

COMPREHENSION AND PRODUCTION IN HEARING IMPAIRED CHILDREN

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1994

DEDICATED


TO THE HEARING IMPAIRED CHILDREN AND THEIR PARENTS

CERTIFICATE

This is to certify that the Dissertation entitled  
COMPREHENSION AND PRODUCTION IN HEARING IMPAIRED CHILDREN  
is a bonafide work done in part fulfilment for the degree of  
Master of Science (Speech and Hearing) of the student with  
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COMPREHENSION AND PRODUCTION IN HEARING IMPAIRED CHILDREN  
has been prepared under my supervision and guidance.



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**DECLARATION**

I hereby declare that the Dissertation entitled COMPREHENSION AND PRODUCTION IN HEARING IMPAIRED CHILDREN is the result of my own study under the guidance of Dr(Mrs) Prathiba Karanth, Professor and Head of the Department of Speech Pathology, All India Institute of Speech and Hearing, Mysore and has not been submitted earlier at any University for any other Diploma or Degree.

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## INTRODUCTION

Language acquisition by children has held the centrestage in investigations by various professionals for centuries and still continues to do so. Over the years the study of language acquisition has shifted its focus from studying phonology to syntax, then to semantics and recently to pragmatics. These have been frequently studied along the receptive and expressive dimensions for purposes of research, diagnosis and clinical educational testing. Most investigators consider reception preceding expression as an indisputable fact. This tenet has guided many of the management strategies for children with speech and language disorders. However, there have been reports of expression and reception being equal, of expression preceding reception and reports of the relation between reception and expression varying with age, person, situation and so forth. These reports question the appropriateness of intervention strategies based on the belief that comprehension precedes expression.

Normal language acquisition is dependent on the adequacy of various faculties. Among others, an essential faculty is that of hearing. Hearing loss in the early developmental years plays havoc with the language acquisition process. Hearing loss in the early developmental years is associated with a delay in the acquisition of speech and language. The delay being in both comprehension and production abilities. In spite of the delay in language acquisition, the feature of reception preceding expression is thought to be maintained. Two studies, one by Usha (1986) and the other by Swathi (1993) reported that language expression was better than language reception in hearing impaired children. The present study was taken up in the context of these contradicting reports.



The current study is aimed at finding the nature of the relationship between comprehension and production in hearing impaired children.

### REVIEW OF LITERATURE

The feeling, of being able to understand much more than one can express, is strongly held by most people. An adult language user stores in his or her brain a comparatively large dictionary of words, perhaps some tens of thousands, any one of which is recognized if one happened to hear it. Among these a much smaller number say about 4000-5000 or less are put to use in every day conversation. It is only when a word is familiar in reception that one ventures to add it to the stock of words used in conversation. Similarly in the early stages of language acquisition, the child learns to detect and recognize an element be it a sound, a grammatical form or a word before it is introduced into his/her own speech productions. This also appears to hold true among the disordered population including the hearing impaired.

This feature in language acquisition, that reception always precedes production is considered a fact and speech language pathologists are taught to hold this view. This belief not only influences the assessment of language but also the diagnosis and management of the language disordered population.

Let us consider some of the studies that have led to this view point. This condition of reception preceding expression is especially apparent in the very early stages of development when a child appears to understand a number of words and yet produce virtually nothing. For example, Benedict (1976) (cited in Nelson, 1978) observed eight children across the period from age nine months to twenty seven months and found that a productive vocabulary of fifty words was achieved much later (at 19 months) than the point at which fifty words were understood (at age 13 months).

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Resides Benedict's study, many others also offer support, to this view. Goldin-Meadow, Seligman and Gelman (1976) reported that young children initially have receptive vocabularies several times the size of the productive vocabularies. They studied 12 children with the mean age being 24 months.

A similar finding that comprehension precedes production in syntax has been reported by many investigators. A widely used technique for investigating this is called the TCP test (Imitation, Comprehension, Production test) developed by Fraser, Bellugi and Brown (1963). In the Fraser et al (1963) study using the LCP tasks, 3 year old children were presented with pairs of pictures that portrayed 10 different grammatical 'relationships such as between subject and direct object. Each pair of pictures presented two contrasting representations of a relation, for example, a girl pushing a boy and a boy pushing a girl. The investigator presented each pair to the child saying "Here are two pictures, one of a boy pushing a girl and the other of a girl pushing a boy". In the imitation phase, the children were asked to repeat one or the other sentence. "The boy pushing a girl" or "The girl pushing the boy". In the comprehension task the children were asked to point to the picture that goes with the sentence. In the production task, the children were asked to say a sentence for one of the pictures. The results lead them to conclude that imitation precedes comprehension and comprehension precedes production in the course of language development. Lovell and Dixon (1967) repeated the experiment with children over an age range of 2 years to 6 years and with retarded 6 and 7 year olds. They found the expected differences due to age (older children do better overall than younger children) and due to IQ (normal children do better overall than retarded ones). They also found the same highly consistent ordering of imitation, comprehension and production scores for each group of children.

Shipley, Smith and Gleitman (1969) studied comprehension of four holophrastic children (those using only single word utterances) and a second group of children using telegraphic 2-3 word sentences. The children were presented with commands that directed them to act on objects in their immediate presence. The commands were divided into adult forms e.g., "Throw me the ball" and child forms e.g., "Throw ball" (V-N) command and (N) commands as "ball". The holophrastic children preferred the child commands to adult commands. The authors concluded that "Those who appear to be at the single word or holophrastic stage, in production prefer to respond to speech at or just, above their own productive limit.

The second group of seven children studied when in the telegraphic stage responded better to adult commands than to child commands, showing that their comprehension was ahead of their production.

Herlekar (1986) during the standardization of a test for assessment of language in children found that of the three dimensions in which language acquisition was evaluated, reception was better than expression and cognition. It was standardized on children aged between 9 months to 3 years based on the informant interview approach.

Other studies reporting comprehension to be ahead of production are those by Brown (1973), Chomsky (1964) Lemeberg and McCarthy (1954) (cited in Cocking and McHale 1981). Also by McNeill (1970), Cocking and Potts (1976), Ingram (1974) and Menyuk (1971) (cited in Hagtvet 1981). Experimental support for this position also comes from studies by Cinque (1973), Cocking (1977), Nelson (1977) and Nurss and Day (1971) (cited in Hagtvet 1981).

The other positions held by many investigators are that comprehension equals production and that production precedes comprehension. Support for these positions have come from syntactic and semantic studies.

Fernald (1972) repeated the experiment done by Fraser et al (1963) using the ICP test. He, however, equated the response possibilities for both comprehension and production. And when looking at only the correct or incorrect responses in both tasks found comprehension and production to be essentially the same. Baird's (1972) study also contradicts the evidence of the presence of comprehension-production gap in language development.

Keeney and Wolfe (1972) pointed out that children often learn to make subject and verb agree for number in the sentences they produce before they comprehend what is actually designated by such agreement. With reference to verb number inflection, then, production does indeed precede comprehension.

Several studies indicate that children produce sentences according to certain grammatical rules which at that time they do not comprehend. Chapman and Miller (1975) studied comprehension and production of subject-object order in semantically reversible sentences with animate or inanimate subject and object in an object manipulation paradigm. Three groups of five children each, average mean utterance length 1.8, 2.4 and 2.9 morphemes respectively, participated. They found that the young children used the correct subject-object order overwhelmingly in sentence production but were frequently confused or mistaken when tested on comprehension similar findings were reported by deVilliers and deVilliers (1973) (cited in Chapman and Miller 1975).

It appears that the children developed an incorrect strategy for processing sentences spoken to them which did not rest on the strategy the children themselves used in producing sentences. For example, in comprehending sentences, the

children appeared to work with a semantic strategy that often backfired deciding on the meanings of some of the words in the sentence and assigning a reasonable interpretation to the relations between the words (e.g., making the only word in the sentence that is animate the actor or subject of the sentence regardless of the sentence word order). Some of the other studies that have examined comprehension of semantic roles by children have found, generally that children are better able to express semantic roles in their sentences than they are able to decode the semantic roles expressed in sentences of others, until after the age of 5 years. Bridges (1980), Chapman and Kohn (1978), Strohner and Nelson (1974).

A different position is held by Bloom (1974). She considers the relationship between comprehension and production to be one that shifts and varies with age, situation and experience. This view point is discussed next.

Several studies have demonstrated that infants as young as two months of age perceive acoustic differences between sounds, Eimas et al (1971) and Moffil (1971) (cited in Bloom 1974) and between different intonation contours at eight months, Kaplan (1970) (cited in Bloom 1974). This ability to hear the difference between two sounds (such as (b) and (p)) involves a different set of capacities than is involved in the ability to associate an acoustic event (a word) with some aspect of the environment. However, the one is embedded in the other inasmuch as the child who recognizes a relationship between a word and an object must necessarily discriminate the word from among other acoustic events that he or she also hears.

Lewis (1951) (cited in Bloom 1974) reported that children responded to intonation before they responded to phonetic

form and would respond similarly to adult utterances with different phonetic form if the intonation contour was the same. The beginning of comprehension Lewis has described in terms of the affective coalescence of intonation contour, phonetic form and situation into "a new whole" which is presumably the primitive mental representation of semantic information linking acoustic linguistic events (intonation and phonetic patterns) with visually perceptual, nonlinguistic (situational) events. With respect to the relation between comprehension and emerging speech, Lewis noted a 1-month lapse between understanding reference to objects and (not until 17 months) the clear use of words for objective reference, for example "ba" (bath), "ba" (button) and so on.

Spitz (1957) (cited in Bloom 1974) described the early development of awareness of prohibitive "no" as the child's first semantic notion. Comprehension begins as an association between the word "no" and a set of events or behaviours that have been defined for the child by the mother as "prohibited". Although prohibitive "no" is often reported in the diary studies to be responded to by children in their 1st year, there have been no reports of prohibitive "no" in children's earliest speech. The use of prohibitive "no" develops after the use of "no" to signal the other semantic notions of nonexistence, disappearance, rejection and denial, Bloom. 1970. 1971 (cited in Bloom 1974).

Leopold (1939) (cited in Bloom 1974) reported the beginning of his daughter Mildegard's comprehension to be at 8 months, and was, at first limited to her own name. In the second half of the ninth month, she took a decisive step forward : both speaking and understanding began, although it was speaking in a very rudimentary sense. However, the earliest words that were understood : "her name", "Daddy" and

"no, no" were not among the first words in Hildegard's subsequent speech. Bloom studying her daughter's language acquisition reported similar findings. Although speech recognition preceded speech production by three months, there was no one to one correspondence between early recognized words and later spoken words.

There have been reports of overinclusion of reference for the first words that children say, where a word is used in situations which seem to share a common element, for the child, but not necessarily for the adult Bloom (1973) and Clark (1971) (cited in Bloom 1974). For example, Werner (1948) (cited in Bloom 1974) described a child's use of "afta" to designate a drinking glass, a pane of glass, a window and also the contents of a glass. The child did not understand the word used in each situation before using it himself because there was little likelihood that he heard the word in the same situations, but that did not keep him from using it. It appeared that for comprehension, the child had to experience a word in each instance in order to understand it. But in speech, as in saying "afta" for instance, the child may not previously have heard the word used in the same context. Thus, it was not the case of production depending on prior comprehension for each instance in which the word was used. Although the child needs to have heard the word in order to say it in the first place, he may well have learnt to understand the word by learning how to use it - that is, by generalizing or associating properties of the situation in which he first heard the word to new situations.

Even though the first words that the child says are not necessarily the same words that are first understood, there seems to be other kinds of similarities between early production and early comprehension. For one, children



Bloom 1974) vividly described the elaborations through gestures, emphasis and repetition that are used to help very young children understand what is said to them. Several studies of mothers' speech to children have demonstrated that their sentences are shorter, simpler and more redundant than speech to adults Beven (1972) and Snow (1972) (cited in Bloom 1974).

The important issue in relating development in comprehension to development in speaking is the relation between the child's mental schemas for processing such linguistic and nonlinguistic cues, on the one hand, and the mental processes which result in utterances, on the other hand. The cues of repetition, exaggeration, pointing and gesture are also present in the child's own behaviour in the 2nd year, but it is not all clear how such behaviours relate to child's perception of such cues produced by others.

One investigation that attempted to tap children's understanding during the single word utterance period was reported by Shipley et. al.,(1969). They found that children who used only single word utterances themselves, responded most often to single word commands. This offers no support for the traditional view that comprehension precedes production. Their other finding was that the older children who were using two and three word utterances preferred to respond to well formed commands than to telegraphic or single word commands. This cannot be taken as evidence that comprehension preceded production if the well formed commands manifested the same syntactic structure represented in the children's own telegraphic, that is reduced, utterances. It has been pointed out that early two and three word utterances are often reductions of more complete underlying structure Bloom (1970) (cited in Bloom 1974).

There seems to be an asymmetry between the child's understanding of words and understanding relations between words in the transition from using single word utterances to using longer, structured speech towards the end of the 2nd year. On the one hand, the child needs to understand something of the semantics of a word in order to respond to the word when he hears it, spoken by someone else. On the other hand, the child does not need to know or to understand the semantic syntactic relations between words when (1) he/she understands the words separately and (2) such objects and relations occur along with the utterances that make reference to them.

Knowledge of semantic constraints and knowledge of syntax are necessary for understanding linguistic messages that do not refer to the contexts in which they occur. In such utterances, the "meaning" is in the linguistic message alone. But when a sentence is redundant with respect to the context in which it occurs, then the amount of information which the child needs to get from the linguistic message is probably minimal. There is, then, another asymmetry between understanding and speaking multiword utterances in that children do not have to process syntax to understand reference to relations among immediate events, but children do need to learn something about the syntax of the language and semantic constraints in order to talk about such relations in a coherent way. Thus, knowing a word and knowing a grammar and understanding structured speech and using structured speech, apparently represent different mental capacities and it may be misleading to consider that such capacities develop in a linear temporal relation (Bloom 1974).

Hagtvet (1981) studied the relation between language comprehension and language production from a social psychological perspective, in the light of the finding that in

the traditional assessments of comprehension and production of isolated linguistic elements due attention was not paid to the situational valuables. Further, the fact that utterances were embedded in acts of communication had been overlooked. And consequently the notion that spoken and understood language is partly a product of reciprocally accepted dialogue roles had been largely ignored.

The results of Hagtvet's study indicated that some children at certain ages were able to express rather complex messages that were understood by an adult while at the same time being almost helpless as listeners when an equivalent message was being conveyed by the adult. The data also indicated that the relation between comprehension and production as reflected in human communication, varies with persons and with age. It probably also varied with content and with the other person in the communication dyad.

#### Issues in comparing comprehension and production

The relationship between comprehension and production has barely been touched on in language development theory and research. Children's early speech has clearly received the lion's share of attention. In contrast, what children understand of what they hear has been virtually ignored, largely because of the difficulties involved in measuring comprehension, not because of a lack of interest. A major problem in evaluating comprehension is that children's responses are multidetermined - what the child does depends on many things: in addition to what he hears. Also, in young children who have little or no speech, comprehension may have to be inferred from nonverbal responses alone, which may reflect much more than the child's understanding of a particular utterance.

Comprehension and production depend on the material, tasks etc., used to assess them. For example, Cocking and McHale (1981) studied 4 and 5 years old children and found that the children's performance on production and comprehension varied depending on the material used. On the comprehension mode, performance using pictures was better than with object-choice material. In the production mode, children's performance was better using objects than either pictures or object-choice materials and between the two harder conditions (pictures and object choice) object choice proved harder. Comprehension and production were affected differentially by the two stimulus media.

Other methodological problems sufficiently nontrivial to dissolve or reverse reported significant differences between comprehension and expression have also been reported. Fernald (1972) challenged both the methodology and the conclusions of the ICP test. He pointed out that the response possibilities were not equated for the comprehension and production tasks and, in part, favoured higher scores for comprehension. In pointing to a picture in the comprehension task, the child could be right or wrong, depending on which picture he or she chose and no other responses or behaviours from the child were considered. However, in the production task, Fraser et al.(1963) had counted irrelevant responses as errors. Fernald repeated the experiment but equated the response possibilities for both comprehension and production and when looking at only the correct or incorrect responses in both tasks, comprehension and production were essentially the game.

The appropriateness of the original procedure has also been questioned by Paired (1972). He pointed out that chance factors could affect the results. The child has a 50% chance

of being correct in the comprehension task which requires choosing one of the two pictures. The exact probability of being correct in the production task is uncertain, but is much lower. Baird also highlighted the problem of the presence of unscorable and missing responses in production tasks but not for the comprehension tasks. This leads to incommensurate guessing probabilities in the two tasks and hence incomparable data.

Overgeneralizations in comprehension and production and the criteria used to determine it can confound the findings of investigations comparing comprehension and production. For example, Goldin-Meadow et al., (1976) tested children's comprehension of names of different object (noun) concepts by having them attempt to locate an exemplar (e.g., in response to "Where is the cat?") amidst a collection of 70 objects and verb comprehension was indicated if the child successfully produced an action appropriate for the verb. In the testing procedure, those subjects who failed to respond correctly to an initial request were retested at least twice (upto 5 times) and, if the subjects were correct on any of the subsequent retests, then they were credited as showing correct comprehension of that item. According to these criteria, it was quite possible for a child who knew only some of the defining features of an object or a concept to be credited as showing comprehension of that concept. For example, if the experimenter asked the child to "show me the cow" and the child simply knew that a cow had a face or was an animal, then the child had upto 6 chances of selecting the right exemplar from the 8 animals or objects with faces. Although the authors point out that comprehension test items "were usually presented only once", some errors obviously were made by the children and it is quite possible that there were a

number of examples of overgeneratization in comprehension. Thus, if more stringent criteria were used in assessing comprehension or receptive vocabulary, then their very strong claim that "There was no child who was correct on any given item on the production task and who failed that same item on the receptive task" might need to be revised so as to weaken the implied inference that production knowledge invariably indicates comprehension knowledge.

Similarly, Huttenlocher (1974) (cited in Nelson 1978) reported that she found no evidence of overgeneralizations in tests of word comprehension in her young subjects (aged 10 and 11 months) whereas these same children frequently overgeneralized in production. Although her point that overgeneralization in production does not necessarily imply overgeneralization in comprehension is taken well, the reviews indicated that the criteria used to determine presence of overgeneralization was not given, leading to differences in identification of overgeneralizations in comprehension.

Ingram (1974) holds the view that comprehension does precede production and that it could never be any other way. That is, it is proposed that comprehension ahead of production is a linguistic universal of acquisition. Comprehension preceding expression according to Ingram would mean "some comprehension of a specific grammatical form or construction occurs before it is produced" and not "all comprehension of language is complete before any production begins" or that "complete comprehension of a specific grammatical form or construction is complete before it is ever produced". A number of factors provide counterevidence to Ingram's view. These concern the appearance of overgeneralizations, the discrepancy between order of appearance of grammatical forms and constructions in comprehension and production, the observation that comprehension in some cases is the same as

production, the use of forms with no apparent understanding and the results of experimental studies. Upon closer examination, however, each one of those provide evidence in favour of the traditional view or no evidence either way.

The first words that the child produces are not always the first words the child understands (Bloom 1973, Leopold 1939) (cited in Ingram 1974). This could be taken as evidence against comprehension preceding production since there is an apparent discrepancy in the operation of the two. This observation is however no counterevidence at all. According to the position stated by Ingram, the traditional view makes no claim that the first words understood must be the first produced. The only claim it makes is that the first words produced must have been noticed or understood to some extent. A variety of factors may contribute to this discrepancy. Obvious ones include attention, memory and frequency of exposure. Leopold's daughter Hildegard also had a number of words in her early speech that dropped out at a later time. This could also so happen in comprehension where words understood at one time might drop out for periods of time. There is no guarantee that words will either appear or be maintained in either comprehension or production in any systematic manner. Observations such as these do not provide counterevidence to the claim that comprehension precedes production.

Does the child's overgeneralization, in every case, reflect the child's comprehension? That is, does the child who, for example, uses "button" to refer to all round objects, actually understand the word to mean "round object"? In some cases it is apparent that comprehension is reduced as seen in experimental studies, e.g., Donaldson and Wales (1970), Clark (1971) (cited in Ingram 1974). However, there are other cases

where the limited productive use does not necessarily reflect a similar comprehension. For example, the word "papa" or an equivalent form of the adult word "father" at some early point comes to be used by the child to mean "man". This has been interpreted by some people to mean that "papa" means something like "man" that is the child understands the word in the same way that he uses it. However, there is cognitive evidence that the child knows the father by this point. The child understands the adult's use of "papa" to refer to this specific individual. The child's comprehension of "papa" contains more information than the child's productive lexical item. Overgeneralizations of this kind do not constitute evidence against comprehension preceding production, but only provide evidence for the way children acquire features. In the above example "papa" has the following semantic and syntactic feature!

- [ + Animate ]
- [ + Human ]
- [ + masculine ]
- [ + Specific ]
- < + Masculine >

(The semantic features are enclosed in square brackets [] and syntactic features within angles <> as suggested by Ingram (1970)). Children appear to acquire several semantic features for a word and then use one of these as the syntactic feature. In the example, children have the semantic feature (+ Specific) used here to represent the fact that the term refers to a specific person, even though syntactically the feature is (+ Masculine) which allows the word to be used in reference to all males. It is not yet limited to a specific person. The issue here is one of the nature of comprehension and production and not that the former does not precede the latter.



Arguments against the traditional view often take the form that (a) there are cases where the two are equal and (b) there are cases where the production of a grammatical feature is different from its comprehension. The common claim from traditional child language research is that children understand more syntax than they produce. This is exemplified by claims that this can be demonstrated for children in the early stages of language development (as the holophrastic stage) through both comprehension and production data. Bloom (1973) (cited in Ingram 1974) criticized the basis for claiming comprehension to be ahead of production in the two groups studied by Shipley et al (1969) (cited in Ingram 1974). The arguments put forth were not really against the traditional view but rather against the assumption that the gap between the two is always uniform and sufficiently long. Arguments that comprehension and production may be closer together than originally supposed for certain constructions does not deny the precedence of comprehension. These results do not violate the traditional view as no claim, for example, is made that children utter meaningful utterances at the holophrastic stage and yet have no understanding of adult speech. Concerning the telegraphic children, Bloom (1973) (cited in Ingram 1974) suggested that the operation of reduction transformations results in creating the impression that comprehension is greater than expression. However, if the claim that the child understands N+V+N constructions actually means that the comprehension is equal to production since reduction rules distort the fact that the child has an underlying N-V-N construction.

The second kind of evidence that can be brought up concerns cases where the child appears to have different production and comprehension of a grammatical form or structure. This is not because of the violation of the

traditional view, but the result of the child's organization of the data he is constantly hearing. The child is simply not receiving and then producing linguistic structures but is also organizing the input and making hypotheses about it based on what limitations there are on the structure of grammar. The end results of hypotheses such as these may occasionally be structures that appear different from the child's comprehending abilities. The initial analysis, however, depends on some prior understanding of the kind of data the child is dealing with. This is in keeping with the traditional view.

Findings like those of Fernald do not necessarily contradict the traditional view point. To show that the two dimensions of language processing are closer does not contradict the position that one still precedes the other. The second question here is whether or not it is justifiable to compare comprehension and production tasks, particularly when the tasks cross a number of different grammatical contrasts. One can argue adnauseam about how one task might be in some way easier than another, or that the relationship between comprehension and production will differ from one grammatical contrast to another, especially if the same kind of task is involved.

Studying subject-verb agreement in English, Keeney and Wolfe (1972) (cited in Ingram 1974) concluded that production was ahead of comprehension. In interpreting such results, several points need to be kept in mind. The first is the methodological questions involved in testing subject-verb agreement by giving a single verb form, particularly when uninflated and then requiring a response from the observation of visual forms. As mentioned by the authors, the child may look at one of the two birds on the plural picture and process it as the singular. More seriously, there is the question whether or not the task is a possible one for children of the age group

tested. As pointed out by Bloom (1973) (cited in Ingram 1974), the nature of the task may have been beyond the capacity of the child. Also, there was no testing of adult speakers to verify the validity of the kinds of responses they assumed the task would elicit from native English speakers. The second point concerns the interpretation of the results. Keeney and Wolfe consider number agreement on the verb as reflecting a combined semantic-syntactic process. And their conclusion is that the child has only acquired part of it. i.e., the syntactic part, but not the semantic side. And that "the correct inflection is produced by a purely syntactic rule". This, however, ignores the facts that there is a distinction between syntax and semantics and that subject agreement is a syntactic rule, not a semantic one. Their findings do not contradict the traditional view as if is apparent from the verbal and sentential tests in Keeney and Wolfe that children do have syntactic understanding of how agreement operates.

Unlike Ingram (1974) who holds the view that comprehension precedes production. Bloom (1974) sees comprehension and production to be mutually dependent but with different underlying processes and she also cites the importance and availability of nonlinguistic context as an additional cue to the semantic relations coded by sentence structure. There is documentation that children may comprehend sentences through the use of superficial linguistic characteristics [for example, noun-verb-noun sequences (Bever, 1970), order of mention of sentences (Clark, 1971; Epstein, 1972), probable semantic relationships among the words (Bever, 1970; Slobin, 1966) or facts about the immediate nonlinguistic context (Huttenlocher, Eisemberg and Strauss, 1968; Huttenlocher and Strauss, 1968; Huttenlocher and Weiner, 1971] (cited in Chapman and Miller 1975). But we have tended to assume that these strategies were overlaid on a basic capacity to understand sentences on

the basis of linguistic form alone Bever (1970) (cited in Chapman and Miller 1975). It is possible, however, that such strategies may constitute the only means by which children may comprehend sentences at the early stages of linguistic development.

A review of the literature indicates that comprehension developing in advance of production is a moot issue in the theory of language development. To resolve the issue researchers must approach both language functions with similar materials and with the same linguistic structures taking into consideration the nonlinguistic context or environment.

#### Comprehension and production in the hard of hearing

In general, studies on the acquisition of language by the hard of hearing indicate an overall delay in acquisition as compared to normals with comprehension preceding expression. This is seen at the syntactic and semantic levels.

Pressnell (1962) studied the acquisition and development of syntax in oral language for 47 congenitally hearing impaired children between the ages of 5 years and 3 years 3 months as compared to the normal hearing children. Significant differences were found in the rate of acquisition in favour of the normal hearing children. Wilson (1974) reports of similar findings. Many studies on syntax in hearing impaired children report a delay, retardation and resistance to improvement with age unlike in normal hearing children.

Power and Quigley (1973) found that both in normal hearing and hearing impaired subjects comprehension of passive voice preceded production and that the pattern of acquisition was only grossly delayed but not different in the hearing impaired subjects. Normal hearing children master the production and comprehension of passive voice by 8 years of age whereas the hearing impaired subjects do not. Even at

17-18 years slightly more than half the children correctly understood passive sentences and less than half correctly produced them.

Brenza, Kricos and Lasley (1981) tested the comprehension and production of basic semantic concepts of orally trained, severely and profoundly hearing impaired children aged 13-14 years using the Boehm test of Basic Concepts.

They found considerably poorer scores on production tasks than on the comprehension tasks.

Unbelievable it may seem, but the range of linguistic structures used to draw conclusions about the priority of one function over the other has come from as few as 6 or 7 syntactic structures and even as few as one (passive voice). This has been especially so with studies having hearing impaired children as subjects.

On the other hand, two Indian studies reported that the hearing impaired children's expression was better than reception.

Usha (1986) studied the performance of hard of hearing children, ranging in age from 18 to 36 months on the 3D-LAT (3D - Language acquisition test).

The subjects included in her study satisfied the following criterias.

- 1) They had congenital hearing impairment or a hearing impairment acquired before the development of speech and language.

- 2) They had no associated problems and had normal motor development.

3) They were not undergoing therapy and

4) hearing aid if being used was within 6 months of data collection.

The language development of the children was assessed along three dimensions - reception, expression and cognition, both on the verbal and nonverbal modes. The test had 3 items for each of the dimensions and modes on all age groups. The information required was collected from the parents of the children. Results indicated that on the verbal scale both reception and expression was poorer in hard of hearing children than the normals. Also the linear relationship between performance and age seen in normal children along both these dimensions (reception and expression) were not seen in the hard of hearing children. In the hard of hearing children cognition was better than reception and expression whereas in normal children reception and cognition scores were about equal. And with the hard of hearing children expression was better than reception unlike in normals where reception is better than expression. On the nonverbal scale, reception was comparable to cognition and better than expression in hearing impaired children. Further, an approximately linear relationship between performance and age was found on all three dimensions.

The other study that reported similar results was done by Swathi (1993). Her study aimed at providing normative data for "Scale of early communication skills for hearing impaired children' translated from English to Kannada and Telugu. The subjects of the study were aged between 2 and 8 years and were; evaluated on

(i) receptive language skills

(ii) expressive language skills

(iii) nonverbal receptive language skills

(iv) nonverbal expressive language skills.

The information necessary to evaluate these skills were obtained from the parents or teachers of these children.

Results indicated that the performance on the verbal scale was poorer than that on the nonverbal scale in all the age groups. She also found that the combined expressive scores (score on A&B that is structured and unstructured item scores) were better than the combined receptive scores (scores on A&B scales) on the verbal scale. This discrepancy was not seen in the nonverbal scale wherein the receptive scores were better than the expressive scores. This discrepancy was not seen in normal hearing children. This finding was attributed to the teaching strategies used wherein stress was more on reading and writing skills of the child; resulting in better inner language and also due to inadequate generalization of speech reading abilities. The better scores on receptive and expressive skills on structured items 'A' than on unstructured item 'B' and the child's inability to differentiate between relevant and irrelevant cues in the environment supported this interpretation.

The studies by Usha (1986) and Swathi (1993) used the informant interview approach to obtain information on various dimensions. Thus the scores obtained gives a measure of what the informant thinks the child's abilities are and not the child's actual abilities. Discrepancies could hence arise here. Yet again the criteria used by the informant to judge whether a structure/concept has been learnt or not varies. They may or may not consider the presence or absence of contentual (linguistic and nonlinguistic) cues, overgeneralizations etc. Also in these studies the comparisons between comprehension and production were not made across any specific linguistic structure or structures.

Need for the study

In the light, of the findings by Usha (1986) and Swathi (1993) and the limitations of their studies, the current study was initiated .



## METHODOLOGY

The current study aimed at finding the nature of relationship between comprehension and expression in hearing impaired children within a particular age group and across different age groups.

### Subjects

Twenty hearing impaired children aged between five and nine years participated in the study. They were grouped into four age groups. Group I - 5-6 years; Group II - 6-7 years; Group III - 7-8 years; Group IV - 8-9 years. Each group had five children. All the twenty children met the following criterias.

1. They had congenital hearing impairment before the development of speech and language.
2. The degree of hearing loss ranged between moderate to profound levels.
3. The children did not have any associated problems.
4. They had normal devetopmental milestones.
5. They had Kannada as their mother tongue.
6. All of them wore pseudobinaural or binaural hearing aids.
7. All of them had attended speech and language therapy for at least an year.

Subjects were selected from among clients attending speech and language therapy at All India Institute of Speech and Hearing, Mysore and Hellen Keller School for the deaf, Mysore.

Materials used - Kannada Language Test (KLT)

The Kannada Language Test was developed by Ali Yavar Jung National Institute for the hearing handicapped (Bombay) and the Regional Rehabilitation and Training Centre (Madras) as part of the UNICEF project "Development and Standardization of Language and Articulation Tests in seven Indian Languages". The test was based on the Linguistic profile test (Karanth, 1980). The test, tests for both comprehension and expression and uses verbal and picture stimuli. KLT has two sections semantics and syntax.

The semantics section has 12 subdivisions and they are

- (1) Semantic discrimination
- (2) Naming
- (3) Lexical itens
- (4) Synonymy
- (5) Antonymy
- (6) Homonymy
- (7) Polar questions
- (8) Semantic anomaly
- (9) Paradigmatic relations
- (10) Syntagmatic relations
- (11) Semantic contiguity
- (II) Semantic similarity

The syntax section has 11 subdivisions and they are

- (1) Morphophcnemic structures
- (2) Plural forms
- (3) Tenses
- (4) Person, Number, Gender
- (5) Case markers
- (6) Transitive?, Intransitives and Causatives

- (7) Sentence types
- (8) Conjunctives and Quotatives
- (9) Comparatives
- (10) Conditioned clauses
- (11) Participle constructions

Each subdivision has 6 items, 3 items testing receptive abilities and 3 items testing expressive skills. This is true of all subdivisions except semantic discrimination which has only receptive items and lexical category which has only expressive items. All subdivisions except naming have one or two model items.

#### Procedure

The KLT was administered. Each child was instructed and tested individually. Instructions given varied depending on the task involved and were in Kannada. The responses obtained were recorded on response sheets. It took 1 1/2 - 2 hrs to test each child.

#### Scoring the data

For all the subdivisions except lexical items and paradigmatic relations under the Semantic section and plural forms under Syntax section, the following scoring procedure was adopted.

Score-1 - for each correct response

Score-1/2 - for emergent behaviour which is acceptable but not listed in expected response

Score-0 - for incorrect response or no response

Scoring for lexical category

Score-1 - if the subject responds with all the 5 names

Score-1/2 - if the subject responds with two or more but less than 5 names

Score-0 - for no response/incorrect response/a single name response

Scoring for paradigmatic relations

Score-1 - for identification of all the four pictures belonging to a specified group

Score-0 - for identification of less than 4 pictures

Scoring for plural forms

While testing this category, both singular and plural forms are tested. But while scoring the response given to the plural form is scored.

Score-1 - for correct identification of plural forms

Score-0 - for any other response

The scores obtained on the KLT test for the 20 hearing impaired children were then analysed. The next chapter discusses the results obtained.

## RESULTS AND DISCUSSION

The receptive and expressive scores of each of the subjects in a particular subdivision was pooled together. The mean and standard deviations for the receptive and expressive scores for that subdivision was then found. Similarly the mean and standard deviations for the receptive and expressive scores for the other subdivisions were found. It was then analysed using the Mann-Whitney Test.

The performance of Group I and II fell far below the respective normative values. It was even lower than the average performance of 3 year old normal hearing children. The performance of Group III was, however, comparable to the performance of 4-5 year old normal hearing children and that of Group IV to 5-6 year old normal hearing children.

In general the mean scores obtained on both the semantic and syntactic sections indicated that the older age groups, Group III and IV did better than the younger groups, I & II (see Tables 1 & 2). This could be expected with increasing age and increase in speech and language intervention.

The mean scores also indicated that the receptive and expressive skills did not increase linearly as a function of age. An abrupt increase in the reception and expression scores for Group III on both syntax and semantic sections was found. This finding may be due to the late identification and delay in the initiation of speech and language therapy for the younger age groups and also because of the longer durations of language therapy attended by the older children.

The performance of all the groups was better on the semantic section than the syntax section. This has been found to be true in normals also. In both the sections, as the

Table 1.

Mean performance of the subjects and the standard deviations for the subdivisions in the semantic section

Subdivision		5-6 yrs		6-7 yrs		7-8 yrs		8-9 yrs	
		R	E	R	E	R	E	R	E
Semantic discrimination									
Colour	M	3		2.4		3		3	
	SD	0		0.39		0		0	
Body parts	n	3		3		3		3	
	SD	0		0		0		0	
Naming	M	3	3	2.6	3.0	3	3	3	3
	SD	0	0	0.55	0	0	0	0	0
Lexical category	M		1.7		1.4		2.8		3
	SD		0.83		1.27		0.27		0
Synonymy	M	0	0	0	0.4	1.0	0.8	0.8	1.2
	SD	0	0	0	0.89	1.41	0.45	1.3	0.84
Antonymy	M	0	0	0.4	0.4	1.4	1.0	2.8	1.4
	SD	0	0	0.89	0.89	1.52	1.32	0.45	0.55
Homonymy	M	0	0	0.4	0	0.6	0	0.6	0
	SD	0		0.39	0	1.34	0	0.89	0
Polar questions	M	2	0	2	0.6		0.8	3	2.8
	SD	1.0	0	0.71	1.34	0	1.1	0	0.45
Semantic anomaly	M	0.6	0.6	0.6	0.6	2.5	2.4	2.6	2.2
	SD	1.34	1.34	1.34	1.34	0.45	0.89	0.55	1.30
Paradigmatic relations	M	0.4	0.4	1	0.4	1.6	2.2	1.8	3
	SD	0.89	0.89	1.23	0.89	1.14	1.10	0.45	0
Syntagmatic relations	M	0	0	0	0	1.8	1.2	2.6	2.0
	SD	0	0	0	0	1.1	1.3	0.55	1.0
Semantic contiguity	M	0	0	0	0	2.0	0.6	2.0	0.8
	SD	0	0	0	0	1.23	1.34	0	0.84
Semantic similarity	M	0	0	0	0	1.8	2.4	2.4	3.0
	SD	0	0	0	0	1.30	1.34	0.55	0

Table 2.

Mean performance of the subjects and the standard deviations for the subdivisions in the syntax section

Subdivision		5-6 yrs		6-7 yrs		7-8 yrs		8-9 yrs	
		R	E	R	E	R	E	R	E
Morphophonemic structures	M	0	0	0	0.4	1.2	2	1.4	3
	SD	0	0	0	0.89	1.64	1.23	1.52	0
Plurals	M	1.6	1.2	1.4	1.2	3	2	2.8	2
	SD	0.83	1.1	1.34	1.1	0	0	0.45	0
Tenses	M	0.5	0.3	1.2	0.1	3	1.1	2.6	1.2
	SD	1.12	0.67	1.64	0.22	0	0.22	0.55	0.27
Person, Number Gender	M	0	0	1.2	0.6	3	2.8	3	3
	SD	0	0	1.64	1.34	0	0.45	0	0
Case markers	M	0.6	0	0.6	0.6	2.6	0.8	2.4	2.8
	SD	1.34	0	1.34	1.34	0.55	1.1	0.55	0.45
Transitives, Intransitives & Causatives	M	0	0.2	0.6	0.6	3	1.4	2.6	2.9
	SD	0	0.45	1.34	1.34	0	0.55	0.89	0.22
Sentence types	M	1	0	1	0.4	3	2.2	3	2
	SD	1.41	0	1.41	0.89	0	0.45	0	0
Conjunctions & Quotatives	M	0	0	0.2	0.2	1.4	0.6	0.8	1
	SD	0	0	0.45	0.45	1.52	0.55	0.45	0
Comparatives	M	0	0	0.6	0.2	3	0.4	2.8	0.2
	SD	0	0	1.34	0.45	0	0.55	0.45	0.45
Conditional clauses	M	0	0	0.2	0.4	0.6	2.6	1.8	2.4
	SD	0	0	0.45	0.89	1.34	0.55	1.3	0.55
Participial constructions	M	0.2	0	0.6	0	3	0.2	2.6	2
	SD	0.45	0	1.34	0	0	0.45	0.55	0

complexity of the subdivisions increased, Group I and II showed increasing difficulty on expressive and receptive items. Group III and IV did not show such clear cut trends but performed well on most of the subdivisions. However, in the homonymy subdivision (see Table 1), all the groups performed badly.

Table 3. Comparison between reception and expression scores within groups

Semantics			Syntax		
Group	Z value	P	Group	Z value	P
I (5-6 years)	0.86	0.39	I (5-6 years)	0.85	0.39
II (6-7 years)	0.77	0.43	II (6-7 years)	1.45	0.15
III (7-8 years)	1.31	0.19	III (7-8 years)	2.56	0.01
IV (8-9 years)	0.45	0.65	IV (8-9 years)	0.59	0.55

The positive Z values in Table 1 indicate that the mean value of the receptive scores are greater than the mean value of the expressive scores. This is true of both the sections (syntax and semantics). However, excepting one, none of the mean receptive scores were significantly greater than expressive scores at 0.05 level, indicating equal performance on receptive and expressive skills. In the syntax section Group III, Z value indicated that reception score was significantly higher than the expressive score, indicating that reception precedes expression in this group. These findings are in agreement with the traditional view.



Although the reception scores were better than the expressive scores on most subdivisions (see Tables 1 and 2), on one subdivision (namely paradigmatic relations) in the semantic section and two (namely conditional clauses and morphophonemic structures) in the syntax section, across all age groups, the expression scores were better than the reception scores. A possible reason for this finding could be the relative ease of the expressive items. On the expressive item of the paradigmatic subdivision on being provided three words from a group, the subject was required to give one more item belonging to the same group. Here the subject had a clue to the basis of grouping. On the other hand, in the receptive section from among 6 pictures, the subject was required to select 4 belonging to a group. Here the subject had no clue to the basis of grouping.

The expressive items of the conditional clause subdivision were questions that were commonly asked and taught to the hearing impaired children. On the other hand, the receptive tasks were rarely encountered by the child. The same explanation holds true for the finding on morphophonemic structures.

In general the performance of the twenty hearing impaired subjects on the KLT could be summarized as follows.

- (1) A delay in language reception and expression was found when compared to the normals.
- (2) Reception scores were better than the expression scores on both the semantic and syntax sections.
- (3) On most of the subdivisions in the syntax and semantic sections, reception was better than expression.
- (4) On a few subdivisions, expression was better than reception.

### SUMMARY AND CONCLUSION

Contradicting the commonly held view, two Indian studies reported language expression to be better than language reception. In this context, the present study was taken up and it aimed at finding the nature of relationship between comprehension and expression in hearing impaired children within a particular age group and across different age groups.

Kannada language test was administered to the twenty hearing impaired children aged between five and nine years.

The test had semantic and syntax sections with 12 and 11 subdivisions respectively. The mean scores and standard deviations for the subdivisions were found. And the responses were then analysed using Mann-Whitney test.

The results indicated that the older age groups (7-8 years; 8-9 years) performed better than the younger age groups (5-6 years; 6-7 years). The performance was better on the semantic section than the syntax section across all age groups. The mean receptive scores were higher than the mean expressive scores across all age groups in most of the semantic and syntax sections. Expressive scores were better than receptive scores on few of the subdivisions. In general, results obtained were in agreement with the traditional view point.

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