41	26	25	25	24-27
45	42	27	26	26	28
50	42-43	28-29	26	26	29-30
55	44	30	27	27	31-34
60	45	30	27	28	35-39
65	46-47	31	28	28	40
70	48	32	29	29	41-43
75	48	33	30	30-31	44-45
80	48	33	31-32	32	46-47
85	49	34-35	33-35	33	48-49
90	49	36-37	36-38	34-36	50
95	50	38	39	37	51

TABLE-4

Percentile Rank And Corresponding Scores Of The
Sub Scales (F,G,H,I, & J) Of IBAS For Age - 2

Percentile Ranks	Derived Scores In Eating And Meal Prepa- tion Scale F	Derived Scores In Toileting Scale G	Derived Scores In Dressing Scale H	Derived Scores In Self-Care Scale I	Derived Scores In Domestic Scale J
5	13	6-8	5-6	3-7	0
10	14	9	7-9	8	0
15	15	10	10-12	9	.85
20	16	11	13-14	10-11	3-4
25	17	12	15	12	5
30	17	12	15	13	6
35	18	13-14	16	14	7
40	18	15	16	15	8
45	18	15-16	17	16	8
50	19	17	17	16	9
55	20	17	18	17	10-11
60	20	18	18	18	12
65	21	18	19	18	13
70	22	19	19	18-19	13-14
75	23	20	20	20	15
80	24	20-21	21-22	21-22	16
85	25-26	22	23-24	23	16
90	27-28	23-27	25-26	24-27	17-21
95	29	28	27	28	22

TABLE-5

Percentile Rank And Corresponding Scores Of The
Main Scales And Full Scale Of IBAS For Age - 3
N=160

Percentile Ranks	Derived Scores In Motor Scale	Derived Scores In Socialization Scale	Derived Scores In Communication Scale	Derived Scores In Daily Living Scale	Derived Scores In Full Scale
5	59-64	22-23	50-54	67-72	221-233
10	65-67	24	55-58	73-75	234-243
15	68-71	25	59-61	76-81	244-252
20	72-74	26-27	62-66	82-83	253-259
25	75-76	28	67-70	84-87	260-261
30	77-78	28	71-72	88-90	262-267
35	79	28	73	91	268-274
40	80	29	74-75	92-95	275-282
45	81	30	76	96-97	283-287
50	82	31	77-78	98-101	288-291
55	83	32	79-80	102-104	292-295
60	84	33	81	105-107	296-307
65	85	34-35	82	108-110	308-311
70	86	36	83-84	111-115	312-317
75	87	37	85-87	116-120	318-325
80	88-89	38-39	88-89	121-131	326-337
85	90-91	40-41	90-91	132-143	338-364
90	92-98	42-47	92-95	144-166	365-391
95	99	48	96	167	392

TABLE-6

Percentile Rank And Corresponding Scores Of The
Sub Scales (A,B,C,D, & E) Of IBAS For Age - 3

Percentile Ranks	Derived Scores In Gross-Motor Scale A	Derived Scores In Fine-Motor Scale B	Derived Scores In Social Inter- Action Scale C	Derived Scores In Language Comprehension Scale D	Derived Scores In Language Expression Scale E
5	38	18-24	22-23	24	22-26
10	39-40	25-27	24	25-26	27-28
15	41-42	28-29	25	27	29-32
20	43	30-31	26-27	28	33-39
25	44	32	28	29	40-41
30	45	32	28	29	42
35	46	33	28	29	43
40	47	33	29	30	44
45	48	34	30	31	45-46
50	48	35	31	31	47
55	48	35	32	32	47
60	49	36	33	33	48
65	49	36	34-35	34	49
70	50	36	36	35	50
75	50	37	37	36-37	51
80	51	38	38-39	38	51
85	51-52	38-39	40-41	39	52-53
90	53-55	40-42	42-47	40-41	54
95	56	43	48	42	55

TABLE-7

Percentile Rank and Corresponding Scores Of The
Sub Scales (F,G,H,I, & J) Of IBAS For Age - 3

Percentile Ranks	Derived Scores In Eating And Meal Prepa- ration Scale F	Derived Scores In Toileting Scale G	Derived Scores In Dressing Scale H	Derived Scores In Self Care Scale I	Derived Scores In Domestic Scale J
5	18	12-13	10-13	11-12	0
10	18	14	14-15	13-14	3-5
15	19	15	16-17	15	6-7
20	19	16	18	16	8-9
25	20	17	18	17	10
30	21	18	19	18	11
35	21	18	19	18	12
40	22	19	20	19	13
45	23	20	21	20	13
50	23	20	21	21	14
55	24	21	22	21	15
60	24	22	23	22	15
65	25	23	24	23	15
70	26	24	25	24	16
75	27-28	25-26	26	25	16
80	29	27-30	27	26-30	17-18
85	30	31-32	28-29	31-33	19-22
90	31-32	33-37	30-35	34-37	23-29
95	33	38	36	38	30

TABLE-8

Percentile Rank And Corresponding Scores Of The
Main Scales And Full Scale Of IBAS For Age - 4
(N = 175)

Percentile Ranks	Derived Scores In Motor Scale	Derived Scores In Socialization Scale	Derived Scores In Communication Scale	Derived Scores In Daily Living Scale	Derived Scores In Full Scale
5	71-76	22-24	22-24	78-87	253-273
10	77-78	25-27	25-27	88-100	274-288
15	79-81	28-29	28-29	101-103	289-295
20	82	30	30	104-107	296-302
25	83	31	31	108-111	303-312
30	84	32	32	112-114	313-319
35	85	33	33	115-121	320-328
40	86	34	34	122-131	329-342
45	87	35-36	35-36	132-138	343-348
50	88	37	37	139-140	349-354
55	89	38	38	141-144	355-361
60	90-91	39-40	39-40	145-147	362-375
65	92-93	41-42	41-42	148-158	376-388
70	94-96	43-44	43-44	159-164	389-402
75	97-98	45-47	45-47	165-173	403-412
80	99-101	48-49	48-49	174-182	413-421
85	102-104	50-52	50-52	183-192	422-432
90	105-109	53-57	53-57	193-208	433-468
95	110	58	58	209	469

TABLE-9

Percentile Rank And Corresponding Scores Of The
Sub Scales (A,B,C,D, & E) Of IBAS For Age - 4

Percentile Ranks	Derived Scores In Gross-Motor Scale A	Derived Scores In Fine-Motor Scale B	Derived Scores In Social Inter- Action Scale C	Derived Scores In Language Comprehension Scale D	Derived Scores In Language Expression Scale E
5	43-45	26-30	22-24	27-28	32-39
10	46	31	25-27	29-30	40-42
15	47	32	28-29	31	43-44
20	48	33	30	32	45
25	49	34	31	33	46
30	49	34	32	34	47
35	50	35	33	35	48
40	50	36	34	36	49
45	50	37	35-36	37	50
50	51	37	37	38	51
55	52	38	38	39	51
60	52	39	39-40	40	52
65	53	40	41-42	41	53
70	53	41-42	43-44	42	54
75	54	43-44	45-47	43	54
80	55	45	48-49	44	55
85	56-58	46	50-52	45	56
90	59-61	47-49	53-57	46	57
95	62	50	58	47	58

TABLE-10

Percentile Rank And Corresponding Scores Of The
Sub Scales (F,G,H,I, & J) Of IBAS For Age - 4

Percentile Ranks	Derived Scores In Eating And Meal Prepa- ration Scale F	Derived Scores In Toileting Scale G	Derived Scores In Dressing Scale H	Derived Scores In Self Care Scale I	Derived Scores In Domestic Scale J
5	19	15-17	15-17	16-17	1-4
10	20	18-19	18-20	18	5-6
15	21	20	21	19-20	7-11
20	22-23	20	22-23	21-22	12
25	24	21-22	24	23	13
30	25	23	25	24	14-15
35	26	24-25	26	25-26	16
40	26	26	27	27	16
45	27	27-28	28	28-29	17-18
50	28	29	29	30-32	19
55	29	30-33	29	33-34	20
60	30	34	30	35-36	21-23
65	31	35	31-32	37-38	24
70	32	36-38	33	39	25-27
75	33	39	34	40	28-31
80	34	40	35-36	41-42	32-34
85	35	41	37	43-45	35-37
90	36-39	42	38	46-51	38-42
95	40	42	39	52	43

TABLE-11

Percentile Rank And Corresponding Scores Of The
Main Scales And Full Scale Of IBAS For Age - 5
(N = 212)

Percentile Ranks	Derived Scores In Motor Scale	Derived Scores In Socialization Scale	Derived Scores In Communication Scale	Derived Scores In Daily Living Scale	Deruved Scores In Full Scale
5	74-82	28	77-81	99-107	292-311
10	83	29-31	82-83	108-115	312-322
15	84-85	32-33	84-85	116-127	323-341
20	86-87	34	86-88	128-132	342-347
25	88-89	35-36	89	133-137	348
30	90	37-38	90	138-145	349
35	91-92	39	91-92	146-148	354-365
40	93	40	93	149-154	366-372
45	94	41	94	155-160	373-383
50	95-96	42-43	95	162-162	384-391
55	97	44	96	163-167	392-397
60	98-99	45	97	168-179	398-410
65	100-101	46-47	98-99	180-187	411-419
70	102-103	48	100	188-198	420-430
75	104-106	49-50	101-102	199-202	431-445
80	107-108	51-53	103-104	203-211	446-468
85	109-111	54-56	105-106	212-218	469-481
90	112-113	57	107-109	219-225	482-503
95	114	58	110	226	504

TABLE-12

Percentile Rank And Corresponding Scores Of The
Sub Scales (A,B,C,D, & E) Of IBAS For Age - 5

Percentile Ranks	Derived Scores In Gross-Motor Scale A	Derived Scores In Fine-Motor Scale B	Derived Scores In Social Inter- Action Scale C	Derived Scores In Language Comprehension Scale D	Derived Scores In Language Expression Scale E
5	45-47	28-33	28	30-33	45-47
10	48	34	29-31	34	48
15	49	35	32-33	35	49
20	49	36	34	36	50
25	50	37	35-36	37	51
30	51	38	37-38	37	51
35	52	39	39	38	52
40	52	40	40	39	53
45	53	41	41	40	53
50	54	42	42-43	41	54
55	54	43	44	42	55
60	55	44	45	42	55
65	55	45-46	46-47	43	56
70	56	47	48	44	56
75	57-58	48	49-50	45-46	57
80	59-60	49	51-53	47-48	57
85	61	50-51	54-56	49	58
90	62	52-54	57	50	58
95	63	55	58	51	59

TABLE-13

Percentile Rank And Corresponding Scores Of The
Sub Scales (F,G,H,I, & J) Of IBAS For Age - 5

Percentile Ranks	Derived Scores In Eating And Meal Prepa- ration Scale F	Derived Scores In Toileting Scale G	Derived Scores In Dressing Scale H	Derived Scores In Self Care Scale I	Derived Scores In Domestic Scale J
5	21-22	19-22	17-21	19-22	5-8
10	23-24	23	22-23	23-24	9-11
15	25	24-26	24-25	25-26	12-13
20	26	27-30	26	27-28	14-15
25	27	31-32	27	29	16-17
30	28	33	28	30-32	18
35	29	33	29	33	19-20
40	30	34	30	34-35	21-22
45	31	35	31-32	36	23-24
50	32	36-37	33	37	25-28
55	33	38	34-35	38-39	29
60	34	39	36	40-41	30-31
65	35	40	36	42-43	32-33
70	36	41	37	44-46	34
75	37	42	38	47-49	35-36
80	38	42	39	50-52	37-41
85	39	42	40-41	53	42-44
90	40	42	42	54-56	45-49
95	41	42	42	57	50

TABLE-14

Percentile Rank And Corresponding Scores Of The
Main Scales And Full Scale Of IBAS For Age - 6

(N = 164)

Percentile Ranks	Derived Scores In Motor Scale	Derived Scores In Socialization Scale	Derived Scores In Communication Scale	Derived Scores In Daily Living Scale	Derived Scores In Full Scale
5	86	32-33	84-88	123-131	337-357
10	87-89	34-35	89-90	132-142	358-367
15	90-92	36-37	91-92	143-150	368-376
20	93-95	38	93	151-155	377-389
25	96	39-40	94	156-161	390-396
30	97	41	95-96	162-167	397-403
35	98-99	42-43	97	168-172	404-412
40	100-101	44-46	98	173-179	413-421
45	102	47	99	180-188	422-439
50	103	48-49	100	189-193	440-445
55	104-105	50-51	101	194-197	446-451
60	106	52-53	102	198-201	452-460
65	107-108	54	103	202-205	461-469
70	109	55	104	206-210	470-474
75	110	56	105	211-217	475-487
80	111-112	57	106	218-222	488-493
85	113-114	58-59	107-108	223-230	494-504
90	115-120	60-61	109-110	231-237	505-517
95	121	62	111	238	518

TABLE-15

Percentile Rank And Corresponding Scores Of The
Sub Scales (A,B,C,D, & E) Of IBAS For Age - 6

Percentile Ranks	Derived Scores In Gross-Motor Scale A	Derived Scores In Fine-Motor Scale B	Derived Scores In Social Inter- Action Scale C	Derived Scores In Language Comprehension Scale D	Derived Scores In Language Expression Scale E
5	48-49	32-36	32-33	34-36	49-50
10	50	37	34-35	37	51
15	51	38	36-37	37	52
20	52	39	38	38-39	53
25	53	40-41	39-40	40	54
30	54	42	41	41	54
35	55	43	42-43	41	55
40	56	44	44-46	42	55
45	56	45	47	43	56
50	57	46	48-49	44	56
55	58	47-48	50-51	45	56
60	59	49	52-53	46	57
65	59	49	54	46	57
70	60	50	55	47	57
75	61	51	56	48	58
80	62	52	57	49	58
85	62	53	58-59	50	59
90	63-64	54-55	60-61	51	59
95	65	56	62	52	59

TABLE-16

Percentile Rank And Corresponding Scores Of The
Sub Scales (F,G,H,I, & J) Of IBAS For Age - 6

Percentile Ranks	Derived Scores In Eating And Meal Prepa- ration Scale F	Derived Scores In Toileting Scale G	Derived Scores In Dressing Scale H	Derived Scores In Self Care Scale I	Derived Scores In Domestic Scale J
5	24	23-29	23-27	24-28	7-14
10	25-26	30-31	28-29	29-31	15-16
15	27	32-34	30	32-33	17-18
20	28	35	31	34	19
25	29	36	32	35-36	20-21
30	30	37-38	33-34	37-38	22-24
35	31-32	39-40	35	39	25-28
40	33	41	36	40-42	29-30
45	34	41	36	43-44	31-32
50	35	42	37	45-46	33
55	36	42	37	47	34
60	37	42	38	48-49	35-37
65	37	42	38	50	38
70	38	42	38-39	51-52	39
75	39	42	40	53	40-42
80	40	42	41	54	43-47
85	40	42	42	55-58	48-50
90	41-42	42	42	59	51-53
95	43	42	42	60	54

TABLE-17

Percentile Rank And Corresponding Scores Of The
Main Scales And Full Scale Of IBAS For Age - 7
(N = 237)

Percentile Ranks	Derived Scores In Motor Scale	Derived Scores In Socialization Scale	Derived Scores In Communication Scale	Derived Scores In Daily Living Scale	Derived Scores In Full Scale
5	89-95	33-37	88-93	139-160	376-395
10	96-97	38	94-95	161-172	396-414
15	98-99	39-41	96-97	173-177	415-429
20	100-101	42-43	98	178-184	430-442
25	102	44	99-100	185-193	443-446
30	103	45-47	101	194-197	447-451
35	104-105	48	102	198-201	452-459
40	106	49-51	103	202-206	460-465
45	107-108	52	103	207-210	466-472
50	109-110	53	104	211-213	473-477
55	111	54-55	105	214-217	478-483
60	112	56	106	218-220	484-489
65	113-114	57	107	221-225	490-497
70	115	57	108	226-230	498-504
75	116-117	58	109	231-234	505-514
80	118-119	59-60	110	235-236	515-522
85	120-121	61	111	237-240	523-530
90	122-125	62-65	112	241-244	531-540
95	126	66	113	245	541

TABLE-18

Percentile Rank And Corresponding Scores Of The
Sub Scales (A,B,C,D, & E) Of IBAS For Age - 7

Percentile Ranks	Derived Scores In Gross-Motor Scale A	Derived Scores In Fine-Motor Scale B	Derived Scores In Social Inter- Action Scale C	Derived Scores In Language Comprehension Scale D	Derived Scores In Language Expression Scale E
5	51	38-39	33-37	36-38	50-52
10	52	40-41	38	39	53
15	53	42-43	39-41	40-41	54
20	54	44	42-43	42-43	55
25	55	45-46	44	44	56
30	56	47	45-47	45	56
35	57	48	48	45	56
40	57	49	49-51	46	56
45	58	49	52	47	57
50	59	49	53	48	57
55	60	50	54-55	48	57
60	61	51	56	48	58
65	62	52-53	57	50	58
70	62	54	57	50	59
75	63-64	54	58	50	59
80	65	55	59-60	51	59
85	66	56	61	52	59
90	66	57-61	62-65	53	60
95	66	62	66	54	60

TABLE-19

Percentile Rank And Corresponding Scores Of The
Sub Scales (F,G,H,I, & J) Of IBAS For Age - 7

Percentile Ranks	Derived Scores In Eating And Meal Prepa- ration Scale F	Derived Scores In Toileting Scale G	Derived Scores In Dressing Scale H	Derived Scores In Self Care Scale I	Derived Scores In Domestic Scale J
5	26-28	32-34	30-32	31-34	14-18
10	29-30	35-36	33-34	35-37	19-23
15	31	37-38	35	38-41	24-25
20	32-33	39	36	42-45	26-31
25	34	39	37	46	32-33
30	35	40	38	47	34
35	36	41	38	48-49	35-36
40	37	41	39	50	37-38
45	38	42	40	51	39
50	39	42	41	52	40-41
55	39	42	42	53	42-43
60	40	42	42	54	44-46
65	40	42	42	55	47-48
70	41	42	42	56-57	49-50
75	41	42	42	58	51-52
80	42	42	42	59	53-54
85	43	42	42	59	55
90	44-46	42	43	60	56-57
95	47	42	44	60	58

TABLE-20

Percentile Rank And Corresponding Scores Of The
Main Scales And Full Scale Of IBAS For Age - 8

(N = 153)

Percentile Ranks	Derived Scores In Motor Scale	Derived Scores In Socialization Scale	Derived Scores In Communication Scale	Derived Scores In Daily Living Scale	Derived Scores In Full Scale
5	101-104	39-42	94-98	163-183	421-440
10	105-106	43-46	99-100	184-188	441-458
15	107-108	47-49	101-102	189-196	459-464
20	109	50-52	103-104	197-205	465-472
25	110	53	105	206-210	473-481
30	111	54	105	211-213	482-488
35	112	55	106	214-217	489-490
40	113	55	107	218-219	491-495
45	114	56	108	220-221	496-499
50	115	57	109	222-223	500-504
55	116	58	110	224-228	505-511
60	117	58	111	229-230	512-517
65	118	59	111	231-233	518-520
70	119	60	112	234-237	521-523
75	120	61-62	113	238	524-530
80	121	63-64	113	239-240	531-533
85	122-123	65	114	241-243	534-541
90	124-127	66	114	244-250	542-550
95	128	66	114	251	551

TABLE-21

Percentile Rank And Corresponding Scores Of The
Sub Scales (A,B,C,D, & E) Of IBAS For Age - 8

Percentile Ranks	Derived Scores In Gross Motor Scale A	Derived Scores In Fine Motor Scale B	Derived Scores In Social Inter- Action Scale C	Derived Scores In Language Comprehension Scale D	Derived Scores In Language Expression Scale E
5	53-54	45-47	39-42	39-42	53-55
10	55-56	48	43-46	43-44	56
15	57	49	47-49	45	56
20	58	49	50-52	45-46	57
25	59	50	53	47	57
30	60	51	54	48	58
35	61	51	55	48	58
40	61	52	55	49	58
45	62	53	56	50	59
50	62	53	57	50	59
55	62	54	58	51	59
60	62	54	58	52	59
65	63	55	59	52	59
70	64	56	60	53	60
75	65	56-57	61-62	54	60
80	65	58	63-64	54	60
85	66	59	65	54	60
90	66	60-61	66	54	60
95	66	62	66	54	60

TABLE-22

Percentile Rank And Corresponding Scores Of The
Sub Scales (F,G,H,I, & J) Of IBAS For Age - 8

Percentile Ranks	Derived Scores In Eating And Meal Prepa- ration Scale F	Derived Scores In Toileting Scale G	Derived Scores In Dressing Scale H	Derived Scores In Self Care Scale I	Derived Scores In Domestic Scale J
5	27-31	25-38	30-35	38-39	18-24
10	32	39	36	40-45	25-31
15	33-34	40	37	46-47	32-34
20	35-36	41	38	48	35
25	37-38	41	39	49-51	36-38
30	39	42	40	52	39
35	39	42	41	53	40
40	40	42	42	54	41-42
45	40	42	42	54	43-44
50	40	42	42	55-56	45-47
55	40	42	42	57	48-49
60	41	42	42	58	50
65	42	42	42	59	51-52
70	42	42	42	59	53
75	43	42	42	59	54
80	44-45	42	42	60	55
85	46	42	43	60	55-56
90	47	42	44	60	57-59
95	48	42	44	60	60

TABLE-23

Percentile Rank And Corresponding Scores Of The
Main Scales And Full Scale Of IBAS For Age - 9
(N = 185)

Percentile Ranks	Derived Scores In Motor Scale	Derived Scores In Socializa- tion Scale	Derived Scores In Communication Scale	Derived Scores In Daily Living Scale	Derived Scores In Full Scale
5	100-106	42-46	100-101	190-198	452-462
10	107-110	47	102-103	199-206	463-474
15	111-113	48-50	104-105	207-211	475-481
20	114	51-53	106	212-216	482-490
25	115	54-55	107	217-221	491-500
30	116-117	56	108	222-228	501-511
35	118	57	108	229-231	512-518
40	118	58	109	232-235	519-523
45	119	59	110	236-238	524-528
50	120	60	110	239	529-531
55	121	61	111	240-241	532-535
60	121	62	111	242-243	536-537
65	122	63	112	244-245	538-539
70	122	64	113	246	540-542
75	123	65	114	247	543
80	124	66	114	248-249	544-548
85	125-126	66	114	250-251	549-550
90	127-128	66	114	252-253	551-555
95	129	66	114	254	556

TABLE-24

Percentile Rank And Corresponding Scores Of The
Sub Scales (A,B,C,D, & E) Of IBAS For Age - 9

Percentile Ranks	Derived Scores In Gross Motor Scale A	Derived Scores In Fine Motor Scale B	Derived Scores In Social Inter- Action Scale C	Derived Scores In Language Comprehension Scale D	Derived Scores In Language Expression Scale E
5	55-57	45-47	42-46	43-44	55
10	58	48-49	47	45-46	56
15	59	50-51	48-50	47-48	57
20	60-61	52-53	51-53	49	57
25	62	54	54-55	49	58
30	62	54	56	50	58
35	62	55	57	50	59
40	62	55	58	50	59
45	63	56	59	51	59
50	64	56	60	51	59
55	65	56	61	52	59
60	65	57	62	52	59
65	65	57	63	53	60
70	66	58	64	54	60
75	66	59	65	54	60
80	66	60	66	54	60
85	66	61	66	54	60
90	66	62	66	54	60
95	66	63	66	54	60

Percentile Rank And Corresponding Scores Of The
Sub Scales (F,G,H,I, & J) Of IBAS For Age - 9

Percentile Ranks	Derived Scores In Eating And Meal Prepa- ration Scale F	Derived Scores In Toileting Scale G	Derived Scores In Dressing Scale H	Derived Scores In Self Care Scale I	Derived Scores In Domestic Scale J
5	33-35	39-40	36	47-49	25-31
10	36-37	41	37-39	50	32-35
15	38	41	40-41	51-52	36-39
20	39	42	42	53	40
25	40	42	42	54	41-43
30	40	42	42	55-56	44-47
35	40	42	42	57	48-50
40	41	42	42	57	51-52
45	42	42	42	58	53
50	42	42	42	58	54
55	43	42	42	59	55
60	44	42	42	60	56
65	45	42	42	60	57
70	46	42	43	60	57
75	46	42	43	60	58-59
80	47	42	43	60	60
85	48	43	44	60	60
90	48	42	45	60	60
95	48	42	45	60	60