ASSESSMENT PROTOCOL FOR CHILDREN WITH SPECIFIC LANGUAGE IMPAIRMENT

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MAY- 2004

Dedicated
to my
Parents & Teachers

CERTIFICATE

This is to certify that the dissertation entitled **"ASSESSMENT PROTOCOL FOR CHILDREN WITH SPECIFIC LANGUAGE IMPAIRMENT"** is a bonafide work in part of fulfillment for the degree of Master of Science (Speech and Hearing) of the student **(Reg. No. 02SH0006).**

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CERTIFICATE

This is to certify that the dissertation entitled **"ASSESSMENT PROTOCOL FOR CHILDREN WITH SPECIFIC LANGUAGE IMPAIRMENT"** has been prepared under my supervision and guidance. It is also certified that this has not been submitted earlier in any other University for the award of any diploma or degree courses.

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DECLARATION

This dissertation entitled "ASSESSMENT **PROTOCOL FOR CHILDREN** WITH SPECIFIC LANGUAGE IMPAIRMENT" is the result of my own study under the guidance of Dr. Shyamala K. C, Reader, Department of Speech Pathology, All India Institute of Speech and Hearing, Mysore and not been submitted in any other University for the award of any degree or diploma courses.

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INTRODUCTION

Language is an essential element for every individual to convey their thoughts, ideas in day to day communication. If it is imperfect, it affects their interaction in society as it affects the dyadic communication required. Developmental language disorders give rise to such conditions. Today, it is commonly understood that children with delayed onset of speech and language with no obvious/ attributable cause may be displaying specific language impairment (SLI).

While no study or survey reports the incidence and prevalence of this condition in the Indian context, some Western studies do report, specific language impairment as one of the most common types of developmental language disorders, affecting approximately 7% of Kindergarten children, more likely to be seen in males than females (Tomblin, Records, Buckwalter, Zhang, Smith & O' Brien, 1997).

Children with specific language impairment appear to be developing normally in all respects except for their receptive and/ or expressive language skills. Although they demonstrate normal intelligence, normal hearing, no evidence of emotional problem and are free from neurological disorders such as cerebral palsy, seizure disorders.

A traditional definition of specific language impairment is exclusionary in nature and it is defined as a form of developmental language disorder occurring in the absence of mental retardation, sensory deficits, frank neurological damage, serious emotional problems and environmental deprivation (Leonard, 1998).

Children with SLI are significantly delayed in acquiring multiple aspects of language, and deficits including grammatical morphology, phonology, syntax, lexicon and pragmatic skills were observed (Joanisse & Seidenberg, 2003). Children with specific language impairment exhibit other types of deficits also that extend beyond language including problem with working memory (Montgomery, 1995), visual imagery (Johnston & Weismer, 1983) and speech perception (Tallal & Piercy, 1974).

The etiology of SLI remains unknown. It is diagnosed by using exclusionary/ inclusionary and/ or discrepancy criteria. A discrepancy between expected performance defined by chronological age (CA), mental age (MA), grade level or nonverbal intelligence and observed language performance is generally required.

Leonard (1998) suggested that a diagnosis of SLI prior to age 3 years is not yet a possibility, because normally developing toddlers often show wide individual difference in their rate of language acquisition. Many normal toddlers can be described as late talkers because at age 2 years they produce few if any words, but by 3 or 4 years of age they speak in full sentences (kelly, 1998).

Need for the study

As such there is no test battery to diagnose children with specific language impairment. Hence, the present study was taken up to develop and standardize a test protocol in the Indian context.

Aim of the present study

Present study was undertaken to develop assessment protocol for children with specific language impairment for diagnosis and also for identifying subgroups of SLI. This exploratory study was planned with the following objectives:

- To ensure appropriate diagnosis of children with specific language impairment using test battery approach.
- Highlight the speech-language characteristics of children with specific language impairment.
- To establish directionality for diagnostic norms, assessment and therapeutic intervention.
- To develop and refine existing framework for subgrouping of SLI in the Indian context.

REVIEW OF LITERATURE

Historical Background of Childhood Language Disorders

Language disorders appear in children of various ages and in countless behavioral manifestations, it originates from a lot of factors ranging from biological to environmental. Children with language disorders present a heterogeneous group. Each child is unique in nature.

A developmental language disorder was recognized in 1822 by Gall (cited in Leonard, 1998) when he published a description of children who had problems in language but did not show the characteristics of other known disorders. Child language disorders as a specialty in speech language pathology grew out of those important and divergent sources of information; those are adult aphasiology, other medical disciplines and field of deaf education. Well documented studies were contributed during twentieth century by Myklebust (1971), Leonard (1979), Aram and Nation (1982), Weiner (1986) and Johnston (1988).

A child language disorder was explained based on a complex set of interactions among the child's language behaviors, processing breakdowns, and the intrinsic and extrinsic developmental context in which he/ she grows. In 1950s and early 1960s most researchers attempted to differentially diagnose and sort out the "true" etiological factors that lead to language disorders. During this period, linguistics and psycholinguistic principles were applied to describe language impairment.

As the twentieth century progressed, the term "aphasia" was used by authors, though the basic meaning was unchanged. Gesell and Amatruda, 1947 (cited in Aram & Nation, 1982) used the term "infantile aphasia". The term "developmental aphasia", was first used in the second decade of the century by Kerr, 1917 (cited in Aram & Nation, 1982). Later Ingram and Reid, 1956 (cited in Wyke, 1978), Benton 1964 (cited in Bernstein & Stark, 1985) and Eisenson (1968) employed the same term for aphasia in children.

As child language disorders field advanced, authors became more specific in use of the terms "expressive developmental aphasia" and "receptive-expressive developmental aphasia" to label language impairment as production deficit or comprehension deficits. In 1960s, "dysphasia" began to be used along with "aphasia" (de Ajuriaguerra, Jaeggi, Guign & Kocher, Maquard, Roth & Schmid, 1965 as cited in Leonard, 1998). It was thought to be technical accuracy might have been reason for gradual change; the prefix a - implies the absence of language, where as dys-implies only problems with language (Eisenson, 1972). Children with grammatical problems were categorized as developmental dysphasia.

The terms - "aphasia" and "dysphasia" have a neurological connotation, their use as labels for language disruption caused by discrete brain damage such as that resulting from CVA (stroke). In 1960s, children with postnatal brain injuries were considered part of the category of developmental dysphasia (Johnston, 1988). Child language impairment with neurological insults ware described as "children with acquired aphasia" or "Children with focal brain injury".

The new nomenclature was given by different authors based on their convenience and symtomatology specific to childhood language impairment. Menyuk (1964) termed "infantile speech", Lowe and Campbell (1965) termed "aphasoid", Lovell, Hoyle and Siddall (1965) termed "delayed speech", Leonard (1972) used the term "deviant language", Ress (1973) termed as "language disorder", Weiner (1974) used the term "delayed language, Aram and Nation (1975) used the term "development language disorder", Wyke (1978) used the term as "developmental dysphasia" and Wolfus, Moscovitch and Kinsbourne, (1980) termed as "developmental language impairment".

The term "Specific language deficit" was first given by Stark and Tallal (1981) and Johnston and Ramstad (1983) preferred the term - "Language Impairment". The term "Specific language impairment" was used by Leonard (1981) along with its abbreviation SLI. It is the most widely adapted term at present, especially in the clinical and research literature.

Criteria for Diagnosis of Specific Language Impairment

Diagnosis of specific language impairment is based on exclusionary factors. Following domains are looked into for diagnosis of SLI children.

Table. 1. Exclusionary criteria for Specific Language Impairment (Leonard, 1998).

Factors	Criteria
1. Language ability	Language test scores of -1.25 SD or lower; at risk for social devalue.
2. Nonverbal IQ	Performance IQ of 85 or higher
3. Hearing	Pass screening at conventional levels
4. Otitis media with effusion	No recent episodes
5. Neurological dysfunction	No evidence of seizure disorders, cerebral palsy, brain lesions; not under medication for control of seizures.
6. Oral Structure	No structural anomalies
7. Oral motor function	Pass screening using development-ally appropriate items
8. Physical and social interactions	No symptoms of impaired reciprocal social interaction or restriction of activities.

a. The Language Deficits

Most studies on children with SLI employ a standardized language test. Children with specific language impairment show limitations in a wide range of language abilities.

The language scores at least should be 1.25 SD below the mean (Leonard, 1998). Tomblin, Records and Zhang (1996) followed scores -1.5 SD to diagnosis of SLI for kindergarten childien. Records and Tomblin (1994) reported language scores 1.25 SD or below this. Aram, Morris and Hall (1993) used procedure to diagnosed SLI on exclusionary criteria, they used language performance cut off score as 1 SD and below it. Stark and Tallal (1981) was best known for employing such a criterion.

The comprehension and production composites were computed in terms of language ages instead of standard scores. A comprehension language age at least six months below expected levels was considered Rice and Oettingv (1993). Tallal, Curtiss and Kaplan (1988) used 1 SD below the mean of comprehension and expression of language.

b. Speech Motor Skills

The children with abnormalities of oral-motor structure might impede normal language production. Volitional oral movements to be examined in the screening should typically include rounding the lips, sealing the lips, biting down on the lower lip, protruding the tongue, and moving the tongue from one side of the mouth to the other.

To diagnose SLI following exclusionary criteria were adopted by Stark and Tallal (1981); Leonard (1998) excluded all those subjects were having peripheral oral motor and sensory deficits, and facial anomalies. Each subject was given a standard oral peripheral examination. Robbin and Klee (1987) highlighted that oral motor movements are well controlled by age 3 6 years. Children who had severe speech/ articulation deficits cannot be included under specific language impairment (Skipp, Windfuhr & conti-Ramsden, 2002).

c. Neurological Dysfunction

There are several neurological conditions can lead to language disorders in children. A child with specific language impairment should be free from any neurological conditions such as focal brain lesion, brain trauma, cerebral palsy or seizure disorders which can lead to language deficits (Stark & Tallal, 1981; Bishop & Edmundson, 1986). Stark and Tallal (1981) accepted a brief period of febrile seizures during infancy, provided that the problem was resolved and the child was no longer on medication for the prevention of seizures.

d. Social Devaluation

Limitation in language ability limits the child's social well being. Gertner, Rice and Hadley (1994) found preschool children with SLI less interactive compared to their normal peers. Fujiki, Brinton and Todd (1996) found that a group of school age children with SLI reported interacting with fewer peers in social activities than did same age peers.

e. Hearing sensitivity

Specific language impairment implies a language problem that cannot be attributed to impairments in hearing. To diagnose SL1, hearing sensitivity must be within normal hearing limits. Leonard (1998) suggested children should in screening at conventional levels. However, investigators have followed the criterion of 25 dBHL (ANSI, 1989) at the frequencies 500, 1000, 2000 and 4000 Hz.

Stark and Tallal (1981) suggested screening of hearing sensitivity across the frequencies 250Hz to 6 KHz, recommended 25 dB hearing level. They also presented familiar words (eg. ice cream, sail boat) through headphones at 25 dB hearing level.

f. Otitis Media with Effusion

Otitis media with effusion (OME) is a serious issue of language limitation in children. Each episode OME can lead to a period of impairment in hearing, and hearing ability can affect spoken language learning (Bishop & Edmundson, 1986; Friel - Patti & Finitzo, 1990). Stark and Tallal (1981) excluded all those children were having history of otitis media with effusion. They recommended that such children can be excluded under the criteria of diagnosis SLI.

g. Intelligence Quotient (IQ)

One of the most fundamental criteria in the diagnosis of specific language impairment is a score of nonverbal intelligence measure that is within age-appropriate levels usually this is defined as a non verbal IQ of at least 85, or less than 1 SD below the mean (Edward & Lahey, 1996, Leonard, 1998; Skipp, Windfuhr & Conti-Ramsden, 2002).

Researches had also followed 90 IQ in nonverbal intelligence test to diagnose SLI. Stark and Tallal (1981) argued that a clear discrepancy should exist between these two types of scores, for the discrepancy criteria, the difference between mental age and language age are of at least 1 year.

Stark and Tallal (1981) used discrepancy method to include children nonverbal IQ scores 85 or above for studies SLI. They suggested a discrepancy definition based on four criteria:

a) at least a 12 month difference between Chronological age (CA) or Mental age (MA) and expressive language equivalent scores,
b) at least a 6 months difference between CA or MA and receptive language age equivalent scores,
c) at least a 12 months difference between MA or CA and a composite (expression and receptive) language age - equivalent scores, and
d) an intelligence quotient IQ of greater than 85 on a non verbal intelligence scale

Leonard (1998) recommended 85 IQ or above on the basis of exclusionary criteria. According to the recent epidemiological study by Tomblin and Zhang, 1999 (cited in Tager-Flusberg & Cooper, 1999) basic profile of the language phenotype based on performance on standardized tests is similar for children who are diagnosed with SLI whose non-verbal IQs fall above or below 85.

Reilly and Wulfeck (2004) used performance IQ within normal range (above 80) as SLI exclusionary criteria.

Etiology of Specific Language Impairment

The causes of specific language impairment are likely to be multifactorial. But none of the causes are clinically established to support SLI and most of them still remain unknown.

a. Genetic studies

Over the past decade evidence has been collected to support familial aggregation in specific language impairment (Tallal, Ross & Curtiss, 1989; Tomblin, 1989; Lahey & Edwards, 1996; Brzustowicz, 1996; Van der Lely & Stollwerck, 1996).

Tallal, Hirsch, Realpe-Bonilla, Miller, Brzustowicz, Bartlett and Flax (2001) ruled out genetic proband in SLI, were two groups of subjects, a proband groups consisting of students receiving school speech/ language services for SLI and a comparable no-impaired control group and their families. SLI probands in this study had a positive family history of language impairment. This study showed a significant correlation of the number of parents in each family affected.

Tallal et al, (2001) support previous studies related to family aggregates in genetics and reported language impairment in a family including parents and siblings of SLI. Bishop and Edmundson (1986); Robinson (1987); Tallal, Ross and Curtiss (1989) demonstrated a significantly increased frequency of affected primary and secondary relatives in language- impaired as compared to control children.

b. Neuroanatomical Correlates

SLI is defined as language deficit without evidence of frank neurological impairment. But this does not mean that there is no physical evidence associated with the language problem. There are few reports on about brain structure and function in children with SLI.

Landau, Goldstein and Kleffner, 1990 (cited in Plante, Swisher, Vance & Rapcsak, 1991) conducted an autopsy on 8 brains of male children who had severe language problems, revealed bilateral cortical atrophy in the perisylvian region, extending from the central sulcus into the occipital lobes. Gyri in this region were abnormally small and increased in number relative to normal. Microscopic examination also revealed degeneration of the medial geniculate nuclei and cerebral peduncles. This child was multiple handicapped, so that it was difficult to generalize with other cases of developmental language disorders.

Cohen, Campbell and Yaghmai, 1989 (cited in Plante Swisher, Vance & Rapcsak, 1991) examined 7 year old girl who had marked expressive deficits and attention deficit disorders with hyperactivity. The brain of this child showed an atypical symmetry of the plana tempoiale. Also noted are small dysplastic gyri on the left inferior surface of the frontal lobe where it borders the sylvian fissure.

Plante, Swisher, Vance and Rapcsek (1991) demonstrated brain lesion based on MRI technique, Six out of the eight SLI subjects had atypical perisylvian asymmetries, right side was larger than left side expected.

Plante (1991) found in four families, parents and sibling of SLI children had atypical perisylvian asymmetries and communication disorders. These studies reflect transmittable, biological factors that place some families at risk for language impairment.

Classification of Specific language impairment

Over the past two decades attempts were made to classify subgroups of language impairment in children. These have resulted in taxonomies based directly on children's linguistic strengths and weakness rather than on medical classification.

Aram and Nation (1975) sub-grouped developmental language impairment into:

a) Repetition strength

The remarkable finding of this group was unusually high syntactic and phonologic repetition ability in relationship to others tasks.

b) Nonspecific Formulation-Repetition Deficits

The group of children was having lower performance on syntactic and phonologic formulation and repetition than other language tasks.

c) Generalized Low Performance

The children in this group performed at a generally low level on all language tasks with little appreciable variation except for some moderate-low performance on phonologic comprehension and repetition.

d) Phonologic Comprehension-Formulation-Repetition

The children were at a generalized high level on all tasks except on the phonologic tasks and one test of syntactic formulation and syntactic repetition.

e) Comprehension Deficits

The children performed comparable or higher level on formulation-repetition tasks than on comprehension tasks.

f) Formulation-Repetition Deficits

The children performed at a high on comprehension tasks than on formulation or repetition tasks.

Wolfus, Moscovitch and Kinsboume (1980) classified specific language impairment into:

i) Deficits in phonology and syntax (Production type)

ii) Global deficits in production and comprehension type

According to Rapin and Allen (1983, 1987) specific language impairment can be sub-grouped into:

1) Verbal Dyspraxia

2) Phonological Programming Deficit Syndrome

3) Phonologic - Sytactic deficit Syndrome

4) Lexical - Syntactic Deficit Syndrome

5) Semantic - Pragmatic Deficit Syndrome

6) Verbal Auditory Agnosia

The DSM-IV (American Psychiatric Association, 1994) classified language disorders in children, and does not use the term specific language impairment, but includes two disorders that together cover much of the same topography:

i) Expressive language disorder and

ii) Mixed expressive-receptive language disorder.

DSM-IV classification allows for the identification of language impairment when no obvious threat exist as well as for cases where the presence of these threats do not seem sufficient to account for the degree of problem presented.

In 1996, Rapin summarized subgroups of SLI as reported by Rapin and Allen (1983, 1987) into:

a. Expressive language disorders

b. Expressive - receptive language disorders

c. Higher order processing disorders

In 1997, Conti-Ramsden, Crutchely and Botting did a study on group of 242 children having language impairment, support Rapin and Allen (1983, 1987) classification and they sub-grouped SLI into five leaving out verbal auditory agnosia.

Bishop (2000) revised Rapin and Allen's notion of Semantic- Pragmatic deficit disorder by describing, SLI children as having pragmatic disorder too. He described these children as having difficulties in the appropriate social use of language, but relatively preserved phonological and grammatical abilities referring to this condition as pragmatic language impairment.

1) Verbal Dyspraxia

These children have articulation and phonological problem and speak effortfully. They have expressive problem only.

2) Phonologic Programming Deficit Syndrome

These children had articulation and phonology problems and expressive difficulties. They performed poorly on all tests except naming vocabulary. There was no time limit for naming picture.

3) Phonologic-Syntactic Deficit Syndrome

Under this section children were having articulation, phonology, syntax and morphology difficulties that were both expressive and receptive.

4) Lexical - Syntactic Deficit Syndrome

These children have syntax and morphology difficulties, world! finding difficulties and expressive (or expressive and receptive) difficulties.

5) Semantic - Pragmatic Deficit Syndrome

These children had semantic and/ or pragmatic difficulties and **were** more likely to have receptive problem only.

6) Verbal Auditoiy Agnosia

There were smallest number of children who had phonology problems, mainly expressive difficulties and poor word reading. These children fall into Phonologic Programming Deficit Syndrome, therefore, those children were not considered under Verbal Auditoiy Agnosia in Conti-Ramsden, Crutchely and Botting (1997) study.

Common Tests Employed to Assess Language Features in SLI children

Lot of research has been carried out since 1950s to study these children, and standardized tests were used to label their language performances. Several tests on language abilities such as language comprehension, expression and articulation have been used in various combinations by the researchers. The following tests were used by several reseaichers to aid in diagnosis of specific language impairment in children.

Plante, Swisher, Vance and Rapcsak (1991) used the following linguistic and nonlinguistic tests to measure the language deficits in children:

- Test of psycholinguistic ability (Kirk, McCarthy & Kirk, 1968).
- Northwestern syntax screening tests-Expressive (Lee, 1969)
- Token test for children (DiSimoni, 1978)
- Expressive one word picture vocabulary test (Gardnen, 1979)
- Pea body picture vocabulary test - Revised (Dunn & Dunn, 1981)
- Templin-Darley test for Articulation (Templin & Darley, 1968) of word articulation.

Lahey and Edward (1996) used following test materials to aid diagnosis in language delayed children.

- Pea body picture vocabulary test- Revised (Dunn & Dunn, 1981).
- Test of psycholinguistic ability sub test of auditory sequential memory (Kirk, McCarthy & Kirk, 1968).
- Test of language development-Primary (Newcomer & Hammill, 1988)
- Northwestern syntax screening test (Lee, 1969)

Conti-Ramsden, Crutchley and Botting (1997) advised using five tests. Test for Reception of Grammar (Bishop, 1982); three subtests of the British Ability Scales (Number Skills, Naming Vocabulary and word Reading) developed by Elliot (1983), Goldman - Fristoe Test of Articulation (Goldman & Fristoe, 1986) and Bus story Expressive language test (Renfrew, 1991).

Linguistic and Non linguistic Abilities in SLI Children

Children with specific language impairment are slower than their typically developing peers on many linguistic and non-linguistic tasks (Johnston & Weismer, 1983; Edwards & Lahey, 1996; Lahey & Edwards, 1996; Miller, Kail, Leonard & Tomblin, 2001).

Nonlinguistic abilities in SLI

a. Cognitive skills

In general, children with specific language impairment perform within normal limits on non-verbal intelligence task such as the Leiter International Performance Scale (Leiter, 1948) and Wechsler Intelligence scale for children - Revised (Wechsler, 1963).

There is contradictory finding by Stark and Tallal (1981). They administered the Wechsler Intelligence Scale for children, on preschool language impaired children, and found 50 children performance IQs was below 85 and few had IQs of 50 of less. However, these children were also had difficulty in other aspects of cognitive skills.

b. Deficits in Cognitive Mechanisms

Gathercole and Baddeley, 1993 (cited in Ahmed, Lombardino & Leonard, 2001) explained how the information degraded in a processing system which has a limited pool of operational resources available to perform computations and when demand exceeds available resources, the processing and storage of linguistic information. This combination of processing and storage function is referred to as "Verbal Working Memory" (Baddeley, 1998; Gathercole and Baddeley; cited in Ahmed, Lombardino & Leonard, 2001).

According to the above view success in comprehending and producing language is dependent upon the ability to actively maintain and integrate linguistic material in working memory.

c. Mental Rotation

According to Johnston and Weismer (1981) SLi children are very slow in responding to the mental rotation tasks than the normal group of children. Fazio (1994) reported that SLI children had difficulty with vote counting, displayed a limited repertoire of number terms and miscounted sets of objects. But they did not have problems in gestural counting tasks.

Kamhi, Catts and Mauer (1988) reported children with language delay performed very poor in short term memory task (non sense syllable). Conti-Ramsden and Hesketh (2003) reported that processing task involving short term memory particularly non-word repetition, have potential as possible risk markers of SLI when

assessing young language learning children. Kamhi, Catts and Mauer (1988) found that the reading impaired and language impaired children significantly performed worse than normal children in word repetition task (monosyllabic nonsense word).

d. Difficulties in speed of processing

It has been reported by several authors that SLI children take longer time to process, nonlinguistic tasks (Leonard, Nippold, Kail & Hale, 1983; Leonard, 1998). Lahey and Edward (1996) reported SLI children to be slower in naming task than their peers.

Lahey, Edward and Munson (2001) investigated sixty-six SLI children. They were given visual stimuli on a computer and auditory stimuli were presented by headphone. In the naming task, children were asked to name pictures of common objects as quickly as possible when they heard a signal to respond Lahey, Edward and Munson (2001) showed that children with SLI to be significantly slower than those of typically developing children. This could be attributed to speed of processing and this is related to language performance and cannot be measured by just language test.

e. Difficulty in temporal sequencing

Sequencing is the ability to hold a series of information in the mind and respond accordingly to stimuli presented. Stark (1967) found this ability is affected in children with language impairment. Elliott and Hammer (1988) reported that children with language learning disabilities have poorer auditory discrimination compared to age matched children.

Kamhi, Catts and Mauer (1988) found similar performance by language-impaired children and reading impaired children in syllable segmentation task. In rapid naming task normal children performed significantly better than language impaired and reading impaired children.

f. Auditory perceptual deficits

One of the high possibilities of language impairment is due to insufficient processing of incoming auditory signal (Lowe & Campbell, 1965). They found children with language impairments, when compared to control peers, required longer intervals between tones to discriminate the order in which they had occurred.

Tallal (1976) reported that language impaired children performed poorer in auditory discriminating task for consonants than vowels. Children with SLI required longer intra-stimulus and inter-stimulus intervals to accurately discriminate consonants - vowel (CV) pairs. Evidence from evoked potential studies under certain experimental conditions showed that language - impaired children adequately discriminate brief or rapidly changing auditory signals/stimuli (Tomblin, Abbas, Records & Brenneman, 1995).

Nittouer (1999) studied the temporal processing abilities of children with poor phonological skills. On temporal processing tasks, children with poor phonological processing task were not disproportionately affected in their abilities to process rapidly presented auditory information when compared to a control group.

g. Deficits of auditory processing

Auditory processing deficits have been implicated in developmental disorder of higher-level cognition processing, such as language impairment (Tallal, Stark & Mallits, 1985). These children also have deficit in fine grained auditory discrimination (Elliott, Hammer & Scholl, 1988).

Several studies directed at uncovering the basis for the disorder have shown that many of SLI children have particular difficulty in discrimination of speech sounds distinguished by rapidly changing acoustic spectra (Tallal, Stark & Curtiss, 1976). Holopainen, Korpilahti, Juottonen, Lang & Sillanapaa (1997) used duration and frequency change MMN to investigate children with developmental dysphasia. They found that the peak amplitude of frequency change MMN (500 Vs 555) was significantly attenuated in dysphasic children as compared to healthy control children

Kaur (2003) evaluated MMN on SLI children. The study revealed that the amplitude of P_{100} - N_{250} wave complex in both standard and deviant LLR waves was significantly attenuated in the SLI group. Peak amplitude of MMN was significantly reduced in the SLI group. It suggests that amplitude measures of P_{100} - N_{250} complex and MMN can be used to predict problems due to auditory processing deficits.

h. Speech Perception difficulties

Rosenthal, 1972 (cited in Wyke, 1978) observed that children with SLI had difficulty in responding the correct sounds | ts | and |s |, two consonants that differ in temporal characteristics. Leonard, McGregor and Allen (1992) presumed the notion

that cues of brief duration are especially difficult for children with SLI, if the brief information is adjacent to other material of longer duration.

Umer, Albrecht and Von Suchodoletz (2002); Rvachew, Ohberg, Grawburg and Heyding (2003) suggested that SLI children showed a specific deficit in automatic discrimination of CV syllables differing in place of articulation, whereas the processing of simple tone difference seems to be unimpaired.

Linguistic ability in SLI

a. Comprehension

There is a mounting evidence to indicate that the comprehension abilities might be affected in SLI children which could be in the form of delayed acquisition of sentence comprehension (Bishop & Edmundson, 1986). Paul and Smith (1993) reported narrative skill was poorer than comprehension.

Leonard (1998) pointed out SLI children having difficulty in both comprehension and production of language, specified that these children acquire lexical competence in delayed manner compare to peers.

b. Learning Deficits

Numerous reports indicated that children who experience early language disorders often have difficulty learning to read and write during school years and beyond (Levi, Lapozzi, Fabrizi & Sechi, 1982; Catts & Kamhi, 1999).

Levi, Lapozzi, Fabrizi and Sechi. (1982) evaluated 18 children who had been diagnosed with specific language impairment when they were 4 year old. When

children were 8 years old in the third grade, they were administered a battery of tests to examine language development and Academic achievement. Their findings showed that children were having deficit in receptive and expressive language, as well deficits in reading, spelling and mathematics.

c. Phonological skills

Children with specific language impairment have difficulty in sound system of language, which are proved by several researchers. There are evidences which show that, if children exhibit deficit in morphosyntax and lexical skills, they almost invariably show weakness in phonology as well.

There are high probabilities that if children are identified first on the basis of phonological problems, a majority of them will also show problems in other areas of language (Paul & Shriberg, 1982; Shriberg, Kwiatkowski, Best, Hengst & Terselic-weber, 1986). Shriberg and Kwiatkowski (1994) reported that approximately one third children scored below age level on measures of language comprehension and 80% exhibited deficits in language production.

Kjelgaard and Tager-Flusberg, 2001 (cited in Tomblin et al., 2003) focused on phonological lexical and grammatical skills in autism and overlap on uny characteristics of autism and SLI. Their data showed considerable variation in their sample with respect to lexical and grammatical development, while phonological abilities in the form of speech sound production were usually normal. This variability revealed some children with autism who had normal levels of vocabulary and grammar, however, the majority of their participants had borderline or impaired levels

of language. The profiles of the children with relatively poor language abilities were similar to those found for children with SLI. This similarity in profile characteristics was viewed as suggestive of an overlap between SLI and autism.

d. Phonological Awareness and Phonemic Perception

Rvachew, Ohberg, Grawburg and Heyding (2003) conducted a study on 4-year old children with moderately or severely delayed expressive phonological skills but age appropriate receptive vocabulary. They found that the children with expressive phonological delays demonstrated significantly poorer phonological awareness skill than those normally developing peers.

Bird and Bishop (1992) found that children with phonological impairments did poorly on phonological processing tasks that involved no speech output, compared with control children matched on age and non-verbal ability. Some phonologically impaired children were also impaired in auditory discrimination tasks.

e. Lexical Ability

Children with specific language impairment appear to be late in acquiring their first words (Leonard, 1998). In a series of studies, Leonard, Schwartz, Allen, Swanson and Loeb (1989); Leonard et al., (1982) used an experimental task to examine lexical learning by young children with specific language impairment during play session. They found that three to four year old children and younger normally developing children comprehended and produced more object words than action words, and comprehension was superior to production. They suggested that the

possible reason for this is that the learning of verbs involves extra obstacles, which might be especially difficult for SLI children.

Gleitman and Gleitmann, 1992 (cited in Leonard, 1998) have demonstrated that the meaning of many verbs cannot be learned on the basis of simple exposure to events.

f. Naming skills

Naming objects is something we learn early and do every day. Children and adults with oral and written language impairment are often slow and inaccurate when naming object. Naming pictures of objects involves lexical and nonlexical process related to accessing information of objects as well as lexical and nonlexical process related to producing the name of the picture (Leonard, Nippold, Kail & Hale, 1983; Lahey & Edward, 1996).

Lahey and Edward (1996) reported that subgroup of SLI children were significantly slower in naming pictures than their peers. They conclude that slow naming times may be related to retrieval of underlying phonological representations or the lexical response processing. It is possible that the slower naming times reported for children with SLI are related to pattern of language deficits and that any problems with cognitive processing involved in naming may vary with pattern of language deficit.

Children with SLI typically present with smaller verb vocabulary than found in younger normally developing children. Children with SLI may require a greater critical mass to develop on robust category of noun (Lahey & Edward, 1996).

g. Grammatical Morphology

Agrammatism has been defined as a deficit in language production primarily characterized by the omission of grammatical function and inflections and by a marked reduction in syntactic complexity. According to Leonard, Miller and Gerber (1999) the grammatical morphology of children with SLI falls below expectation level on lexical diversity. This study suggests that SLI children differ from normal developing children in terms of use of grammatical morphology.

Rice, Haney, and Wexler (1998) reported persisting problems with finite verb morphology in children with SLI, who significantly produced lower scores for tests on past tense - ed and present progressive - ing inflection. Leonard (1999) suggested children with SLI were having difficulty with noun related morphology, verb related morphosyntax.

h. Syntactic ability in SLI children

Many children with specific language impairment (SLI) exhibit sentence comprehension difficulties. In some instances, these difficulties appear to be related to poor linguistic knowledge and, in other instances, to inferior general processing abilities.

In general, it can be concluded that sentence structure produced by the SLI children is not appropriate to their age level. Specific language impairment children produce the sentence less frequently well formed then normal children (Klee, 1989; Grimm & Weinert, 1990). Joanisse and Seidenberg (2003} indicated that children with SLI have difficulty comprehending specific types of syntactic relationship such

as reversal passives and bound pronouns and reflexives. Such deficits indicate that SLI is associated with difficulties in processing configurable aspects of grammar.

i. Mean length of Utterance

Tests of language are not the only standaidized measures of language ability that are employed in identifying children with specific language impairment. Language ability is also derived from the child's spontaneous speech i.e., Mean Length of Utterance (MLU).

Dunn, Flax, Sliwinski and Aram (1996) diagnosed SLI based on children's spontaneous speech and MLU than from formal tests. Johnston and Kamhi (1984) observed difference in MLU between children with SLI and control group.

j. Pragmatic Skills in SLI

Children with SLI not only differ in linguistic characteristics, but also are pragmatically impaired. The literature on the pragmatic abilities of children with SLI reveals varieties of results. Their speech may be fluent and grammatically well formed, but the content of what they say has an odd quality and the way in which they use language in social interaction may be unusual (Tomblin, Hafemant & O'Brien, 2003).

Rapin and Allan (1983) reported normal or relatively intact grammar and phonology, but inadequate conversational skills, selecting inappropriate words, poor maintenance of topic. Adams and Bishop (1989) pointed that SLI children too have pragmatic deficits and are not homogeneous group.

Bishop and Rosenbloom (1987); Conti-Ramsden, Crutchley and Bolting (1997) supported above study reported by Rapin and Allan (1983). Specific language impaired children have normal pragmatic abilities as measured in pronouns in story telling and their ability to make conversational interference (Van der Lely, 1997).

k. Narration ability

Even the simplest sentence cannot be constructed and produced without the coordination of lexical, morphosyntactic, phonological and pragmatic elements. Narratives required considerably skill in manipulation in language, whether they arc in the form telling a fictional story, providing an account of a previous experience, or retelling a story heard from someone else (Paul & Smith, 1993).

The evidence suggests that children with SLI have the greatest problems like organizing in an appropriate sequence of words (Clifford, Reilly & Wulfeck, 1995; cited in Leonard, 1998). Paul and Smith (1993) reported difficulty of narrative skills in SLI children, they pointed that language difficulty may be due to deficit beyond language, difficulty in encoding, organizing, linking proposition and retrieval words.

Cross Linguistic Studies

SLI children do not constitute a homogeneous group, most of SLI children exhibit a moderate deficits across a broad range of linguistic features, with more serious and selective impairments in particular areas (Leonard, Sabbadini, Leonard & Volterra, 1987).

Leonard, Sabbadini, Leonard and Volterra, (1987) measured grammatical morphemes that are subject to common phonological process in English speaking SLI children and Italian speaking SLI children. Studies found that English speaking SLI children showed mastery of the regular plural than the Italian speaking SLI children. According to Leonard (1998) Italian speaking SLI children show difficulty in learning. Lexical development appears to be slow in these children and emergence of word combination is quite late.

There are additional studies carried out across languages in SLI children to determine the language deficits, which included French, German, Hebrew and Spanish other than English. All these showed wide variability on SLI across language.

The Indian Scenario

There have been lots of studies carried out towards identification and selection criteria of specific language impairment in the Western setup. But there is no assessment tool to diagnose children with specific language impairment and aid in subgrouping in the Indian context. The studies on SLI themselves are none.

To cite the closest study by Swapna (1995) developed an informal check list to identify and evaluate developmental dysphasia. In this study 10 children in the age range of 2.3 - 6 years were included. The criterion for their inclusion in the study was a diagnosis of delayed speech and language with no other associated problems. This study used case history including medical history, hearing evaluation, assessment of intelligence to identify developmental dysphasia.

The present study was undertaken to develop an assessment protocol for children with specific language impairment. This study facilitates specific identification and subgrouping of language characteristics in children with SLI utilizing battery of tests.

METHOD

The aim of the present study was to develop assessment protocol for children with specific language impairment to diagnose and identify the subgroups in the children with SLI based on exclusionary criteria.

Subjects

Fifteen subjects were selected to collect the data based on exclusionary criteria given by Leonard, (1998, the set of criteria is given in appendix-B). The children were in the age range of 3 years to 5 years (12 male and 3 female). These children were from urban monolingual Kannada speaking background. They reported to All India Institute of Speech and Hearing with complaint of delayed onset of speech and language with no evidence of serious neurological deficits, behavioral problems, or hearing problems.

Tools

Following tests were administered to aid in diagnosis and sub grouping of SLI:

1) Kannada Language Test (Project by RRTC & AYJNIHH, 1990)
2) Reading Readiness Test (Devaki Devi, 1987) Subsections
   a) Vocabulary test b) Auditory Discrimination task
3) Test of Articulation in Kannada (Babu, Rathna, & Bettageri, 1972)
4) Pragmatic Abilities Questionnaire (Anjana, 1999)

A brief description of the tests used in the assessment battery is given in the appendix-A

Procedure

A detailed case history was taken for all the fifteen subjects who reported to All India Institute of Speech and Hearing, Mysore. The case history included medical history, birth history, behavioral history and deficits of speech and language development.

Receptive and expressive language level was elicited with the help of Kannada Language Test. Their vocabulary, articulation, auditory discrimination and pragmatic skills were also elicited, with the help of the test battery. In addition their hearing sensitivity was conventionally screened with appropriate audiological tools like pure tone audiometry, BSERA and BOA. Non-verbal Intelligence was obtained by clinical psychologist with the help of Developmental Screening Test (DST, Bharath Raj, 1977). All fifteen children were found to be having an IQ of 90 or above. The language test battery was administered in the clinical set-up.

Scoring

The response was recorded on a score sheet provided in the test material. An appropriate marking was done based on criteria was given in each of the test materials.

Statistical Analysis

The mean and standard deviation of the scores in individual test was calculated. The t-test was done in order to find out the significance of difference between the mean of experimental data and standardized normative data.

RESULTS AND DISCUSSION

The purpose of the present study was to develop a test protocol to assess and make a subgrouping of children with specific language impairment.

Fifteen subjects, only those who reported with a complaint of delayed onset of speech-language; no evidence of serious neurological deficits, behavioral problems, or hearing problems. Subjects were selected based on exclusionary criteria given by Leonard (1998). Subject's age ranged from 3 to 5 years (12 male and 3 female).

To administer Kannada language test, fifteen subjects were equally divided into three groups ranging from 3-3.6 years, 3.6- 4 years and 4- 4.6 years, and to administer Vocabulary and Auditory discrimination section of Reading readiness test those fifteen subjects were divided into two groups, ten subjects were in age rang of 3-4 years and five subjects were in the age range of 4-5 years. The difference in subgrouping of subjects for different tests is to match with the age groups used in the standardization of the test.

Data was subjected to statistical analysis. Mean scores, standard deviation of present study was compared with normative values given for urban children in Kannada language test and Reading readiness test. A t-test was used to find the significance of difference between normative values and present study. Results are discussed under the following headings:

I. Kannada Language Test:

1. Semantic Receptive and Expressive skills
2. Syntax Receptive and Expressive skills
3. Semantic and Syntax skills
4. Language Receptive and Expressive skills
5. Overall Language skills

II. Reading Readiness Test:

1. Vocabulary skills
2. Auditory Discrimination skills

III. Test of Articulation in Kannada:

- Articulation abilities

IV. Pragmatic Abilities Questionnaires

V. Cluster identification for subgrouping

I. Kannada Language Test

1. Semantic Receptive and Expressive skills

The present study shows Semantic receptive and expressive scores in Kannada language test.

Table.2. Mean, SD and t-value of semantic receptive and expressive scores in the Kannada language test.

Receptive					Expressive		
Age range (years)	Measures	Exp. group	Normative group	t-value	Exp. group	Normative group	t- value
3-3.6	Mean	8.2	23	5.10*	3.4	13.9	3.91*
	SD	1.09	6.32		1.51	5.81	
3.6-4	Mean	11.2	22.2	4.76*	5.8	9.3	1.42NS
	SD	2.58	4.77		3.56	4.90	
4.-4.6	Mean	12	26.15	5.40*	6.4	17.15	4.05*
	SD	3	5.41		2.51	5.60	

Maximum score: *p<0.01 NS: not significant

Semantic receptive = 36, Semantic expressive = 30

The results show Mean, SD and t-value of semantic receptive scores and expressive scores of present study. The t-value revealed no significant difference of expressive scores of age range between 3.6-4 years compare to normative group.

2. Syntax Receptive and Expressive skills

Table.3 shows finding of present study receptive and expressive scores of syntax in Kannada Language test.

Table. 3. Mean, SD and t-value of syntax receptive and expressive scores in the Kannada language test.

Receptive					Expressive		
Age range (years)	Measure	Exp. group	Normative group	t- value	Exp. group	Normative group	t- value
3-3.6	Mean	3	15.3	9.4*	0.6	7.35	3**
	SD	2.12	2.06		0.54	4.95	
3.6-4	Mean	8.2	14.95	2.59**	2.2	6.75	3.58*
	SD	3.70	5.16		2.58	2.21	
4.-4.6	Mean	4.8	20.4	5.25*	0.4	6.45	2.68*
	SD	3.27	6.17		0.54	4.94	

Maximum score: * p< 0.01 ** p<0.05

Syntax receptive = 33, Syntax expressive = 33

Table.3 shows syntax scores of receptive and expressive of experimental and normative group. The t-value revealed significant difference of syntactic receptive and expressive language across age at 0.01 and 0.05 levels respectively.

3. **Semantic and syntax skills**

Scores of semantic and syntax skills in present study of Kannada language test are as shown below.

Table.4. Mean, SD and t-value of Semantic and Syntax scores of Kannada language test.

Semantic scores					Syntax scores		
Age range (years)	Measure	Exp. group	Normative group	t-value	Exp. group	Normative group	t- value
3-3.6	Mean	11.6	36.9	4.81*	4.4	26.65	4.74*
	SD	2.51	11.59		2.88	10.26	
3.6-4	Mean	17	31.5	3.21*	10.4	20.8	3.31*
	SD	5.87	9.26		6.23	5.64	
4.-4.6	Mean	184	43.3	5.11*	5.2	26.85	4.87*
	SD	3.78	10.54		3.7	9.58	

Maximum score: $*p<0.01$

Semantic scores = 66, syntax scores = 66

Table.4 shows mean scores of Semantic skills as 11.6, 17 and 18.4, and mean scores of Syntax skills 4.4, 10.4 and 26. 85 respectively. The t-value for both semantic skills and syntax skills were obtained. Obtained values show significant difference at 0.01 level compared to normative data of Kannada language test.

Also statistical analysis was conducted in order to compare relation between semantic scores and syntax scores. The t- value of semantic scores and syntax scores are given in the Table.5.

Table.5. Mean, SD and t-value of experimental group of semantic and syntax skills.

Age range (years)	Measure	Semantic score	Syntax score	t-value
3-3.6	Mean	11.6	4.4	4.23*
	SD	2.51	2.88	
3.6-4	Mean	17	10.04	1.87**
	SD	5.87	6.23	
4.-4.6	Mean	18.4	5.2	5.59*
	SD	3.87	3.7	

*p<0.01 **p<0.10

The obtained t-value shows significance of difference between these two domains and mean scores of semantics are higher than those of syntax. It suggests that children with language deficits are found to have better performance in semantic skills compared to syntax skills. In agreement, Klee (1989) revealed that sentences produced by SLI children were not age appropriate. Leonard, Miller and Gerber (1999); Joanisse and Seidenberg (2003) suggested that children with specific language impairment have difficulty comprehending specific types of syntactic relationship such as reversal passives and bound pronouns and reflexive.

4. Receptive and expressive skills of language

Receptive and expressive language scores were obtained from Kannada language test. Scores were compared with normative values of standardized Kannada language test (Shyamala, Vijayashree & Jayaram, 2004).

Table.6. Mean, SD and t-value of receptive and expressive language of Kannada language test.

Receptive scores					Expressive scores		
Age range (years)	Measure	Exp. group	Normative group	t-value	Exp. group	Normative group	t-value
3-3.6	Mean	11.4	45.2	6.97*	4.6	23.2	3.97*
	SD	2.88	10.64		1.67	10.38	
3.6-4	Mean	19.4	52.1	8.15*	8	28.9	4.84*
	SD	5.55	8.12		6.08	8.72	
4.-4.6	Mean	16.6	52.75	8.9*	6.2	31.1	6.27*
	SD	5.5	8.26		1.92	8.76	

Maximum score: *$p < 0.01$

Receptive = 69, Expressive = 63

Table.6 shows mean and standard deviations of receptive language skills. The obtained means were 11.4, 19.4 and 16.6 respectively for receptive skills and expressive means were 4.6, 8 and 6.2 respectively for their age group. Both mean value of receptive skills and expressive skills were compared with normative values, t-value shows significant difference between these two at the level of 0.01 significance. It is clear that mean scores of receptive skills are higher than those of expressive skills.

Overall, the research related to specific language impairment suggests that receptive skills of SLI children are always higher than the expressive language. The above findings correlate with the studies reported by Leonard (1991) and Nippold and Schwarz (2002).

5. Overall Language skills

All fifteen subjects' language scores were obtained and statistical analysis was done. The mean scores of the subjects are displayed in Table 7.

Table.7. Mean, SD and t-value of total scores for Kannada language test.

Age range (years)	Measure	Exp. group	Normative group	t-value
3-3.6	Mean	16	67.35	5.34*
	SD	4.52	21.14	
3.6-4	Mean	27.4	81	6.98*
	SD	11.54	15.28	
4.-4.6	Mean	23.6	83.85	8.15*
	SD	5.64	16.02	

Maximum scores = 132 *$p < 0.01$

Table.7 shows mean score of language skills as 16, 11.54 and 23.64 for different age groups. Mean and SD value of each group was compared with normative values. The t-value shows significant difference at level of 0.01 between normative scores and experimental data. The present finding correlated with Stark and Tallal

(1981) with reference to diagnosis of children with specific language impairment. They remarked that the language scores of specific language impairment children should show at least 12 months difference between compared to that of chronological age or mental age.

IT. Reading Readiness Test

Vocabulary and Auditory discrimination skills

Vocabulary and Auditory discrimination test was administered on each child. The obtained results were compared with normative data. In the vocabulary test, children were asked to point to the pictures as named by the tester. For auditory discrimination minimal pairs of words were presented and children were instructed to point to the picture in same sequence of words presented by the tester. The obtained mean scores and SD are given in Table.8.

Table.8. Mean, SD and t-value of Vocabulary and Auditory discrimination in Reading readiness test.

Vocabulary					Auditory discrimination		
Age range (years)	Measure	Exp. group	Normative group	t- value	Exp. group	Normative group	t-value
3-4	Mean	13.2	14.4	0.64NS	4.8	37.2	11.4*
	SD	4.9	5		7.82	7.5	
4-5	Mean	17	18.1	0.69NS	3.8	43.3	10.28*
	SD	1.41	3.5		4.14	8.4	

Maximum scores: NS: not significance *p<0.01

Vocabulary = 22, Auditory Discrimination = 68

Table.8 shows mean scores of Vocabulary skills were 13.2 and 17 of the two age groups respectively, while mean values of Auditory discrimination were 37.2 and 43. All the children involved in this test were found to be having good receptive vocabulary. The t-value of vocabulary skills shows no significant difference between experimental mean scores and normative mean scores. These findings suggest that these children were having age appropriate vocabulary, but mean scores of auditory discrimination and t-value indicates significance of difference between normative mean scores and experimental mean, which is indicative of auditory perceptual deficits in these children. This finding correlated with several such studies earlier which report that a child with specific language impairment has difficulty in auditory discrimination.

Bird and Bishop (1992) revealed that children with specific language impairment were having poor auditory discrimination. Rvachew, Ohberg, Grawburg and Heyding (2003) revealed age appropriate vocabulary in children with moderately or severely delayed expressive phonological skills but significant poor performance on auditory discrimination skills compared to their normally developing peers.

III. Test of Articulation in Kannada

Articulation abilities

Kannada articulation test was administered on 11 children. For the rest of four subjects (two children from each age ranges between 3-3.6 and 3.6 to 4 years) Kannada articulation test could not be administered as these children did not have any verbal language, and they did not cooperate for the imitation of target words. During test these children were asked to repeat the target words presented by the tester.

Table.9. Articulation errors in different age groups on Kannada articulation test.

Age range (in years)	No. of children	Target sounds Vs Errors sounds
3 -3.6 years	3	ʧ/s, ʈ/ʈ ɭ/r, distortion of k, w, d
3.6 -4 years	3	ʧ/s, ʈ/ʈ, s/S, ɖ/d, i/j, r/ɾ, b/v, omission- r, ʈ
4-4.6 years	5	s/S, ʧ/s, r/ɾ, l/r, f/v, clusters, blending absent

As shown above, there children were found to be having difficulty in articulation ability. The common articulation errors were noted such as substitution, omission and distortion errors. However, these children were not having consistent errors of sounds. Errors of target sounds were compared with developmental articulation skills in normally developing children given by Tasneem Banu (1977). These children were also having poor auditory discrimination scores in Reading readiness test which revealed that children were having phonological deficits.

The above finding may be compared with the findings by Conti-Ramsden, Crutchely and Bottig (1997); Bishop (2000); Rvachew, Ohberg, Grawburg and Heyding (2003). They too have reported phonological deficits in specific language impaired children.

IV. Pragmatic abilities Questionnaire

Questionnaire on pragmatic skills for evaluation of normal children and clinical population like Autism children developed by Anjana (1999) was given to each child's parents. This questionnaire has 30 questions. The child's parents were instructed to rate the child's performance in three scales i.e. most frequently occurring,

frequently occurring and "never" responses. The responses were subjected for calculating frequency of responses in percentage.

The following parameters such as Attention seeking, request for objects, request action, request information, naming, greeting, responding to appropriate question, comment on topic, turn taking, topic maintenance and conversation repairs were included.

Table. 10. Children's performance on pragmatic skills Questionnaire

Parameters	Most frequent Response in %	Frequent response in %	Never occur response in %
Attention seeking	60.4	23.1	16.6
Request object	67.5	20	12.5
Request action	34.5	22	43.75
Request Information	67	15	19
Naming	31.25	43.75	25
Greeting	75	25	0
Responding	56	25	19
Protest	50	12.5	37.5
Comment	62.5	18.75	18.75
Turn taking	52	23	23
Topic exchanged	41	28	31
Conversational repairs	35	31	34
Total percentage	52.7 %	23.94 %	23.35 %

The above Table 10 shows scattered responses in the responses for the questionnaire. The SLI children obtained fewer scores in conversation repairs, request action, topic exchange and naming. This result shows that these children were having pragmatic deficits as well. The above findings correlate with finding reported by Rapin and Allan (1983) and Tomblin, Hafemant and O'Brien (2003). These authors suggested that children's speech may be fluent and grammatically well formed, but the content of what they say has an odd quality and the way in which they use language in social interaction may be unusual (Tomblin, Hafemant & O'Brien, 2003).

Rapin and Allan (1983) also reported normal or relatively intact grammar but inadequate conversational skills, selecting inappropriate words, poor maintenance of topic. Adams and Bishop (1989) pointed that SLI children too have pragmatic deficits and are not homogeneous group.

The following is a general observation of speech-language characteristics seen in these children. The common pattern of language features noted during language assessment such as difficulties in lexical categories of verbs, limited verbal lexicon, and poor attention and concentration. Bishop and Edmundson (1986); Tallal, Allard, Miller and Curtiss (1997) found that both comprehension and expression were affected in SLI children. However, comprehension was better than expression ability. They suggested that (his could be attributed in the form of delayed acquisition of language. Leonard et al., (1982) specified that SLI children acquire lexicon in delayed fashion compared to peers. Lexical categories such as verbs are most difficult to learn.

V. Cluster identification for subgrouping

All fifteen subjects were investigated for the feasibility of subgrouping based on the present battery of tests i.e. Kannada language test which included semantic and syntax of language, Reading readiness test including vocabulary and auditory discrimination, articulation abilities and pragmatic abilities.

Table. 11. Clusters of language features base d on the performance in each domain.

Skills	Phonology	Lexical	Semantic	Syntax	Pragmatic
3-3.6 years					
1.	—	1	0	0	1
2.	—	1	0	0	1
3.	0	0	0	0	1
4.	0	1	0	0	0
5.	0	0	0	0	0
3.6-4 years					
6.	—	0	0	0	0
7.	—	1	0	0	1
8.	0	1	0	0	0
9.	0	1	0	0	1
10.	0	1	0	0	1
4-4.6 years					
11.	0	1	0	0	1
12.	0	1	0	0	0
13.	0	1	0	0	0
14.	0	1	0	0	1
15.	0	1	0	0	1

(Note: 0, indicates children who failed to perform in each domain, - indicates children not tested and 1, indicates children who performed positively in language domains).

Table. 11 shows the performance of these children on different domains. As can be seen all fifteen children i.e. 100% failed to perform in articulation test, auditory discrimination task and Kannada language test which included semantic and syntax subtests. Twelve children i.e. 80 % achieved fair scores in the receptive vocabulary *test*, and six children i.e. 40% failed on pragmatic skills. Thus, Table. 11 shows children's poor performance in the different language domains of the test battery. Based on performance of the each child in each domain of language skills these children were found to have generalized low performance in all tasks. However, only 40% children had pragmatic deficits clearly indicates pragmatic deficits may not be prominent among SLI children.

The present findings do not support subgrouping of specific language impairment as reported by Rapin and Allen (1987). However, characteristics of SLI children in the present study were comparable to the 'Generalized low performance' group in Aram and Nation (1975) classification; and the 'Global deficits in production and comprehension' type of Wolfus, Moscovitch and Kinsbourne (1980) classification. Further subgrouping however was not feasible in the small sample studies.

This needs to be further explored. This may be because of the differences observed with respect to number of subjects and the age range in the present study with the above studies. The investigation reported by Aram and Nation (1975) studied 47 children with the mean age of 5 years and Rapin and Allen (1987) had 242 children

with the mean age 7 years, while the present study had only 15 children with the mean age of 3.9 years.

In view of the above factors, the present finding suggests the replication of this study on larger population of specific language impaired children.

SUMMARY AND CONCLUSIONS

Children with specific language impairment show evidence of a significant language deficit in the face of normal nonverbal intelligence, adequate auditory acuity and absence of neurological impairment. It is necessary for a clinician to assess language problems with standard assessment tools, so that an appropriate intervention program can be planned.

Aim of the present study was to develop assessment protocol for children with specific language impairment to assess and identify the subgroups in the children with specific language impairment.

Fifteen subjects were selected to collect the data based on exclusionary criteria given by Leonard (1998). The children were the age range of 3 years to 5 years (12 males and 3 females). These children were from monolingual Kannada speaking background from urban area. They reported to All India Institute of Speech and Hearing with the complaint of delayed onset of speech and language with no evidence of neurological deficits, behavioral problems, or hearing problems.

Following tests were administered to aid in diagnosis and subgrouping of specific language impairment.

1) Kannada Language Test
2) Reading Readiness Test: subsections
   a) Vocabulary skills b) Auditory Discrimination skills
3) Test of Articulation in Kannada
4) Pragmatic Abilities Questionnaire

The results of the test battery are discussed under the following headings.

I. Kannada Language Test.

1. Semantic Receptive and Expressive Skills
2. Syntax Receptive and Expressive Skills
3. Semantic and Syntax skills
4. Language Receptive and Expressive Skills
5. Overall Language skills

II. Reading Readiness Test:

1. Vocabulary skills
2. Auditory Discrimination skills

III. Test of Articulation in Kannada.

- Articulation abilities

IV. Pragmatic Abilities Questionnaires

V. Cluster identification for subgrouping

The mean score and standard deviation were compared with normative values of Kannada language test (for urban children), Pragmatic abilities, Articulation abilities and Reading Readiness test respectively. The t-test was used to find significance of difference between normative values and present study.

The results indicated a significant difference between normative values and present study on Kannada language test, Reading readiness test and Kannada Articulation test. All fifteen children were found to have deficits in overall language skills including receptive, expressive skills of language and subtests of semantic and

syntactic skills. The receptive skills are found to be better than expressive skills of language. They also had deficits in articulation abilities and auditory discrimination task.

The present findings revealed only 40% children had a pragmatic deficit in contrast to the literature reports showing these deficits were characteristic of SLI children. The present findings do not support subgrouping of specific language impairment as reported in the literatures. This needs to be further explored with the replication of this study on larger population of specific language impaired children.

Limitations

1. The number of subjects was limited
2. Present study was conducted only in Kannada speaking children

Implications

- The test battery help to arrive at a constructive assessment, identification and diagnosis of children with specific language impairment and thus providing directions to the management related to it.
- The study adds to the clinician and educational research concern specifically w. r. t. pursuit of possible clinical markers of SLI.

Recommendations

1. This assessment tool can be administrated on large SLI population for the possibility of subgrouping.
2. Cross-language study can be conducted to check out similarities and differences language impairment of SLI w. r t. the various Indian languages.

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APPENDIX-A

Description of the tests used in the assessment battery

1) Kannada Language Test (KLT) developed by Regional Rehabilitation Centre (RRTC), Madras and Ali Yavar Jung National Institute of Hearing Handicapped, Bombay (AYJNIHH, 1990) for age range of 3 - 7 years old children. Receptive and expressive language level is elicited. It is in picture form. The whole section is divided into two parts.

   Part I: Semantics include the sections as Naming, Semantic discrimination, Lexical category, Semantic similarity, Semantic anomaly, Semantic contiguity, Paradigmatic relations, Syntagmatic relations, Polar questions, Antonomy, Homonymy and Synonymy. Scoring: Each correct answer is given 1 mark and 0 for incorrect answer.

   Part II: Syntax include following sections those are Morphophonemic structures, Plural forms, Tenses, PNG Markers (Person, Number, Gender marker), Case marker, Conditional Clauses, Transitive/Intransitive/Causative, Sentence type, Conjunctive and Quotative, Comparative and Participal construction. Scoring: Each correct answer is given 1 mark and 0 for incorrect answer.

2) Reading Readiness Test (RRT) developed by Devaki Devi (1987) for age range of 3-6 6 years.

   A. Vocabulary Test: This test is a measure of the child's vocabulary and concept development. The words used as test items are objects, action pictures and concepts with in the young child's experience.

There are total numbers of sixty eight pictures vocabulary test consisting of twenty three items, each item consisted of four pictured. The picture used on simple line drawings of objects, body parts, actions and concepts.

B. Auditory Discrimination: This is a test originally developed by Kumudavalli (1973) and adopted for use by Devki Devi (1987). This test consists of 17 minimal pairs words. In this test four minimal pairs pictures are used in each plate. Each correct response is scored as one and incorrect response as zero.

3) Test of Articulation in Kannada (KAT) developed by Babu, Rathna and Bettageri (1972). This is test for articulation for above 3-years-olds children. This test is available in picture and written words both for screening as well diagnostic.

4) Pragmatic Abilities Questionnaire developed by Anjana (1999).

This test developed to reveal pragmatic deficits in language disorders children. It has 30 questionnaires. Scoring. 3 points scales, response of children can be recorded on record sheet.

APPENDIX-B

Diagnostic criteria for SLI, Leonard (1998)

Factors	Criteria
I. Language ability	Language test scores of—1.25 SD or lower; at risk for social devalue.
2. Nonverbal IQ	Performance IQ of 85 or higher
3. Healing	Pass screening at conventional levels
4. Otitis media with effusion	No recent episodes
5. Neurological dysfunction	No evidence of seizure disorders, cerebral palsy, brain lesions, not under medication for control of seizures.
6. Oral Structure	No structural anomalies
7. Oral motor function	Pass screening using developmentally appropriate items
8. Physical and social interactions	No symptoms of impaired reciprocal social interaction or restriction of activities.