VARIABILITY IN STUTTERING ACROSS TASKS AND ITS RELATIONSHIP WITH SOCIAL ANXIETY

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Dedicated to,

Acharyan, Perumal, Thayar and Anjaneya

Amma, Appa, Baba and Chotu

Certificate

This is to certify that this dissertation entitled "**Variability in Stuttering across Tasks and Its Relationship with Social Anxiety**" is a bonafide work submitted in part fulfillment for degree of Master of Science (Speech-Language Pathology) of the student Registration Number: 18SLP038. This has been carried out under the guidance of a faculty of this institute and has not been submitted earlier to any other University for award of any other Diploma or Degree.

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Abstract

Stuttering is a heterogeneous disorder. It is variable amongst and within persons with stuttering. This variability of stuttering makes it important to determine the actual severity of the problem. They also have anxiety. Hence, the aim of the study is to assess the variability of stuttering across task and study its relationship with social anxiety. Six persons with stuttering participated in the study and performed three language formulation tasks – speaking task, storytelling task with TAT cards with human pictures, and storytelling task with TAT cards with non-human pictures. Leibowitz social anxiety scale was administered to assess the levels of social anxiety. No significant difference was found for the measures of stuttering across the tasks, except for the scores of physical concomitants, where significant difference was found between the speaking task and the story telling task with human pictures. Mean for the story telling task was the least for all the measures across the task. Though frequency of stuttering and severity were positively correlated, the other two measures did not correlate consistently. LSAS scores and measures of stuttering across tasks showed a negative trend. None of the correlations reached statistical significance. One participant with moderate stuttering and two participants with mild stuttering were could be diagnosed with SAD based on the LSAS scores. To conclude, the results indicate that stuttering might vary across tasks and all persons with stuttering may not have social anxiety. Social anxiety does necessarily correlate with severity and must be assessed and the intervention plan should be holistic.

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Chapter 1

Introduction

Stuttering is a developmental disorder characterized by frequent and protracted sound prolongations, sound, syllable, word and phrase repetitions and silent blocks that interfere with the efficient production of speech (Bloodstein, 1995; Guitar, 2006).

Wingate provided an operational definition of stuttering in 1964. The term "stuttering" means: 1. (a) Disruption in the fluency of verbal expression, which is (b) characterized by involuntary, audible or silent, repetitions or prolongations in the utterance of short speech elements, namely: sounds, syllables, and words of one syllable. These disruptions (c) usually occur frequently or are marked in character and (d) are not readily controllable.2. Sometimes the disruptions are (e) accompanied by accessory activities involving the speech apparatus, related or unrelated body structures, or stereotyped speech utterances. These activities give the appearance of being speech-related struggle.3. Also, there are not infrequently (f) indications or report of the presence of an emotional state, ranging from a general condition of "excitement" or "tension" to more specific emotions of a negative nature such as fear, embarrassment, irritation, or the like. (g) The immediate source of stuttering is some incoordination expressed in the peripheral speech mechanism; the ultimate cause is presently unknown and may be complex or compound.

The primary aspects of the speech of a person with stuttering have been described as core behaviors (Van Riper, 1982). These behaviors are perceived to be involuntary by the persons who stutter and they can do little to control them (Guitar, 2006). As opposed to core behaviors, secondary behaviors are learned reactions to core behaviors. Guitar (2006, 2013) classifies

secondary behaviors as avoidance and escape behaviors. Escape behaviors occur during the moments of stuttering as a means to get out of stuttering and finish the word. Examples are eye blink, head nods or interjection of extra sounds. These often are followed by the termination of stuttering and are thus rewarded. When the person anticipates stuttering and the negative experiences associated with it, he tries to prevent it by exhibiting avoidance behaviors. These behaviors maybe one of those used as escape behaviors or maybe something like changing the words that he wanted to say initially or circumlocutions. These are learned as initially it may prevent stuttering from occurring and provide highly rewarding emotional relief. As a result these become deep rooted habits impervious to change.

Variability is one of the hallmarks of stuttering (Yaruss, 1997). The severity, the core and the secondary behaviors, feelings and attitudes towards stuttering vary between individuals as well as within individuals. This variability can also be with respect to situations pertaining to people, places and language.

There are various factors which lead to such a variability which include different linguistic factors (Brown, 1945), communicative intent (Dorothy, 1940; Weiss, 1995) as well as emotional reactivity and stress (Choi, Conture, Walden, Jones, & Kim, 2016; Jones, Conture, & Walden, 2014), anxiety levels (Hennessey, Dourado, &Beilby, 2014) and speaking situations (Ulliana & Ingham, 1984).

Of particular importance to this study is the variability that is seen across situations as well as those across tasks. Constantino et al. (2016) examined the variability of stuttering across days in 3 language formulation tasks which included carrying out a conversation, monologue and picture description and reading task. They concluded that there is significant variation in the frequency of stuttering from situation to situation and day to day, with observed variability

exceeding the degree of change often reported in treatment outcomes studies from before to after treatment .A noticeable difference in %SS during the language formulation speaking tasks and the reading task was also found.

Sheehan (1975) proposes the ice- berg analogy. The overt features like the core and secondary features are just the tip of an iceberg. There is a hidden part that includes feelings of guilt, shame, hopelessness and anxiety. Some persons with stuttering may try to pass as fluent. Such persons may demonstrate covert stuttering which is the fear or anticipation of stuttering but do not demonstrate overt symptoms (Douglass, 2011). Persons with covert stuttering put in a lot of effort to conceal their overt symptoms as they are very uncomfortable with stuttering (Constantino, 2017). It is reported that persons who stutter covertly look at stuttering in an extremely negative perspective and have high levels of social anxiety and they also expend a lot of energy to make their stuttering inconspicuous (Douglass & Quarrington, 1952; Kroll, 1978; Levy, 1987; Murphy et al., 2007)

Persons with stuttering often have a negative self-view acquired from years of stuttering experience, and often project this attitude on listeners, believing that they think poorly of him (Guitar, 2013). Hence, anxiety often co-occurs with stuttering. According to Walden et al. (2012), the arrow goes both ways. Anxiety contributes to stuttering and stuttering leads to anxiety. These findings indicate that anxiety may be a contributing factor to its etiology ,however it is also conceivable that anxiety may be a direct consequence of chronic stuttering with the cause of stuttering (e.g., deficient speech motor control) being extraneous to these psychosocial issues (Mulcahy et al., 2008)

Often negative consequences associated with stuttering include expectancies of social harm, fear of negative evaluation, social isolation, shame, self-consciousness and poor self-

esteem (Messenger et al., 2004). This fear of being negatively evaluated by others, particularly in social situations, is described as social anxiety (Messenger et al., 2004). Studies have reported that stuttering is frequently associated with social anxiety and also highlight the significance of routine assessment of social anxiety during evaluation (Kraaimaat et al., 2002)

Since speech, anxiety and respiration are associated, it is possible that stuttering is mediated it certainly is possible that social anxiety mediates stuttering in everyday speaking environments, influencing its severity (Messenger & Onslow, 2004)

Anxiety and its determinants may therefore mediate and exacerbate instances of stuttering including its surface features, severity (frequency of stuttering) and typography (type of stuttering), due to the effect of this arousal on speech motor control .Considering the association between communication and anxiety, it appears that social anxiety potentially mediates the surface features of stuttered events in daily communication (Messenger et al., 2004). Hence, it maybe hypothesized that social anxiety may play a role in the exacerbation of stuttering across social situations or specific persons.

Need for the Study

Though studies have been carried out on variability of stuttering across situations and tasks for children, the literature for adults is sparse. Also, studies have been carried out to study social anxiety and stuttering, to explore the temperament of persons with stuttering using projective tests. The literature on how social anxiety affects the various feature of stuttering across different tasks or emotionally arousing situations is sparse. A detailed understanding of how anxiety relates to stuttering will also help in formulating better treatment strategies. Variability of stuttering poses a challenge for both clinicians and clients. Due to the variable nature of stuttering, persons with stuttering feel hopeful when there are moments of reduced

stuttering, but these are only short lived. Also, since stuttering may become less severe in some moments, other people may believe that the person with stuttering just needs to put additional effort. Individuals with stuttering report that this is not so (Bobrick, 2011; Carlisle, 1986; Corcoran & Stewart, 1998; Jezer, 1997).

For clinicians, the legitimacy of the assessed severity and the observed improvement during treatment becomes questionable. The measured severity in the clinical setting may not be the actual severity of stuttering (Ingham, 1975, 1980; Ingham & Lewis, 1978; Johnson, Karrass, Conture, & Walden, 2009) .It becomes difficult to decide whether the positive change in the dysfluencies is due to treatment or the variable nature of stuttering (Bloodstein & Bernstein Ratner, 2008). These challenges call for a deeper understanding of the variable nature of stuttering.

Hence, the aim of the study is to explore the relationship between variability of stuttering w.r.t number of dysfluencies, duration of blocks and kind of secondary behaviors (physical concomitants) manifested across different tasks. In addition to this, the study also aims to compare social anxiety with the variability of stuttering.

Objectives of the Study

- To study the variability in the frequency of stuttered events , duration of the stuttering events and physical concomitants across different tasks (speaking task , storytelling task with non-human picture stimulus and storytelling task with human picture stimulus)
- To study the relationship between variability in the frequency of stuttered events , duration of the stuttering events and physical concomitants across different tasks and the severity of stuttering

- To study the relationship between frequencies of stuttered events, duration of the stuttering events and physical concomitants across tasks, severity of stuttering and the scores obtained from the Leibowitz Social Anxiety Scale (Liebowitz,1987)

Chapter 2

Review of Literature

2.1 Variability of Stuttering

One of the remarkable attributes of stuttering is its variability. Stuttering varies not only across persons but also within a person. There are various factors which lead to such a variability which include different linguistic factors (Brown, 1945), communicative intent (Dorothy, 1940; Weiss, 1995) as well as emotional reactivity and stress (Choi, Conture, Walden, Jones, & Kim, 2016; Jones, Conture, & Walden, 2014), anxiety levels (Hennessey, Dourado, &Beilby, 2014) and speaking situations (Ulliana& Ingham, 1984).

The research on the cause of this variability is inconclusive. Earliest theory which explains this phenomenon was put forth by Sheehan (1950) in his approach avoidance conflict. A person with stuttering battles with the competing desires to speak and to not speak, this oscillation brings about the dysfluencies. The occurrence of the moment of stuttering releases fear, reduces the "speech avoidance gradient". It again builds up during periods of fluent speech or silence, hence the person's fluent and dysfluent speech alternate. Sheehan used to this to explain why some people are fluent when angry and silent in group discussions.

Quarrington (1965) extended this claim by saying that events of stuttering reflect a cycle of avoidance reduction as the act of sentence production progresses, the chances of occurrence of dysfluency on a particular word is some function of the amount of stuttering present on the previous word or words. He used this to explain why stuttering occurs in certain word positions in sentence. Taylor and Taylor (1967) sought to test this "conflict" hypothesis put forth by

Quarringaton .They found no evidence of any dependence of the stuttering events on the previous moments of stuttering.

The speech and monitoring interaction (SAMI) framework is a recent theory proposed by Arena (2017) to explain the contextual variability of stuttering. This model explains the influence trait and state factors for each production and monitoring system and the interaction between the two systems all of which lead to variability. Some state factors that influence the speech production and monitoring system which may be relevant to this study are the linguistic complexity and the emotional and social pressure.

2.1.1 Variability of Stuttering Across Task

Linguistic factors as well as context influence the variability of stuttering, but research in this area is sparse. The type of speaking task like picture description as opposed to answering questions may influence the stuttering variability (Yaruss, 1997). Johnson et al. in 2009 concluded from their study on the effect of variability in the talker group classification of stuttering in children with stuttering, that significant variability of stuttering did not exist in conversational partners and locations. Nevertheless significant variability in SLD/TD was found between two contexts, narration and conversation.

The latter had greater SLD / TD ratio. It is uncertain as to whether these findings can be attributed to differences in the speech language processes involved in narration and conversation in children with stuttering.

Constantino et al. (2006) carried out a study to investigate daily variability of stuttering in adults across five different tasks. The purpose of the study was to assess the variability of both frequency and duration of stuttered and non- stuttered disfluencies across days in 5 different

speaking tasks which were – general conversation, monologue, picture description and two reading tasks. Several components of variability were explored, including the variability between speakers on different tasks, the variability within a speaker on different tasks during the same session, and the variability within a speaker on the same task across time. They found that not only is stuttering variable from day to day, it also variable from task to task in the same person but no overall pattern was observed. Greater number of normal disfluencies were seen in the language formulation tasks as compared to reading tasks. The proposed possible reasons for such findings was the normal disfluency being used as a place holder for either searching for an appropriate word or stalling the stuttering event itself. Results also indicated that all the persons stuttered less either on speaking tasks or reading tasks. Greater dysfluencies in spontaneous speaking task maybe due to greater opportunity to exhibit avoidance behaviors whereas greater disfluencies in reading tasks maybe due to the inability to avoid words that they would have skipped or replaced in a spontaneous speaking task.

Greater number of dysfluencies in speaking task can be explained alternatively by considering the linguistic complexity or load of the task relative to the reading task and the greater number of dysfluencies in the reading tasks observed in some patients can be attributed to increased performance anxiety associated with it.

2.1.2 Variability across Situations and Conversational Partners

Stuttering varies not only due to the linguistic aspects but also due to the situations/environment as well as the person they have to speak to. Persons with stuttering often report that it is easier for them to talk to a family member as compared to a stranger,

authoritative figure or to a group of people. While speaking alone the number of dysfluencies are usually lower when compared to a situation where a conversational partner is involved. (Hahn, 1940; Porter, 1939; Svab et al., 1972).Martin (1998) concluded from his study that frequency of stuttering can be increased experimentally when a conversational partner is involved as compared to a situation where the person is alone. Stuttering frequency is affected by socio-environmental conditions , Kalinowski (1999) concluded so from his investigation on the effect of FAF and NAF on three different speaking conditions (speaking alone , speaking while being recorded (audio-visual) , monitored by two persons in the presence of AV recording). Under the NAF condition, no significant difference was found between the first two situations. But significant increase in the frequency was seen during the monitoring condition.

Silverman (1971) carried out a study on 3 preschoolers aged between 3- 4 years with the purpose of investigating variability in the dysfluencies w.r.t situations (home, structured interview and pre-school). The interactions were scheduled as follows – Preschool interaction during free play in the morning , structured interview in the afternoon followed by interaction at home in late afternoon or early evening. She reported a systematic variability in the disfluencies from situation to situation. For all the children the number of disfluencies was greater for the home situation than the interview or preschool. However, whether these results were obtained due to the space itself (that is home) or because of the effect of the time at which the interaction occurred (like fatigue) cannot be ascertained from the study. She concluded that sampling of disfluencies in only one situation is inadequate. Persons with stuttering often develop fear of specific speaking situations.

Blood et al. (2001) reported that adolescents with stuttering reported to be more fearful of certain speaking situation. The participants' perception of their communicative apprehension and

communicative competence was measured using two self - report scales, personal report of communication apprehension and self- perceived communicative competence (SPCC). Participants had to rate their apprehension / competence for four different speaking situations – public speaking, group discussions, interpersonal conversations and meetings. In addition to this, SPCC also included three communication partners – strangers, acquaintances and friends. They found that significantly greater number adolescents who stutter were apprehensive of group discussions and interpersonal conversations as compared to the control group. Similar results were found in SPCC. In addition to it, there was a significant difference in the perception of communicative competence while talking to strangers between the two groups. Persons with stuttering might have experienced a greater difficulty in these situations and communicative partners and hence their perception of their competence / incompetence would have shaped their apprehension

2.2 Anxiety and its Mediating Role on Stuttering Events

Anxiety is one of the most frequently occurring and an extensively researched psychological concomitant of stuttering (Iverach & Rapee, 2014) .Stuttering is precipitated by anxiety (Miller &Watson, 1992).Many agree to the notion that demanding situations increases anxiety in persons with stuttering, but the etiological role of anxiety in stuttering remains unclear (Davis et al., 2007).

Some researchers view anxiety as the chief cause of the disorder (Sheehan, 1970; Wischener, 1952). A few others consider anxiety as the outcome of the disorder (Perkins, 1979;

Ryan, 1974). Another view is that anxiety plays the role of a mediator in the onset, development and severity of the problem (Brutten &Shoemaker, 1967).

Communication emotional model proposed by Conture et al. (2006) supports the notion that anxiety may influence stuttering. The model talks about distal factors (Environment and Genetics) which set the stage for stuttering and act as foundation to proximal factors (speech planning, production and experiences) , which finally leads to stuttering . However the stuttering events are exacerbated and maintained by emotional reactivity and regulation. Anxiety is also included in this. Due to anxiety's effect on speech motor control, it may exacerbate and mediate its surface features, severity and typography (Conture et al., 2006).

Persons with stuttering are often reported to have more trait and/or state anxiety as compared to persons with fluent speech (Ezrati-Vinacour & Levin, 2004; Craig et al., 2003). Fitzgerald et al. (1992) administered Willoughby Personality Scale – R to measure the trait anxiety in adults with stuttering and found that the scores were similar to those of psychoneurotic adults.

Although the relationship between anxiety and stuttering has been speculated, only a small amount of evidence exists supporting its role in etiology of stuttering and maintenance into adulthood (Andrews, Craig, Feyer, Howie, & Nielson, 1983; Bloodstein, 1987; Ingham, 1984).

2.3 Social Anxiety and Stuttering

Social anxiety, which is also known as social phobia, is a mental health condition.

The Diagnostic and Statistical Manual of Mental Disorders (DSM-5; American Psychiatric Association,2013a) describes social anxiety disorder as a condition in which one exhibits profound fear of social situations and performance in social situations where other persons may

be critical of them. Speaking with authorities, public speaking and meeting new people are some of the feared social situations (Ballenger et. al, 1998). Often persons with social anxiety are fearful of their physical/ motor symptoms (like blushing, sweating, speech blocks, trebling etc.) are visible to others (Bogels et. al, 2010). Hence, feared situations are anticipated anxiously. This brings about a lot of distress and a person may resort to avoidance.

Development of social anxiety disorder is influenced by various factors like temperament , cognitive styles , influence of peer , biological and psychological vulnerabilities and so on (Ollendick & Hirshfeld-Becker, 2002; Rapee & Spence, 2004). There are various ways by which social anxiety can be acquired (Iverach & Rapee, 2014)

In addition to studies examining trait anxiety, state anxiety specific to social anxiety and speaking also has been examined. A large number of researchers have demonstrated the high rate of occurrence of social anxiety disorder amongst adults who stutter (Iverach & Rapee, 2014). There are several reasons as to why social anxiety maybe associated with stuttering. Stuttering is accompanied by numerous negative consequences across the lifespan which may increase vulnerability to social and psychological difficulties (Schneier, Wexler, & Liebowitz, 1997).

Predisposing factors, triggering factors and sustaining factors are the three groups of factors that can be distinguished for stuttering. Predisposing factors are factors are determined genetically, whereas triggering and sustaining factors psychological and environmental in nature. These are related to a lot of variables connected to a person's personality, temperament (like intense emotionality). In addition to this it is linked to environmental stresses (fear of people's reaction or anticipation of stuttering in situations). People in the person with stuttering's environment as well as persons with stuttering can influence these factors. Some may develop fear of environment, hence social phobia. Therefore, depending on the factors and the

environmental influence on them some persons with stuttering may develop social phobia while some may not (Czernikiewicz, 2019).

Often children who stutter are bullied in school. Langevin Packman and Onslow (2009) investigated how children with no stuttering responded to the dysfluencies of children with stuttering in preschool. It was also determined whether specific characteristics of stuttering patterns lead to an adverse peer response. 4 children in the age range 3-4 years participated in the study. The children's interactions were videotaped in four outdoor free play sessions. The stutters were identified from the transcripts and peer responses were judged whether they were positive, negative or neutral. Although the results indicate that most of the responses were positive / neutral, they also show that stuttering can evoke peer responses that are negative and have an impact on preschool social interactions. Even if the negative reactions were infrequent, they did have a consequence. School age children with stuttering are at risk for being bullied (Blood & Blood, 2007; Reynolds & Richmonds, 2002). As a result, children and adolescents who stutter frequently experience peer victimization, social isolation and rejection, and they may also be less popular than their non-stuttering peers (Blood et al., 2011; Davis, Howell, & Cooke, 2002; Hearne, Packman, Onslow, & Quine, 2008). These negative consequences have the potential to result in shame and embarrassment, low self-esteem, withdrawal, and lowered school performance (Langevin & Prasad, 2012). Similar factors have been associated with social anxiety (Hudson & Rapee, 2009).

Blood and Blood (2016) studied the long term impact of bullying experienced in childhood in adults who stutter. The participants had to fill out the retrospective bullying questionnaire and had to complete four psychosocial scales (Social interaction anxiety, fear of negative evaluation, self- esteem and satisfaction with life scale). They found that out of the two

groups, adults with stuttering had a significantly higher score in Social interaction anxiety, fear of negative evaluation, and satisfaction with life scale. It seems plausible that social anxiety among adults who stutter may stem from a generalization of speech-associated negative emotion (Kraaimaat et al., 2002)

Kraaimaat et al. (2002) conducted a study to investigate whether or not the experiences of discomfort in social situations and the frequencies with which social responses are performed vary between individuals with stuttering and without stuttering. These two verbal cognitive components of social anxiety were measured using a self – evaluation scale, namely Inventory of Interpersonal situations (IIS). It consists of a 5 point discomfort and 5 point frequency of occurrence scale. 35 statements is IIS were grouped into 5 subscales which were giving criticism, expressing opinion, giving a compliment, initiating contact and positive self-statements. Scores on discomfort as well as frequency scales differed significantly between the two groups for all sub – scales except positive self – statements. About 50% of the scores of the people who stuttered fell within the range of a group of highly socially anxious psychiatric patients. They concluded that social anxiety is important to assess.

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environmental influence on them some persons with stuttering may develop social phobia while some may not (Czernikiewicz, 2019)

2.3.1 Social Anxiety and Severity of Stuttering

Anxiety appears to relate to severity of stuttering. Anxiety is a part of the personality of persons with stuttering and, stuttering severity and state anxiety are related (Davis et al., 2007).

Studies on the relationship between anxiety and severity of stuttering are equivocal. Not many studies have directly investigated the relationship between severity and social anxiety, but have looked into various aspects of anxiety that relate to social communication situations.

Few studies have shown that stuttering severity measured by %SS does not correlate with the presence of anxiety / social phobia. Irrespective of the severity, persons with stuttering have an elevated trait and social anxiety (Blumgart, 2010; Stein, 1996).Whereas, a few other studies have demonstrated a correlation between severity of stuttering and anxiety. Persons with more severe stuttering exhibit a greater state anxiety in social communication (Ezrati- Vinacour & Levin, 2004).

Fitzgerald et al. (1992) administered the WPS- R on adults with stuttering. Two groups were formed, more severe and less severe stuttering based on a median split of the data on the obtained SSI scores. They found that persons with more severe stuttering had greater WPS-R scores, although the difference was not significant.

Blood et al. (2001) carried out a study on 39 adolescents who stutter and 39 adolescents who do not stutter to examine the perception of their communicative competence and apprehension using two standardized tools, personal report of communication apprehension and self- perceived communicative competence. Communicative apprehension is the anxiety or fear about speaking to one or more individuals. One of their objectives was to examine the

relationship of the severity of stuttering with apprehension and competence. Results indicated that there was a significant positive correlation between severity and communicative apprehensions as measured by PRCA and SPCC. Persons with severe stuttering may be more apprehensive to communicate, that is they may be more anxious or fearful of speaking.

Vinacour and Levin (2004) concluded from their study that stuttering severity and state anxiety are related. One of the objectives of their study on their study on relationship between stuttering and anxiety was to see how severity is related to anxiety. The participants (47 persons with stuttering and 47 persons with fluent speech) had to perform two speech tasks (conversation and reading) and two non -speech tasks (silent reading, listening to a recorded speech sample). The participants had to fill out STAI and SSC-EC. The participants also had to rate their task related anxiety. The severity of stuttering was measured using SSI-3, % SS and a subjective measuring of stuttering severity. Results obtained from the measures of state anxiety (SSC-EC and TRA) indicated that persons with severe stuttering have more anxiety in social communication as compared to those with mild stuttering or fluent speech .

The presence of stuttering does perpetuate state anxiety, but the extent to which it operates in social situations is moderated by the severity.

Manning et al. (2013) concluded from their study that social and trait anxiety correlates with the severity obtained from OASES rather than the traditional methods like %SS and SSI- 3.

Iverach et al. (2018) compared the functioning of persons with stuttering with and without the diagnosis of social anxiety disorder. They found that the group with social anxiety disorder did not self-report a greater severity or percentage of syllables compared to the group without the diagnosis of social anxiety disorder. Even so the group with the diagnosis of social anxiety disorder exhibited a greater dissatisfaction with their speech and experienced a larger

negative impact of stuttering. They also had significant psychological problems. Hence, presence of social anxiety may not necessarily be positively correlated to severity of stuttering.

Chapter 3

Method

3.1 Participants

A total of 6 individuals with a diagnosis of stuttering within the age range 18 to 30 had participated in the study. Purposive sampling was carried out and participants were taken from the department of clinical services, AIISH.

3.1.1 Participant selection criteria

The participants chosen for the study were fluent speakers of Kannada. All the participants were diagnosed with stuttering by using SSI-4 in the department of clinical services, AIISH. Marital status of all the participants was unmarried and all had a minimum academic qualification of senior secondary education. None of the participants had attended more than three therapy sessions at the time data was collected. It was confirmed that the onset of stuttering was developmental and that there was no history of any neurological issues like stroke, seizures, head injury etc.

3.2 Materials

Six picture cards from the Thematic Apperception Test (TAT) were chosen on the basis of frequent plots and the description of the cards as stimuli for the two storytelling tasks.

Out of the 6 chosen cards, 3 cards represented Authoritative humans. The card numbers were 7BM (depicts an older man is looking at a younger man, who appears to be peering into space), 8BM (depicts a young boy in the foreground is staring directly out of the picture. In the background is a hazy image of two men performing surgery on a patient who is lying down) and

12M (depicts a man with his hand raised is standing above a boy who is lying on a bed with his eyes closed).

Other three cards were non-human picture cards. The card numbers were 11 (depicts a road in a chasm, several figures are proceeding along a path toward a bridge. Above them and against the side of a cliff appears to be a dragon), 12 BG (depicts a country setting with a tree, with a rowboat pulled up next to it. No human figures are present) and 19 (depicts a surreal scene with clouds and a home covered with snow)

Liebowitz Social Anxiety Scale (Liebowitz, 1987) was used to assess aspects of social anxiety. This is a self -rated measure with a total of 24 items, 13 pertaining to performance anxiety and 11 to social situations. It assesses both fear and avoidance.

3.3 Procedure

Signed consent for the participation in the study was taken from each participant. Demographic data was collected for each participant. Audio-video recording was carried out as the subjects performed the tasks.

Speaking task: The subjects were told describe their future plans. Whenever required appropriate prompts were provided like “where do you see yourself in the next five years?”

Storytelling task: In this task the subjects were asked to look at the picture card and narrate a story. They were told that this was a test of imagination and they had to make up a dramatic story of each of the pictures shown to them. They were instructed to tell what had led to the scene depicted, describe the current moment in the picture, what the characters were feeling and thinking and also tell the outcome (Hersen, 1991).

Examiner attempted to obtain a sample consisting of a minimum of 200-300 words. However, some participants did not speak as much despite the prompts.

Leibowitz Social Anxiety Scale (Leibowitz, 1987) was administered in English, the subjects were asked to read the questions thoroughly and rate each situation on the basis of how anxious they feel in that situation and how often they avoid such a situation on a 4 point rating scale for each. In case the subject found it difficult to understand a question, it was explained to him in Kannada by the examiner.

3.3 Analysis

The Audio – Video recording of the participant was transcribed. Frequency of stuttering (%SS) was obtained by dividing the total number of syllables stuttered by the total number of syllables spoken multiplied by 100.

To analyze the duration of stuttering moments PRAAT software was used. Duration of each stuttering moment was calculated from the onset of the audible stuttering moments till the offset of it on the spectrogram. To measure the duration of blocks both the video and the audio samples were played. The timings of the articulatory fixation was matched with the audio signal and the duration was be calculated from the cessation of the acoustic energy of the previous sound till the onset of the following sound (Kelly & Conture, 1988; Zebrowski, 1991; Zebrowski & Conture, 1989; Maruthy & Sharma, 2017). The duration of the longest dysfluency was obtained for each task.

For each of the three tasks across each condition, the physical concomitants were rated on a 6 point rating scale (0- None to 5- severe and painful looking) across 4 categories namely

distracting sounds , facial grimaces , head movements and movements of extremities as recommended by Riley (2009).

Statistical analysis was done using 'Statistical Package for Social Sciences' software (SPSS, version 20.0).The frequency of stuttering, duration of the longest dysfluency, and the scores on physical concomitants were compared between the tasks by using Wilcoxon signed rank test . Spearman's correlation was used to find the relationship between severity and measures of stuttering across the three tasks as well as to find the correlation between LSAS scores and severity, measures of stuttering across the task.

Chapter 4

Results

The aim of the study was to explore the variability of stuttering across tasks and its relationship with social anxiety. The objectives of the study were –

- To study the variability in the frequency of stuttered events , duration of the stuttering events and physical concomitants across different tasks (speaking task , storytelling task with non-human picture stimulus and storytelling task with human picture stimulus)
- To study the relationship between variability in the frequency of stuttered events , duration of the stuttering events and physical concomitants across different tasks and the severity of stuttering
- To study the relationship between frequencies of stuttered events, duration of the stuttering events and physical concomitants across tasks, severity of stuttering and the scores obtained from the Liebowitz Social Anxiety Scale (Liebowitz,1987)

Statistical analysis was carried out to using 'Statistical Package for Social Sciences' software (SPSS, version 20.0). Wilcoxon signed rank test was carried out to analyze the first objective. Spearman's rank correlation was carried to analyze the second and the third objective.

The results have been represented in the following order

- Individual participant characteristics and their scores on the Leibowitz social anxiety scale
- Variability in frequency, duration and physical concomitants of stuttering across tasks.

- Relationship between the severity of stuttering and measures across the three tasks
- Relationship between scores obtained on the Leibowitz social anxiety scale and the measures of stuttering across the three tasks and severity.

4.1 Individual Participant Characteristics and Their Scores on the Leibowitz Social Anxiety Scale (LSAS)

Participant 1

Participant one was a 21 year old male who was diagnosed with severe stuttering. He was pursuing undergraduate studies. The total score of the LSAS is quite low and indicates that participant one does not have social anxiety disorder. Scores obtained from the LSAS are summarized in table 1 and the measures obtained across tasks are summarized in table 2.

Table 1

LSAS Scores of Participant 1

Age	Severity	LSAS- Anxiety	LSAS- Avoidance	Total LSAS
21	Severe	12.00	4.00	16.00

Table 2

Measures of Stuttering Obtained for Participant 1

Task	% SS	Duration of the longest dysfluency(sec)	Score on Physical concomitants
Speaking	9.87	1.31	3.00
Storytelling - Human	6.98	1.42	2.67
Storytelling – Non-human	12.19	1.58	3.67

Participant 2

Participant two was a 20 year old male with a diagnosis of mild stuttering. He was pursuing undergraduate studies. It was observed that the patient's rate of speech was relatively fast .Along with stuttering like dysfluencies, dysfluencies like whole word repetitions, broken words were also observed. Revisions of words was observed. The patient would start a word and then replace it with another word and articulatory errors were observed like saying t/ch and d/d. Use of this /that as pronouns instead of content words was also observed. Some narratives were lacked appropriate structure. The total score on the LSAS for participant 2 indicates moderate social phobia. LSAS scores and measures obtained across tasks are shown in table 3 and table 4.

Table 3

LSAS Scores for Participant 2

Age	Severity	LSAS- Anxiety	LSAS- Avoidance	Total LSAS
20	Mild	25.00	30.00	55.00

Table 4

Measures of Stuttering Obtained for Participant 2

Task	% SS	Duration of the longest dysfluency(sec)	Score on Physical concomitants
Speaking	2.59	.71	6.00
Storytelling - Human	1.63	.50	2.33
Storytelling – Non-human	2.33	.45	2.00

Participant 3

Participant three was a 28 year old male with a diagnosis of moderate stuttering. He was working as a software engineer. It was observed that participant would use frequent interjections

'I mean', 'like', 'you know' as an avoidance strategy. Sound /a/ would be added frequently to words perceived difficult by the participant consistently. The total score on the LSAS for participant 2 indicates moderate social phobia .The scores of LSAS and measures of stuttering obtained across tasks are shown in table 5 and 6 respectively.

Table 5

LSAS Scores for Participant 3

Age	Severity	LSAS- Anxiety	LSAS- Avoidance	Total LSAS
28	Moderate	30.00	29.00	59.00

Table 6

Measures of Stuttering Obtained for Participant 3

Task	% SS	Duration of the longest dysfluency(sec)	Score on Physical concomitants
Speaking	9.41	3.64	5.00
Storytelling – Human	9.21	1.14	4.00
Storytelling – Non-human	7.54	2.05	3.00

Participant 4

Participant four was a 25 year old male with a diagnosis of moderate stuttering. He was working as a junior site engineer. It was observed that the participant would pretend to blow his nose and twist his mouth before starting a sentence as a compensatory strategy to ease his anxiety rather than an avoidance behavior. Even though the total scores for participant 4 are high, it does not indicate social phobia. The scores of LSAS and measures of stuttering obtained across tasks are shown in table 7 and 8 respectively.

Table 7

LSAS Scores for Participant 4

Age	Severity	LSAS- Anxiety	LSAS- Avoidance	Total LSAS
25	Moderate	22.00	20.00	42.00

Table 8

Measures of stuttering Obtained for Participant 4

Task	% SS	Duration of the longest dysfluency(sec)	Score on Physical concomitants
Speaking	12.79	5.31	5
Storytelling - Human	11.39	3.90	4.67
Storytelling – Non-human	10.63	5.66	5.00

Participant 5

Participant five was an 18 year old male diagnosed with mild stuttering. He was pursuing undergraduate education. The participant was deliberately using a slower rate of speech. A few word and phrase revisions were observed along with other stuttering like dysfluencies. The total score on the LSAS for participant 5 indicates moderate social phobia. The scores of LSAS and measures of stuttering obtained across tasks are shown in table 9 and 10 respectively.

Table 9

LSAS Scores for Participant 5

Age	Severity	LSAS- Anxiety	LSAS- Avoidance	Total LSAS
25	Mild	40.00	15.00	55.00

Table 10

Measures of Stuttering Obtained for Participant 5

Task	% SS	Duration of the longest dysfluency(sec)	Score on Physical concomitants
Speaking	3.24	.56	3
Storytelling – Human	4.65	1.49	2.00
Storytelling – Non-human	6.68	1.43	3.00

Participant 6

Participant six was a 20 year old male with moderate stuttering. He was pursuing undergraduate studies. Along with stuttering like dysfluencies a few cluster dysfluencies and phrase repetitions were observed. The participant also had a few dysfluencies in the middle or final place of the words. It was observed that at times there were changes in the pitch. The total score of the LSAS is quite low and indicates that participant six does not have social phobia. The scores of LSAS and measures of stuttering obtained across tasks are shown in table 11 and 12 respectively.

Table 11
LSAS Scores for Participant 6

Age	Severity	LSAS- Anxiety	LSAS- Avoidance	Total LSAS
20	Moderate	15.00	8.00	23.00

Table 12
Measures of Stuttering Obtained for Participant 6

Task	% SS	Duration of the longest dysfluency(sec)	Score on Physical concomitants
Speaking	18.33	4.80	7
Storytelling - Human	18.41	3.75	5.67
Storytelling – Non-human	17.83	4.66	5.67

4.2 Variability in frequency, duration and physical concomitants of stuttering across tasks

Wilcoxon signed rank test was performed and the following results were obtained. The tables13, 14 and 15 show the results obtained for the frequency of stuttering, duration of the longest dysfluency and scores on the physical concomitants respectively for the speaking task, storytelling task with human pictures and storytelling task with non-human pictures.

On comparison of frequency of stuttering across the tasks as seen in table 13, no significant difference was found between any of the three tasks. Story telling task with human pictures has a lesser mean for the frequency of stuttering than that of speaking and story- telling task with non – human pictures though not significant.

Table 13

Comparison of Frequency of Stuttered Events (measured by % of syllables stuttered) across Tasks

Type of task		Mean	SD	Median	Z value	p- value
Sp. task vs. ST task – Human pictures	Sp. Task	9.3717	5.92916	9.6400	-. 943	.345
	ST task- Human pictures	8.7117	5.85022	8.0950		
Sp. task vs. ST task – Non human pictures	Sp. Task	9.3717	5.92916	9.6400	-.105	.917
	ST task– Non human picture	9.5333	5.31221	9.0850		
ST task – Human pictures vs. ST task– Non human pictures	ST task – Human pictures	8.7117	5.85022	8.0950	-.524	.600
	ST task- Non human pictures	9.5333	5.31221	9.0850		

Note. Sp. task = Speaking task, ST task = Story telling task, SD = Standard deviation *p<0.05

On comparison of duration of longest dysfluency across the tasks as seen in table 14, no significant difference was between any of the three tasks. Story telling task with human pictures has a lesser mean for the duration of the longest dysfluency than that of speaking and story-telling task with non – human pictures though not significant

Table 14

Comparison of the Duration of Longest Dysfluency (measured in seconds) across Tasks

Type of task		Mean	SD	Median	Z value	p value
Sp. task vs. ST task – Human pictures	Sp. Task	2.7217	2.12484	2.4750	-1.363	.173
	ST task- Human pictures	2.0333	1.43192	1.4550		
Sp. task vs. ST task– Non human pictures	Sp. Task	2.7217	2.12484	2.4750	-.314	.753
	ST task – Non human picture	2.6383	2.04610	1.8150		
ST task – Human pictures vs. ST task – Non human pictures	ST task – Human pictures	2.0333	1.43192	1.4550	-1.577	.115
	ST task- Non human pictures	2.6383	2.04610	1.8150		

Note. Sp. task = Speaking task, ST task = Story telling task, SD = Standard deviation
*p<0.05

On comparison of physical concomitants across the tasks as seen in table 15, significant difference was found between the means of speaking task and the story telling task with human pictures. Also, the mean for the story telling task with human pictures was lesser than the mean for the story telling task with non-human pictures, though not significant.

Table 15

Comparison of the Scores for the Physical Concomitants across Tasks

Type of task		Mean	SD	Median	Z value	p value
Sp. task vs. ST task – Human pictures	Sp. Task	4.8333	1.60208	5.0000	-2.214	.027*
	ST- Human pictures	3.5567	1.45714	3.3350		
Sp. task vs. ST task – Non human pictures	Sp. Task	4.8333	1.60208	5.0000	-1.461	.144
	ST task– Non human picture	3.7233	1.37394	3.3350		
ST task – Human pictures vs. ST task – Non human pictures	ST task– Human pictures	3.5567	1.45714	3.3350	-.552	.581
	ST task- Non human pictures	3.7233	1.37394	3.3350		

Note. Sp. task = Speaking task, ST task = Story telling task, SD = Standard deviation

*p<0.05

4.3 Relationship between the severity of stuttering and measures across the three tasks

Spearman's rank correlation was performed to obtain the following results. The following tables 16, 17 and 18 summarize the results obtained for the relationship between severity and frequency of stuttering, duration of the longest dysfluency and scores on the physical concomitants for the Speaking task, storytelling task with human pictures and storytelling task with non-human pictures respectively.

Table 16

Relationship between Severity and the Measures of the Speaking Task

	Frequency of stuttering (%SS)	**Duration of the longest dysfluency**	**Sum of the physical concomitants**
Correlation coefficient	.679	.555	-.175
p – value	.138	.252	.740

A moderate positive correlation has been obtained between severity and the frequency of stuttering and the duration of longest dysfluency with the severity for the speaking task, although not significant.

Table 17

	Frequency of stuttering (%SS)	**Duration of the longest dysfluency**	**Sum of the physical concomitants**
Correlation coefficient	.555	.247	.555
p – value	.252	.637	.252

Relationship between Severity and the Measures of the Story Telling Task with Human Pictures

A moderate positive correlation has been observed between the severity and the frequency of stuttering and the scores of physical concomitants for the story telling task with human pictures, though not significant

Table 18

Relationship between Severity and the Measures of the Story Telling Task with Non-Human Pictures

	Frequency of stuttering (% SS)	**Duration of the longest dysfluency**	**Sum of the physical concomitants**
Correlation coefficient	.802	.555	.611
p – value	.055	.252	.198

A high positive correlation has been observed between severity and the frequency of stuttering and moderate positive correlation has been obtained for the duration of longest dysfluency and the sum of physical concomitants for story telling task with non- human pictures, though neither are statistically significant.

From the obtained results a consistent pattern of a moderate to high positive correlation with severity has been obtained for the frequency of stuttering across all the three tasks, though not statistically significant.

Such a consistent correlation with severity has not been obtained for duration of the longest dysfluency and physical concomitants. It can be concluded that frequency of stuttering gives a good estimate of severity. For the correlation between duration of longest dysfluency and severity across tasks, storytelling with human pictures showed negligible correlation with severity whereas the other two tasks showed a moderate positive correlation. Similarly, for physical concomitants the speaking task had negligible correlation with severity whereas other two tasks showed a moderate positive correlation.

Therefore the correlation between severity cannot be completely ruled out and probably play a role in the estimation of severity to some extent. Also, a larger sample size would give a clearer picture as the sample size for this study was small.

4.3 Relationship between scores obtained on the Leibowitz social anxiety scale and the measures of stuttering across the three tasks and severity

Spearman's rank correlation was performed to obtain the following results. The following tables 19, 20 and 21 summarize the results obtained for the relationship between the scores of LSAS and frequency of stuttering, duration of the longest dysfluency, scores on the physical concomitants for the speaking task, storytelling task with human pictures and storytelling task with non-human pictures respectively. Table 21 shows the correlation between LSAS scores and severity.

Table 19

Relationship between Scores on LSAS and Speaking Task

		Duration of the longest dysfluency	**% of syllables stuttered**	**Sum of the physical concomitants**
LSAS scores on fear or anxiety	Coefficient of correlation	-.486	-.657	-.177
	p- value	.329	.156	.738
LSAS scores on avoidance	Coefficient of correlation	-.086	-.600	.353
	p- value	.872	.208	.492

A moderate negative correlation has been observed between the scores on the LSAS scores on fear or anxiety and duration of longest dysfluency and frequency of stuttering for the speaking task, though not statistically significant.

Whereas for the LSAS scores on avoidance only percentage of syllables stuttered has a moderate negative correlation, duration has negligible correlation. Physical concomitants show a weak positive correlation, though none of them are statistically significant.

Table 20

Relationship between Scores on the LSAS and the Measures of Storytelling Task with Human pictures

		% of syllables stuttered in the	**Duration of the longest dysfluency**	**Sum of the physical concomitants**
LSAS scores on fear or anxiety	Coefficient of correlation	-.429	-.257	-.543
	p- value	.397	.623	.266
LSAS scores on avoidance	Coefficient of correlation	-.371	-.486	-.200
	p- value	.468	.329	.704

For the storytelling task with human pictures, the LSAS score on fear or anxiety has a moderate negative correlation with physical concomitants, a low negative correlation with frequency of stuttering and negligible correlation with the duration of the longest dysfluency, though none are statistically significant.

For LSAS scores on avoidance low negative correlation has been obtained for frequency of stuttering and duration of longest dysfluency and negligible correlation for the sum of physical concomitants.

Table 21

Relationship between Scores on the LSAS and the Measures of Storytelling Task with Non-Human Picture

		% of syllables stuttered	Duration of the longest dysfluency	Sum of the physical concomitants
LSAS scores on fear or anxiety	Coefficient of correlation	-.638	-.771	-.371
	p- value	.173	.072	.468
LSAS scores on avoidance	Coefficient of correlation	-.667	-.771	-.257
	p- value	.148	.072	.623

The LSAS scores on fear and anxiety have a moderate negative correlation with frequency and high negative correlation with the duration of the longest dysfluency, low negative correlation with physical concomitants , though not statistically significant.

The LSAS scores on avoidance have a moderate negative correlation with frequency and high negative correlation with the duration of the longest dysfluency, negligible correlation with physical concomitants , though not statistically significant.

Severity of stuttering has a high negative and a moderate negative correlation with LSAS scores on fear or anxiety and LSAS scores on avoidance respectively (see table 22). Neither of the correlations are statistically significant.

Table 22

Relationship between Scores on LSAS and Severity of Stuttering

		Severity of stuttering
LSAS scores on fear or anxiety	Coefficient of correlation	-.772
	p- value	.072
LSAS scores on avoidance	Coefficient of correlation	-.617
	p- value	.192

Chapter 5

Discussion

In this study the variability of stuttering was assessed across three tasks and its relationship with social anxiety was explored. The frequency of stuttering, duration of the longest dysfluency and physical concomitants were measured for each task. The tasks were speaking task and two storytelling tasks. In the speaking task the participant had to talk about his future plans. TAT cards were used for both the storytelling tasks; 3 cards with human pictures for one task and three cards with non-human pictures for the other task. Participants were instructed to tell the current scenario, the past and the future/outcome of the story based on the picture. Leibowitz social anxiety scale was also administered.

The three tasks chosen for this study required language formulation (Constantine, 2006; Johnson, 2009). In a study done by Johnson et al. (2009) it was found that there was a significant difference between two language formulation tasks (conversation vs. narration) in children with stuttering. However, in this study for the variability of stuttering across tasks, no significant difference was found across the three tasks for frequency of stuttering and duration of the longest dysfluency. This may be due to the small sample size .It is interesting to note that the mean for the storytelling task with human pictures was lesser than the speaking task and the storytelling

task with non -human pictures for the frequency of stuttering ,duration of the longest dysfluency as well as for the scores on physical concomitants.

Multiple factors influence stuttering including the anxieties, emotional state and arousal, processing demands, situations and so on (Hennessey, Dourado, & Beilby, 2014; Weber & Smith, 1990; Arenas, 2017; Bosshardt 2006). Since in the story telling task the participant had to talk about the present situation in the picture, what might have led to that situation and the outcome, it is plausible that coming up with a story involving human pictures required less effort as compared to telling a story with non-human pictures. As for the speaking task the reason maybe that since they were asked about their future plans, which is very personal to them and this task required them to consistently maintain eye contact with the clinician, it may have triggered a higher emotional reaction.

When the physical concomitants scores were compared across tasks the mean was highest for the speaking task and lowest for the storytelling task with human pictures, and a statistically significant difference was obtained between the two. Mean for the story telling task with non-human picture was also lesser than that of the speaking task, though not statistically significant.

While performing the storytelling task, participants would often look at the picture and talk which may have influenced the scoring of the physical concomitants. Also, in the speaking

task the participant had no choice but to look at the clinician as well as talk about something personal which may have triggered greater discomfort hence greater dysfluencies and secondary reactions.

Second objective of the study was to explore the relationship between severity and the measures of stuttering across the three tasks.

From the obtained results a consistent pattern of a moderate to high positive correlation with severity (based on SSI-scores) has been obtained for the frequency of stuttering across all the three tasks, though not statistically significant. Constantino et al. (2006) found strong positive correlation between SSI-4 scores and average percentage of syllables stuttered on each day, while assessing day to day variability. They also found a strong positive correlation between physical concomitants and the SSI-4 scores. It is not an unexpected finding as SSI-4 takes into consideration the frequency, duration as well as physical concomitants.

Strangely such a consistent correlation with severity has not been obtained for duration of the longest dysfluency and physical concomitants in this study. For the correlation between duration of longest dysfluency and severity across tasks, storytelling with human pictures showed negligible correlation with severity whereas the other two tasks showed a moderate positive correlation. Similarly, for physical concomitants the speaking task had negligible correlation with severity whereas other two tasks showed a moderate positive correlation. As the

results are mixed, the correlation between severity and physical concomitants cannot completely be ruled out. It is important to note that none of the aforementioned correlations reached statistical significance. In a study done by Maruthy and Sharma (2018) to investigate the day to day variability of stuttering, they found no correlation between the duration of the longest dysfluency and SSI-4 scores. Also, frequency and duration of stuttering may correlate with severity often, but not always. These two overt measures give rise to a lot of heterogeneity in the disorder. (Kalinowski & Saltuklaroglu, 2005). The small sample size of the study may also have influenced the results and there is no consistency in the correlations of duration and physical concomitants across tasks, it is difficult to conclude whether or not the duration and physical concomitants correlate with severity.

The third objective of the study was to see the relationship between the severity, measures of stuttering across the three tasks and the scores on Leibowitz social anxiety scale. The participant had to rate their fear or anxiety towards the mentioned situations and also rate their avoidance. The results obtained are ambiguous as some of the measures like frequency of stuttering across the speaking task and the storytelling task show a moderate negative correlation with both fear and the avoidance scales , whereas the for the story telling task with human pictures there is a low negative correlation with the LSAS fear and avoidance scales. Physical concomitants have low positive or negligible negative correlation with LSAS avoidance scores across all three tasks. But for LSAS anxiety scores, the story telling task with human pictures has

a moderate negative correlation whereas for the other two tasks it is negligible or low. For duration of the longest dysfluency, speaking task and storytelling with human pictures showed a negligible or low negative correlation with both LSAS anxiety scores and LSAS fear scores, whereas the story telling task with non- human pictures showed a high negative correlation with both the fear and avoidance scores of LSAS. These results seem unprecedented. It is important to note that none of the aforementioned correlations reached statistical significance.

When severity was correlated with the LSAS scores on anxiety/fear and avoidance, high negative correlation and moderate negative correlation was obtained respectively. Again, it did not reach statistical significance.

The correlation between the scores on LSAS and frequency of stuttering, duration of the longest dysfluency, physical concomitants and severity seems aberrant as most studies have reported no correlation (Blumgart, 2010; Stein, 1996) or a positive correlation between anxiety and severity (Vinacour & Levin, 2007; Blood, 2001; Fitzgerald, 1992). Again, the small sample size may have influenced the results. Manning et al. in 2013 found that anxiety did not correlate with SSI and % syllables stuttered, but correlated with scores obtained on OASES, which is protocol that measures the impact of stuttering on a person's life. It may be possible that severity of stuttering does not always impact the lives of persons in the same way. Amongst the participants enrolled for the study, it is interesting to note that two participants with mild

stuttering and one participant with moderate stuttering could be diagnosed with moderate social phobia based on LSAS scores, where as a participant with severe stuttering and two participants with moderate stuttering had low scores on LSAS and did not fall in the SAD category. Stuttering is a heterogeneous disorder, not only amongst individuals but also within an individual. As stuttering develops individual patterns are shaped and may even change at any point in the course of time (Kalinowski & Saltuklaroglu, 2005)

Various factors play a role in triggering and maintaining stuttering which maybe psychological or environmental in nature (temperament, stresses in the environment and so on); how these factors interact and are influenced by persons around the PWS as well as person with stuttering may lead to some persons with stuttering develop social phobia while others may not. Hence there can be persons with stuttering without social phobia and persons with stuttering with social phobia (Czernikiewicz, 2019). Iverach et al. (2018) concluded from their study that despite the stuttering not being severe, socially anxious adults with stuttering demonstrate more difficulties psychologically and have negative view towards their speech. Hence, it may be possible that there is a subgroup of individuals with stuttering who develop social phobia. It may also be possible that the participants with mild stuttering were covert stutterers, who passed as relatively fluent but the underlying internal factors may be pathological levels of shame, social anxiety and poor self-esteem (Cox, 2013; Paterson, 2009). Although external factors like social stigma may play a role (Goffman, 1963) .These internal and external factors may also have a

combined effect (Brune & Wilson, 2013). Again as stuttering is a heterogeneous disorder, this maybe a subgroup.

However, the results of this study need to be interpreted with caution as there are a few limitations. Due to small sample size, the results are mere speculations. The sample does not encompass the wide range of severities of stuttering. But the results do give a lead into what can be explored further, with a larger sample size that encompasses the wide range of severities

Future research can study the ways in which different linguistic formulation tasks impact the stuttering, especially how cognitive load and emotions interact can be looked into. Also, correlations between severity scores on a scale that measures quality of life of persons with stuttering can be compared with LSAS scores. The results of the study also indicate that the interaction between overt and covert features of stuttering are complex, mere measurement of the overt features of the may not completely represent the entirety of the disorder. Further research on how the various overt features and covert factors like shame, anxiety, and avoidance interact and influence the patterns of dysfluencies in an individual would be beneficial. Normal dysfluencies can also be measured and their variation can also be documented.

An important implication of the study is the presence of co-morbid disorder like social anxiety with stuttering. It calls for assessment of psychological aspects along with overt features, and if needed psychological/pharmacological intervention should be provided along with speech therapy.

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Chapter 6

Summary and Conclusion

The striking feature of stuttering is its variability, not only across individuals but also within an individual. Various factors like the linguistic complexity, temperaments, situations, persons being spoken to etc. influence this variable nature of stuttering. Also, often persons with stuttering present with anxiety, especially in social situations.

This study aimed to look into how different language formulation tasks affect variability in stuttering and how it is related to social anxiety. Three tasks that were chosen are speaking task, storytelling task with non- human picture cards of TAT and storytelling task with human picture cards of TAT. For each of these tasks frequency of stuttering (percentage of syllables stuttered), duration of the longest dysfluency (seconds) and physical concomitants were measured. Statistical analysis was done on data obtained from six participants. No significant difference was found amongst the three tasks for the frequency and duration of the longest dysfluency. For scores on physical concomitants there was a significant difference between the speaking task and the story telling task with human pictures. The scores for storytelling task with non-human pictures was also lesser than that for the speaking task but did not reach statistical significance. An important observation made here was the measures for the storytelling task with human pictures were the lowest amongst the three tasks.

When these measures across the tasks were correlated with the severity, positive correlation was obtained for the frequency of stuttering across the three tasks but such a consistent correlation was not obtained for the other two measures. None of the correlations reached statistical significant.

When correlation was carried out with the scores obtained on LSAS, a pattern of negative correlation was observed, but it was unevenly distributed across the measures (negligible to high negative correlation) and did not reach statistical significance. Similarly, negative correlation was obtained between LSAS scores and severity but it did not reach statistical significance. Also out of the six participants who enrolled for the study, three of them could be diagnosed with moderate social anxiety disorder. It is intriguing that 2 participants with mild and 1 participant stuttering fell in the SAD category, whereas other participants whose severities ranged from moderate to severe fared low scores on LSAS.

The results of the study, although not statistically significant, indicate that stuttering is a variable disorder and also interplay of various factors give rise to individualistic pattern of symptom presentation. Severity may not always correlate with anxiety and a person with stuttering may present pathological levels of social anxiety which necessitates the need to include psychological assessment along with the assessment of overt features of stuttering. For

such patients intervention which includes psychological/pharmacological treatment along with speech therapy will be beneficial.

Clinical Implications of the Study

- This study lends support to the literature that stuttering is a variable disorder and different tasks may impact the measures of stuttering.
- This study indicates that persons with stuttering have individual patterns and that assessment of covert features is as important as overt features effective assessment and treatment.
- This study adds to the literature that persons with stuttering may present with social anxiety. This highlights the importance of psychological/pharmacological treatment along with speech therapy

Limitations and Future directions

- This study was done on six males, replicating this study with a larger sample size with a broader spectrum of severities will lend support to the literature.
- In this study variability of stuttering was studied, in future investigations variability for normal disfluencies in persons with stuttering can be looked into.
- Leibowitz social anxiety scale was correlated with measures of stuttering like percentage of syllables stuttered and severity. Future research can look into links between Liebowitz social anxiety scale and measures of quality of life in persons with stuttering.
- The results of the study also indicate that the interaction between overt and covert features of stuttering are complex, mere measurement of the overt features of the may not

completely represent the entirety of the disorder. Further research on how the various overt features and covert factors like shame, anxiety, and avoidance interact and influence the patterns of dysfluencies in an individual would be beneficial.

- Future research can study the ways in which different linguistic formulation tasks impact the stuttering, especially how cognitive load and emotions interact can be looked into.

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