Chapter I

Introduction

*Fluency*, according to ordinary usage, is the ability to speak a language rapidly and continuously and without any particular effort. The term fluency is derived from the Latin root “fluere” (Oxford Dictionary). In communication, it refers to the smooth and easy flow of utterance. Technically, fluency is the effortless production of long, continuous utterances at a rapid rate (Starkweather, 1980). According to Starkweather (1980), fluency refers to the general phenomenon of the flow or rate of speech, influenced by variables such as duration of individual sounds and syllables, duration of sounds and syllables in relation to adjacent sounds and syllables, duration of pauses, presence of stress contrasts and degree of co-articulation.

Disfluencies refer to interruptions in the forward flow of speech. Children vary a great deal in learning to talk. Some children learn to speak with relatively little disfluency; while others repeat sounds, syllables, phrases, interject and revise during the mastering of speech and language skills. *Disfluency* has been defined by the American Speech-Language and Hearing Association (ASHA) Special Interest Division (SID) 4 as speech that exhibits deviations in continuity, smoothness, and ease of rate and effort (ASHA SID 4, 1999). Terms disfluency or non fluency suggest disruptions in the timing and flow of speech that are often perceived as being part of the normal interruptions of speech. Thus disfluency can be regarded as just being the opposite of fluency. The prefix “dis” denotes separation, negation or reversal. In case of “disfluency”, the referent is “all kinds of speech features that contrast with fluency” (Wingate, 1984)
Dysfluency, however, signifies abnormality of fluency; it includes, but is not limited to stuttering (Wingate, 1984). The prefix “dys” clearly means “abnormal.” Fluency is thus the basic referent from which contrasting words are constructed by adding to “fluency,” the qualifying prefixes: “dis” (or “non”) and “dys” (Wingate, 1984).

Stuttering refers to “disorders in the rhythm of speech in which the individual knows precisely what he wishes to say, but at the time is unable to say it because of an involuntary, repetitive prolongation or cessation of a sound” (WHO, 1977). One of the most comprehensive definitions has been provided by Wingate (1964). According to him, stuttering is defined as, 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. 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 speech-related struggle. III. Also, there is not infrequently (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 like. (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.

Wingate (1984) says “Fluency is an illusion, a fact borne out considerable amount of research on normal speech. Speech perceived as normal fluent speech contains a variety of disfluencies. Most people have instances of disfluency in their speech that
would not be labeled stuttering. Normal disfluencies refer to a temporary stage of language learning and communication development in children. Distinguishing between disfluencies that are normal and those that represent stuttering is essential and is a required skill for speech-language pathologists.

Difficulties in distinguishing normal from abnormal disfluencies, causing parents to erroneously diagnose interruptions in their children’s speech as “stuttering” was the fundamental aspect of the diagnosogenic theory (Johnson et al., 1959). Shames and Sherrick (1963) also proposed that selective reinforcement of initially normal disfluency was the essential element in operant learning processes presumed to eventuate in stuttering. Disfluencies have also assumed a central role in descriptions of development of stuttering and in subgroup identification. Easy repetitions to tense prolongations, blocks, and broken words have been a core feature in developmental models of stuttering (e.g., Bluemel, 1932; Bloodstein, 1960a, 1960b; Van Riper, 1971). Schwartz and Conture (1988) attempted to classify young children who stutter based in part on differences in the dominance of disfluency type, i.e. sound/syllable repetition vs. sound prolongation; Yairi and Ambrose (1992) and Yairi, Ambrose, Paden and Throneburg (1996) used longitudinal disfluency profiles to differentiate persistent from recovered subgroups.

(1982) examined developmental disfluency in 2-, 4- and 6-yr old boys in neutral and stress situations and Wexler and Mysak (1982) studied disfluency characteristics of 2-, 4-, and 6-year-old males. Yairi (1983) explored the onset of stuttering in two- and three-year-old children. Further, DeJoy and Gregory (1985) examined the relationship between age and frequency of disfluency in preschool children. All these studies counted the frequency of disfluencies such as repetitions, prolongations, revisions and so on. None the less, these studies on disfluencies in normal children have provided data on expected speech behaviors of young children.

In spite of the wide range of available information concerning disfluency, the reference data for young children who stutter are based primarily on a single large source (Johnson et al., 1959). Johnson and his associates featured data for 89 children diagnosed as exhibiting stuttering and an identical number of normally fluent control children. In many ways, it charted the boundary of children’s disfluent speech behavior. According to Yairi (1983), there are, however, two drawbacks to this source that weaken its standing as normative. First, the children ranged from ages 2 to 8, and second, the mean interval between the onset of stuttering and the recording of speech samples was 18 months on an average. With reference to the first point, the treatment of such a wide range as a single group does not yield normative data. In fact, the age range used far exceeds the preschool period. As for the second point, in view of increasing evidence for possible rapid changes in stuttering shortly after the disorder begins (Yairi, Ambrose, & Niermann, 1993), the long time delay between onset and recording of speech samples in the Johnson et al. study also interrupts the data from being considered early stuttering. However, the interpretation of speech data by Johnson and his associates had several significant theoretical and clinical
implications. It also contributed to the belief that it is difficult, if not impossible to differentiate between early stuttering and normal disfluency.

Yairi (1997) stated that disfluency counts have been the classic metric of the disorder for both clinical and basic research and have been employed as the dependent measure in numerous studies of stuttering. Clinically, the number of disfluencies, especially of certain types has been regarded as the most important index of stuttering severity (Van Riper, 1971). Analyses of disfluency have been weighted heavily in instruments of evaluation and diagnosis of early childhood stuttering, especially in differentiating between normal disfluency and incipient stuttering [Adams, 1977; Curlee, 1980; Pindzola & White, 1986; Campbell & Hill, 1987; Gorden & Luper, 1992, Ambrose and Yairi, 1999 all in English, Carlo and Watson (2003) in Spanish speaking children from Puerto Rico, Natke, Sandrieser, Pietrowsky and Kalveram (2006) in German-speaking preschool children who stutter and 24 gender and age matched comparison children who do not stutter, Boey, Wuyts, Heyning, Bodt and Heylen (2007) conducted a study to compare the characteristics of stuttering-like disfluencies in a group of Dutch speaking children who stutter (n= 693) with a group of normally speaking children (n=79) and Valente and Jesus (2011) in Portuguese school age children]. Disfluency counts have also been used in formal and informal instruments designed to predict stuttering chronicity (Riley, 1981; Cooper & Cooper, 1985; Conture, 1990; Curlee, 1993).

Several investigators have attempted to provide more information about disfluencies of young children with stuttering or compare them with their normally disfluent counterparts (Yairi and Lewis, 1984; Meyers, 1986; Conture, 1990; Schwartz, Zebrowski & Conture, 1990; Zebrowski, 1991; Yairi & Ambrose, 1992; Ryan, 1992;
Yairi et al. 1993; Yaruss, 1997, Pietrowsky and Kalveram, 2006, Boey, Wuyts, Heyning, Bodt and Heylen, 2007). These studies have contributed to additional understanding of childhood stuttering. For example, Meyers (1986) investigated *quantitative and qualitative variability*, and Zebrowski (1991) provided data on *duration of disfluencies*. For normative purposes, however, all of these studies were limited in terms of one or more of the following: (a) small number of children, (b) the inclusion of children within wide age ranges, (c) insufficient disfluency data due to short speech samples and (d) speech samples recorded in varied time distance from onset. Yairi and Lewis (1984) used only 10 two- three year olds, Meyers (1986) used speech samples of only 10 minutes in length, and Schwartz and Conture (1988) had 43 children from almost 4 to 9 years of age. Furthermore, not all studies provide actual frequencies of specific disfluency types, and only Schwartz et al., (1990), Zebrowski (1991), and the studies by Yairi et. al. presented speech disfluency data uniformly recorded reasonably close to beginning stuttering.

The past 50 years of research on early childhood stuttering and normal disfluency have produced data on the general features of disfluent speech behavior of young children (Zebrowski, 1995). However, because of the widespread diversity across studies, and varied or unknown reliability, the data reviewed cannot be combined to construct a reference for “typical” early stuttering. *Thus, a normative reference for early stuttering that meets several criteria does not exist.* Furthermore, most of the studies mentioned above have focused on the frequency/type metric or have investigated extent and duration separately from frequency. Few sources that have combined measures are either based on wider age ranges (Schwartz & Conture, 1988; Riley, 1994) or provide only general estimates of severity based on clinician impressions (Van Riper, 1973; Darley & Spriesterbach, 1978). However, Ambrose
and Yairi, 1999 provided a more specific, single metric reflecting frequency, type and extent and duration of disfluencies for preschool children near the onset of stuttering. Their findings revealed that stuttering is both qualitatively as well as quantitatively different from normal disfluency even at the earliest stages of stuttering.

Although the descriptions of early speech disfluencies in young children have been extensive, these investigations are almost focused on disfluencies of speech of English speaking children from Anglo-European, African-American, Hispanic, and Spanish cultures. Because stuttering is a fluency disorder observed across languages and cultures (for e.g. reviews by Van Riper, 1971; Bloodstein, 1995; Cooper and Cooper, 1998; Shapiro, 1999; Van Borsel, Maes and Fonlon, 2001 among others) understanding disfluencies in the speech of young children in culturally and linguistically diverse backgrounds is essential.

In the Indian context, Indu (1990), Nagapoornima (1990), Yamini (1990) and Rajendraswamy (1991) proposed a fluency test each in different age groups in Kannada, a South Indian Dravidian Language. This was based on disfluency data of 12 children in the age groups of 3-4 (Nagapoornima), 4-5 (Indu), 5-6 (Yamini) and 6-7 (Rajendraswamy) years. Simple pictures, cartoons and pictures depicting Pancatantra stories were used in these tests. A total disfluency of greater than 25 – 30 % was considered to be abnormal. The percent disfluency reported in these studies is high because unlike in English where several iterations of sound/syllable are considered as one instance of repetition, the authors have calculated each iteration as one repetition. Geetha, Karanth, Rao & Ravindra (2000) developed Disfluency Assessment Procedure for Children (DAPC) in Kannada. This consists of historical indicators, attitudinal indicators, behavioral (speech) indicators, articulation
assessment and language assessment. Artificial Neural Network analysis indicated behavioral indicator to be a good predictor. A score of ‘0’ on behavioral indicator was obtained in children with normal nonfluency and score ranging from 3 to 20 indicated stuttering. However, a clinician will not have problem classifying a child as having normal disfluencies if s/he has ‘0’ disfluencies. Therefore, this index may not be of clinical use. Further, frequency and type of disfluencies were measured in these two studies and not the duration. Thus, the disfluencies in normal speaking Kannada children are not known.

Since evidence of linguistic and cultural influence on fluency has been explained in literature (Watson and Keyser, 1994; Cooper and Cooper, 1998; Watson, 2001), one must be cautious in generalizing findings describing English speaking children to other linguistic and cultural groups. Analysis of the structure of Kannada language reveals several interesting and contrasting points from English. In English, the syllable structure varies from /v/ as in the word /a/ to /cccvcc/ as in the word /strength/. However, in Kannada, the structure varies from /v/ as in the word /a:/, /i:/ to ccv as in the word /kas:t:a/. Also, in English, single words such as /cow/, /cat/ are monosyllabic, while the same words in Kannada such as /hasu/, bekku/ would be bisyllabic. Thus, English has more of monosyllabic words, while Kannada has more multisyllabic words. Hence not much difference is seen in percent disfluencies when word count or syllable count is taken in English. However, in Kannada large differences may be obtained between syllable and word counts.

Thus, an understanding of expected speech behaviours in normally fluent Kannada speaking children will be better able to differentiate more or less typical behaviors and identify stuttering within this population. Finally, through studies in various
languages of fluent and disfluent speech, understanding of fluency development in all young children, including those children who speak Kannada should be enhanced.

Also, the period between 2 to 6 years is of great concern in studying disfluency patterns and parameters. Children are not only particularly disfluent during these ages (Muma, 1971), but also, the onset of stuttering is most frequently observed during this period of development (Johnson and Associates, 1959; Van Riper, 1971). Since the relationship between normally disfluent speech and early stuttering continues to be of theoretical interest (Yairi, 1981), researchers view the establishment of “normal expectations of disfluency” (Wexler & Mysak, 1982) for various preschool age groups as being theoretically and diagnostically important. This warrants the study of disfluencies in children at discrete age levels.

More research is needed to specify the number, type and duration of speech disfluencies that occur in the speech of children between 2 to 6 years, more so in the Indian context. While several studies carried out in the past are of tremendous assistance, they still do not make clear what the central tendencies and variability of speech disfluencies are for 2 year olds, 3 year olds and so forth. Without this information it is hard to assess the extent to which a child suspected or known to have stuttering deviates from his or her age norms or how closely an individual normally fluent child approximates them.

In the majority of the previous studies only mean disfluency rates are reported without a breakdown of percentages of different disfluency types. Important patterns in data might be missed if disfluencies are not divided into sub-categories.

Currently, a number of factors have motivated contemporary practitioners to advocate early identification and treatment of stuttering (e.g., Conture, 1990; Starkweather,
Gottwald and Halfond, 1990; Peters and Guitar, 1991). These include: the relatively young age at which stuttering begins (approximately three years of age); the difficulty in differentiating those children who will recover from those who will not; the importance of preventing the development of a well established, long term stuttering problem and its social and emotional consequences; and the assumption that early stuttering is most responsive to therapy (Zebroski, 1995).

There is **limited research base for the diagnostic procedures used to identify beginning stuttering**. There are multiple behaviors to simultaneously consider (e.g., frequency, type and duration of disfluency), and that for most, if not all of these characteristics, there is considerable overlap between young children who stutter and those who do not (e.g., Johnson and Associates, 1959; Meyers, 1986; Yairi & Lewis, 1984, Zebrowski, 1991). As a group, it appears that children who stutter, differ in degree, but not kind, from normally disfluent children in the frequency and distribution of their disfluent behaviors (Bloodstein, 1970; Conture, 1990). Zebrowski, 1995).

Therefore **in order to distinguish stuttering from normal disfluency**, Speech Pathologists need to (1) be familiar with what behaviours are important to making this distinction; (2) be able to observe and quantify these behaviours; and (3) be able to use the qualitative and quantitative differences of multiple behaviors to judge the likelihood that a child is either stuttering or at risk for developing a stuttering problem. As Conture has stated, the complex and multidimensional nature of early stuttering makes its diagnosis a consideration of probabilities, not absolutes (1990).

There has been **limited research focusing on the disfluencies of Kannada** [Kannada /ˈkænədə/ is a language spoken in India predominantly in the state
of Karnataka. Kannada, whose native speakers are called Kannadigas (Kannaḍigaru) and number roughly 70 million, is one of the 40 most spoken languages in the world. It is one of the scheduled languages of India and the official and administrative language of the state of Karnataka – Downloaded from http://en.wikipedia.org/wiki/Kannada_language.} speaking children in the preschool age. Hence there is a need to provide a normative reference for disfluencies to see the general trend in the patterns of disfluencies across different ages in the preschool period. This would aid in reducing the difficulty in identifying and differentiating a child with beginning stuttering from his/her normally disfluent counterpart and facilitate in deciding the treatment action. In this context, the present study was undertaken.

The aim of the study was to describe the frequency, type of speech disfluencies, repetition units, and duration of disrhythmic phonations in 2.1-6 year old typically developing Kannada speaking children. Specifically the study is designed to examine the influence of gender and age on speech disfluencies in these young children. The objectives of the study are multifold and as follows:

1. To investigate number, type, and duration of speech disfluencies exhibited by 2.1 ≤ 3, 3 ≤ 4, 4 ≤ 5, 5 ≤ 6 year old typically developing Kannada speaking children.

2. To investigate the effect of gender (Boys and Girls only) and age on speech disfluencies in these children.

3. To examine the clinical relevance of the measures derived from the study.
The results of the study will provide normative values of disfluencies in typically developing Kannada speaking children in the age range of 2.1-6 years. The study will also provide a base for determining normative disfluency scores in other Indian languages. India being a linguistically and culturally diverse country, language specific normative scores would throw more light on the fluency pattern present in young children of a particular culture or language. This would further a better differential diagnosis of a child with and without stuttering.