

Navigating Stuttering Through A Psycho-Somatic Intervention to Improving Speech Fluency in Adults

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Abstract

The objective of the present paper is to propose a holistic intervention model that integrates therapeutic, somatic, and speech training elements to effectively address the cognitive, emotional, and physiological aspects of stuttering. The framework advocates for a systematic progression through three stages: therapeutic work, breathwork, and speech training. Each stage is designed to target specific objectives related to shifting self-concept, enhancing physiological foundations for speech fluency, and developing and enhancing speech fluency through structured exercises. The model offers implications in speech therapy, emphasising individualised interventions, long-term maintenance strategies, and collaboration among healthcare professionals. Suggestions for further refinement include empirical validation, flexibility in the intervention model, ethical considerations, and the need for multidisciplinary teams in stuttering-care.

Keywords: Stuttering therapy · Speech fluency · Breath work · Psychosomatic Intervention

India, the most populated nation on earth, has an estimated 11 to 12 million stammerers. Meanwhile, the numbers computed around the world stand at a staggering 70 million or comprising over 1 percent of the entire population (Carlson, 2013). Despite these significant figures, the lack of representation and unfortunate ignorance on this topic in academia is appalling. The intention of the present research is to argue against the dearth of efficient literature on stammering.

Stammering, also known as stuttering, is a disturbance in the normal fluency and time sequencing of speech. It is often characterised by a

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Referring to the nature of the problem, stammering impairs one's capacity to communicate with others, particularly in stressful settings (such as public speaking), and it can be made worse by the awareness of and concern over the dysfluency of the individual. Williamson (2014) adds a multifaceted dimension of stammering by giving background to underlying psychological elements behavioural and manifestations. He explains that stammering may be divided into two: primary (dysfluent speech with no anxiety, mostly in children, due to lack of cognitive awareness), and secondary (dysfluent speech with anxiety or emotional distress due to awareness of the impairment). While stammering entails not only physical disruptions in speech, it is associated with

concomitant or accompanying movements, such as facial tics, grimacing, avoiding eye contact, covering the mouth with the hand, sputtering, clenched fists, rapid eye blinking, and trembling lips. Many people who stammer (henceforth, PWS) develop avoidance behaviours as a result of this fear, including not picking up the phone, not presenting themselves at parties or meetings, losing eye contact when stammering, substituting words, using the words "uh" or "um" before feared words, and more, simply anything a person does, in general, to keep from stammering (Sisskin Stuttering Center, n.d.).

Stammering Across Development

Stammering exhibits a spectrum of severity, both interpersonally and situationally. Individuals may experience intermittent periods of stammering, interspersed with phases of comparatively fluent speech and it may appear different for each individual. Each individual will have a distinct experience with stammering, marked by distinct overt characteristics, and a distant identity they carry that is deeply intimate to them. Two primary classifications delineate the manifestation of stammering. The first is developmental stammering, which the predominant form occurring during early childhood when speech and language skills undergo rapid development. The second is acquired or late-onset stammering, a comparatively rare occurrence observed in older children and adults. The latter emerges as a consequence of various etiologies, including head injuries, strokes, progressive neurological conditions, certain medications, and psychological or emotional trauma. This discourse concentrates on the developmental facet of stammering. The aetiology of stammering in early childhood remains elusive, with neither parental actions nor environmental factors conclusively linked to its onset. Contributing factors may encompass developmental and hereditary elements, coupled with subtle variations in the efficiency of speech-related neural circuits within the brain.

Genetic predisposition is posited as a contributing factor, as evidenced by the familial recurrence of stammering. Approximately two-thirds of individuals who stammer have a familial history of the disorder, suggesting a hereditary component that may heighten a child's susceptibility to developing a stammer (American Speech Language Hearing Association, n.d.; Büchel & Sommer, 2004; Kang et al., 2011). Brain scans reveal altered blood flow and neural connectivity in stammerers, while abnormalities in speech-related brain areas and neurotransmitter imbalances may contribute to speech difficulties (Foundas et al., 2001; Pool et al., 1991; Scott, 2006; 2020). Psychological factors, including traumatic events such as bereavement, contribute to identity transformation. The Michael Palin Centre (n.d.) notes that some individuals who stammer, but not all of them, exhibit high levels of anxiety when they believe their ability to speak smoothly will be judged. Moreover, psychogenic stammering can develop as a psychological response to physical trauma, a traumatic event like a death in the family, or a romantic break up (Ward, 2008).

Speech development itself is a nuanced process, requiring intricate communication between diverse cerebral regions and coordination with the musculature involved in breathing and articulation. Successful speech execution entails the precise arrangement of words, rhythm, pauses, and emphasis. During the developmental phase of constructing sentences, a child necessitates practice to refine the neural pathways facilitating the synergistic functioning of distinct speech-related brain regions. Stammering may ensue when certain components of this evolving system lack synchronisation, leading to repetitions and halts, particularly in situations demanding heightened verbal expression or under perceived pressure. As the cerebral architecture matures, stammering tendencies may ameliorate or the brain may adapt, elucidating the observation that many children naturally outgrow stuttering with age. Stammering coexists with various conditions, including ADHD, dyslexia, and social anxiety (Blood et al., 2003; Manning & Beck, 2013), impacting dynamics children's social and school experiences.Given that this psychological imprint occurs during the formative developmental years when the child is acquiring language skills, the inappropriate speech patterns, characterised by

interruptions and syllabic repetition, become ingrained. Over time, the child's physiological components, including vocal cords and breath, adapt to this stammering pattern, and neural circuits become wired accordingly. Further complicating the matter is the significant role of speech modulation, wherein one's self-perception is influenced by the act of listening to their own voice during communication. The persistent experience of stammering perpetuates a self-reinforcing cycle, amplifying the individual's conviction of being a 'stammerer'. Consequently, addressing a persistent stammer in adulthood necessitates a comprehensive approach that acknowledges the intertwined psychological and neurological aspects of the issue. On the psychological front, it becomes imperative for the client to disentangle from adverse childhood experiences and re-conceptualise their identity. In cases of traumatic memories, employing

In cases of traumatic memories, employing techniques such as V-K (Visual-Kinesthetic) or Visual-Auditory-Kinesthetic dissociation, which involves restructuring traumatic memories by changing the internal representations and the feelings associated with those memories, proves to be beneficial.

This technique, rooted in neuro-linguistic programming (NLP), is utilised to alleviate PTSD symptoms and phobic responses through nontraumatic declarative processes (Thomas & Poptani, 2022). Dissociation techniques and cognitive reframing emerge as potential therapeutic avenues for addressing traumatic memories associated with stammering, subsequently facilitating the integration of speech modulation techniques, including audio conditioning and breathwork. The synthesis of empirical findings accentuates the intricate interplay psychological, physiological. among and neurological factors contributing to stammering behaviours. Consequently, the envisaged intervention emphasises the retraining of clients to adopt optimal speech patterns, navigating the inherent physiological responses. This encompassing approach entails the integration of audio conditioning, targeted speech exercises, and deliberate breathwork to facilitate a transformative shift towards fluent communication.

Human Speech: The Basics of Articulate Expression

To comprehend the full scope of stammering, it is essential to deduce the rudimentary basics of articulate expression within the broader context of human speech, a complex process that involves language, voice, self-monitoring feedback loop and physiology of speech. Speech in humans is one of the most complex processes, involving neurology, biology and psychology that allows a person to share a version of their reality with another human being, through a codified system of meaning, known as language. It is purely through several years of evolution that speaking, as a behaviour, has become so 'normal' for the average person. Breaking speech down into its components, a successful spoken sentence should be complete, grammatically correct, vocally accurate (phonetic and auditory sounds), and semantically meaningful. Speech relies on two aspects, language and voice.

Language

Language functions as a conduit for conveying messages through the careful selection and arrangement of words. Its role is to enable individuals sharing a common language to comprehend messages, irrespective of their prior knowledge about the discussed topics. For example, delivering a lecture on economics in English should be tailored in a manner that English speakers can understand, even without familiarity with the economic ideas being communicated. Language, in this way, acts as the tangible link between the speaker's conceptualization and the listener's understanding. Exploring how ideas transform into language leads us to the realm of neurology. Two critical brain regions, Wernicke's area and Broca's area, play pivotal roles in this process.

Wernicke's area, located in the temporal lobe near the auditory cortex, is instrumental in language comprehension. It engages in semantic processing, decoding the meaning of words and sentences, and integrates linguistic information with stored knowledge. Collaborating closely with the auditory cortex, it facilitates the recognition and processing of speech sounds. Damage to Wernicke's area may lead to Wernicke's aphasia, wherein individuals may articulate fluent and grammatically correct speech, yet the content lacks coherence, and their ability to comprehend language is significantly impaired. On the other hand, Broca's area, situated in the frontal lobe, plays a pivotal role in language production. Comprising the pars opercularis and the pars triangularis, it manages motor planning and execution, coordinating the movement of speechrelated muscles for intelligible speech. Broca's area is also involved in processing grammatical structures, ensuring proper sentence sequencing, and plays a crucial role in working memory for sentence coherence. Damage to Broca's area can result in Broca's aphasia, characterised by difficulties in forming grammatically correct sentences and slow, hesitant speech, despite preserved comprehension abilities.

The dynamic communication between these brain areas, facilitated by the arcuate fasciculus, a neural pathway connecting Broca's and Wernicke's areas, is the essence of the magic of speech. To illustrate this process, let's consider conveying the idea of liking the taste of Kashmiri apples. The idea initiates as an electrical signal in the brain, connecting with memory-related regions, retrieving information about Kashmir and apples, and linking it to the feeling of liking. Wernicke's area processes this information, understanding the idea's meaning, involving both the place (Kashmir) and the object (apples), and integrating sensory experiences, memories, emotions, and knowledge. Broca's area then plans the words needed to express the idea, coordinating motor movements, ultimately converting the idea into a meaningful sequence ready to be voiced. Thus, language simply, in a way, functions in alliance with existing knowledge or memories, brain capacities, and creative expression.

Voice

We often use speech and voice interchangeably, but they are fundamentally different from each other. Voice is a somatic, psychological involvement of the body in the production of sounds that align with the structure of the sentence created by the brain, particularly Broca's region. The primary motor cortex, situated in the frontal lobe, plays a vital role in translating the intention to speak into precise muscle movements required for vocalisation. This process involves multiple steps, starting with the generation of a motor plan in language-related areas, followed by the activation of neurons in the primary motor cortex that stimulate speech-related muscles, such as those controlling the lips, tongue, vocal cords, and Coordinated muscle diaphragm. contractions triggered by motor neurons shape the vocal tract, controlling airflow and ultimately leading to the generation of sound waves that form spoken words.

This step-wise analysis of speech underscores that the synergy between different brain regions and body parts, rather than their isolated functions, facilitates healthy and fluent speech. Effective communication through spoken language depends on the coordination of motor neuron activation, muscle contractions, and airflow regulation. In the process of optimising speech, the emphasis shifts from isolating the individual roles of brain regions or body parts to identifying obstacles, such as "stuckness" or proverbial "traffic jams," and fortifying specific functions through targeted practice in this paper. This holistic approach recognizes the intricate connections between the brain and body, acknowledging timing as the ultimate metric for achieving fluency in spoken language.

The Self-Monitoring Feedback Loop

One really important thing about speaking is how our brain checks and improves our speech while we talk. This system ensures that spoken language maintains its natural rhythm and coherence. Understanding this feedback loop and the processes it involves is essential for addressing speech impairments, such as stammering. It operates as a closed loop, involving several interconnected brain regions and neural pathways. This system enables individuals to adjust their speech patterns during production, ensuring that their output matches the intended rhythm and fluency. The feedback loop can be broken down into several steps:

Motor Execution and Feedback: The primary motor cortex initiates muscle movements required for speech, such as those controlling the vocal cords, lips, and tongue, and the actual production of speech sounds begins. These movements generate auditory and proprioceptive feedback.

Auditory Feedback: The produced speech sounds are captured by the listener's ears, and auditory feedback is transmitted to the auditory cortex, enabling self-evaluation of speech in real time.

Comparison and Analysis: The auditory cortex compares the feedback with the internal representation of intended speech stored in the brain. This involves assessing timing and rhythm.

Error Detection: Any discrepancies between the intended rhythm and the actual rhythm of speech are detected by the brain's error-detection mechanisms. These discrepancies might involve variations in pitch, pace, or timing.

Adjustment and Motor Correction: Upon detecting discrepancies, the brain's feedback loop activates motor correction processes. Neural signals modify ongoing muscle movements, aligning them with the desired rhythm. The primary motor cortex adjusts the muscle movements based on the feedback received, allowing the speaker to immediately correct any deviations from the desired rhythm. A large part of the work related to speech impairments is about utilising this closed feedback loop to train the brain and body, almost automatically, to change and improve their muscular movements while creating sounds. By making tweaks in the data (both auditory and proprioceptive), we can alter the person's perception of their speech, hence affecting their subsequent muscular movements.

From Thought to Sound: The Physiology of Speaking

As far as the physical act of speaking is concerned, once the brain has done its job of creating a clear neural output for the muscular contractions required in the body, the body now acts purely as an acoustic instrument, being played by the tunes set by the brain.

This sequence begins with the primary motor cortex, where neuro-muscular impulses are generated in response to a motor plan. These impulses travel down motor neurons through neural pathways to reach lower motor neurons in the spinal cord and brainstem. Activation of motor units ensues, leading to controlled muscle contractions. Once this stage is reached, different speech-related muscles perform their function and contribute to the overall production of voice.

Respiratory Control, the diaphragm and other respiratory muscles regulate airflow and control the pressure needed for speech. This control ensures appropriate breath support during speech production.Vocal Cord Function, the muscles controlling the vocal cords adjust their tension and length. This manipulation alters the vibratory properties of the vocal cords, producing different pitches and phonations.

Articulatory Movements, muscles controlling the lips, tongue, and jaw orchestrate intricate movements that shape the vocal tract. These movements create various configurations that result in the production of different speech sounds.

The coordination of respiratory muscles and vocal cord adjustments regulates airflow through the vocal tract, influencing the loudness and intensity of speech. As the vocal cords vibrate and the vocal tract shapes itself, sound waves are generated. These sound waves represent the acoustic output of speech. Furthermore, speaking encompasses three essential skills: articulation, pronunciation, and enunciation. Articulation transforms mental representations into meaningful words, while pronunciation accurately expresses words phonetically. Enunciation involves assigning proper breath and voice to individual sounds. To optimise speech, exercises are designed to enhance these skills. At an atomic level, all speech is the ability to express an idea through a systematic sequence of meaningful sounds. Choosing the right words to express an idea is articulation. Choosing the right syllables to express a word is pronunciation. Choosing the right assignment of breath to each syllable is enunciation.

Rationale

A question persists: what is the most effective way to solve the problem of a stammer/stutter and learn to speak fluently? Addressing stammering involves improving phonetic sound creation, enhancing muscular control of speech-related body parts, and mastering speech rhythm.

Process 1: Creating the Correct Sounds

People who stammer often develop incorrect ways of saying certain words due to years of struggling with speech. The brain plays a key role in converting written words into spoken sounds, and this involves a brain region, known as the angular gyrus. To improve speech, it is crucial for those who stammer to regularly hear correct pronunciations of words. Speed also matters. The faster and better they connect written words to how they sound, the better their speech becomes. Another important part is how the brain uses what it hears to adjust speech. Additionally, the brain uses auditory feedback to monitor speech, and practising with audio tracks can help self-correct speech.

Process 2: Muscular Control of Speech

In the physiology of speech, a person's voice is fundamentally composed of breath, expelled from the diaphragm through the vocal cords to the mouth. Motor planning and execution involves converting linguistic thoughts into precise muscle movements, coordinated by brain areas like Broca's area and the primary motor cortex. Stammering introduces disruptions in motor planning, resulting in involuntary pauses, repetitions, or sound prolongations due to challenges in the intricate motor coordination essential for fluent speech. Despite cognitive awareness of the issue, individuals who

stammer face difficulties in real-time execution, indicating ineffective control over speech-related muscles—specifically, the diaphragm, vocal cords, tongue, and mouth. This is achieved by altering vocal elements, namely emphasis and speed, with emphasis on the slow and loud, and fast and loud aspects for individuals with stammering.

Process 3: Rhythm of Speech

Rhythm, or the timing between sounds in speech, is vital for fluency. Disruptions in rhythm can lead to stuttering symptoms. Rhythm is closely linked with fluency, regulating speech pace and facilitating seamless transitions between sounds, words, and phrases. It acts as a predictive cue for listeners, enhancing comprehension and reducing cognitive load. Disruptions in rhythm pose significant challenges for individuals who stammer, manifesting as repetitions, prolongations, or blocks in speech sounds, contributing to broken fluency. Such disruptions also impact breath control during speech, leading to irregular breathing patterns. Notably, the predictable rhythm of singing provides a unique contrast, allowing even those who stammer to exhibit fluent speech, as the predetermined song rhythm alleviates the real-time burden on the brain and speech-related muscles. Addressing stammering involves assisting individuals in adapting to diverse rhythms and speaking styles through neuro-muscular training, training the brain and body to adjust rhythm as needed. This involves training vocal rhythm by prompting individuals to speak predetermined sentences in varying rhythms, mimicking different speech patterns for enhanced adaptability to different styles and contexts.

Treatment Models for Fluent Speech

Many of the treatments that are currently available centre on teaching stammering prevention techniques including breathing regulation, speed reduction, and gradually moving from one-syllable responses to larger words and then elaborate sentences. Meanwhile, other treatment options cater to the cognitive, emotional and social needs of the stutterers, through medications, individual therapies and selfhelp groups (NIDCD, 2017).

In traditional speech therapy for stammering, commonly the first line of intervention post-diagnosis by a professional is a counselling component that focuses on altering the client's reactions to their stammering, by trying to 'glide' or 'slide' through blocks. Additionally, the individual is encouraged to stammer on purpose in order to face their disorder more directly and purposefully. Regulated breathing and slow speech are a few strategies used to reduce stammering (Sander & Osborne, 2019). An fMRI study of neural activity of PWS shows that fluencyinducing techniques in a two-year treatment helped synchronise an erroneous signal transmission between areas responsible for the motor, speech motor planning, and auditory areas, and stabilise the right hemispherical dependence by shifting focus towards left hemisphere (the region of the brain associated with producing speech), bringing the neural mechanism of PWS as close to people who do not stutter (Neumann et al., 2003). While regulated breathing and slow speech are employed to reduce stammering, the long-term sustainability and generalisation of these techniques into real-life communication situations may be challenging. The approach tends to oversimplify the complexities of stuttering. The focus on mechanics might overlook the importance of addressing the cognitive and emotional dimensions of stuttering, limiting the overall effectiveness.

Indian Academy of Pediatrics (2021) has mentioned various strategies and techniques that are employed for early intervention for children who stammer. Some of these include breathing techniques while speaking, speaking slowly and in a relaxed manner, relearning mono-multi syllables, especially those commonly repeated, and speaking together in chorus. Additionally, there are relaxation techniques, gradual building of confidence, behaviour strategies that help anxiety and fear, as well as electronic applications to assist fluent speech. Medications are usually taken as the last resort.

Pharmacological treatments, in conjunction with speech therapy, that consider stuttering as a neurological condition, have shown promising results of the use of botulinum neurotoxin to manage motor symptoms (Bentivoglio et al., 2009). Along with dopamine-blockers like risperidone, and olanzapine, as well as investigational drug, ecopipam (Cohen, 2014, Maguire et al., 2019). While these treatments show promising results in managing motor symptoms, they lack confidence in their standalone efficacy. Moreover, the potential side effects and long-term consequences of these medications raise concerns about their extended use. Cognitive behavioural techniques often address anxiety, catering to the execution of word production and atypical planning as their main priority (Lu et al., 2010). Modification and fluency-shaping therapy are operational conditioning therapies that familiarise people who stutter with techniques to speak more fluently. These techniques involve managing their breathing, phonation (production and utterance of speech sounds), and articulation (lips, jaw, and tongue). The overarching goal is to minimise the fear and anxiety associated with speech. Therefore, the aim is not to exacerbate stuttering but to make it less effortful (Ward, 2006). While these techniques have shown efficacy in managing anxiety, they might not directly target the core motor aspects of stuttering. The focus on anxiety reduction may be beneficial, but a more integrated approach considering both motor and psychological dimensions is necessary to ensure long-term success.

Somatic intervention, grounded in relaxation techniques, focuses on the mind-body connection, highlighting bodily sensations, movements, and experiences to address psychological or emotional issues. The McGuire Programme and the Starfish Project are two popular treatment programmes that promote diaphragmatic breathing (also known as costal breathing) as a method of stammering control (Birchenough, 2014). Others have refocused on mindfulness practices, such as yoga, and inquirybased stress reduction exercises (Feldman et al., 2021; O'Malia, 2021). Upcoming methods, like the 'HT5 acupuncture point', where the tongue as a sensory organ to the heart, manifests a calming effect and has been known to potentially reduce various speech difficulties, like stuttering (Loo, 2009). Gilman and Yaruss (2000) assert that the use of somatic education in the treatment of stammering may enhance the impression of relaxation and make it easier to habituate new behavioural patterns, leading to improved generalisation of relaxation outside the context. Research treatment to assess the effectiveness of electronic fluency devices and multiple mobile applications based on auditory feedback is also in motion.

Hypnotherapy's Unique Contribution to Treatment Models for Stammering

Stammering is often rooted in the inability to manage the natural rhythm of speech due to the stammerer's tendency to exert excessive effort in speaking too quickly. Hypnotherapy complements this by consolidating all therapy stages and promoting fluency, aimed at improving neuromuscular control while facilitating intense concentration and heightened awareness (trance state), reinforced by a metronome (Spiegel, D. & Spiegel , H., 2004). Another study found that adult patients who could induce and experience trance also showed increased optimism and self-confidence (Frankel, 1973). The effectiveness of Hypno-Behavioural Therapy in treating stammering resulting from traumatic experiences has addressed emotional aspects with behavioural techniques (controlled fluency shaping, stammering modification, and desensitisation exercises) to enhance speech fluency and well-being (Dempsey & Granich, 1978).

In order to lessen the severity of both the overt and covert elements of stammering, the participants in a study by Zloof and Ezrati-Vinacour (2015) were given recommendations for ego building, resolving prior traumas, and boosting his sense of control over the course of nine sessions of hypnotherapy. It plays a central role in enhancing self-concept, transitioning individuals from "stammerers" to "fluent speakers" in a process called ego-strengthening. Lockhart and Robertson (1977) in their paper explain that this transformation reinforces speech fluency and bolsters self-esteem and confidence. Additionally. hypnotherapy redirects physical tension that often accompanies stammering, channelling it into alternative motor movements, such as clenching a fist, thereby mitigating speech blocks. Age regression techniques further aid in addressing traumatic memories connected repressed childhood to experiences, enriching the overall treatment of 'Kaya Method' stammering. An innovative combining hypnotherapy and diaphragmatic exercises to effectively manage stammering, has suggested significant improvements in speech fluency, self-confidence and alleviating anxiety (Kaya & Alladin, 2012). Hypnotherapy, thus, as an approach is a step beyond the 'causation' focus for PWS and makes the patient feel more comfortable with their symptom by removing the anxiety experienced by stammerers (Kelemen, 1980).

Analytical hypnotherapy has propelled results in PWS, in order to find their triggers and help in selfmanagement. Hypnosis has reported significant results in not only mental well-being but also physical management of symptoms among the target population (Moss & Oakley, 2006). It is important to note that the success of medical or clinical hypnotherapy in stuttering treatment can vary from person to person. However, hypnotherapy has hypothesised its efficacy in emotional regulation, speech fluency, confidence building, relaxation techniques, motivation and commitment which could well influence PWS positively (Collison, 1972).

Gaps in Previous Research

Hayhow and colleagues (2002) spotlight the dissatisfaction that results from unmet individual needs being an emerging issue in ineffective treatment. Thus, there is a need for therapists and clients to negotiate therapy goals and procedures that are precisely stated, suitable to individual needs, doable, and, if possible, recorded and measured. With this, we centre the current approach to treatment.

Porch (1995) proposed a dual speech model of stuttering, which provides an explanation for the complex interplay between two vital components of phonological-linguistic planning (including selecting words, constructing sentences, and adhering to linguistic rules) and the motor execution (the physical act of producing speech sounds and coordinating the muscle movements required for fluent speech) in the treatment plan. However, this approach, although quite revolutionary for its time, has a limited psychological perspective, lacks proper treatment guidelines and underrepresents the comorbid status of stuttering client's context. Besides this, another famous training model called the 'Camperdown Program' (O'Brian et al., 2018) conveys a systematic intervention guide for behavioural treatment, social anxiety management and self-management for those with stuttering. This moves beyond the dual context of speech disfluency, yet oversimplifies treatment with one-fit-all training and has a heavy reliance on adopted techniques, as well as the absence of longterm maintenance of improvement.

Recognising and well-acknowledging the legacy of such phenomenal works in the field of psycholinguistics and making an impact on those who struggle with stuttering, this paper caters to a holistic psychosomatic model of intervention for adults, to target not only the clients who may benefit from it but also mental health professionals for their clinical practice. It is an attempt to bridge the gap in research and pave the way for related works in maintaining sustainable change.

Fundamentals of Change-work for Stuttering: A Psychosomatic Intervention for Adults

Adults grappling with stuttering encapsulates the understanding of the term with a spectrum of encounters, extending beyond the apparent disfluency in speech behaviours conventionally identified as stuttering by external observers. Often the onset of stuttering episodes is frequently marked by sensations of anticipation, feeling stuck, or a perceived loss of control. Such sensations prompt diverse reactions among speakers, encompassing affective. behavioural, and cognitive responses that may become deeply rooted as individuals contend with challenges in expressing themselves verbally. The anticipation and sensation of being stuck during stuttering moments can evoke emotions like frustration and anxiety, leading to affective triggers. Observable behaviours, such as avoidance strategies and compensatory actions, may emerge as individuals navigate their speech challenges. Additionally, cognitive responses, including negative selfperception and heightened self-awareness, shape how individuals perceive their communicative abilities. These reactions, in turn, can be linked to adverse consequences in various aspects of individuals' lives (Tichenor & Yaruss, 2019).

Recognising and understanding these diverse reactions is pivotal for an all-inclusive approach to stuttering interventions, addressing both, surfacelevel disfluencies and the broader impact on individuals' emotional, behavioural, and cognitive dimensions. The intricate chain of events associated with stuttering experiences can be further complicated by external environmental factors, including the responses of those listening. Consequently, efforts should be directed towards formulating a comprehensive definition of the stuttering experience, one that not only relies on external observers' perceptions but also takes into account the profound impact of stuttering on the lives of adults who stutter (Yaruss & Quesal, 2004).

In addressing these challenges of stammering, the proposed model of psychosomatic intervention for stuttering speech in this study embraces three fundamental pillars, each designed to contribute to the overall improvement of speech fluency in adults who stammer. The first pillar focuses on therapeutic intervention, aiming to recognise events that may have triggered the onset of stuttering. The ultimate goal is to shift the client's self-concept from identifying as a 'stammerer' to acknowledging a different way of speaking that, if altered, would not be labelled as stammering.

The second core pillar centres on somatic work, acknowledging speech as a skill intricately linked to the body. Here, attention is directed towards the respiratory system, fostering diaphragmatic breathing for enhanced air volume and control over rhythm. Concurrently, the focus extends to the larynx for sound production and the tongue as a vital vocal apparatus. By incorporating somatic techniques, the modal aims to optimise the physiological aspects crucial for fluent speech.

The third pillar emphasises perception and feedback training, an extension of the first pillar, aiming to reframe the individual's self-concept bv distinguishing between instances of stammering and fluent speech. This involves monitoring speech production and addressing perceptual abnormalities through the use of audio materials for practice and feedback mechanisms. Confidence-building exercises further contribute to enhancing overall communicative abilities.

The proposed model is tailored for adults, encompassing both males and females aged 18 and above, with the intention of helping individuals who stammer and speech and language therapists. The need for such an intervention arises from the absence of a concrete method for addressing stammering or stuttering, given that approximately 1% of the population grapples with this challenge. The proposed system seeks to provide a structured and comprehensive approach to enable individuals to speak more fluently, addressing a notable gap in existing interventions.

Stage One: Therapeutic work

Therapeutic intervention is for eliciting the event that may have led to the onset of the stutter, and working with it to ensure it doesn't lead to a psychological block in the process of improving speech. The core intent is to get the client from:

"I am a stutterer" to "I speak in a way that is commonly called stuttering, and if I learnt to speak differently, it won't be called a stutter anymore"

The methods or tools would be:

- 1. Visual-Auditory-Kinesthetic dissociation for an adverse childhood experience
- 2. Raising the child with new resources
- 3. Re-framing (visualisations/affirmations in the form of a hypnotherapy audio recording)
 - a. Therapeutic work for ACE (Adverse childhood experiences): This is optional, and part of the therapy work is done one-on-one with the client if required. Age-regression and raising the child with resources is the general outline of hypnotherapy.
 - b. Daily hypnotic suggestions for egostrengthening and muscle control for fluency. This is a 5-10 minute audio recording given to the client, which works on a regular repetition of direct suggestions in trance, that adds on the speech practice and breathwork.
 - c. It will be added as a part of the audio track given to the client, which contains the vocal guide for the breathing exercise and ends with a hypnotic induction where the client can visualise a new version of themselves, along with direct suggestions as discussed earlier.

The key points of this audio can be summarised as follows:

- 1. Deep Relaxation: The audio begins by instructing the listener to take deep breaths and become fully present in the moment. It encourages a sense of calm and relaxation.
- 2. Transition to Hypnosis: The listener is guided to focus on the speaker's voice, allowing it to penetrate their mind and body. This helps induce a state of heightened suggestibility and relaxation associated with hypnosis.
- 3. Trance Induction: The speaker leads the listener into a trance-like state. This involves closing one's eyes and letting go of conscious thoughts, transitioning from the mind to the body, from thoughts to feelings.
- 4. Metaphorical Journey: The listener is taken on a metaphorical journey, imagining themselves entering the body of a young boy in a forest. This visualisation serves to deepen the hypnotic experience.
- 5. Quenching Thirst: During the journey, the listener encounters a lake in the forest and quenches their thirst, which is symbolic of releasing tension and finding relief.

- 6. Transformation: The experience symbolises transformation, with each drop of water representing a positive change. The body, mouth, tongue, and diaphragm are released from burdens, and the listener's voice is empowered.
- 7. Self-Expression: The audio encourages the belief that the listener has a valuable voice, which deserves to be heard. It emphasises clear speech, fluent language use, and self-confidence.
- 8. Return to the Present: The listener is gently guided to return to the present moment, becoming aware of their surroundings and gradually opening their eyes.

This hypnotherapy audio (refer to the appendix), inspired by Spiegel and Spiegel's work on trance treatment, aims to help individuals with stammering issues overcome psychological barriers, gain confidence in their speech, and envision a future with improved fluency and self-expression. It utilises relaxation and guided imagery techniques to facilitate this transformation.

Stage Two: Breath-work

Practise a 10-minute guided breathing audio training system that gives you exercises that help you work on the aspects of breath related to speech.

Things one needs to be able to do to breathe properly and effectively for fluent speech:

- 1. Breath deep into the belly: Diaphragmatic breathing and strengthening
- 2. Active-exhaling: Controlled exhales (increase vital capacity)
- 3. Vocal control: Humming or creating sound with a long exhale.

Structure of the breathwork practice round: Deep belly breathing for 30 seconds (inhale through the nose, and exhale through the mouth)

- 1. Breath-of-fire (kapalbhati) for 30 seconds
- 2. Holding your breath at the end of the inhale for 30-seconds
- 3. Exhale with a humming sound at the end of the hold
- 4. The 10-minute practice inclined 3 rounds of this system.

Stage Three: Speech training

Of all the aspects of improving speech, this one is the most flexible, but still very important. A variety of different methods can be used to work on speech, but there are a few important aspects to speech training, which form a certain structure that can be implemented in different ways.

Read and listen to a text at the same time (audio conditioning)—Start by choosing a certain piece of written material, and begin reading it silently, along with playing the audio of a speaker reading the same text. Find a speed of audio comfortable to you, and then try increasing it to a level that's slightly more than that. Once done, now read the same text aloud, while still playing the audio of the speaker reading the text at a slightly lower volume, while syncing your speed with the speed of the audio.

Emphasis and speed training—Choose to speak about a topic, and write a few sentences about it, (say 3-5 sentences). Reach the text out, emphasising one word of each sentence at a time slowly and with a louder tone, while saying the other words normally.

(Here "words" refer to key words, not grammatical connection words like 'a', 'the', etc.)

Rhythm training—Choose a video clip (from a movie, podcast or youtube video) and transcribe it to get the script. Use this script to try and read the lines in the tone and rhythm of the person narrating it in the video, which includes, pauses, volume, speed and pitch. The goal is to get as close to the rhythm of the speaker as you can.

Discussion

Stuttering, a complex speech disorder, has prompted diverse therapeutic approaches over the years. This discussion proposes a holistic intervention model that incorporates therapeutic, somatic, and speech training elements. The rationale is rooted in the recognition that effective stuttering interventions should address not only the physical aspects of speech but also the cognitive, emotional, and somatic dimensions with the disorder. The proposed associated psychosomatic intervention aligns with contemporary understanding, emphasising a multifaceted approach to stuttering. This approach acknowledges the need to correct speech sounds, enhance muscular control, and address the rhythm of speech. Existing literature supports these components, foregrounding the importance of auditory feedback, motor planning, and rhythmic patterns in speech therapy.

The critique of conventional treatment models reveals the limitations of some approaches, such as oversimplification of stuttering complexities and a focus on mechanics without addressing cognitive and emotional dimensions. This echoes existing discussions about the dissatisfaction arising from unmet individual needs in stuttering interventions. Literature on hypnotherapy and somatic interventions in stuttering treatment supports this integration, recognising their role in enhancing relaxation, egostrengthening, and altering physical tension associated with stuttering so it is responsibly adopted. The psychosomatic intervention proposed for adults facing speech fluency challenges aims comprehensively address both the psychological and physiological aspects of stammering. It relies on three pillars, namely, therapeutic intervention, somatic work, and perception and feedback training, each contributing to the overall improvement of speech fluency.

The intervention model is strategically divided into three stages: Therapeutic Work, Breath-Work, and Speech Training. This advocates for a systematic progression in stuttering interventions and provides a blueprint for addressing diverse aspects of stuttering, from exploring triggering events to optimising physiological aspects crucial for fluent speech. Each stage is designed to target specific objectives while recognizing the interconnected nature of psychological and physiological factors contributing to stammering. The primary objective of stage one of therapeutic work is to facilitate a shift in the client's self-concept from identifying as a "stammerer" to acknowledging an alternative way of speaking that would not be labelled as stammering, using trance and V-A-K dissociation techniques of hypnotherapy. With the objective of enhancing physiological aspects crucial for fluent speech, Stage Two focuses on breath control through diaphragmatic breathing, vital capacity enhancement, and vocal control, providing a physiological foundation for improved speech fluency. The final stage of speech training aims to develop and enhance speech fluency through structured exercises, involving audio conditioning, emphasis and speed training and rhythm training.

The proposed psychosomatic intervention framework for adults experiencing stuttering carries noteworthy implications and versatile applications in the domain of speech therapy. With its holistic treatment inclination, integrating cognitive and physiological dimensions, the framework furnishes speech therapists with a comprehensive model to effectively address the intricate complexities associated with stammering. Its attentiveness to individualised interventions recognizes the varied experiences of stammering, providing practitioners with the flexibility to tailor therapeutic approaches. The incorporation of hypnotherapy for psychological fortitude and the practical integration of somatic techniques, such as diaphragmatic breathing, present tangible tools for mental health professionals and speech therapists alike. Furthermore, the structured speech training exercises offer a flexible yet systematic approach to enhance speech fluency which can be practised by the clients with little supervision. By focusing on self-concept transition and incorporating strategies for long-term maintenance, the framework guides therapists in fostering enduring changes beyond the intervention phase. The advocacy for collaborative efforts among healthcare professionals multidisciplinary encourages а approach, ensuring a holistic support system. In essence, the proposed framework stands poised to bring forth change in the treatment for adults grappling with stuttering, offering a personalised, comprehensive, and collaborative paradigm in the domain of speech therapy.

However, a few considerations and suggestions could further enhance the robustness of this inclusive intervention model. Supporting the theoretical framework with empirical evidence, and demonstrating the effectiveness of proposed interventions, would strengthen the elaborated argument. Acknowledging the diverse nature of stammering causes and experiences is essential to this field of study. Ensuring flexibility in the intervention model to accommodate individual differences and preferences is key to successful treatment. Long-term maintenance strategies can be addressed to mitigate the potential for relapse and ensure sustained improvements beyond the aforesaid intervention period. Therapist orientation will play a crucial role in the application. Defining clear metrics for assessing the success of the intervention and incorporating validated assessment tools will provide an objective basis for evaluating changes in speech fluency and psychological well-being. For readers belonging to quantitative research, OASES-A (Overall Assessment of the Speaker's Experience of Stuttering) may be of interest.

Additionally, ethical considerations related to the psychological nature of hypnotherapy should be thoroughly addressed, including obtaining informed consent and respecting the autonomy of individuals participating in such interventions. Encouraging collaboration with speech-language pathologists, psychologists, and other healthcare professionals in a multidisciplinary approach could further enhance the overall effectiveness of the intervention. In summary, continuous refinement based on feedback and ongoing research is essential in this complex and nuanced field.

Conclusion

The proposed intervention model offers a holistic and client-centred approach to stuttering, integrating therapeutic, somatic, and speech training modalities. While aligned with existing literature, its novelty lies in the integration of these components into a comprehensive psychosomatic model. Further empirical research is warranted to validate the efficacy of this time-efficient intervention in diverse populations of individuals who stutter, contributing to the ongoing discourse on effective stuttering interventions.

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Declarations

Conflicts of interest: The author has no conflicts of interest.

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Appendix 1

Hypnotherapy Audio Transcript

"Take a deep breath, and get connected to the present moment.

Take another deep breath, and bring your awareness to the movement of air in your body as you do so, and if it makes it easier, you can choose to shut your eyes.

Just focus on the sound of my voice, as my voice sinks into your mind, as your mind sinks into your body, and your body sinks into the seat that you're sitting in, into a calm state of relaxed awareness.

Give yourself permission to move from the mind into the body, from thoughts to feelings, from stories to sensations, and as you sense this, whenever you do, you can just close your eyes.

You can choose to close your eyes or keep them open for a few more seconds, just like you can choose to go into a trance right now, or after a few seconds. When you make the choice that's chosen by you, let your eyelids rest as they begin to feel heavy, droopy and drowsy.

With every breath you take, the nerves and muscles in and around your body get loose and let you relax into this feeling of trance that you're experiencing, and as you begin to experience this consciously, and unconsciously the experience has already begun.

One doesn't need to know that they're in a trance, because what is known is known and what is unknown is also in some way known to you...NOW.

And with this floating, drifting feeling in your body, you can float above the clouds, and slowly enter the body of a young boy, living in a village on the outskirts of your city. As you enter the body of this young boy, and see what you see, hear what you hear, feel what you feel, you begin to realise that you're walking on a beautiful pathway into a silent forest.

One step, and at a time, you gradually move into the forest, covered with trees, bushes, and flowers, all of them having their own sights, sounds, smells and maybe even tastes. The road has been a long one, and the sun is scorching in the sky, making you feel very thirsty. You're tired, and thirsty, waiting for someone, or something, to quench the thirst in your throat...and as you feel this dryness in your throat, you begin to walk deeper and deeper into the thick forest of opportunity, to find the opportunity to quench your thirst.

Finally, after a long walk, you reach a lake in the middle of the forest. At first, you think it's just a small puddle, but as you go closer, and closer towards the edge of the water, the water gets deeper and deeper below your sight, until you come right to the edge. The dryness of your throat finally sees some relief, and you decide to take a sip from this lake.

There's a mud pot near the lake, just as there are resources at resourceful places, to help make this water accessible for you, and you decide to take advantage of the access you have to the resources you need, to drink the water to quench your thirst. You fill the pot with as much water as you can hold, knowing that there is no rush, and the lake is always available to you for another sip, and slowly, at your own time, you begin to take a sip from this pot.

As the first drop of the calm, clear and pure water rests on your tongue, you realise this isn't ordinary water, it tastes different. Maybe it was the beauty of the forest or the calmness of the lake, or maybe it was the patience you had to wait to reach the lake and quench your thirst...and maybe it's all of them working for you...now...and that feels amazing.

The water slides down your throat like a small kid sliding down a water slide, with complete fluidity, fluency and rhythm, like it's one single connected stream of resources flowing into your body. Your thirst releases its thirst and finally opens up the way it's always wanted to, without fear, hesitation or worry. It knows it's always going to be supported by the water, the lake, the mud pot and the forest.

Any resistance dissolves in the waters, and melts away, all blocks, as your throat, mouth and tongue are unleashed to their full potential of movement.

Any bit of tension you feel in your body gets released through the muscles and nerves in your body, and you return to a calm, composed state, with a relaxed mouth and throat. It's almost as if your throat, your mouth, your tongue, your entire speaking system has been released of this burden they've been carrying for so long, and they finally decided to let go of this weight. You gave them permission to let loose, and they chose to make the choice of opening up and expanding themselves into the space they've been gifted with.

With every sip of the water you drink, you feel the shift in energy across your throat all the way through your chest, and your diaphragm and finally ends at the base of your spine, slowly revealing its magic to you as fast as you're willing to receive it.

Gradually, each drop of water turns into a symbol of transformation that begins to create massive shifts across the entire midline of your body. Your mouth, tongue and face begin to feel free like a bird learning how to fly for the first time, filled with enthusiasm and curiosity. Your throat becomes your source of power, like a loyal machine gun firing on your command and resting tight when you need it to...and your diaphragm becomes your reservoir or potential, that holds your breath and gives you the ability to express yourself in a way that's loud and clear to others.

Feel your diaphragm shift with your breath, and its hidden power is slowly being realised after its thirst has been quenched after all these years. Let every movement in your body reflect the belief that you have a voice, and it deserves to be heard, and from now on, it will be heard, clearly, powerfully, and continuously.

It's not necessary to feel this change, but when you do, acknowledge this indication from your body, and thank it for supporting your new journey from today, your path to unleashing your voice...and as you do, let each step be guided by your conviction that the world wants to and is waiting to listen to what you have to say.

You can feel this conviction in your body now, isn't it?... As time and space become a container that holds the potential of your future of confidence, fluency and uninhibited self-expression, just as the mud pot held the liquid that quenched the thirst of your throat.

Slowly, taking your own time, because the time is yours, as you keep the mud pot away and begin to walk towards the path in the forest, you decide to steal a quick glimpse of the lake. It's too tempting to ignore, isn't it?

And as you look into the lake, you begin to see your reflection in the calm, composed, confident and fluid water. It resembles you enough to know it's you, but it's different enough for you to know that it's a new you, the one that you always knew you were.

The next breath that you take surprises you, almost as if you notice something different about this breath. You might know what it is, or you might not notice the change now, but when you do, you feel a deeper depth of air in your belly, as if your body is beginning to adjust to its natural state of fluency. The breath of air moves through your body as fluently as the fluid water ripples across the lake, in perfect rhythm and harmony.

And if you could see now.... what you saw then in the lake, you'd see this new version of yourself, standing up straight, and having a powerful voice resting calmly in his body, ready to obey the master's commands as and when ordered to...and that's beautiful. Clear speech, fluent use of language and a deep resonating voice, as deep as the lake and as clear as the water. Every word you speak has a rhythm to it, and you follow the beat like the band in a Beatles concert, matching every beat perfectly...and the listeners respond to you accordingly.

People enjoy listening to you, they love getting into a conversation with you, and most importantly, they want to hear what you have to say, because you have a voice, and it deserves to be heard, now and forever, as many times as you wish for it.

The more you use your voice, the better it becomes and the better it becomes, the more you decide to use it, just like every deep inhale leads to a deep exhale, and every deep exhale creates space for an even deeper inhale. This cycle of fluency and progress goes on and on and on, with each step being better than the last, turning your voice into your instrument of power.

With that realisation, slowly, in your own time, begin coming to the present moment, the 'here and now.' Feel the presence of the room, the seat you're sitting on and the sounds around you. And gradually, only when you're ready, you can open your eyes."