

Speech Disorders: Theoretical Dimensions and Therapeutic Approaches to Dysarthria, Speech Anxiety, and Stammering

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ABSTRACT

Speech disorders can affect the clarity, smoothness, and flow of spoken communication. This article examines three speech-related conditions: dysarthria, a motor speech disorder caused by impaired control of the muscles used for speech; speech anxiety, characterized by excessive fear or anxiety when speaking before others; and stammering, characterized by involuntary repetitions, prolongations, or blocks. This theoretical study aims to clarify the conceptual and therapeutic dimensions of these conditions and to examine the psychological and neurological factors associated with them. The reviewed literature indicates that dysarthria may involve irregular or explosive speech, hypernasality, muscle weakness, and impaired coordination. It also suggests that psychological and neurological factors may interact in stammering, highlighting the importance of comprehensive assessment and individualized intervention.

Keywords: Dysarthria; Speech Anxiety; Stammering; Speech Fluency; Speech Therapy.

Introduction

A speech disorder is a condition that affects an individual's ability to produce sounds and words correctly and intelligibly. It may manifest as difficulty articulating sounds accurately, maintaining an appropriate speech rhythm, or coordinating sounds and words. Speech disorders include stuttering, difficulties in sound production, and impaired coordination of the muscles used for speech. Their causes may involve neurological conditions, language delays, physical abnormalities of the speech apparatus, or genetic factors. These disorders can particularly affect children during language development.

Accordingly, early intervention and accurate diagnosis are essential. Speech disorders can affect the academic and social functioning of both children and adults, necessitating specialized therapeutic strategies to improve speech and communication skills. Treatment may include speech therapy, breathing exercises, and articulation techniques that help individuals express themselves more clearly and effectively.

Aim

This theoretical study aims to explore the conceptual and therapeutic dimensions of speech disorders, specifically dysarthria, speech anxiety, and stammering.

Methods

Research and studies concerning individuals with speech disorders were reviewed to identify the challenges they face and the medical and psychological interventions described in the literature.

Results

The reviewed literature indicates that dysarthria may manifest as explosive or intermittent speech accompanied by increased hypernasality due to weakness and impaired coordination of the muscles involved in speech production. The literature on stammering points to a complex interaction between psychological and neurological factors rather than a single cause.

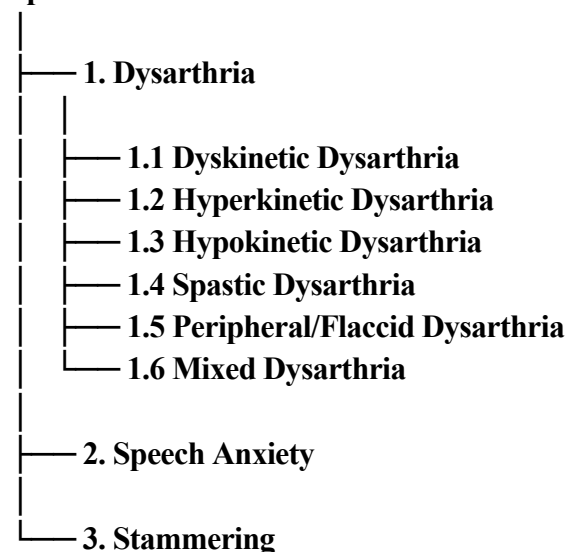
Speech Disorders and Fluency

Fluency is defined as "the smooth flow of sounds, syllables, words, and phrases during verbal communication, with minimal hesitation or repetition" [1]. It is the ability to express oneself easily and smoothly without interruption.

Psychological disorders are conditions characterized by clinically significant difficulties in emotion, cognition, or behavior and may emerge early in life [2]. A speech fluency disorder describes a disruption in the flow of spoken language and is not limited to stuttering. Such disorders can affect both the speaker and the listener [1]. They include interruptions in speech flow or unusual disturbances in speech rate and rhythm, sometimes accompanied by emotional and psychological symptoms. Examples include stuttering and cluttering, while speech anxiety may exacerbate fluency difficulties [3].

Speech-Related Conditions Addressed in This Study:

1. Dysarthria, including dyskinetic, hyperkinetic, hypokinetic, spastic, peripheral/flaccid, and mixed dysarthria.
2. Speech anxiety.
3. Stammering.

Speech-Related Conditions

Dysarthria:

Dysarthria is a motor speech disorder that affects a person's ability to speak clearly. It may occur in childhood and can involve difficulty producing certain sounds, together with changes in rhythm, rate, and tone.

According to the Cleveland Clinic, dysarthria is defined as follows:

"Dysarthria is a motor speech disorder where damage to your nervous system causes the muscles that produce speech to become paralyzed or weakened. The damage may make it difficult to control your tongue or voice box, causing you to slur words" [4].

Dysarthria is a motor speech disorder and may manifest as intermittent or explosive speech accompanied by increased hypernasality. This may result from weakness in the muscles involved in speech and articulation, as well as impaired coordination among these muscles. It may also be accompanied by involuntary movements of the face, neck, eyes, shoulders, or other parts of the body.

Symptoms may include:

- Tremulous or poorly coordinated speech.
- Omission of sounds and syllables, with inappropriate timing between syllables and a syllabic speech pattern.
- Increased hypernasality.
- Speech produced with considerable difficulty or explosiveness, making it challenging for the listener to understand.
- Speech accompanied by involuntary movements of certain parts of the body [5].

Types of Dysarthria:

Dyskinetic dysarthria includes two types:

- Hyperkinetic Dysarthria: May involve the omission of sounds and syllables and the presence of hypernasality.
- Hypokinetic Dysarthria: Often occurs in individuals with Parkinson's disease and may involve weak articulation and deterioration in connected speech.
- Spastic Dysarthria: May involve impairment across several speech parameters, together with breathing difficulty, hoarseness, and excessive stress on words.
- Peripheral/Flaccid Dysarthria: Characterized by short phrases, nasal air escape during speech, increased hypernasality, and consonant distortion.
- Mixed Dysarthria: Results from damage to more than one motor system and may include features of the types described above [6].

Speech Anxiety (Glossophobia):

Often referred to as "speech anxiety," "stage fright," "communication anxiety," "public-speaking anxiety," or simply the "fear of speaking," this condition is characterized by anxiety during speaking. Some reports suggest that fear of public speaking is widespread.

Speech anxiety is a state of anxiety and tension experienced when speaking in front of others or engaging in important conversations. Individuals may experience symptoms such as confusion, sweating, stammering, difficulty concentrating, and severe tension before and during speaking [7].

The Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5), published by the American Psychiatric Association, describes social anxiety disorder as involving a persistent fear of social or performance situations in which an individual may be scrutinized by others, leading to fear of embarrassment or humiliation [8].

Mowrer describes speech anxiety as an increased fear that one's faults will be discovered when one is observed by many people or monitored while speaking [9].

Ross defines it as a complex reaction involving severe physical symptoms, such as a rapid heart rate, stomach discomfort, sweating, and trembling hands, as well as cognitive symptoms, such as persistent doubt and disrupted thinking [9].

Fluency difficulties can contribute to personal and social maladjustment. Individuals may withdraw from verbal communication, appear introverted or shy when required to participate in conversation, and hold irrational beliefs that participation will embarrass them or annoy others. Consequently, they may prefer to remain silent [9].

Furmark emphasizes that speech anxiety can negatively affect social performance. It may cause individuals to miss opportunities for social success and thereby hinder self-actualization [8].

Glossophobia may overlap with social anxiety disorder and is characterized by excessive fear of speaking or performing before others. This fear can produce high levels of stress and anxiety before, during, and after social situations, affecting quality of life and hindering social interaction and the achievement of personal and professional goals.

Causes of Speech Anxiety:

Several factors may contribute to speech anxiety, including:

1. Irrational Ideas [10]:

These are unrealistic or illogical thoughts that affect speaking, such as believing that one will fail, attract negative attention, or be subjected to criticism or ridicule. Such thoughts increase anxiety and tension during speaking [11].

2. Demandingness [10]:

Demandingness refers to negative thinking patterns that impose strict and unrealistic demands on oneself or others. A person may believe that they must be perfect in everything, perform every task exceptionally well, and gain everyone's approval [11]. These thoughts place significant pressure on the individual, increasing stress and anxiety and, in turn, affecting social relationships.

3. Catastrophizing [9]:

This involves negative, irrational thoughts that lead a person to expect catastrophic outcomes when speaking. The individual may believe that a minor mistake or negative event will have disastrous, overwhelming, or terrifying consequences.

4. Discomfort Disturbance [12]:

Thoughts related to discomfort disturbance range from guilt and negative expectations to doubts about one's ability to handle difficult situations, speak appropriately, or maintain a sense of personal worth.

5. Self-Denigration [12]:

Self-denigration refers to negative and pessimistic thoughts often experienced by individuals with low self-esteem or depression. These thoughts involve viewing oneself negatively, doubting one's abilities, and experiencing a persistent sense of failure [13]. They may range from believing that one cannot succeed or meet goals to believing that one has no value or significance. Individuals with

speech anxiety may fear criticism, ridicule, or negative feedback, or they may have had negative past experiences that create stress and psychological pressure.

Symptoms Associated with Speech Anxiety:

Individuals with high levels of speech anxiety may experience a range of physical, psychological, and cognitive manifestations. These symptoms vary in severity and may not be readily visible to an audience, although they can be strongly felt by the individual [14]. Common physiological and psychological symptoms include [15]:

- Cold hands and feet.
- Dry throat.
- Blushing.
- Rapid heartbeat.
- High blood pressure.
- Difficulty concentrating.
- Trembling of the voice or body.
- Increased sweating.
- Severe tension before and during speaking.
- Confusion and stammering.
- Facial flushing in some individuals.
- Feelings of inferiority or perceived neglect.

Speech anxiety can significantly affect an individual's life by limiting professional, academic, and personal opportunities.

Stammering

Stammering is a common speech disorder among children and adults across societies. Parents may become concerned when they observe their children repeating parts of words before pronouncing them. Some psychological accounts interpret stammering as related to emotional tension in the child [16].

Stammering is defined as the "involuntary repetition and prolongation of sounds, syllables, or words" [17]. It may also involve blocks or hesitation when attempting to produce a syllable. The terms "stuttering" and "stammering" are generally used interchangeably to describe repetitions, prolongations, and interruptions in the flow of speech [18].

Faisal Al-Zarad classifies stammering into two types:

1. Vibratory Stammering: This appears as the repetition or prolongation of certain sounds, letters, or words, typically at the beginning of speech or when pronouncing the first letter of a word.
2. Spasmodic Stammering: This involves a sudden cessation of speech accompanied by involuntary spasmodic movements [18].

Stammering may manifest as tremulous movements and a blocked flow of speech followed by a burst of speech. A person who stammers may exert considerable effort to overcome the block. In severe cases, the person may move their hands, press their feet against the floor, tremble, move their head, or protrude their tongue [16].

Causes of Stammering:

Stammering has multiple interacting causes that vary among individuals, and heredity may play a significant role. Psychological, neurological, and other biological factors may also contribute. Its core features can be divided into primary behaviors and secondary symptoms. Primary behaviors include [19]:

1. Repetitions: Repeated production of sounds, syllables, or words at a noticeable frequency.
2. Prolongations: Extension of the duration of sound production, especially vowels.
3. Blocks: Obstruction of airflow or phonation at certain points in the speech apparatus, hindering the mechanical production of speech. Continued air pressure behind the blockage may lead to muscle tension or spasms.

Secondary Symptoms:

Researchers have proposed two broad schools of thought to explain this phenomenon:

The first emphasizes organic factors related to the structure and function of the respiratory and speech systems that may affect a person's ability to produce words correctly [20].

Examples include [21]:

- Muscle Spasms: Spasms in the facial muscles, eyes, and limbs.
- Rapid Tongue Movements: Rapid movements of the tongue into and out of the mouth.
- Breathing Difficulties: Obstruction or difficulty in breathing.
- Facial and Neck Redness: Redness of the face and neck.

The second school emphasizes psychological factors in the onset and development of the problem. Its proponents suggest that stress, nervous tension, and emotional difficulties are related to the emergence of speech and communication problems [20].

Examples include [21]:

- Nervous tension.
- Anxiety and depression.
- Low self-confidence.
- Unrealistic expectations of self-efficacy.
- Avoidant or defeatist behavior.

Some individuals may also display involuntary habits, such as repeating words or sounds, or co-occurring conditions that involve involuntary movements. These may include attention-deficit/hyperactivity disorder (ADHD), post-traumatic stress disorder (PTSD), tic disorders, or muscular conditions such as facial spasms. Genetic factors may also increase susceptibility.

These symptoms may manifest as:

- Repetitive, atypical body movements.
- Eye rolling or vertical head movements.
- Sudden muscle spasms, such as contractions of the facial or arm muscles.
- Tremors in the extremities, such as hand shaking or involuntary finger movements.

According to Nabila Abbas, stammering may be associated with psychological and family-related factors summarized as follows [20]:

1. Lack of parental affection and attention: Disagreement between parents about child-rearing practices, family discord, and conflict among family members.
2. Differential treatment of children: This may foster jealousy in the child.
3. Overindulgence: Failure to teach the child self-reliance.
4. Academic failure: Feelings of inadequacy in comparison with peers and classmates.

Neural Bases of Speech and Language Disorders and Therapeutic Approaches

Neural Basis of Stammering:

Some hypotheses attribute stammering primarily to neurological causes. However, the literature reviewed in this article also emphasizes psychological factors and suggests that neither category should be considered in isolation [21].

Some researchers in the field of speech disorders have proposed that biochemical conditions, including disruptions in processes that produce energy for vital functions, may contribute to stammering. West and Dominick examined this possibility without excluding the role of psychological factors in the biochemical disturbances associated with stammering. The cited literature therefore presents psychological and biological processes as potentially interacting rather than mutually exclusive [22].

Overall, studies point to a complex interaction among psychological factors, such as stress, tension, and anxiety; neurological factors; and possible biochemical processes. A multifactorial perspective is therefore important when considering the causes of stammering.

Speech Therapy Techniques for Stammering:

1. Speech Relaxation

The term "speech relaxation" refers to the use of relaxation techniques to ease tension and improve speech fluency.

Some psychological accounts describe stammering as arising from an internal struggle that disrupts an individual's thoughts and self-perceptions. From this perspective, the struggle disturbs nervous-system balance and creates a lack of harmony between mental and physical actions [23].

The proposed benefit of speech relaxation lies in reducing disruptive tension during speaking. A relationship has also been reported between ease of reading with this method and speech initiation [24]. The approach aims to promote relaxation and reduce tension and anxiety during verbal communication.

Speech therapy techniques that may incorporate elements of relaxation include:

- General relaxation techniques: Deep breathing and meditation may help reduce overall stress and calm the nervous system.
- Breathing techniques: Exercises aim to improve control of inhalation and exhalation during speech.
- Verbal relaxation techniques: Slowing speech and using gradual pacing may improve fluency.
- Verbal sensitivity: Increased awareness of verbal and physical movements during speaking may promote smoother and more differentiated speech patterns.

Exercises based on the principles of speech relaxation consist of twelve sheets [24]:

- The exercises begin with vowels, followed by consonants and then isolated words that are gradually combined into phrases and sentences. Practice is conducted in a relaxed and deliberate manner described as "melodic, slow, steady, and monotonous."

- Each unit of practice, whether a sound, word, phrase, or sentence, is first modeled by the speech therapist in the prescribed manner. The patient is then asked to imitate it using the same tone.
- After the preliminary stage on pages 1-3, another stage begins on pages 4, 5, 6, and 8. These pages contain simple questions to be practiced in the same manner.
- A selection of reading passages is then used to assess whether the child who stammers has gained greater control over speech movements.

Speech exercises that emphasize relaxation may enhance control of articulation and produce noticeable improvements in verbal expression.

Learning to Speak Again: Speech Rehabilitation

Speech rehabilitation involves exercises that encourage individuals who stammer to participate in varied forms of conversation and reduce their focus on stammering. Techniques include:

- Participation in various forms of conversation: Engaging in diverse conversations, including group discussions, to reduce preoccupation with stammering.
- Puzzle and riddle activities: Using puzzles and riddles to engage individuals in stimulating, interactive discussions.
- Play and entertainment: Using playful and enjoyable activities as motivators for freer conversation [24, 25].

"Learning to Speak Again," or "Speech Rehabilitation," is a process involving exercises that encourage participation in various types of conversation to help individuals manage stammering [26].

Rhythmic Speech

This method is based on the observation that stammering may decrease when individuals speak rhythmically. A metronome is used to help time the production of each syllable. Reading material is divided into manageable units that align with the selected rhythm, allowing gradual improvement in speech patterns [27].

A metronome is a device used by musicians to maintain rhythm and accurate timing. In speech practice, it may support greater control of speech timing and production in individuals who stammer. First, an appropriate rhythm is selected for the individual and adjusted to be slower or faster as needed. The text is then divided into short segments and readily readable words that match the designated rhythm.

Several researchers have described the advantages of rhythmic approaches. John Fletcher mentioned techniques such as foot tapping and whistling, which may be applied as follows [27]:

Rhythmic Speech Techniques

1. Reading While Walking: The individual reads while walking, pronouncing one word per step (250 words).
2. Reading with Arm Movements: The individual reads while moving one arm, pronouncing one word per movement (250 words).
3. Rhythmic Reading: The individual reads with rhythmic pauses between beats (250 words).
4. Reading with Audible Cues: The individual reads while the trainer provides audible cues, such as tapping on a table, with one tap per word (250 words).
5. Control Condition: The individual reads without rhythmic movements (500 words).

The Chewing Speaking Method

The Chewing Speaking Method is based on coordinated chewing-like movements during speech and is intended to strengthen or coordinate the muscles involved in sound production. Developed by Froschels, the method aims to change the perception of speech as difficult or effortful for individuals who stutter. The procedure is as follows:

1. Initial Chewing Exercise: The individual is asked whether they can chew and is then instructed to chew quietly.
2. Imaginary Chewing: The individual is asked to imagine chewing a piece of food and to mimic the movement.
3. Adding Sound to Chewing: Once the chewing movements are performed correctly, the individual is encouraged to produce sound while chewing. If the individual is hesitant or shy, the therapist may demonstrate the exercise.
4. Incorporating Speech: The individual engages in a conversation and answers simple questions, such as "How old are you?" and "Where do you live?" while using the chewing method.

Some individuals may initially find the method challenging and need time to adjust. With continued practice, however, their ability to produce sounds accurately may improve.

Speech Shadowing

Speech shadowing is a technique in which individuals who stutter repeat words and sentences shortly after hearing them. The goal is to improve pronunciation, rhythm, attention, and auditory-verbal coordination.

The patient begins by listening carefully to words and sentences and focusing on pronunciation and rhythm. They then repeat the material shortly after hearing it, attending to verbal details and sound sequences. During a session, the person may read aloud the same passage as the therapist with a slight delay, which can produce noticeable short-term improvement and reduce stuttering during practice.

An individual may practice this technique independently as follows:

1. Choose a Short Audio Clip or Text:

Select an audio clip or short text appropriate to your level.

2. Listen Carefully:

Listen attentively to understand the rhythm and pronunciation.

3. Repeat Words and Sentences:

Play the clip again and repeat the sentences or words immediately after hearing them, maintaining the original speaker's rhythm.

4. Repeat the Process:

Repeat the step several times until you can reproduce the content accurately.

5. Record Your Performance:

Record yourself repeating the sentences and words, then listen to the recording to evaluate and improve your performance.

6. Gradually Increase the Speed of the Audio Clip:

Once you can shadow comfortably at the original speed, gradually increase the speed of the clip.

Delayed Auditory Feedback

Delayed auditory feedback is a technique in which an individual hears their own voice shortly after speaking. The delay alters auditory feedback and may support speech modification.

Delayed auditory feedback allows individuals to hear their speech after a short time lag. It can alter voice pitch and disrupt the natural rhythm of speech in fluent speakers, while sometimes producing a fluency-enhancing effect in individuals who stutter.

To apply delayed auditory feedback:

1. Use an Appropriate Device:

Use a device equipped with headphones and software that can introduce a delay into the audio signal.

2. Adjust the Delay Level:

Set the delay in accordance with guidance from a speech-language specialist, beginning with a short delay and adjusting it gradually.

3. Self-Talk and Presentation:

Begin by speaking to yourself and noticing the delayed playback of your speech.

4. Adapt to the Delay:

Try to adapt to the delay while continuing to speak.

5. Evaluate Performance:

Assess performance regularly and adjust the delay or practice material as advised.

Masking Noise

"Masking noise" refers to the use of continuous sound to reduce unwanted auditory input. It is used in acoustics, audio recording, concentration, and some therapeutic contexts. The therapeutic context is discussed here.

Auditory masking has been used on the premise that stuttering may decrease when individuals cannot hear their own voices clearly while speaking. The approach emerged in the 1960s, but lasting benefits have not been established because the masking devices were generally used only in therapy rooms. Such devices may produce white noise at intensities ranging from 80 dB to 110 dB through headphones.

White noise is a continuous sound containing energy across a broad range of frequencies. Although it may temporarily reduce stuttering for some individuals, exposure should be medically supervised and limited because high sound levels can damage hearing.

Speech Habit Retraining

Speech habit retraining seeks to improve speech patterns and pronunciation by focusing on specific difficulties, such as phoneme articulation, tongue position, timing between words, breathing, and speech rate.

In practice, a child who stutters reads from a book appropriate to their educational level. Reading is performed slowly and calmly. When a speech block occurs, the child stops, relaxes, and then resumes reading comfortably. A visual cue, such as a red light, may signal when to stop and relax before continuing. The cited approach suggests that moderate stuttering may improve after approximately 20 sessions. Once adequate fluency is achieved, the individual is encouraged to increase speaking speed gradually toward a natural pace.

Steps for Speech Habit Retraining:

1. Diagnosis: Consult a speech-language specialist before beginning speech habit retraining.

2. Practice: Practice accurate production of phonemes and syllables, improve breathing and intonation, and increase awareness of speech sounds and language.

3. Repetition: Repeat the recommended exercises regularly to support improvement.

Systematic Desensitization

Systematic desensitization is a technique used to reduce negative emotional responses or fears associated with specific situations. It involves gradual exposure, beginning with the least anxiety-provoking situations and progressing to more challenging ones. Its success depends on consistent, repeated practice.

Some individuals who stutter may achieve greater fluency during therapy sessions but find it difficult to speak in real-life situations outside the clinic. This approach involves creating a hierarchy of speaking situations that cause anxiety, ordered from least to most anxiety-provoking. The individual then imagines or enters these situations in sequence and speaks aloud about a topic of interest. Relaxation remains important throughout the process [28].

Conclusions

1. Neurological Hypotheses:

- Although some hypotheses link stuttering to neurological causes, the reviewed sources question explanations based on neurological factors alone. They emphasize the contribution of psychological stress while also supporting a broader, multifactorial interpretation.

2. Biochemical Factors:

- Some researchers suggest that biochemical processes within living cells may contribute to stuttering. The reviewed literature also links these processes to psychological factors, underscoring the need to consider interactions rather than a single underlying cause.

3. Impact of Psychological Factors:

- Psychological factors, such as stress, tension, and anxiety, may contribute to the emergence or severity of stuttering. They can disrupt cognitive and physiological regulation, making it more difficult to control speech patterns and express oneself fluently.

4. Treatment of Stuttering:

- Several therapeutic approaches have been developed to help individuals who stutter improve speech fluency. Speech relaxation uses breathing and relaxation exercises to reduce tension. Speech rehabilitation promotes participation in conversations and verbal activities. Rhythmic speech uses external timing cues, such as a metronome, to help individuals regulate speech rhythm.

5. Interaction Among Factors:

- Studies indicate a complex interaction among psychological, neurological, and biological factors in stuttering. Comprehensive assessment and treatment should therefore address the individual's speech behaviors, emotional responses, and relevant medical or developmental factors.

6. Importance of Continuous Practice:

- The therapeutic techniques discussed require continued practice. Speech relaxation requires repeated training to help individuals regulate speech under stress, while speech rehabilitation and rhythmic speech require regular practice and adherence to clinical guidance.

These conclusions highlight the importance of psychological factors in understanding and treating stuttering while recognizing the possible contribution of neurological and biological factors. Therapeutic interventions should therefore be comprehensive, individualized, and supported by continuous practice.

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