

Creativity In Hearing Impaired And Normals

Veena Kanvga

ADISSERTATION SUBMITTED IN PART FULFILMENT FOR THE DEGREE

OF MASTER OF SCIENCE (SPEECH AND HEARING) OF

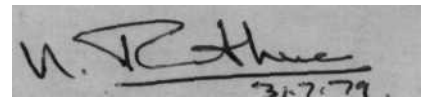
UNIVERSITY OF MYSORE

1979

To my beloved parents

C E R T I F I C A T E

This is to certify that the dissertation entitled "Creativity in Hearing Impaired and Normals" is the bona fide work in partial fulfilment for the degree of M.Sc. (Speech & Hearing), carrying 100 marks, of the student with Register Number

A rectangular stamp containing a handwritten signature in black ink. The signature appears to be "U. R. Thiru" with a horizontal line underneath. Below the signature, the date "3.7.79" is written.

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C E R T I F I C A T E

This is to certify that this dissertation has been prepared under my supervision and guidance.

A. D. Bhavani

Guide
30/7/79

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The investigator wishes to express her sincere thanks to Miss A.D.Bhavani, Lecturer in Psychology, All India Institute of Speech & Hearing, Mysore, for her guidance and help at all stages of this study.

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D E C L A R A T I O N

This dissertation is the result of my own study undertaken under the guidance of Miss A.D.Bhavani, Lecturer in Psychology, 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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CHAPTER I

INTRODUCTION

Ever since man started dreaming and fantasizing, he has been inventing new things. This aspect of man's life which may perhaps be called as creativity is manifested in a wide variety of areas, e.g., science, technology, music, dancing, painting and such other arts. In general, man has proved to be creative in dealing with challenging situations in the world. People may differ among themselves in creative abilities. Some may have more of it and some less.

Creative ability becomes potentially manifested in many forms. Language may be one of the important media resulting in creative poems, dramas, novels, essays etc. It may also be manifested in other media, e.g., construction of an aeroplane, construction of a township, construction of a monument, etc. Execution of creative abilities means harmonious use of sensory and motor organs. It is not clearly known how handicapped individuals like those of hard of hearing, or blindness, or cases with motor disorders show creativity. Quite possibly they may be even more creative than their normal counterparts. This is an interesting area for scientific exploration.

An individual, whether a child or adult, can express his creative ability either verbally or in performance or both. But

for this purpose his sensory and motor system should be within normal functioning conditions. If an individual is having any handicap mentioned above, e.g., hearing impairment, blindness or cerebral palsy. we cannot assume that these persons are not creative, but it is just that they are unable to express or show their creativity due to their handicap or they are not given an opportunity to do anything.

If we see truly from the humanistic point of view, each individual has full right to make use of his potentialities. They should yield their maximum to the society and should not be a burden on their family instead. So, if we try to identify creativity of a handicapped individual, it will help him to choose his field of interest, capabilities and thus he can be guided to choose a particular line of vocational placement.

In simple terms, anything that is new, original and constructive, is referred to as creative. creative thinking is a process in which there is thought, synthesis, where the mental product is a mere summation.

In the past creativity was more or less synonymous with terms like intuition, insight and imagination. Now the concept of 'creativity' has been recognized as an independent entity in the domain of intellect.

In the present study the use of non-language tests of creativity has been planned. This is going to be purely an

exploratory type of study.

One of the major developments in psychological testing since midcentury concerns the measurement of creativity. This development is itself only one aspect of an upsurge in research on the nature and cultivation of creative talent (Barron, 1969; Bloomberg, 1973; C.W.Taylor, 1972; Taylor & Barron, 1963; Torrance, 1962; Wallach & Wing, 1969).

An increasing number of psychologists and educators have come to recognize that creative talent is not synonymous with academic intelligence and is rarely covered by tests yielding an "IQ". In an early paper, Thurstone (1957) emphasized this distinction and provided a provocative analysis of the possible role of ideational fluency, inductive reasoning, and certain perceptual tendencies in creative behaviour. He observed that creativity is encouraged by a receptive as contrasted to a critical attitude toward novel ideas and that creative solutions are more likely to occur during periods of relaxed, dispersed attention than during periods of active concentration on a problem.

The investigation of creativity has reviewed considerable impetus from the growing demand for research scientists, engineers and high level executives. Studies of scientific talent have become increasingly concerned with creative abilities. Thus creativity, long regarded as the prime quality in artistic production, is coming more and more to be recognized as a basis for

scientific achievement as well.

Investigations of the variables associated with creative achievement have followed a variety of approaches. Some have concentrated on the creative person's biographical history and antecedent experiences; others have analyzed the situational variables conducive to creative productivity. MacKinnon (1962) and his associates combined a clinical with psychometric approach through the use of a variety of personality-testing techniques and controlled observational procedures.

We come across problems like (i) Is there an aspect of cognitive functioning which can be appropriately labelled 'creativity' that stands apart from the traditional concept of general intelligence? and (ii) can one demonstrate the existence of greater and lesser degrees of a cognitive capability that is like intelligence in regard to being a pervasive, broad dimension, but yet is independent of intelligence, and which can appropriately be labelled 'creativity'? There is need for research in this new field of creativity. A common example of recent efforts in the field of creativity is the volume by Gelzels and Jackson (1962) "Creativity and Intelligence". From the findings obtained, it seems fair to take that the present definition of creativity denotes a mode of cognitive functioning that matters a great deal in the life of the child.

Nature of Creativity

Great many demands for creative people like scientists, engineers, artists, etc., have called for knowing much more about the phenomena of creativity. Thus wide recognition on various aspects of creativity and its relation to other personality traits is recently developed. Since 1955 various branches have sprouted in the study of creative research. Several important, eminent persons in the field of psychology have given their attention towards creativity. Experimental investigations have also been carried out on the same lines.

This problem of defining creativity is one with which we must grapple. One dictionary defines creativity as "having the ability to create". Another dictionary does not even have the word 'creativity' in it; and yet another defines it as "the power of being creative".

Definition

There are many definitions of creativity. Morgan has published 25 definitions of creativity as seen in the literature. Some of the definitions are considered here.

From the Freudian point of view, creativity is a sort of neurotism which leads to creative search.

John Gowan (1964) has long searched for answers to this

problem of definition and his search has led him to believe currently that the use of verbal analogies and the proficiency of verbal analogical thinking leads to creative manipulation of words and ideas. Verbal creativity can be developed when we articulate and sequence verbal tasks within the Guilfords - Structure of Intellect Model (1959).

There are products not necessarily verbal which indicate creative ability using manipulative and concrete media. Such ability demands motor skills, co-ordination, and visual and auditory acuity and is based on human functions which are psychomotor, and perceptual motor. Within the structure of Intellect, the cognitive components are included in the figural dimension. Often, this combination of skills is shown as talent.

According to Murray (1967), creativity in many contexts refers to the occurrence of a composition which is both new and valuable.

May (1959) contends that creativity is the encounter of the intensively conscious human being with his world.

Schachtel (1965) defines creativity as essentially openness to experience.

Sinnot (1959) says that creativity is related to richness and variety of mental life.

Torrance (1966) describes creativity as a process of being

sensitive to problems, deficiencies, gaps in knowledge, missing elements, disharmonies and so on, identifying the difficulty, searching for solutions, making guesses, or formulating hypothesis about the deficiencies, testing and retesting these hypotheses and possibly modifying and retesting them.

Guilford (1959) who has done Factor Analytic studies on cognitive abilities, views "creative thinking" as similar to "divergent thinking". From these factor analytic studies, He discovered several traits of creative thinking.

Joe Khatena (1978) and others who work with visual imagery pointed to the internal and external environments which form conditions for inspiration, originality, insight, and intuition development. Some even suggest that creativity is a right brain function and that the above processes allow the left brain to give up control to let the right brain come into dominance.

Getzels and Jackson (1962) defined creativity or creative potential as the ability to deal inventively with verbal and numerical symbol systems and with object-space relations. The operative word in this definition is "inventive".

A more carefully constructed type of definition has been offered by Mednick (1962) and by Wallach and Kogan (1968). Starting with the introspections of creative people, they find these involve frequent use of phrases such as these: "Combinatory play", "associative play", "ideas that rise in crowds", "flow of

ideas", "springs of ideas bubbling up", and so on. Such data can be taken to imply an associative theory of creativity. Thus Mednick defines creative thinking as "the forming of associative elements into new combinations which either meet specified requirements, or are in some way useful". Wallach and Kogan (1965) suggest a basically a similar notion "greater creativity should be indicated by the ability to produce more associations and to produce more that are unique".

TRAITS OF GUILFORD CREATIVE THINKING

Fluency of Thinking		Flexibility Factor		Originality Factor	Elaboration
Word Fluency	Asso- cia- tional Fluen- cy	Expre- ssional Fluency	Idea- tional Fluen- cy	Spon- taneous Flexi- bility	Adap- tive Flexi- bility

In exploring the new field of creativity, Guilford has mapped it in terms of a system of concepts by Factor Analysis. Guilford favoured the notion that creativity, whatever its range of application is, by no means a unity, but is rather a collection of different component abilities or traits. His theory is an outcome of Spearman's concept of general intelligence.

Some of the traits of creativity as discovered by Guilford are as follows:

1. Fluency of Thinking
2. Flexibility Factor
3. Originality Factor
4. Elaboration

1. Fluency of Thinking

Fluency of thinking is an important aspect of creativity. This is a quantitative aspect that has to do with fertility of ideas when one is most creative. His ideas are often forming and flowing more freely than is usual for him.

Fluency factors as recognized by Guilford are as follows:

- a) Word Fluency
- b) Association Fluency
- c) Expressional Fluency - and
- d) Ideational Fluency

a) Word Fluency: This factor was first reported by Thurston in 1938. This is an ability to produce words each containing a specified letter or combination of letters.

b) Associational Fluency: It is the ability to produce as many synonyms as one can for a given word in a limited time.

c) Expressional Fluency: It is the ability to produce phrases or sentences.

d) Ideational Fluency: It refers to the fluency in producing ideas. This trait, according to Guilford, is of much wider usefulness.

2. Flexibility Factor

In 1950, it was hypothesized that creative thinkers are flexible thinkers and they readily desert old ways of thinking and strike out new ways.

Two flexibility factors were newly discovered, viz., Spontaneous and Adaptive.

a) Spontaneous Flexibility; The ability or disposition to produce a great variety of ideas with freedom from inertia or from preservation.

b) Adaptive Flexibility: It facilitates the solution of problems.

3. Originality Factors

It is the most important and the broadest of the traits that makes for creativity. It includes such abilities as the capacity to produce unusual ideas, solve problems in unusual or novel ways and use things or situations in a novel manner.

Novelty alone, however, does not make an act or an idea creative, relevance is also to be considered (Kneller, 1965).

An act or an idea is creative not only because it is novel but also because it achieves something that is appropriate to a given situation.

Of course, a thing can be creative without being entirely new. Even in the most talented of creations something has been suggested by a prior performance in some tests.

The trait of originality is indicated by the source of some tests in which the responses are weighed in proportion to their infrequency of occurrence in the population of examinees. Unusualness of responses in a statistical sense is one principle of measurement of originality.

4. Elaboration

According to Guilford, elaboration is the ability to supply details to complete a given outline or skeleton form. This factor was found in a study of planning abilities and it needs further verification and analysis. This factor was indicated by a test in which the examinee is given one or two simple lines and told to construct on this foundation a more complex object.

The above mentioned traits of creativity can be summarized in a tabular form. Some other traits of creativity like the capacity to be puzzled, ability to concentrate, remoteness, etc. were not found to be significant.

Process of Creativity

During the process of creative thinking, the individual sees beyond the task which is to be done; he develops new connections, novel and unique relationships. Thus, unexpected and unanticipated synthesis is the result. That is, essentially two major methods are operative in the creative process.

1. Deductive process: It arranges the widest possible array of facts and ideas and then carefully searches for the unrecognized, new relationship between them.

2. New idea arises almost spontaneously in the mind of an individual who at that time may be thinking of something quite different.

Phases of Creativity

1. Preparation: In this stage, the thinker becomes aware of a problem, goes through trial and error. Random movements occur with unsuccessful attempts to solve the conflict.

2. Incubation: The difficulty drops out, the attention is totally redirected, the thinker is restless, preoccupied and nervous.

3. Inspiration and Insight: It is characterized by a flood and vivid imagery and an emotional release.

4. Elaboration and verification: The ideas are worked out in detail, fitted together with previous knowledge and fully developed.

These stages are logically linked together. But each and every thinker need not invariably go through each of these stops and exceptions may be there.

The creative individual while going through the above phases will be receptive, immersed, commits himself to the problem, and detaches himself from other things.

Creativity is usually found to have aspects as follows:

1. Creativity is characterized by markedly greater than ordinary sensitivity to sensory stimulation.

2. Unusual capacity for awareness or relation between various stimuli.

3. Predisposition to an empathy of wider range of deeper vibration than is usual.

4. Possession of such good motor equipment as to allow the building up of discharges for expressive functions.

The above 4 characteristics together imply a potentiality for creativeness.

Levels of Creativity

Creativity may be expressed in five levels. They are:

1. Expressive Level: Denotes independent expression where skills, originality, and the quality of the product are unimportant as in spontaneous drawings of children.
2. Productive Level: Scientific or artistic products in which there is control of free play but development of techniques for producing finished products.
3. Inventive Level: Ingenuity shown with material, methods and techniques, by inventors, explorers and discoverers.
4. Innovative Level: Involves improvement through modification involving skill.
5. Emergentive Level: Entirely new principle or assumption around which new schools flourish.

The creative product may be of any five levels mentioned above.

Creativity and Related Mental Functions

It is being widely recognized that the personality variables play a decisive role in creativity. Gollann (1963) has ventured to say that personality variable can be used as criterion variable in the study of creativity. The role of personality

is obvious in a large number of investigations dating from Galton. The scientists, the teachers as compared to general population are more dominant, more adventurous, sensitive and more radical.

Another variable is that Intelligence is related to creativity. A number of studies have been made to test the relation between the IQ as measured by intelligence scales and abilities to perform in creative ways usually represented by tests of divergent production abilities in semantic area. The typical result is a bivariate scatter plot that approaches triangular form. That is, individuals of high IQ vary widely over the range of divergent production or Dp scores, whether the latter are derived from a composite of DP Tests or whether from single DP test. Individuals of low IQ very rarely obtain moderate or high DP scores. There can be many high IQ, but low DP cases, but there are no low IQ but high DP cases.

CREATIVITY AND HANDICAPPED

Creativity and Hearing Loss

In terms of the mental operations, as defined by Guilford, as cognition, memory, convergent thinking, divergent thinking and evaluation, what is the effect of early deafness on intellect. If we assume that each of these consists of both verbal and non-verbal functions, then all five mental operations would be

influenced to some degree by language limitation. But, does deafness have an equal effect on each of these mental processes? Using non-verbal criteria such as Koh's Block Design, it appears that deafness does not influence cognition. Memory and convergent thinking are affected only selectively. The deaf are not inferior on the test of Picture Arrangement which measures mental ability.

According to Dictionary of Psychology, the ability to see new relationships, to produce unusual ideas and to deviate from traditional patterns of thinking is termed as Creativity. And many modern psychologists, particularly in America have given up the use of the term Intelligence, and are throwing doubts on usefulness of IQ and are preferring to use the term Mental Ability or Ability Profiles in place of Intelligence.

So, according to Guilford's Factor Analysis Technique, the divergent thinking and evaluation ability both are likely to be affected by deafness. These mental functions entail use of experience more broadly with fluidity, flexibility, and generalizing ability playing a significant role. To measure all this creative ability one has to make use of creativity tests, e.g., Torrance test of creativity, as it cannot be measured by common tests of intelligence. It is apparent from studies that deafness influences intelligence, but a generalized effect is not suggested. So, it is presumed that those aspects of intelligence which are not affected by deafness should be capitalized

through training and education, e.g., special aptitude or ability in a particular field.

Deaf children do not lag behind hearing children when non-verbal instruments are used to assess imagination, originality, and abstract thinking (Silver, Rowley, 1978). Assistance is essential for the deaf in the field in which they are creative, if they are to actualize their potentials.

The Problem of Deafness

Man is highly dependent on his senses. Through his senses come the sensations which constitute his experience. Upon the information he receives from his senses he builds his world, his world of perception and conception, of memory, imagination, thought and reason.

Sensory deprivation either partial or total limits the world of experience. It deprives the organism of some of the material resources from which the mind develops. Because total experience is reduced, there is an imposition on the balance and equilibrium of all psychological processes. When one type of sensation is lacking, it alters the integration and function of all others.

The degree of sensory impairment, the age at which it is sustained, and other factors, influence the extent and nature of the shift which the organism undergoes. It is not identical

for all who have impaired sensory capacities. It is the purpose of our psychological study to ascertain the nature of this impact and to foster the best possible learning and adjustment in all so handicapped.

The study of deafness, one type of sensory deprivation, has a long history. Deafness is a broad and inclusive condition which encompasses a wide variety of problems.

Definition and Classifications

The implication of an auditory impairment vary from person to person and from one circumstance to another. This makes it difficult to define rigorously what is meant by terms such as hearing loss, deaf, and hard of hearing. Such classifications vary according to the purpose for which they are being made. In medicine, frequently a classification is made on the basis of the type of pathology present. In education, prime considerations are the degree of deafness and the age at which it was sustained.

One of the long standing, useful definitions of deafness was given by Committee on Nomenclature of the Conference of Executives of American School for Deaf. This committee defined the deaf as "those in whom the sense of hearing is non-functional for the ordinary purpose of life". They classified the deaf into two groups on the basis of the age at which deafness occurred.

a) Congenitally Deaf - Those who are born deaf.

b) The Adventitiously Deaf - Those who are born with normal hearing but in whom the sense of hearing becomes non-functional later through illness. The same committee defined the hard of hearing as "those in whom sense of hearing, although defective, is functional with or without a hearing aid".

For educational purposes it is necessary to add another factor before suitable classification can be made. This factor is the extent to which the hearing loss has affected language development. During recent years, this consideration has become increasingly important. A greater number of individuals can be classified as having functional, or useful hearing because they can be benefitted through the use of hearing aids. This being true, it has become more difficult to distinguish between those who have functional hearing loss and those who do not. So, an additional definition has become necessary.

a) The Deaf - Those whose hearing loss is precluded normal acquisition of language.

b) The Hard of Hearing - Those having a hearing loss but in whom language acquisition has not been precluded.

The above given definition emphasizes two of the factors which must be considered in dealing with all types of handicapped people. These factors are the degree of the involvement and the time factor. Another confusion encountered in various classifications used for deafness is the attributing of casual

meanings to terms which refer only to the extent of impairment, or to the age at which it was sustained.

To overcome this confusion and error in classification, Myklebust suggested applying the terms exogenous and endogenous. Here, exogenous refers to all factors other than heredity, while the term endogenous includes only the hereditary. The terms deaf and hard of hearing refer to the extent, or the degree of deafness.

Other classifications which are necessary, especially in connection with medical diagnosis and treatment, are sensory-neural, conductive, and central deafness.

Sensory-neural deafness includes all hearing loss which derives from trauma, maldevelopment, or disease affecting the normal function of the inner ear.

Conductive deafness includes all hearing loss which derives from lack of normal function in the middle ear.

Central deafness includes all auditory impairment which derives from lack of normal function of the auditory pathways leading from the inner ear to the interpretive areas of the brain.

other classifications used in the study, treatment, and educational classification of individual with impaired hearing are presbycusia and deafened. Presbycusia is the term used for

deafness which results from the natural loss of hearing which accompanies advancement in age.

Deafened is another such term meaning that hearing was normal, language was acquired and is remembered, and the degree of deafness is so great that no useful residual hearing is retained. This degree of hearing loss can occur only from sensori-neural deafness.

To summarize the problem of definition and classification of deafness, there are four basic factors or variables which must be considered. These are:

a) Degree of deafness, the basis of classifications - deaf and hard of hearing.

b) The factor of time, referred to as the age of onset, the basis of the classifications - congenital and acquired.

c) The causal factor, the basis of the classification - exogenous and endogenous.

d) The physical origin of the impairment, referred to as the site of the lesion, the basis of the classifications - sensory-neural, conductive, and central deafness.

Incidence of Hearing Loss

It is not a simple task to define the minimum limits of a

significant hearing loss. When the question of incidence is raised, it becomes evident that it is not possible to use one definition for all professional and scientific purposes.

The incidence of hearing impairment varies by age, varies on the basis of training and experience of personnel, the equipment used, the testing assessment, the socio-economic level of sample, and the age levels being screened.

The figures reported in American Annals of the Deaf in 1963-64 is 54% male deaf children and hard of hearing children out of 16557 and 46% females out of 30799.

Incidence:	1967 - Johnson	3% - 8%	A.S.H.S.
	1968 - Connor	2% - 21%	
	1979 - AIISH	44.48%	which includes different types of hearing impairment

Hearing Impaired and Mental Development

Man matures in three primary ways: physically, emotionally and mentally. Mental growth has been studied extensively by workers such as Binet, Terman, Thurstone, Piaget and Wechsler. Gradually more attention is being given to possible relationship between sensory deprivation and growth of intellectual capacities. Hayes first explored this possibility in blind, while Pintner in deaf. More recently, Heider, Oleron, Fiedler and Myklebust

have pursued the question of more specific effects of deafness on mental processes such as abstraction, memory and learning.

The difficulties in measuring intelligence of deaf and hard of hearing individuals can be overcome by making use of non-verbal tests of intelligence. One of the earliest tests was Pintner Non-Language Mental Test. The most extensive survey of the mental and educational capacities of hearing impaired children was done by Pintner and Reamer. This study raised the question of relation between intelligence and deafness. The foremost conclusions were that deaf children, on the average, are two years retarded mentally and five years educationally, due to mental inferiority and language handicapped resulting from deafness in early life.

Many other tests, by 1930, Grace Arthur Point Scale, Drever and Collins Test, were used to assess intelligence in hearing impaired children.

A number of early workers have used a single test to appraise the intelligence of deaf children. Peterson and Williams first used the Draw-a-Man test with hearing impaired and reported an IQ level of 80.

Prior to use of Wechsler Adult Intelligence Scale and the Wechsler Intelligence test for children, the most commonly used Performance Intelligence, Leiter International Performance Scale, and the Wechsler Bellevue.

Most of the studies using the above tests indicated that the range of the intelligence levels of the hearing impaired does not differ from the hearing considering the variations and individual differences.

Another important aspect to be considered in hearing impaired individuals is memory. It is indicated by studies using tests like Knox Cube Test, Digit Span Test, Object Location Test, etc. that hearing impaired were found to be superior on some tests, on some other tests equal, and on other tests inferior to the hearing.

Now another aspect of abstract abilities in hearing impaired is also indicated by many studies. The results support the point of view that deafness does not exert uniform influence on all abstract processes.

Many studies have been conducted by Myklebust and Burchard, Pellet, Lyon, Heider and Heider, McAndrew, Bindon, etc., to assess personality and emotional adjustment of hearing impaired individuals. The results indicated a relationship between the sensory deprivation and emotional adjustment. The age of onset, the degree of hearing loss, and sex were found to be significant variables.

The studies on motor functioning of hearing impaired individual indicate that the person deaf from early life falls at the normal level in maturation of ability to sit, and to walk

and that he is not inferior in manual dexterity or synkinesia.

In case of social maturity, a person who is hearing impaired from early life has increased dependency.

Hard of hearing and deaf individuals are poor in language level compared to hearing individuals. In hard of hearing and deaf children, we come across problems like delayed speech and language, and misarticulation, etc.

As far as creative thinking is concerned, there has been not much research done with hearing impaired individuals.

How Handicapped may be Creative

People who have physical disabilities are called handicapped. But we really ought to find some new words to describe them. They may do so successfully in their life, and they may contribute so much to our society that the term handicapped just seems inappropriate.

Here are given some of the examples of hearing impaired people who have been very successful in their life. They were creative in different fields and have achieved maximum of their potentials. Miss Helen Keller who was deaf and blind from birth, did her doctorate in English Literature, and she has written a book about handicapped and their rehabilitation in brail.

Beethoven, who was a famous musician, was blind from birth. Later, he became deaf, but his best contribution to music was after he lost his hearing. Bill Sweezo, who was deaf since birth, is now one of the best linotypists in the business. Ali Ahmed, who is profoundly deaf, in India, is one of the famous painters and his exhibitions are often held all over the world.

Miss AKhila, who was a hearing loss case coming to AIISH Clinic for speech therapy, is very good at drawing and painting. She is all along working as a typist at the Deaf School in Mysore.

Many painting competitions are held at AIISH clinic and it is noted that 75% of the hearing impaired children are good at drawing and painting. Some of the hearing impaired children are also good at electronic repairs etc.

So creative ability becomes potentially manifested in any form - even in hearing impaired individuals.

Prompted by a desire to make an exploratory study of how the hearing impaired children show creativity, this specific study has been undertaken. It is believed that being deprived in one of the important sensations like audition, there might be sublimated channelization of their mental energies towards constructive inventions. It might quite well be possible that

such handicapped children may be able to contribute something significant to the society they live in. Therefore, it remains the responsibility of society in which they live to identify and channelize their creative abilities in a desirable direction.

CHAPTER II

REVIEW OF LITERATURE

Research on creative talent has been one of the major developments in psychological testing since midcentury and is concerned with the measurement of creativity. This development is itself only one aspect of an upsurge in research on the nature and cultivation of creative talent (Torrance, 1962; Taylor and Barron, 1963; Barron, 1969; Wallach and Wing, 1969; W.Taylor, 1972; and Blamberg, 1973). An increasing number of psychologists and educators have come to recognize that creative talent is not synonymous with academic intelligence and is rarely covered by tests yielding an IQ. In an early paper, Thurston (1951) emphasized this distinction and provided a provocative analysis of the possible role of ideational fluency, inductive reasoning, and certain perceptual tendencies in creative behaviour. He also called special attention to the contribution of non-intellectual, temperamental factors to creative activity. He observed that creativity is encouraged by a receptive as contrasted to a critical attitude toward novel ideas and that creative solutions are more likely to occur during periods of relaxed, dispersed attention than during periods of active concentration on a problem.

The investigation of creativity has received considerable impetus from the growing demand for research scientists, engineers, and high level executives. Studies of scientific talent have become increasingly concerned with creative abilities. Thus, creativity long regarded as the prime quality in artistic production, is coming more and more to be recognized as a basis for scientific achievement. The definition of creativity is confounded by the diversity of subareas within the field, and so little is known about the creative process that measuring instruments are, seemingly, chosen on a trial-and-error basis.

Research on creativity started in a serious, programmatic way around the early 1950s. Guilford, with his dedication to the factorial analysis of mental functions, was one of the first to emphasize the importance of this trait. Another was MacKinnon, who came to Berkeley from the Harvard Clinic and the influence of Henry Murray. Since that time, many articles and a number of important books have been published on the subject.

Looking back through history, it is possible to identify fairly the great creative geniuses; such names as these readily spring to mind: Plato, Aristotle, Kant, Gallileo, Darwin, Beethoven, Alexander, Churchill, Gandhi, who were creative in different fields such as music, arts, politics, science, etc.

Research has been done regarding the different mental aspects of the creative people. The two major mental functions

investigated are Intelligence and Personality.

Creativity and Related Personality Traits

It is being widely recognized that the personality variables play a decisive role in creativity. Gollann (1963) has ventured to say that personality variable can be used as criterion variable in the study of creativity. The role of personality in a large number of investigations dating from Galton.

The whole field of creativity and personality research is in its infancy. A number of studies have been made to test the relation between the IQ as measured by intelligence scales and abilities to perform in creative ways usually represented by tests of information. The typical result is a bivariate scatter plot that approaches triangular form. That is, individuals of high IQ vary widely over the range of divergent production or DP scores whether the latter are derived from a composite of DP tests or whether from single DP test. Individuals of low IQ very rarely obtain moderate or high DP scores. There can be many high IQ but low DP cases, but there are no low IQ but high DP cases.

High level in cognition is a necessary condition for high level in divergent production, but it is not a sufficient condition (Taylor, 1972).

Another study conducted by Barron (1955) on 100 Airforce captains showed that highly original people were more intelligent,

widely informed, concerned with basic problems, clever and imaginative, socially effective and personally dominant, verbally fluent and possessed of initiative. Low scores were found to be conforming, rigid, stereotyped, uninsightful, and apathetic and dull.

In another study conducted by Drevdahl (1969) on graduate students and advanced graduate students in science and arts at the University of Nebraska, Cattell, S.P.F., tests selected from Guilford's Factor Analytic Study of Creative Thinking and Thurstone's Primary Mental Abilities were administered. The results obtained show that the creative art group scored higher on radicalism and self-sufficiency.

Cattell and Drevdahl (1958) compared personality profiles of eminent reserchers with those of eminent teachers, administrators and general population. The results show that the scientists as compared to general population are mote intelligent, more dominant, more adventurous, sensitive and more radical.

Barron (1955) studied hundred captains in US Airforce. He administered 8 tests - some on creativity and some on personality. The results showed that the original persons are more independent in their judgements.

In another study conducted in a project at the Institute of Personality Assessment and Research at the university of

California, it was found that the high creative persons tended to perceive possibilities than facts. They tended to score low on tests of confirmity, although they were not necessarily non-confirmists in their behaviour.

Guilford's (1959) study also shows that the original person is necessarily less inclined towards cultural conformity. But still the hypothesis that originality rests upon an attitude of unoonventionality is not supported.

Recently, in India, attempts have been made to correlate several personality traits with creativity.

Paramesh (1970) conducted a study to find out the relationship between social introversion and creativity among industrial personnel. MMPI Scale was used to assess social introversion and creativity was assessed with a rating scale. No significant difference was observed among high, moderate and low creativity groups on social introversion.

Paramesh (1972) studied the relationship between traits like extroversion, introversion, emotionally (neuroticism plus anxiety), ego-strength, and values with creativity. The results indicated that the creative individual is neither extroverted nor introverted and is neither high nor low in neurotism and anxiety. He is stable in personality organisation, and is characterized by high theoretical and aesthetic values.

Raina (1970) studied sex difference among teachers in creative thinking ability and attempted to relate variables like age and experience to creativity. Males and females were not significantly different except on factor of originality. Positive and significant correlations were found between elaboration and age and correlation between fluency and age was not significant.

Creativity in open and traditional classrooms was a study done by Ramsey, Craig and Piper, Vera) (1974). They investigated the effects of open and traditional classrooms on creative expression using 60 children randomly drawn from grades I, IV and VIII from two different private school systems. Measures derived from the Torrance Tests of Creative Thinking indicated that the open classroom setting was related to superior performance in verbal creativity.

In 1970, "Perceptual and Motor Skills Journal, a study was reported which obtained validity evidence for Torrance Thinking Creative Motivation Inventory Scale with pictures, forms A and B as criterion using 118 under-graduates. The results showed high creative subjects had a significantly higher Mean than low scores on fluency, flexibility, originality and elaboration on both forms.

Acha Frances B, 1976, attempted to determine whether different levels of figural creativity (as measured by Torrance

tests) were related to personality factors (as measured by the 16 PF test and the children's personality questionnaire - CPQ). The results indicated a significant relationship.

Kumar, Girijesh and Raina (1976) administered the Torrance Tests of Creative Thinking (Form A), a group test of mental ability by S.S. Jalota and a Sentence Completion Test of Achievement Motivation to 96 Indian 9th graders. The results showed significant effects of creativity and intelligence on achievement motivation but a non-significant creativity versus intelligence interaction.

Arem, Cyntesia and Zimmerman, Barry (1976) studied effects on the creative behaviour of retarded and non-retarded children. The effects of observing a model over display of a creative drawing responses and having a description of these actions were assessed with 54 retarded and 68 non-retarded. The retarded children were less able than the non-retarded children to discriminate the essential elements of the models elaboration strategy.

Forteza, J.A. (1974) studied well-known measures of creativity and discussed some of the problems associated with measuring creativity: (a) The lack of accepted theory of creativity; (b) The existence of various types of creativity; (c) Lack of accepted criteria for judging creativity; (d) The possibility that creativity is a response to certain situations rather than a permanent characteristic which can be called forth at will;

(e) The varying correlations between different measures of creativity and measures of intelligence; and (f) The low correlations among different measures of creativity.

Paramesh, C.R., and Narayanan, S. (1976) administered visual creativity scales and the culture Fair Intelligence test (Adult form) and the Thurstone Interest Schedule to 50 college students in Madras. On the basis of the Median scores of creativity and intelligence, subjects were divided into 4 groups: High creative-High Intelligence; High Creative-Low Intelligence; Low Creative-Low Intelligence; and Low Creative-High Intelligence. Creativity and Intelligence had a significant effect on persuasive, linguistic, artistic, and musical interests.

Recently, research has been conducted regarding creative thinking with hearing impaired individuals.

Johnson, Roger, A (1977) administered Figural Form B of Torrance Test of Creative Thinking to 131 deaf and 131 hearing, 11 to 19 years old adolescents. The deaf subjects scored significantly higher than the hearing on Fluency, Flexibility and Elaboration subjects of Torrance Tests of creativity. Deaf subjects scored somewhat higher as their age increased, whereas no such thing was observed with hearing subjects.

Silver, Rowley, A. (1978) studied that deaf children do not lag behind hearing children when non-verbal instruments are used to assess imagination, originality, and abstract thinking. The

non-verbal instruments used in this study were drawings and paintings produced in an experimental art class. The results showed that deaf population equalled hearing population and often excelled.

Martin, John, D, Blair, Garland, Stoker, Elizabeth and Armstrong (1978) determined the inter-correlations between the object Assembly, and Block Design Test of WAIS and Torrance Tests of creativity. The correlations results suggest that the object assembly and Block Design Test of WAIS may reject some sort of creative ability.

Rousia, M.K. and Raina, Usha (1976) reviewed creativity research in the cross-cultural perspective, and stressed that there is need, namely the structure of Intellect Model (SI). This model encompasses all intellectual functions, but a major contribution of the Aptitudes Research Project (ARP) was in the divergent production section. This test has 14 sub-tests, out of which 10 are verbal and 4 employed figural content. These 14 tests represent only some of the divergent production instruments developed in ARP Guilford and Hoepfner, 1971.

While the ARP Tests were a by-product of factor-analytic research on the nature of intellect, the Torrance Tests were developed in 1962, 1963, 1965. These tests of creative thinking comprise of 12 tests, grouped into verbal, a pictorial, and an auditory battery.

Wallach and Kogan (1965) following their model use the following tests:

- I Instances
- II Alternate Uses
- III Similarities
- IV Pattern Meanings - and
- V Line Meanings

In all these tests subjects are scored on unique responses and total number of responses.

Other tests of creativity which are developed are Minnesota Tests of Creativity, Creativity Tests for Children (Guilford, 1974), etc.

D. Vasanta Kumari (1977) did a study finding relation between creativity, intelligence, persuasion, and personality, in high school children. She found a positive correlation between creativity and all other mentioned mental functions.

Appraisal of Creativity

Standardized tests of creative aptitudes have been produced chiefly in the course of large scale research projects on the nature of creativity. In the first place, unlike most tests of aptitude, those purporting to measure creativity are made up of items to which a great range of answers is possible.

Frank Barren (1957) of the Institute of Personality Assessment, has put together a battery of eight tests to comprise a composite test of originality.

Getzels and Jackson (1962) used five tests for assessing creativity. These tests involve the assessment of novel reactions to conventional material.

Two major batteries to be considered are: The University of Southern California Tests developed by Guilford (1959) and his colleagues; and the Torrance Tests of Creative Thinking (1963). although commercially available, all these tests are still in experimental form and not ready for operational use. The items in creativity tests are typically open-ended, thus precluding objective scoring. For this reason, it is imperative to ascertain scorer reliability for all such instruments. Norms are generally tentative, being based on small scattered groups chosen primarily because of availability. Data on reliability and validity vary among individual tests but are usually quite limited. At this stage, the chief application of these tests is in research.

The availability of uniform, standardized testing instruments assures a reasonable degree of comparability among different investigations.

In course of his factor analytic investigation, Guilford

developed the categories of divergent and convergent thinking and finally a test of Fluency, Flexibility and Elaboration, for more research in this direction, and advocated an inter-disciplinary approach to cross-cultural research in creative functioning.

Thus, the area of creativity has caught the attention of investigators quite recently. The main topics of study so far covered have been the factors in creativity, the different areas of creativity, testing of creative ability, and its relation with Intelligence and Personality. But compared to other areas of research, this area has not been investigated sufficiently.

And also the creativity in the Indian setting has made a short lately and we have to go a long way to say anything about the creativity among handicapped, and in particular, about the hearing impaired. Hence, an exploratory study is attempted to make a comparative study between creativity of Hearing Impaired and Normals.

CHAPTER III

METHODOLOGY

Present Research

"Creativity" is an activity on the part of the person which involves invention which may or may not be based on the current experience of the individual. And also it may or may not have application to current environment.

In the operational terms this can be taken to mean as to variety or number of new ideas on the part of the person, translated into number of items utilized, originality, flexibility, synthesis and complexity, etc. being shown in the test performance.

A sensory impairment may affect this aspect and so a need is felt to make a study of this aspect in hearing impaired individuals as compared with normals. In this connection, it is needed to construct a non-verbal battery of creativity test and compare the creativity of the hearing impaired persons with normals. So, this is going to be purely an exploratory type of study.

Hypothesis

Main Hypothesis

"The two groups, namely, the hearing impaired and normals, do not differ with reference to their scores in general in aspects of creativity."

Sub-hypothesis

- 1) "The two groups, namely, the hearing impaired and normals, do not differ with reference to their scores on the first test, namely, Creativity Blocks."
- 2) "The two groups, namely, the hearing impaired and normals, do not differ with reference to their scores on the second test, namely, Completion of Forms."
- 3) "The two groups, namely, the hearing impaired and normals, do not differ with reference to their scores on the third test, namely, Draw-a-Person Test."
- 4) "The hearing impaired group varies with regard to their performance in the first test, namely, creativity Blocks."
- 5) "The hearing impaired group varies with regard to their performance in the second test, namely, completion of Forms."
- 6) "The hearing impaired group varies with regard to their performance in the third test, namely, Draw-a-Person Test."

7) "The normals group varies with regard to their performance on the first test, namely, Creativity Blocks."

8) "The normals group varies with regard to their performance in the second test, namely. Completion of Forms."

9) "The normal group varies with regard to their performance in the third test, namely, Draw-a-Person test."

10) "computation of requirements of standardization, i.e., Reliability and Validity,with regard to Control and Experimental groups. And that the constructed non-verbal battery of creativity test tests creativity."

Method

A pilot study was done in order to construct non-verbal battery of testing creativity and to make suitable changes in the test materials, administration, instruction and scoring procedures.

In the pilot study the criterion was that the non-verbal test should be suitable for hearing group. So, only five hearing impaired male cases within the age range of 15 to 19 years were taken up.

The test materials like plastic blocks sold in the market, mechano set, match sticks, different sets of completion of

forms, and Draw-a-Person Test as given by Goodenough, were used. Suitable selection of materials was done, unsuitable items were discarded, and some of the suitable items were added later.

When the subjects were asked to perform with a known duration of time, these were found not creative enough, so the time aspect was dropped out in order to make subjects come with spontaneity. The sequence of administration of the three tests was also determined in order to maintain motivation of persons till the end of testing session.

"Subjects"

For the present study, 15 male subjects in each of the two groups, namely, hearing impaired and normals, with age range of 15 to 19 years matched with regard to age were selected. The hearing impaired cases were coming to AIISH for consultation and therapy.

The Non-verbal Battery of Creativity Tests

A Non-verbal Battery of Creativity Tests, which has been newly constructed, has been used and the details of administration and scoring are given below. This was given as an individual setting.

There are different areas of creativity as has already been mentioned. So, a simple test of creativity is not enough to

assess all the different areas of creativity. Therefore, a battery of tests of creativity has been constructed in this study.

In order to tap different aspects of creativity both Drawing and Performance Tests have been used. The Non-verbal Battery of Creativity Tests consists of the following:

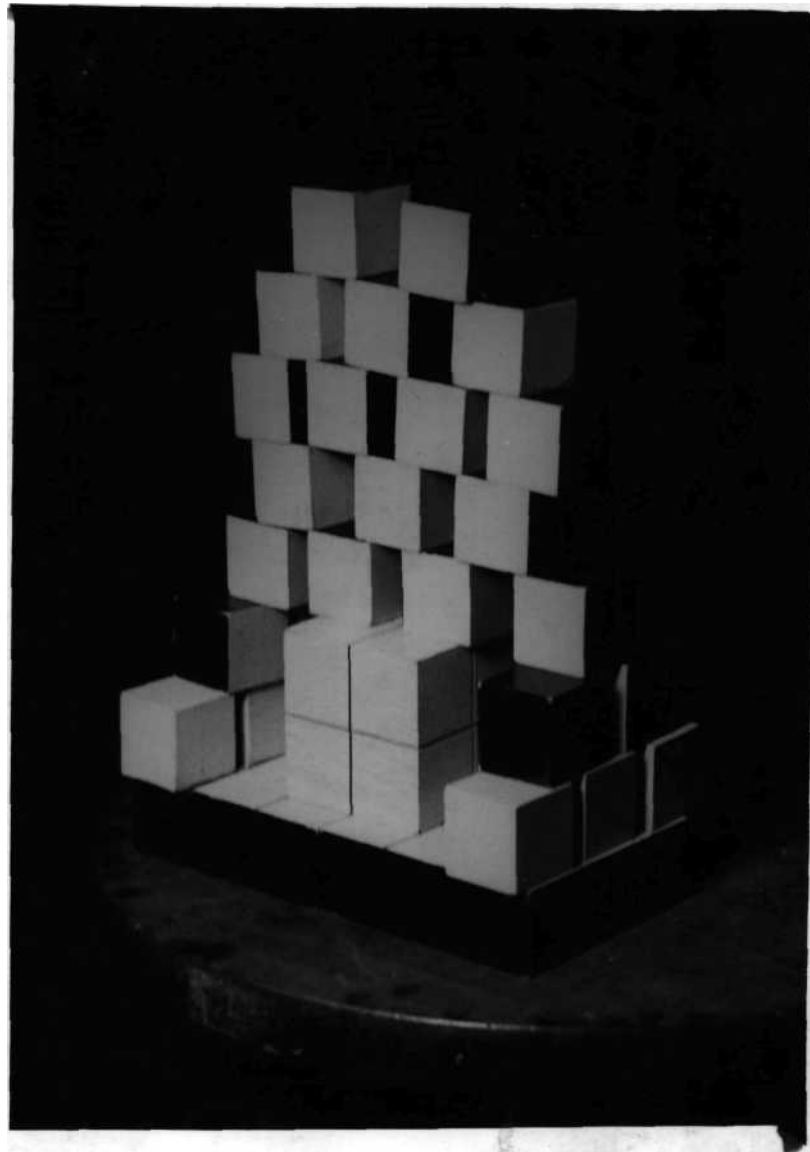
- 1) Creativity Blocks
- 2) Completion of Forms - and
- 3) Draw-a-Person Test

The first test, the creativity Blocks, taps the creativity of a person in dealing with concrete materials without any model to be followed.

The second test, Completion of Forms, taps the creativity in the aspect of its extent, non-meaningful aspects being made meaningful, coming with new items, which are aesthetically appealing, complexity in the using different given stimuli in complex fashion making it much more versatile, and Elaboration.

The third and the last test, Draw-a-Person, is found to be a very interesting task for any individual. This is found to make one get an idea as to how an individual will be creative with regard to his personal aspects, but may be more of this needs to be investigated.

STANDARD MODEL OF THE CREATIVITY BLOCKS TEST.



SCORING.

SCORE

	3
	2
A	3
	3
a.	3
	3
b.	<u>17</u>
B	
Total	

In this test, the scoring is done in order to suit the adults, although it is based on the Goodenough's Draw-a-Person Test. The scoring also includes the creative aspects more than the cognitive aspects.

Administration of the Tests

All the tests were administered one after the other with a rest time of five minutes in between. The tests were administered in the same order to all the subjects.

1) Creativity Blocks

Materials: Three types of wooden blocks, 29 in number, differing in size and shape, were used in this test. Colour combination of all the blocks was blue and yellow.

Size and number of blocks were as follows:

<u>Size of the blocks</u>	<u>No. of blocks</u>
i) 2½" x 2½"	26
ii) 5½" x 5½" 1	
iii) 7½" x 7½" 2	

Procedure: Instructions were given through pantomime to both hearing impaired and normals.

The examiner first gave a simple demonstration of a standard model using all the blocks (Appendix I). All the

blocks of all sizes and shapes were placed in front of the subject and in order to make sure that he has understood the instructions, a trial was given. If the subject had not followed, the demonstration was repeated. The subject was asked to take his own time to build some new model out of the given blocks. More than one items were not restricted. The scores were taken down on the scoring sheet after the subject indicated that he had finished. Behavioural observations were done.

Scoring: The model constructed by the subject was rated by using a proforma so that standardized rating could be attempted. It was done under the following five aspects:

- A) Number of Blocks and Number of Stages
- B) Different Types of Blocks used
- C) General Aesthetic Appeal
- D) Symmetry
- E) Organization

A) and B) The complexity of the model was decided by the A) and B) aspects which included the 3 aspects, namely, number of blocks used, number of stages constructed and the types of blocks used. In case of number of blocks used, the rating was done as follows:

		<u>Score</u>
For 10 stages	..	3
For 5 stages	..	2

		<u>Score</u>
For less than 5 stages	..	1
For building on the same plane..		0

In case of number of blocks, the rating was done as follows:

		<u>Score</u>
All the blocks used	..	3
20 blocks used	..	2
10 blocks used	..	1
Less than 10 blocks used	..	0

In case of types of blocks used, the rating was done as follows:

		<u>Score</u>
All 3 types used	..	3
Only 2 types used	..	2
Only 1 type used	..	1
No consideration for type used..		0

C) General Aesthetic Appeal: It was subjectively decided whether the model done was artistically appealing. In this case, the rating was as follows:

			<u>Score</u>
Good	..		3
Fair	..*		2
Present	* 4		1
Poor	4 *	..0	

D) Symmetry: Main Design , Auxillary Design

Here, Symmetry means arrangement of parts in artistic whole so as to produce the effect of balance. The rating was done as follows:

<u>Score</u>	
	<u>Main Design:</u>
	Presence .. 3
	Absence .. 0
	<u>Aurillary Design:</u>
	Presence .. 5
	Abasence .. 0

E) Organization: Here organisatgion is defined as differentia-
 tion of parts and functions and intergration into a
 systematic inter-connected whole. Here, the rating was
 done as follows:

Score

2) Completion of Forms

Materials: Three foolscap sheets, each having a simple figure (Appendix II) on each of them. Each sheet had 20 incomplete figures of same type. A sheet for demonstration where incomplete figures similar to Form (a) were present. A pencil and a rubber.

Procedure: Instructions were given through pantomime.

The examiner first gave a demonstrator on the demonstration sheet, e.g., flag. Then, the subject was presented with form (a) and he was instructed to imagine and draw different things out of the incomplete figures. In the same way, he was presented with form (b) and then form (c). The subject was allowed to take his own time and he was insisted to come with a different form each time.

Scoring: Scoring has been done about different aspects. Rating has been used excepting one aspect. Each form is scored on the following headings, namely -

- A) Number of items utilized
- B) Number of obviously meaningful items
- C) Number of Non-meaningful items
- D) Type of items drawn
- E) Proportions of drawing mentioned
- F) Tremours

- G) Aesthetic Appeal
- H) Rubber used
- I) Elaboration of an item
- J) Complexity - using two or more items to form a single drawing
- K) Penalization for perseveration

A) Number of item utilized - Here the number of items, ie, the incomplete figures on all the three sheets or forms (a), (b) and (c) was noted down.

B) Number of obviously meaningful items on all the three different forms were noted down.

C) Non-meaningful items - Here the number of non-meaningful items, e.g., design, any uncomprehensible figure, etc. was rated as follows:

	<u>Score</u>
All non-meaningful items aesthetically impressive ..	15
More than 10 non-meaningful items aesthetically impressive ..	7
More than 7 non-meaningful items aesthetically impressive ..	5
Less than 4 non-meaningful items aesthetically impressive ..	3
None of the items aesthetically impressive ..	0

Since creativity not only means meaningful items but also that the person should come with new items.

D) Types of items drawn - Here items drawn on all the forms were classified as follows:

			<u>Score</u>
Animal	..	..	4 each
Human	..	..	3 each
Objects like flower, pen, notebook, furniture, etc.	..	..	2 each
Landscape	..	..	1 each

E) Proportion of Drawing - Here proportion means the relation of one part of drawing to another with regard to magnitude and symmetrical arrangement. The rating was done as follows: for all the three forms in general.

			<u>Score</u>
Correct proportion	..	..	2
Attempted proportion	..	..	1
No proportion..	..	..	0

F) Tremours - Here any shaking or quivering observed in the drawings was rated as follows:

			<u>Score</u>
Absence of tremours	..	..	1
Presence of tremours	..	..	0

G) Aesthetic Appeal - It was subjectively decided whether the drawing is artistically appealing or not. The rating was done as follows.

			<u>Score</u>
Good	..	..	2
Fair	..	+. .	1
Poor	.*	**	0

Materials: Foolscap sheet, pencil and rubber. Two standard drawings, one of a male and the other of a female for demonstration.

Instructions: Instructions were given through pantomime.

Scoring: In general, each item is scored as 1 excepting 8 items where different scores are given depending on the complexity aspect (Appendix III).

Here the maximum score is 100.

Limitations in the Methodology

- 1) Importance to inventive aspect of creativity has not been stressed upon at all, which is an important aspect of creativity.
- 2) The colour concept should have been stressed in the scoring of the creativity blocks test.
- 3) All the different aspects of creativity need to be studied.
- 4) Many other tests like painting, sculpturing, etc., were not included in the test battery.
- 5) More different dimensions, colours and sizes of items would have given better scope for creativity on the part of the subjects.

CHAPTER IV

RESULTS AND DISCUSSION

In this study the analysis of results may throw some light on the performance of the two categories, namely, the hearing impaired and the normals. However, there are not enough early non-verbal tests available, and also because of the lack of time at the disposal of the investigator, the standardization procedures like the more detailed investigation about item selection, different procedures and comparison of reliability, validity, and also the factors of creativity with regard to other mental functions in two groups is not undertaken. Also other problems are there which are peculiar to assess and do research with creativity, for example, in this study, no maximum score could be thought of, as the tests themselves could go to any length with regard to their scores depending on the creativity of the individuals, as has been found by author Fortenza, J.A. (1974) also.

The general results found can be taken up for discussion in order to know how the two groups, namely, hearing impaired and normals, performed with regard to creativity.

I General Discussion of the two groups

Now we will take up the main hypothesis, that is, "The two

groups, namely, the hearing impaired and normals, do not differ with reference to their scores in general in different aspects of creativity."

Table I and Figure I show the composite creativity score of the two groups. Here, the mean of the hearing impaired group is 194.53 and that of the normals is 219.86. This shows that the hearing impaired are less creative than the normals, since the χ^2 (Median Test) is 4.8 and it is significant at 0.05 level. The Mean scores of both the groups are found to be significant at both levels indicating that generalization is possible to the population of normals as well as hearing loss respectively.

The standard deviations of hearing impaired and normals are 22.85 and 28.76 respectively. Both the standard deviations are found to be significant at both the levels. The second group varies from the first only to a little extent. So, the main hypothesis is rejected here, as the two groups vary to some extent and also it is found that hearing impaired group is found to be less creative than the normals.

Now, let us discuss the performance of the hearing impaired as compared to normals with respect to each of the subtests, namely, the Creativity Blocks, the Completion of Forms, and the Draw-a-Person Test.

The first sub-hypothesis is that "The two groups, namely,

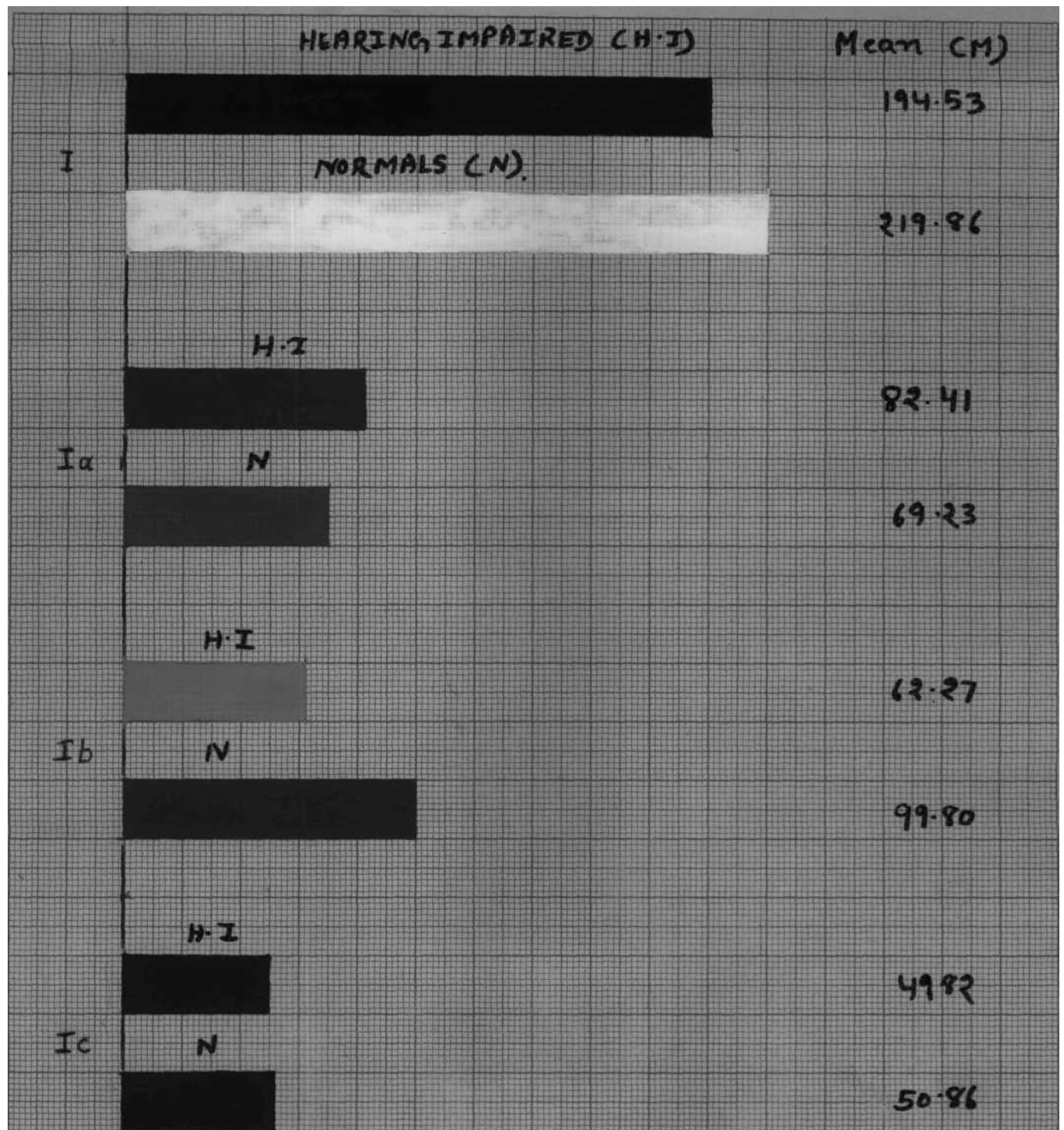
Table I - showing the composite Creativity Scores of the Hearing Impaired and the Normals

	M		Sm	
Hearing Impaired	194.53	22.85	7.54	4.19
			Signifi- cant at both the levels	Signifi- cant at both the levels
Normals	219.86	28.76	7.69	5.28
			Signifi- cant at both the levels	Signifi- cant at both the levels

$$x^2 = 4.8 \text{ significant at } 0.05 \text{ level}$$

the hearing impaired and normals, do not differ with reference to their scores on the first test, namely, Creativity Blocks."

From Table II and Figure Ia we can see that the Mean scores of Creativity Blocks Test for both the groups and they are 82.4 and 69.23 respectively, indicating that hearing impaired group is better than the normals with respect to this aspect of creativity. But, the results are significant at 0.05 level and non-significant at 0.01 level, indicating that the results may not hold good for the two populations always. Hence, the sub-hypothesis is rejected, as the hearing impaired perform better



BAR DIAGRAM SHOWING THE MEAN SCORES OF TOTAL TEST BATTERY, and INDIVIDUAL TESTS, NAMELY C.B, C.F AND D.A.P, FOR BOTH GROUPS.

Table II - showing the complete Frequency Data of Matched Group of Subjects for the Creativity Blocks

	M		Sm	
Hearing Impaired	82.4	14.48	0.90	2.66
			Not significant at both levels	Significant at 0.05 level
Normals	69.23	18.47	4.93	3.38
			Significant at 0.05 level	Significant at both the levels

$$x^2 = 0.5041 \text{ significant at } 0.05 \text{ level}$$

than normals.

Taking up the sub-hypothesis (2) which is as follows - "The two groups, namely, the hearing impaired and normals, do not differ with reference to their scores on the second test, namely, the completion of Forms", Table IIa and Figure Ib show the Mean scores of Completion of Forms Test for both the groups and they are 62.27 and 99.8 respectively. Here, it indicates that the creativity in hearing impaired group is lower than in normals. But the results are not significant at both the levels of confidence and hence cannot be generalized to populations. Hence, sub-hypothesis (2) is rejected, as the

Table IIa - showing the complete Frequency Data of Matched Groups of Subjects for Completion of Forms

	M		Sm	
Hearing Impaired	62.27	9.46	2.52	1.73
			Signifi- cant at 0.05 level	Not sig- nificant at both levels
Normals	99.80	17.49	4.67	3.20
			Signifi- cant at 0.05 and 0.01 levels	Signifi- cant at both levels

$\chi^2 = 2.133$ not significant at 0.05 and 0.01 levels

two groups differ in performance, the normals being more creative than the hearing impaired.

The third sub-hypothesis, "The two groups, namely, the hearing impaired and the normals, do not differ with reference to their performance in the third test, namely, Draw-a-Person Test.

Table IIb and Figure 1c show the Mean scores of Draw-a-Person Test for both the groups and they are 49.8 and 50.86 respectively. So, it is indicated that the hearing impaired and the normals do not differ in their performance in this

Table lib - showing the complete Frequency Data of Matched Groups of Subjects for the Draw-a-Person Test

	M		Sm	
Hearing Impaired	49.8	6.54	1.74	1.19
			Not significant at both levels	Not significant at both levels
Normals	50.86	5.56	1.48	1.02
			Not significant at both levels	Not significant at both levels

$\chi^2 = 0.533$ not significant at both levels

aspect of creativity. But the results are not significant and hence cannot be generalized to the population. The Null Hypothesis is accepted in this case.

II Discussion of Individual Difference in the Groups

Taking up the sub-hypothesis (4) which states that "The hearing impaired group varies with regard to their performance in the first test, namely, the creativity Blocks.

Table II and Figure Ia show that the Mean score of hearing impaired group is 82.4 and the Standard Deviation is 14.48. The

Mean is not significant at both levels, whereas the Standard Deviation is significant at 0.05 level. Hence, the above Hypothesis is rejected.

Taking up the sub-hypothesis (5) which states that the hearing impaired group varies with regard to their performance in the second test, namely, the Completion of Forms, from Table IIa and Figure Ib we can see that the Mean score of hearing impaired group for the second test, namely. Completion of Forms, is 62.27 and the Standard Deviation is 9.46. The Mean is significant at 0.05 level and the S.D. is not significant at both levels of confidence. Again the sub-hypothesis (5) is rejected.

Taking up the next sub-hypothesis (6) which states that "The hearing impaired group varies with regard to their performance on the third test, namely, Draw-a-Person Test," and looking at the Table IIb and Figure Ic we can read the Mean and S.D. of the hearing impaired in the third test and they are 49.8 and 6.54 respectively. Both the measures are not significant at both the levels. Hence, the sub-hypothesis is rejected again.

Now, let us take up the sub-hypothesis (7) which states that "The normals vary with regard to their performance on the first test, namely, Creativity Blocks". Table II and Figure Ia give us the Mean and S.D. of the normals for the first test and

they are 69.23 and 18.47 respectively. The Mean is significant at 0.05 level, whereas the S.D. is significant at both the levels of confidence. Hence, the above sub-hypothesis is proved and it is obvious from the scores that the normals vary with reference to the first test, namely, the Creativity Blocks.

Taking up the sub-hypothesis (8) which states that "The normals vary with regard to their performance in the second test, namely, completion of Forms, Table IIa and Figure Ib show the Mean and S.D. of the normals in the second test and they are 99.8 and 17.49 respectively. The Mean is significant at 0.01 level and the S.D. is significant at both the levels of confidence. Hence, the above sub-hypothesis is accepted proving that the normals vary with regard to their performance in the second test.

Taking up the sub-hypothesis (9) which states that "The normals vary with regard to their performance in the third test, namely, Draw-a-Person Test", Table IIb and Figure Ic show the Mean and the S.D. of the normals in the third test and they are 50.86 and 5.56 respectively. Both the measures are not significant at both the levels of significance. Hence, the sub-hypothesis (9) is rejected as the results are not significant.

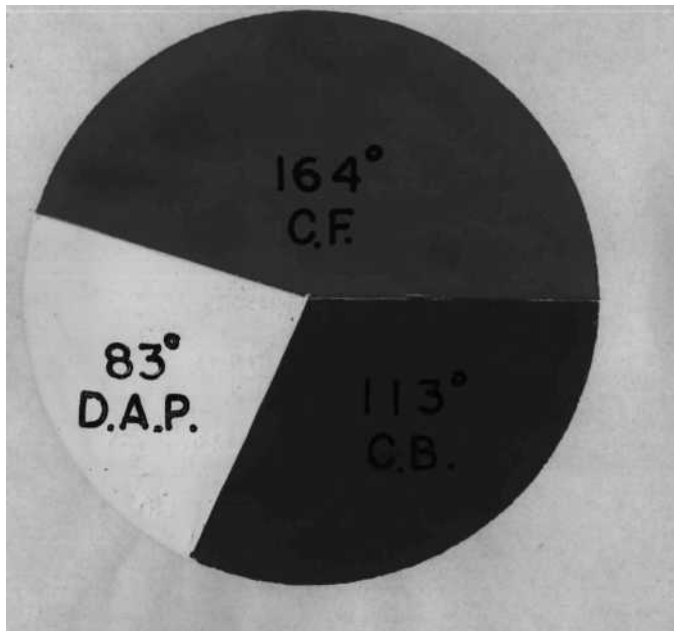
Now we will discuss the performance of the two groups with reference to three different tests, as to how they compare with each other. The Mean scores for the hearing impaired group in the three tests, namely, creativity blocks, completion of forms, and draw-a-person test, are 82.4, 62.27 and 49.8 respectively, making a total of 194.6. Looking at the Figure 2 (Pie Diagram) the creativity blocks appear to be easiest amongst the three tests in case of hearing impaired. The Mean scores for the normals in the three tests (mentioned above) are 69.23, 99.8 and 50.86 respectively, making a total of 214.87. Looking at Figure 2, we can say that the completion of form test is found to be the easiest amongst the three tests in case of normals. The most difficult test in case of both hearing impaired as well as normals is Draw-a-Person test, the Mean scores being 49.8 and 50.86 respectively for the two groups.

Item Analysis

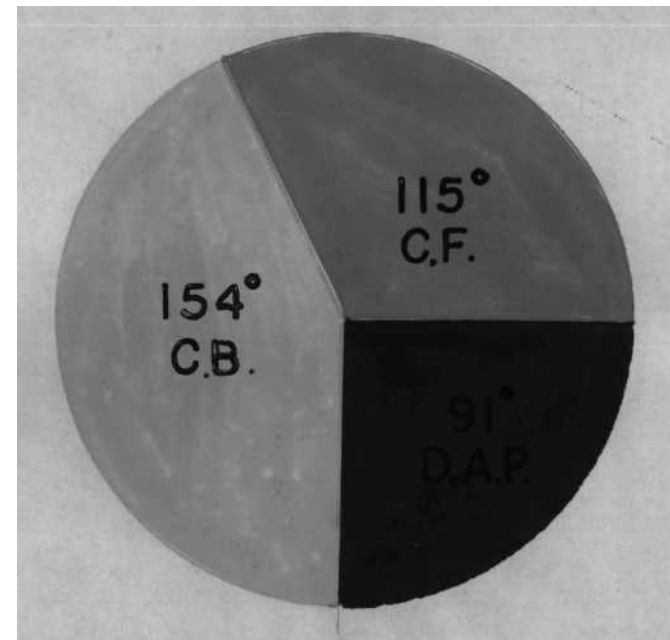
The adequacy of a test - whatever its purpose - depends upon the care with which the items of the tests have been chosen. There are many approaches to the study of item analysis and the topic properly belongs in a book on test construction.

Item analysis will be treated under three heads -
(1) Item selection; (2) Item difficulty; and (3) Items

NORMALS



HEARING IMPAIRED



Pie diagram showing the total scores of the three tests namely CB, CF + D.A.P. for both groups.

validity.

(1) Item selection - The choice of an item depends, in the first instance, upon the judgement of competent persons as to its suitability for the purposes of the test. The validity of the items in most tests depends, as a first step, upon the consensus of teachers and educators as to the adequacy of the material included. The items are carefully selected from all sources of information judged to be suitable.

(2) Item difficulty - The difficulty of an item may be determined in several ways:

- (a) by the judgement of competent people who rank the items in order of difficulty;
- (b) by how quickly the item can be solved; and
- (c) by the number of examiners in the group who get the item right.

The first two procedures are usually a first step, especially when the items are for use in special aptitude tests, in performance tests, and in areas such as music, art - the creativity aspects, where qualitative distinctions and opinions must serve as criteria. But the number right is the standard method for determining difficulty in objective examinations.

(3) Item variance and Item difficulty - The proportion (P) passing an item is an index of item difficulty, where the formula $P = \frac{V}{V + 1}$ can be used to find out the maximum variance which an item can have. The larger the variance of the item, the greater the number of separations among individuals the test items is able to make. Items of moderate difficulty (40-60%) are to be preferred to those which are much easier or much harder.

The Item Analysis of the two groups, namely, hearing impaired and normals, in each of the three tests can be discussed. In case of both the groups in the creativity Blocks Test, as seen from the Table IIa, as well as the Figure II, findings are similar, namely, more frequent responses has been as follows, the number of Blocks being 20 and all types of blocks being used. The other aspects are the 'aesthetic appeal being good', symmetry is 'fair', and organization also being 'Fair'. In descriptive terms, we can say that the two groups fall in mild degree of performance in A aspect, and moderate degree of performance in case of B aspect that is the Types of Blocks used. Coming to the C, D and E aspects, namely, the aesthetic appeal, symmetry and organization, both the groups fall in the moderate categories.

Coming to the second test, namely, the Completion of Forms (refer Table III, Figure II in the appendix IV),

referring the Table VI regarding the "number of items utilized", which indicates the extent of creativity, it is seen that in case of hearing impaired group, all the three items forms are more or less of the same difficulty.

Table III - showing the Degree of Difficulty of Items in the Completion of Forms Test

	Degree of difficulty	Most difficult	Moderately difficult	Least difficult
Hearing Impaired	Number of Items	30	18	39
Normals		26	13	48

It is the same in case of normals also, but the normals are found to be better than the hearing impaired to a little extent. The same is found with regard to another item of scoring, namely, the number of meaningful items. This aspect of creativity seemed to have been worked out by other investigators. Since details are not available, no comparison of results can be made.

Coming to the other aspects of creativity in the test, namely, number of non-meaningful items, proportion of drawing, aesthetic appeal, complexity, and elaboration, etc., normals are found to be much better than hearing loss group, as the scores are almost double in that of hearing impaired.

Coming to the types of forms completed, it is seen that the number of forms are found to be almost same in both the groups, namely, 43 and 45. And also, it is found to be the same with regard to different categories, namely, animals, human forms, objects, and landscapes.

The results in Table III indicate that the gross aspects of the persons are found to be present in the drawing more frequently than the other aspects in both the groups. The number of items being 39 and 48. The moderately difficult being 18 in hearing impaired and 13 in case of normals. Coming to the most difficult, the number of items are 30 and 26 in both the groups respectively.

Reliability and validity

Reliability of Test Scores

A test score is called reliable when we have reasons for believing the score to be stable and trustworthy. Stability and trustworthiness depend upon the degree to which the score is an index of true ability - is free of chance error. Scores achieved on unreliable tests are neither stable nor trustworthy. In fact, a comparison of scores made upon repetition of an unreliable test, or upon two parallel forms of the same test, will reveal many discrepancies, some large and some small, in the two scores made by each individual in

the group. The correlation of the test with itself computed in several ways is called the reliability co-efficient of the test.

Methods of determining reliability

There are four procedures in common use for computing the reliability co-efficient of a test. These are:

- 1) Test-retest Method
- 2) Alternate or Parallel Forms Method
- 3) Split-Half Technique
- 4) Rational Equivalence

1) The Test-retest Method - Repetition of a test is the simplest method of determining agreement between two sets of scores. The test is given and repeated in the same group, and the correlation is computed between the first and second set of scores.

2) Alternate or Parallel Forms Method - When alternate forms of a test can be constructed, the correlation between Form A and Form B may be taken as measure of the self-correlation of the test.

3) The Split-Half Technique - In the split-half method, the test is first divided into two equivalent halves and the

correlation found for these half tests. From the reliability of the half test, the self correlation of the whole test is then estimated by Spearman-Brown prophecy formula. The procedure in detail is to make up two sets of scores, for example, represents performance on the odd-numbered items - 1, 3, 5, 7, etc. and the second set of scores, performance on the even-numbered items - 2, 4, 6, 8, etc. From the self correlation of the half tests, the reliability co-efficient of the whole test may be estimated from the formula -

$$r_{1I} = \frac{2r_{\frac{1}{2}II}}{1 + r_{\frac{1}{2}II}}$$

where, r_{1I} = reliability co-efficient of the whole test; and

$r_{\frac{1}{2}II}$ = reliability co-efficient of the half test found experimentally.

The Split-Half Method is employed when it is not possible to construct parallel forms of the test, nor advisable to repeat the test itself. This method is regarded by many as the best of the methods for measuring test reliability. One of its main advantages is the fact that all data for computing reliability are obtained upon one occasion, so that variations brought about by differences between the two testing situations are eliminated. A marked disadvantage of Split-Half technique lies in the fact that chance errors may

affect scores on two halves of the test in the same way, and so tending to make the reliability co-efficient too high. This follows because the test is administered only once. The longer the test less the probability that affects of temporary and variable disturbances will be cumulative in one direction, and more accurate the estimate of more reliability.

4) The Method of "Rational Equivalence" - Two forms of a test defined as equivalent when corresponding items a, A, b, B, etc. are interchangeable, and when the inter-item correlations are the same for both forms. Here the inter-item correlation and the correlations of the items with the test as a whole.

How large is reliability co-efficient depends upon the nature of the test, the size and variability of the group, and purpose for which the test is given. Most of the authors of standard intelligence and educational achievement examinations report reliability co-efficient of at least .90 between alternate forms of their tests. The reliability co-efficient of a test administered to a group of wide range of talent cannot be compared directly with the reliability co-efficient of a test administered to a group of reliability narrow spread, a single grade, for example. The self-correlation of a test is affected by the variability of the group. If we know the reliability co-efficient of a test in a wide range,

we can estimate the reliability co-efficient of the same test in a group of narrow range, provided the test is equally effective throughout both ranges.

$$\frac{\sigma_n}{\sigma_w} = \frac{\sqrt{1 - \gamma_{ww}}}{\sqrt{1 - \gamma_{nn}}}$$

where, $\sigma_n + \sigma_w = \sigma$ of narrow and wide ranges; and
 and $\gamma_{nn} + \gamma_{ww} = \gamma$ of narrow and wide ranges

Reliability of different tests for both the groups for all the three tests has been found using the odd and even or split-half method of finding the reliability.

In this nonverbal creativity test battery, all the three tests have been used, which will be assessing all the aspects of creativity in its lucid form. As a result, this test is bound to be more reliable, reliability being 0.62 - for whole test battery than if only one of the subtests is being used for the same task. This can be ascertained by reliability study, by repeating the battery for required number of times. Hence, it was not done because of lack of time, as already shown. For the second test, namely, Completion of Forms, Inter-rater reliability is used.

Validity of Test Scores

The commonest definition of validity is epitomized by the

question. Are we measuring what we think we are measuring? The emphasis in this question is on what is being measured. Although the commonest definition of validity is as given above, it should be known that there is no one validity. Three types of validity are discussed below and they are:

- 1) Content
- 2) Criterion related - and
- 3) Construct

1) Content - Validity is basically judgmental. The items of a test must be studied, each item being weighed for its presumed representativeness of the universe. This means that each item must be judged for its presumed relevance to the property being measured. Different judges are chosen for making judgments and then same method for pooling independent judgment can be used.

2) Criterion related validity - This is studied by comparing test or scale scores with one or more external variables, or criteria, known or believed to measure the attribute under study.

3) Construct validity - Here we account for the test performance, deriving hypotheses from the theory involving the construct, and testing the hypothesis empirically.

Validity can be found out by the following formula

Val

Where, Val = the validity,

V_{co} = the common factor variance, and

V_t = the total variance of a measure.

(Refer Tables IV and V)

In this study, the criterion type of validity was found for all the subjects as well as the whole test battery. The short form of Bhatia's battery was used as criterion for the creativity test.

$$\text{Validity} = (v)^2$$

The correlation between the scores of Intelligence Test (short form of Bhatia), and the Total Score of the Creativity Test battery was calculated, and found to be 0.63, indicating that the creativity test battery is moderately valid (Refer Table V). The Inter-test validity was also found, and correlation between all the three tests were found as follows: The validity between Completion of Forms and Creativity Blocks being -0.14, between Completion of Forms and Draw-a-Person tests being 0.13, and between creativity Blocks and Draw-a-Person Tests being 0.47 in case of hearing impaired. In case

Table IV - showing Reliability and Correlation

	Hearing Impaired		Normals	
	(Reliability)	(Correlation)	(Reliability)	(Correlation)
C.F.	0.71*		0.63*	+0.92
C.B.	0.65*	0.49	0.87'	0.76
D.A.P.	0.742*	0.59	0.65*	0.47

*Significant at both the levels

Significant at 0.05 level

Table V - showing Validity

C.B. & C.F.		C.F. & D.A.P.		C.B. & D.A.P.		Intelligence Test & creativit ^T &st	
Hearing Impaired	Normals	Hearing Impaired	Normals	Hearing Impaired	Normals	Hearing Impaired	Normals
-0.14	0.30	0.13	0.47	0.47	0.043	0.63	0.72

of normals, the validity between Completion of Forms and Creativity Blocks Tests is 0.30, between Completion of Forms and Draw-a-Person Tests is 0.47, and lastly between Creativity Blocks and Draw-a-Person tests is 0.043. So, each of the three tests is not valid individually, but the total test battery is valid, according to the obtained results.

Another type of validity, namely, construct Validity, could have been calculated with regard to this test battery, where, to predict whether the test can discriminate between the different levels of creativity like the less creative, moderately creative and highly creative persons, which will be almost approximating the scores of the same in known populations like the less creative individuals, normals, and the highly creative. But, in this study, it is not worked out.

So, we can conclude this nonverbal creativity test battery is reliable, as well as valid, if the whole test battery is used for tapping creativity. (The reliability scores of the three tests, namely, Completion of Forms, creativity Blocks and Draw-a-Person Tests, in case of hearing impaired and normals are 0.71, 0.65, 0.74 and 0.63, 0.87 and 0.65 respectively (Refer Table TV). The results indicate that each of the three tests is quite reliable, as the whole of the test battery.)

Limitations

- 1) The number of subjects tested in this study is so small that generalization to population belonging to hearing impaired and normals is not possible.
- 2) In the validation, the discriminative aspects of the test regarding creativity could have been attempted by administering the same to the group known to be creative and comparing it with the non-creative group.
- 3) Other type of validity, namely, Construct Validity, could have been calculated, but, due to lack of time, it was not done.

CHAPTER V

SUMMARY AND CONCLUSIONS

In this study, the creativity of two matched groups of subjects, namely, hearing impaired and normals, consisting of 15 individuals in each group, was studied with the help of a newly constructed battery of Creativity Test.

The main hypothesis in the study is that "the two groups, namely, the hearing impaired and the normals, do not differ with reference to their scores in the general aspects of creativity". The Mean scores of the two groups are 194.53 and 219.86 respectively for the whole nonverbal Creativity Test battery. This indicated that hearing impaired were found to be less creative than normals significantly. The variability scores were 22.85 and 28.76 respectively for both the groups, indicating that the normals are slightly more variable in their performance on the Creativity Test, compared to hearing impaired significantly. There are individual differences found in both the groups regarding the different creativity scores.

The Reliability and Validity of the Total Creativity Test Battery is 0.62 and 0.63 respectively and indicates that the nonverbal creativity test battery is both reliable as well as

valid, and can be used as a Test for tapping creativity in hearing impaired and normals.

Suggestions for the future research

- 1) Detailed studies need to be done regarding the factors promoting creativity in general and in hearing impaired in particular and also other handicapped.
- 2) Studies about reinforcement procedures to make a person more creative.
- 3) More studies to identify creative individuals amongst the handicapped and in particular with hearing impaired.
- 4) To study the value of creativity test with respect to vocational aspects of the hearing impaired and normals.
- 5) Developments of testing procedures to tap creativity in hearing impaired.
- 6) Studies need to be done regarding relation between creativity and other mental functions.

- 7) Personality problems of creative individuals should be studied and how to make them exploit their creativity for harmonious adjustment.

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A P P E N D I X

APPENDIX I

SCORING OF CREATIVITY BLOCKS

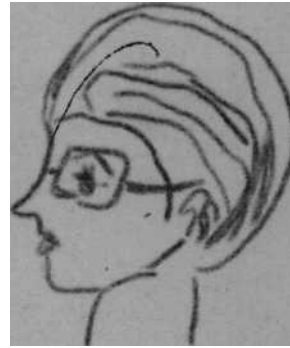
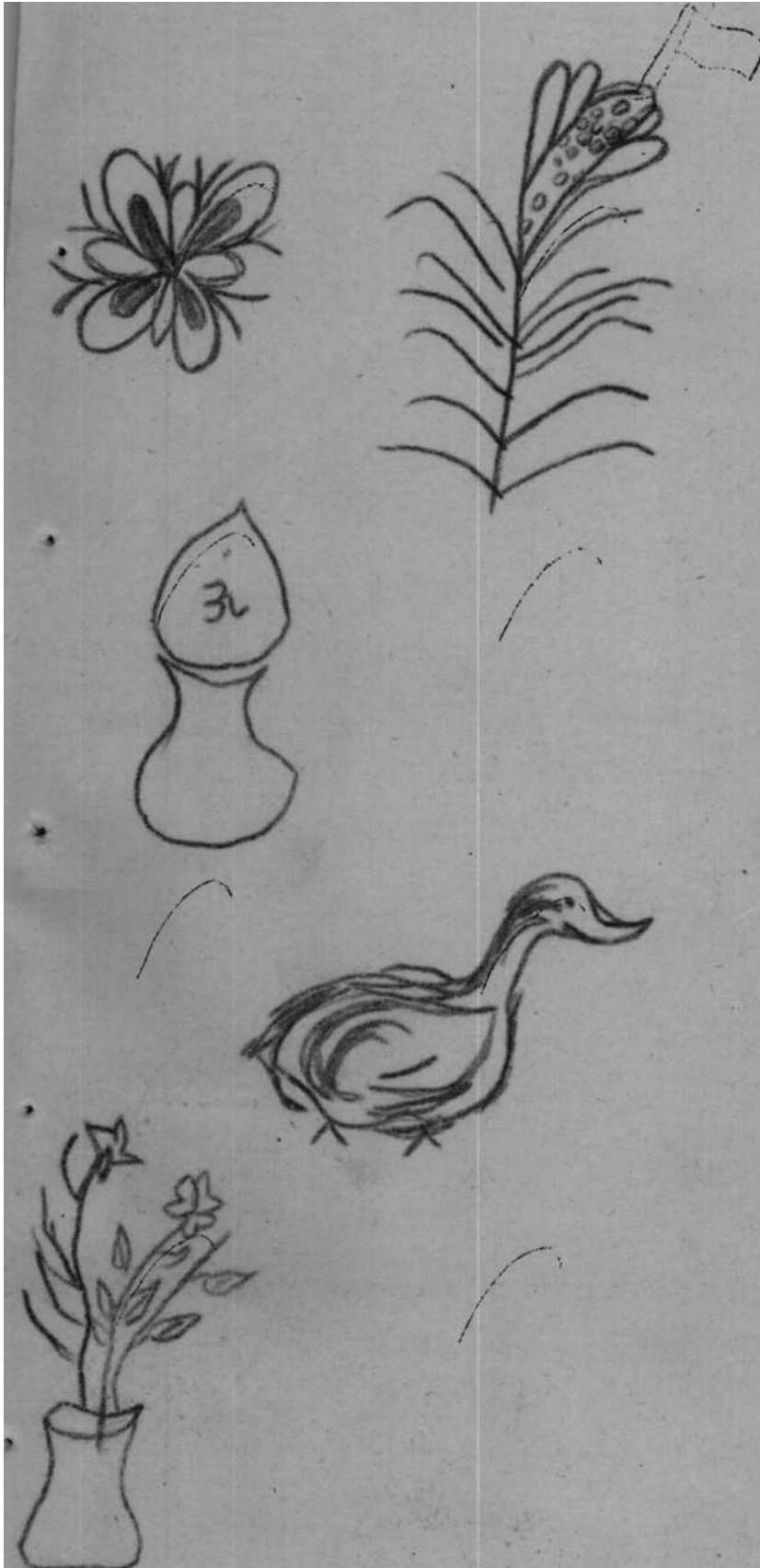
				Score
A)	Number of Stages:			
	10 stages	..	..	3
	5 stages	..	..	2
	Below 5 stages	..	..	1
	Built on the same plane		..	0
	Number of Blocks:			
	All the blocks used..		..	3
	20 blocks used	..	..	2
	10 blocks used	..	..	1
	Less than 10 blocks used		..	0
B)	Types of Blocks used:			
	All three types of blocks used		..	3
	2 types of blocks used		..	2
	Same size of blocks used		..	1
	No consideration for size & dimension etc.			0
C)	General Aesthetic Appeal:			
	Good	..	..	3
	Fair	..	..	2
	Present	..	..	1
	Poor	..	..	0

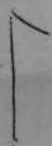
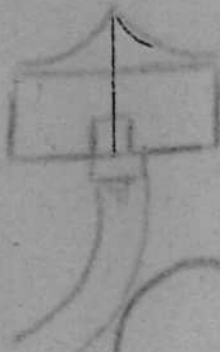
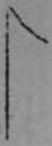
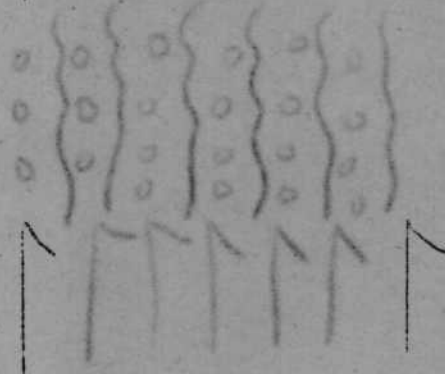
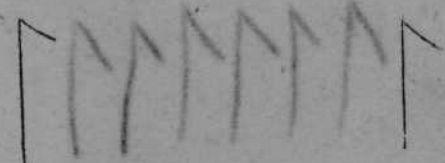
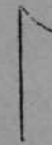
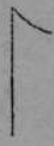
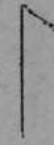
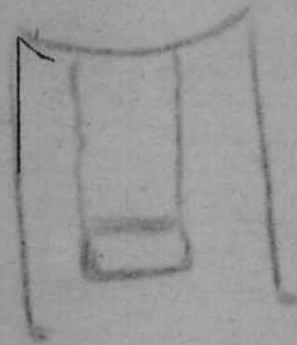
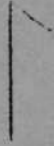
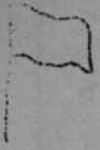
APPENDIX I - contd.

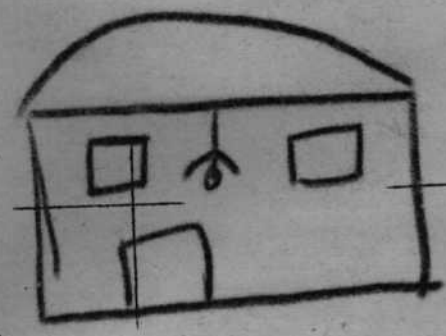
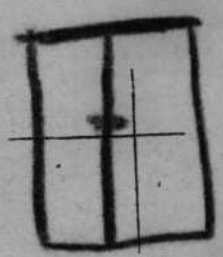
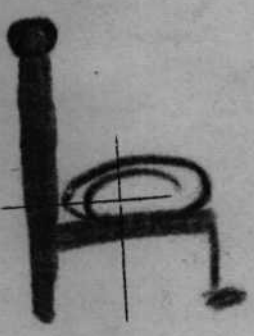
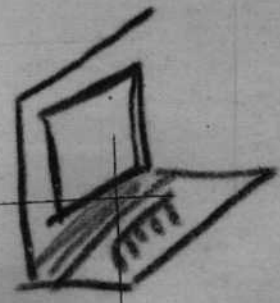
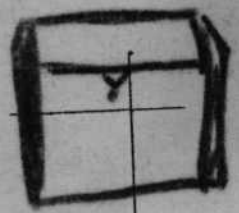
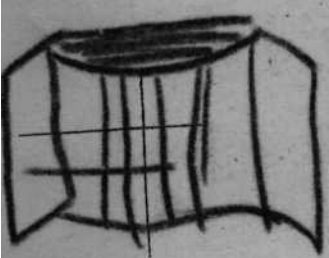
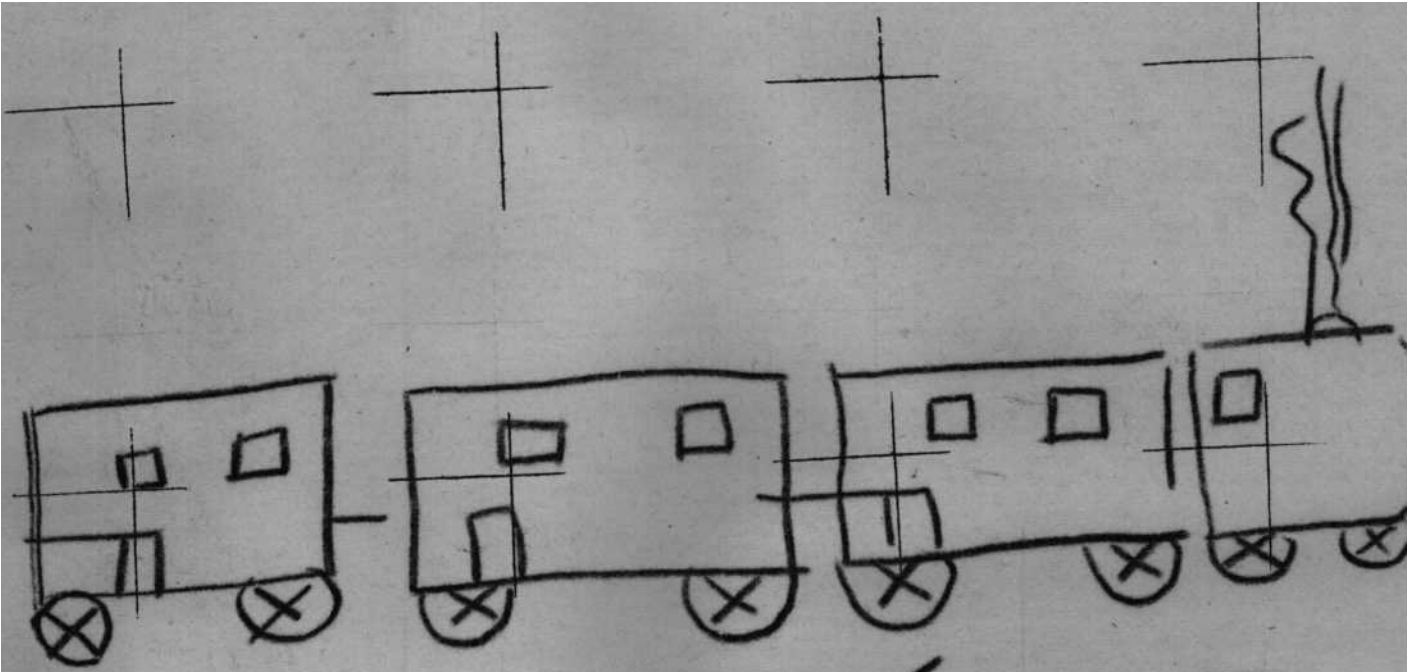
			Score
D)	Symmetry:		
	Main Design - Present	..	3
	Absent	..	0
	Auxiliary Design - Present	..	5
	Absent	..	0
E)	Organization:		
	Good	..	3
	Fair	..	2
	Poor	* *	1
	Nil	..	0

Behavioural Observation -

Care Name - Vizay kumar
Age- 17 years
problem- Hearing impair

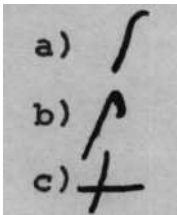






APPENDIX II

SCORING OF COMPLETION OF FORMS

		Score
A)	Nature of items utilized in the three forms: ..	
		
B)	Number of obvious meaningful items - (Score 1 for each) ..	60
	maximum ..	
C)	Number of non-meaningful items (Score 1 for each) ..	60
	maximum ..	
	a) All non-meaningful items aesthetically impressive ..	15
	b) More than 10 non-meaningful items aesthetically impressive ..	7
	c) More than 7 non-meaningful items aesthetically impressive ..	5
	d) Less than 4 non-meaningful items aesthetically impressive ..	3
	e) None of the items aesthetically impressive	0
D)	Types of Completed Figures:	
	a) Animals - for each figure ..	4
	b) Humans - for each figure ..	3
	c) All objects, eg, flower, pencil, furniture etc. ..	2
	d) Landscapes, eg, house etc. ..	1

APPENDIX II - contd.

	Score
B) Proportion of Creativity:	
a) Correct proportion	
b) Attempted proportion	1
c) No proportion ..	0
F) Tremours:	
a) Absence of tremours	1
b) Presence of tremours	0
G) Aesthetic Appeal:	
a) Good	2
b) Fair	1
c) Poor	0
H) Rubber used for correction	1
I) Elaboration of a item..	Maximum 5
J) complexity - using two or more items to form a single drawing	Maximum 10
a) Attempt at utilizing two items	2
b) Two items well drawn	4
c) Three items utilized	6
d) Three items well drawn	10
K) Penalization	1

Total Score

D.A.P TEST

care name: Vizay Kumar
Age - 17 Years
Problem:-Hearing imparied



APPENDED III

SCORING OF DRAW-A-PERSON TEST

- I 1) Head present
- II 2) Legs present
- 3) *Both legs present
- III 4) Arms present
- 5) *Both arms present
- IV 6) Trunk present
- 7) Both arms and legs attached to trunk
- 8) Shoulder indicated
- 9) *Shape of the trunk
- 10) *Form of trunk relevant with overall drawing
- V 11) Length of the trunk greater than breadth
- 12) Legs attached to trunk at correct point
- 13) Arms attached to trunk at correct point
- VI 14) Neck present
- 15) Outline of the neck continues with that of head
of trunk or both
- VII 16) Eyes present
- 17) Nose present
- 18) Mouth present
- 19) Both nose and mouth in two dimensions, two lips
- 20) Nostrils indicated
- 21) *An attempt at three dimensional aspect of nose
indicated

- 22) *Shading effective enough to give the three dimensional aspect
- VIII 23) Hair indicated
- 24) *Parting indicated
- 25) *Grooming indicated
- 26) *Decoration indicative
- 27) *Hair style
- IX 28) Clothing
- 29) Two articles of clothing, non-transparent are shown
- 30) Entire drawing free from transperancies when both sleeves and trousers are shown
- 31) *Print of the dress material indicated
- 32) *Impressive pattern of print indicated
- 33) *Dress design indicated respectively for males and females
- 34) *Impressive dress design indicated
- 35) Four or more articles of clothing indicated
- 36) Costume completely indicated
- X 37) Fingers
- 38) Correct number of fingers
- 39) Fingers in two dimensions, length greater than breadth and the angle substended by no greater than 180*
- 40) Opposition of thumb shown

- 41) Hand distinct from fingers or arms
- XI 42) Arms joints shown, i.e., elbow joint, shoulder joint or both
- 43) Leg joint shown, i.e., knee joint, hip joint or both
- 44) Toes present
- 45) Correct number of toes
- 46) *Apparel indicated (accessories - belt, shoes, cap, broach, pin, etc.)
- 47) *Apparel appropriately indicated
- XII 48) Head in proportion
- 49) Arms in proportion
- 50) Legs in proportion
- 51) Feet in proportion
- 52) Both arms and legs shown in two dimensions
- XIII 53) Heels shown
- XIV 54) Motor coordination line A
- 55) Motor coordination line B
- 56) Motor coordination head outline
- 57) Motor coordination trunk outline
- 58) Motor coordination arms and legs outline
- 59) Motor coordination of features outline
- XV 60) Ears present
- 61) Correct position and proportion ears

- XVI Eye Details:
- 62) Eye lashes indicated
 - 63) Eye brows indicated
 - 64) Pupils indicated
 - 65) Correct proportion of eyes
 - 66) Glance directed to front in profile
- XVII
- 67) Chin and forehead shown
 - 68) Projection of chin indicated
- XVIII
- 69) Profile with one error
 - 70) correct profile
 - 71) *Face turned at 45*
- XIX
- 72) *Attempt at emotional expression
 - 73) *Eyes expressive
 - 74) *Brows expressive
 - 75) *Mouth expressive
 - 76) *Forehead lines indicated
 - 77) *Social interaction shown
- XX
- 70) Naming - (a) Attempt at naming
 - (b) Correct naming
- XXI
- 79) *Face decorations
 - 80) *Good attempt
 - 81) *well drawn

11.

TABLE I - SHOWING SCORES OF THE NONVERBAL CREATIVITY TESTS AND ALSO INTELLIGENCE TEST (TOTALS AND MEANS)

S No.	K.B.D	P.T	TOTAL	C.F	C.BX5	D.A..P..	TOTAL C.F+ C.B+ D.A.P
1.	18	17	35	79	80	59	218
2.	17	15	32	79	20	53	152
3.	13	16	29	90	75	57	222
4.	11	14	25	99	80	49	228
5.	14	16	30	115	75	47	237
6.	16	14	30	110	55	55	230
7.	12	10	22	94	45	54	193
8.	18	17	35	77	90	60	227
9.	17	15	32	138	85	41	264
10.	13	14	27	86	75	39	200
11.	19	17	36	116	85	52	253
12.	14	12	26	99	60	48	207
13.	18	16	34	85	70	40	195
14.	15	12	27	106	48	52	206
15.	19	17	36	124	85	57	266
TOTAL: 234		222	456	1497	1040	763	3298
MEAN 15.6		14.8	30.4.	99.8	89.3	50.9	219

TABLE I- SHOWING SCORES OF THE NONVERBAL CREATIVITY TESTS
AND ALSO INTELLIGENCE TEST. (TOTALS AND MEANS) OF
NORMALS OF HEARING IMPAIRED ItA.

S No.	K.B.D	P.T.	TOTAL	C.F	C.B	X 5	D.A.P	TOTAL C.F.+ C.B + D.A.P
1.	17	17	34	68	106		57	231
2.	6	13	19	38	70		51	159
3.	11	12	23	46	74		46	166
4.	14	18	32	64	81		49	194
5.	17	15	32	64	107		50	221
6.	16	17	33	66	49		43	158
7.	18	14	32	64	93		54	211
8.	14	16	30	60	85		59	204
9.	17	18	35	70	78		45	193
10.	18	19	37	74	81		49	204
11.	17	18	35	70	87		47	204
12.	18	15	33	68	74		52	194
13.	16	15	31	62	73		42	177
14.	16	18	34	68	100		60	228
15.	10	16	26	52	79		43	174
TOTAL:	225	241	466	934	1237		747	2918
MEAN:	15	16.07	31.06	62.27	82.4		49.8	194.5

K.B.D. = Kohs Block Design

P.T.Passalong Test

C.F. = Completion of forms

C.B. Creativity Blocks

Q D.A.P. = Draw a Person Test.

TABLE 2- SHOWING SCORES OF THE COMPLETION OF FORMS TEST
IN CASE OF HEARING IMPAIRED.

S.NO	A			B	C.F. SCORES & RATINGS										TOTAL				
	a	b	c																
1.	10	8	6	24	3	51	1	1	0	0	2	0							106
2.	6	8	3	17	0	34	1	1	0	0	0	0							70
3.	5	6	6	13	3	37	1	0	1	0	2	0							70
4.	9	7	5	20	0	39	1	0	1	0	0	-1							81
5.	9	7	8	22	3	50	2	1	2	0	4	-1							107
6.	4	3	4	9	0	27	1	0	1	0	0	0							49
7.	9	8	6	20	5	43	1	0	1	0	0	0							93
8.	8	5	6	19	0	45	1	0	1	0	0	0							85
9.	9	5	3	16	0	40	2	1	2	2	0	0							78
10.	8	7	5	18	0	39	2	1	1	0	0	0							81
11.	7	7	7	20	3	34	2	1	2	0	4	0							83
12.	8	6	5	19	0	32	1	0	1	0	2	0							74
13.	9	5	3	16	0	32	2	1	2	0	4	-1							73
14.	11	6	4	20	5	51	1	1	1	0	0	0							100
15.	5	6	7	18	0	39	2	1	1	0	0	0							79
Total	a+b+c=289			271															1237
Mean	19.97			18.07															82.47

Here A = No of items utilised in each of the c.f sheets

-a, b, c.

B=No of meaningful items.

C.F= Completion of forms Test

TABLE 2- SHOWING SCORES OF THE C.F.T3ST IN CASE OF HEARING,-
IMPAIRED.

S.No	At a b c	B	C.F SCORES GRATINGS	TOTAL
1.	6 8 9	16	0 32 2 1 2 0 0 4 -1	79
2.	5 6 7	18	0 39 2 1 1 0 0 0 0	79
3.	7 9 4	17	3 45 1 1 1 0 0 0	90
4,	8 10 7	22	3 47 1 1 1 0 0 0 -1	99
	8 10 9	27	0 57 2 1 1 0 0 0 0	115
S.	9 7 10	23	0 54 2 2 0 0 0 0	110
7.	8 10 5	21	0 49 1 0 1 0 0 0 31	94
3.	5 4 6	15	0 39 2 0 1 0 5 0 0	77
9*10	18 8	31	3 64 2 1 2 0 0 0 =1	138
10.	7 6 10	17	0 41 1 1 1 0 4 0 -1	86
11.	6 7 12	20	3 48 2 1 2 0 5 10 0	116
12.	8 10 7	22	3 47 1 1 1 0 0 0 -1	99
13,	8 9 3	16	0 36 2 1 1 0 5 4 0	85
14.	7 7 7	17	3 63 1 0 1 0 0 0 0	106
15.	10 11 7	28	0 61 2 1 1 0 0 4 -1	124
Total a+b+c = 355				1497
Mean : 23.67				99.8
Total B = 312				
Mean : 20.8				

