CHAPTER II
REVIEW OF LITERATURE

A Theoretical Overview

There have been a variety of etiological explanations to stuttering. The mystery of stuttering is manifested in its complexity of presentation and inconclusive findings of research into its nature and etiology. It is possible to find subjects to fit into almost any theory. But, no theory seems to relate successfully to even a smallest group of stutterers presenting for treatment in an unselected group. It has been said that the only common denominator distinguishing those who stutter from those who do not is “the fact of stuttering”. (Perkins, 1965). Several investigators have rigorously examined the possible causes of stuttering. It is increasingly being realized that there is no one cause of stuttering which is applicable to all stutterers. In a given stutterer, there might be more than one etiological factor interacting to precipitate stuttering. The etiological factors can be broadly described as organic, linguistic, psychological, social and interpersonal in nature.

1) Organic Models- Search for an organic abnormality within the central nervous system (CNS) has led people to investigate cerebral motor ability, dichotic listening and cerebral blood flow in stutterers and non stutterers. Beech and Fransella (1968) concluded that stutterers might have “some minimal disorder of the CNS”. Specifically they may have incomplete cerebral dominance or bilateral representation of speech. However such conclusions have been refuted by many others (Dorman and Porter, 1975). Dorman and Porter believed that stuttering might be due to disturbances in cerebral laterality and/or laryngeal motor control, while Andrews (1984) believed it to be due to diminished ability to deal with the relationship between motor activity and the associated sensory activity produced during speech. Neuropsychological models have ascribed stuttering to a break down in the co-ordination of speech motor output as well as to the predominant use of right hemisphere in processing language in contrast to non stutterers (Rosen field, et. al, 1991). Auditory feedback theory
of stuttering proposed that a delay in the auditory feedback of the stutterers
own speech results in hesitations, repetitions and other stuttering features.

2) **Linguistic Models**- Factors related to phonological, morphological and
syntactical characteristics of speech have been reported to be associated with
the occurrence of stuttering. Phonological factors relate to the frequency of
occurrence of different phonemes in the language and the relative complexity
of production of different phonemes among others. (Bloodstein, 1995).
Morphological variations include word length and word frequency while word-
initial sound, word position, grammatical class and information load, among
others comprise the syntactic variables associated with stuttering.

3) **Psychological and Learning Theory Models**- Sigmund Freud regarded that
stuttering was a result of unresolved unconscious conflicts and considered the
stutterer as a neurotic person. Psychoanalysis regards stuttering broadly as a
neurotic disorder in which personality disturbance is in part reflected in a
disturbance of speech (Glauber, 1958). Repressed need theories (Glauber,
1958) of stuttering have a lot in common with definitions of the etiology of
neurotic behavior. However, many others like Andrews (1984) do not believe
that personality disturbance is the core of stuttering.

Emotional turmoil and anxiety have been considered to have a central
role in the manifestation of stuttering by many. Sheehan (1953) described
stuttering as avoidance behavior. Classical conditioning theories hypothesized
that stutterers learn to associate speech with negative emotional states like
anxiety, fear and stress (Brutten and Shoemaker, 1967). Anticipation of
specific situations or speech difficulty evokes an intensified anxiety resulting in
speech disintegration. (Brutten and Shoemaker, 1967). Negative emotions
become classically conditioned so that anxiety and fear elicit stimuli which
affect fluency.

4) **Social and Interpersonal Model**- Stuttering tends to increase under certain
social pressures or demands for communication. This has lead to the belief that
the basic anxiety problem may be interpersonal in nature. On the other hand,
anxiety, negative attitudes and emotional arousal are described as normal correlators of personal distress and embarrassment experienced by stutterers. (Bloodstein, 1981). Research has shown that stutterers do have difficulty in social adjustment and are more prone to social avoidance than non stutterers. (Andrews, Craig, Feyer, Hoddinott, Howie and Neilson, 1983). Sheehan (1975) emphasized the role of interpersonal relationships (within the family) as a primary factor in the development of stuttering. Johnson and his associates (1959) identified three major environmental variables that influence stuttering. They were, a) the clients agree of stuttering, b) the client’s sensitivity to their listeners and c) the client’s sensitivity to their own dysfluency and the listener’s evaluations.

In addition to all these models, over the years, numerous theories have been proposed to explain the etiology of stuttering. Although the etiology of stuttering is not fully understood there is strong evidence to suggest that it emerges from a combination of constitutional (predisposing), developmental and environmental (precipitating) and psychological factors.

1) Biological Theories- Kidd (1980) has established that when stuttering run in families, the genetic closeness between family members predicts the occurrence of the disorder, thus suggesting that some genetically transmissible trait or set of traits influence the probability that a child will develop the disorder. Genetic studies support for the presence of a physiological predisposition to stutter. Kenneth and Kidd’s analysis of family data related to transmission of stuttering yielded gender differences, role of genetics and environmental factors. Studies in twins have shown a higher concordance for stuttering in monozygotic twins than in dizygotic twins (77% versus 32%). Among first degree relatives of stutterers, the risk of the disorder is more than three times that of the general population.

According to Eisenson (1975), stuttering is based upon a constitutional predisposition to motor and sensory perseveration, stutterers inclined to
perseverate more in performing certain psychomotor tasks. (Preservative Theory). Geschwind (1985) proposed that male sex hormone testosterone tends to retard neuronal development in the fetal brain, because the right hemisphere develops earlier than left. The effect is more pronounced than in the left hemisphere, so excessive delays in left hemisphere will be more common among males. On the basis of this, Geschwind saw the relationship among maleness, left handedness and disorders such as dyslexia, delayed speech and stuttering.

According to Speech Control Motor Theory (Neuropsychological model) two factors are necessary and sufficient for stuttering to occur. The two factors are a) inefficiency of the SMA (Supplementary Motor Area) and b) labile system of hemispheric activation (Webster, 1993). There is a “greater lability or flexibility of hemispheric activation” in people who stutter. There may also be a “lack of normal gating of information flow between hemispheres”, although “the SMA may be susceptible to interference from any concurrent neural activity, not just that in the right hemisphere” (Webster, 1998). According to Webster (1997), ‘the anomalous brain mechanisms of the left hemisphere leads to speech dysfluency and this dysfluency in turns leads to and reinforces negative emotional reactions to speech. These reactions in turn evoke greater right hemisphere activity which, in turn, interferes more with the fragile left hemisphere mechanisms, resulting in dysfluency and so on. Stuttering is the deficit of the neural processing related to speech motor control and the psychological disturbances are a result rather than a cause of stuttering. Nonetheless, the psychological sequelae of stuttering impacts on the neural processing underlying stuttering and so influence the severity of stuttering. Stuttering is mainly associated with wide spread over activation in right cortical and left cerebellar motor regions and often with deactivations in left hemisphere language and auditory areas. Over-activations of the SMA, anterior insula, Anterior Cingulate Cortex (ACC) are reported during stuttered speech. Recently neuroimaging such as Magnetoencephalography (MEG), Positron
Emission Tomography (PET), Transcranial Magnetic Stimulation (TMS) increasingly point to the failure of normal temporal lobe activation during speech that may either contribute to (or in the result of) a breakdown in the sequencing of processing among premotor regions implicated in phonologic planning. Functional neuroimaging studies have revealed two important facts, 1) in stutterers, the right hemisphere seems to be hyperactive and 2) a timing problem seems to exist between the left frontal and the left central cortex. (Ingham, 2001).

2) Psychological Theories

   Psychodynamic perspective- Stuttering has been said to satisfy an infantile need for oral erotic gratification. It is an attempt to satisfy anal erotic needs. It is a covert expression of aggressive impulses the person fears to express openly. Stutterers, in chewing up their words are symbolically attempting a cannibalistic destruction of their parents. It represents the unconscious desire to suppress speech; children fear that while speaking they may reveal forbidden wishes as proposed by Glauber (1958). Stuttering is driven by number of unfulfilled or unresolved infantile psychosexual needs and conflicts centre on oral and anal erotic gratification, feeling of hostility and anger towards the parent. (Bloodstein, 1995).

3) Learning Theories- Initial interest in the learning approach was stimulated by the work of Wischner (1950) within the framework of Hulls theory of learning. He posited that reinforcement consisted chiefly of reduction in the stutterer’s anxiety following the block prior to the moment of stuttering, there is a building up of expected fear. The immediate effect of stuttering is a reduction in the tension and consequently stuttering behavior was reinforced rather than extinguished. Instrumental conditioning forms the basis for the escape and avoidance behavior of persons who stutter that relate to speech situations, words or sounds. The person who stutter have a predisposition of a low
emotional threshold and a limited neuro-physiological make-up, which make them susceptible to emotional conditioning.

According to Anticipatory Struggle Hypothesis, stutterers have difficulty whenever they expect to stutter and to speak fluently when not thinking about their speech. (Brutten and Shoemaker, 1967). The central point is that anticipation of stuttering leads to stuttering. According to Stark weather (1987), stuttering results when demands for fluency from the child’s social environment, exceeds the child’s cognitive, linguistic, motor or emotional capacities for fluent speech (Demand and Capacity Model).
Review of Related Studies

The review of literature has been attempted to get a broad picture of various researches related to the investigation. For any worthwhile research, review of related literature enables the investigator to define the frontiers of his/her field. Since, effective research is based upon past knowledge, the review of related literature helps to eliminate the duplication of what has been done and provides useful hypothesis and helpful suggestions for significant investigation. The review is of considerable importance to investigation because it makes researcher of the significance of the problem they have selected for the study. It also aids the investigator to give insights into and suggestions about research methodology.

Review of literature convinces the reader, the actual necessity of the proposed study and the background of the previous studies. This chapter presents an attempt to collect theoretical reviews and studies which are related to the problem under investigation.

Studies related to Stuttering and Adjustment

Stuttering and Home Adjustment

Daily lifestyles, events, experiences, attitudes, and behaviours that occur at home have an impact on all adults who stutters. Most families' daily lives are busy and demanding. There is so much to organize and to remember including full schedules of activities, clothes to find, mealtimes, appointments, social lives etc. There are constant demands and pressures, fun times and conflicts, anxieties and health worries - all normal parts of everyday life. Adults who stutter may find it difficult to keep up the same pace, or keep trying to get in ahead of others. Stuttering and a fast pace do not go well together. That is if everyone at home talks at once and at a rapid rate, the stutter may try to match it or if the family members use complicated language, the stutter may try to copy it.
Beilby, Byrnes and Young (2012) investigated the experiences of fluent siblings of children who stutter to examine the impact that stuttering may have on their lives. A mixed methods research design incorporated qualitative semi-structured interviews and quantitative questionnaires. The results of the qualitative investigation revealed four aspects of children's lives that were affected by having a sibling who stuttered: the relationship between siblings, the impact on the fluent sibling, the impact on the parent relationship with both children, and the impact on the sibling's relationship with others. Findings revealed that siblings of children who stutter exhibited strongly negative emotions, and differing levels of responsibility associated with their involvement in the actual stuttering management programme. Furthermore, for the fluent sibling, secondary to having a brother or sister who stuttered, communication with and attention from their parents was variable. The results of the quantitative component of the study revealed children who stutter and their siblings demonstrated significantly greater closeness, and concurrently, increased conflict and status disparity than did the control fluent sibling dyads. The parents of the experimental sibling dyads also demonstrated significantly greater partiality towards a child, namely the child who stuttered, than did the parents of the control sibling dyads.

Beliby, Byrnes, Lau and Hennessey (2012) aimed to examine whether quantitative measures of parenting styles, parent and peer attachment patterns, and parent- and self-reported child behaviour could differentiate between school-aged children who stutter and their fluent peers. In addition, qualitative individual semi-structured interviews with all children who stutter were conducted to gain insight into their life experiences and reflections in relation to stuttering. The interviews were classified into ancillary themes of school, peers and parents. Quantitative findings revealed that children who stutters perceived their parents with significantly lower attachment, particularly in relation to trust, and parents of children who stutter perceived their children with significantly higher maladjustments than fluent counterparts. Qualitative
themes emerged pertaining to attitudes, perceptions and relationships with teachers, peers and parents, with consistent experiences of teasing and bullying reported as a consequence of the stutter. The majority of participants recounted frustration with the nature in which their parents attempted to remediate their stuttering. Collectively, these findings highlight imperative management considerations for school-aged children who stutter and their parents. The usefulness of quantitative and qualitative research paradigms is also emphasized.

Mielke (1993) investigated 67 stuttering and 50 non-stuttering children, all of them aged between three and five years, regarding their social conditions. The results showed significant differences with regard to presence in a day nursery in the child's first year, space conditions at home, attention given to the child, physical exercise, occupational satisfaction of mothers and self-appraising qualities of fathers. These differences, on balance, are interpreted to the effect that in the individual case stuttering may be affected by psychosocial conditions and would then call for therapeutic action, although it appears to be obvious that there are no stutter-specific social factors.

**Stuttering and Health Adjustment**

Patients with long term stuttering may have mental health problems, and these may begin early in childhood after the onset of stuttering (Langevin, Packman, Onslow (2009), Ezrati-Vinacour, Platzky and Yairi (2001). A recent observational study in adults who stutter found that stuttering affects quality of life as adversely as life threatening conditions such as neurotrauma and coronary heart disease (Craig, Blumgart and Tran, 2009). People who stutter may be affected by social anxiety, and an observational study estimated that people with chronic stuttering have a thirty four fold increased risk of having a formal diagnosis of social phobia compared with matched controls (Iverach, et al., 2009). Case reports of social phobia and stuttering are common, (De Carle and Pato, 1996) and comorbid stuttering has been reported in 40-60% of
clinical cohorts of people with social phobia. (Iverach, et al., 2009, Blumgart, Tran and Craig, 2010, Stein, Baird and Walker, 1996). Anxiety disorders, mood disorders, substance misuse, and personality disorders are also highly prevalent in people who stutter, (Iverach, et al., 2009 and 2010) and the presence of mental health problems reduces the likelihood that speech rehabilitation will be successful. (Iverach, et al., 2009).

Gunn et al., (2013) conducted a study to evaluate anxiety and psychological functioning among adolescents seeking speech therapy for stuttering using a structured, diagnostic interview and psychological questionnaires. This study also sought to determine whether any differences in psychological status were evident between younger and older adolescents. Participants were 37 stuttering adolescents seeking stuttering treatment. Computerized Voice Version of the Diagnostic Interview Schedule for Children, and five psychometric tests are administered. Participants were classified into younger (12-14 years; n = 20) and older adolescents (15-17 years; n = 17). The results showed that 38% of participants attained at least one diagnosis of a mental disorder, according to the diagnostic criteria of the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV; APA, 2000), with the majority of these diagnoses involving anxiety. Although many of the scores on psychological measures fell within the normal range, older adolescents (15-17 years) reported significantly higher anxiety, depression, reactions to stuttering, and emotional/behavioral problems, than younger adolescents (12-14 years). There was scant evidence that self-reported stuttering severity is correlated with mental health issues.

Developmental stuttering is associated with increased risk of psychological distress and mental health difficulties. McAllister, Collier and Shepstone (2013) conducted a study to determine the impact of parent-reported adolescent stuttering and other speech difficulties on psychological distress and associated symptoms as measured by the Rutter Malaise Inventory. A British birth cohort dataset provided information about 217 cohort members who
stuttered and 301 cohort members who had other kinds of speech problem at age 16 according to parental report, and 15,694 cohort members who had experienced neither stuttering nor other speech difficulties. The main analyses concerned associations between adolescent stuttering or speech difficulty and score on the Rutter Malaise Inventory. The results showed that in the adjusted analyses that controlled for other predictors, cohort members who were reported to stutter had higher malaise scores than controls overall, indicating a higher level of psychological distress, but they were not at significantly more likely to have malaise scores in the range indicating a risk of serious mental health difficulties. Cohort members who were reported to have other speech difficulties during adolescence had malaise scores that overall did not differ significantly from those of controls in the adjusted analyses, but they were at significantly greater risk of serious mental health difficulties.

Cruice, Worrall and Hickson (2013) conducted a study to draw conclusion about the suitability of the Short Form 36 Health Survey for the communication disorders of aphasia and stuttering. This study reports on the impact of post-stroke aphasia on 30 Australian older adults health related quality of life (HRQOL). It also comments on the capacity of the SF-36 to measure HRQOL in this population, specifically whether it is sensitive to the three known determinants of post-stroke HRQOL - emotional, physical and social functioning. The results shows that (1) adults with post-stroke aphasia have similar HRQOL to their peers on six subscales, but significantly lower Role emotional and Mental health HRQOL; (2) a substantial number of aphasic adults reported depressive mood; and (3) aphasic adults with depressive mood have significantly worse HRQOL on six subscales than aphasic adults without depressive mood, but similar Role emotional and Body pain HRQOL. In conclusion, stroke and aphasia have minimal impact on older adults' HRQOL as measured by the SF-36, which conflicts with an established evidence base of the negative consequences of aphasia on life.
Koedoot (2011) conducted a study to explore to what extent quality of life is impaired in adults who stutter and also to identify determinants of quality of life in adults who stutter by testing relationships between stuttering severity, coping, functioning and quality of life and by testing for differences in variable scores between two stuttering subgroups: receiving therapy versus not receiving therapy. A total of 91 adults with stuttering filled in several questionnaires to assess their stuttering severity, daily functioning, coping style and quality of life. The quality of life instruments used were the Health Utility Index 3 (HUI3) and the EuroQoL EQ-5D and EQ-VAS. The results indicated that moderate to severe stuttering has a negative impact on overall quality of life; HUI3 derived quality of life values varied from .91 (for mild stuttering) to .73 (for severe stuttering). The domains of functioning that were predominantly affected were the individual's speech, emotion, cognition and pain as measured by the HUI3 and daily activities and anxiety/depression as measured by the EQ-5D. The adult who stutters in the therapy group rated their stuttering as more severe and recorded more problems on the HUI3 speech domain than adults who stutters in the non-therapy group. The EQ-VAS was the only instrument that showed a significant difference in overall quality of life between groups. Finally, it was found that the relationship between stuttering severity and quality of life was influenced by the individual's coping style (emotion-oriented and task-oriented).

According to Yaruss and Quesal (2004) the World Health Organization (WHO) recently presented a multidimensional classification scheme for describing health status and the experience of disablement. This new framework, the *International Classification of Functioning, Disability, and Health* (ICF; WHO, 2001), is a revision of WHO’s prior framework for describing the consequences of disorders, the *International Classification of Impairments, Disabilities, and Handicaps* (ICIDH; WHO, 1980). A comparison of the WHO’s ICIDH and ICF frameworks is presented, followed by an analysis of how the ICF can be adapted to describe the speaker’s experience of the stuttering disorder. Emphasis is placed on the fact that
stuttering involves more than just observable behaviors. Specifically, the speaker’s experience of stuttering can involve negative affective, behavioral, and cognitive reactions (both from the speaker and the environment), as well as significant limitations in the speaker’s ability to participate in daily activities and a negative impact on the speaker’s overall quality of life. Health conditions of stutterers are affected by both internal and external factors, and can involve more than just observable behaviors that are seen on the surface.

**Stuttering and Social Adjustment**

Davis, Howell, and Cooke (2002) uses a sociometric scale (adapted from Coie, Dodge, & Coppotelli, 1982) to assess children who stutter in classroom groups with fluent peers. The peer relationships between 16 children who stutter and their classmates (403 children in total) were examined. The results showed that children who stutter were rejected significantly more often than were their peers and were significantly less likely to be popular. When compared to children who do not stutter, the children who stutter were less likely to be nominated as 'leaders' and were more likely to be nominated to the 'bullied' and 'seeks help' categories.

Blood et al., (2001) examined the communication apprehension and self-perceived communication competence of 39 adolescents who stutter and 39 adolescents who do not stutter using two standardized communication measures. Significantly higher levels of communication apprehension and poorer scores on self-perceived communication competence were found in adolescents who stutter when compared with adolescents who do not stutter. Subscore test data revealed that adolescents who stutter had significantly greater fears about speaking in group discussions and interpersonal conversations than they had about public speaking and talking during meetings, when compared with those who do not stutter. They also had significantly poorer perceptions about their own communication competence when compared with students who do not stutter. A significant positive relationship
among stuttering severity, communication apprehension, and self-perceived communication competence was found.

Green (1997) addresses the effects of stuttering upon the extent to which people who stutter may perceive themselves as accepted in social speech situations. 12 females and 48 males participated in the study. Their perceptions of coping with the reactions from others during episodes of stuttering, as well as with their own reactions in social speech situations, were assessed. The subjects were classified into three groups on the basis of the degree to which they perceived themselves as agent in social interaction with respect to their experiences as persons who stutter. The three groups differed with respect to the extent to which they put themselves into social roles or situations which afford perceptions of being accepted in social speech situations. While subjects who regard themselves as agents of their experiences as persons who stutter appeared to succeed in these endeavors, the two other groups did not. Subjects who do not perceive themselves as agents of their experiences as persons who stutter appeared to perceive acceptance in social speech situations as dependent upon how fluently they spoke. Subjects who have resigned from attempts at being the agent of their experiences as persons who stutter appeared to identify with the social stereotypes and burdens placed upon them by their stuttering.

**Stuttering and Emotional Adjustment**

Ntourou et al., (2013) conducted a study on emotional reactivity and regulation in preschool-age children who stutter. This study experimentally investigated behavioral correlates of emotional reactivity and emotion regulation and their relation to speech (dis)fluency in preschool-age children who do and do not stutter during emotion-eliciting conditions. Participants (18 children who stutters, 14 boys; 18 children who do not stutter, 14 boys) completed two experimental tasks (1) a neutral (“apples and leaves in a transparent box,” ALTB) and (2) a frustrating (“attractive toy in a transparent box,” ATTB) task, both of which were followed by a narrative task. Dependent measures were emotional reactivity (positive affect, negative affect), emotion
regulation (self-speech, distraction) exhibited during the ALTB and the ATTB tasks, percentage of stuttered disfluencies (SDs) and percentage of non-stuttered disfluencies (NSDs) produced during the narratives. Results indicated that preschool-age children who stutter exhibited significantly more negative emotion and more self-speech than preschool-age children who do not stutter. For children who stutter only, emotion regulation behaviors (i.e., distraction, self-speech) during the experimental tasks were predictive of stuttered disfluencies during the subsequent narrative tasks. The present findings support the notion that emotional processes are associated with childhood stuttering. Specifically, findings are consistent with the notion that preschool-age children who stutter are more emotionally reactive than children who do not stutter and that their self-speech regulatory attempts may be less than effective in modulating their emotions.

A critical review by Alm (2004) suggested that persons who stutter often report their stuttering is influenced by emotional reactions, yet the nature of such relation is still unclear. Psycho physiological studies of stuttering have failed to find any major association between stuttering and the activity of the sympathetic nervous system. A review of published studies of heart rate in relation to stressful speech situations indicate that adults who stutter tend to show a paradoxical reduction of heart rate compared with non stuttering persons. Reduction of heart rate has also been observed in humans and mammals during anticipation of an unpleasant stimulus, and is proposed to be an indication of anticipatory anxiety resulting in a "freezing response" with parasympathetic inhibition of the heart rate. It is suggested that speech-related anticipatory anxiety in persons who stutter is likely to be a secondary, conditioned reaction based on previous experiences of stuttering.

Karrass et al., (2006) conducted a study to examine relations between stutterers emotional reactivity, emotion regulation and stuttering. Findings indicated that when compared to normally fluent peers, the stutterers were significantly more reactive, significantly less able to regulate their emotions,
and had significantly poorer attention regulation, even after controlling for gender, age, and language abilities. Findings suggest that the relatively greater emotional reactivity experienced by stutterers, together with their relative inability to flexibly control their attention and regulate the emotions they experience, may contribute to the difficulties these stutterers have established in reasonably fluent speech and language.

**Stuttering and Occupational Adjustment**

The experiential claims of nine people who stuttered were examined by Katz, Lincoln and Cumming (2013) with the purpose of determining the impact of stuttering on their work lives and to further examine what meaning they derive from these experiences. Six male and three female participants aged 29-61 years (mean age, 41.4) who stuttered were interviewed and verbatim interview transcripts were analyzed using interpretative phenomenological analysis. Credibility was established by way of member checking, researcher comparison with only consensual themes and interpretations presented in the final analysis. The results shows four superordinate themes, “stuttering is always there; stuttering at work reveals a problem; stuttering limits communication; and stuttering limits occupational progression” were distilled by descriptive and interpretative treatment of the interview transcripts. The interpretative level of analysis identified self-stigma as central to the meaning derived from these experiences. Participants’ expectation of stigmatizing public attitudes, together with their own self-validation of such attitudes perpetuated diminished feelings about self-esteem and self-efficacy. Fear of negative evaluation may be heightened in the work context and might mediate feelings of self-stigma in this context. Super ordinate themes and their subthemes indicate that stuttering is problematic at work by way of perpetuating in the people who stutter as an expectation of negative evaluation by others. Findings implicate issues of self-stigma as generating feelings of self-doubt and self-reproach in people who stutters in the workplace.
In interviews and survey studies, people who stutter report the belief that stuttering has had a negative impact on their own education and employment. McAllister, Collier and Shepstone (2012) conducted a study to investigate the impact of adolescent stuttering on educational and employment outcomes. A secondary analysis of a British birth cohort dataset was used in the study. At age 16, there were 217 cohort members who were reported by their parents to stutter, and 15,694 cohort members with no known history of stuttering or other speech problems. Data were analyzed concerning factors associated with report of stuttering at 16, school leaving age, highest qualification, unemployment early in working life, pay at age 23 and 50, and social class of job at age 23 and 50. The results show those who stuttered at 16 were statistically more likely than those who did not stutter to be male, to have poorer cognitive test scores, and to have been bullied. There were no significant effects of stuttering on educational outcomes. For employment outcomes, the only significant association with stuttering concerned socioeconomic status of occupation at 50, with those who had been reported to stutter having lower-status jobs. These findings fail to support the belief that stuttering has a negative impact on education and employment. The higher likelihood of those who stutter working in lower-status positions may reflect their preference for avoiding occupations perceived to require good spoken communication abilities.

For stutterers the actual dysfluencies are not the only obstacle standing between them and employment opportunities. It is common for employers to associate hesitations and difficulty speaking with overall lack of intelligence. Employers assume that a person is not capable of thinking quickly or making rapid judgments because that person cannot be fluent (Parry, 2009).

Klein and Hood (2004) conducted a study to examine the impact that stuttering has on job performance and employability. The method involved administration of a 17-item survey that was completed by 232 people who stutter, age 18 years or older. Results indicated that more than 70% of people
who stutter agreed that stuttering decreases one's chances of being hired or promoted. More than 33% of people who stutter believed stuttering interfere with their job performance, and 20% had actually turned down a job or promotion because of their stuttering. Results also indicated that men and minorities were more likely to view stuttering as handicapping than were women and Caucasians. These findings suggest that people who stutter believe stuttering to be handicapping in the workplace.

The results of a survey conducted by Opp (1997) on 166 people who stutters shows high rates of unemployment and discrimination in attaining employment. These participants answered questions about their job choices, number of years they were employed, and whether or not they reported experiencing discrimination in their careers. Results of the study suggested that 35% of the participants reported being in careers that required a low level of communication, and 39% believed they had experienced discrimination in the hiring process because of their stuttering.

Rice and Kroll (1997) surveyed 568 National Stuttering Project members regarding their perceptions of past work experiences. Results indicated that stuttering directly affected these individuals’ perceptions of work experiences and career choices. In particular, 70% of the participants reported that they believed they could have had a better job if they did not stutter, and 56% reported choosing a career that required less speaking. 35% of the participants reported that they believed stuttering had affected their chances of being promoted, reported feeling discriminated against in the hiring process, and perceived that their supervisors had misjudged their performance because they stuttered.

Employment opportunities can be limited for a person who stutters. The stuttering is usually noticeable during the job interview process, which may affect the way that the employer perceives the applicant. A study by Hurst (1983) showed that 85% of employers agreed that stuttering decreases a person’s employability and opportunities for promotion.
Kolpovskaya and Defektologiya (1980) conducted a study toward social adaptation of graduates of a special school for children with severe speech disorders. They reviewed case histories of 110 graduates of a special school for children with severe speech disorders to determine how stutterers succeeded in their occupations after graduation. Results show that following graduation, most stutterers held various jobs, and some continued with their education. Success at work (i.e., ability to adapt to the work environment) was dependent on the nature and degree of stutterers defect. Results indicate that there is a correlation between the level of stutterer’s education and their success at work; stutterers with the most years at school performed better. Citing cases of stutterer’s failure to adapt to employment upon graduation, researchers stress the need to orient students with speech disorders to the working world while they are still enrolled in school.

**Stuttering and Adjustment**

Stuttering can cause wide ranging psychosocial impact. This is particularly the case for adolescents who may face additional physical, emotional and personality changes as they become adults. This study by Erickson and Block (2013) reports the findings of an investigation into the social and communication impacts of stuttering on Australian adolescents seeking treatment for stuttering and their families. A cross-sectional design utilizing questionnaires assessed the self-perceived communication competence and apprehension, stigma and disclosure, and experiences of teasing and bullying of 36 adolescents who stutter. Additionally, the impact of stuttering on the families of these adolescents was investigated. The results showed that adolescents who stutter have below average self-perceived communication competence, heightened communication apprehension, are teased and bullied more often than fluent peers, and they try to keep their stuttering secret. The families of the adolescents in the study reported high levels of emotional strain, family conflict and difficulty managing their child's frustrations.
Green (1997) examined the effects of stuttering upon psycho-social adjustment on stutterers who were classified into three groups on the basis of the degree to which they perceived themselves as agent in social interaction with respect to their experiences as persons who stutter. The meaningfulness of their communication, their manner of perceiving and reacting to psycho-social experiences, and their psycho-social adjustment were assessed. The subjects who did not regard stuttering as a hindrance for attainment of their needs and objectives seemed to adjust well to most life situations. The subjects who regarded stuttering as a major obstacle with respect to attainment of these needs and objectives seemed to adjust ineffectively. Those who were indifferent with regard to the implications of their stuttering seemed to base their adjustment to most life situations on compromising means.

Parker and Asher (1987) reviewed work on bullying and concluded that peer rejection and bullying can have severe and long-lasting effects such as low peer acceptance or peer rejection and also find out that these low peer acceptance or peer rejection have an influence on later personal adjustment problems such as depression and early school dropouts.

**Studies related to Stuttering and Maladjustment**

**Stuttering and Anxiety**

Manning and Beck (2013) examined the associations of trait anxiety (STAI), social anxiety (SIAS), depression (BDI-II), and personality features (ADP-IV) with three measures of stuttering severity: %SS, Stuttering Severity Instrument (SSI), and the Overall Assessment of the Speaker's Experience of Stuttering (OASES). Fifty adults with a history of stuttering served as participants. Participant scores on trait, anxiety, social anxiety, depression, and personality features were entered into a regression analysis, with the criterion variables (DVs) being: %SS, SSI-3, OASES total score. In order to explore the OASES, further, each of the four OASES subscales were also examined. A separate regression was conducted for, each dependent variable. The results showed that OASES total score model was significant ($p < .0001$) and revealed
that social anxiety and, trait anxiety were the only significant predictors, with medium effect sizes noted for both variables. In contrast, percent syllables stuttered and the SSI were not significantly associated with psychological variables, suggesting that anxiety may not always be related to overt indicators of stuttering. Depression and personality dysfunction were not significantly associated with any measure of, stuttering severity.

Erdem and Çelik (2011) investigated the relation of anxiety levels and coping strategies in young and adult stutterers. By studying 45 patients with developmental stuttering and 30 normal speakers as healthy controls. The stuttering severity is evaluated by the Stuttering Severity Instrument (SSI-3). The semi-structured socio demographic data form, Beck Anxiety Inventory and The Coping Orientations to Problems Experienced Scale (COPE) were performed to all subjects. The results showed that Beck anxiety scores in stuttering group were higher than healthy controls. Problem focused and emotion focused coping strategies scores were lower and dysfunctional coping strategies scores were higher in stuttering group than healthy controls. Beck anxiety scores were positively correlated with the scores of dysfunctional coping strategies scores and negatively correlated with the onset of disorder in stuttering group.

Blumgart, Tran, and Craig (2010) conducted a study on social anxiety disorder in adults who stutter. The aim of this study was to determine the spot prevalence of social phobia in adults who stutters and to investigate differences in social anxiety between adult who stutters and controls who do not stutter. The study involved a comprehensive assessment of 200 adults who stutters and 200 adults who do not stutter similar in age and sex ratio. Measures included stuttering severity, health status, self-report measures of social anxiety as well as a structured diagnostic interview for social phobia for randomly selected sub-group of 50 from each group. The adult who stutters were found to have significantly raised trait and social anxiety, as well as significantly increased risk of social phobia in comparison to the controls.
Findings indicated a social phobia spot prevalence of at least 40% in adult who stutters, and for them to be at high risk of having generalized social phobia.

Iverach et al., (2009) explored the prevalence of anxiety disorders among adults seeking speech therapy for stuttering. Employing a matched case-control design, participants included 92 adults seeking treatment for stuttering, and 92 age- and gender-matched controls from the Australian National Survey of Mental Health and Well-being. A conditional logistic regression model was used to estimate odds ratios for Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) and International Classification of Diseases (ICD-10) anxiety disorders. Compared with matched controls, the stuttering group had six- to seven-fold increased odds of meeting a 12-month diagnosis of any DSM-IV or ICD-10 anxiety disorder. In terms of 12-month prevalence, they also had 16- to 34-fold increased odds of meeting criteria for DSM-IV or ICD-10 social phobia, four-fold increased odds of meeting criteria for DSM-IV generalized anxiety disorder, and six-fold increased odds of meeting criteria for ICD-10 panic disorder. Overall, stuttering appears to be associated with a dramatically heightened risk of a range of anxiety disorders.

Mulcahy et al., (2008) examined the relationship between anxiety, attitude toward daily communication, and stuttering symptomatology in adolescent stuttering. Adolescents who stuttered (N=19) showed significantly higher levels of trait, state and social anxiety than fluent speaking controls (N=18). Trait and state anxiety was significantly associated with difficulty with communication in daily situations for adolescents who stutter, but not for controls. No statistically significant associations were found between anxiety and measures of communication difficulty, and the severity or typography of stuttering surface behaviors. These results highlight some of the psychosocial concomitants of chronic stuttering in adolescence, but challenge the notion that anxiety plays a direct mediating role in stuttering surface behaviors. Rather, the results suggest stuttering is a disorder that features psychosocial conflict regardless of its surface features.
A study was conducted by Blood et al., (2007) on the anxiety levels in adolescents who stutter. Thirty-six adolescents who stutter and 36 adolescents who do not stutter were administered standardized scales for anxiety and self-esteem. Significant differences were found for the total T-scores for Revised Children's Manifest Anxiety Scale for the two groups, although both groups mean T-scores were within normal range. Eighty-three percent of adolescents who stutter and 95% of adolescents who do not stutter earned scores in the normal range. No significant differences were found on the self-esteem scale, with 86% of adolescents who stutter and 97% of adolescents who do not stutter earning scores in the normal/positive range. Adolescents who stutter with co-occurring disorders displayed significantly higher levels of anxiety than adolescents who stutter with no co-occurring disorders. No significant differences were found between groups on ethnicity, socioeconomic class, gender and anxiety levels. A positive, significant correlation between anxiety scores and self-esteem scores was found for both groups.

Davis and Shisca (2007) designed a study to see whether young children and adolescents who persist in their stutter (N = 18) show differences in trait and/or state anxiety compared with people who recover from their stutter (N = 17) and fluent control speakers (N = 19). So the method of this study involves a fluent control group, a group of speakers who have been documented as stuttering in the past but do not stutter now and a group of speakers (also with a documented history of stuttering) who persist in their stuttering participated, all aged 10-17 years. The State-Trait Anxiety Inventory for children was administered. The results showed that there were no differences between persistent, recovered and control groups with regard to trait anxiety. The persistent group had higher state anxiety than controls and the recovered group for three out of four speaking situations.

Ezrati and Levin (2004) examined the relationship between anxiety and stuttering. This study examined the relationship within the framework of the multidimensional interaction model of anxiety that includes an approach to
general anxiety in specific situations. Ninety-four males aged 18-43, half dysfluent speakers and half fluent speakers completed two questionnaires: The Trait Anxiety Inventory and the Speech Situation Checklist. In addition, after performing speech and non-speech tasks, participants evaluated their level of anxiety on a subjective scale, labeled Task-Related Anxiety - TRA. The stuttering group also evaluated the level of severity of their stuttering. Findings indicate that trait anxiety is higher among people who stutter compared to fluent speakers, thus indicating that anxiety is a personality trait of people who stutter. State anxiety in social communication is higher among severe stutterers as compared to mild stutterers and fluent speakers. Thus, state anxiety is related to stuttering severity. The results are discussed in the frame of the multidimensional model of anxiety.

Messenger and Onslow (2004) conducted a study on social anxiety in stuttering. The present study consisting of 34 stuttering and 34 control participants completed the Fear of Negative Evaluation (FNE) Scale and the Endler Multidimensional Anxiety Scales-Trait (EMAS-T). The FNE data showed a significant difference between the stuttering and control participants, with a large effect size. Results suggested that, as a group, a clinical population of people who stutter has anxiety that is restricted to the social domain. For the EMAS-T, significant differences between groups were obtained for the two subtests that refer specifically to people and social interactions in which social evaluation might occur (Social Evaluation and New/Strange Situations) but not for the subtests that contained no specific reference to people and social interactions (Physical Danger and Daily Routines). These results were taken to suggest that those who stutter differ from control subjects in their expectation of negative social evaluation, and that the effect sizes are clinically significant. The findings also suggest that the FNE and the EMAS-T are appropriate psychological tests of anxiety to use with stuttering clients in clinical settings. The clinical and research implications of these findings are discussed, in terms of whether social anxiety mediates stuttering or is a simple by-product of stuttering.
Craig and Hancock (2003) conducted a randomized population study on the anxiety levels in people who stutter. The study involved a random selection and telephone interview of people in 4,689 households. The telephone respondent was given a description of stuttering and asked if any person living in their household stuttered. If yes, a number of corroborative questions were asked, and permission was requested to tape the speech of the person believed to stutter over the telephone. A definite case of stuttering was based on a positive detection of stuttering from the tape and at least one of the corroborative questions supporting the diagnosis. A total of 87 people were identified as definite cases of stuttering across all ages, and 63 participants who were 15 years or older completed a trait anxiety questionnaire over the telephone. Mean trait anxiety levels were significantly higher than levels generally found in society, though differences were not large.

Cabel, Colcord, and Petrosino (2002) investigated self-reported anxiety of adults who do and do not stutter. 10 people who stuttered, all of whom had experience with stuttering therapy, were matched with 10 participants who did not stutter. Each participant in both groups was engaged in a session to evaluate speech in a format similar to a professional diagnostic session for stuttering. Each participant was stopped and asked to rate his anxiety during specific moments during the session. The participants' reports were taken during a baseline period, during a period in which they were thinking about their speech, and during three different speaking tasks. The anxiety reported by the group of people who stuttered was compared to the anxiety reported by the group of individuals who did not stutter. Statistical analyses indicated a significant main effect for the group who stuttered as they reported more anxiety during the entire session. There was no main effect for condition. The interaction of group by condition fell short of significance.

Kraaimaat and Vanryckeghem (2002) examined the presence of social anxiety in adults who stutter. 89 adults (aged 18-50 yrs) who stuttered completed the Inventory of Interpersonal Situations concerning the extent to
which emotional tension or discomfort is perceived in social situations, and the frequency with which social responses are executed. Results show that stutterers displayed significantly higher levels of emotional tension or discomfort in social situations compared to control stutterers who did not stutter. Stutterers also reported a significantly lower frequency of social responses compared to control stutterers. In addition, approximately half of the stutterer’s scores fell within the range of a group of highly socially anxious psychiatric patients. It is concluded that the measurement of social anxiety is an important element in the assessment of adults who stutter, but that high levels of social anxiety is not a prerequisite for stuttering.

Gabel and Colcord (2002) assessed the self-reported anxiety of adults who do and do not stutter. This is a preliminary investigation of the differences in self-reported anxiety of people who do and do not stutter. 10 people (6 men and 4 women, aged 26-54 yrs) who stuttered, all of whom had experience with stuttering therapy, were matched with 10 participants who did not stutter (aged 22-57 yrs). Each participant in both groups was engaged in a session to evaluate speech in a format similar to a professional diagnostic session for stuttering. Each participant was stopped and asked to rate his anxiety during specific moments during the session. This procedure is similar to in vivo cognitive assessment used in cognitive-behavioral treatments and research. The participants’ reports were taken during a baseline period, during a period in which they were thinking about their speech, and during three different speaking tasks. The anxiety reported by the group of people who stuttered was compared to the anxiety reported by the group of individuals who did not stutter. Statistical analyses indicated a significant main effect for the group who stuttered as they reported more anxiety during the entire session. There was no main effect for condition. The interaction of group by condition fell short of significance.

Dietrich and Roaman (2001) examined physiological arousal and predictions of anxiety by people who stutter. 24 people (aged 18-71 yrs) who
stutters were administered a questionnaire to elicit predictions of their speech-related anxiety for 20 hypothetical speaking situations. Participants rated their predictive anxiety on a seven-point scale. Participants were then asked to engage in an enactment of four of the situations described in the questionnaire and their skin conduction responses were measured as an index of physiological arousal. No correlation was found between the participants' predictions of anxiety on the questionnaire and the participants' skin conduction responses during the different speaking situations.

Mahr and Torosian (1999) examined the relationship between anxiety and social phobia in stuttering. This study compared symptoms of anxiety among a sample of 22 stutterers (ages 27–51 yrs) to previously gathered data for social phobics, and nonpatient controls. Stutterers had more social anxiety and avoidance than did nonpatient controls. The stuttering group had less social distress and avoidance, less fear of negative evaluation, fewer symptoms of social phobia, and fewer symptoms of agoraphobia as compared to the social phobia group. There was not, however, a significant difference between the stuttering and social phobia groups on a measure of general anxiety. The majority of stutterer’s reported speech-related fear as their primary phobia. The results of the study suggest that stutterers may not suffer from social phobia, but that some stutterers may avoid social situations because of fear of stuttering.

Blood et al., (1994) studied the subjective anxiety measurements and cortisol responses in adults who stutter. Anxiety, as measured by self-report inventories and salivary cortisol levels, was examined in 11 adult males who stutter and 11 adult males who do not stutter during baseline, low stress, and high stress sessions. During the high stress session, salivary cortisol was significantly greater in stutterer than the non stutterers. No significant differences were found between the 2 groups on the state or trait anxiety measures of the State-Trait Anxiety Inventory (STAI) or the Personal Report of Communication Apprehension. Significant differences in anxiety levels
among the baseline, low stress, and high stress sessions for both groups of stutterers were found for the STAI. No other significant differences or relationships were found between the 2 groups.

Miller and Watson (1992) examined self-perceptions of general state and trait anxiety, depression, and communication attitude in matched groups of 52 stutterers and 52 nonstutterers (aged 16–68 yrs). Measures included the Beck Depression Inventory and the State-Trait Anxiety Inventory. Anxiety and depression were not related to self-ratings of stuttering severity. Communication attitude was negative and became increasingly negative as self-ratings of stuttering became more severe. Stutterers grouped by severity rating differed in the strength of the relation between measures of communication attitude, anxiety, and depression. Findings suggest that the anxiety of stutterers is restricted to their attitude toward communication situations and is a rational response to negative communication experiences.

Kraaimaat and Janssen (1991) conducted a study on social anxiety and stuttering. They compared social anxiety of 110 stutterers with that of 110 social phobic patients and 110 normal controls. While the mean social anxiety score of stutterers was significantly higher than that of controls and lower than that of social phobics, stutterers' scores showed a normal distribution, indicating stutterers show high as well as low in anxiety.

Craig (1990) investigated the relationship between self-reported anxiety and stuttering. In this study, a large number of stutters were assessed on state and trait anxiety before, and on trait anxiety after, intensive behavioral treatment. Their levels of anxiety were compared to those of nonstuttering controls matched for gender, age, and occupational status. Results showed that persons who stutter had significantly higher levels of fear (state anxiety) in a demanding speech situation. They were also shown to have higher levels of chronic anxiety (trait anxiety) than matched controls. However, trait anxiety measured after treatment was within normal levels. Although not allowing the
conclusion that anxiety causes stuttering, these results do have important implications for the management of the disorder.

Peters and Hulstijn (1984) conducted a study on stuttering and anxiety: The difference between stutterers and nonstutterers in verbal apprehension and physiologic arousal during the anticipation of speech and non-speech tasks. They tested 24 stutterers and 24 nonstutterers (aged 18–37 yrs) in reading a text, holding a conversation, mirror writing, and an intelligence task performance to determine if stressful anticipation in the speech tasks is a factor in eliciting stuttering behavior. Anxiety measures included physiologic variables (skin conductance levels and fluctuations, pulse, and heart rate), a trait anxiety scale, a debilitating anxiety scale, and facilitating anxiety scale. Results show that physiologic variables were high for both groups, but that subjective anxiety reported after the tasks was significantly higher for stutterers than nonstutterers. It is concluded that stuttering is not elicited by anxiety.

In a study, Leith, et al., (1983) found out that one of the most commonly feared talking situation among stutterers is speaking on the telephone. They interviewed 130 stutterers who feared speaking on the telephone, regarding their fear of telephone calling and answering the age at which they began to fear calling and answering and their fear reaction to eight specific telephone calling situations. Subjects included male and female, black 8 white, and mild, moderate and severe stuttering groups. Results indicated that telephone calling was judged to be more feared than telephone answering with the exception of the black stutterers. When general reactions to the eight telephone situations were considered, the black stutterers had the most severe fear reaction while the male and moderate stutterers had the least severe reaction.

Aguilar (1982) studied the relationship between anxiety and stuttering behavior. Their reviews, studies and therapy techniques demonstrate that there is a direct relationship between anxiety and stuttering. Four clinical studies with 2 adults (aged 23 and 25 yrs) and two 2–3 yr olds are presented. It was
found that in cases where a relationship was found, stuttering was the cause of anxiety, and anxiety did not cause or maintain stuttering behavior.

Brown and Hull (1942) used Speech Attitude Scale with fifty nine older stutterers to collect data regarding the speech attitude of the stutterers. Their scores were compared with those reported for the standardization group. They reported that as a group the stutterers scores were significantly lower, which was interpreted to suggest that stutterers were less confident and enthusiastic about speaking, less poised in doing so and enjoyed it less.

**Stuttering and Depression**

Bray et al., (2003) investigated the relationship of self-efficacy for verbal fluency, academic self-efficacy, and depression between adolescents who stutter and fluent speakers. Two separate discriminant function analyses were performed. The first analysis used the self-efficacy and depression scores as response variables and fluency classification as the grouping variable. Results indicated that self-efficacy for speech was the sole significant variable and accounted for 61% of the variance in group status. A second simplified discriminant function analysis was performed using speech self-efficacy as the sole predictor of group membership. This single discriminant function correctly classified 81% of the overall sample into their known groups. Further, classification for participants who did not stutter (95.2%) was better than for those who did stutter (67%). Based on this and earlier research, adolescents appear to be capable of using self-efficacy scaling as a measure of confidence for verbal fluency, which may eventually prove to be useful in treatment.

Bloch et al., (1997) conducted a study in which the depressogenic effect of the neuroleptic drug pimozide was assessed in stuttered men without psychiatric disorders. Eight men with developmental stuttering but no past or present psychiatric illness participated in a double-blind, placebo-controlled study assessing the effect of 6 weeks of pimozide treatment on speech fluency and mood. Four of the seven subjects who were compliant with the treatment
developed marked depressive symptoms. No clear association was found between these reactions and pimozide dose, blood level, or degree of neurologic side effects. Symptoms abated soon after drug discontinuation. So it can be concluded that pimozide induced significant depressive symptoms in this group of psychiatrically normal men who stutter. Neuroleptic drugs may have a causal effect in the induction of depression in psychiatrically normal subjects, ostensibly independent of dose or severity of neurologic side effects.

Kotbi and Farag (1992) investigated differences between 2 matched groups of 29 male stutterers and 29 male nonstutterers on anxiety, depression, intelligence, and self-concept, as well as the intercorrelations among these variables within each group. Stutterers were examined and enrolled in therapy sessions, with an average of 30 sessions per stutterer. A 5-level depression criterion was formed using the Beck Depression Inventory. For the variables examined, differences between the 2 groups were found only for depression and anxiety.

Hays and Field (1989) recorded the pedigrees of 3 families in which both stuttering and bipolar illnesses were found. Results revealed an association between the 2 conditions (manic depression and stuttering) and linkage analysis suggested that the respective genes could occur at linked loci.

**Stuttering and Inferiority**

Carey et al., (2010), in his study containing a parallel group, non-inferiority randomized controlled trial with multiple blinded outcome assessments investigated whether telehealth delivery of the Camperdown Program provides a non-inferior alternative to face-to-face treatment for adults who stutter. The results showed that there was no statistically or clinically significant difference in percent syllables stuttered between the two groups at 9 months post-randomization. Analysis of covariance adjusting for baseline percent syllables stuttered showed telehealth had 0.8% absolute lower per cent syllables stuttered than face-to-face. There were also no differences in percent
syllables stuttered between groups immediately post- treatment, or at 6 months and 12 months post-treatment. In the second primary outcome measure, the telehealth group used statistically less contact time (221 min) on average than the face-to-face group (95% confidence interval = - 387 to - 56 min).

Stuttering and Paranoia

Tran, Blumgart and Craig (2011) conducted a study on subjective distress associated with chronic stuttering. Stuttering is a chronic condition involving involuntary disruption to speech fluency. Participants included 200 adults who have stuttered since childhood, with comparisons made to 200 non-stuttering controls of similar age and sex. The adults who stuttered were found to have significantly elevated levels of distress and negative mood states compared to the controls. Significant differences were found for anxiety, however, significant and substantial differences were also found across a broad range of negative affect, including dimensions such as somatization, interpersonal sensitivity, depressive mood, hostility and paranoia.

Stuttering and Maladjustment

Tudor (2013) compared the intrusive memories in groups of people who stutter, and who do not stutter. Twenty-one participants who stuttered and 21 matched controls were given a semi-structured interview which explored imagery in speaking situations. The data were analyzed using a Content Analysis approach. Other outcome measures were the Beck Anxiety Inventory, the Beck Depression Inventory, the Post Traumatic Stress Disorder (PTSD), Symptom Scale: Self-Report Version. The results show that the stuttering participants significantly indicated both recurrent imagery and associated memories than control participants. Content Analysis revealed themes of disfluency, anxiety; negative social evaluation, self-focus and pressure to speak that were common to both groups’ reports. Additional themes of helplessness, shame, sadness and frustration were found only in the images and memories of the stuttering group. No group differences were evident for the number of
sensory modalities involved in images and memories, or for ratings of their vividness or strength of associated emotions, or on self-report of depression, anxiety and trauma.

Treon, Dempster and Blaesing (2006) administered the Minnesota Multiphasic Personality Inventory (MMPI-2 and MMPI-A) to 60 subjects who stutter and to 60 matched subjects who do not stutter. Computer scored results indicate a statistically significant ($p = .017$) greater average tendency toward psychosocial-emotional disorder in subjects who stutter than in subjects who do not stutter. Also, mean t-score in 24 of the 93 scales/subscales assessed were statistically significantly higher for subjects who stutter than for subjects who do not stutter, especially in personality characteristics related to schizophrenia, depression, healthy concerns-somatic complaints, psychasthenia, anxiety-fearfulness, and self-doubt/self depreciation. Overall, these findings tend to support the tendency toward psychopathology (TTP) pole of the etiologic bipolar stuttering threshold hypothesis. In accord with this hypothesis, average MMPI-2/A t-scores for subjects who stutter were within the normal range of psychosocial-emotional functioning.

**Studies related to Stuttering and Aggression**

Blood and Blood (2007) conducted a study of self-reported experience of physical aggression and bullying of boys who stutter: Relation to increased anxiety. This study examined the relationship of self-reported anxiety and vulnerability to bullying for 18 children who stuttered and 18 children who did not stutter. More children who stuttered were at significantly higher risk of experiencing bullying behavior (61%) than children who did not stutter (22%); 39% of children who stuttered scored at least one standard deviation above the mean on the Revised Children's Manifest Anxiety Scale, suggestive of higher anxiety. In contrast, only 6% of children who did not stutter scored at least one standard deviation above the mean. The correlation was .82 for children who stuttered between greater vulnerability to bullying and self-reported anxiety. A
A bidirectional relationship is hypothesized between high anxiety and bullying of children who stutter.

Hugh-Jones and Smith (1999) conducted a study on adults who stutter and a retrospective report was obtained. It shows that 74% of 276 adults who stutter that took part in the survey reported that they had been bullied during their time at school. Of the 205 respondents that indicated they were bullied at school, 6% reported that the bullying had a long-term effect on their fluency.

Mooney and Smith (1995) used a questionnaire to obtain information regarding their time at school from adults who stutter. They found 11% of adults who stutter said they had been bullied at school and that this had a negative effect on the fluency of their speech. Comparison of this with estimates about how many fluent school children are bullied, on the other hand, indicates that children who stutter are no more at risk of bullying than their peers.

**Studies related to Stuttering and Personality**

Bleek et al., (2012) investigates the association between the five-factor model of personality measured by the NEO Five-Factor Inventory (NEO-FFI) and the Overall Assessment of the Speaker's Experience of Stuttering (OASES). The OASES measures the adverse impact of stuttering on a person's life. Participants in the present study were 112 persons who stutter from Germany. Results revealed a strong positive correlation between the personality trait Neuroticism and scores on the OASES. Moreover, Extraversion was negatively correlated with the OASES scores. The findings suggest that people with higher Neuroticism and lower Extraversion scores experience a greater impact of stuttering on their daily life.

Iverach et al., (2010) investigated the five personality domains of Neuroticism, Extraversion, Openness, Agreeableness and Conscientiousness, as measured by the NEO Five Factor Inventory (NEO-FFI), in a sample of 93 adults seeking speech treatment for stuttering, and compared these scores with
normative data from an Australian and a United States sample. Results revealed that NEO-FFI scores for the stuttering group were within the ‘average’ range for all five personality domains. However, adults who stutter were characterized by significantly higher Neuroticism, and significantly lower Agreeableness and Conscientiousness, than normative samples. No significant differences were found between groups on the dimensions of Extraversion and Openness.

Iverach et al., (2009) conducted a study to screen personality disorders among adults who stutter, and to compare these screening estimates with matched controls from a national population sample. Using a matched case-control design, participants were 94 adults seeking treatment for stuttering, 92 of whom completed the International Personality Disorders Examination Questionnaire (IPDEQ) as a first-stage screener, and 920 age- and gender-matched controls from the Australian National Survey of Mental Health and Well-Being (ANSMHWB). A conditional logistic regression model was used to estimate odds ratios for the primary outcome: first-stage presence of any personality disorder; as well as specific personality disorders. Based on first-stage screening, the presence of any personality disorder was significantly higher for adults in the stuttering group than matched controls, demonstrating almost threelfold increased odds. This difference between groups remained significant for all specific personality disorders, with four- to sevenfold increased odds found for Dissocial, Anxious, Borderline, Dependent and Paranoid personality disorders, and two- to threefold increased odds found for Histrionic, Impulsive, Schizoid and obsessive compulsive personality disorders. So stuttering appears to be associated with a heightened risk for the development of personality disorders.

Ying and Baokun (2001) conducted a study on personality trait and affective symptom of stuttering. They investigated the relation between emotion, personality trait and stutter. SAS, SDS, EPQ were administrated to 108 patients with stutter (stutter group), 110 normal controls (normal group),
103 patients with obsessive–compulsive disorder (OCD) and 137 patients with depression (depression group). The scores of SAS and SDS in stutter group were significantly higher than those in normal control, but lower than those in depression or OCD group. The E score in the stutter group was lower than that in the normal control group, but higher than that in the depression or OCD group. The N score in the stutter group was higher than that in the normal group, but lower than that in the depression or OCD group ($p < 0.01$). In the stutter group, the scores of SAS and SDS were negatively correlated with E score and positively with N score. It is concluded that the personality trait of patients with stuttering tends to depressive. The occurrence of negative emotions in them relates to their personality.

Schenker and Michael (1998) investigated the role of self-consciousness and personality in stuttering. One purpose of this study was to experimentally test a hypothesis that directing a nonstutterer's attention towards his normal speech disfluencies would result in an increase in such disfluencies. A second purpose of this study was to test a hypothesis that differential changes in verbal and nonverbal indicators of speech disfluency would vary with differential scores by these same participants on self-report personality measures of need for social approval, perfectionism, neuroticism, and self-consciousness. One hundred and twelve male college students served as participants for a Disfluency-Focus (D-F) group ($n = 70$), a Content-Focus (C-F) Control group ($n = 21$), and a No-Focus (N-F) Control group. All groups performed a pre-manipulation baseline speech task. Two of the groups were then given false feedback about their performance which was designed to increase their self-consciousness to either their speech disfluency (D-F group) or their speech content (C-F group), with the N-F group engaging in a rest-task during which no attention was paid to their speech performance. Following this manipulation, all groups then performed a post-manipulation speech task, identical to the first. Dependent variables included a variety of speech fluency and disfluency measures, as well as verbal and nonverbal avoidance behaviors. The results showed that, contrary to prediction, the participants in the D-F
group alone significantly decreased speech disfluency, but they also engaged in avoidance behaviors of speaking less and in a more cautious manner (i.e., with more inappropriate pauses). Only one personality style (need for social approval) demonstrated a pattern of significantly predicting change score measures (i.e., participants with higher levels of need for social approval tended to be the ones who, when made self-conscious of their speech, avoided speech more and were less able to manage the implicit demands for fluency that were placed on them). This study suggests that speech self-consciousness and environmental demands for fluency, alone, may not be sufficient factors in the development and maintenance of stuttering. It is suggested that a biogenetic predisposition for speech breakdown may be a necessary component to the disorder. Also, these results suggest that a high need for social approval may negatively impact some individuals' responses to increases in speech self-consciousness and environmental speech fluency demands.

Manning, Dailey and Wallace (1984) found that self-perceived personality characteristics of older people who stutters (29 participants, mean age 62 years) were not significantly different from those of nonstuttering controls (13 participants, mean age 65 years). They used a bi-polar adjective scale (Wood & Williams, 1976) containing pairs such as anxious-composed and introverted-extroverted. The person who stutters had a tendency to see themselves as more inflexible, withdrawn, self conscious, anxious and introverted than the control group, however no significant differences between the groups were reported.

Turnbaugh, Guitar and Hoffman (1981) studied the attribution of personality traits in stutterers and nonstutterers. Three videotaped recordings were made of an adult male speaking in an interview situation. Tapes differed as a function of the fluency exhibited by the interviewed speaker (i.e., fluent speech, primary stuttering, and secondary stuttering). Three audiotapes were recorded from the videotapes yielding six stimulus tapes. Independent groups of college students saw and/or heard one of the stimulus tapes each
described as an interview with a "male who stutters." The fluent audio- and videotapes were replayed to two additional groups but were described only as an interview with a "male." Groups rated the personality of the speaker after tape presentation. Results revealed no difference in personality trait assignment as a function of experimental variables. However, in a second experiment two groups of college students rated a hypothetical normal speaker and a hypothetical stutterer as significantly different in personality attributes. Results are discussed with reference to stereotyping behavior.

Wingate (1966) studied the behavioral rigidity in stutterers. In this twelve young adult male stutterers were compared with a matched control group in a test developed to assess several dimensions of "behavioral rigidity." The test yields rigidity scores in three areas: Motor- Cognitive, Personality-Perceptual and Psychomotor Speed- as well as a Composite Rigidity score expressing the over-all test performance. Stutterers were found to evidence more rigidity than the controls in only the Motor-Cognitive dimension. The findings are consistent with the results of earlier studies suggesting that perseveration does not exist as a general factor in stutterers, but that stutterers do evidence less flexibility in mental tests requiring a rapid and contiguous change of set. On the other hand, the findings contradict the hypothesis that “moral rigidity” is a trait typical of stutterers.

Prins (1972) conducted a study on personality, stuttering severity, and age. For this sixty-six male stutterers between the ages of 8 and 21 years were given the California Test of Personality and evaluated for stuttering severity during oral reading and spontaneous speech. Twenty-three subjects with other communicative disorders served as a control group. Simple and multiple correlation coefficients were computed among scores of personality, speech and age. There were no significant correlations to indicate a relationship between personality maladjustment and increased age or stuttering severity. In the experimental group an interesting disparity was found between Social Standards (60th percentile) and Social Skills (30th percentile).
Contrary to usual assumptions, however, signs of maladjustment were more prevalent among subjects with disorders of speech other than stuttering.

**Studies related to Stuttering and Self Consciousness**

Ginsberg (2000) studied shame, self-consciousness, and locus of control in people who stutter. This investigation of the value of 3 psychological constructs (shame, self-consciousness, and locus of control) in the prediction of 3 self-reported behavioral dimensions of stuttering (struggle, avoidance, and expectancy) revealed shame and self-consciousness to be significant psychological predictors of the selected dimensions of stuttering, whereas locus of control was found not to be. Certain demographic elements, including affiliations with others who stutter, were also determined to be predictive of the stuttering dimensions.

Patraka and Amy (1998) conducted a study on shame, self-consciousness, locus of control, and perceptions of stuttering among people who stutter. In this investigation, the value of these three psychological constructs, along with certain demographic factors, was determined with a sample of 119 participants. Regression analyses revealed shame and self-consciousness as significant psychological predictors of behavioral dimensions of stuttering, whereas locus of control was not found to be significant in the prediction of stuttering behaviors. Within a tripartite model of self-consciousness (Carver & Scheier, 1985), social anxiety emerged as the critical component in the prediction of stuttering behaviors, whereas private self-consciousness and public self-consciousness appeared to be less important influences in this regard. Certain demographic elements, including affiliations with others who stutter, were also determined to be of value in the prediction of behavioral dimensions of stuttering. Moreover, comparisons of this sample and reported norm samples with regard to shame, self-consciousness and locus of control revealed noteworthy similarities and differences.
Studies related to Stuttering and Genetics

Rautakoski et al., (2012) investigated the genetic and environmental effects on stuttering: a twin study from Finland. This study explored the prevalence of self-reported stuttering in a Finnish twin population and examined the extent to which the variance in liability to stuttering was attributable to genetic and environmental effects. 1,728 Finnish twins, born between 1961 and 1989 were analyzed. The participants were asked to complete a questionnaire on speech, language, and voice. In two of the questions they were asked to report the occurrence of childhood and present stuttering of their own and that of their sibling. According to the results, 2.3% (52) of the participants were reported to have stuttered as children and 28.8% of them (15) were reported to continue to stutter in adulthood. There was no significant gender difference in the prevalence of stuttering in either childhood or adulthood. By means of structural equation modeling it was found that 82% of the variance in liability to childhood stuttering was attributable to additive genetic effects, with the remaining 18% due to non-shared environmental effects. In conclusion, the results of the present study confirm findings from prior studies and support a strong genetic and only a moderate non-shared environmental effect on stuttering.

Buck, Lees and Cook (2002) analyze the influence of family history of stuttering on the onset of stuttering in young children. Content analysis was undertaken of the case records of 61 children who stuttered who were attending a specialist centre for children who stutter. The subjects were divided into two groups, on the basis of family history of stuttering. Positive family histories of stuttering were reported for 44 children and 17 had negative family histories. The two groups were compared in terms of gender ratios, the age of onset and the type of onset (gradual vs. sudden) of stuttering. Those with positive family histories began stuttering earlier than those with no reported family history of stuttering, though this difference was not statistically significant. The type of onset of stuttering was not related to the presence or absence of a family history of stuttering.
According to the review by Poulos and Webster (1991) in a clinical population of 169 adult and adolescent stutterers, 112 members (66%) reported a family history of stuttering. Only 3 (2.4%) of these reported any birth or early childhood factors or events that were thought to be associated with stuttering onset or that potentially might have precipitated stuttering. In contrast, 21 (37%) of the 57 members without a family history of stuttering reported such a factor or event. On the basis of this retrospective investigation of family history, the stutterers could be segregated in ways that may be informative relative to etiology and underlying mechanisms despite being apparently similar with respect to time of stuttering onset, dysfluency characteristics, and emotional concomitants. It is suggested that these data are consistent with a hypothesis that within the clinical population of adults presenting as developmental stutterers there are really two subgroups. One subgroup is thought to consist of individual with a genetically inherited predisposition for stuttering, and the second of individuals without such a predisposition but who may have sustained some form of early brain damage. The incidence of false negatives in the 36 individuals classified as having no family history and no known early physical trauma remains to be ascertained.

Neils and Aram (1986) studies the family history of children with developmental language disorders. This study shows the increased incidence of language-related disorders among family members of children with language disorders. The family histories of 74 children with developmental language disorders and 36 normal children were compared. The children with language disorders had significantly more family members who reported speech, stuttering, reading, and language disorders than the normal control group.

Cox, Seider and Kidd (1984) investigated some environmental factors and hypotheses for stuttering in families with several stutterers. Individuals in families with several stutterers (five or more) and individuals in families with no stutterers were the basis of abroad study designed to elucidate
both genetic and non genetic factors relevant to stuttering. In order to examine both non genetic hypothesis regarding the etiology of stuttering as well as environmental factors possibly predisposing to stuttering, data were collected using two structured case-history interviews and four self-report inventories. They were unable to identify prenatal, developmental, or medical factors that distinguish stutterers from their non stuttering family members and also found no evidence of (a)anxiety levels differing among stutterers, their non stuttering family members, and non stuttering controls; (b)familial attitudes toward speech differing between non stuttering family members and those of non stuttering controls; or (c) ratings of parental behavior or children's traits which distinguished stutterers from non stuttering family members.

**Studies related to Stuttering and Recovery**

Finn and Howard (2005) conducted a study on unassisted recovery from stuttering: Self-perceptions of current speech behavior, attitudes, and feelings. The purpose of this study was to investigate the nature of recovery from stuttering based on the experiences of adults who recovered without treatment. Using a semi-structured, open-ended interview format, 15 speakers verified as persons who recovered without treatment were asked to describe their status as everyday speakers. Seven speakers reported that they no longer stuttered and eight reported that they still stuttered on occasion. Interview material was coded and analyzed by the investigators and checked by independent judges. Results suggested that complete recovery was possible for speakers who reported that they no longer stuttered; whereas, those who still stuttered occasionally appeared to no longer be handicapped by stuttering, but required some vigilance to maintain their relatively fluent speech.

Kraaimaat and Janssen (1988) studied the relationship between stutterers' cognitive and autonomic anxiety and therapy outcome. Following therapy, a group of 33 male stutterers (aged 13–16 yrs) showed a significant reduction in stuttering and adjustive behaviors, as well as in certain indices of
autonomic and cognitive anxiety. The decrease in stuttering correlated negatively with a pretreatment measure of autonomic anxiety. In contrast, the reduction in adjustive behaviors correlated negatively with a pretreatment measure of cognitive anxiety. It is suggested that the anxiety determinants of speech improvement among those who stutter are different for different categories of fluency failure.

James, Ricciardell, Hunter and Rogers (1989) were randomly assigned to two treatment formats for twenty adults and adolescents consisting of either sixteen two hours session of fluency training administered within a concentrated period of four consecutive days (intensive treatment) or two hour session per week for eight weeks (spaced treatment) Frequency of stuttering and rate of speaking were repeatedly assessed from speech samples obtained in six different clinic and extra clinic speech settings. The efficacy of treatment, subject compliance and communication attitude were also measured. Fluency training produced significant improvements in speaking rate and communication attitudes for both treatment formats. Both formats were found equivalent on all measures. However, maintenance of generalization effects was uneven across settings, suggesting the possible need for differential levels of training for different speaking situations.

Blood's (1995) paper evaluated the efficacy of a behavioural cognitive treatment programme for adults who stutter The programme combines a commercially available computer-assisted biofeedback programme for the reduction of stuttering and a relapse management programme for counselling and attitude change. Four adults who stutter between the ages of 20-25 years, participated in a study with multiple base line across individuals. The initial treatment was conducted in an intensive time block, followed by extended treatment session Results showed that subjects reduced their disfluencies to below 3% stuttered syllables and maintained those changes at the six and twelve months Measures of attitude changes were also assessed and showed that increases in positive feelings and attitudes were maintained at follow-ups.
Craig et al., (1987) presented a behaviour therapy approach to treatment for stuttering based on outcomes data on 191 adult stutterers, treated over six years. This cognitive-behavioural approach to therapy emphasizes the importance of changing in appropriate thought patterns and attitude in the process of successful therapeutic change. Following training, patients are treated on an outpatient basis to encourage generalization of the skills (learned in the clinic) to home work and school environment. Patients are introduced to concepts of self control and given schedules of therapy practice to enhance long term survival. It was noticed that the programme had been effective with stutterers: and that rate of relapse comes down substantially.

Fawcus (1970) described intensive group therapy programmes for stammerers. Adult groups contained 8-12 members, while smaller groups organized by ages were recommended for children. Each patient was interviewed and the severity, frequency and type of a stammer were rated. A questionnaire was completed for the patients assessment of his speech problem, anticipated difficulty in fifty speech situations, previous treatment, and personal and family background. Treatment focused on the modification of abnormal speech behaviour by slow syllable timed speech and block modification of speech avoidance objective evaluation of audience reaction and scientific study of his own speech contribute to change in the patient's attitude. Group therapy was considered to provide interpersonal relationships, realistic stress and the opportunity for the positive reinforcement. Results of the programmes are considered promising.

Onslow et al., (1996) assessed the speech of twelve adults in prolonged speech treatment prior to treatment and after discharge. Results showed that stuttering was eliminated without using unusually slow or unnatural speech patterns and many clients maintained stutter free speech at high rates of speech. Speech rate correlated to perceived post treatment speech naturalness.
Studies related to Stuttering and Socio-Psychological factors

Srivastava (1985) investigated the socio-psychological factors of stammering and the problem of rehabilitation of stammerers. 80 stammerers (aged 10+ yrs) were interviewed and completed an information schedule and a follow-up information schedule. Stutterers had been treated with group therapy for 1 month. Results indicate overall improvement with regard to adjustment in family, schools, offices, and other public places. Stutterers needed further treatment concerning speaking in public or with family members. Stammering was not related to income, developmental stage, education, occupation, or marital status but was related to physical and socio psychological factors and they were more emotionally disturbed, anxiety-ridden, depressed, and indecisive and tended to be shy and withdrawn.

Studies related to Stuttering and Birth Order

Karbasi, Fallah and Golestan (2011) conducted a descriptive study to determine prevalence of speech disorders specifically stuttering, voice, and speech-sound disorders in primary school students in Iran-Yazd. 7881 primary school students in Yazd evaluated in view from of speech disorders with use of direct and face to face assessment technique. The prevalence of total speech disorders was 14.8% among whom 13.8% had speech-sound disorder, 1.2% stuttering and 0.47% voice disorders. The prevalence of speech disorders was higher than in males (16.7%) as compared to females (12.7%). Pattern of prevalence of the three speech disorders was significantly different according to gender, parental education and by number of family member. There was no significant difference across speech disorders and birth order, religion and paternal consanguinity.

Tomblin (1990) examined the birth order of second-grade children with and without developmental language impairment to determine if language-impaired children were more likely to be later born than earlier born. In this study the family size and socioeconomic status of the families for the language-impaired and normal groups were very similar. Comparison of the distribution
of birth ranks between second-grade language-impaired and normal second-grade children failed to show a difference in birth ranks. Further, the distribution of birth ranks of all language-impaired children within the sibships was not found to show evidence favouring either early or later born birth ranks. This study did not provide evidence in support of a birth order effect in developmental language impairment.

**Studies related to Stuttering and Socio Economic Status**

Richels et al., (2013) investigate the possible relation between standardized measures of vocabulary/language, mother and father education, and a composite measure of socioeconomic status for children who do not stutter and children who stutter. Participants were 138 children who do not stutter and 159 children who stutters and their families. The Hollingshead Four Factor Index of Social Position (i.e., Family SES) was used to calculate socioeconomic status based on a composite score consisting of weighted values for paternal and maternal education and occupation. Statistical regression analyses were conducted to investigate the relation between parental education and language and vocabulary scores for the childrens who do not stutter and those who stutters. Correlations were calculated between parent education, family socio economic status, and stuttering severity. Results indicated that maternal education contributed the greatest amount of variance in vocabulary and language scores for the children who do not stutter and for participants from both groups whose family socio economic status was in the lowest quartile of the distribution. The paternal education generally contributed the greatest amount of variance in vocabulary and language scores for the children who stutters. Higher levels of maternal education were associated with more severe stuttering in the children who stutters.

According to Manning (2001) the data concerning the possible effect of a child’s socio economic status suggest that stuttering is present at the same frequency of occurrence in all socio economic groups. A lack of diagnostic and
treatment services is likely to result in an under estimate of the occurrences of stuttering for certain populations in lower socio economic categories. It may also be those in upper socio economic categories are more informed about and economically capable of obtaining assistance.

Bloodstein (1987) suggest that the occurrences of stuttering may be related to the imposition of high standards for the achievement of status and prestige, along with the intolerance of deviancy; values that may vary depending on the socio economic status of families. At this point there appears to be no convincing evidence of socio economic influence.

**Studies related to Stuttering and Marital Status**

Beilby (2012) conducted a study exploring the impact of stuttering within adult relationships which has discovered partners of people who stutter may underestimate the true impact that the disorder has on their loved one’s quality of life. The study investigated the personal experiences for both people in a relationship when one person stutters. The results show people who stutter and their fluent partners report similar experiences in reactions to stuttering and difficulties in communication, but do not share the same views on how this impacts on overall quality of life. The researchers observed clear differences when interviewing couples on the intense psycho-social experiences of living with a stuttering disorder. Both qualitative and quantitative data showed that the fluent partners of people who stutter assumed the quality of life when living with a stutter was pretty good. But the quality of life of people who stutter themselves was significantly impacted by their stuttering and the partner hadn’t fully understood this.

Klompas and Ross (2004) investigated the life experiences of a group of South African adults who stutter and the impact of stuttering on their quality of life. Participants were 16 adults with a mean age of 28.9 and ranging from 20 to 59 years. Methods involved individual interviews designed to explore the life domains of education; social life; employment; speech therapy; family and
marital life; and identity, beliefs and emotional issues. Main findings of the study indicated that the majority of participants perceived their stuttering to have impacted on their academic performance at school, and relationships with teachers and classmates. Although their stuttering was not perceived to adversely influence their ability to establish friendships, people generally reacted negatively to their stuttering. Many felt that their stuttering did not have an adverse effect on their choice of occupation, ability to obtain work, and relationships with managers and co-workers. Although the majority viewed their speech therapy experiences as being negative; more than half the sample believed that speech therapy had, nevertheless exerted a positive effect on their quality of life. Overall, stuttering did not appear to have influence participants’ family and marital life. Most participants felt that stuttering had affected their self-esteem and self-image, and had evoked strong emotions within them.

**Studies related to Stuttering and Onset**

Reilly et al., (2009) conducted a study to document the onset of stuttering and whether specific child, family, or environmental factors predict stuttering onset in children aged up to 3 years. Participants included a community-ascertained cohort of 1619 2-year-old Australian children recruited at 8 months of age to study the longitudinal development of early language. The main outcome measure was parental telephone report of stuttering onset, verified by face-to-face expert diagnosis. Pre onset continuous measures of the child's temperament (approach/withdrawal) and language development were available. Information on a range of predictor measures hypothesized to be associated with stuttering onset was obtained (maternal mental health and education levels, gender, premature birth status, birth weight, birth order, twinning, socioeconomic status, family history of stuttering). The results show that by 3 years of age, the cumulative incidence of stuttering onset was 8.5%. Onset often occurred suddenly over 1 to 3 days (49.6%) and involved the use of word combinations (97.1%). Children who stuttered were not more shy or withdrawn. Male gender, twin birth status, higher vocabulary scores at 2 years
of age, and high maternal education were associated with stuttering onset. The multivariable model, however, had low predictive strength; just 3.7% of the total variation in stuttering onset was accounted for.

Hayasaka (1995) provides new information on the onset of stuttering and explores various factors at the onset especially stress. Data was obtained from 73 preschool children through parent interviews, using informal questionnaires. The results indicate that the onset tends to occur at an earlier age and the onset of stuttering in girls is earlier than boys. Physical or emotional stress and familial histories of stuttering were reported for many of the participating children. The sudden onset group of girls had been exposed to a great deal of stress and therefore its not possible to ignore the relationship between the role of stress and the onset of stuttering.

Yairi and Arnbrose (1992) interviewed parents of eighty seven pre-school children within a year of a stuttering diagnosis and found that onset tended to occur 35 earlier than was previously thought and was sudden and severe in many cases. About twice as many as girls stuttered and there was a positive relationship between severe stuttering and sudden onset. Again Yairi and Ambrose (1992) conducted a pilot study on twenty seven pre-school aged children and followed for a minimum of two years shortly after they began stuttering. Children continued to be followed for varying periods up to twelve years. Eighteen of the twenty seven subjects received a few speech treatment sessions during the initial period of the study whereas nine children did not receive direct treatment. Results indicated that for the two subgroups there was marked deceleration overtime in the mean frequency of stuttering. Individual subjects data showed considerable variability in the longitudinal development of disfluency but most subjects followed the patterns of the group means. Much of the reduction in stuttering took place during the early stages of the disorder, especially near the end of the first year post onset.
In another study Schwartz and Zebrowski (1990) studied the behaviours at the onset of stuttering. The purpose of their investigation was to identify speech and non-speech behaviours associated with the stuttering of children close to the onset of their problem. Ten stuttering children (nine boys and one girl) were identified through parent interviews. Fourteen associated speech and non-speech behaviours and speech disfluency types were identified and quantified from each of the ten subjects. The fourteen associated behaviours and speech disfluency types were further reduced to form three indices (a) Sound prolongation index (b) Non-speech behaviour index (c) Behaviour variety index. Results indicated that all children exhibited speech and non-speech behaviour in association with their stuttering. In addition, chronological age did not significantly correlate with any of the three indices investigated. Findings are taken to suggest that the quantification of speech disfluency type and the speech and non-speech behaviours associated with stuttering are more sensitive than chronological age as indicators of the development of stuttering.

**Studies related to Stuttering and Muscle Tension**

In a study by Cordes and Ingham (1996) ten speech-language pathology students judged five second audio visually recorded speech intervals on stuttered and nonstuttered in group and single subject experiments. Results showed that judgement accuracy tended to increase after training, both for speakers in the training programme and unfamiliar speakers. Slight increases in inter judge and intra judge agreement after interval judgement training were also found.

Cordes and Ingham (1994) in their study included six groups of judges, three experimental and three control group (In each group N=5), to categorize consecutive five second speech intervals as stuttered or non stuttered on four judgement occasion. Between the second and third occasion each experimental group was trained to categorize correctly one of three sets of speech intervals agreed intervals, which has been unanimously prejudged to
be stuttered or non-stuttered, disagreed intervals, which had been prejudged to be stuttered by approximately half of a large group of judges or randomly selected intervals, including both agreed and disagreed intervals. Results replicated and extended an earlier finding of improved interjudge agreement for judges trained with highly agreed intervals (Ingham, Cordes & Gow, 1993). Training with highly agreed intervals was shown to be more effective than equivalent exposure to those intervals without feedback, and training with highly agreed intervals was shown to be more effective than training with or exposure to poorly agreed or randomly selected intervals.

Finn and Ingham (1994) investigated the method of estimating the reliability and validity of stutterer's self-training of how natural their speech sounds and how natural they felt about the amount of attention they were paying to the way they were speaking. Twelve adult stutterers were instructed to self-rate the speech and feel naturalness of their speech under a variety of rhythmic stimulation condition across repeated rating occasion. The results showed that stutterers were relatively consistent and valid self-raters of speech quality and levels of speech monitoring.

In another study Ingham, Cordes and Gow (1993) investigated two experiments interval-by-interval interjudge and intrajudge agreement for stuttered and nonstuttered speech intervals and found that training of judges could improve reliability levels. Judges with relatively high intrajudge agreement also showed relatively higher interjudge agreement and interval-by-interval interjudge agreement was not influenced by order of presentation of judgement task. Ingham, Cordes and Finn (1993) replicated and extended the results of the previous study by Ingham, Cordes and Gow (1993) that investigated time interval judgement of stuttering. Results confirmed earlier findings that interjudge agreement is higher for these interval recording tasks than has been previously reported for event based analysis of stuttering judgements or for time interval analysis of event judgements. Results also confirmed an earlier finding that judges with intrajudge agreement levels of
90% or better show higher interjudge agreement than judges with lower intrajudge agreement scores. But this study failed to find differences between relatively experienced and relatively inexperienced student judges, and between judgements made and the agreement levels achieved by judges from two different clinical research settings.

Waterloo and Gotestam (1988) studied the experimental evaluation of the regulated breathing method. Thirty two subjects were randomly assigned either to treatment or to a waiting list control group. The treatment was completed during one single session of 2-3 hours. Both frequency of stuttering and rate of speech were measured before and after treatment and on follow ups two, three and eight months later. Both obstructive and unobstructive measures of speech were recorded. At the eight months follow-ups, stuttering in the treatment group was found to be significantly less than in the control group, and also significantly less than before treatment.

In a study Metha (1985) compared the effectiveness of abbreviated and full relaxation therapy in systematic desensitization in male stutterers. Ten subjects were given abbreviated relaxation (head, face, shoulders and breathing) while another ten were given full relaxation training. Results showed that subjects who received full relaxation made more improvement in their stuttering condition than subjects who received abbreviated relaxation training.

In another study Mc Intyre, Silverman and Trotler (1974) reviewed an analysis of video taped interviews with six males, 15-52 years old stutterers who had practiced Trancendental Meditation (TM) for 2 weeks to 3 ½ years. Results indicated that all subjects had a reduction in stuttering, and reported being more relaxed and feeling better about themselves in general.

In a more directly relevant study, Shrum (1967) showed that stutterer's anticipatory increases in muscle tension before stuttering were greater than before non-stuttered speech and also greater than anticipatory responses by
normal readers. Normals did not differ in this regard from stutterers engaged in non-stuttered speech.

Williams (1955) also studied the electro-myogram (EMG) recordings of Masseter Muscle Tension in stutterers and non-stutterers, and showed obvious differences between the two groups.

**Studies related to Stutterers and Non Stutteres**

Lieshout, Hultijin and Peters (1996) conducted a study to identify what differentiates a person who stutters from a person who does not stutter. The main purpose of the present study was to differentiate between people who stutter and control speakers regarding their ability to assemble motor plans and to prepare (and execute) muscle commands. Adult males who stutter, matched for age, gender, and educational level with a group of control speakers, were tested on naming words and symbols. In addition, their ability to encode and retrieve memory representations of combinations of a symbol and a word, was tested in a recognition task, using manual reaction times and sensitivity scores, as defined in signal detection theory, as performance measures. Group differences in muscle command preparation were assessed from electromyographic recordings of upper lip and lower lip. Results indicated no interaction between group and word size effects in choice reaction times or a group effect in the ability to recognize previously learned symbol-word combinations. However, they were significantly different in the timing of peak amplitudes in the integrated electromyographic signals of upper lip and lower lip (IEMG peak latency). Findings question the claim that people who stutter have problems in creating abstract motor plans for speech. In addition, it is argued that the group differences in IEMG peak latency that were found in the present study might be better understood in terms of motor control strategies than in terms of motor control deficits.