

DIFFERENTIAL DIAGNOSIS BETWEEN NORMAL NON FLUENCY AND STUTTERING

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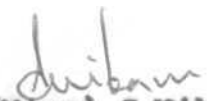
The four WOMEN I admire, respect,
look upto and would do anything
to possess at least a few of their
qualities.

AWIA_____for everything that she is
GEETA — for being kind, warm, loving,
understanding, caring and most of all,
being a FRIEND,

SAVITHRI MA'AM AND MANJULA MA'AM_____
for being 'Bosses' in their respective
fields and yet being so humane, easy to
approach and ready to lend a helping hand,

CERTIFICATE

This is to certify that the Dissertation entitled "DIFFERENTIAL DIAGNOSIS BETWEEN NORMAL NON FLUENCY AND STUTTERING" is the bonafide work in partial fulfilment for Final Year M.Sc. (Speech and Hearing) of the student with Reg.No.M9020.


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C E R T I F I C A T E

This is to certify that the Dissertation
entitled: DIFFERENTIAL DIAGNOSIS BETWEEN
NORMAL NON FLUENCY AND STUTTERING has been
prepared under my supervision and guidance.

May 1992

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DECLARATION

This Dissertation entitled: DIFFERENTIAL DIAGNOSIS BETWEEN NORMAL NONFLUENCY AND STUTTERING is the result of ay own study, undertaken under the guidance of Dr.S.R.Savithxi, Lecturer ia speech Sciences, All India Institute of Speech and Hearing, Mysore-6, and has not been submitted earlier at any University for any other Diploma or Degree.

Mysore

May 1992

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Thanks to Amma, Appa and Rajoo for their support, inspiring letters which arrived at the right times and their confidence in me. I hope I've lived up to the faith they have in ma,

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II. Sometimes the disruptions are (e) accompanied by accessory activities involving the speech apparatus, related or unrelated body structures, or stereotyped speech utterances. These activities give the appearance of being a speech related struggle.

III. Also, there are not frequently (f) indications or report of the presence of an emotional state, ranging from a general condition of 'excitement' or 'tension' to more specific emotions of a negative nature such as fear, embarrassment, irritation or the (g) The immediate source of stuttering is some incoordination expressed in the peripheral speech mechanism, the ultimate cause is presently unknown and may be complex or compound.

Just as there are numerous definitions of stuttering, so too do we have various theories about the development of stuttering. The schools of thoughts are varied, with organicity at one end of the scale and psychological origin at the other end.

These theories propose several causes for stuttering. The opinion is that stuttering is caused by learning (Amman, 1700s; Brutten and Shoemaker, 1967), organicity (Aristotle, 384 DC, Galen, 200 A) Morgagni, 1761; Hunt, 1870; Travis, 1931 and Bryngelson, 1935), disturbed auditory feedback (Black, 1951; Lee, 1951; Tomatis, 1954) and neurosis (Coriat, 1931; Travis, 1957).

The literature in the 1940's to 1960's was filled with the view that the parents were the sole reason for stuttering in children. According to Johnson (1942) stuttering is the result of misperception and misevaluation, that, it has its onset in the parents misjudging the child's normal disfluencies as being abnormal or unacceptable. Johnson et al. (1959) opine that stuttering starts in the ears of the parents rather than the mouth of the child. Also prevalent around this time was the concept that disfluency was high in children between 4-6 years. With this view, children in this age group were considered to have normal nonfluency.

In 1970's and 80's, fluency development of children was a major field of interest as it was felt that the understanding of disfluency was based on the knowledge of fluency. Four major studies have been conducted on the development of fluency in English speaking children.

Kowal et al.(1975) reported that in the early ages, children exhibit more of unfilled pauses, filled pauses and repeats which decrease in frequency with increasing age. However, an increase in false starts and parenthetical remarks is noticed in the older age group.

Haynes and Hood (1977) found word repetitions to be a predominant disfluency type in children under age six and that they tended to decrease as the youngsters approached the age

INTRODUCTION

Many good minds have attempted definitions of stuttering, but the variability among them makes clear that this complex and variable disorder is hard to delimit. Some of its complex behaviours always seem to evade capture. Some of the definitions are merely statements of the authors' points of view with respect to the cause or nature of the disorder.

Some definitions are so broad that they fail to provide proper limitations, something a good definition always tries to do. Conversely, there are definitions which are so restrictive that they exclude many persons who would be commonly called or would call themselves stutterer*. Other definitions are frankly descriptive lists of behaviours, overt or covert, shown by different stutterers. However, the following definition of stuttering as given by Wingate (1964) seems to encompass the behaviour common to all stutterers and indicate the kinds of accessory behaviours shown only by some.

The term stuttering means - I(a) Disruption in the fluency of verbal expression, which is (b) Characterized by involuntary, audible or silent, repetitions or prolongations in the utterance of short speech elements, namely; sounds, syllables and words of one syllable. These disruptions (c) Usually occur frequently or are marked in character and (d) are not readily controllable.

of eight. Between the ages four and six, the repetitions (part word, word and phrase) were found to decrease. Haynea and Hood (1977) found interjections, disrhythmic phonation, revisions and incomplete phrases to Increase between 4-6 years.

Yairi (1981) studied preschool children and found repetitions of syllables, words, part word and phrases to be common. Revisions and incomplete phrases were also seen. Filled pauses, audible inspirations and tence pauses were less in the age group studied.

Dejoy and Gregory (1985) opined that 3.5 year olds were more disfluent in all categories except grammatical pauses. The younger children evidenced significantly more frequent part word repetitions, word repetitions, phrase repetitions, incomplete phrases and disrhythmic phonation.

Among the Indian languages, Kannada and Hindi have been studied (Nagapornima, 1990; Indu, 1990; Yamini, 1990; Rajendra swamy, 1991; and Sharma, 1991).

To summarize, these studies indicate that as children grow they do not have fewer number of disfluencies as was the concept of Johnson et al. (1959) but they learn more adult ways of being disfluent, the false starts and parenthetical remarks being more adult than the repeats which is an immature type. The filled pauses are neither mature nor immature, occurring in the speech of young and old alike.

Thus, as opposing the earlier belief to diagnose a child between 4-6 years as normally nonfluent and wait to see if stuttering will disappear on its own, it would be appropriate to differentiate the young stutterer from the normally nonfluent. The higher recovery rates recorded in literature for younger stutterers than for adults (Conture, 1990) and the greater risk of the belief to wait and see if stuttering will disappear than treating the child, have lead to several ways of differentially diagnosing a disfluent child from a dysfluent child.

A need for fluency test has risen following attempts by Davis (1939), Egland (1955), Wingate (1962b), Floyd and Perkins (1974), Bjerkan (1975), Bloodstein (1975a), Adams (1977), Yairi and Lewis (1984), Wells (1987), Hubbard and Yairi (1988) to differentiate stutterers from normally nonfluent or disfluent children.

In Kannada, tests of fluency has been proposed by Nagapornima, (1990), Indu (1990), Yamini (1990) & Rajendraswamy (1991). These tests give; the percent of occurrence of various disfluencies (filled pause, unfilled pause, repetition, par enthetical remarks, false starts, sound prolongations; part question repetitions, audible inspirations broken words and hesitations) in normal children between the age of 3-7 years. However, these have not been clinically

tested. The test would gain its importance and be strong on evaluating it with the clinical population. It would give a consistent and more specific diagnosis. In this context, the present study is planned and the aim of the study is to evaluate the efficacy of the Kannada fluency test in differentiating disfluent from dysfluent children.

Specifically, children reporting to the Institute with a complaint of stuttering will be evaluated using this test and the score obtained by these children on the fluency test would be compared with that of normal children. Further, the diagnosis made on the basis of this test would be compared with the diagnosis made by a speech pathologist.

REVIEW OF LITERATURE

The question of what differentiates normal nonfluency from Stuttering has been a riddle since the days when the field of speech language pathology was fledgeling. Now, when it has been proved that we are a force to reckon with, the above question still remains unanswered. This area has been the interest of many researchers but till now no conclusive evidence is available on what distinguishes the normal nonfluent speech from the speech of a stuttrer.

What is the relation between the so-called normal disfluency and the more pathological dysfluency of the stuttrer? Two views of seemingly different philosophies regarding these two types of disfluencies are prevalent in literature. The first view, suggests that normal disfluencies have a place on the same continuum as stuttering and that the latter is simply a more severe and frequent manifestation of the former.

A second view of the relation between stuttering and normal disfluency is that they do not lie on the same continuum nor does the former arise from the latter. Rather, stuttering is a distinctly different entity from the disfluencies produced by non-stuttering speakers. There are certain speech traits which characterize stuttering.

Most studies of early childhood nonfluencies examine the following characteristics: interjections part word repetitions, phrase repetitions, revisions of incomplete phrases, disrhythmic phonation and tense pauses (Johnson, et al, 1967).

The first study in this particular aspect of the vast field of 'fluency' can be traced to 1930s, Stinchfield (1930) refers to repetitions as slight signs of stuttering, occurring before the child has sufficient control of the speech mechanism.

Steer (1937) in a comparison of a group of 30 preschool stutterers (aged 3-6) with a group of 20 like-age normal speaking children, described a number of symptoms of breathing disturbance observed in both groups. Although concluding that both stutterers and non-stutterers evidenced disturbances in breathing while speaking, his analysis revealed a different type of breathing irregularity for the stutterers than for the non-stutterers.

Davis (1939) studied the disfluencies of non-stuttering children aged 24-62 months. A child, whose speech is such that approximately one word in four is a repeated word, either in part or in whole in a word or phrase repetition, is not presenting any abnormality in speech and is talking normally. The children in *the* age group 2-5 years used more phrase repetitions than word or syllable repetitions and more word repetitions than

syllable repetition. She reported that syllable repetitions and a high number of reiterations of a repetition were indicative of a disorder.

Johnson (1942) obtained information on 46 stutterers between the approximate ages of two and nine years and a likegroup of non stutterers. His report dealt mainly with history and developmental data. Though he did not present any detailed data on the speech characteristics of the two groups. he reported that prolongations and conspicuous pauses were features distinguishing the stutterers from non-stutterers.

Egland (1955) evaluated the occurrence of non-fluencies in a group of 26 non-stuttering kindergarten children and three pre-school age stutterers. The non-stuttering group had a lower frequency of sound or syllable repetitions than either word or phrase repetitions. Repetitions of parts of words constituted the most common type of repetitious speech in both the stutterers and non-stutterers. However, the stutterers showed a markedly higher percentage of repetitions of all types, the repetitions consisted more heavily of sound or syllable repetitions and very few phrase repetitions. The stutterers showed repetitions consisting of 1-5 repetitions of the repeated part whereas the non-stutterers had

repetitions ranging from 1-3. The speech samples of non-stutterers contained a higher percentage of stalls (uh, um, etc.) whereas the speech of the stutterers had a greater percentage of prolongations.

Results of several studies of nonfluency in the speech of young children are present in the report by Branscom, Hughes and Oxtoby, 1955. The data were collected from 193 children, whose age range was 2-5 years. Inspection of the data revealed that repetitions of sound, words and phrases were present to some degree in the speech of every subject. Such repetitions occurred significantly often to render unwarranted any hypothesis that repetitions per se constitute abnormal speech behaviour. There was a mean of approximately 4.9 instances of all types of repetition per 100 words during free play speech behaviour.

Glasner and Rosenthal (1957) were of the view that parents were the first who diagnosed their children as stutterers. Excessive repetition was the most frequently associated with the label of stuttering by parents of first grade children.

Boehlmer (1958) assessed the ability of trained and naive listeners to distinguish the speech of stutterers from non-stutterers. He found that it was sometimes difficult to distinguish normal disfluency from stuttering dysfluency.

Johnson et al. (1959) report on three separate studies which drew comparisons between non-stuttering children and Children regarded as stutterers. The combined samples contained 246 children in each group, over an age range of approximately 2-14 years. From their research findings, Johnson and Associates (1959) concluded that the stutterers exceeded the non-stutterers in the frequency of most types of disfluency. There was no significant difference, however, in the case of interjections (such as uh), revisions and incomplete phrases. Significant differences between the two groups appeared in the case of sound and syllable repetition, word repetition, phrase repetition, broken words and prolonged sounds. The groups differed mainly in the number of sound, syllable and word repetitions. Not only did the stutterers tend to have more of these repetitions, they also exceeded the non-stutterers in the mean number of units/repetition. This is also true of interjections. The average stutterers tended to have 1-3 unit repetitions while the average non-stutterers tended to have repetitions of one or two units.

Because certain children bore the label stutterer though they were more fluent than certain children who were called normal speakers, it seemed to Johnson that it was the evidence of perceptual and evaluative factors at work. Johnson et al. (1959) argued that there were no natural lines of demarcation

between normal and abnormal fluency. Consequently, there was no way to define stuttering as a feature of child's speech which would serve to differentiate it operationally from normal disfluency. Stuttering, therefore, could only be defined as an evaluative reaction of a listener.

According to Wingate (1962a), nonfluencies are common among youngsters i.e. not only that most children evidence non-fluencies but that the frequency of occurrence is generally comparable among children and that the nonfluencies are generally similar in character from one child to another.

In a later study conducted in the same year, Wingate (1962b) concluded that stuttering can be differentiated from normal nonfluency in two ways (a) stuttering is identified primarily on the basis of sound and syllable repetition and prolongation, somewhat secondarily in terms of hesitation, (b) a concurrent factor in the identification of stuttering is the severity of expression of the symptoms, which is judged in terms of the frequency with which the foregoing irregularities are evidenced, the presence of a combination of these irregularities or both. Thus, sound repetitions, syllable repetitions, prolongations and hesitations might be designated as 'stuttering nonfluencies'. Fluency irregularities ordinarily accepted as normal are the order of word repetitions, revisions and interjections.

Also, both hesitations and word repetitions might be identified as either stuttering or normal nonfluency depending on whether they occur in speech which contains predominantly one or the other category of nonfluency. The criterion used by most people to differentiate between stuttering and non-stuttering nonfluencies is that the former involve difficulty in uttering speech whereas the latter reflect an uncertainty, a reflection, a momentary lapse or easily correctable error in expressing a thought.

McDearmon's (1968) re-evaluation of Johnson's work pointed out the following differences between normally non-fluent and stuttering groups of children: prolongations and repetitions of sounds and syllables, and the presence of slight tension in getting the words out occurred with significantly higher frequency in the children who had been diagnosed as stutterers than in those children who had not been so diagnosed.

According to Kools and Berryman (1971), non-stutterers showed more interjections than any other type of disfluency. The categories of word repetitions, revisions and incomplete phrases also appear to be prevalent types of disfluency in the speech of non-stuttering children. The tendency for non-stutterers to exhibit marked quantities of interjections, word repetitions, revisions, and incomplete phrases but to present relatively little disfluency in those categories of disfluency commonly associated with stuttering behaviour, suggests that stuttering behaviour may be qualitatively and quantitatively different from the disfluent behaviour of nonstuttering children.

Van Riper (1971) provides the following guidelines for differentiating normal from abnormal disfluency.

Behaviour	Stuttering	Normal disfluency
Syllable repetition		
Frequency/word	Greater than 2	Less than 2
Frequency/100 words	Greater than 2	Less than 2
Tempo	Faster than normal	Normal tempo
Regularity	Irregular	Regular
Schwa vowel	Often present	Absent or rare
Airflow	Often interrupted	Rarely interrupted
Vocal tension	Often apparent	Absent
Prolongations		
Duration	Longer than 1 sec.	Less than 1 sec.
Frequency	More than 1/100 words	Less than 1/100 words
Regularity	Uneven/interrupted	Smooth
Tension	Important when present	Absent
When voiced	May show rise in pitch	No pitch rise
When unvoiced	Interrupted airflow	Airflow present
Termination	Sudden	Gradual
Gaps (silent pauses)		
Within word boundary	May be present	Absent
Prior to speech attempt	Unusually long	Not marked
After the disfluency	May be present	Absent

Behaviour	Stuttering	Normal disfluency
<u>Phonation</u>		
Inflections	Restricted, monotone	Normal
Phonatory arrest	May be present	Absent
Vocal fry	May be present	Absent
<u>Articulatory posture</u>		
Appropriateness	May be inappropriate	Appropriate
<u>Reaction to stress</u>		
Type	More broken words	Normal disfluencies
<u>Evidence of awareness</u>		
Phonemic consistency	May be present	Absent
Frustration	May be present	Absent
Postponement (Stallers)	May be present	Absent
Eye contact	May waver	Normal

Silverman (1972), on studying the disfluencies of 4 year old non-stuttering children found that part word repetitions' and 'disrhythmic phonations' were the most frequently occurring type of disfluency and were therefore not peculiar to stuttering disfluencies.

Yairi and Clifton's (1972) study involved 15 normal pre-schoolers aged five years one month - five years eleven months. They found revisions or incomplete phrases to be the most common disfluency. Interjections and word repetitions were the

next most commonly occurring forms of disfluency. Tense pauses which are typically regarded as characteristic of stuttering was the least occurring disfluency. These could be used to determine whether the child in the particular age range was normally non-fluent or an incipient stutterer.

Repetition of whole words occur frequently in the speech of young stutterers and non-stutterers alike. They are more frequent in the speech of stutterers, however. These word repetitions occur almost always at the beginning of a syntactic unit and never at the end (Bloodstain, 1974).

Floyd and Perkins (1974) selected 24 preschool children (3.2 years to 5.2 years) and measured the total syllables spoken and the syllable dysfluencies (repetitions, prolongations and interjections). They found that the mean percent syllables dysfluent for the stutterers was 9.88, whereas for non-stutterers it was only 1.24. No percent syllable dysfluency of any non-stutterer approached that of a stutterer. They conclude that young stutterers are handicapped from the beginning in their management of fluency and it could be that their relatively high percentage of syllable dysfluency was learnt.

Huffman and Perkins (1974) found that sound repetitions elicited more stuttering judgements than prolongations and hesitations. Also, more frequent disfluency instances per-sample generated more stuttering judgements than fewer instances.

Bjorkan (1975) noted that fragmentation of a word before the whole word is pronounced is the most characteristic feature which distinguishes the speech of stutterers from that of non-stutterers. Fragmentation includes part word repetitions, sound prolongations, blockings and interjections within words. In addition, repetitions of one syllabic words and pauses before starting the utterance of a word have frequently been considered as instances of stuttering. According to the present concept of stuttering, however, these categories should be counted as normal disfluency.

Bloodstein (1975a) is of the opinion that sound or syllable repetitions and sound prolongations tend to incline listeners to identify stuttering more than do revisions and interjections, which are more likely to be evaluated as normal disfluencies.

He found that no types of disfluency exhibited by the stutterers were absent from the speech of non-stutterers. This observation makes it possible to entertain a continuity hypothesis about the relationship between stuttering and normal disfluency. Stutterers appear to do the same things non-stutterers do, only more so.

Stocker (1976) developed a technique "The stocker Probe Technique for Diagnosis and Treatment of stuttering". This is

a screening test that elicits responses of varying length and complexity. It provides normative data which indicates the presence or absence of stuttering and the severity of the disorder if it exists. This can be used for screening and differentiating the very young stutterer from the very young non-stutterer during early stages of the disorder.

According to Wingate (1976), the speech characteristics which distinguished stuttering disfluencies from normal disfluencies were "audible and silent elemental repetitions and prolongations". He further stated that appropriate identification of these features as "stuttering" was enhanced through consideration of frequency, amount of effort, spacing of repetitions and analysis of what occurred during the intervals of a repetition.

Adams (1977) drew from several sources in delineating a strategy to distinguish normally non-fluent children from incipient stutterers. The following qualitative and quantitative criterion were cited: (i) Stutterers were twice as non-fluent as non-stutterers, (ii) Stutterers produced 1-5 reiterations of a part word repetition whereas non-stutterers produced 1-4 reiterations, (iii) Stutterers displayed "Schwa" intrusion in repetitions whereas non-stutterers did not.

Children who stutter will generally have ten or more disfluencies for every 100 words while children who do not

stutter will tend to have no more than five disfluencies for every 100 words (Adams, 1977). Another danger sign to watch for is the duration of the disfluencies. Stuttering children tend to repeat sounds longer than do non-stuttering children who will generally repeat the sound only once or twice. Other danger signs include abnormal voicing and abnormal airflow during the production of disfluencies and the use of schwa for the vowel usually found in the syllable being repeated. Using these five behaviours or danger signs, Adams (1977) has developed a clinical strategy to contrast the normally disfluent child to the young stutterer by analysing the child's spontaneous language for these behaviours.

In Curren and Hood's (1977a) study, the samples containing double unit part word repetitions and word repetitions were more likely to be labelled as stuttering than as normal non-fluency.

Sound, syllable and part word repetitions and to a lesser extent prolongations are those disfluency types which observers are likely to classify as stuttering instances. Interjections and word repetitions may be classified as stuttering if these occur with sufficient frequency.

With increasing frequency of interjections, judgements of fluency decreased and judgements of stuttering increased. Also, observers readily applied the label stuttering rather than disfluent to word repetitions than to interjections as the frequency of these fluency departures increased (Hegde and Hartman, 1979 a & b).

Williams, Darley and Spriesterbach (1978) advocate the use of a tape recorded sample of speaking and oral reading, They measure the different kinds of disfluencies and also the total disfluency index. Though norms have not been given, they are of the opinion that part word repetitions, prolongations, interjections, phrase repetitions, incomplete phrases and broken words are seen more in the speech of stutterers than non-stutterers.

In an extensive longitudinal analysis, Colburn (1979) examined the nonfluencies of four children. He found a great deal of individual variation over time among the children in their overall rate of fluency. He found dysrhythmic phonation and tense pauses were the least frequently occurring nonfluencies in normal speaking subjects.

Bjerkkan (1980) studied children in the age group 2-6 years. He found that children in this age group may have considerable numbers of one syllable word repetitions in their speech and still be considered as fluent speakers. This study indicates that word fragmentation may be a useful criterion for distinguishing instances of stuttering from normal pronunciation of words, at least as far as pre-school children are concerned. This is justified by the fact that fragmentation of words was extremely rare in the sample of non-stuttering pre-school children. Fragmentation of words in contrast to other types of disfluency does not occur in non-stuttering speech, regardless of what age groups are concerned.

Bloodstein and Grossman (1931) studied speech of five stutterers, aged 3.10 years - 5.7 years and concluded from their study that word repetition appeared more frequently than any other form of disfluency. It was also *the* more frequent type of disfluency for three of the five subjects and was the only one that formed an outstanding aspect of the pattern for all subjects. Both word and phrase repetitions appeared consistently at the beginnings of syntactic units.

According to this study; like early stuttering, normal non-fluency in preschool children is very common on the first word of sentences or clauses. Both occur on pronouns and conjunctions than on other parts of speech. It is hard to avoid the impression that what we observe in the disfluencies of these young stutterers is, for the most part, a greater degree of the same behaviour which we find in the speech of non-stuttering children.

Yairi (1981) studied 32 pre-school children's spontaneous speech. She found that filled pauses, audible inspirations and tense pauses was less in these children. Syllable, word, part word and phrase repetitions were common in their speech. False starts and incomplete phrases occurred more.

According to Adams (1982), the child who will pass most easily and rapidly through the period of nonfluency will

posses three general attributes: (i) a *family* background Which is untainted by stuttering (ii) a normal, if not accelerated cerebral maturation and organization (iii) support from significant others in his environment.

The rate of development of non-fluencies within the context of normally fluent speech in the early years appears to be a very dynamic phenomenon, and one which occurs on a highly individual basis. The two characteristics that would most likely be associated with stuttering, dysrhythmic phonation and tense pause, rarely occur in normal speaking youngsters. (Wall and Meyers, (1982).

In studying the development of fluency in 2-, 4-, 6-year old boys, Wexler and Kysak (1982) found revision - incomplete phrase and interjections to be the most frequent and part word repetitions to be the least type of nonfluency. This could be used for differentiating stuttering from non-stuttering children.

According to Dalton (1983), the differential diagnosis between normal childhood disfluencies and early stuttering is still problematic. The clinical picture is usually confusing, with children manifesting a variety of normal and abnormal behaviours.

Between the stutterers and non-stutterers, regularity (even or uneven stress) is a distinguishing factor. Clinical evidence shows that stuttering children show more uneven rhythm and stress in their repetitions (Gregory and Hill, 1984).

In a study by Yairi and Lewis (1984) two groups of ten, 2- and 3- year old children were tested. Overall, stutterers were $3\frac{1}{2}$ times more disfluent than control subjects. The most frequent disfluencies in the speech of stutterers, in ranked order, were part-word repetitions, dysrhythmic phonation and single-syllable word repetition. For the non-stutterers the most frequent disfluencies were, in ranked order, interjection, part word repetition and revision-incomplete phrase.

The range for part word repetition for the stutterers was 1-11 units while for non-stutterers it was 1-2 units. Stutterers repeated a part word repetition segment on the average 1.72 times, whereas the non-stutterers repeated the segment only 1.12 times.

Wells (1987) is of the opinion that stuttering usually develops between the ages of 2-6 years, although it may develop in later childhood. Most children go through a period of increased disfluency at this time making it difficult to differentiate easily between the children who are developing stuttering and those who are simply going through this normal period of increased disfluency.

Also, stuttering children tend to repeat parts of words, sounds or syllable more often than their non-stuttering counterparts, who will tend to repeat words and phrases more frequently.

Although both the stuttering and non-stuttering children will have increased disfluencies during this period of development (2-6 years), stuttering children will tend to have more than twice as many disfluencies as will the non-stuttering children (Wells, 1987).

There is a large and statistically significant difference between the stutterers and non-stutterers in the proportions of total disfluencies occurring in clusters (Hubbard and Yairi, 1988). For stutterers, most disfluencies (57%) are clustered. Single disfluency instances usually prevailed in the speech of the control subjects. Also, the stutterers produce longer clusters than do the non-stuttering controls. Thus, cluster concentrations encompassing 50% or more of all disfluencies in a speech sample and/or the frequent occurrence of clusters of two or more disfluencies, may be useful indicators of early stuttering.

In Meyers study (1989), in order to be classified a stutterer, a child had to receive a severity rating of mild, moderate or severe on both the Stocker-Probe Technique (Stocker, 1976) and the Stuttering Prediction Instrument for young children (Riley, 1981). Meyers (1989) found that the pre-school stutterers showed more part word repetitions and prolongations than any other type of disfluency.

Hegde (1990) used a five percent cutoff in all age groups for the selection of clients to therapy.

Author	Stuttering	Normal non-fluency
Davia (1939)	Syllable repetitions and a high number of reiterations of a repetition are indicative of a disorder.	If one word in four is a repeated word, either in part or in whole in a word or phrase repetition, then considered normal. Used phrase repetition, word repetition and syllable repetition in given order.
Egland (1955)	Stutterers showed a remarkably higher percentage of repetitions of all types, the repetitions were mainly of sound and syllable repetition and very few phrase repetition.	Lower frequency of sound or syllable repetition than either word or phrase repetitions.
Johnson at al. (1959)	Increased frequency of most types of dis-fluency.	
-	Stutterers tend to have more of sound, syllable and word repetitions.	
	They exceeded the non-atutterers in mean no. of units/repetition and interjections.	
	Had 1-3 unit repetitions.	Had repetitions of 1 or 2 units.
Wingate (1962b)	Identified primarily on basis of sound and syllable repetition and prolongation. Secondarily in terms of hesitation.	

Author	Stuttering	Normal non-fluency
	Sound repetitions, syllable repetitions, prolongations and hesitations might be designated as stuttering nonfluencies.	Fluency irregularities regarded normal are word repetitions, revisions and interjections.
	Stuttering disfluencies involve difficulty in uttering speech.	Non-stuttering disfluencies reflect an uncertainty, a reflection, a momentary lapse or easily correctable error in expressing a thought.
Van Riper (1971)		

Behaviour	Stuttering	Normal disfluency
<u>Syllablerepetition</u>		
Frequency/word	Greater than 2	Less than 2
Frequency/100 words	Greater than 2	Less than 2
Tempo	Faster than normal	Normal tempo
Regularity	Irregular	Regular
Schwa vowel	Often present	Absent or rare
Airflow	Often interrupted	Rarely interrupted
Vocal tension	Often apparent	Absent
<u>Prolongation</u>		
Duration	Longer than 1 sec.	Less than 1 see.
Frequency	More than 1/100 words	Less than 1/100 words
Regularity	Uneven/interrupted	Smooth
Tension	Important when present	Absent.

Behaviour	Stuttering	Normal disfluency
When voiced	May show rise in pitch	No pitch rise
When unvoiced	Interrupted airflow	Airflow present
Termination	Sudden	Gradual
<u>Gaps(Silent pauses]</u>		
Within word boundary	May be present	Absent
Prior to speech attempt	Unusually long	Not marked
After the dia-fluency	May be present	Absent
<u>Phonation</u>		
Inflections	Restricted, monotone	Normal
Phonatory arrest	May be present	Absent
Vocal fry	May be present	Absent
<u>Articulatory posture</u>		
Appropriateness	May be inappropriate	Appropriate
<u>Reaction to stress</u>		
Type	More broken words	Normal disfluencies
<u>Evidence of awareness</u>		
Phonemic consistency	May be present	Absent
Frustration	May be present	Absent
Postponement	May be present	Absent
Eye contact	May waver	Normal

Author	Stuttering	Normal non-fluency
Bjerkan (1975)	Fragmentation (part word repetition, sound prolongation and interjection within words) is most characteristic feature of stutterers.	Repetition of one syllabic words and pauses before starting the utterance of a word should be considered as normal disfluency.
Bloodstein (1975a)	Sound or syllable repetitions and sound prolongations identify stuttering.	Revisions and interjections are likely to be evaluated as normal non-fluency.
Adams (1977)	Stutterers twice as non-fluent as non-stutterers	
	Stutterers produced 1-5 reiterations of a part word repetition.	Non-stutterers produced 1-4 reiterations.
	Stutterers displayed a 'schwa' vowel which non-stutterers did not.	
	Ten or more disfluencies for every 100 words.	Tend to have no more than five disfluencies for every 100 words.
	Tend to repeat sounds longer than the non-stutterers.	Tend to repeat sounds only once or twice.
Yairi and Lewis (1984)	Stutterers were 3½ times more disfluent than non-stutterers.	
	Part word repetitions, disrhythmic phonation, and single syllable word repetition seen.	Interjection, part word repetition seen.
	Range for part word repetition was 1-11 units.	Range of part word repetition was 1-2 units.
	Stutterers repeated a part word repetition segment on the average 1.72 times.	Repeated the segment only 1.12 times

Author	Stuttering	Normal non-fluency
Wells (1987)	<p>Tend to repeat parts of words, sounds or syllable.</p> <p>Stutterers have more than twice as many disfluencies as non-stutterers.</p>	Repeat words and phrases more frequently.
Hubbard and Yairl (1988)	<p>57% of disfluencies are clustered.</p> <p>Stutterers produce longer clusters than do non-stutterers.</p> <p>Cluster concentrations encompassing 50% or more of all disfluencies in a sample and/or the frequent occurrence of clusters of two or more disfluencies are indicators of early stuttering.</p>	Single disfluency instances seen in the normal subjects.
Hegde(1990)	Greater than 5% cutoff in all age groups for diagnosis of stuttering.	Less than 5% cut off in all age groups for diagnosis of normal non-fluency.

Table-1: Summary of the differential diagnosis between normal non-fluency and stuttering.

The differential diagnosis has been summarized in Table-1. In spite of extensive research, it is not clear as to what differentiates stuttering from normal non-fluency, starkweather

(1987) opines that the knowledge of fluency is a must for the understanding of dysfluency. In this regard, studies (Nagapoomima, 1990; Indu, 1990; Yamini, 1990; Rajendraswamy, 1991) Shanna, 1991) were conducted to analyze the disfluencies of normal children in the age range of 3-7 years. Based on this, a test was proposed. Table-2 summarizes the percent of disfluencies in these children in the proposed test. However, the validity of this test was not established.

Disfluency types in percentage	Age in years			
	3-4 years	4-5 years	5-6 years	6-7 years
Filled pause	9.6	12	7.66	7.4
Unfilled pause	8.6	1.52	9.2	1.53
Repetition	4.0	0.69	3.21	6.37
Parenthetical remarks	3.5	5.27	7.49	6.54
False starts	0.16	0.39	6.51	2.88
Sound prolongation		0.13	1.11	1.84
Part question repeats	-		0.04	-
Audible inspira- tions		0.18	5.38	2.79
Broken words		-	-	0.19
Hesitations			-	0.13
Total	24.86	20.18	35.60	29.67

Table-2: Percentage of disfluencies in normal children (3-7 years)

The present study aims at administering this test to children brought to the Institute with the complaint of disfluencies in speech. The results of the test will be compared with the normative data and the opinion of speech pathologist in diagnosing a child either as a stutterer or a normally non-fluent child. The outcome **will** be a test which could be clinically used.

METHODOLOGY

Subject: Seven children in the age group of 3-4 years and six children each in the age range of 4-5 years, 5-6 years and 6-7 years brought to the Institute with the complaint of stuttering were selected for this study. All of them had hearing within normal limits (thresholds less than 20 dB) and normal intelligence. They were all from the middle socio-economic status. Table-3 shows the age details of the subjects.

Subject	Age in years							
	M	3-4 F	M	4-5 F	M	5-6 F	M	6-7 F
1			4+2			5.1	6.2	
2	3.4			4.3		5.2	6.3	
3	3.5			4.8	5.8			6.4
4		3.6	4.9			5.9	6.4	
5		3.7	4.10		5.10		6.6	
6	3.10		4.11		5.11		6.9	
7	3.11							

Table-3: Age of subjects selected for the study.

Material: The material developed by Nagapoornima (1990); Indu (1990); Yamini (1990); Rajendraswamy (1991) for the fluency test was used. It comprises of 13 single pictures for the age group 3-4 years and 6 sets of connected pictures

for the age group 4-5 years; 11 sets of cartoons for the children in the age group of 5-6 years and connected pictures depicting six panchatantra stories for the age range 6-7 years. (Appendix-I, II, III, IV).

Procedure: Initially, rapport was built with the subject to enable easy facilitation of speech. Each child was individually tested in a quiet room and was accompanied by one of the parents. For the younger age group (3-4 years), the pictures were presented visually one at a time and the tester prompted the child to respond for the questions asked. The questions were related to the pictures and included 'What is this?', 'Have you seen it?', 'what does it eat' etc. In the age group 4-5 years, the child was provided with pictures and was stimulated to respond for the same. One picture was used for trial and the picture was described to the child by the tester or parent. The children in the age group of 5-6 and 6-7 years were visually presented with cartoons and picture stories respectively and were Instructed to describe them. All the speech samples were recorded on audio-cassettes.

Analysis: The speech sample was transcribed verbatim and utterances were used as a basis for analysis. The following categories of disfluencies were considered for the study:

- i) Filled pauses (FP): Characterized by extraneous sounds such as /mmm/ /uh/ /um/ /aa/ etc.

- ii) Unfilled pauses (UFP): Characterized by silence, judged to affect the smooth flow of speech.
- iii) Repeats (R): This category involved syllable repetition, part word repetitions, word repetitions, utterance repetitions and phrase repetitions.
- iv) Sound prolongations (P): Characterized by words/utterances wherein the phonation disturbs or distorts the so called normal rhythm or flow of speech.
- v) Audible inspirations (AI): This was judged to exist between words, part words, utterances, part utterances and non-words.
- vi) False starts (FS): False starts included content modification, grammatical correction, change in pronunciation, incomplete utterance/phrase? precision/addition of an adjective, adverb etc. change in the meaning and negation, exclamation.
- vii) Parenthetical remarks (PR): This was characterized by fillers like /m a t t e/, /a:me:le/, /a:va:ga/, /g o t t a/,
- viii) Part question repetition (PQR): This category is characterized by repetition of part of a question put forth by the experimenter.

Each instance of disfluency was considered as one disfluency. /ma/ /mara/ is an example of one disfluency (repetition) while /ma/ /ma/ /mara/ is an example of two disfluencies (repetitions).

The total number of utterances and the number of different types of disfluencies in the picture description task was calculated. The disfluencies were converted to percent by using the following formula:

$$\text{Percent of disfluency} = \frac{\text{No of disfluencies} \times 100}{\text{Total no.of utterances}}$$

The disfluency data on normal children determined by Napapoornima, 1990; Indu, 1990; Yamini, 1990, Rajendraswamy, 1991 was used as a standard. (Table-2), The data obtained was compared with this normative data for the diagnosis. Also, to comparison of the diagnosis of the child on the basis of the fluency test was made with that of a speech pathologist. Further, Pearson's correlation co-efficient was performed to findout the correlation between the results of the fluency test and the speech pathologists diagnosis.

RESULTS AND DISCUSSION

RESULTS:

In the age group of 3-4 years, the fluency test results indicated that unfilled pauses, filled pauses and repeats in the given order of frequency were the major criteria for diagnosing a child as a stutterer in the age group of 3-4 years. However, the speech pathologists criteria seems to be different in different subjects. Unfilled pauses seem to be a guide for the diagnosis of stuttering in one subject, pauses in another and repeats and filled pauses in yet another subject.

For eg. while in subject-2, the Speech Pathologist consider* the unfilled pause (UPP) as an indicator of diagnosis inspite of them being within the normal range, in subject-3 the presence of UFP is not considered and the child is diagnosed to have normal non-fluency (NNF).

Table-3 shows the details of the fluency test results and that of the Speech Pathologist. While 57.14% were diagnosed as having stuttering from the fluency test, only 42.85% were diagnosed to have stuttering by Speech Pathologist. Table-4 depicts the false positives and the false negatives identified by the Speech Pathologist.

	S ₁	S ₂	S ₃	S ₄	S ₅	S ₆	S ₇
False +ve		+					
False -ve			+	+			

Table-4: False positives and negatives (Speech Pathologist's diagnosis).

	Normal	S1	S2	S3	S4	S5	S6	S7
Fp	9.6	9.3	5.1	12.3	11.4	10.6	10.7	e.2
UFP	8.6	7.4	e.0	10.0	5.7	9.4	9.1	6.8
R	4.0	2.3	2.1	2.2	4.9	4.1	4.8	3.8
Total	22.2	20.0	15.5	24.5	23.0	24.1	24.6	18.8
Diagnosis on fluency test		NNF	NNF	Sttg	Sttg	sttg	Sttg	NNF
Diagnosis by Speech Pathologist		NNF	Sttg	NNF	NNF	Sttg	Sttg	NNF

Table-5: Diagnosis by Speech Pathologist and fluency test (3-4 years).

NNF - indicates normal non-fluency; Sttg - Stuttering

In the age group of 4-5 years, repetitions, pauses and audible Inspirations seem to have guided the fluency that results in favour of stuttering. The Speech Pathologist, however, seems to have used repeats and filled pauses, or repeats alone, or a combination of repeats, pauses and audible inspiration to help in differentiating the subjects. In subject-2 and subject-5 inspite of the repeats being within normal limits. Speech Pathologist's diagnosis of stuttering is based on repeats

The details of the results of the fluency test and the Speech Pathologist's evaluation are given in Table-6. While 33.33% were diagnosed as stuttering using the test, 66.66% were

diagnosed as stuttering by the Speech Pathologist. Table-7 highlights the false positives and false negatives in this age group. It could be observed that no false negatives are identified.

	Normal	S1	S2	S3	S4	S5	S6
FP	12.00	10.8	11.0	14.6	9.1	10.0	11.2
UFP	1.52	1.0	0.8	1.8	10.3	0.20	1.1
R	0.69	0.3	0.5	2.2	6.8	0.6	0.3
P	0.13	-	-		2.2	-	0.1
AI	0.18	0.1	-	1.6	1.1	-	
Total	14.52	12.1	12.3	20.2	29.5	10.8	12.7
Diagnosis on fluency test		NNF	NNF	Sttg	Sttg	NNF	NNF
Diagnosis by Speech Pathologist		NNF	Sttg	Sttg	Sttg	Sttg	NNF

Table-6: Diagnosis by Speech Pathologist and fluency test (4-5 years).

NNF - indicates normal non-fluency; Sttg - stuttering.

	S ₁	S ₂	S ₃	S ₄	S ₅	S ₆
False +ve		+			+	
False -ve						

Table-7: False positives and negatives (Speech Pathologist's diagnosis)

Among the subjects in the age group 5-6 years, the fluency test results reveal that repeats, filled pauses and unfilled pauses serve as a clue to diagnose a child as a stutterer.

However, the speech Pathologist seems to have used a varied criteria of repeats or filled pauses or unfilled pauses to come to a diagnosis, in subject-4 and subject-6. Speech Pathologist considers repeats and repeats and unfilled pauses respectively as the criteria for diagnosis sinpite of them being within normal limits. However, in subject-3 the same percentage of repeats as in subject-4 and subject-6 is not considered for the diagnosis of stuttering.

The details of the fluency test results and the Speech Pathologist's diagnosis are shown in Table-8. 50% of the subjects were diagnosed as stutterers based on the test results and 83.3% of the subjects were diagnosed as stutterers baaed on the Speech Pathologist's evaluation. Table-9 gives the false positives and false negatives seen in this group. It could be observed that there are no false negatives identified.

	Normal	S1	S2	S3	S4	S5	S6
FP	7.66	9.2	5.6	2.3	9.3	10.1	4.6
UFP	9.2	6.8	4.5	9.0	9.7	11.5	8.3
R	3.21	9.8	-	3.0	3.0	4.9	3.1
P	1.11	0.2	-	-	2.1	-	-
AI	5.38	-	4.2	2.5	6.1	-	1.2
Total	26.56	26.0	14.3	36.8	30.2	26.5	17.2
Diagnosis by fluenty test		Sttg	NNF	NNF	Sttg.	Sttg	NNF
Diagnosis by Speech Pathologist		Sttg	NNF	Sttg	Sttg	Sttg	Sttg

Table-8: Diagnosis by Speech Pathologist and fluency test (5-6 years).

NNF - indicates normal nonfluency; Sttg.- stuttering

	S1	S2	S3	S4	S5	S6
False +ve			+			+
False -ve						

Table-9: False positives and negatives (Speech Pathologist's diagnosis).

In the age group of 6-7 years, the scores obtained according to the test reveal that repeats, filled pauses and unfilled pauses help in differentiating a young stutters from a normally nonfluent child. The Speech Pathologist seems to have used repeats as a major criteria in one subject and a combination of repeats and pauses (either filled and unfilled) in others to aid in diagnosis.

In subject-2, repeats are considered to aid the diagnosis of stuttering by Speech Pathologist inspite of the percentage of repeats within normal limits. Comparing subject-2 with subject-5, inspite of the filled pauses being closer, in subject-5 and prolongation is considered for the diagnosis of stuttering while in subject-2 it is not.

The details of the fluency test results and the Speech Pathologist's evaluation are provided in Table-10. 66.66% of the subjects fall under the diagnosis of stuttering using the fluency test and 83.3% have been labelled as stutterers by the

Speech Pathologist. Table-11 depicts the false positives and false negatives seen in this age group. It could be noticed that there are no false negatives and the number of false positives decrease as compared to the earlier age groups.

	Normal	S1	S2	S3	S4	S5	S6
FP	7.4	4.3	7.2	10.5	11.0	7.5	10.1
UFP	1.53	0.2	-	1.3	2.6	4.4	2.1
R	6.37	5.1	6.2	9.8	8.5	15.9	7.3
P	1.84	0.2	0.4	0.1	-	-	-
AI	2.79	-	-	1.9	-	-	2.9
BW	0.19	-	-	-	-	-	-
H	0.13	-	-	-	-	-	-
Total	20.25	9.8	13.8	23.6	22.1	27.8	22.4
Diagnosis by fluently test -		NHF	NNF	Sttg	Sttg	Sttg	Sttg.
Diagnosis by Speech Pathologist		NNF	Sttg	Sttg	Sttg	Sttg	Sttg

Table-10: Diagnosis by Speech Pathologist and fluency test (6-7 years)

NNF - indicates normal nonfluency; Sttg - Stuttering.

	S1	S2	S3	S4	S5	S6
False +ve		+				
False -ve						

Table-11: False positives and negatives (Speech Pathologist's diagnosis).

The results of the Pearson's Correlation Coefficient Indicated that the correlation between the diagnosis by the fluency test and by Speech Pathologist was positive ($r=0.505$ at 0.01 level

44% of the subjects who reported to the Institute were diagnosed to have stuttering both by the test and the speech Pathologist. The fluency test results and the Speech Pathologist's decision that the child had normal non-fluency concurred in 24% of the total number of cases. On the whole, 68% of the subjects were diagnosed similarly (stuttering or normal non-fluency) both according to the test and the Speech Pathologist's criteria.

DISCUSSION:

The results of the study reveal the following interesting points:

First of all, repeats, Unfilled and filled pauses to a major extent and prolongation and audible inspiration to a lesser extent, seem to be the major features which aid in differentially diagnosing a stutterer from a normally nonfluent child* The percentage of the various forms of dysfluencies in those cases diagnosed as stuttering on the basis of the fluency test is given in Table-12.

Disfluencies	Average across age groups (3-7 years)	Age group in years			
		3-4	4-5	5-6	6-7
Repetitions	84.6%	50%	66.6%	66.6%	100%
Unfilled pauses	84.6%	75%	100%	66.6%	75%
Filled pauses	69.2%	100%	50%	100%	100%
Prolongation	30.7%	-	30%	50%	-
Audible inspiration	15.4%	-	100%	50%	25%

Table-12: Percentage of disfluency as obtained by the fluency test.

From the above table, it can be observed that repetitions seem to be the most commonly occurring disfluency in the age group of 6-7 years, and it occurred in all the subjects tested. Filled pauses occur maximally in the age group of 3-4 years, 5-6 years and 6-7 years. Unfilled pauses and audible inspirations seem to be maximum at 4-5 years.

On an average, repetitions and unfilled pauses occur maximally. Filled pauses also occur to a large extent and prolongations and audible inspirations occur minimally.

These findings seem to agree with the findings of Davis (1939), Glasner and Rosenthal (1957), Johnson et al. (1959), Bloodstein (1974), Huffman and Parkins (1974), Adams (1977), Curren and Hood (1979a), Hegde and Hartman (1979 a & b), Bloodstein and Grossman (1981), Yairi (1983) and Nells (1987), in that repetitions occur maximally in stutterers.

Davis (1939) reported that syllable repetitions and a high number of reiterations of a repetition are seen in stutterers. Glasner and Rosenthal (1957) found that excessive repetition in stutterers was reported by the parents. Johnson et al. (1959) concluded that stutterers exceeded the non-stutterers in mean number of units/repetition and interjections. They also tend to have more of sound, syllable and word repetition. Bloodstein (1974) found whole word repetitions to occur

more frequently in stutterers than non-stutterers. Huffman and Perkins (1974) opine that sound repetitions elicited more stuttering judgements than prolongations and hesitations. Adams (1977) reported that stutterers produced 1-5 reiterations of a part word repetition and Curren and Hood (1977a) concluded that sound, syllable and part word repetition and lesser extent of prolongations are classified as stuttering,

While Hegde and Hartman (1979 a & b) found that word repetition elicit more of stuttering judgements than do interjections, Bloodstein and Grossman (1981) observed that word repetition occurred more frequently than any other form of disfluency. Yairi (1983) and Yairi and Lewis (1984) claimed repetition to be characteristic of early stuttering and Wells (1987) observed that stutterers tend to repeat parts of words, sounds or syllables.

The results also agree partly with the findings of Egland (1955) in that stutterers show higher percentage of repeats. However, it is not in consonance with Egland's (1955) findings that prolongations had a greater percentage of occurrence and the work of Johnson (1942) who reported that prolongations and conspicuous pauses were distinguishing features of stuttering.

Second, in the younger age group, unfilled and filled pauses seem to serve as clues for the identification of

stuttering and as the age increases the increased percentage of repeats and filled pauses facilitates easy diagnosis of stuttering.

Third, the Speech Pathologist appears to follow varied criteria in differentially diagnosing the subject as stutterers or normally non-fluent. Repeats, filled and unfilled pauses, and audible inspirations either singly or in combination, seem to help the Speech Pathologist to come to a conclusion about the diagnosis of stuttering. However, while in one case, the Speech Pathologist considers unfilled pause, filled pauses, and repeats to diagnose the child as having stuttering, the same percentage of unfilled pauses, filled pauses or repeats in another child is not considered to indicate stuttering. This indicates a need for the speech Pathologist to be more strict and consistent.

Fourth, in the younger age group, the Speech Pathologist tends to label the child as having 'normal nonfluency' and with increase in age, the inclination is more towards the labeling of stuttering.

Following figure depicts the difference in the diagnosis using the fluency test and the evaluation by the Speech Pathologist.

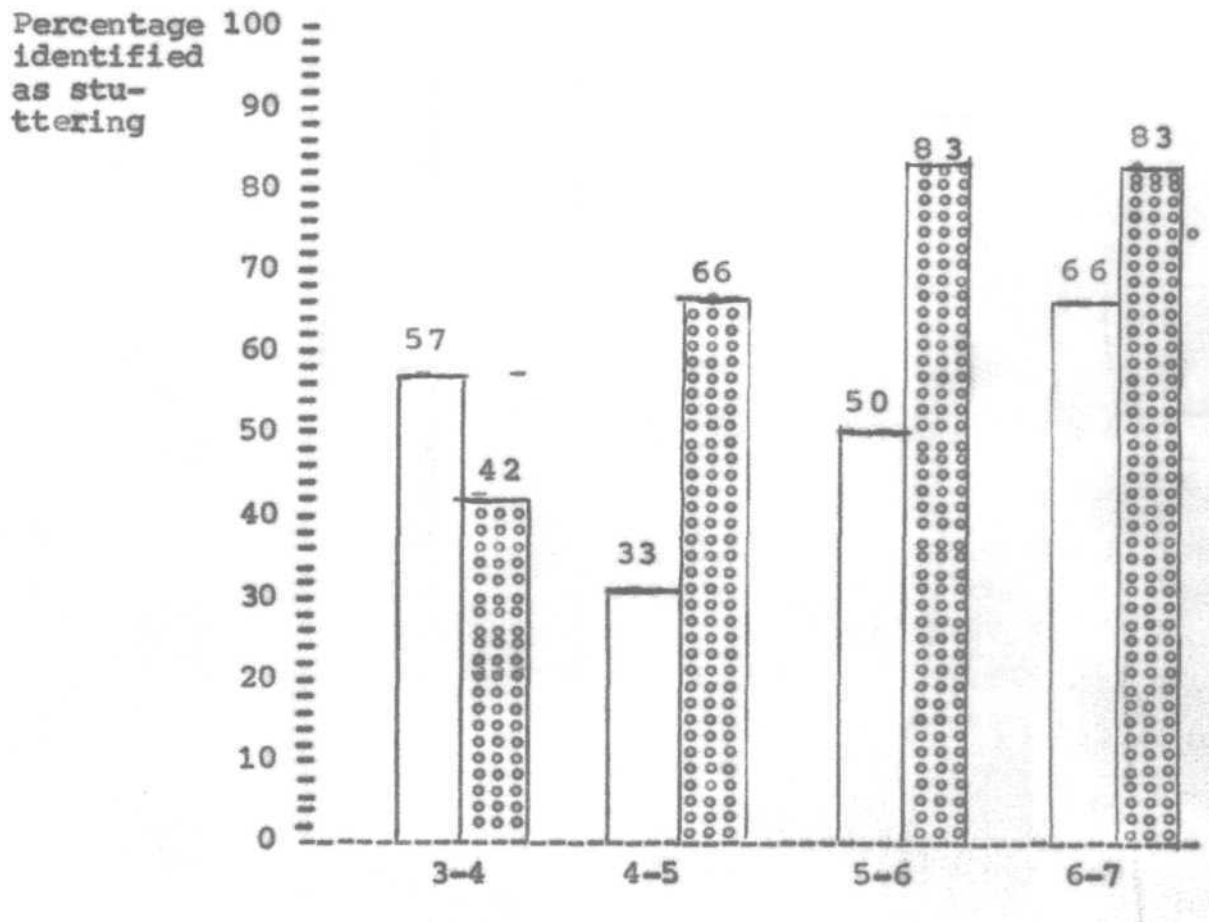


Fig.1: Percentage diagnosis of stuttering by Speech Pathologist and the fluency test

- Diagnosis by fluency test
- Diagnosis by Speech Pathologist

It appears that the Speech Pathologist still has the Johnsonia concept that stuttering originates in the parents ear and not in the child's mouth. The notion to consider all children in the young age as normally non-fluent prevails. This suggests that in spite of the extensive research in the area of fluency development, the results of the research has not been utilized clinically.

It could be suggested that the test of dysfluencies can be any but one should take care of the specificity and the comprehensiveness. The main draw-back with the Speech Pathologist seems to be not having a strict criteria or a cut-off point to diagnose the child as stutterer or normally non-fluent. A strict and uniform measure should be followed by the Speech Pathologist to diagnose a case as stutterer or normally non-fluent.

Fifth, there is a positive correlation of $r=0.505$ (using Pearson's correlation co-efficient) between the judgement of the Speech Pathologist and the results of the fluency test. Further, as the test can differentiate between stuttering and normal non-fluency, the test seems to be valid and it may be used as a clinical tool for differential diagnosis.

The belief that waiting to see if stuttering will disappear of its own accord runs greater risks than treating the child whose speech shows evidence of abnormal dysfluency. Also, higher recovery rates are recorded in literature for young stutterers than for adult stutterers (Conture, 1990). Hence, it is necessary to differentiate a young stutterer from the young non-fluent child as early as possible and start the remediation programme. Thus, a set criteria as in the fluency test could be used as a diagnostic measure.

However, the test needs some modifications. The parenthetical remarks, false starts and part question repeats which have been included in the proposed test need not be considered to differentially diagnose a case. As these disfluencies do not seem to draw the attention of the speaker and since they are considered to be sophisticated forms of disfluency, they may be deleted. Also, the test needs to be modified in its length. In the older age group (5-6 years and 6-7 years), the number of stories used for the picture description task may be reduced. It was found that the children tend to lose interest and find the task boring when asked to describe the entire set of pictures. In order to maintain economy of time and the efficiency of the test, it is proposed that the stories be reduced to six instead of the original eleven in the age group 5-6 years and four instead of the original six in the age group of 6-7 years.

The norms for the fluency test which has been validated with the deletion of parts in it is provided in Table-13.

Disfluency types in percentage	Age group in years			
	3-4	4-5	5-6	6-7
Filled pauses	9.6	12	7.66	7.4
Unfilled pauses	8.6	1.52	9.2	1.53
Repeats	4.0	0.69	3.21	6.37
Prolongations	—	0.13	1.11	1.84
Audible inspiration	—	0.18	5.38	2.75
Broken words	—	—	—	0.15
Hesitation	—	—	—	0.13
		14.52	26.56	20.25

Table-13: Norms for modified fluency test in the age range of 3-7 years.

It is suggested that the Speech Pathologist use this fluency test to have uniformity, consistency and a set criteria.

SUMMARY AND CONCLUSIONS

What differentiates stuttering from normal non-fluency is a question which still draws debates. Several authors (Davis, 1939; Johnson, 1942; Egland, 1955; Meyers, 1989) have tried to list the features which delineate stuttering from normal non-fluency but of no avail. Till now, no consensus has been reached among the Speech Pathologist's as to what features constitute stuttering and what constitute normal non-fluency.

The present study aims at differentially diagnosing the children who report to the Institute with the complaint of Stuttering using the fluency test proposed and developed by Nagapoomima(1990), Indu (1990), Yamini (1990), Rajendraswamy (1991), Shaewa (1991). 25 children in the age range 3-7 years, belonging to the middle socio-economic class were chosen for the study. Speech samples, were elicited from all children using the picture description task, connected pictures, cartoons and panchatantra story pictures respectively for 3-4, 4-5, 5-6 and 6-7 year old children.

Recorded speech samples were transcribed verbatim and analyzed for the following disfluencies. Unfilled pause, filled pause, repeat, prolongation, audible inspirations,

parenthetical remarks, false starts and part question repetition, broken words and hesitations. For eg. Ma Mara was considered as one instance of repetition while ' ma..ma. .mara' was considered as two instances of repetitions.

The data obtained was compared with the normative data given by Nagapoomima (1990), Indu (1990), Yamini (1990), Rajendraswamy (1991) for the diagnosis of stuttering or normal non-fluency. Also, a comparison of the diagnosis of the child on the basis of the fluency test was made with that of a speech pathologist. Pearson's correlation test was performed to find out the correlation between the diagnosis by the test: and by Speech Pathologist.

The results indicated that repeats, unfilled pauses and filled pauses to a greater extent and prolongations and audible inspirations to a lesser extent seem to guide in the diagnosis of a child as a stutterer. Unfilled and filled pauses in the younger age group and repeats and filled pauses in the older age group facilitated easy diagnosis of stuttering, The/ speech Pathologist appeared to follow varied criteria in differentially diagnosing the subjects as stutterers or normally non-fluent. In the younger age group, the Speech Pathologist tended to label the child as being 'normally non-fluent' and with increase in age, the label of 'stuttering' was used more frequently.

Also, there was a positive correlation of $r=0.505$ between the judgements of the Speech Pathologist and results of the fluency test. It was observed that a strict and uniform measure was to be followed by the Speech Pathologist to diagnose a case as stutterer or normally non-fluent.

Baaed on these results, the test was found to be valid and clinically useful in differentiating young stutters from their normally non-fluent peers. The fluency test provides a Set criteria which could be used as a diagnostic tool.

However, the fluency test needs some modifications in the form of reduced length of testing, decrease in number of picture description tasks and deletion of parenthetical remarks, part question repeats, and false starts from the list of disfluencies. The validated modified form of the fluency test may be Used by the Speech Pathologists to have uniformity in their diagnosis.

BIBLIOGRAPHY

- Adams, M.R. (1977): Cited in "The relationship Between Normal Dysfluency and Stuttering: An Old Question Revisited", Shapiro, A.I. and DeClcco, B.A. (1982), JFD, 7, 1982, 109-121.
- Adams, M.R. (1982): "Fluency, Non-fluency and Stuttering in Children", JFD, 7, 1982, 171-186.
- Amman, J.O.C. (1700): Cited in "The Nature of Stuttering" by C.Van Riper, Prentice Hall, Inc, Bnglewood Cliffs, N.J. 1971.
- Aristotle (384BC): Cited in "The Nature of Stuttering*" by C.Van Riper, Prentice Hall, Inc, Bnglewood Cliffs, N.J. 1971.
- Bjerkan, B. (1975): Cited in "Word Fragmentation and Repetitions in the Spontaneous Speech of 2-6 Year Old Children". JFD, 5, 1980, 137-148.
- Bjerkan, B. (1980): "Word Fragmentations and Repetitions in the Spontaneous Speech of 2-6 Year Old Children". JFD, 5, 1980, 137-148.
- Black, J.W. (1951): "The effect of Delayed Sidetone Upon Vocal Rate and Intensity", JSHD, 16, 1951, 56-60.
- Bloodstein, O.(1974):"The Rules of Early Stuttering", JSHD, 39, 1974, 379-394.
- Bloodstein, O.(1975a): "Handbook on stuttering". National Easter Seal Society for Crippled Children and Adults, Illinois, 2nd Edition.
- Bloodstein, O.(1975b): "Stuttering: A second symposium (J.Eisenson,Ed.) New York: Harper and Row, 1975b.
- Bloodstein, O., and Grossman,M. (1981): "Early Stutteringa: Some Aspects of their Form and Distribution". JSHR, 24, 1981, 298-302.
- Boehlmer, R.M. (1958): "Listener Responses to non-fluencies", JSHR, 1, 1958, 132-141.
- Branscom, M.E., Hughes, J., and Oxtoby, E.T. (1955):in "Studies on Nonfluency in the Speech of Preschool Children," in Johnson (ed) "Stuttering in Children and Adults", Minneapolis, Minneapolis University Press.

- Brutten, E.J., and D.J. Shoemaker (1967): Cited in "The Nature Of Stuttering" by C. Van Riper, Prentice Hall, Inc, Englewood Cliffs, N.J. 1971.
- Bryngelson, B. (1935): Cited in "The Nature of Stuttering*" by C. Van Riper, Prentice Hall, Inc, Englewood Cliffs, N.J. 1971.
- Colburn, N. (1979): Cited in "A Review of Linguistic Factors Associated with Early Childhood Stuttering", by Wall, M.J., and Myers, F.L., JCD, 15, 1982, 441-449.
- Conture, E.G. (1990): "Stuttering" 2nd Edition, Englewood Cliffs, Prentice Hall, 1990.
- Coriat, I.H. (1931): Cited in "The Nature of Stuttering" by C. Van Riper, Prentice Hall, Inc, Englewood Cliffs, N.J. 1971.
- Curren+ M.F., and Hood, S.B. (1977a): Cited in "Identification of Stuttering and stutters" by Martin, A, Young in 'Nature and Treatment of stuttering: New Directions by Curlee, R.F., and Perkins W.H. (eds.) Taylor and Francis, London, 1985.
- Dalton, P. (1903): "Approaches to the treatment of Stuttering" Groom Helm, London, 1983.
- Davis, D.M. (1939): "The Relationship of Repetitions in the Speech of Young Children to Certain Measures of Language Maturity ana Situational Factors" Part-1, JSD, 4, 1939, 303-318.
- Dejoy, D., and Gregory, H. (1985): "The Relationship Between age and Frequency of Disfluencies in Preschool Children", JFD, 10, 1985, 107-122.
- England, G.O. (1935): "Repetitions and Prolongations in the Speech of Stuttering and Non-Stuttering Children". In W. Johnson (Ed.), Stuttering in Children and Adults, Minneapolis, University of Minnesota Press.
- Floyd, S., and Perkins, W.H. (1974): "Early Syllable Dysfluency in Stutterers and Non-Stutterers: A Preliminary Report", JCD, 7, 1974, 279-282.
- Galen (200 AD): Cited in "The Nature of Stuttering " by C. Van Riper, Prentice Hall, Inc, Englewood Cliffs, N.J. 1971.

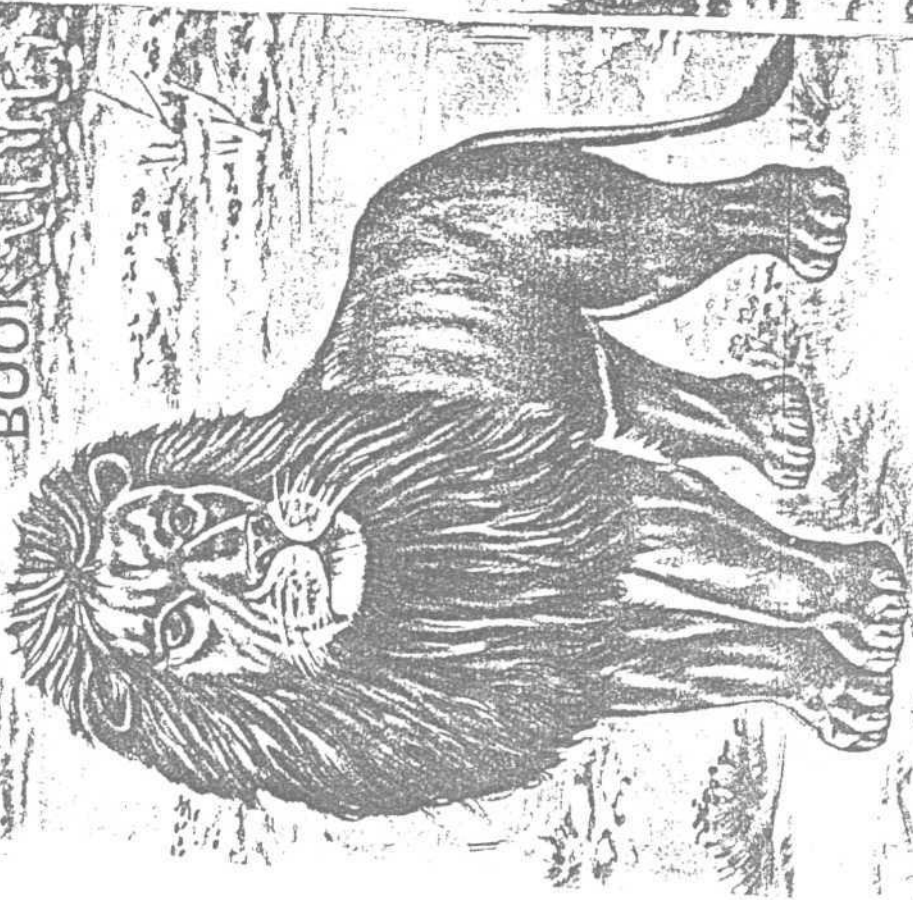
- Glasner, P.J., and Rosenthal, D. (1957): "Parental Diagnosis of Stuttering in Young Children", *JSHD*, 22, 1957, 28S-295.
- Gregory, H., Hill, D. (1984): Cited in "Stuttering: A contemporary perspective" by Gregory, H.H., *Folia Phoniat*, 38, 1986, 89-120.
- Haynes, W., and Hood, S. (1977): Cited in "The Effect of Grammatical complexity upon disfluency behaviour of non-stuttering pre-school children*", Susan Zuckerman and Bernthal, J.F. (1980), *JFD*, 5, 1980, 55-68.
- Hegde, M.N. (1990) Cited by Nagapoornima, M (1990) Unpublished Dissertation submitted to Mysore University as part fulfilment of Masters degree in Speech and Hearing.
- Hegde, M.N., and Hartman, D.E. (1979)a & b): Cited in "Identification of Stuttering and Stutterers" by Martin A, Young, in *Nature and Treatment of Stuttering: New Directions* by Curlee, R.F. and Perkins, W.H. (Eds), Taylor and Francis, London, 1985.
- Hubbard, C.P., and Yairi, E. (1988): "Clustering of disfluencies in the Speech of stuttering and Non-stuttering Pre-school Children", *JSHR*, 31, 1988, 228-233.
- Huffman, E.S., and Perkins, W.H. (1974): "Dysfluency Characteristics Identified by Listeners as 'Stuttering' and 'Stutterers'". *JCD*, 39-96.
- Hunt, (1870): Cited in "The Nature of Stuttering" by C. Van Riper Prentice Hall, Inc, Englewood Cliffs, NJ, 1971.
- Indu, V. (1990): "Some aspects of fluency in Children 4-5 years" Unpublished Dissertation submitted to Mysore University as part fulfilment of Masters degree in Speech and Hearing.
- Johnson, W. (1942): "A Study of the Onset and Development of Stuttering", *JSD*, 7, 1942, 251-257.
- Johnson, W. (1961): "Measurement of Oral Reading and Speaking Rate and Disfluency of Adult Male and Female stutterers". *JSHD*, Monograph supplement, 7, 1961, 1-20.

- Johnson and Associates (1959): "The Onset of Stuttering! Research Findings and Implications", Minneapolis, University of Minnesota Press, 1959.
- Johnson, W., and Leutenegger (1963): "Stuttering in Children and Adults" Minneapolis, University of Minnesota, 1963.
- Kools, J., and Berryman, J. (1971); "Differences in Disfluency Behaviour Between Male and Female Non-stuttering Children", JSHR, 14, 1971, 125-130.
- Kowal, S., O'Connell, D.C., and Sabin, E.F. (1975): Cited in "Speed Fluency and its Development in Normal Children - Fluency and Stuttering" by Starkweather, W.C. (1980), Speech and Language series. Advances in Basic Research and Practice, 4, Eds. Las, N.J. 143-200, Academic Press, New York.
- Lee, B.S. (1951): "Artificial Stutterer" JSHD, 16, 1951, 53-63.
- Martin, R., Haroldson, S., and Kuhl, P. (1972): "Disfluencies in Child-Child and Child-Mother Speaking Situations", JSHR, 15, 1972, 753-756+
- McDearmon, J.R. (1968): "Primary Stuttering at the Onset of Stuttering: A Re-examination of the Data" JSHR, 11, 1968, 631-637+
- Meyers, S.C. (1989): "Non-fluencies of Pre-school strutterers and Conversational Partners Observing Reciprocal Relationships", JSHD, 54, 1989, 106-112.
- Morgagni (1761): Cited in "The Nature of stuttering" by C. Van Riper, Prentice Hall, Inc, Englewood Cliffs, N.J. 1971.
- Nagapoornima, M. (1990): Disfluencies in Children (3-4Years) Unpublished Dissertation submitted to Mysore University as part fulfilment of Masters degree in Speech and Hearing.
- Rajendraswamy, R. (1991): Some aspects of fluency in Children (6-7 Years) Unpublished Dissertation submitted Mysore University as part fulfilment of Masters Degree in Speech and Hearing.

- Riley (1981): Cited in "Non-fluencies of Pre-school stutterers and Conversational Partners Observing Reciprocal Relationships" by Mayers, S.C. (1989), JSHD, 54, 1989, 106-112.
- Sharma, A.K. (1991): Disfluencies in Hindi Speaking Children (6-7 Years) Unpublished Dissertation submitted to Mysore University as part fulfilment of Masters Degree in Speech and Hearing.
- Silverman, E.M. (1972): "Generality of Dysfluency Data Collected from Pre-schoolers". JSHR, M. 1972, 84-92.
- Silverman, E.M. (1973): "Clustering: A Characteristic of Pre-schoolers' Speech Disfluency", JSHR, 16, 1973, 578-583.
- Starkweather, W.C. (1987): "Fluency and Stuttering", Prentice Hall Inc, Englewood Cliffs, New Jersey.
- Steer, M.D. (1937): "Symptomatology of Young Stutterers", JSD, 2, 1937, 3-13.
- Stinchfield, S.M. (1930): Cited in "The Relationship of Repetitions in the Speech and Young Children to Certain Measures of Language Maturity and situational Factors" Part-I, Davis, D.M. (1939), JSD, 4, 1939, 303-318.
- Stacker, (1976): Cited in "Non-fluencies of Preschool stutterer and Conversational partners Observing Reciprocal Relationships", Meyers, S.C. (1989), JSHD, 54, 1989, 106-112.
- Tomatis, A.(1954): Cited in "The Nature of Stuttering" by C.Van Riper, Prentice Hall, Inc, Englewood Cliffs, N.J. 1971.
- Travis,L.E. (1937): Cited in "Then Nature of Stuttering" by C.Van Riper, Prentice Hall, Inc, Englewood Cliffs, M.J. 1971.
- Travis,L.E. (1957): "Handbook of speech Pathology", New York, Appleton-Century-Crofts, 1957.
- Van Riper, C. (1971): "The Nature of Stuttering", Prentice Hall, Inc, Englewood Cliffs, New Jersey, 1984.
- Wall* M.J., and Meyers, F.L. (1982):"A Review of Linguistic Factors Associated with Early Childhood Stuttering", JCD, 15, 1982, 441-449.

- Wells, C.B. (1987): "Stuttering Treatment - A Comprehensive Clinical Guide", Prentice-Hall Inc, Englewood Cliffs, New Jersey.
- Wexlar, K.B. (1981): "Developmental Disfluency of 2-, 4-, and 6-year Old. Males in Neutral and Stress Situations", JSHR, 1981(In Press).
- Wexlar, K.B., and Mysak, E.D. (1982): "Disfluency Characteristics of 2-, 4-, and 6-year Old Males", JFD, 7, 1982, 37-46.
- Williams, D.E., Parley, F.L., and Spriatexbach, D.C.(1978): in "Diagnostic Methods in Speech Pathology" Ed. by Darley and Spriesterbach, 2nd Ed. Harper, and Row. Publishers, Inc.
- Wingate, M.E. (1962a): "Evaluation and Stuttering" Part-I: Speech Characteristics of Young Children* JSHD, 27, 1962, 106-115.
- Wingate, M.E. (1962b): "Evaluation and Stuttering:II; Identification of Stuttering and the Use of a Label". JSHD, 27, 1962, 363-377.
- Wingate,M.E. (1964): "A Standard Definition of Stuttering", JSHD, 1964, 29, 1964, 484-489.
- Wingate,M.E.(1976): "Stuttering: Theory and Treatment" New York, Irvington, New York.
- Yairi, E. (1981): Disfluencies of normally Speaking two-year-old Children", JSHR, 24, 1981, 490-495.
- Yairi, E. (1982): "Longitudinal studies of Disfluencies in Two-Year-old Children", JSHR,25, 1982, 155-159.
- Yairi, E. (1983): "The Onset of Stuttering in Two and Three Year Old Children: A Preliminary Report". JSHD, 48, 1983, 171-178.
- Yairi, E.,(Clifton,N.(1972): "Disfluent Speech Behaviour of Pre-school Children, High School Seniors and Geriatric persons", JSHR, 4, 1972, 714-719.
- Yairi, E., and Lewis, B. (1984): "Disfluencies at the Onset of Stuttering", JSHR, 27, 1984, 155-159.
- Yamini, B.K. (1990): Disfluencies in Children 5-5 years Unpublished Dissertation submitted to Mysore University as part fulfilment of Masters Degree in Speech and Hearing.

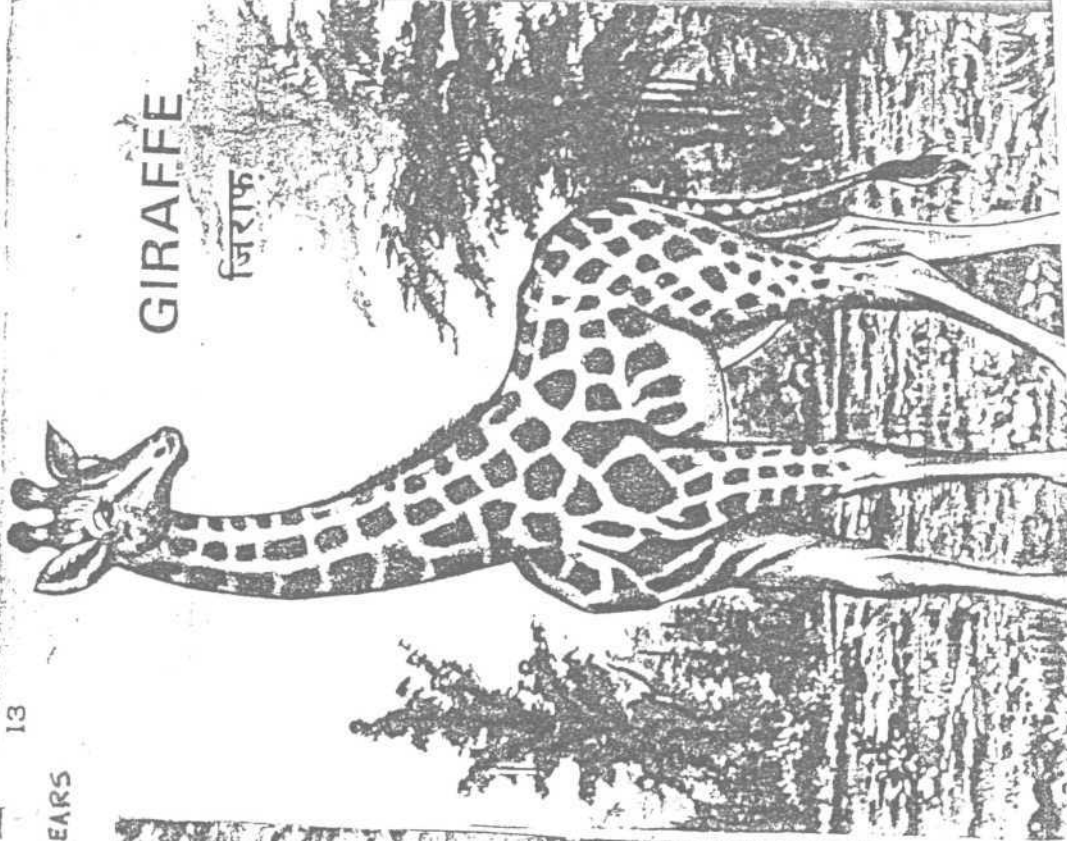
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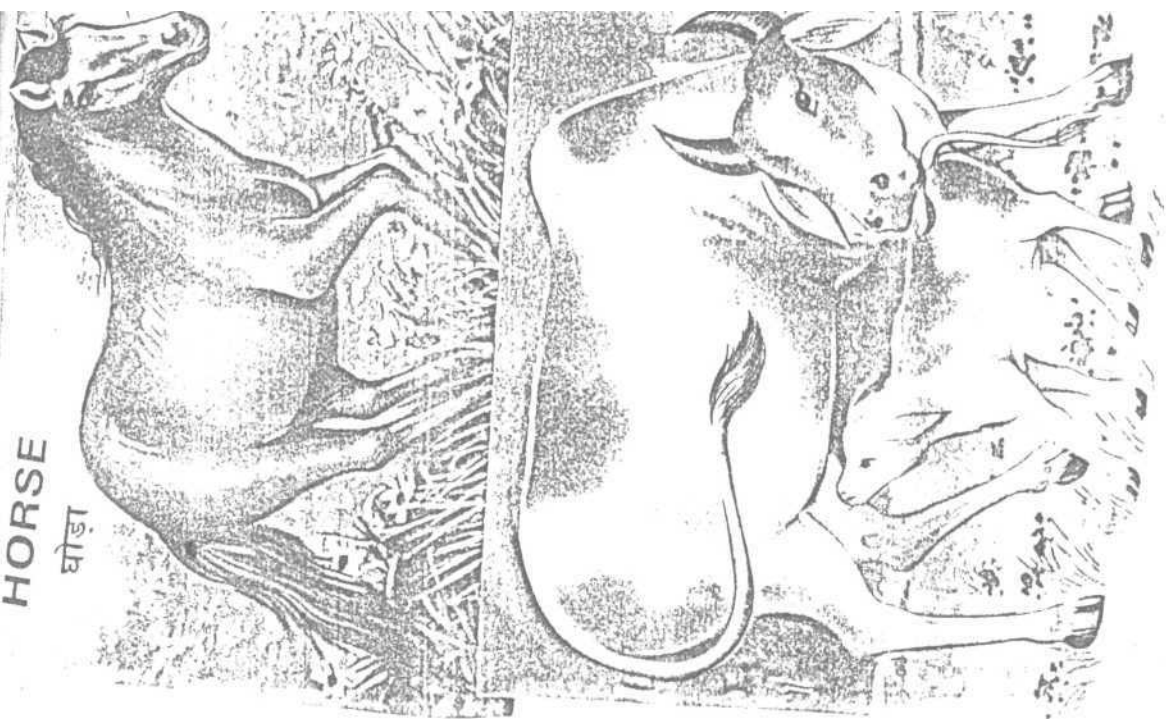
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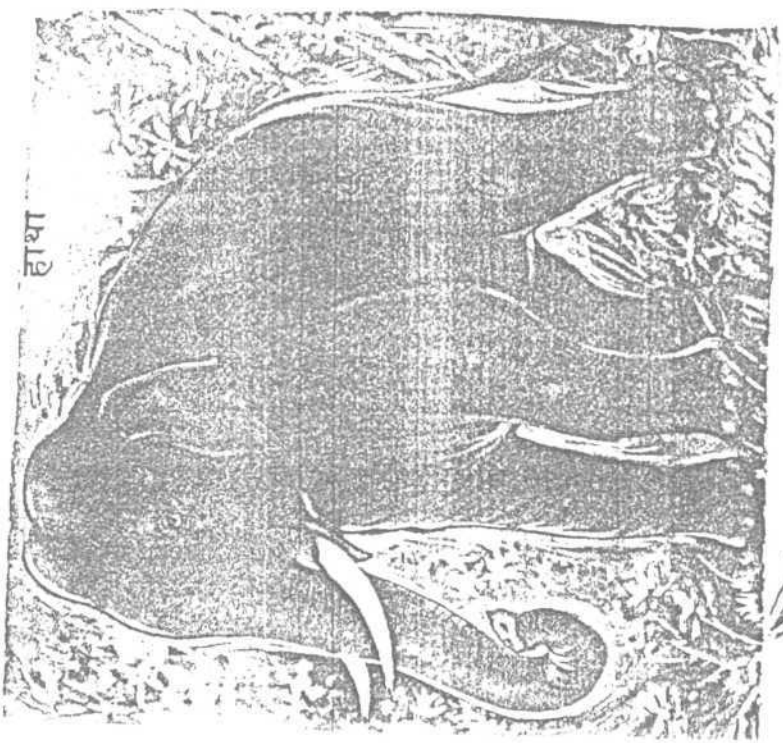
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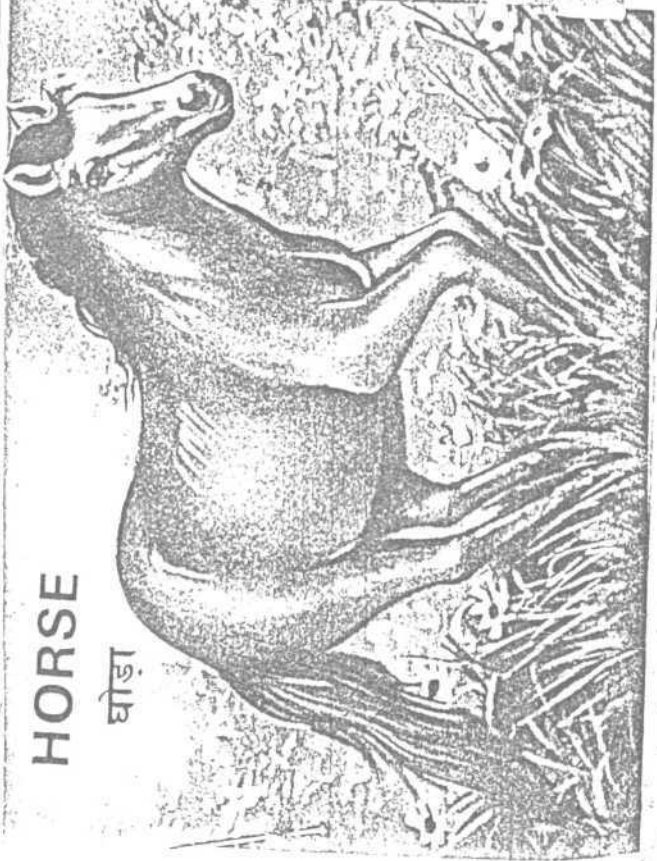
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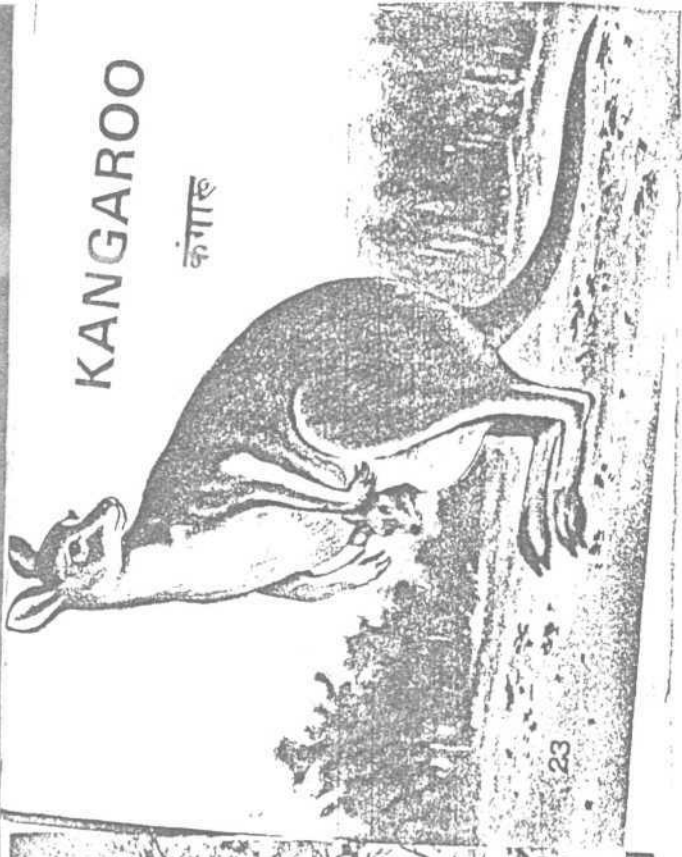
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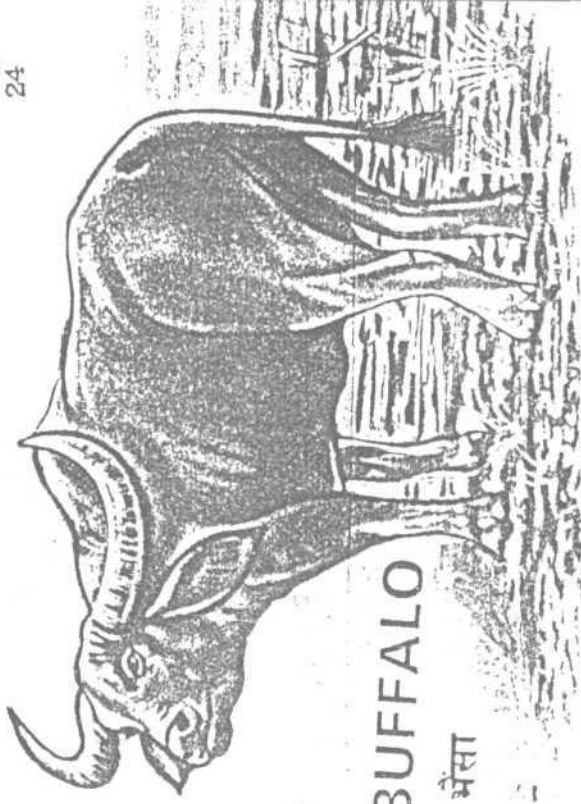
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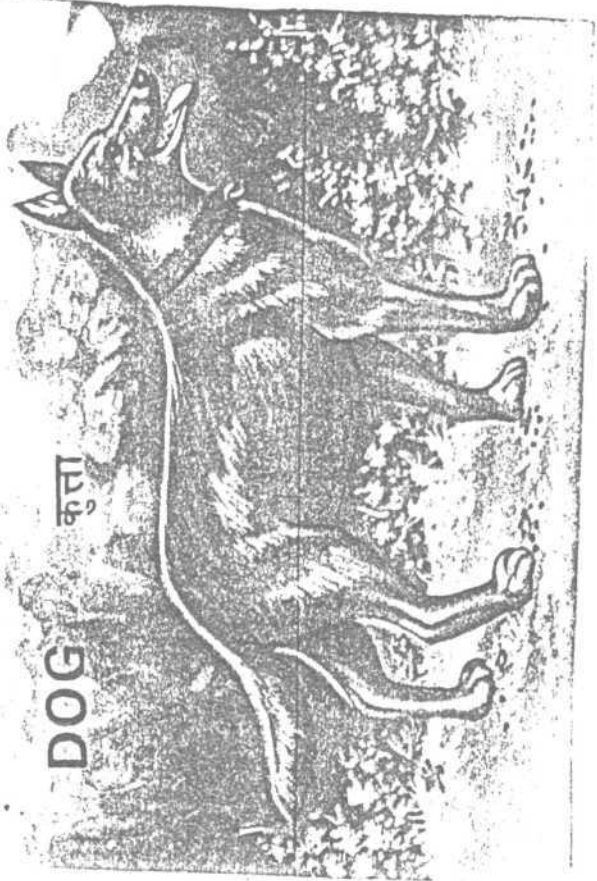
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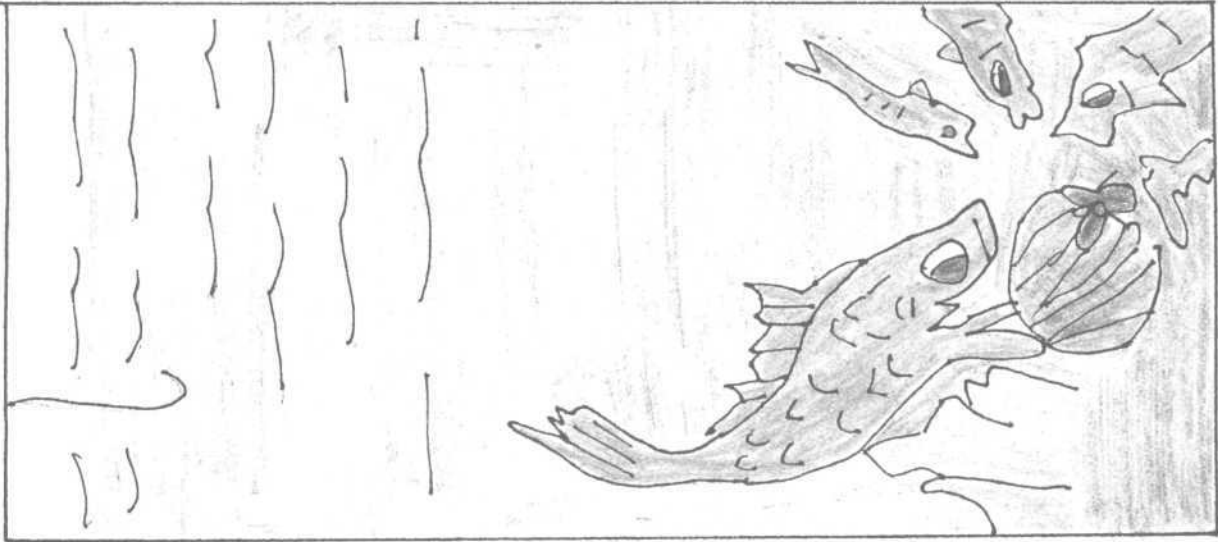
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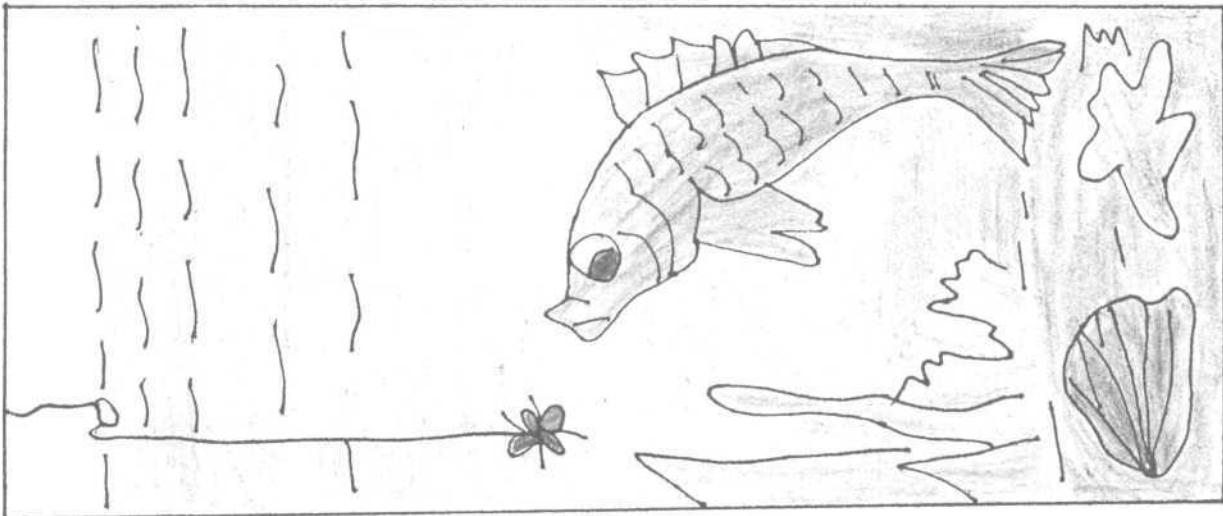
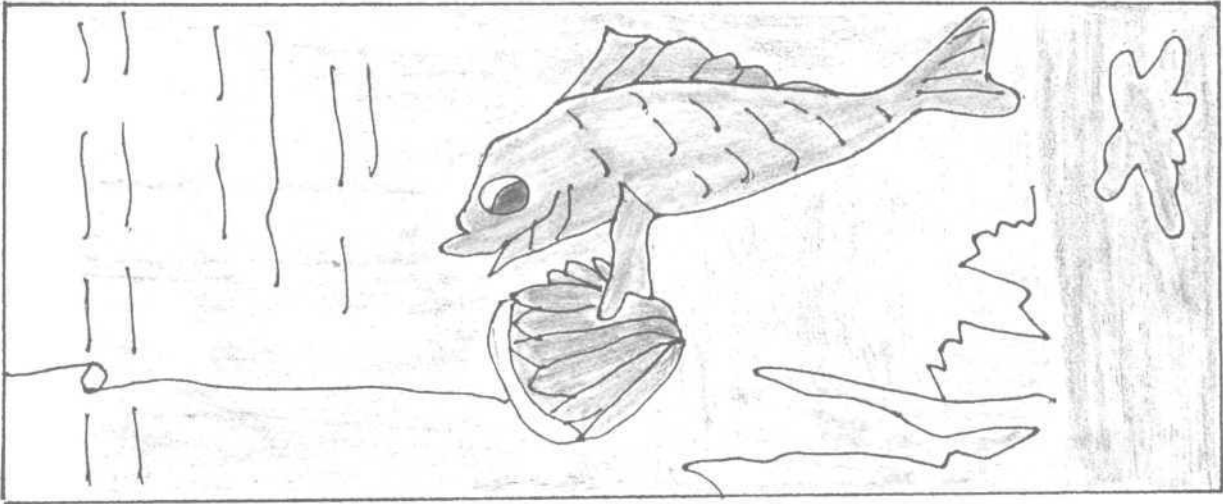
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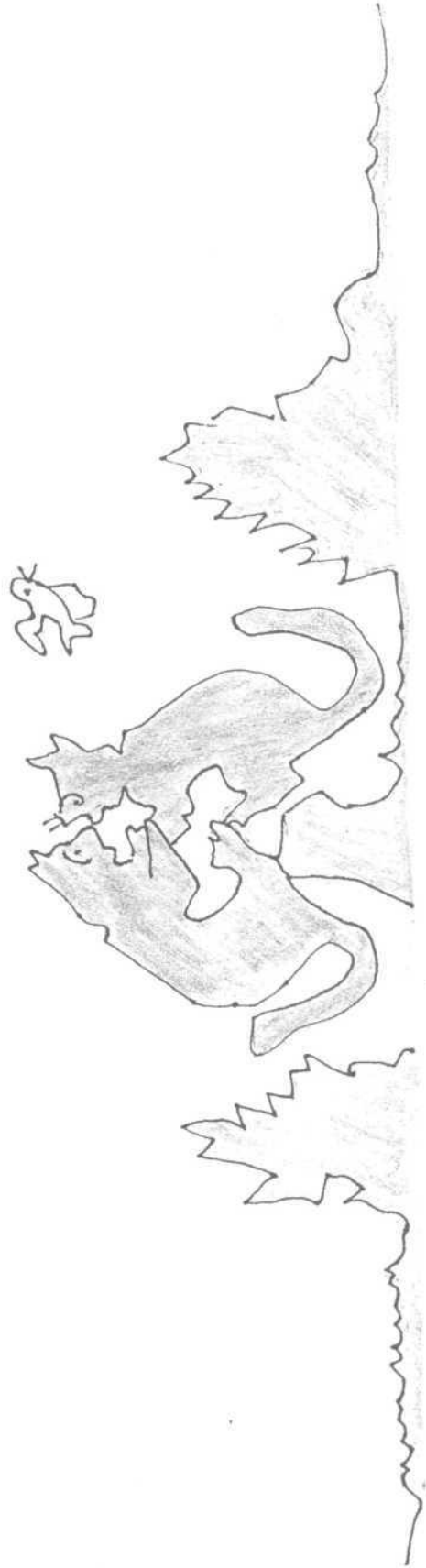
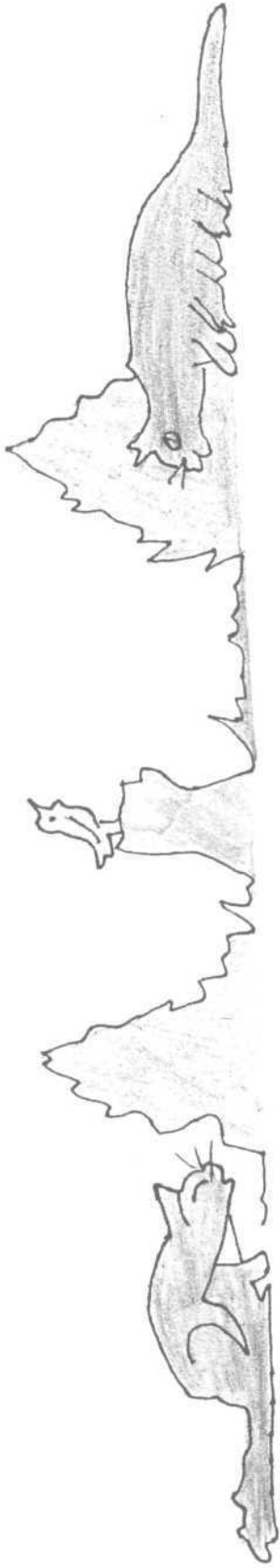
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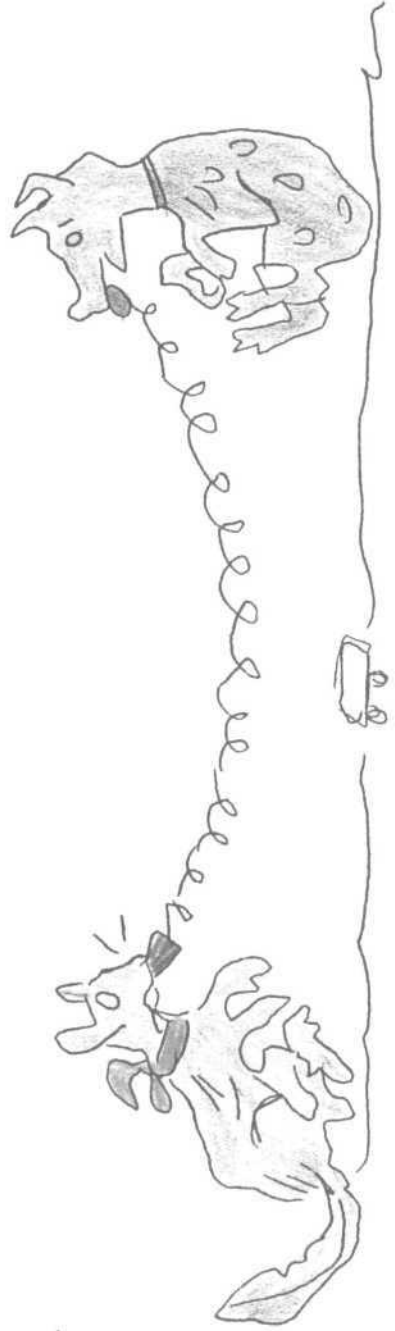
AGE GROUP 4-5 YEARS

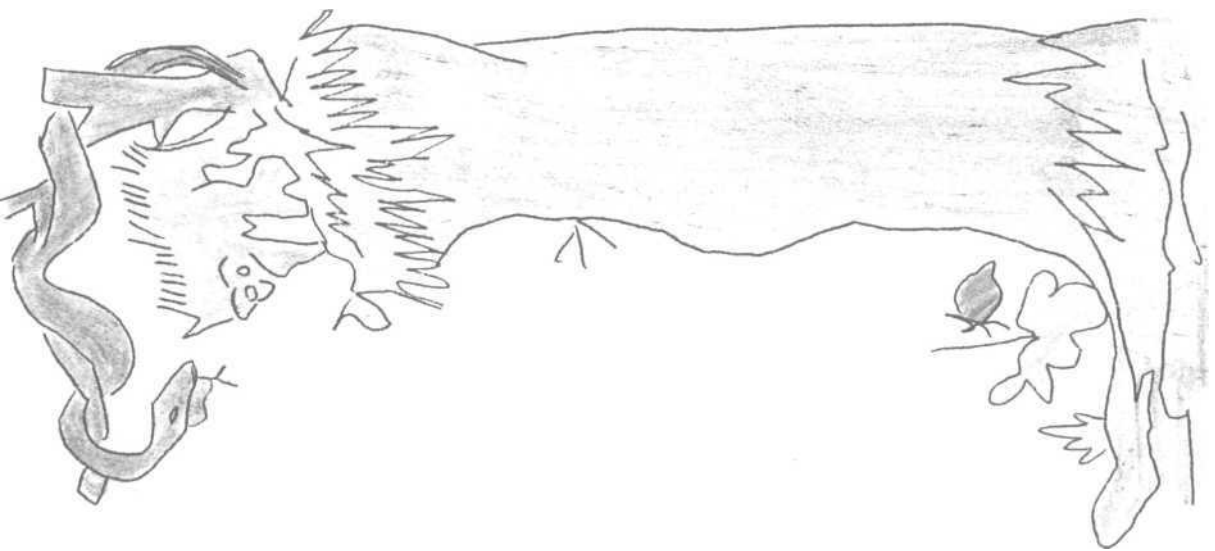
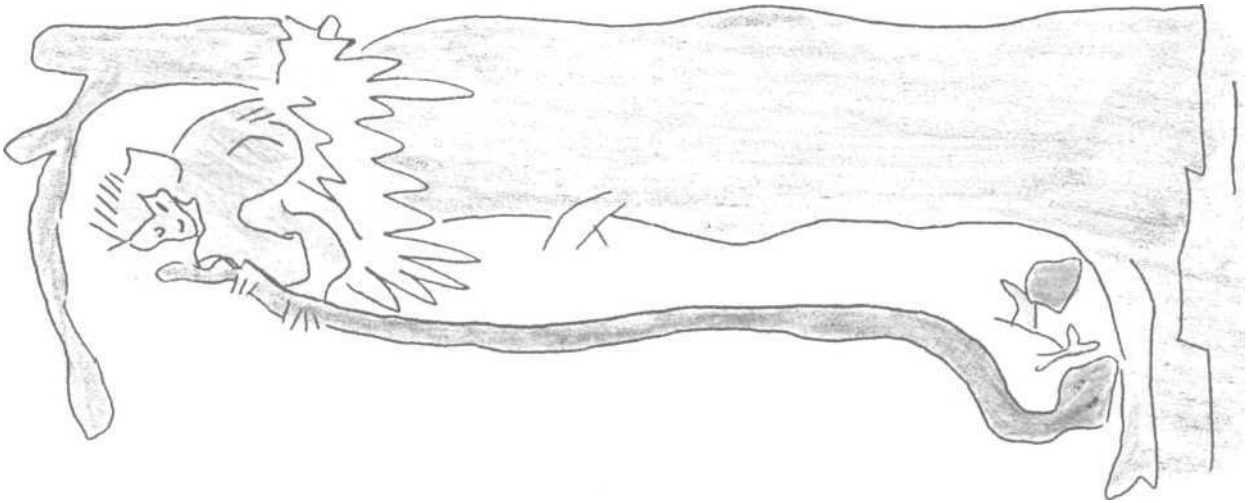
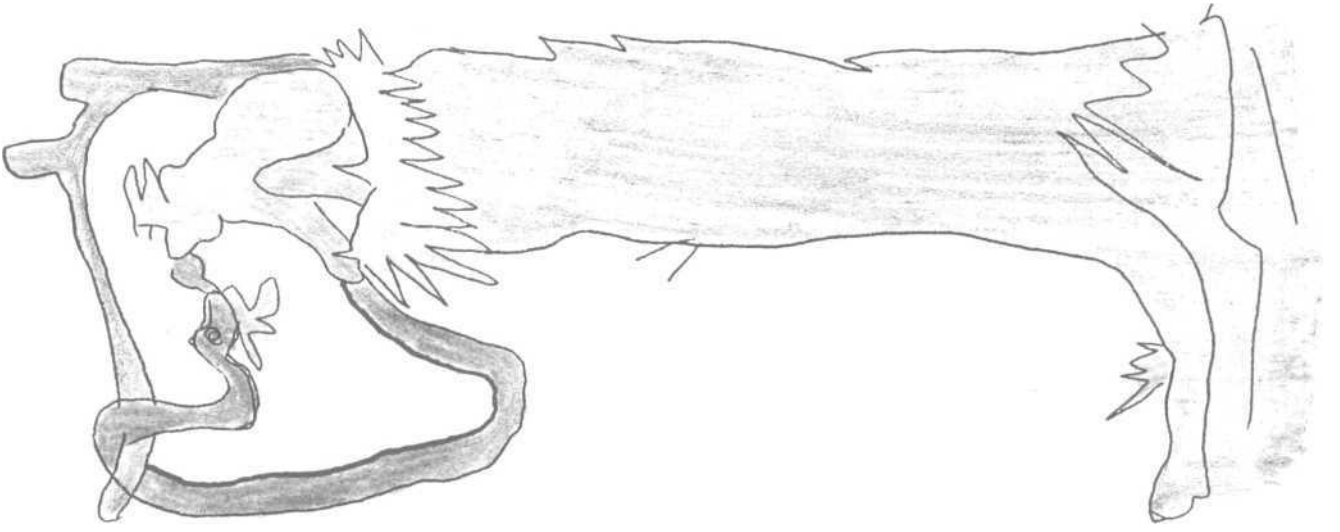




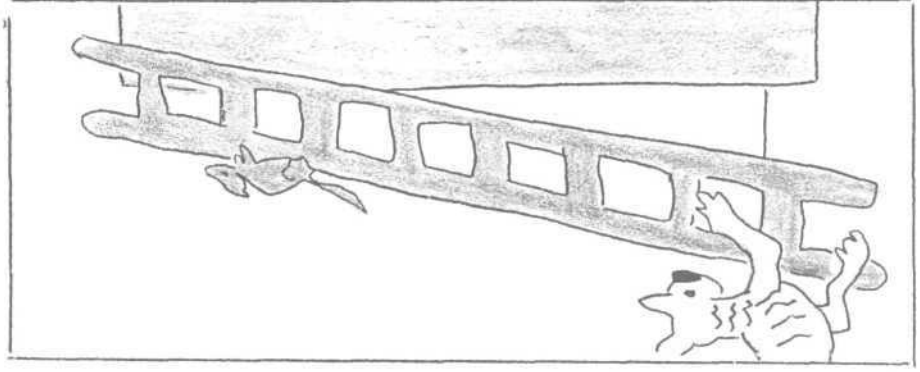
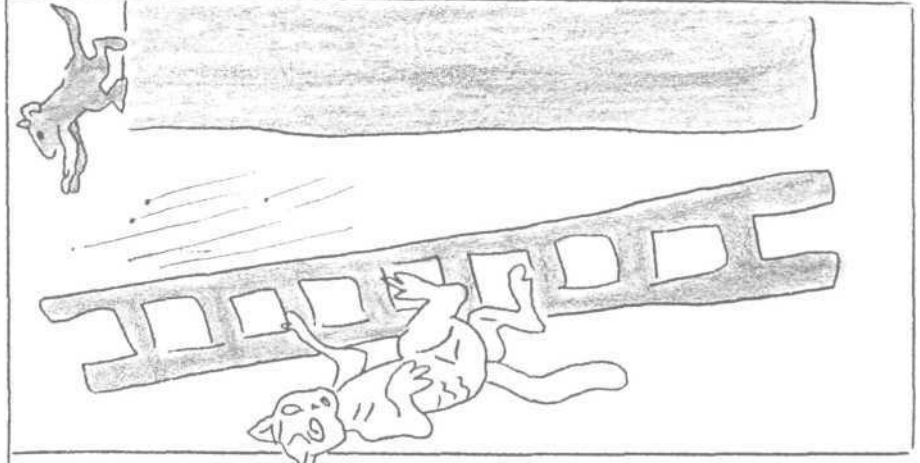
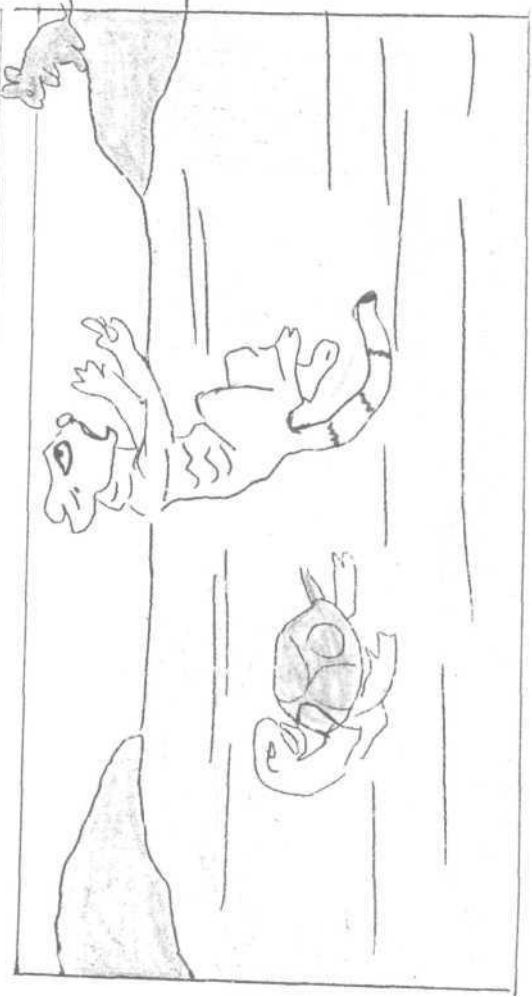
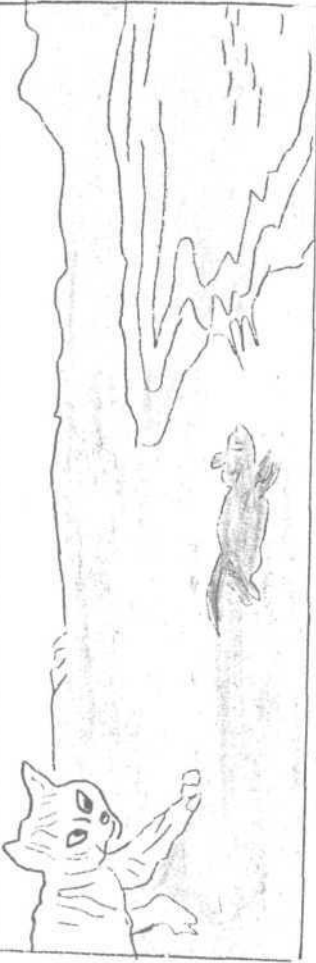


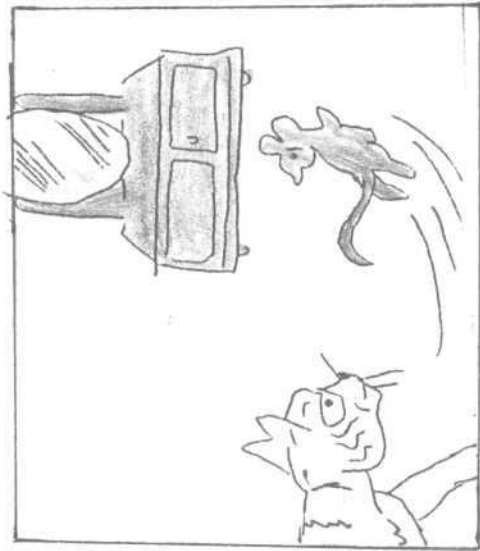
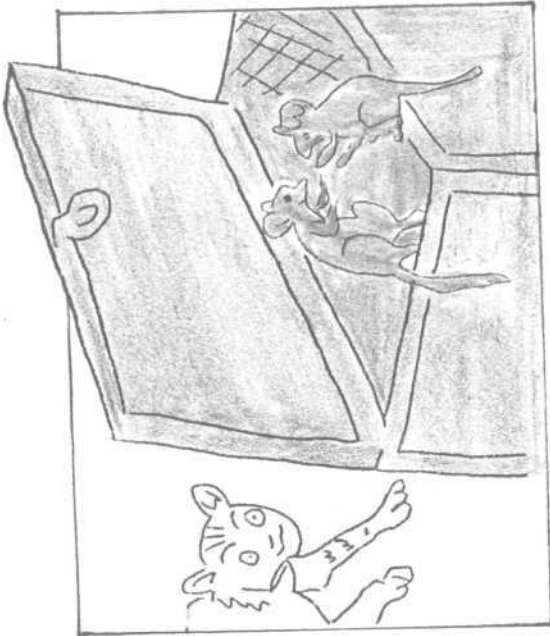
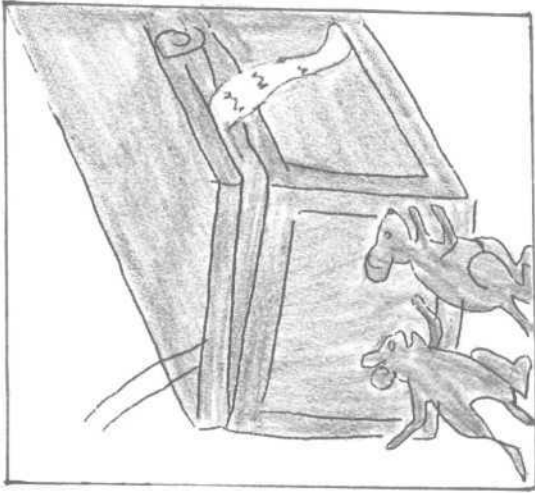


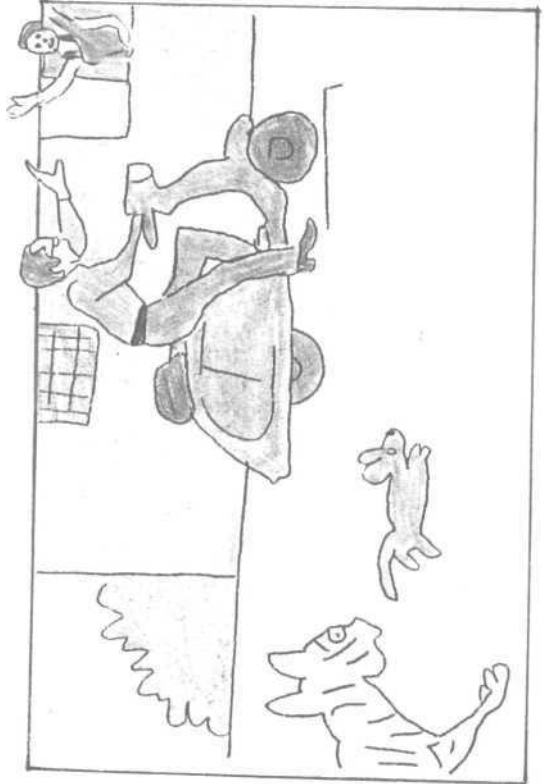
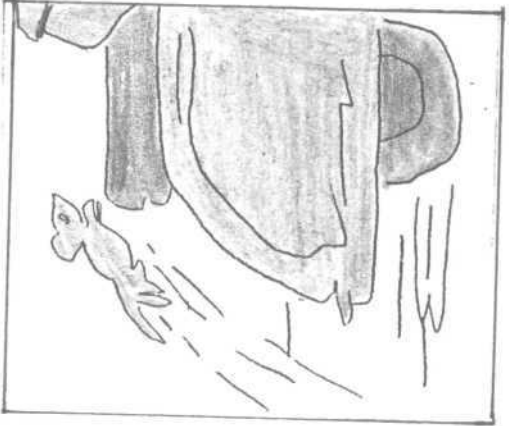
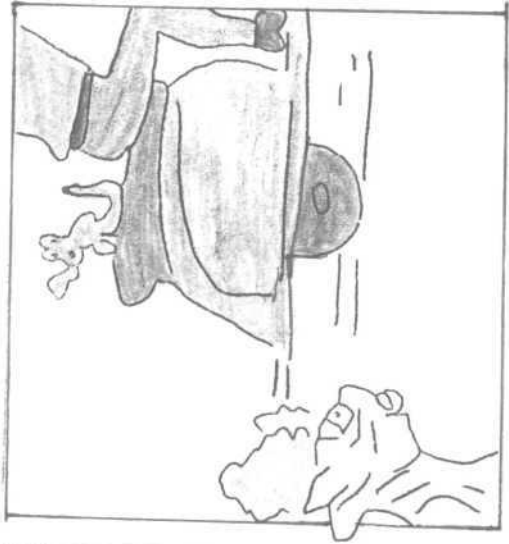


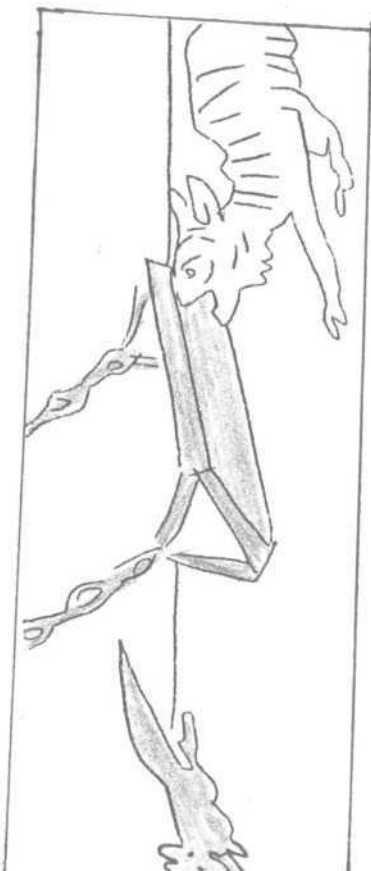
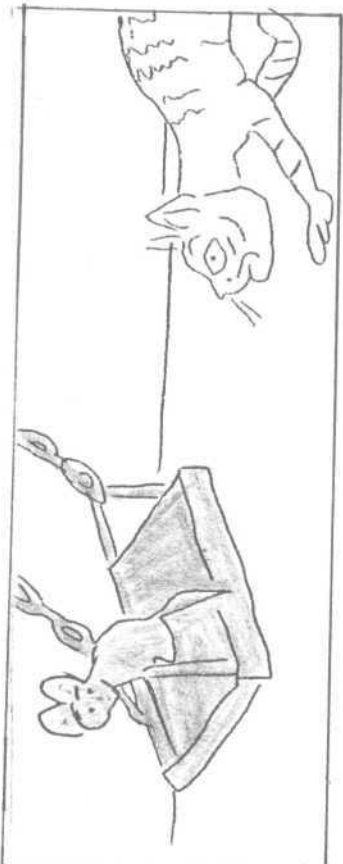
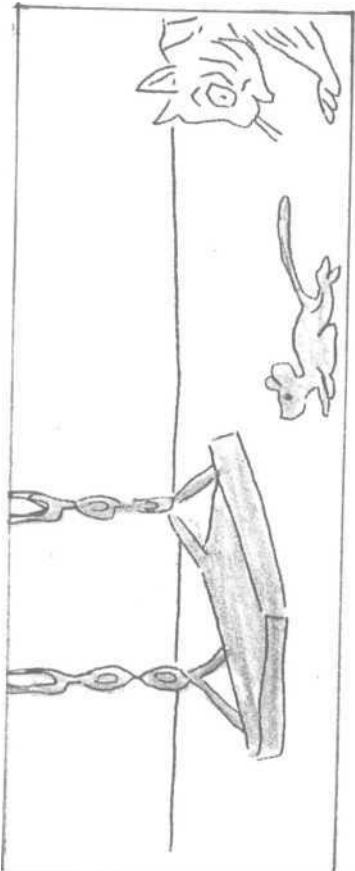
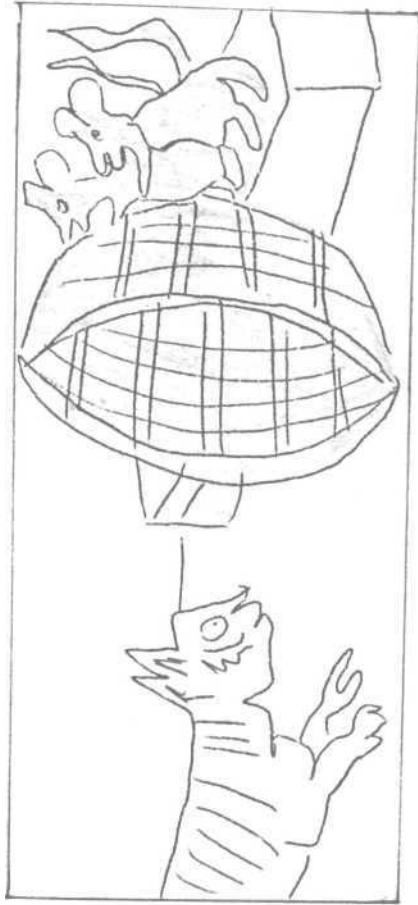


AGE GROUP 5-6 YEARS

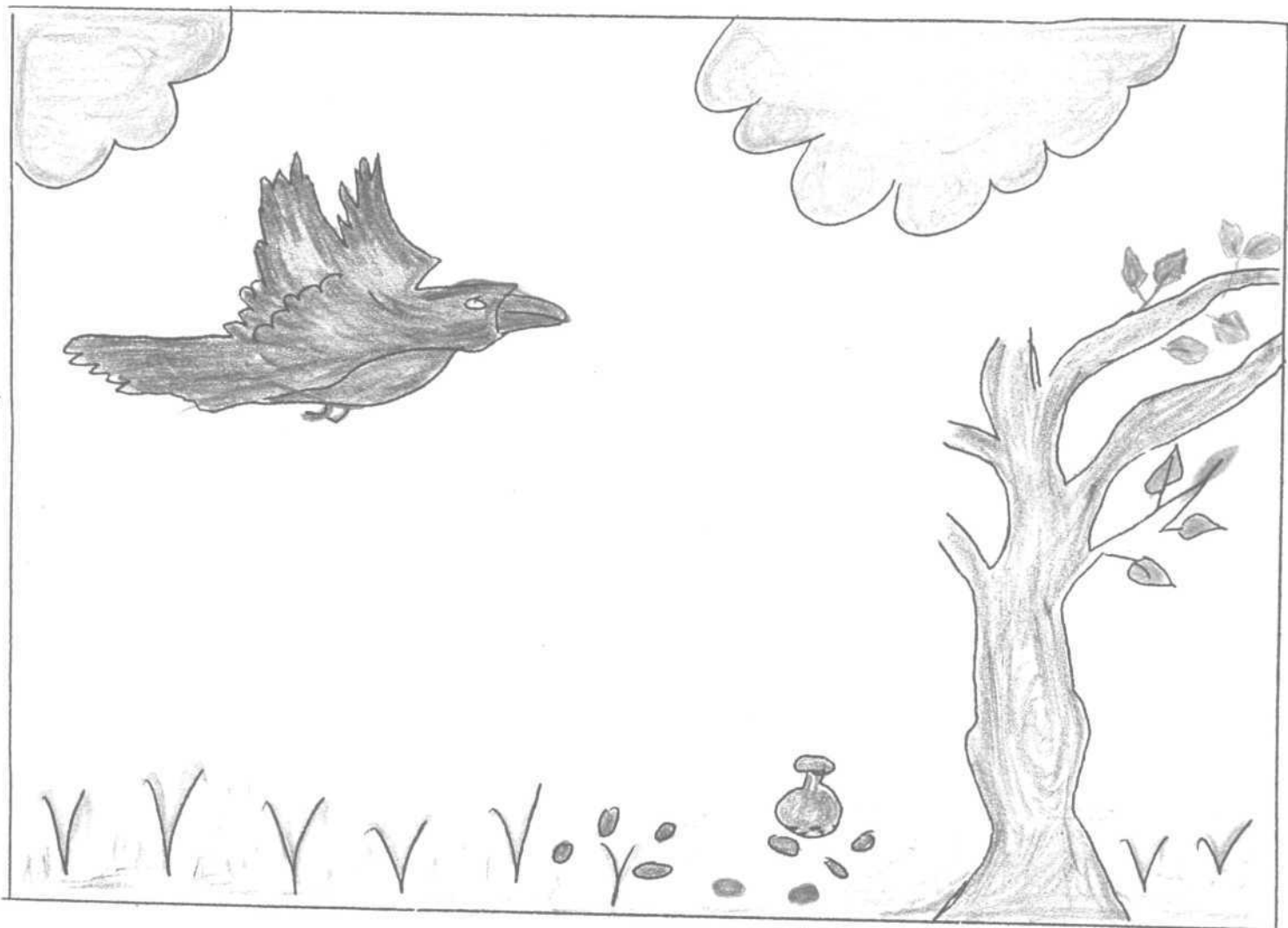






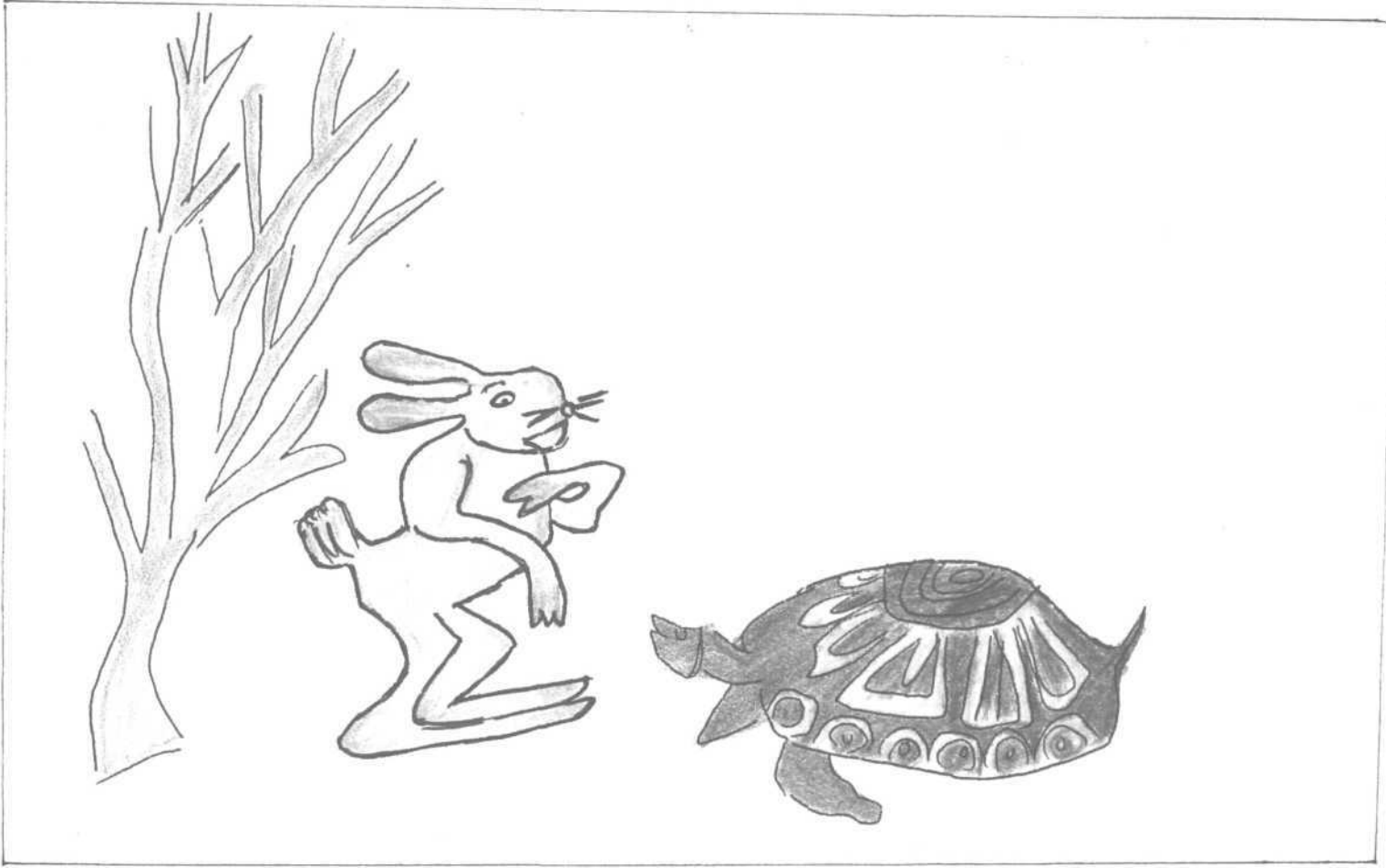


AGE GROUP 6-7 YEARS









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