

**DEVELOPMENT AND VALIDATION OF “A TREATMENT MANUAL FOR  
CHILDREN WITH AUTISM SPECTRUM DISORDERS”**

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Mysore



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May, 2015

## CERTIFICATE

This is to certify that this dissertation entitled “*Development and validation of a treatment manual in English for children with Autism Spectrum Disorders*” is a bonafide work submitted in part fulfilment for degree of Master of Science (Speech-Language Pathology) of the student Registration Number: 13SLP001. This has been carried out under the guidance of a faculty of this institute and has not been submitted earlier to any other University for the award of any other Diploma or Degree.

Mysore

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## CERTIFICATE

This is to certify that this dissertation entitled “*Development and validation of a treatment manual in English for children with Autism Spectrum Disorders*” has been prepared under my supervision and guidance. It is also been certified that this dissertation has not been submitted earlier to any other University for the award of any other Diploma or Degree.

Mysore  
May, 2015

**Guide**  
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## **DECLARATION**

This is to certify that this dissertation entitled “*Development and validation of a treatment manual in English for children with Autism Spectrum Disorders*” is the result of my own study under the guidance of Prof. Shyamala K.C, Professor in Language Pathology, Department of SLP, All India Institute of Speech and Hearing, Mysore, and has not been submitted earlier to any other University for the award of any other Diploma or Degree.

*Mysore,  
May, 2015*

*Registration No. 13SLP001*

*Dedicated to Amma..*

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“If they can’t learn the way we teach, we teach the way they learn.”

**-Dr. O. Ivar Lovaas** of the Lovaas Institute

Autism and other Pervasive Developmental disorders (PDDs) are a set of neuropsychiatric disorders which are related phenomenologically. These disorders typically have an onset in the first few months of life, and over the years manifest through patterns of delay and deviance in multiple areas of development. Though some children may have associated mental retardation, the behavioural and developmental features significantly differ from those seen in children with mental retardation.

Pervasive Developmental disorders are serious disorders of child development encompassing multiple areas. Characteristics common to all the PDDs include poor social interaction, restricted communication skills and repetitive, stereotypical behaviours, activities or interests. Because there is no biological test for PDD, it is diagnosed based on systematic behavioural observation. PDD is not treated as a diagnostic category, but is a term which encompasses specific diagnostic categories which have overlapping characteristics. The disorders which fall under the umbrella term of PDDs include:

1. Autism
2. Rett’s syndrome
3. Asperger syndrome
4. Childhood disintegrative disorder
5. PDDNOS

## **1. Autism:**

Autism is a Pervasive Developmental disorder that varies on a spectrum of mild to profound impairment, characterized by disinterest in social interaction; severely impaired communication skills stereotypical movements and restricted or obsessive interests. To warrant a diagnosis of autism, the child must show characteristics in the three areas of social interaction, communication and repetitive, stereotypical interests.

Based on the DSM-IV-TR (APA, 2000) criteria, a diagnosis of autistic disorder is dependent upon four inclusionary criteria and one exclusionary criteria. The exclusionary criteria are that the disorder does not belong to any other PDD diagnosis. The inclusionary criteria considered must appear before the age of three years and involve the triad of social interaction, communication and repetitive behaviours.

**DSM-IV Criteria for Autistic Disorder:**

A. Significant impairments in social interaction skills, evidenced by impaired use of nonverbal behaviours like facial expression, eye contact and gestures, inability to create appropriate relationships with members of their peer group and a profound lack of emotional and social reciprocity.

Marked impairments in communication, demonstrated by a lack or significant delay in the development of verbal language, impaired ability to sustain conversations, use of stereotypic verbalizations or idiosyncratic forms of language.

Stereotypic patterns of interests, activities and behaviours manifested as an obsessive preoccupation with specific routines, parts of objects or patterns of behaviour.

B. Delays or atypical functioning, with an onset before three years of age in at least one of the following areas: 1) social interaction skills, 2) language used for purposes of social communication, or 3) imaginative or symbolic play.

C. Cannot be accounted for by Childhood Disintegrative Disorder or Rett's Disorder.

## **2. Asperger syndrome:**

This clinical entity was first observed and described by Dr Hans Asperger in 1944. The diagnosis of Asperger syndrome is based on the presence of two fundamental characteristics from the autism triad; serious and constant impairment in social interaction and confined, repetitive behaviours, activities and interests. The third important feature of impaired communication is excluded. According to the DSM-IV-TR (American Psychiatric Association, 2000) the functional definition for ruling out general delay in language is that production of single words must be attained by 2 years and phrases by 3 years of age. If these criteria are not met, autism would be considered the more appropriate diagnosis.

## **3. Rett Syndrome:**

Rett Syndrome, first described by Dr. Andreas Rett in 1966, is listed as one of the PDDs. RS occurs only in females. The gene mutation involving MECP2, a gene on the chromosome X was reported in 1999 to be the cause for RS. A unique feature of RS is the stereotypic hand movements that seem like hand washing.

The symptoms of RS progress over 4 stages:

Stage 1: This is known as the early onset stage which occurs between 6 to 18 months of age, in which the child shows faint signs of disinterest in social interaction, poor eye contact, loss of interest in toys and play and deceleration of head growth.

Stage 2: This stage spanning over 1 to 4 years of age known as the rapid destruction stage, is when the child shows slowing of head growth, loss of communicative skills, impaired social interaction; hand wringing and sometimes irregularities in breathing and gait abnormalities.

Stage 3: The plateau stage which may appear between the age of 2 to 10 years, may be characterized by subtle improvements in behaviour, less petulance and autistic like characteristics; improved communication, eye contact and interest in the environment.

Stage 4: The late motor deterioration stage, could be prolonged for years and is marked by poor mobility due to motor weakness, spasticity, rigidity, dystonia and eventual loss of the ability to walk.

#### **4. Childhood Disintegrative Disorder:**

In the DSM-IV-TR (APA,2000), childhood disintegrative disorder (CDD) is described as a PDD characterized by deterioration in functioning following a minimum of two years of normal development. The diagnosis of CDD is dependent on the regression of skills in two of the five developmental areas: motor skills, receptive or expressive language skills, play skills, social skills or bowel and bladder control.

#### **5. Pervasive Development Disorder, Not Otherwise Specified:**

Pervasive development disorder, not otherwise specified (PDD-NOS), is the diagnosis given to individuals who exhibit symptoms of PDD but do not strictly fall into any of the other four PDD classifications. This diagnosis applies to children or adolescents with atypical autism, showing late onset of symptoms, subthreshold levels

of impairment or atypical symptomatology. It is highly important to exclude other possible diagnoses of schizophrenia or personality disorder in these individuals.

Though there are five distinct disorders falling under the term PDD, they share similar features of deficits in communication, poor social skills and stereotypy in behaviours, hence with a few modifications and considerations similar treatment approaches can be used. Over the years, a large number of treatment methods have emerged through research and unrelenting clinical practice.

A number of approaches have been used for language intervention in children with ASD:

**1. Behavioural Intervention methods:** These methods are guided by the principles of the Skinnerian approach and include highly effective and structured teaching methods like contemporary Applied Behaviour Analysis (ABA) and Discrete trial training. These methods emphasize on the manipulation of events preceding behaviour and consequences that follow it to modify or control the behaviour. By having a precise control over antecedent events and consequences aberrant behaviours can be modified into the use of socially acceptable behaviours.

**2. Naturalistic Intervention methods:** These methods developed to create a bridge between the effective principles of behavioural intervention and use of language in more natural and spontaneous situations. These include, time delay procedure, milieu teaching procedures and incidental teaching methods. They focus on the use of natural language behaviours in more natural situations and tend to be more child-directed than therapist or parent-directed.

**3. Developmental Approaches to intervention:** Intervention methods like the Hanen approach, Floortime approach, etc view language intervention from a developmental perspective. They derive their principles for language treatment by closely following the development of language in typically developing children and believe that children with ASD will benefit from such an approach to language intervention.

**4. Alternative and Augmentative Communication methods:** Non-verbal or minimally verbal children with ASD who benefit little from traditional language intervention methods, alternative methods of communication are seen to be highly beneficial. Methods like sign language, Picture Exchange Communication System (PECS) and aided communication systems aim to provide an alternate means of communication for individuals who are unable to develop verbal language skills.

In addition to these approaches to language intervention, many other methods have been developed and studied. Decades of research have led to the emergence of a large number of treatment methods to improving language and communication abilities of children with ASD. Studies to examine treatment effectiveness have shown limited benefits from some forms of treatment whereas others have shown significant gains as a result of treatment.

A systematic review of treatment efficacy of communication intervention in children with Autism was carried out by Goldstein in 2002. A summary of approximately 60 studies evaluating the effectiveness of communication intervention approaches was carried out. Different methods of intervention involving sign language, discrete trial training, milieu teaching and approaches to promote social interactions were selected for treatment. The author drew the following conclusions from a detailed review of all the studies:



Investigators must identify appropriate outcome measures which are sensitive to the changes associated with treatment efforts.

Add useful components to the treatment program and disqualify expendable ones.

Augment generalization and durability of the intervention program.

Although an impressive number of studies on treatment outcome for children with autism have reported success, there seem to be difficulties in assessing and measuring change in language abilities of children with autism as a result of language intervention. This may be due to many reasons namely:

Small sample sizes

Paucity of treatment/comparison groups

Scarcity of assessment measures which monitor change in language skills.

As a result of inability to conduct treatment efficacy studies by using treatment and comparison groups, researchers have successfully utilized multiple-baseline designs to monitor and gauge progress.

Few tools have been developed in the Western context which aims to quantify or measure progress over the course of treatment. Few of them include, Autism Treatment Evaluation Checklist (ATEC) – Rimland & Edelson (1999) and Verbal Behaviour Milestones Assessment and Placement Program (VB-MAPP)- Sundberg(2008).

In the Indian context, Shiam & Shyamala (2002) developed a resource manual for speech-language pathologists providing guidelines for intervention. The manual provides detailed descriptions of the methods used in treatment of children

with ASD and provides a detailed summary of goals that must be worked upon. However, the manual is exhaustive and does not provide sufficient means to chart the baseline levels so as to be compared with levels post-therapy.

**Need for the present study:**

There is no tool for use by speech-language pathologists which could help to quantify the progress attributable to language intervention in children with Autism.

There is no material available for selection of treatment goals for children with Autism.

**Aim of the Study:**

To develop a manual in English for children with Autism Spectrum Disorders.

**Purpose of the study:**

It can serve as a measure for baseline and post-therapy comparison.

It can help in the choice of treatment goals for speech-language pathologists.

It can be administered at multiple intervals to evaluate the effectiveness of treatment.

**Objectives of the study:**

To develop a tool for the selection of treatment goals for children with autism spectrum disorders.

To provide a means of measuring treatment gains over the course of intervention.

## **CHAPTER II**

### **REVIEW OF LITERATURE**

An extensive review has been provided under the following headings:

- I. Development of language in children with autism
- II. Approaches to intervention in children with ASD
- III. Materials for treatment profiling

#### **I. DEVELOPMENT OF LANGUAGE IN CHILDREN WITH AUTISM:**

Children who fall under the Autism spectrum have marked deficits in communication, which act as an obstacle in the development of play skills, social skills, academic skills and integration into the society. These children may show delayed or deviant patterns of language development evident even before the emergence of first words. The development of language in children with ASD will be discussed under the following headings:

Pre-linguistic phase

Early language phase

Basic-to-advanced language phase

#### **Pre-linguistic phase:**

This is the period of typical language development from 8 months to 18 months and is marked by the initiation of intentional communication. In typically developing children, there occurs an emergence of interactive behaviours, vocal turn-taking and expression of intentions by pointing and gesturing. At this phase children begin to realise that they are capable of regulating others' behaviour by the use of meaningful words, grabbing attention of the caregivers and establishment of joint attention. The following features are seen in children with ASD at the pre-linguistic phase:

Reduced rate of pre-verbal communicative behaviours (Wetherby et.al, 1998)

Absence or delay in the development of pointing and other communicative gestures (Dawson et.al, 1998)

Deviant means of non-verbal communication like pulling caregiver's hand rather than pointing. (Stone et.al, 1997)

Poor response to name call and other verbal stimuli (Osterling and Dawson 1994; Paul et al. 2007a)

Circumscribed range of communicative functions, mostly regulatory in nature and restricted use of communication for interactive functions. (Mundy and Stella 2000)

Peculiar preverbal vocalizations (Sheinkopf et al. 2000)

Deficient motor and verbal imitation abilities (Volkmar et al. 1997)

Lack of imaginative and pretend play (Rogers et al. 2005)

A collection of such deficits shows that children with ASD do not develop communication as typically developing children and also do not attempt to use other

means to communicate their intentions. They therefore, show poor response to speech and gestures, inability to establish joint attention and fail to express themselves (Yoder and McDuffie 2006).

### **Early language phase:**

This phase extends from 12-18 months till 24-36 months in which typically developing children begin to produce meaningful words and string them into simple phrases. Initially between 12-18 months there is a gradual increase in vocabulary as the child discovers new words and attempts to use them in a variety of situations for different functions. As the child approaches 24 months, they begin to combine words into “telegraphic” phrases. The period of 18 months to 2 years is a time for significant advancements in conversational ability as children begin to comprehend the “conversational obligation” which is the behaviour of responding to speech with speech (Chapman 2000).

In most children with ASD, there occurs a delayed acquisition of first words. A study by Paul et al. (2007b) revealed that 36% of children with ASD above two years had not developed any expressive language skills. In children with ASD who do acquire some words, they still tend to lag approximately 6 months behind their non-verbal mental age (Paul et al. 2007b). Most children with ASD who develop large expressive vocabularies encounter difficulty in progressing to multiword utterances due to an inability to combine words to form phrases.

Children with ASD show deviant language behaviours in the early language phase as they begin to use language. Pronoun reversals are a common observed

deviance in these children (Fay 1979), echolalia is another unusual feature frequently seen to persist well beyond early childhood in children with ASD. Occasionally echolalia may aid in communication (McEvoy et al. 1988; Prizant and Rydell 1984), however in other instances it may be purely self-directed with no associated communicative intent (Tager-Flusberg et al. 2005).

### **Basic-to-advanced language phase:**

The period from the age of 2 to 5 is the preschool period which is marked by rapid acquisition of new vocabulary and the evolution of telegraphic utterances into fully grammatical forms. The child also attempts to approximate the grammatical structure of the language they are exposed to.

Children with ASD show a slow rate of language development during this phase, however do develop restricted functional use of expressive language. There may be a persistence of echolalia even after the emergence of spontaneous language. Tager-Flusberg (1995) described the development of language in these children as demonstrating a disconnection between language form and function. This can be clearly evident as children with ASD develop syntax, morphology and phonology commensurate with their overall mental age, however show pronounced deficits in pragmatics and prosody.

Tager-Flusberg and Joseph (2003) identified a group of individuals with ASD who demonstrate language development patterns similar to other developmental language disorders, who show deficits complementary to their mental age in morphology and syntax, however speakers with ASD demonstrate relatively preserved language form, i.e., syntax, morphology and phonology but have marked problems in language function and use, i.e., pragmatics.

## **II. GENERAL APPROACHES TO INTERVENTION IN CHILDREN WITH AUTISM SPECTRUM DISORDERS:**

### 1) Developmental approach:

Floortime techniques

Relationship Development Intervention

Social Communication, Emotional Regulation, and Transactional Support

Hanen approach

### 2) Behavioural approach:

Applied Behavior Analysis

Discrete Trial Training

### 3) Naturalistic Behavioural methods:

Milieu teaching

Pivotal response training

Functional communication training

### 4) Medical approach

### 5) Psychotherapeutic approach

6) Play therapy

7) Sensorimotor approach

8) Natural language Approach

9) Classroom Based Approaches:

Treatment and Education of Autistic and Related Communication-Handicapped  
Children

Project Developmentally Appropriate Treatment for Autism (DATA)

10) Video Modelling

11) Augmentative and Alternative Communication:

Picture Exchange Communication system

Sign language Training

Aided systems

12) Other techniques:

Auditory Integration therapy

Music therapy

Facilitated communication

Visually Cued Instruction

**1) DEVELOPMENTAL APPROACH:**



Developmental approaches have contributed largely in the assessment and management of children with ASD. The presumption behind this approach is that the development of language in children with ASD follows a pattern which is analogous to that seen in typically developing children. Advocates of this approach believe that children attain communicative success by using many nonverbal behaviours and learn to control others' behaviour and improve interactions. The basic assumptions of these approaches include the following:

To pursue the attention cues given by the child.

Determining treatment goals by adhering to typical patterns of language development.

Involving children with autism in activities resembling those as typically developing peers.

Using everyday occurrences and routines to incorporate functional goals to improve communication.

Promote gestures, vocalization, gaze and other non-verbal modes of communication to aid the development of language.

**Floor time techniques:**

These techniques employ joint play and affect to improve interactive and symbolic communication in children with ASD. These techniques are based on the developmental, individual-difference, relationship-based model (DIR) put forth by Greenspan and Wieder (1997). In these techniques parents of children with ASD are trained to build 'circles of communication' by spending multiple 'floor time' sessions. During these 'floor time' sessions, the parent picks up on the child's attentional cues

and then involves them in an interaction by talking about the child's actions. As the parents spend prolonged periods of 'floor time' they begin to challenge the child to stretch their capabilities by intensifying the complexity of responses.

A pilot study was conducted by Pajareya and Nopmaneejumruslers (2007) to study the effect of supplementing home-based Developmental, Individual-Difference, Relationship-Based (DIR)/Floortime™ to routine preschool intervention with children with ASD. Thirty two children diagnosed with ASD were randomly assigned into two groups: typical treatment or DIR/Floortime–supplemented treatment groups. The children in the typical treatment group received routine behavioural treatment, whereas parents of the children in the supplemented group were trained on the use of Developmental, Individual-Difference, Relationship-Based (DIR)/Floortime™ and the parents carried out the treatment at home. They were trained to identify the cues given by the child and respond to them appropriately. At the end of three months and an average of over 15 hours per week of DIR/Floortime, the supplemented group showed more gains on measures of Functional Emotional Assessment Scale (FEAS), Childhood Autism Rating Scale and Functional Emotional Questionnaires. In addition to the gains observed in the measures selected, the parents involved in the study reported a significant change in the quality of interaction between them and their children.

### **Relationship Development Intervention- Gutstein and Sheeley (1958)**

This is a cognitive-developmental model in which parents of children with ASD are trained to implement various strategies to create opportunities for the child with ASD to react in a number of ways to increasingly challenging and unexpected activities in daily routines. Parents who undergo this program discover how to

scaffold and recognise communicative moments and to incorporate them into the child's lifestyle.

A study by Gutstein, Burgess and Montfort. (2007) was done to evaluate the effectiveness of RDI. Their study included 16 children with ASD and changes in Autism Diagnostic Observation Schedule (ADOS) and Autism Diagnostic Interview-Revised (ADI-R), flexibility and school placement were compared before treatment and after a minimum interval of 30 months. The authors reported positive results in all measures, however stated the pitfalls to be lack of comparison groups and an inability to show change on IQ scores however reported that the gains achieved through RDI included improvement in social participation, more interest in reciprocal communication and more flexible behaviour. The authors reported that children with ASD who underwent RDI became substantially more social, functioned with reduced adult participation in school settings, involved more in reciprocal communication and were perceived to be more flexible and adaptive in their behaviour.

### **Social Communication, Emotional Regulation, and Transactional Support:**

It is a developmental, social-pragmatic model by Prizant and Rubin (1999) which can be applied to the treatment of cognitive, communicative, sensory processing, and regulatory deficits in children with ASD. The SCERTS model addresses Social Communication, Emotional Regulation, and Transactional Support as the major dimensions of development that must be prioritized in a rehabilitation program designed to promote the communicative and cognitive development of children with ASD. Education/treatment priority goals are given under the three domains:

Social communication: Two core areas of deficit in children with ASD are addressed in this domain of the model, the establishment of joint attention which involves sharing emotions and communicating intentions, and improving symbolic behavior, which regulates the comprehension of the meaning of conventional gestures and advanced linguistic forms.

Emotional regulation: This domain focusses on enhancing abilities for self and mutual regulation and improving abilities to recover from dysregulation. Studies have demonstrated that regulation of emotions can be promoted by sensory-motor or higher level cognitive channels congruous with the child's skill acquisition and developmental profile (DeGangi, 2000; Prizant & Meyer, 1993).

Transactional support: As a result of the deficits in emotional regulation and social communication, children with ASD and their families require various types of support to facilitate optimal interpersonal relationships and interactions. This domain is therefore designed to provide educational, interpersonal, family support or support from other professionals.

### **Hanen approach- More Than Words:**

This is a child-centered program which was derived from the principles followed by the Hanen Centre for training teachers and parents of children with ASD to promote language development by giving contingent, stimulating and enriched input to children with ASD. The basic principle of the Hanen approach and More Than Words is to train parents and teachers of children with ASD to facilitate communication and social skills by using everyday interactions in the child's life.

There have been a large number of studies supporting the use the Hanen approach for promoting language in children with delayed language development yet there are few empirical studies supporting its use with children with ASD.

A randomized control trial by Carter et.al (2011) studied the effect of Hanen's 'More Than Words' to a control group. 62 children who fulfilled the criteria for ASD were selected for the study and randomly assigned to treatment and control groups. The treatment groups received HMTW intervention for a period of 3.5 months and control groups received the regular treatment that the children were previously enrolled in. Three measurement periods were considered: Time 1 was prior to randomization, Time 2 was at 5 months post-enrolment and Time 3 was 9 months post-enrolment. At each measurement point, parental responsivity and children's communication levels were measured using The Vineland Adaptive Behavior Scales, Second Edition (Vineland II; Sparrow et al., 2005), Parent Interview for Autism–Clinical Version (PIA-CV; Stone et al., 2003), The Early Social Communication Scales (ESCS) – Abridged (Mundy et al., 2003). Children's interest with objects was measured at Time 1, using the Developmental Play Assessment (DPA; Lifter, 2000). The number of toys which children with ASD used differentiated play served as an index of child's object interest (Yoder & Stone, 2006b). The results of the study showed no main effects of HMTW intervention on children's communication levels or parental responsivity. However, it was seen that treatment effects on communication gains was moderated by the children's Time 1 object interest. The children who had low levels of object interest in Time 1 showed greater progress in communication. Hence, the HMTW intervention exhibited divergent effects on communication level and seem to be controlled by a baseline child factor.

## **2) BEHAVIOURAL APPROACH:**

Approaches based on the behavioural model to the treatment of autism have received tremendous empirical support over the years. They are based on the experimental analysis of behaviour, of how events manipulate and alter behaviour. The large number of approaches have sprouted as a result of this model.

### **Applied Behaviour Analysis :**

Applied Behaviour Analysis (ABA), based on the behavioural model, is a clinically applied field which focuses on identifying the interaction between environmental events and behaviour to demonstrate socially significant changes. It consists of a meticulous assessment of events and behaviours by assessing contextual factors, events that precede the behaviour, motivational variables and events or consequences of the behaviour. By breaking down the behaviour one can gain a wider understanding of what events are responsible for the development and sustenance of any particular behaviour. Any behaviour, be it communication, language, play, social skills, academic skills, motor skills or problem behaviours can be altered by using a detailed assessment and careful implementation of behavioural techniques.

ABA programs focus on the expansion of premature symbols into increasingly elaborate forms of expression and address the advancement of language form. The Verbal Behaviour Program is based on the work of Sundberg (1978) and Sundberg and Partington (1982), adopts a Skinnerian approach to communication and language learning. It is a tightly structured behavioural approach, using highly effective techniques like errorless teaching, prompting and fading procedures, incorporating discrete trials for intensive training sessions and in naturalistic situations. Language goals are hierarchically ordered as Skinnerian categories of Verbal Behaviors which include the following:

Echoic: Imitation of verbal behaviour.

Mands: Behaviours used to request or produce an instantaneous benefit for the speaker.

Tacts: Labelling, naming objects, actions, attributes, etc

Reception by Function, Feature and Class (RFFC): Responding by comprehension of frequently used stimuli.

Intraverbals: Nonechoic verbal behaviours made in responses to the speech of others.

### **Discrete Trial Training (DTT):**

DTT is a highly effective behavioural approach and is also known as Early Intensive Behavioural Intervention (EIBI). It involves breaking down of complex skills into their fundamental parts and teaching each subskill by using tightly structured mass-teaching trials. The training of target behaviours is accomplished by the imitation of a model, immediate prompting and contingent reinforcement of the target response. A discrete trial is a short unit of instruction presented by a teacher who works with the learner in a setting without distractions. It can be implemented by family members and non-professionals and have been seen to benefit from it.

Every discrete trial consists of five parts:

1. Cue: This is also known as the discriminative stimulus where there teacher gives a clear instruction or question.
2. Prompt: As soon as the cue is given, the teacher assists the learner to respond accurately to the cue. The teacher provides physical guidance or may model the

expected response. As the learner attempts to produce independent responses, the teacher gradually fades the prompt.

3. Response: The learner responds to the teacher's cue.

4. Consequence: If the learner produces an accurate response, contingent reinforcement follows it in the form of praise, hugs, small pieces of an edible reinforce, play for a short duration with toys or any other activity which is of the child's interest. If the learner produces an incorrect response, the teacher, looks away, says "No" or removes the teaching materials.

5. Inter-Trial interval: A brief pause is given by the teacher before presenting the stimulus for the next trial.

Few aspects of DTT enable it to be successful in increasing children's motivation to learn. As each trial is short-lived, it increases the opportunities given to the child to learn. Since each teacher works one on one with each child, they can focus on their individual needs. DTT have a precise and clear-cut format, it provides a clarity for the child regarding the teaching situation, especially as each discrete trial has a clearly defined start and end point, and the components are tailored to the child's abilities. Hence, DTT help to "break down the continuous flow of ordinary adult-child interactions into highly distinctive (discrete) events that are more easily discriminated by the child" (Newsom, 1998).

Peters-Scheffer et.al. (2011) carried out a meta-analysis on the effectiveness of ABA-Based intervention programs for children with ASDs. 11 highly relevant randomized control trial studies involving 344 children with ASD were reviewed and the outcome variables selected were Intelligence Quotient (IQ) and Adaptive



behaviour. The experimental groups in the studies reviewed received intensive EIBI for 10 months to more than two years while the control groups received less intensive EIBI. The treatment methods used for the experimental group included Lovaas method using a discrete trial format, ABA using discrete trial format and home-based behavioural treatments. The methods used for the control group included less intensive eclectic treatment, nursery provision involving developmental and behavioural approaches and school-based behavioural interventions. The results revealed that the children in the experimental group outperformed the children in the control group on IQ as well as adaptive behaviour measures. There was considerable variation among studies and participants and these can be accounted by differences in the intensity of treatment (Lovaas, 1987), intensity of supervision (Eikeseth, Hayward, Gale, Gitlesen, & Eldevik, 2009), quality of EIBI, participant characteristics and other such variables.

Reichow (2011) presented an overview of five meta-analyses published from 2009 to 2010 on the effectiveness of EIBI for children with ASD. A number of differences were present among the meta-analyses selected which lead to diverse estimates and overall conclusions. The weighted mean effect sizes were calculated for the meta-analyses for IQ and adaptive behaviour. The weighted mean effect sizes for IQ ranged from  $g = .38$ – $1.19$ , and for adaptive behaviour ranged from  $g = .30$ – $1.09$ . Four out of the five meta-analyses selected reported that EIBI is a highly effective intervention method for children with ASD.

### **3) NATURALISTIC BEHAVIOURAL METHODS:**

Naturalistic behavioural methods have received great importance to overcome the limitations of the contemporary ABA approach and DTT, like the lack of

generalization of learnt verbal behaviours to natural situations. These methods aim to incorporate more spontaneous and natural situations and adapt the child's advances and interests into language learning opportunities. Few naturalistic treatment methods include incidental teaching, milieu teaching, etc. These approaches have the advantage of reduced need for generalization and being easier to assimilate in daily situations.

**Milieu teaching:**

Milieu teaching is a term used for a number of treatment methods which target facilitating communication in the child's natural environment than having a tightly structured learning environment with well-controlled stimuli. These approaches involve:

Improving communication in everyday environments.

Communicative activities that are not limited to 'therapy time' but extend over the day.

Using toys and activities which serve to self-reinforce the child.

Anticipating the child's initiation through gesturing or showing interest in an object.

Giving opportunity to the child to communicate spontaneously by expectant waiting instead of immediate prompting.

Providing prompts and reinforcing the child's attempts to communicate.

### **Pivotal Response Training:**

Pivotal Response Training (PRT) was derived from the Natural Language Paradigm which targets pivotal behaviours in children with ASD to achieve generalized improvement in communication. It is based on the principles of ABA and aims at improving a broad range of deficits including communicative and social skills. Studies have shown that PRT has led to improvement in play skills (Schreibman et.al, 1996), asking questions (Koegel et.al, 1998) and social initiation (Koegel et.al, 2003).

Koegel et.al (2014) conducted a randomized clinical trial to compare pivotal response treatment (PRT) and structured applied behaviour analysis (ABA). 30 children were divided into two clinical groups and were assigned to them randomly. One group received structured ABA sessions and the other received PRT. Mean Length of Utterance (MLU) was calculated prior to treatment which served as a baseline. Each child received a total of 24 hours of therapy- PRT or structured ABA over a 3 month period. The results of the study demonstrated that PRT was more competent in improving social skills than structured ABA. However, all the children who were included in the study showed overall progress in the targeted area of MLU as well as, pragmatic skills and social communication.

### **Functional Communication Training:**

It is an organized treatment method in which any challenging behaviour exhibited by the child is replaced by more appropriate behaviour, assuming that the reason the child is showing such challenging behaviour is to communicate a particular intent. The challenging behaviour is often replaced by simple vocalization, graphic symbols or gestures. Studies have demonstrated that FCT shows significant changes in disruptive behaviour by carrying out functional analysis and replacing the

challenging behaviour with more suitable responses and showed more spontaneous and appropriate verbal communication.

A study carried out by Mancil et.al (2006) on a four-year old boy with PDD who received FCT at home showed drastic reduction in tantrums during mand training, increase in spontaneous verbalizations, emergence of two and three word combinations and generalization across people and objects was seen.

Few other naturalistic intervention methods have been studied to improve the social interaction and generalization skills of children with Autism. Some examples include, Social Stories <sup>TM</sup> (Gray, 1998), which are short stories that aim to improve the social skills of children with ASD by bringing to their attention the relevant parts of any particular social situation (Gray, 1998; Gray & Garand, 1993). Another method is Peer-mediated intervention (PMI) in which the peers are trained to function as the agents of intervention, to implement programs, behavioural techniques and also to improve social reciprocity (Garrison-Harrell et al., 1997 and Laushey and Heflin, 2000).

#### **4) MEDICAL APPROACH:**

As children with ASD show a wide variety of deficits, a large number of treatment methods have been used, including behavioural, medical, educational, allied health and complementary medical interventions. Medical interventions for children with ASD are primarily aimed toward the comorbid symptoms, rather than the core ones. Not only do these children have associated problems like hyperactivity, intellectual disability and seizures, but may also face medical issues like immune system dysfunction, or neurochemical imbalances like increased levels of serum serotonin.

There is a wide range of medical interventions suggested for children with ASD, but there is limited evidence to support benefit from these interventions. Antipsychotic medications like risperidone, aripiprazole and haloperidol act on the dopamine and serotonin systems used for the treatment of irritability, self-injurious behaviour and aggression. Serotonin-Reuptake inhibitors like fluoxetine and citalopram act on the serotonin system and are administered to reduce repetitive and problem behaviours. Stimulants like methylphenidate, amphetamine, and dextroamphetamine, and other medications to treat hyperactivity work on the dopamine system. Few medications have demonstrated improvement in challenging and disruptive behaviours however, research has also pointed out significant adverse effect profiles making it clear that though these drugs may be efficacious they must be used with caution.

##### **5) PSYCHOTHERAPEUTIC APPROACH:**

Research has shown that children and adolescents with ASD experience more emotional difficulties, anxiety disorders and behavioural issues compared to their peers. Therefore, it is necessary and appropriate to add cognitive techniques to traditional behaviour therapy. Evidence-based Cognitive Behaviour Therapy (CBT) is seen to be highly effective in treating a large variety of psychological disorders and has been found to be successful for children when they are altered to be appropriate from a developmental perspective (Kendall and Chodhury 2003; Weisz and Kazdin 2010). In CBT, with the use of behavioural strategies, cognitive techniques aim to change how an individual processes information or thinks about situations. CBT therefore helps to promote positive behaviours and encourages new skills by changing antecedent events and pairing motivating reinforcers, at the same time aiming at

modifying maladaptive thought processes. By using CBT the child/ individual will be exposed systematically to the feared stimulus and to overcome the fear.

## **6) PLAY THERAPY:**

Play therapy has been used extensively with children with ASD to treat behavioural and emotional problems and suits well to the unique and diverse developmental needs of children with ASD. Till the age of 11 years, children lack an adequately developed capacity for abstract thinking, which is essential for the development of meaningful verbal expression and comprehension of complex issues, feelings and motives (Piaget, 1952). Adults communicate through words naturally, however children use the concrete world of play to express themselves naturally. Therefore in play therapy, play is considered as the means of communication between the child and the therapist based on the assumption that the play materials are used directly or symbolically by children to express the thoughts, feelings or experiences which they are unable to communicate verbally (Axline, 1947; Landreth, 1991). Play gives an opportunity for children to bridge the gap between their understanding and experiences, hence yielding a means for learning, insight, problem solving and coping.

Non-directive play therapy provides unconditional positive regard, congruence and empathy and there has been a recent emphasis on a more developmental approach to treatment; thereby pointing to the likelihood that children with ASD would lead to emotional and social benefit. Unconditional positive regard focuses on accepting the child's current functioning levels and also presuming that children possess an inborn drive toward better functioning. Thus, in the play room the child with ASD is able to

regulate the pace and focus of change by establishing joint attention controlled by the child rather than the adult.

Ryan and Josefi (2004) studied the usefulness of non-directive play therapy to how changes in the behaviours of a child with ASD. A 6 year old boy with severe autism was selected for the study. Video recordings of 16 sessions of non-directive play therapy were analysed qualitatively for attachment, autonomy and symbolic play development and quantitatively by considering measures for child-initiated play activities and physical contact with the therapist, time spent on play activities and on ritualistic/obsessive activities. The authors concluded that the child was able to show attachment behaviours towards the therapist and was able to enter into a positive therapeutic relationship. The primary areas of improvement were in child's autonomy and pretend play skills, while there was only mild improvement seen in ritualistic behaviour.

Bratton et.al (2005) conducted a meta-analysis on 93 controlled outcome studies carried out from 1953 to 2000 to study the efficacy of play therapy and the factors that influence its effectiveness. The overall effect of treatment was studied by the calculation of effect size for the outcomes measures which served as a standardized measure of change in the group that received treatment and the control group. The mean effect size across all the treatment-control comparisons was 0.80 indicating large treatment effects for play therapy methods. The methods employed during therapy were divided into two categories of humanistic-nondirective and nonhumanistic- intervention involving cognitive, behavioural and directive play therapy methods like board games. Humanistic-nondirective interventions showed larger effect sizes compared to nonhumanistic-directive methods. Larger treatment effects were also seen when play therapy was carried out by parents as compared to

therapy conducted by a professional. An analysis of the data of the 93 studies revealed that play therapy was effective across age and gender.

## **7) SENSORIMOTOR APPROACH:**

The patterns of motor and sensory features in children with ASD may vary qualitatively from those seen in other developmental disorders. It is also seen that atypical sensory-perceptual features begin to appear relatively early, approximately by 9 to 12 months, in the development of children with ASD. Motor patterns and sensory processing in these children are not completely understood, but may bear relationship to the core features, expansion of other aberrant behaviours and future prognosis, and hence hold significance for early diagnosis and treatment.

A diverse variety of unusual sensory responses like hypo- and hyper-responsiveness to certain stimuli, fixation on particular sensory features of objects, paradoxical responses to selective sensory stimuli and perceptual distortions have been found in 42 to 88% of children with ASD of the older age group (Kientz & Dunn, 1997; LeCouteur et al., 1989; Ornitz et al., 1977; Volkmar, Cohen, & Paul, 1986), suggestive of the observation that this is a common concern among this population. Though some individual differences are reported, visual spatial skills are seen to be stronger than other skills. Both extremes of hyper- and hypo-responsiveness can be evident in the same individual due to the imbalanced and wavering nature of the sensory processing abilities in children with ASD. These bizarre sensory reactions are considered a reflection of poor integration of sensory information or modulation of the arousal in the central nervous system. Patterns of over- and under-arousal may be caused by disturbances in neurological structures or systems which involve the cortical mechanisms, cerebellum or the limbic system



(Hutt, Hutt, Lee, & Ounsted, 1964; Kootz, Marinelli, & Cohen, 1982; Rimland, 1964; Zentall & Zentall, 1983). Abnormal sensory responses are seen by children with ASD in response to social as well as non social stimuli, even in the absence of any known peripheral dysfunction.

Sensory Integration (SI) therapy primarily based on the contributions of Dr A. Jean Ayres, is focussed on the processing of sensory information to facilitate the learning of higher-level skills. Interruption in sensory integrative (subcortical) functions is treated by exposing the children to systematically controlled sensory experiences to enable them to respond with adaptive behaviours. It is assumed that the nervous system is capable of better modulating, organizing and integrating information from the surrounding environment, which would serve as a basis for learning of adaptive responses and higher-order learning. Intervention goals focus on improving processing of sensory information to help in sensory modulation and for the integration of sensory information for the creation of better perceptual schemas as a support for the learning of academic skills, social skills and independent functioning.

An example of a well known SI-based program is the sensory summation approach, also known as the “Sensory Diet”, in which the therapist or teacher provides a program of sensory activities which aim to fulfil the individual’s sensory needs. The program consists of systematic and frequent somatosensory stimulation, as a recommended set of activities which are individualized for the child’s sensory needs are assimilated into the child’s daily routines.

Techniques for sensory stimulation are diverse and involve providing a selective type of stimulation through a restricted modality like vestibular stimulation

or touch pressure. At times these techniques are used in isolation and at other times are consolidated into a broader SI program. Most techniques are fundamentally based on neuropsychological principles, so as to specify that a particular sensory experience provides facilitation or inhibition on the nervous system to lead to behavioural changes. A technique using “deep pressure”, a firm touch which is calming, and is applied through a therapeutic touch like joint compression, massage or through an apparatus like weighted garments and vests, Hug machine, etc. Vestibular stimulation is another technique which helps in the facilitation of postural tone and modulation of arousal.

#### **8) NATURAL LANGUAGE APPROACH:**

Naturalistic language intervention was defined by Camarata (1996) as “procedures paralleling those employed to teach typically functioning children that produce measurable and socially valid change in the morphological, syntactic, semantic, pragmatic and speech intelligibility aspects of the linguistic system of children with disabilities”.

The use of more naturalistic and loosely structured language intervention procedures such as mand-model (Rogers-Warren & Warren, 1980), and time delay (Charlop, Schreibman, & Thibodeau, 1985; Halle, Baer, & Spradlin, 1981) developed to overcome the limitations of traditional operant procedures. Natural Language Paradigm (NLP) is a naturalistic language intervention method structured for use with children with ASD in clinical settings (Koegel, O'Dell, & Koegel, 1987). It bears similarities to the mand-model approach, in which the child is systematically prompted or modelled to verbalize and reinforcement is provided for the production

of appropriate verbalizations. The NLP however combines the beneficial features of both naturalistic and traditional operant language procedures.

NLP is a protocol designed to increase the frequency of positive responses by presenting direct reinforcers (Koegel & Williams, 1980), increasing motivation to respond by varying tasks (Dunlap, 1984) and enhancing generalization by following a loose structure and training multiple exemplars (Stokes & Baer, 1977). Studies have shown that when implemented in a clinical settings by well-trained therapists, the NLP demonstrated more generalized improvement in speech of children with ASD than the traditional operant procedures (Koegel,1987; Laski.et.al,1988).

#### **9) CLASSROOM-BASED APPROACHES:**

**TEACCH (Treatment and Education of Autistic and related Communication-handicapped Children)** is a classroom-based professional training program developed by Eric Schopler (1972). It is also known as Structured Teaching based on the presumption that there exists a shared pattern of neuropsychological assets and weaknesses in children with ASD. There are four important principles of Structured teaching:

Selecting activities that the child can comprehend and structuring the environment accordingly.

Augmentation of weaker skills by utilization of relatively stronger visual skills

Use of activities which are interesting to the child to involve them in learning.

Encouraging self-initiated advances to communicate meaningfully.

Welterlin (2009) studied the effectiveness of training parents of children with autism in the use of the TEACCH program. The results of the study showed significant progress in fine motor skills, reduced maladjusted behaviours, quantifiable increases in visual skills and increased independence.

Virues-Ortega et.al (2013) carried out a meta-analysis of 13 studies to examine the clinical effects of the use of the TEACCH program in children with ASD. The study considered a total of 172 individuals with ASD and standardized measures of motor, adaptive, perceptual, cognitive and verbal skills were recognized as treatment outcomes. The results of the meta-analysis demonstrated that the effect of TEACCH on the motor, verbal, cognitive and perceptual skills was of small magnitude, effect on communication and on activities of daily living was negligible and the effect on maladaptive behaviour and social skills was moderate to large. The authors were unable to identify any specific characteristics related to intervention like the duration, setting or intensity that would serve as a moderator of the effects seen and reported that the effects were replicated across different age groups, however greater magnitude of effects were seen in the school-age children group.

**Project DATA (Developmentally Appropriate Treatment for Autism)** model was developed by Schwartz et. al (2004) which was motivated by amalgamating existing knowledge about principles of ABA and child development. The Project DATA model aims to serve as a developmentally appropriate and inclusive program for preschool children with autism. One of the fundamental beliefs of this model is that children with autism learn from watching and interacting with other children. Project DATA was developed with the aim of constructing a program for children with ASD which would be effective and acceptable to consumers as well. It blends the most effective ideals of ABA and early childhood special education. The results reported

by Schwartz et.al (2004) over a period of 16 months showed substantial gains for children with ASD, as well as the consumers (e.g., school district personnel and families).

However, for the implementation of this model a meticulous understanding of the suggested practices for early childhood special education and effective principles of applied behaviour analysis is required of the staff members. Classroom and other teachers involved in the child's training need to have a thorough knowledge of the effective practices followed, like continuous and consistent collection of data, systematic presentation of instructions, positive support for behaviour and general early childhood curriculum.

#### **10) VIDEO MODELLING:**

In this technique, the child is expected to watch the behaviour of others and accommodate what is observed from the video on their interactions. The video models are generally made by the clinicians by using peers or other children with ASD to enact particular behaviours. Some commercially produced videos are also available for implementation in video-modelling activities like "My School Day" by Silver Lining Multimedia. This method helps in focussing the concentration of the child with ASD on appropriate and relevant behaviours so that the child is able to retain the targeted language behaviour and demonstrate it at a later point of time (Prelock 2006). It thereby also helps in the generalization of the learnt skill as the child applies what is learnt from the video-modelling session to daily life activities (Shipley-Benamou et al. 2002).

Several considerations must be made while developing a video for the intervention of children with ASD. Firstly, the team must select and clearly and

operationally defined the target behaviour which must be observable, measurable and specific to the child (Charlop-Christy 2004). Secondly, a detailed task analysis must be carried out to determine the exact steps of the video model. This step must be directed by a careful observation of target scripts that have been identified in typically developing children (Prelock 2006).

Video-modelling has seen to be an appropriate intervention method for a wide range of developmental levels; Charlop-Christy (2004) used this strategy with young children of 4 years as well as older adults. It is also reported to have greater generalization across settings and helps in supporting the conversational skills of children with ASD (Charlop and Walsh 1986).

Bellini and Akullian (2007) reviewed 23 single-subject design studies carried out from 1987 to 2005, to delve into the effectiveness of video-self modelling and video modelling in the treatment of children with ASD. Percentage of non-overlapping data points (PND) was used as a measure to study the treatment, maintenance and generalization effects of video-modelling across the various studies. The results of the meta-analysis showed that video-modelling serves as an effective intervention technique that leads to improvement in behavioural functioning, social communication skills and functional skills in individuals with ASD. The results also demonstrated that these methods promote acquisition of skills effectively and its benefits are transferred across settings and persons and are maintained over time. The reasons stated for their effectiveness were the integration of two highly effective teaching methods; visually-cued instruction and modelling of desired behaviour. Also the use of video-modelling enables the removal of irrelevant components of the modelled behaviour by utilizing video editing.

## **11) AUGMENTATIVE AND ALTERNATIVE COMMUNICATION STRATEGIES**

Alternative methods of communication are often initiated for children with ASD who have a severely delayed development of verbal communication. AACs were originally considered as a method for treatment of individuals who experience profound sensory or motor deficits for speech production, but have been recognised as an effective nonvocal option for communication for children with ASD. The ruling principle of AAC is that every child has an innate desire to communicate and if speech is delayed or absent, communication should not be dependent on its development. The child is taught to use other means to communicate his intentions. Some AAC methods that have been used with children with ASD are:

### **Sign Language:**

Manual signs have been used extensively as a modality for communication for children with ASD who are non-verbal. The acquisition of manual signs is dependent on fine motor abilities, hence children who have delayed or subnormal levels of fine motor control may not benefit from this method (Seal and Bonvillian, 1997). A review by Goldstein (2002) of studies using manual signs along with speech, called Total Communication (TC) demonstrated that TC can be useful for teaching receptive and expressive early vocabulary. However, authors argue that signs may be supportive in achieving a transition to first words but do not help in the learning of a fully functional language system.

### **Aided AAC:**

There exists some evidence that nonverbal individuals with ASD can benefit from the use of 'high-tech' communication aids like voice output communication aids (VOCA). Ronski & Sevcik (1999) studied two adolescents with ASD who were trained on the use of a computerized VOCA as well as spoken language over a period of two years. Both the participants benefited from the treatment and as it was paired with naturalistic teaching methods it led to an improvement in communicative skills in terms of requesting, responding to questions and making comments. Olive et.al (2007) demonstrated in their study involving three children with ASD, who used a voice output communication device, to evidence an improvement in requesting skills during play when trained using a Milieu teaching approach. A complete visual language system was proposed by Shane and Weiss-Kapp (2008) for teaching children with ASD suggesting to include symbols, pictures and video clips which may be presented on an electronic device. This system therefore not only provides a means for communication but simultaneously improves comprehension and organizational skills.

### **Picture Exchange Communication System (PECS):**

PECS was originally developed by Frost & Bondy (1994) for children with ASD who show highly restricted or no functional means of communication. The objective of this method is to train the child with ASD to use functional communication within a social setting guided by intrinsic, non-social rewards (Prelock, 2006). It was developed to overcome the shortcomings of traditional language approaches to language intervention inclusive of imitation skills, initiation and pointing (Bondy and Frost 1994, 1998, 2001). It aims at improving spontaneous



communication, at the same time preventing dependency on prompts and does not require extensive training prior to initiation of the training (Bondy and Frost 1998; Prelock 2006).

The system consists of 6 phases, where in the training is initiated in Phase I, by encouraging physically initiated exchange, Phase II involves increasing spontaneity of requests, Phase III consists of training picture discrimination, Phase IV focuses on constructing sentence structure, Phase V targets responding to questions and Phase VI involves learning how to comment in response to questions (Frost and Bondy 2001). The goals selected for PECS serve one of the two functions of communication; regulatory or directive (eg: requesting, commanding or demanding) and social (eg: labelling, describing or commenting) (Prelock 2006).

Watson et.al (2010) reviewed eight single-subject design studies and three group studies to study the communication and speech outcomes by implementing PECS. Effect sizes were calculated separately for single-subject designs and group studies for speech and communication outcomes. The results of the meta-analysis showed that small to moderate gains were seen in communication skills, whereas small to negative gains were seen in speech. The increases in communicative skills were seen in both group and single-subject designs. The studies do support that gains in communication occur as a result of PECS intervention however further empirical studies are required to determine the long-term treatment effects of the use of PECS.

A meta-analysis of 24 single-case studies on the use of aided AAC systems in children with ASD was conducted by Ganz et.al (2012). They analyzed the effect sizes via a measure called the Improvement Rate Difference (IRD), which is the difference between the percent of high scores from the baseline to the intervention

phase, for different aided AAC systems. The aided AAC interventions included voice output communication aids, speech generating devices, Picture Exchange Communication System (PECS) and picture-point systems. The results showed that aided AAC had strong effects on the targeted outcomes of communication skills, social skills, challenging behaviours and academic skills. The effect sizes were seen to be greater for communication skills compared to other skills and PECS and speech generating devices were to have larger effect sizes compared to other picture-based systems.

## **12) OTHER TECHNIQUES:**

### **Auditory integration therapy:**

Based on the work of Berard and Tomatis (Berard, 1993), Auditory Integration therapy involves 10 hours of exposure to electronically manipulated music which is presented through headphones in two half-hour sessions each day. The training device is used to dampen the particular frequencies which the individual is particularly 'hypersensitive' to. The music that is filtered is modulated by indiscriminate dampening of low and high frequencies. It is based on the assumption that the filtered/modulated music may be beneficial in reducing hypersensitivity helps in improving overall processing abilities in children with ASD.

### **Music therapy:**

Music therapy is defined as "a systematic process of intervention wherein the therapist helps the client to promote health, using musical experiences and the relationships that develop through them as dynamic forces of change" (Bruscia, 1998). The most important techniques in this approach involve structured and free

improvisation, listening to music and songs. The processes occurring in musical improvisation are thought to benefit individuals with ASD. Music has been used in individuals with ASD to encourage social engagement and improve communication skills (Alvin 1978; Alvin and Warwick 1992). The nonverbal facet of music functions as a means of involving the individual with ASD and the therapist in a musical-emotional communication (Alvin 1978; Alvin and Warwick 1992; Malloch and Trevarthen 2009). Gold et al (2006) reviewed three studies in which children below the age of ten years participated in the study and the use of music to non-music conditions were compared. Significant results were seen for gestural as well as verbal communicative skills in the music condition group, but the studies were restricted to highly structured environments and receptive music therapy with a limited number of young children.

A meta-analysis was conducted by Whipple (2004) in which nine studies on children with ASD compared music and non music conditions. The author reported that, irrespective of age, treatment methodology and type of intervention, music was seen to be an effective method of intervention for children with ASD.

### **Facilitated communication:**

Facilitated communication (FC) is an intervention method which encourages nonverbal individuals with ASD to communicate by typing. It consists of providing the individual with ASD with physical assistance to type out words on a keyboard or letter board with the aid of a facilitator who is trained. The initial study on the use of physically assisted communication for improving written communication (Oppenheim,1961) showed that the child with ASD was able to write his name and other few words, with minimal guidance and support from the facilitator.

The controversy that surrounds FC arises from the observation that a great deal of studies has postulated that the messages that are typed represent the thoughts and intentions of the facilitator rather than the child with ASD (Bebko et al., 1996; Bomba et al., 1996; Green, 1994; Jacobson, Mulick, & Swartz, 1995). The facilitator functions to inhibit uncontrolled, random hand movements, and to withdraw the child's hand once a letter has been selected, recent research has suggested the use of a mechanical device to take up the role of the facilitator thus eliminating any influence on the child's hand movements.

### **Visually Cued Instruction:**

Visually cued instruction involves use of graphic cues like written words or pictographs as instructional prompts to improve communication or language comprehension or as environmental prompts to help in enhanced self-management and organizational skills. This method builds on the strengths of the learning styles of children with ASD. Children with ASD demonstrated sustained focussed attention to picture stimuli similar to typically developing children (Garretson, Fein, & Waterhouse, 1990), however in contrast to their deficits in rapid shifting of attention. Studies have shown that through the simultaneous presentation of oral and visual instruction facilitated joint attention, prelinguistic communication and receptive language skills (Quill, 1996a; Quill & Grant, 1996)

Studies indicate that the simultaneous presentation of visual and oral language instruction facilitates joint attention, prelinguistic communicative gestures, and receptive language. Visual cues act supportively to improve the child's oral language comprehension. Visually cued instruction facilitates simultaneous processing of graphic and oral language and bears resemblance to associative learning. Visual cues

are gestalt stimuli and provide a tangible recognition cue. The pairing of spoken language with written stimuli or pictographic symbols enables the child to gain meaning from the information presented.

### **III. MATERIALS FOR TREATMENT PROFILING:**

As children with ASD require sustained and systematic treatment, it becomes important to monitor the gains achieved by treatment. A number of tools have been developed to diagnose children with ASD like the Childhood Autism Rating Scale (CARS) [Schopler, Reichler, De Vellis and Daly, 1980], Autism Diagnostic Observation Schedule – Revised (ADOS-2)[Rutter.et.al, 2012], and on the Indian forefront, Shyamala.et.al (2007) developed the Differential Diagnosis Checklist for Autism Spectrum Disorders (DDC-ASD).

#### **1. Autism treatment evaluation checklist:**

The Autism Treatment Evaluation Checklist (ATEC; Rimland and Edelson, 1999) is a comprehensive assessment tool which can be used to monitor the progress in children with ASD who are receiving treatment. The ATEC was developed to provide an instrument for children with ASD, which would be quick and simple to administer, and which would be valid and susceptible to change. The scale covers 77 items in the areas of communication, sociability, sensory and cognitive awareness, and health and physical behaviour, and also provides a total score. The ATEC consists of the following domains:

Speech/ Language/ Communication- 14 items (Maximum Score- 28)

Sociability- 20 items (Maximum score- 40)

Sensory / Cognitive Awareness- 18 items (Maximum Score- 36)

Health/ Physical Behaviour- 25 items (Maximum Score- 75)

Each of the items under the first three domains is rated at three levels: Not descriptive, Somewhat descriptive or Very descriptive. Under the Health/Physical Behaviour domain the rating is done under four levels: Not a problem, Minor problem, Moderate problem or Serious problem. The four subscale scores can be used to calculate a total score (total scores can range from 0 to 180).

The ATEC has been successfully used to measure treatment effects and progress over time in several studies in ASD (Jarusiewicz, 2002; Magiati, Moss, Yates, Charman, & Howlin, 2011). Moreover, the ATEC has been found to correlate with physical symptoms and biomarkers in ASD

## **2. Autistic behavior composite checklist and profile (ABCCP):**

The Autistic Behavior Composite Checklist was developed by Anita Marcott Riley in 1984. It consists of 148 items that profile interfering behaviours associated with autism. The items fall into eight categories:

Prerequisite learning behaviours,

Sensory perceptual skills,

Motor development,

Prelanguage skills,

Speech, language and communication skills,

Developmental rates and sequences; and

Relating skills

Each of the 148 items is scored under:

Frequent- behaviour occurs 70-100% of the time.

Intermittent- behaviour occurs 30-70% of the time.

Seldom- behaviour occurs less than 30% of the time

Not applicable

The checklist helps to support a diagnosis of autism, to track a child's behavioural change, guideline to prioritizing problem areas and provides a graphical representation of behaviour and behaviour change.

### **3. Verbal behavior milestones assessment and placement program (VB-MAPP):**

The VB-MAPP is an assessment tool developed by Sundberg (2008) based on Skinner's analysis of verbal behaviour (Skinner.B.F,1957). It was developed to test verbal skills in children with language delay and consists of five sections:

**Milestones Assessment:** It assesses learning and language milestones at three age levels: 0-18 months, 18-30 months and 30-48 months. The milestones are assessed under different skills of Mand, Tact, Listener Responding, Motor Imitation, Echoic, Intra-verbal, etc;

**Barriers Assessment:** It evaluates the behaviours that commonly act as an obstacle and slows down learning in children with autism;

**Transition Assessment;**

**Task Analysis and Skills Tracking and**

**Placement and IEP Goals**



The material can be used for assessing the functioning levels of children with ASD and also to develop a comprehensive treatment program. This material also allows a charting of skills through a graphical representation. The VB-MAPP is a comprehensive tool which can be used for detailed profiling of language skills, however one major limitation is the administration time which may vary depending on the co-operation of the child.

#### **4. Autistic spectrum disorder- a speech language pathologist's resource manual of intervention guidelines for language and communication disorders**

This resource manual was developed by Anna Shiam.K and Shyamala.K.C (2002) to serve as a guideline for speech-language pathologists for the selection and implementation of treatment goals for children with ASD.

It consists of four chapters:

Language profile: This helps to get the baseline profile of the child with ASD and a language profile of the child.

Treatment goals: It contains goals for treatment derived from the language profile.

General therapy guidelines and strategies: It consists of therapy guidelines which may be helpful for the SLP during therapy.

Specific therapy activities and intervention strategies: It contains specific therapy activities for each goal in chapter two.

As seen from the review of literature, there is a need for tools to profile the language skills of children with ASD and to chart progress of these skills over the course of treatment.

## **CHAPTER III**

### **METHOD**

The study was carried out in 4 phases:

Development of treatment manual

Establishment of baseline using the treatment manual

Administration of treatment manual post-therapy

Scoring and Statistical analysis

#### **Phase I- Development of treatment manual:**

Various sources of information regarding language development, assessment protocols and treatment programs for children with ASD were reviewed from books, journals, standardized treatment manuals and various internet sources. The diverse information obtained from these sources was condensed and adapted for this manual. The developed manual contains a progression of items from simple to complex under the following domains:

Pre-Linguistic skills- 10 items (Maximum score: 10)

Receptive language skills- 60 items (Maximum score: 60)

Expressive language skills- 60 items (Maximum score: 60)

Pragmatic language skills- 60 items (Maximum score: 60)

Play skills- 45 items (Maximum score: 45)

In the domains of Receptive language skills, Expressive language skills, Pragmatic skills and Play skills, the items are grouped under three levels: Beginner, Intermediate and Advanced.

The scoring for each item is as follows:

Score of 0 indicates – child is unable to perform the skill.

Score of 0.5 indicates- child is able to perform the skill but inconsistently.

Score of 1 indicates- child is able to perform the skill consistently.

The maximum score that a child can obtain including the scores of all the domains is 235.

**Validity check:** To check for construct validity, the developed manual was given to 5 Speech-language Pathologists who hold a Master's Degree and who have experience in dealing with children with ASD. They were asked to rate each item on a 2 point rating scale, 1 indicating appropriate and 0 indicating not appropriate. The items which had 80% agreement were retained and others were eliminated and modified.

The items that were modified were rated by 3 Speech-language pathologists who hold a Master's degree and items with a 60% agreement were included in the manual.

**Phase II- Establishment of baseline using treatment manual:**

**Participants:**

The participants included children diagnosed with Autism Spectrum Disorder. 9 participants were selected for the study. An attempt was made to include 3 children with ASD roughly under each of the levels of Beginner, Intermediate and Advanced.

**Inclusion criteria:**

The children must be diagnosed with Autism Spectrum Disorder using standardized tests like CARS (Childhood Autism Rating Scale) and DDC-ASD (Differential diagnosis checklist for Autism Spectrum Disorders).

Participants may include children with ASD associated with Mild Mental Retardation or Borderline intelligence.

Participants selected for the study will undergo speech language therapy for 15 sessions (45 minute sessions, twice/thrice a week) in any language of the client's preference.

Participants who have received therapy prior to administration of the manual will also be considered for the study. The duration of therapy attended prior to establishment of baseline will be taken into consideration.

If any participants are under medication for seizures or hyperactivity, the information pertaining to the course of treatment will be obtained in the form for recording demographic data and general information.

The details of the participants included for the study are as follows:

Characteristics Participants	Age/ Gender	Provisional diagnosis	Behaviour issues	Sensory issues
P 1	2 years / Male	DSL with Autism	✓	-
P 2	4.2 years / Female	DSL with Autism	✓	-
P 3	6.5 years / Male	DSL with Autism	✓	-
P 4	3.2 years / Male	DSL with PDDNOS	✓	-
P 5	5.10 years / Female	DSL with Autism	✓	✓
P 6	3.3 years / Male	DSL with PDDNOS	-	-
P 7	10.4 years / Female	DSL with Autism	✓	-

P 8	13.6 years / Female	DSL with PDDNOS	-	-
P 9	20 years / Male	High- functioning autism with pragmatic deficits	✓	-

Written consent was taken from the parents of the children included in the study.

The assessment checklist for speech & language domain, play and social and emotional domain [Swapna, N., Jayaram, M., Prema, K.S., & Geetha, Y.V. (2010)], was administered on the children selected for the study.

The treatment manual was administered on the participants to establish the baseline level of functioning. Based on their current level of functioning, goals were selected for treatment under the domains of prelinguistic skills, receptive language skills, expressive language skills, pragmatic skills and play skills. The treatment plan was given to the parents as well as the clinicians of the participants. The participant was monitored during the course of the study and if the goals provided had been achieved, the plan was updated.

### **Phase III- Administration of the treatment manual Post-therapy:**

The treatment manual was administered at the completion of 15 sessions of speech-language therapy (45 minute sessions, twice/thrice a week). The assessment checklist (Swapna et.al, 2010) was administered again to evaluate if there has been significant improvement over the course of treatment. Baseline and post-therapy scores were scored on the same sheet.

#### **Phase IV- Scoring and Analysis:**

The scoring under each domain was carried out and statistical analyses of scores was done using a commercially available SPSS.

## CHAPTER IV

### RESULTS AND DISCUSSION

The primary aim of this study was to develop a treatment manual for children with Autism Spectrum Disorders (ASD). The results of the study will be discussed under the following headings:

1. Establishing Construct validity for the developed manual
2. Statistical procedures and results
3. Qualitative analysis

#### **1. Establishing Construct Validity for the developed manual:**

Information from various sources were consolidated and to establish construct validity for the developed tool, it was given to five Speech-language pathologists, who hold a Master's degree in Speech-language pathology and who have experience in dealing with children with ASD. The speech-language pathologists were asked to rate each item on the manual on a 2-point scale, "0" representing "irrelevant" and "1" representing "relevant". The ratings obtained from the 5 speech-language pathologists were tabulated and percentage of agreement was calculated. Items which scored a percentage of 80 and above were retained and the ones with a percentage of 80 were eliminated and modified.

The following are the items which were eliminated from the manual:

Pre-Linguistic Skills:

Item No 4: Understands and withdraws from activity in response to 'No'.



Receptive Language Skills:

No items were eliminated from this domain.

Expressive Language Skills:

Beginner Level: Item No 1: Quiets down when spoken to.

Pragmatic skills:

No items were eliminated from this domain.

Play skills:

No items were eliminated from this domain.

The items that were eliminated were replaced by the following items:

Pre-Linguistic Skills:

Can match object-object, picture-picture and object-picture.

Expressive skills:

Responds to 'where is \_\_\_\_\_?' by showing or pointing to the location.

The above items were given to 3 speech-language pathologists to rate as relevant or irrelevant. The items that got a percentage of agreement of 60 or more were retained.

Both the items received higher than 60% of agreement.

The modification was incorporated into the manual and was administered on the participants selected for the study.

## 2. Statistical procedures and analysis:

Nine participants who were diagnosed with ASD were considered for the study. Baseline and post-therapy scores were obtained for all the participants under the five domains. The scores obtained were converted to percentage. As the sample size was small (N=9) and do not follow normal distribution, non-parametric test with Wilcoxon Signed Rank test was selected to check for the significance between the baseline and post therapy scores

	postpl - prepl	postrec - prerec	postexp - preexp	postprag - preprag	postplay - preplay	posttotal - pretotal
Z	-2.032	-2.668	-2.668	-2.666	-2.524	-2.668
Asymp. Sig. (2-tailed)	.042	.008	.008	.008	.012	.008

Table 1: Statistical analysis of baseline and post-therapy scores for all domains and total scores- Z values and significance values.

Statistical analyses of the baseline and post-therapy scores showed significant difference in all five domains of Pre-linguistic skills, Receptive language skills, Expressive language skills, Pragmatic skills, Play skills and Total scores.

Baseline and post-therapy scores of the Assessment checklist (Swapna.et.al, 2010) under the domains of Social, Emotional, Play, Comprehension and Expression skills were converted into percentage and Wilcoxon Signed Ranks Test was used to compare the baseline and post-therapy scores.

	Post social – baseline social	Post emotional – baseline emotional	Post play – baseline play	Post comp – baseline comp	Post exp – baseline exp	Post therapy total – baseline total
Z	-2.675 <sup>a</sup>	-2.585 <sup>a</sup>	-2.673 <sup>a</sup>	-2.379 <sup>a</sup>	-2.032 <sup>a</sup>	-2.666 <sup>a</sup>
Asymp. Sig. (2-tailed)	.007	.010	.008	.017	.042	.008

Table 2: Statistical analysis of baseline and post-therapy scores for domains of social-emotional, play, comprehension, expression and total scores on the Assessment checklist (Swapna et al. 2010) - Z values and significance values.

Statistical analyses between baseline and post-therapy scores on the Assessment checklist developed by Swapna et al. (2010) showed significant difference in the selected domains of Social, Emotional, Play, Comprehension and Expression.

An overall comparison of the percentage scores at baseline and post-therapy conditions on the developed manual and the Assessment Checklist developed by Swapna et al. (2010).

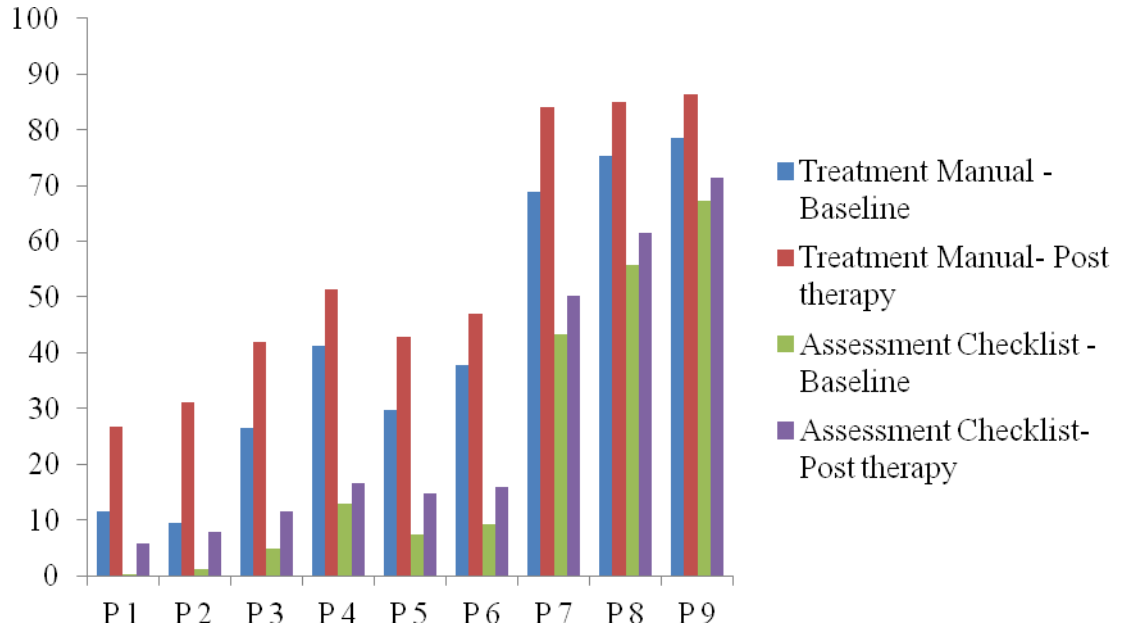


Fig 4.1: Graph comparing the baseline and post-therapy total scores of the developed treatment manual and the Assessment Checklist (Swapna.et.al, 2010).

Note: Participant 1- P1, Participant 2- P2, Participant 3- P3, Participant 4- P4, Participant 5- P5, Participant 6- P6, Participant 7- P7, Participant 8- P8, Participant 9- P9.

A comparison of baseline and post-therapy total scores on the developed treatment manual and on the Assessment Checklist by Swapna et.al, 2010 shows a general trend of improvement from baseline to post-therapy levels on both measures. The gain in scores of the developed treatment manual was higher than the gains observed in the levels of the Assessment checklist (Swapna.et.al, 2010). This can be attributed to the selection of treatment goals. The goals chosen for treatment were based on the developed manual and were monitored and revised at regular intervals during therapy. The Assessment checklist (Swapna et.al, 2010) was administered at

baseline and post-therapy to examine the indirect effect of treatment on a standardized tool.

The Assessment Checklist developed by Swapna et.al, 2010 aimed to serve as an intervention module for children with communication disorders. The items in the checklist were standardized on typically developing children in the age range of 3 years to 6 years and was shown to be effective in the treatment of children with hearing impairment and mental retardation. As seen in Fig 4.1, there has been an indirect effect of use the developed treatment manual on the scores of the Assessment Checklist (Swapna et.al, 2010), in the present study.

### 3. Qualitative Analysis of Results:

#### Pre-linguistic Skills:

The goals worked upon in this domain included improving eye contact, joint attention, visual matching skills, and other essential prelinguistic skills. Comparison of baseline and post-therapy scores showed significant difference.

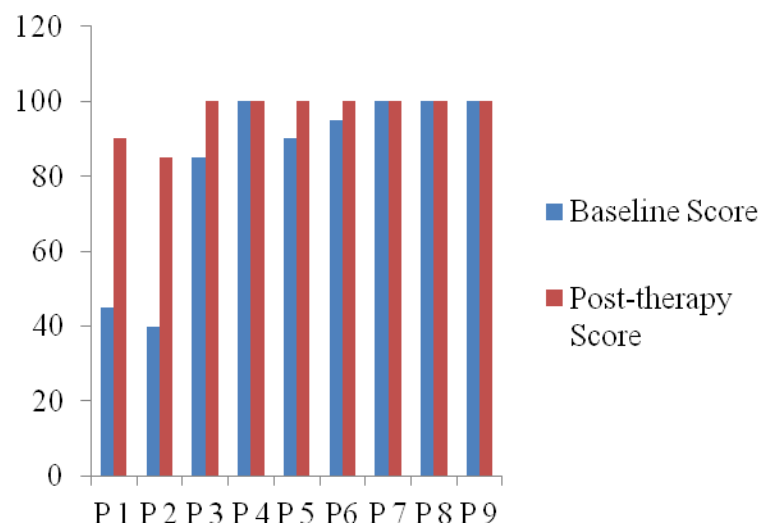


Fig 2: Graph showing comparison between baseline scores and post-therapy percentage scores of Pre-linguistic domain.

As seen from Fig 4.2, in the baseline condition P1, P2, P3 and P5 had lower scores compared to others. The progress seen was therefore more in these participants. P4, P6, P7, P8 and P9 had scores of 90% or more in the baseline condition. Pre-linguistic skills serve as a base for future communicative success. Without essential skills like distal pointing, object permanence and concept of means-to-end, intentional and meaningful communication will not develop. Some of the other pre-linguistic skills like eye contact in response to name and joint attention evidences social and pragmatic development. These skills are also important in developing representational ability and symbolic awareness in his/her environment. The premise that pre-linguistic skills, especially joint attention are predictive of language development in the later years in children with autism has received extensive research and theoretical support (Baldwin, 1991; Mundy, Sigman, & Kasari, 1990). Baldwin (1991) suggested that joint attention plays a crucial role in the learning of words as the child must establish an association between the object seen and the spoken word as referenced by the speaker. To correctly interpret these labels, a child must be able to understand the speaker's line of regard.

### **Receptive Language Skills:**

This domain was divided into three levels- Beginner, Intermediate and Advanced. The complexity of items progressively increased from Beginner to the Advanced level. This domain had goals which targeted language comprehension exclusively without taking into account the expression. Due to deficits in communication, children with ASD may be unable to express themselves in spite of having good comprehension abilities. This domain is of great importance in children with ASD who are non-verbal or minimally verbal as it helps to gain an insight of how much they understand though they may not be able to express.

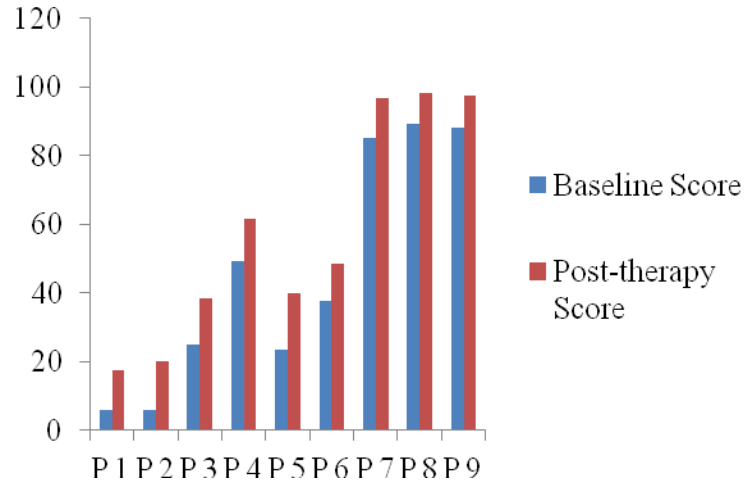


Fig 4.3- Graph showing comparison between baseline scores and post-therapy scores of Receptive Language skills domain

Fig 4.3 shows a comparison between the baseline and post-therapy percentage scores of all the participants. All participants showed significant gains in receptive language skills. Large gains were seen in P2 and P5 in this domain. P2 was non-verbal and P5 was minimally verbal, but both participants had good cognitive abilities and home training and more importance was given to receptive language skills hence, a large improvement can be seen in this domain. In P7, P8 and P9, the baseline scores were above 80%, the gains observed in these three participants were limited, possibly due to a ceiling effect.

Receptive language skills act as a foundation for expressive language skills to emerge. A number of receptive concepts must be known to the child before he/she can begin to use them, for example, concept of prepositions/plural markers. Only when a child is able to differentiate between in/ on and book/books and understand the differentiating feature (like in the example of prepositions the differentiating feature is the position, whereas in the example of plurals it is the quantity), will the child be able to use them accurately. As language skills advance, the understanding of language

becomes more complex as it involves comprehending humour, long stories with morals, etc. These complex skills require some level of abstract thinking and reasoning and also provide evidence of highly developed cognitive skills.

### **Expressive Language Skills:**

This domain consisted of the levels: Beginner, Intermediate and Advanced and accounted for the expressive abilities of the children taken for the study. Children with ASD have a marked difficulty in expressing their thoughts or emotions appropriately. Due to poor expressive abilities, children with ASD show extreme amounts of frustration as they are unable to communicate their needs and wants to others. Not only do they have deficient expressive abilities, some may also show abnormal expressive abilities, as in echolalia, where the child may repeat everything he/she hears but with no associated meaning. Therefore, it is important to give these children a means to communicate their needs, either verbally, gesturally or using a picture.

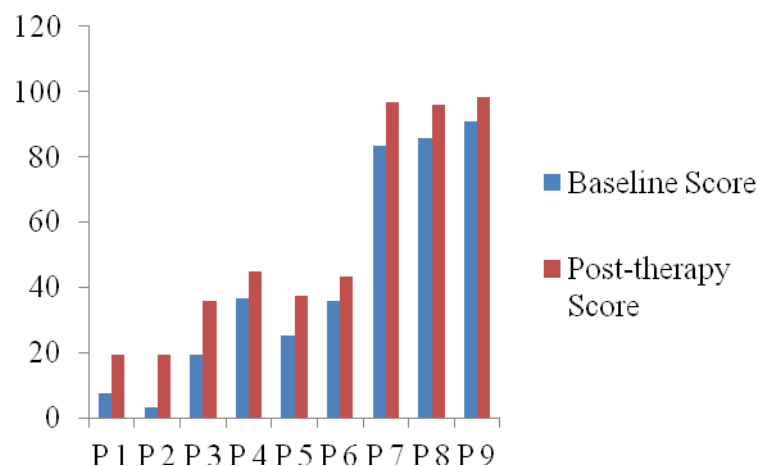


Fig 4.4- Graph showing comparison between baseline scores and post-therapy scores of Expressive Language skills domain



The results show that all children with ASD showed an improvement in expressive skills post-therapy. P1 to P5 showed greater gains in this domain, as the goals in the Beginner level are simpler and require a shorter duration to achieve as compared to the ones in the Intermediate and Advanced levels. P2 who was non-verbal, was taught signs to communicate needs, and showed a large gain in expressive abilities. In P7, P8 and P9 most of the items were achieved, however higher language tasks like comprehending the plot of the story, understanding jokes, judging the correctness of sentences (Meta-semantic skills) were not achieved.

Tager-Flusberg et.al (2009) suggested a framework for describing the acquisition and development of spoken language in children with ASD. Taking a developmental approach they suggested considering the following as benchmarks for spoken language:

Pre-verbal communication- which involves preverbal intentional communication through babbling or pointing.

First words- production of meaningful linguistic units

Word combinations- emergence of phrases along with rapid expansion in vocabulary

Sentences- combining words into clausal structures, or sentences, and use some morphological markers such as plurals, prepositions, and some verb endings.

Complex language- developing and rich vocabularies that they use to communicate a wide range of topics (including abstract or hypothetical ideas) using complex grammatical constructions (e.g., relative clauses, sentential complements, anaphora) in different discourse contexts (e.g., conversation, narrative)

### Pragmatic skills:

A defining characteristic of children under this spectrum is poor socialization skills, this in turn has a direct effect on the pragmatics which is the social use of language. Most children with ASD have severely affected or deviant pragmatic skills. The development of pragmatics begins right from infancy as the child learns to respond to the mother's communicative attempts and intentional communication sets in. As children develop they learn the rules of language use as they develop skills of verbal turn-taking, topic initiation, maintenance and termination and presuppositional skills. Children with ASD however, fail to learn these rules as they are not implicitly specified and must be learnt through observing others speak. This domain is therefore highly important with these children as they may have the expressive language abilities but the use of their language might be highly disordered or deviant.

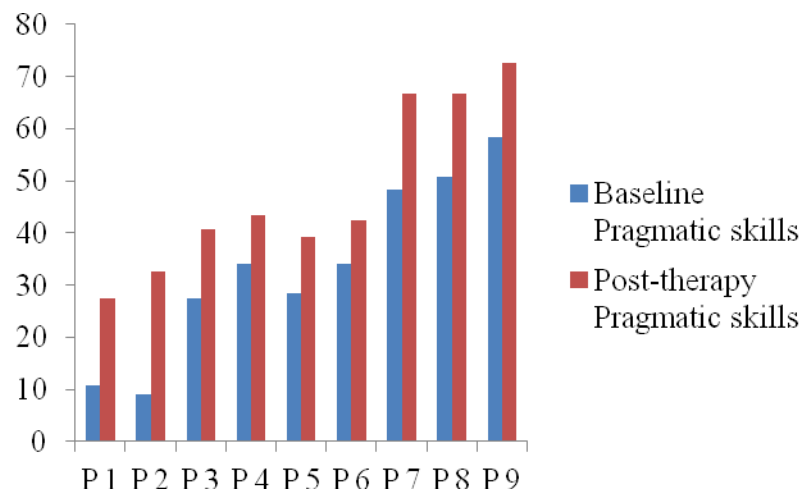


Fig 4.4- Graph showing comparison between baseline scores and post-therapy scores of Pragmatic skills domain.

Results show that there was a drastic increase in pragmatic skills in most participants. This effect could be attributed to the overall effect that language

improvement has on pragmatic skills. In the earlier stages, pragmatic skills are closely intertwined with pre-linguistic skills, for example, development of joint attention leads to an improvement in eye contact while speaking to the child, thus it can be seen that there is a drastic increase in scores seen in P1 and P2.

This domain is of great importance in highly verbal autistic children and children with Asperger syndrome, as they may have good or almost age-adequate receptive and expressive language abilities but may be significantly lacking in this domain. In P7, P8 and P9, it can be seen that they had percentages of 85 and above in the domains of receptive and expressive language skills, however, during baseline their scores in the pragmatic skills domain was below 60%. Hence, it becomes important to breakdown these skills and target them separately to ensure they use language appropriately.

### **Play Skills:**

This domain also consisted of three levels: Beginner, Intermediate and Advanced and took into account the child's skills during play. Children with ASD generally show atypical patterns of play like stereotypic play, play with objects instead of toys, etc. Play skills play an important role for the development of imagination, abstract thinking, reasoning and also serve to improve social skills. As children with ASD engage in atypical forms of play they do not mingle with their peer group and prefer to play in isolation. This domain therefore becomes crucial as it can help in the overall development of imagination and social activity of the child.

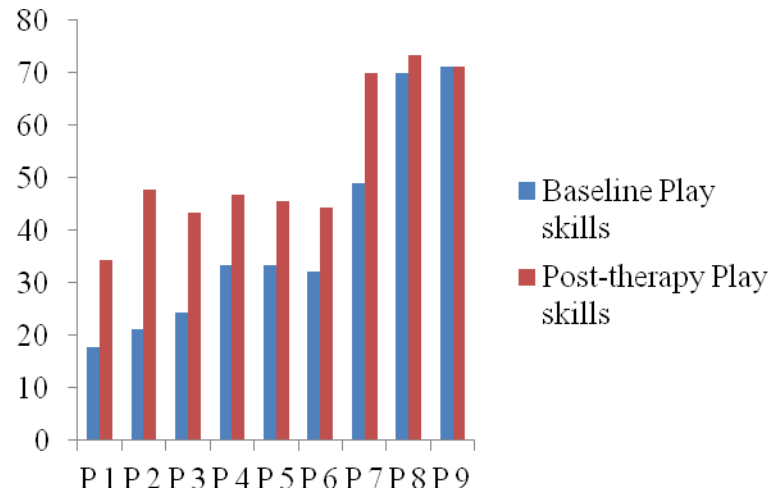


Fig 4.5- Graph showing comparison between baseline scores and post-therapy scores of Play skills domain

All participants except P9 showed an improvement in play skills. The improvement seen in P1, P2 and P3 was quite significant. These children were less resistant to interact with other children or to play near other children as compared to participants who were older and who did not mingle with other children. This also reflects that play skills must be targeted as early as possible to see most beneficial results.

### Total Scores:

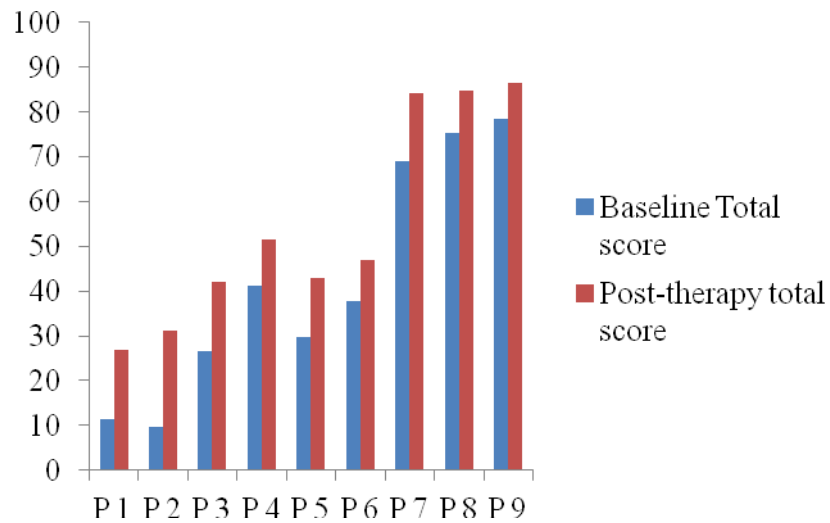


Fig 5.6- Graph showing comparison between baseline scores and post-therapy Total scores

These 5 domains were selected keeping in mind the core deficit areas of children with ASD. Comparison of the overall scores considering all domains showed improvement in all participants. By focussing only on the receptive and expressive language abilities of children with ASD we may be missing out on other relevant areas where these children lack. Therefore, it is important to have a holistic approach of treatment when considering these children. Importance must also be given to play skills, as well as pragmatic skills which would stimulate more natural language development and would guide these children on the appropriate use of language in society.

## **CHAPTER V**

### **SUMMARY AND CONCLUSION**

Autism Spectrum Disorders comprise a number of disorders which range in severity from mild to severe degree. All disorders that fall under the spectrum however, share similar deficits which include profound deficits in communicative abilities, poor social skills and a restricted range of activities and interests.

As a result of these deficits individuals with autism face marked difficulties in language comprehension, expression and use. A large number of treatment methods have emerged over the years and studies have focussed on proving the efficacy of these techniques. However, the treatment of children with ASD poses a challenge to speech-language pathologists due to the variety of communicative deficits that they exhibit.

The aim in developing this treatment manual was to ensure uniformity in the selection of treatment goals and to enable the documentation of gains over the course of treatment. The manual was designed to encompass the core areas of deficit in children with ASD- pre-linguistic skills, receptive language skills, expressive language skills, pragmatic skills and play skills. A progression of items in each domain was provided to aid the selection of treatment objectives. The content of the manual was validated and items that were irrelevant were modified.

The manual provided a domain score and a total score and hence gave a means of quantifying the progress seen across the different domains and in overall language skills. Instructions for administration are provided in the manual. The treatment manual was administered on 9 children diagnosed with ASDs and goals were

selected. Scores were obtained for baseline and post-therapy levels and statistical analysis showed significant difference in all domains.

The manual aimed to help in goal selection for varying levels of severity within the Autism Spectrum, hence the domains consisted of beginner, intermediate and advanced levels. The manual therefore can be used with children with ASD who have just been enrolled into an intervention program as well as highly verbal children with ASD who may have deficits in pragmatics.

**Limitations of the study:**

The manual was administered on a small sample size.

The manual was developed in English, hence some items may not be applicable to Indian languages.

The number of sessions considered for measuring difference between baseline and post-therapy levels were limited.

**Implications for future research:**

The developed manual was administered on a limited number of participants and can be administered on a larger population to assess its effectiveness on the improvement of communicative skills of children with ASD. The items or structure of the manual can be further modified or refined and standardized to suit the need of the clinical population. The items can be modified also keeping in mind different Indian language as some items in the developed manual may not be suitable for use in native languages. Treatment recording sheets can be included along with the manual to monitor daily progress and to facilitate the timely updating of treatment goals. The

treatment manual can be administered over a longer duration to study progress seen under the different domains when therapy is carried out over a long term.



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## Appendix

### A TREATMENT MANUAL FOR CHILDREN WITH AUTISM SPECTRUM DISORDERS

Case Name:	Date Of Evaluation		Clinician
Age/Gender:	1.		
Case Number:	2.		
	3.		
Provisional Diagnosis:	4.		
	5.		

Medical History:

Therapy details:

Attending therapy since-

Behaviour issues:

Sensory issues:

Specific therapy technique used:

Domains:

- Pre-linguistic skills
- Receptive language skills
- Expressive language skills
- Pragmatic skills
- Play skills

Instructions for administration:

1. The demographic details must be obtained from the case file. Information regarding sensory, behavioural and medical issues can be obtained from parent.

2. Each domain is divided into levels of Beginner, Intermediate and Advanced. Assessment must begin from Beginner level and progress ahead.

3. Items in each level can be given a score of 0, 0.5 or 1.

Score of 0 indicates – child is unable to perform the skill

Score of 0.5 indicates- child is able to perform the skill but inconsistently

Score of 1 indicates- child is able to perform the skill consistently

4. The score under each domain must be totalled to give the Domain Score. The sum of scores under all domains will give the Total overall score.

5. Comments can be added under each sub-section, if any skill is emerging or is partially achieved.

6. Each skill mentioned must be generalized by use of different stimuli and in different settings like home, park, etc by the parent/ caregiver.

List of reinforcers:

- |    |     |
|----|-----|
| 1. | 6.  |
| 2. | 7.  |
| 3. | 8.  |
| 4. | 9.  |
| 5. | 10. |

PRE-LINGUISTIC SKILLS:

S.No	Skill	Score				
		1	2	3	4	5
1.	Establishes eye contact in response to name					
2.	Has selective social smile					
3.	Imitates gross motor movements of others					
4.	Object permanence is present					
5.	Independently explores toys and surrounding environment					
6.	Establishes joint attention with the caregiver					
7.	Can match object-object, picture-picture and object-picture.					
8.	Has an established cause-effect relationship					
9.	Shows distal pointing					
10.	Functional use of objects is present					

DOMAIN

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TOTAL:

Remarks:

RECEPTIVE LANGUAGE SKILLS:

A. BEGINNER:

S.No	Skill	Score
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1.	Turns toward sound source or familiar voices.				
2.	Quiets when spoken to.				
3.	Responds to 'no'/'stop' by inhibition of activity.				
4.	Looks at named object/person.				
5.	Responds to name by turning or coming toward caregiver.				
6.	Obeys some commands when accompanied by gestures, like 'Come here', 'Sit down'.				
7.	Responds appropriately to non-verbal gestures like waving bye, gesturing to come, etc.				
8.	Follows simple directions in context, like 'Wear your shoes', 'Give me the glass'.				
9.	Points to objects in the nearby surroundings in response to 'Show me _____'.				
10.	Shows knowledge of single words in sentence contexts with the referents present, like if the parent says 'Lets go out and play', child responds by going toward door.				
11.	Points to 5 gross body parts on self, like head, nose, legs, etc.				
12.	Follows one-step commands, even when not in context, child can follow 'Wash hand' whenever he/she is told, and not only in context of eating.				
13.	Understands simple questions, like 'Where is _____?'				

14.	Carries out multiple directions with the same object, like 'throw ball', 'roll ball', 'give me the ball', etc.					
15.	Comprehends up to 50-60 words, including family members, body parts, lexical items, actions, etc					
16.	Listens to descriptions about pictures in a book or simple stories.					
17.	Follows a simple direction involving a preposition, like 'Put it in the bag'.					
18.	Follows 2 related simple commands, like 'Take the bottle and drink water'.					
19.	Points to pictures in a book, in the presence of multiple distracter pictures.					
20.	Can perform action when asked to, eg: when asked 'Show me how you sleep?' , child does the action of sleeping.					

Remarks:

**B. INTERMEDIATE:**

S.No	Skill	Score				
		1	2	3	4	5
1.	Can follow 2-step commands, like 'Keep the book on the table and bring the ball'.					
2.	Identifies 10 gross body parts and few fine body parts (cheek, chin, etc)					
3.	Comprehends 5 prepositions (in, on , under, in front, behind)					
4.	Comprehension of possession, eg: Show me amma's watch, Show me akka's dress, etc					

5.	Understands the concept of 'one' vs. 'all', eg: Give one spoon vs. Give all spoons.					
6.	Identifies objects based on functions, eg: Show me what you drink with, Show me what you wear, etc.					
7.	Comprehends few adjectives, eg: big/small, full/empty, hot/cold, etc.					
8.	Comprehends 'what, who, where, whose' questions and responds appropriately.					
9.	Comprehends regular plural forms, eg: Show me the cup vs. Show me the cups.					
10.	Identifies few colours (any five) and shapes (any three).					
11.	Identifies items based on class/category, eg: Which one is a fruit/ animal? (Any 5 major categories- animals, fruits, vehicles, clothes, toys)					
12.	Selects two objects in sequence when named, eg: Point to the Apple and Ball.					
13.	Comprehends irregular and regular past tense forms which are commonly used , eg: ate, fell, went, played etc.					
14.	Understands opposites, eg: day-night, first-last,					
15.	Identifies features of objects, eg: Show me the tail of the dog, Show me the wheel of the car, etc.					
16.	Identifies 5 common places, eg: Home, park, school, hospital, railway station					
17.	Understands negation using 'not' , eg: Show me which is not red, Show me which is not an animal, etc.					
18.	Can arrange pictures in a sequence, eg: Arranges the pictures of a boy getting					



	ready for school, arranges the pictures of a girl making juice.					
19.	Identifies and imitates emotions, eg: Show me how you look when you are happy/sad/angry/scared/etc.					
20.	Identifies 5 community helpers, eg: Doctor, teacher, policeman, vegetable seller, bus/auto driver.					

Remarks:

C. ADVANCED:

S.No	Skill	Score				
1.	Can follow three-step commands, even when unrelated to each other and involving distance, eg: Go bring the book, throw the ball and give the pen to mummy.					
2.	Comprehends pronouns 'he', 'she' and 'they', eg: 'Show me the picture where he/ she is eating.'					
3.	Can understand stories with a simple plot and can answer questions about it. Eg: 'A thirsty crow' and can answer simple questions.					
4.	Comprehends the meaning of conjunctions like 'if', 'and' and 'because', eg: the child is able to understand when the mother says 'If you finish your work, I will let you watch TV' when not supplemented by any visual cues.					
5.	Comprehends irregular and regular past tense forms in complex sentence constructions, eg: Show me the boy who played, Which girl danced?					

6.	Understands concepts related to time, eg: yesterday, tomorrow, before, after, now, later, etc					
7.	Comprehends comparative and superlative forms, eg: Show me which dog is bigger/biggest.					
8.	Comprehends few irregular plurals, eg: Leaf- leaves, Sheep- Sheep					
9.	Comprehend sentences spoken in future tense, eg: Understands when the parent says, 'We will go to the park' or can point to the appropriate picture when asked, 'Show me the boy who is going to eat.'					
10.	Comprehends and follows directions involving right and left, eg: turn to your left, show me your right ear, etc.					
11.	Comprehends and responds appropriately to 'when, how, why and which' questions.					
12.	Able to identify the odd one out and is able to provide the correct reason for it being different, eg: When the child is presented with four pictures, three being of vehicles and one being of a fruit he/she will be able to identify the odd one and give a reason stating it is not a vehicle.					
13.	Comprehension of infrequently used verbs ( digging, ploughing, knitting, etc) and adjectives ( graceful, rude, dangerous, etc)					
14.	Understands complex sentences with embedded clauses, eg: Point to the picture which shows 'The boy who was wearing a blue shirt played on the swing'					

15.	Can comprehend possessives 'his', 'her', 'their', 'our'. Eg: Show me his/her watch, Where is our car?					
16.	Is able to understand sentences in passive voice, eg: Point to the picture which shows 'The mouse is being chased by the cat'					
17.	Is able to identify synonyms, eg: When given a list of words like 'big, huge, hot, empty and large' and told to identify the ones that mean the same the child is able to.					
18.	Shows meta-linguistic skills- metasemantic- is able to judge the correctness of a sentence, eg: When asked to tell if the sentence is correct/wrong and presented with a sentence 'The dogs is barking' the child will say it is wrong.					
19.	Shows meta-phonological skills- is able to produce rhyming words, or words with a particular alphabet, etc, eg: Tell me a word that rhymes with 'sky', Tell me 5 words starting with the sound 't'					
20.	Can comprehend stories with a complex plot, many characters and a moral, and is able to answer questions regarding the story.					

Remarks:

TOTAL:

DOMAIN

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## EXPRESSIVE LANGUAGE SKILLS:

### A. BEGINNER:

S.No	Skill	Score				
1.	Cries for assistance or help.					
2.	Pulls the caregiver to object of interest.					
3.	Reaches out to object of interest					
4.	Points to object of interest, even if placed at a distance.					
5.	Gesturing or vocalizing to indicate needs.					
6.	Spontaneous production of speech sounds during play.					
7.	Uses social gestures, eg Waving bye-bye, shaking hands, etc.					
8.	Shakes head for 'no'.					
9.	Imitates some sounds/ CVCV combinations. Eg: mama, papa, etc					
10.	Imitates / produces environmental sounds, eg: Bow bow for dog, meow for cat.					
11.	Uses one or more true words/gestures/ gives a picture to communicate needs. Eg: Says 'choki' for chocolate, or uses a specific gesture for a chocolate or gives a picture of chocolate.					
12.	Refers to self by name.					
13.	Has a vocabulary of 5-10 words/ signs/ pictures to ask for objects or activities of his/her interest.					
14.	Asks for 'more' verbally/using sign/ giving picture.					
15.	Responds to the questions - 'what is					

	that?’ by naming object or performing the sign.					
16.	Completes sentences of rhymes, eg: When the parent says ‘Twinkle twinkle little’ the child completes it by saying ‘Star’.					
17.	Combines two words/signs or pictures , eg: says ‘dog gone’, signs ‘more chocolate’ or gives pictures ‘ more bubbles’.					
18.	Uses ‘I’. Eg: when asked ‘What do you want’ child says, ‘I want chocolate.’					
19.	Has a vocabulary of 15-20 words/signs.					
20.	Responds to ‘where is _____?’ by showing or pointing to the location.					

Remarks:

#### B. INTERMEDIATE:

S.No	Skill	Score				
1.	Uses present progressive marker –ing, eg: eating, sleeping, drinking.					
2.	Vocabulary of 40 – 50 words comprising, common items from basic lexical categories, kinship terms, verbs.					
3.	Asks ‘what’ and ‘where’ questions.					
4.	Spontaneously labels or requests for items/actions in the environment. Eg: While in a restaurant, child sees an ice-cream, he labels ‘Ice-cream’ and then says, ‘I want ice-cream.’					
5.	Uses negation by adding no in front of word. Eg: if the child does not want bubbles, he/she will say ‘No bubbles’.					

6.	Uses prepositions, 'in' 'on' and 'under'.					
7.	Uses pronoun 'I' in large number of situations, eg: 'I want bubbles', 'I am playing', 'I see dog', etc.					
8.	Uses irregular past tense forms, eg: ate, went, fell, drank, etc.					
9.	Uses possessive 'my', and uses possessive marker -s, eg: My shirt, Amma's watch, Appa's shoe					
10.	Labels objects when told the function, eg: when asked What do you eat with? , and presented with pictures of ball, comb and spoon, the child says 'Spoon'.					
11.	Uses adjectives in phrase/sentence, eg: 'big ball', 'This is a small ball'.					
12.	Uses regular plural forms, eg: Book-books, dog-dogs, etc.					
13.	Labels objects when told the class/category, eg: when asked 'which one is an animal?' and presented with pictures of dog, shirt and apple, the child says 'dog'.					
14.	Labels at least 5 colours of items, eg: red, blue, green, etc					
15.	Labels objects when told a feature, eg: when asked 'which one has a tail?' and presented with a picture of dog, car and book, the child says 'dog'.					
16.	Asks 'who' and 'whose' questions. Eg: 'who is this?', 'whose shoe is this?'					
17.	Narrates simple stories/events with the help of pictures, eg: when presented with pictures the child will describe each picture using a sentence, like a boy getting ready for school.					

18.	Uses the conjunction 'and', eg: I want chips and juice.					
19.	Labels emotions, eg: happy, sad, angry.					
20.	Labels places (school, park, home) and community helpers (doctor, teacher).					

Remarks:

C. ADVANCED:

S.No	Skill	Score				
1.	Consistently uses 3-4 word sentences.					
2.	Uses negation, eg: 'I don't want', 'I can't open door'.					
3.	Uses the pronoun, 'you', eg: when asked 'what am I doing?', child says, 'you are eating'. Or when asked 'what do i have in my hand?', child says 'You have a ball.'					
4.	Can label items from a category, eg: Name 5 animals/fruits. (no stimulus cards presented, child must name from memory)					
5.	Uses prepositions, 'in between', 'above', 'below', 'around', 'across'.					
6.	Can label items when told a function, eg: 'what do you write with', child says 'pen, pencil' (No stimulus cards presented).					
7.	Uses pronouns, 'he', 'she' and 'they'.					
8.	Uses regular past tense forms, eg: I played, I walked to the park, etc.					
9.	Uses conjunctions, 'because' and 'if'.					
10.	Answers 'how' questions by giving directions to perform an action or solve					

	a problem. Eg: When asked, 'How will you go to school if it is raining?', the child will say 'I will take an umbrella'.					
11.	Answers 'why' questions with appropriate justification, eg: When asked 'why are you wearing a sweater?', the child says 'Because it is cold'.					
12.	Uses words related to time concepts, eg: before, after, tomorrow, yesterday, etc.					
13.	Asks questions- 'why', 'how', 'which', 'when'.					
14.	Can describe an object in three sentences or more. Eg: when told to talk about 'apple' the child says, 'Apple is a fruit, it is red in colour, we cut the apple and eat'.					
15.	Uses irregular plurals, eg: leaf- leaves, foot-feet.					
15.	Uses possessives 'his', 'her', 'their'.					
16.	Describes, people, places or events using single sentences. Eg: She is wearing red dress, This is a big park, I went on Papa's bike.					
17.	Uses future tense when describing upcoming events. Eg: I will go to park today.					
18.	Uses comparatives and superlatives. Eg: This dog is bigger, This boy is the tallest.					
19.	Uses complex and compound sentences, eg: 'I will eat food and then go to play', 'If I go out, I will get wet in the rain'.					
20.	Can narrate a simple story, without changing the order of events and using complete grammatical sentences.					



Remarks

DOMAIN

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TOTAL:

PRAGMATIC SKILLS:

A. BEGINNER:

S.No	Skill	Score				
1.	Alerts to sights and sounds and follows caregiver with eyes.					
2.	Quiets when picked up or when spoken to in a comforting voice.					
3.	Appears to prefer child directed speech to adult directed speech.					
4.	Is aware of strangers and unfamiliar situations.					
5.	Briefly looks at people.					
6.	Fixes gaze on face of speaker.					
7.	Turns when called by name or comes to the person who calls the name.					
8.	Engages in joint attention for objects/items at a close distance, eg: Attends to the toy placed nearby when the mother points to it.					
9.	Finds comfort in hugging or pulling caregiver to hold.					
10.	Makes eye contact in play situations, like while playing peek-a-boo or singing rhymes.					
11.	Begins to communicate intentionally, using gestures or pulling caregiver towards objects.					
12.	Communicates to seek attention, by					

	crying or vocalizing.					
13.	Uses imperative pointing, to request for desired object.					
14.	Uses true words or gestures to request or acknowledge.					
15.	Takes vocal and gestural turns in communication games or when singing rhymes.					
16.	Initiates interactions and waits for responses.					
17.	Engages in joint action, eg: imitate actions of the caregiver in activities.					
18.	Rejects by saying 'no' or shaking head.					
19.	Requests for objects (object name/vocalization/gesture + pulling / pointing), request for action (says up + raises hands).					
20.	Uses two word/gesture combinations to request, comment, acknowledge and ask.					

Remarks:

**B. INTERMEDIATE:**

S.No	Skill	Score				
1.	Makes eye contact when attempting to communicate.					
2.	Uses greetings, 'hi', 'bye', 'thank you', etc					
3.	Asks questions to obtain information, 'what', 'where', 'who'					
4.	Attends to the speaker during conversation and maintains eye contact.					
5.	Waits for his/her turn during play, or					

	during communication games.					
6.	Uses phrases/sentences to request for object/action, eg: I want big car, Give more chocolate.					
7.	Answers questions appropriately, 'what', 'where', 'why', 'whose', 'which'.					
8.	Uses phrase/sentence to comment or give information about place, person or object, eg: black cat , boy is crying.					
9.	Attempts to initiate conversation about topic of his/her liking.					
10.	Uses eye contact to signal his/her turn in a game.					
11.	Shows verbal turn-taking skills, waits for the communicative partner to finish his/her turn while talking.					
12.	Expresses dislike or denial by using sentences, eg: 'I don't want', 'I don't like apple.'					
13.	Engages in short dialogues, still restricted to topics of his/her liking.					
14.	Is able to stay on the topic without deviating from it for 3-4 exchanges with the communicative partner.					
15.	Asks questions related to the topic of discussion, if the information is unknown, eg: the child asks the meaning of a new word he/she has not encountered.					
16.	Engages in dialogue with communicative partner even if the topic is not of the child's interest.					
17.	Changes topics of discussion appropriately, eg: Waits for the current					

	topic of conversation to finish and then changes topic.					
18.	Chooses a topic that is relevant to the situation, eg: Child speaks about the park near his house when the communication partner asks him if he likes playing in parks.					
19.	Maintains appropriate distance, facial expressions and body language while conversing with others.					
20.	Engages in longer dialogues, can maintain a conversation for 5-6 turns, without deviating.					

Remarks:

C. ADVANCED:

S.No	Skill	Score				
1.	Adds more/new information to the conversation.					
2.	Maintains eye contact with communicative partner throughout the conversation.					
3.	Makes smooth shifts from one topic to another, eg: If the child is talking about a cartoon, and wants to shift the topic to playing video games, he/she must move into the topic smoothly, by saying a connecting sentence like, 'I like watching cartoons and also like playing video games..' and then shift the topic of conversation.					
4.	Begins to use primitive narratives, eg: Narrates experience in school using 3-4 sentences.					
5.	Pauses/ stops appropriately during					

	conversation.					
6.	Requests for clarification during conversation, eg: 'I can't understand'.					
7.	Pays attention to the communicative partners non-verbal cues like body language, facial expressions, to monitor if they have understood.					
8.	Uses sentences/phrases to express beliefs or emotions to describe an event, eg: child says, 'I ran because I am scared of dogs'					
9.	Rephrases the sentence or tries to explain if the listener has not understood.					
10.	Provides the adequate amount of information, not too less or too much information for the partner.					
11.	Talks differently to people, based on age, gender or authority.					
12.	Uses true narratives, eg: Is able to tell a story with plot and ending following the correct sequence of events.					
13.	Uses polite words like 'please', 'sorry'.					
14.	Child provides information regarding the topic if the communicative partner has no prior knowledge about it, eg: If the child wants to talk about his/her out of station visit, he should provide that information to the listener by saying 'I went to Bangalore..' and then go on to explain his/her experience.					
15.	Can terminate a topic appropriately, eg: If the child is having a conversation about cricket, and wants to end the topic he/she must conclude by saying 'I will watch the match today. I will tell you who won.' And then will move on to the					

	next topic.					
16.	Asks for permission politely if he/she has to interrupt, by saying 'please excuse me' or 'sorry to interrupt'.					
17.	Chooses words or phrases appropriately depending on the communication partner, eg: uses vocabulary appropriate for children/adults, etc.					
18.	Able to sustain topics through many conversational turns, topics may be a mix of his/ her interests as well as that of the communication partner.					
19.	Produces narrative plots containing beginning, end, problem and resolution.					
20.	Requests for clarification appropriately, and learns different strategies to make conversational repair.					

Remarks:

TOTAL: DOMAIN

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PLAY SKILLS:

A. BEGINNER:

S.No	Skill	Score				
1.	Bangs or mouths objects.					
2.	Attempts to manipulate object by pulling or pressing.					
3.	Plays with toy in only one way, eg: spinning ball, turning wheel of toys.					
4.	Likes games involving physical movement like jumping, bouncing, etc.					

5.	Engages in solitary play, does not observe others.					
6.	Plays with toy in more than one way, eg: spins ball and throws ball, turns wheels of car and plays holding car and making it go on the table.					
7.	Plays simple games like peek-a-boo with caregiver.					
8.	Likes being tickled, bounced, etc.					
9.	Has awareness that objects exist when not seen, finds toy hidden under scarf.					
10.	Purposeful exploration of toys; discovers operation of toys through trial and error.					
11.	Hands toy to adult if unable to operate.					
12.	Begins to use toys appropriately, eg: Child understands that by pulling the string the car will move on its own.					
13.	Emergence of onlooker play, observes other children playing from a distance.					
14.	Auto-symbolic play seen. Child pretends to go to sleep, or drink from cup, etc					
15.	Engages in parallel play, plays near other children but does not imitate or modify style of play.					

Remarks:

**B. INTERMEDIATE:**

S.No	Skill	Score				
1.	Sways/ dances to music or performs gestures for rhymes.					
2.	Uses most toys appropriately and can independently play without adult					

	assistance.					
3.	Uses tools, eg: uses plastic hammer to push pugs in the box.					
4.	Enjoys different forms of play, eg: blows bubbles, plays with water, plays with blocks, etc.					
5.	Emergence of pretend play, plays with dolls, makes cars race, etc.					
6.	Talks to self during play.					
7.	Block play consists of stacking and knocking down.					
8.	Emergence of symbolic play, child uses a soap to symbolise a car or holds a box as a phone.					
9.	Combines two ideas in pretend play, eg: puts spoon in pan and pours from jug to cup.					
10.	Plays with doll/car,etc in different ways, eg: combs hair, feeds, puts blanket; races cars, makes cars crash, etc.					
11.	Child performs pretend activities on more than one person, eg: feeds self, feeds mother, feeds doll, etc.					
12.	Sand and water play consists of filling and pouring.					
13.	Allows children to come near his/her toys or play with them.					
14.	Tries to find how to operate new toy without adult assistance.					
15.	Claps hands, dances along with other children in a group song.					

Remarks:



C. ADVANCED:

S.No	Skill	Score				
1.	Represents daily experiences in play-acts as the daddy, uses doll as baby, etc.					
2.	Plays games restricted to table top, like puzzles, painting, etc.					
3.	Play is well co-ordinated, child follows a system while playing, eg: child takes out all the blocks, stacks them and when done puts them back.					
4.	Plays spatial and motor games with rules, eg: taking turns on a slide.					
5.	Emergence of associative play, child plays near other children and modifies his/her own play watching them.					
6.	Shows imitative play involving rudimentary rules with peers. Eg: All children must pass on the ball to the next person.					
7.	Represents events less frequently experienced or observed, particularly impressive or traumatic events, eg: Doctor and child.					
8.	Communicates with children during associative play, by pulling them to show something or pointing to something.					
9.	Re-enactment of experienced events with new outcomes. Eg: If the child was making the doll get ready to go school, they will have a new outcome of going to a park.					
10.	Uses blocks and sandbox for imaginative play, eg: blocks used to create house for animals.					

11.	Uses one object to represent another when the other object is not available, eg: When pretending to put animals to sleep, a paper can be used as a blanket.					
12.	Plans a sequence of pretend events.					
13.	Emergence of co-operative play, interacts with other children during play.					
14.	Follows the rules of the game and waits for his/her turn to play when in a group					
15.	Organizes what he/she needs for play, both objects and children.					

Remarks:

TOTAL:

DOMAIN

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**SCORE SHEET:**

S.NO	DOMAIN	Client's score / Maximum Score				
1.	Pre-linguistic skills DOMAIN SCORE	/10	/10	/10	/10	/10
2.	Receptive language skills A. Beginner	/20	/20	/20	/20	/20
	B. Intermediate	/20	/20	/20	/20	/20
	C. Advanced	/20	/20	/20	/20	/20
	DOMAIN SCORE	/60	/60	/60	/60	/60
3.	Expressive language skills A. Beginner	/20	/20	/20	/20	/20
	B. Intermediate	/20	/20	/20	/20	/20
	C. Advanced	/20	/20	/20	/20	/20
	DOMAIN SCORE	/60	/60	/60	/60	/60
4.	Pragmatic skills A. Beginner	/20	/20	/20	/20	/20
	B. Intermediate	/20	/20	/20	/20	/20
	C. Advanced	/20	/20	/20	/20	/20
	DOMAIN SCORE	/60	/60	/60	/60	/60
5.	Play skills A. Beginner	/15	/15	/15	/15	/15
	B. Intermediate	/15	/15	/15	/15	/15
	C. Advanced	/15	/15	/15	/15	/15
	DOMAIN SCORE	/45	/45	/45	/45	/45
	TOTAL SCORE	/235	/235	/235	/235	/235

Evaluation No.	Total Score	Date of Evaluation
1.		
2.		
3.		
4.		
5.		