

# International Encyclopedia of Rehabilitation

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# Stuttering

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## Terminology, Definition and History

Nowadays we mostly speak about PWS, which stands for a *Person Who Stutters* or *People Who Stutter*. Especially in British English the term stammering is also used. In many languages the word for stuttering is an onomatopoeia, an imitation of stuttered speech with an element of repetition, cf. the Egyptian expression *nit-nit*, the Greek words *battos*, *Battalos* (nickname for a PWS), *battarzein* and *battarikso*, the Latin words *balbuties* and *blaterator*, the Italian *balbuzie*, the Esperanto *balbuti*, and the French *bégayer* (Fibiger, 1990).

Stuttering has no absolute definition that encompasses all aspects of the disorder, but it is characterized as speech with frequent repetition or prolongation of sounds or syllables, or by frequent hesitation, pauses or blocks that disrupt the rhythmic flow of speech. Beside those open behaviors, stuttering also includes concealment behaviors, such as anxiety, fear, shame, guilt, avoidance, or contending. Therefore stuttering is often compared with an iceberg (Sheehan, 1970).



\*"Stuttering is like an iceberg, with only a small part above the waterline and a much bigger part below." (Sheehan, 1970 and the American Institute for Stuttering, New York, <http://www.stutteringtreatment.org>).

Interest in stuttering has a long history. Stuttering was mentioned for the first time about 2100 B.C. in two Egyptian texts and has been described and treated since then in many different civilizations during the last four thousand years (Fibiger, 1990).

## Classification and Characteristics

Stuttering is classified in the International Classification of Diseases, version 10 (ICD-10) as a behavioral and emotional disorder, and coded as F98.5 with this description: "Speech that is characterized by frequent repetition or prolongation of sounds or syllables or words, or by frequent hesitations or pauses that disrupt the rhythmic flow of speech. It should be classified as a disorder only if its severity is such as to markedly disturb the fluency of speech."

In the forthcoming version of *Diagnostic and Statistical Manual of Mental Disorders* (DSM-V, published by the American Psychiatric Association, 2012) stuttering is classified as a neurodevelopmental disorder and coded as 307.0 Stuttering. The diagnostic criteria in the present version of DSM-IV-TR are:

- A. Disturbance in the normal fluency and time patterning of speech (inappropriate for the individual's age), characterized by frequent occurrences of one or more of the following:
  - (1) sound and syllable repetitions
  - (2) sound prolongations
  - (3) interjections
  - (4) broken words (e.g., pauses within a word)
  - (5) audible or silent blocking (filled or unfilled pauses in speech)
  - (6) circumlocutions (word substitutions to avoid problematic words)
  - (7) words produced with an excess of physical tension
  - (8) monosyllabic whole-word repetitions (e.g., "I-I-I-I see him")
- B. The disturbance in fluency interferes with academic or occupational achievement or with social communication.

The International Classification of Functioning, Disability and Health (ICF) classify *Body Functions* of stuttering under the subheading, b 3300, Fluency of speech.

According to Yairi and Ambrose (2005), 65% have the onset of stuttering before age 3 years and 85% before age 3.5 years. Onset of stuttering in adulthood is rare, but stuttering-like characteristics may develop late in life due to cerebral stroke, head injury, tumor or drug abuse (Helm-Estabrooks, 1999). Psychogenic stuttering may arise in adulthood after a traumatic deprivation (Mahr and Leith, 1992).

Self-reported population based lifetime prevalence in Danish twins is about 8 % for males and 4 % for females (Fagnani et al., 2010). Twins might have a higher rate than 'single-born' children and Yairi and Ambrose (2005) mention that 5% of preschool-age children will have stuttering episodes. Most children recover from their stuttering and the prevalence for adults is less than 1%. More males than females experience stuttering.

## Causes and Consequences

All developmental disorders have a strong genetic component, and stuttering is not an exception. Twin studies indicate substantial genetic influence on individual liability to stuttering with heritability estimates from 70% to more than 80% (Felsenfeld et al., 2000; Ooki, 2005; Fibiger et al., 2010). So, the sum of many different genetic factors explain best the background for stuttering, but recently Kang et al. (2010) also identified a mutation in a specific genomic region in 10% of persons who stuttered in consanguineous Pakistani families with stuttering members. For many

decades the Johnson “diagnosogenic and semantogenic theory” on stuttering etiology was implicated in stuttering etiology (Johnson, 1959), but twin studies focus on moderate unshared (unique, individual-specific) environmental factors (Fibiger, 2010). Unshared environmental factors are those factors that are specific to an individual, thus contributing to make children growing up in the same family different, and the factors might be physical traumas, adequacy of blood supply, position in the womb, birth complications, infections and/or foster home (Guitar, 2006; Fibiger et al. 2010). Simultaneously occurrence of stuttering and childhood speech-language disorders, stuttering and cluttering as well as cluttering and childhood speech-language disorders has been claimed and described through many clinical communications since Treitel (1892). Both stuttering and cluttering have been regarded as disorders of speech motor control (Kent, 2000) and language factors may be important in both disorders (Kent, 2000; Guitar, 2006, 61).

Because neural connections between the motor cortex and basal ganglia are implicated in speech motor functions, stuttering could also be associated with a dysfunction in basal ganglia activity or closed head injury (Alm, 2004), and a correlation between severity of stuttering and activity in the basal ganglia was found by Giraud et al. (2008). In general, there is an agreement that multiple factors contribute to the development of stuttering.

## **Prevention**

Due to the genetic influence on individual liability to stuttering, parents should be observant on the possible heritability, but also on possible unshared environmental factors. The Stuttering Foundation of America (2010) recommends parents ask themselves those ten questions:

1. Does the child repeat parts of words rather than whole words or entire phrases? (For example, “a-a-a-apple”)
2. Does the child repeat sounds more than once every 8 to 10 sentences?
3. Does the child have more than two repetitions? (“a-a-a-a-apple” instead of “a-a-apple”)
4. Does the child seem frustrated or embarrassed when he has trouble with a word?
5. Has the child been stuttering more than six months?
6. Does the child raise the pitch of his voice, blink his eyes, look to the side, or show physical tension in his face when he stutters?
7. Does the child use extra words or sounds like “uh” or “um” or “well” to get a word started?
8. Does the child sometimes get stuck so badly that no sound at all comes out for several seconds when he’s trying to talk?
9. Does the child sometimes use extra body movements, like tapping his finger, to get sounds out?
10. Does the child avoid talking or use substitute words or quit talking in the middle of a sentence because he might stutter?

These questions are listed in order of the seriousness of the problem. If a parent answers “yes” to any question other than number 1, it suggests the possibility of stuttering rather than normal disfluency and a referral to a fluency subspecialist for additional support and acknowledgement of individual concerns.

Families play an important role in the management of stuttering in children. Providing an environment that encourages slow speech, affording the child time to talk, and modeling slowed and relaxed speech may help reduce stuttering events (Ratner and Guitar, 2006).

## Assessments

The University of Florida (2010) suggests these assessments for children with stuttering:

- Aim: Should we be concerned about the disfluency?
- Case history/client interview
- Observe parent-child interaction
  - Do the parents speak excessively fast?
  - Are complex sentence structures used?
  - Do parent often interrupt their child?
- Analysis of speech behaviors
  - Calculate types of disfluencies observed
  - Calculate proportion of each type of disfluency
  - Measure duration of disfluencies
  - Measure overall speaking rate
  - Observe type and frequency of secondary symptoms
- Evaluate speech-related attitudes & emotions
- Determine how stuttering affects daily activities
  - To what extent does stuttering affect patient's ability to perform professional and social activities?
  - Does stuttering limit or affect choices/decisions?
  - Is the client penalized because of the disability?
- May use standardized tests such as "Stuttering Prediction Instrument (SPI)"
- Developmental Stuttering Diagnosed if:
  - 3 or more repetitions and/or prolongations per 100 syllables of speech (sample thoroughly)
  - "clustering" of repetitions and prolongations observed
  - Greater than 50% of total disfluencies are repetitions and/or prolongations
  - Average duration of repetitions and/or prolongations is > 750 msec.
  - Evidence of 2 or more iterations per repetition
  - Tempo of repetitions is perceived as rapid or irregular
  - Repetitions/prolongations are accompanied by physical tension, struggle, or bodily movements
  - Client is frustrated or concerned about disfluencies
- Therapy or not-to-therapy, that is the question!
  - A clinician may **actively** monitor a youngster (e.g., regular consults or re-evaluation with parents, thoroughly counsel parents):
  - If the child is a preschooler who is very near onset (e.g., 0-6 months).
  - If the child appears to be at low risk for persistent stuttering.
  - If social/emotional "pressures" are absent e.g., Child and parent are unconcerned.

**To simply “wait and see” is not appropriate.**

For reading children, adolescents and adults self-reporting assessments exist. They may e.g. include aspects on stuttering behaviors (frequency, and range of qualitative stuttering behaviors, including defensive and coping reactions to stuttering), thoughts and cognitive aspect of stuttering, feelings about stuttering, avoidance due to stuttering, and disadvantage and lack of social participation due to stuttering (Alm, 2007 have listed many of the assessments). For evaluation by the listener *Stuttering Severity Instrument* (SSI-4) is very common (Riley, 2009).

## **Interventions and Prognosis**

The progress PWS make in response to intervention is affected by many factors and no single intervention or therapy will be beneficial for everybody. During history many different therapy approaches have been applied. Today most therapies relate to fluency shaping therapy, stuttering modification therapy, electronic fluency devices. Pharmacological agents have been tried also, but almost all of them with side-effects or little therapeutic effect in general. In many countries the most common or only affordable for most adult PWS are the Self Help Groups. For preschool children the Lidcombe Program is widely used today. Therapy evaluation depends on which aspects of your stuttering you evaluate. Guitar and McCauley (2009) give you more details. In general, evidence of the efficacy and effectiveness of specific interventions is sparse.

### **Fluency Shaping Therapy**

Fluency shaping therapy is based on operant conditioning techniques. There are many different names and many variations of fluency shaping therapies, such as easy stuttering, connected speech, smooth speech, and prolonged speech. Some of the therapy names are: Dr. Fluency (computerized fluency shaping procedure designed to provide a home-based, programmed training facility for people who stutter), the Camperdown Program (prolonged speech), Syllable Timed Speech, Easy Onset Stuttering, coarticulation therapy, Self Modeling treatment (video self-modeling using restructured stutter-free speech), Intensive Speech-Restructuring Treatment, Air Flow Technique, and Easy, Relaxed Approach with Smooth Movements (ERS-SM). In sparsely populated areas, such as Australia, telehealth treatment may be applied. The fluency shaping therapies train PWS to speak fluently by controlling their breathing, phonation, and articulation.

### **The Lidcombe Program**

The Lidcombe program is a behavioral treatment for children at age 3 to 6 who stutter. Throughout the program, parents provide verbal contingencies for periods of stutter free speech and for moments of stuttering. This occurs in conversational exchanges with the child in the child's natural environment. The contingencies for stutter free speech are acknowledgment ("That was smooth"), praise ("That was good talking"), and request for self evaluation ("Were there any bumpy words then?"). The contingencies for unambiguous stuttering are acknowledgment ("That was a bit bumpy") and request for self correction ("Can you say that again?"). The program is conducted under the guidance of a speech pathologist. During the first stage of the program, a parent conducts the treatment for prescribed periods each day, and parent and child visit the speech pathologist once a week. The second stage starts when stuttering has been maintained at a frequency of less than 1.0% of syllables stuttered over three consecutive weeks inside and outside the clinic and is designed to maintain those low levels. Treatment is withdrawn, and the frequency of clinic visits decreases over a period of at least one year, providing stuttering remains at less than 1.0% of

syllables stuttered (Jones, 2005). Manual for the Lidcombe Program of Early Stuttering Intervention (2008) gives the details.

## **Electronic Fluency Devices**

The stuttering reducing effect of Delayed Auditory Feedback (DAF) became aware by contingency (Lee, 1950) and has been more or less used since then, but not very much. Nowadays other forms of Altered Auditory Feedback (AAF) for altering the speech signal are also used in stuttering therapy, such as Frequency Altered Feedback (FAF) and white noise masking. Current devices may be similar in size to a hearing aid, including in-the-ear and in-the-canal models. Some brand names are: the Edinburgh Masker, The Fluency Master, the Casa Futura DAF, the SpeechEasy, the Derazne Correctophone, and the Vocaltech Clinical Vocal Feedback Device.

## **Stuttering modification therapy (Non-avoidance therapy approach)**

The goal of stuttering modification therapy is not fluent speech but that the moments of stuttering are easier going, and the stuttering is modified to a more fluent stuttering. This therapy approach was developed in the 1930s in the US by stuttering speech therapists. The main promoter was Charles Van Riper, professor at Western Michigan University (Van Riper, 1973). His therapy is based on the **MIDVAS** steps:

### **Motivation**

The person who stutters needs to assess her/his motivation for seeking therapy and the clinician needs to help the person to build and maintain the motivation necessary for successfully changing speech behaviours and attitudes.

### **Identification**

In the identification stage, the client and clinician identify all of the behaviours, feelings, and attitudes that go along with the person's stuttering. They identify the core stuttering behaviours, any secondary behaviours, physiological components, such as changes in heart rate, feelings of fear, anxiety, shame, guilt and hostility, and avoidance.

### **Desensitisation**

In order for the individual to have control over the stuttering, he must drain away negative emotions from the act of stuttering so that stuttering becomes a neutral event. The most common strategy used in the desensitisation phase is called **voluntary stuttering**, in which the person stutters on purpose. By choosing when and how to stutter, the individual begins to gain control over the stuttering and the fear and anxiety begin to diminish.

### **Variation**

Much of a stutterer's behaviours and reactions become ingrained to the point of being stereotyped. The same stimulus (such as ringing telephone) will set off the same chain reaction of feelings and behaviours in the person. Varying these stereotyped responses weakens their power over the individual and helps the individual continue gaining control over the fears and the stuttering. Van Riper suggested having individuals change their reactions to word fears, situation fears, communicative stresses, and frustration and penalty. In addition, the individual learns how to stutter differently in this phase. For example, if the person usually prolongs the initial "s" in "sister," have her/his repeat the sound or stutter on a different sound in the word.

## **Approximation**

Once the stereotyped pattern of the stuttering has broken up, the individual can learn specific strategies to smooth out and minimise the moments of stuttering. The three most common strategies for altering the stuttering are:

### **Cancellation**

In which the person stutters all the way through a word, stops immediately, and then repeats the word stuttered a different way.

### **Pull-out**

In which the person gains control over a moment of stuttering while it is happening and smooth it out.

### **Preparatory set**

In which the person prepares for a moment of stuttering before it happens, starts it gently and glides through it smoothly. Strategies such as coarticulation, bouncing, sliding, easy onset, and light contacts represent variations on these three techniques.

## **Stabilisation**

In the stabilisation phase, the client uses the new stuttering controls in more and more situations of daily life, and the client needs to become his own clinician. The client also continues to stutter voluntarily and to seek out communication situations, which he previously avoided. Stabilisation is often a long-lasting or lifetime process.

Stuttering modification therapy is widely used in Northern Europe.

## **Summary**

Stuttering has been described since 2100 B.C. and is classified as a behavioral and emotional disorder by health professionals and as a neurodevelopmental disorder by psychiatrists. Stuttering has no absolute definition that encompasses all aspects of the disorder, but it is characterized as speech with frequent repetition or prolongation of sounds or syllables, or by frequent hesitation, pauses or blocks that disrupt the rhythmic flow of speech. Beside those open behaviors stuttering also includes concealment behaviors, such as anxiety, fear, shame, guilt, avoidance, or contending. Stuttering has a strong genetic component, but also unshared environmental factors are involved. There is a correlation between severity of stuttering and activity in the basal ganglia.

Families play an important role in the management of stuttering in children. Providing an environment that encourages slow speech, affording the child time to talk, and modeling slowed and relaxed speech may help reduce stuttering events. Stuttering may be assessed by observations or analysis, self-reporting assessments or evaluated by the listener. The progress persons with stuttering (PWS) make in response to intervention is affected by many factors and no single intervention or therapy will be beneficial for everybody. During history many different therapy approaches have been applied. Today most therapies relate to fluency shaping therapy, but stuttering modification therapy, electronic fluency devices are also used. Pharmacological agents have been tried also, but almost all of them with side-effects or little therapeutic effect in general. In many countries Self Help Groups are common and the only affordable for most adult PWS.

## Further reading

<http://www.stutteringhelp.org>  
<http://www.facebook.com/pages/Stuttering-Foundation/102395577904>  
<http://www.stutterisa.org/>  
<http://www.stuttering.ws/>  
<http://www.nsastutter.org/>  
<http://www.theifa.org/>  
<http://www.stutteringtreatment.org>  
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