

Toward an Integrative Understanding of Safety Behaviours in Stuttering

Shweta Gupta ^{1*}, Dr Krishna Dutt ²

^{1*} PhD. Scholar, Department of Clinical Psychology, Era University, Lucknow, India, ORCID Number: 0009-0003-3179-1925, **Email:** - shwetagupta@erauniversity.in

² Professor, Department of Clinical Psychology, Era University, Lucknow, India, ORCID Number: 0009-0002-6569-478X, **Email:** - asmita_slc@yahoo.com

***Corresponding Author**

Article received: 05 Jul 2023

Article Revised: 03 Aug 2023

Article Accepted: 12 Oct 2023

Abstract

Safety behaviours are commonly understood as actions that maintain anxiety by preventing individuals from confronting feared situations, particularly in the framework of cognitive-behavioural therapy (CBT). While this concept is widely applicable to anxiety disorders, its relevance to chronic conditions like stuttering is less clear. Stuttering, a complex speech disorder, involves social and communication challenges that may lead to using up safety behaviours on the subject of chronic conditions like stuttering, where these can act as supportive strategies rather than merely causing anxiety. This paper judiciously examines the function of safety behaviours in stuttering, contrasting traditional CBT approaches that discourage these actions with speech therapy strategies that often incorporate them as practical tools. Drawing on clinical evidence and theoretical insights, authors argue that safety behaviours in chronic stuttering may also have supportive value, helping individuals navigate social and communicative demands. The authors also highlight the need to differentiate between maladaptive safety behaviours and those supporting functional communication. By using manual reference checks and keyword searches, a systematic review of peer-reviewed literature was carried out. The findings focused on how safety behaviours work in chronic medical conditions and then analysed within the framework of stuttering, evaluating the dual role of safety behaviours as both supportive strategies and contributors to anxiety.

Keywords: Cognitive behaviour therapy, Stuttering, Safety behaviour, chronic medical condition.

Introduction

Stuttering is a complex condition defined by disruptions in speech flow and fluency. It often leads to significant social and emotional challenges for those affected. While the causes of stuttering are rooted in neurological, genetic, and physiological factors, its impact extends beyond speech production. It frequently triggers heightened anxiety in social situations, which, in turn, exacerbates the severity of stuttering, creating a cyclical relationship between the two.

To cope with the anticipation of stuttering, individuals often adopt safety behaviours, such as avoiding specific words, altering speech patterns, or minimizing eye contact. These strategies are used to reduce discomfort and manage communication demands. However, in the field of psychology, safety behaviours are typically viewed as maladaptive, as they prevent individuals from confronting their fears and prolong the cycle of anxiety over time. Cognitive-behavioural therapy (CBT), a widely recognized remedy for anxiety disorders, focuses on eliminating safety behaviours to disrupt this cycle of avoidance and facilitate long-term anxiety reduction.

In the context of stuttering, however, the role of safety behaviours is more complex. Stuttering is not solely a psychological phenomenon but also a medical condition with a complex neurological and genetic basis. In this context, it may not be entirely fair to view safety behaviours solely as mechanisms that maintain anxiety, as is often the case in other conditions. Instead, these behaviours might play a role in enabling people who stutter to face social interactions more effectively, offering a temporary but important bridge to more confident communication.

This raises an important question: Should safety behaviours in stuttering be universally categorized as maladaptive, or could they serve as beneficial tools in specific contexts? Reconsidering the traditional perspective on safety behaviours might inform more balanced treatment approaches, recognizing their potential to support individuals while also addressing their limitations. To explore this issue, a systematic approach was employed to identify and synthesize peer-reviewed literature. Studies were retrieved using targeted keyword searches across multiple electronic databases and were supplemented by manual reference checks. The paper examined the contribution of safety behaviours in chronic medical conditions, where such behaviours are commonly associated with symptom maintenance or precaution. These findings

were then analysed within the framework of stuttering, evaluating the dual role of safety behaviours as both supportive strategies and contributors to anxiety.

This paper highlights the complexity of safety behaviours in stuttering, challenging the conventional view of these strategies as entirely maladaptive. Instead, it advocates for a more flexible perspective that considers the medical and social dimensions of stuttering, paving the way for more inclusive and effective treatment models.

Relationship between Anxiety Disorders and Safety Behaviours

Safety behaviours are actions, an individual performs to avoid a feared result or lessen anxiety in distressing situations (Rachman, et al, 2008). Rachman first proposed the concept of safety behaviours (1984) and highlighted actions associated with agoraphobia aimed at enhancing a sense of security when confronted with a feared situation. These behaviours have been observed across various anxiety-related disorders such as panic disorders, obsessive-compulsive disorders, hypochondriasis, and social anxiety disorders. The specific set of safety behaviours can differ among these disorders and may involve actions such as excessive preparation etc. This is mainly because these behaviours reduce anxiety temporarily but can sustain or worsen anxiety in the long run. Several reasons have been proposed for why safety behaviours are worsening and maintaining anxiety.

Firstly, Safety behaviours are considered to obstruct the natural process of anxiety habituation. (Asnaani et al, 2016). For instance, when someone with social anxiety encounters a frightening situation, such as addressing an audience, their anxiety initially spikes, peaks, and then decreases. However, suppose involved in safety behaviours like not maintaining eye contact with the audience. In that case, their anxiety might remain low temporarily and they prevent the feared outcome. However, this also stops them from learning to face the situation without anything bad happening. As a result, their fear doesn't go away and may even come back in the future.

Secondly, safety behaviours perpetuate anxiety by blocking the disconfirmation of exaggerated threat expectations, which are essential for learning. For instance, diverting gaze from the audience prevents someone from registering that others offer supportive or approving expressions. It fosters a false belief that avoiding eye contact protects from harm, but in fact, no real harm exists.

Thirdly, beyond hindering the extinction of fear, safety behaviours can trigger the feared social outcomes they are meant to prevent. For example, speaking minimally, giving brief responses, and avoiding eye contact may make a person seem disinterested during social interaction, ultimately leading to the negative outcomes they fear.

Research indicates that safety behaviours function as indirect forms of avoidance strategies, offering temporary relief from anxiety but ultimately perpetuating it for an extended period (Thwaites and Freeston, 2005). As avoidance contributes to anxiety disorders, exposure-based interventions are widely regarded as the most productive approach. These psychotherapies involve exposing individuals to feared situations or stimuli, allowing their anxiety to naturally subside or helping them gain new evidence against their disastrous prediction (Craske et al., 2008; Conway et al., 2014; Craske, Vervliet, & Hermans, 2018). The clinical relevance of safety behaviours is significant, as most anxiety disorder treatments aim to reduce or eliminate such behaviours which are hindering disconfirmation of disproportionate prediction of outcome in perceived feared situations.

Chronic Medical Conditions and Anxiety Related Disorders

Research indicates that individuals with chronic medical conditions are more prone to experience anxiety-related disorders compared to the general population. These individuals not only face the same types of anxiety-related disorders, including generalized anxiety, panic episodes, and social phobia, but they tend to experience them more frequently and with greater intensity. This higher prevalence is often linked to the stress of managing their condition, uncertainty about the future, and the impact of the condition on daily life.

Anxiety is commonly observed in individuals with prolonged health conditions like obstructive pulmonary disease (Livermore et al., 2010), diabetes (Smith et al., 2013), epilepsy (Scott et al., 2017, Scott et al., 2020), chronic pain (Asmundson & Katz, 2009), cancer (Mitchell et al., 2013), and cardiovascular disease (Tully et al., 2016). Additionally, people with long-term medical conditions may experience anxiety specifically related to their illness. For example, patients with cancer may fear recurrence (Simard et al., 2013), individuals with diabetes may worry about hypoglycemic episodes (Gonder-Frederick et al., 2013), those suffering from chronic pain may have concerns about re-injury or movement (Leeuw et al., 2007), and individuals with heart disease may experience anxiety related to their heart condition (Marker et al., 2008). These condition-specific anxieties highlight the significant challenges faced by individuals living with chronic medical issues.

Interventions aimed at reducing anxiety in individuals with chronic medical conditions are generally less effective than those targeting individuals without such conditions. For example, in cancer patients, anxiety therapies show a small effect size (Cohen's $d = 0.21$; Sanjida et al., 2018), while in individuals with cardiovascular disease, the impact is moderate (Cohen's $d = 0.42$) (Klainin-Yobas, Stephen, Ng, & Lau, 2016). Additionally, cognitive-behavioural therapy (CBT) has

not demonstrated significant effectiveness in treating anxiety in people with epilepsy (Noble, Reilly, Temple, & Fisher, 2018; Gandy et al., 2014).

Safety Behaviour and Chronic Medical Conditions

In the context of chronic medical conditions, it is not entirely surprising that there is a lack of in-depth discussion on safety behaviours. Safety behaviours present unique challenges in chronic medical conditions, as these actions can often be interpreted differently depending on the specific condition. For example, a young man with chronic low back pain may use a walking aid to maintain his stability and prevent a fall. This could be categorized as "pain behaviour" (Fordyce et al., 1984), a form of safety behaviour designed to safeguard against perceived injury. In the case of an anxiety disorder, such behaviour would function as a safety mechanism due to the individual's overestimation of the threat. Since the likelihood of falling from back pain in a young person is minimal, the use of the walking stick is driven by anxiety rather than a realistic risk. However, the same behaviour would be viewed differently in someone with multiple sclerosis, where balance issues are a primary symptom and the risk of falling is genuinely high. In such a scenario, we should encourage using a walking aid.

Some behaviours considered a safety measure in one situation could be more accurately described as a precautionary step in another. This duality makes it challenging to empirically study behaviours in chronic medical conditions. A recent study explored adaptive and maladaptive behaviours in response to anxiety related to COVID-19, finding that individuals with multiple medical comorbidities were more inclined to engage in both effective and ineffective safety behaviours to shield themselves from infection (Kohler et al., 2021).

Many anxiety-related behaviours in the context of medical conditions aim to mitigate the risk of feared outcomes or minimize their potential impact. For example, individuals with diabetes often fear hypoglycemia (Gonder-Frederick, Shepard, Grabman, & Ritterband, 2016). To prevent loss of consciousness, they may carry sugary snacks to quickly restore their blood sugar levels when they sense hypoglycaemic symptoms. Similarly, managing diabetes requires balancing both hypoglycemia and hyperglycemia, highlighting how the management of chronic medical conditions often involves a combination of both safety behaviour and Supportive Measures.

Certain behaviours that are helpful in specific situations can contribute to maintaining anxiety when taken to an extreme. For example, being cautious or avoiding stressful situations may offer short-term relief. Still, when this behaviour becomes excessive, such as consistently avoiding social interactions or constantly seeking reassurance, they can end up reinforcing anxiety rather than alleviating it. What begins as a supportive measure gradually turns into a cycle that sustains anxiety instead of reducing it.

A clear example of this is the worry of cancer relapse, which is among the most common anxieties experienced by people who have battled cancer, especially those who have undergone treatment for breast cancer (Simard et al., 2013). While the risk of cancer returning is real, medical guidelines generally recommend that women check their breasts for lumps once a month to detect any changes early. However, some women, driven by heightened fear and vigilance, may check their breasts far more frequently. When these actions go beyond the recommended guidelines, they reflect an elevated level of anxiety.

These actions can be classified as safety behaviours, as they are performed to alleviate the fear of cancer recurrence. Ironically, instead of reducing anxiety, frequent checking can make it worse by reinforcing the perception of an ongoing threat. This heightened vigilance transforms what should be a simple, routine preventive measure into a source of psychological distress, creating a vicious cycle of fear and compulsive behaviour. In a broader sense, this demonstrates how behaviours intended for self-monitoring and precaution can, in certain situations, become counterproductive, contributing to heightened anxiety rather than providing reassurance. When behaviours that are meant to manage risk are excessively performed, they may lead to an overestimation of danger, making the individual more focused on the potential for recurrence, thereby amplifying their anxiety instead of alleviating it.

Safety Behaviour and Stuttering

Recent studies highlighted that social anxiety in individuals who stutter is higher than in the normal population. Studies report that between 22% and 60% of adult PWS and around 24% of school-going individuals who stutter are diagnosed with social anxiety disorder (Blumgart et al., 2010; Iverach et al., 2009; Menzies et al., 2009; Stein et al., 1996). A meta-analysis conducted by Craig & Tran (2014) further supports these findings, showing significant differences in both trait and social anxiety levels between those who stutter and those who do not. The effect sizes were found to be $d = 0.57$ for trait anxiety and $d = 0.82$ for social anxiety.

Many PWS express concerns about how others will perceive their stuttering (Cream et al., 2003) leading them to adopt behaviours aimed at avoiding stuttering or its potential negative consequences. Common avoidance behaviours include evading certain situations, words, topics or even making eye contact (Corcoran & Stewart, 1998; Crichton-Smith, 2002; Plexico et al., 2005; Vanryckeghem et al., 2004). For instance, Vanryckeghem et al. (2004) observed that PWS employ

more strategies than those who do not stutter, frequently substituting words, pausing before feared words, or repeating interjections like "ah" or "the" before speaking.

Avoidance is often seen as a strategy to alleviate the emotional strain of stuttering (Guitar, B (2013); Vanryckeghem et al. (2004) or to mask the stutter itself (Van Riper, 1982). In a study by Jackson et al. (2015), participants who stutter disclosed three common strategies: avoidance, self-management (applying tactics learned in speech therapy), and approach strategies, where they continue speaking despite the stuttering. These strategies were associated with feelings of distress and physical discomfort when anticipating stuttering episodes.

Systemic linguistic research has found that people who stutter often choose words or ways of speaking that help them avoid difficult conversations, possibly as a coping mechanism for negative emotional reactions, in addition to self-reports (Lee et al., 2015). Health professionals, including speech-language pathologists (SLPs), may unintentionally reinforce these safety behaviours by offering problem-solving advice (Thwaites & Freestone, 2005). Helgadottir et al. (2014) conducted a study where clinical psychologists and speech-language pathologists (SLPs) identified 34 safety behaviours commonly used by adults during stuttering treatment. A subsequent survey of 160 SLPs found that many recommended these behaviours to help clients manage social anxiety associated with stuttering. General safety behaviours, practice and rehearsal, general avoidance, choosing safe discussion partners, and control-related activities were the five primary categories into which these behaviours were divided.

According to research by Lowe et al. (2017), 132 out of 133 patients undergoing anxiety therapy for stuttering used at least one of the 27 safety practices. The actions that are most commonly reported include avoiding complex words, mentally preparing sentences before speaking, keeping responses short, choosing familiar or non-threatening conversation partners in socially stressful situations, and steering clear of challenging syllables. Another study involving 502 adults who stutter found that participants employed various safety behaviours, such as repeating words, staying silent, or opting not to speak, often to avoid stuttering during the conversation.

Robyn et al. (2021) identify a critical tension between speech restructuring methods and current best practices for managing social anxiety. While speech restructuring is beneficial for individuals seeking to control their stuttering, it may unknowingly heighten self-focused attention, foster safety behaviours, and potentially become safety behaviour itself. In anxiety management, clinicians typically target safety behaviours to alleviate anxiety, whereas speech therapy may unintentionally promote these behaviours. These complex dynamics underline the necessity for further research to explore the implications of these treatment approaches and their effects on individuals who stutter.

Stuttering a chronic medical condition with neurological and genetic roots

Stuttering, much like other medical conditions is a complex disorder that affects individuals in multiple ways physically, emotionally, and socially. Similar to conditions like diabetes or asthma, stuttering cannot be controlled through willpower alone. It is rooted in a combination of neurological (Smith and Weber, 2017) and genetic factors (Drayna and Kang, 2011), making it a unique and complex medical challenge. While substantial progress has been made in understanding neurodevelopmental disorders such as Tourette Syndrome and ADHD (American Psychiatric Association, 2015) research into the precise causes and effective treatments for stuttering continues to evolve. Despite being recognized for centuries, stuttering remains a complex puzzle for researchers and clinicians. Its exact cause is still unclear, which makes developing effective treatments challenging. Unlike conditions with well-defined therapies, no medication specifically designed to treat stuttering has been approved by the FDA.

Some medicines, such as risperidone and olanzapine, have been studied (Maguire et al., 2019, 2020; Shaygannejad et al., 2013) for their potential to reduce stuttering. However, their use is limited due to mixed results and side effects. As a result, speech and cognitive therapies, like the Lidcombe Program and cognitive-behavioural therapy (CBT), are the most widely recommended options (Brignell et al., 2020; Menzies et al., 2008). Even so, these therapies have shown varying success. Clinical trials often report modest improvements, with some individuals experiencing relapse or disruptions in their natural speech patterns.

Stuttering affects over 1% of adults worldwide (Yairi and Ambrose, 2013) and is classified as a mental and neurodevelopmental disorder by organizations like the APA and WHO. Its symptoms and severity can vary widely depending on age, with children exhibiting different stuttering patterns compared to teenagers and adults (Chang et al., 2008; Smith & Weber, 2016). Adults who stutter (AWS) may experience speech disruptions such as elongations, repetitions, block-outs, and broken words, often accompanied by anxiety and avoidance behaviours (Bloodstein & Ratner, 2008; Blumgart et al., 2010; Iverach et al., 2018), syllable repetitions are common but vary in appearance some may struggle to start sentences, while others experience involuntary repetition of syllables mid-speech. The physical symptoms of stuttering may include irregular breathing, involuntary movements like eye blinks or tremors, and autonomic responses such as flushing or sweating (APA, 2013). These challenges can negatively impact the quality of life (Maguire et al., 2020), especially when combined with conditions like social anxiety disorder (SAD), ADHD, or obsessive-compulsive disorder (Blumgart et al., 2010; Iverach & Rapee, 2014). Social anxiety, in particular, often exacerbates stuttering symptoms (Iverach et al., 2009; Yang et al., 2017).

Neurological research indicated that the brain structure and activity of individuals who stutter differ from those who do not (Neef et al., 2015). For instance, children with chronic stuttering exhibit reduced function in specific brain regions, such as the left premotor cortex and basal ganglia, during spontaneous speech compared to children who do not stutter (Chow et al., 2023). Neuroimaging studies have also identified structural differences in the premotor cortex (PMC) and supplementary motor area (SMA), along with their neural connections, in people who stutter (Chang et al., 2015; Garnett et al., 2018). These variances in brain anatomy have been associated with the severity of stuttering symptoms in several studies (Chang et al., 2015; Neef et al., 2018), suggesting a strong link between brain structure and speech fluency challenges.

Moreover, the role of dopamine in basal ganglia function provides additional insight into the neurochemical basis of stuttering. There is strong evidence linking stuttering to disruptions in the basal ganglia circuits, which play a crucial role in initiating and coordinating speech-motor activities. Imaging studies have revealed that individuals who stutter often have elevated levels of presynaptic dopamine, a key neurotransmitter involved in these circuits (Wu et al., 1997). This observation gave rise to the dopamine hypothesis, which suggests that an imbalance in dopamine levels contributes to the speech difficulties experienced by people who stutter. This hypothesis was further refined through later research (Alm, 2004) and is supported by recent findings and limited clinical trials (Maguire et al., 2020; Shaygannejad et al., 2013).

The basal ganglia's function heavily depends on precise dopamine regulation, and studies have shown that medications targeting dopamine pathways can significantly improve stuttering symptoms, particularly in adults who stutter (Maguire et al., 2021). Dopamine receptor 2 (D2R) antagonists, for example, have shown promising results in clinical settings. However, despite these positive outcomes, no D2R antagonist has undergone a Phase II clinical trial large enough to determine its effectiveness definitively. Such trials are critical for advancing these treatments to gain FDA approval and wider clinical use. These structural and functional findings reinforce the idea that stuttering is deeply rooted in neurological differences.

Stuttering also has a genetic foundation, offering a crucial understanding of the molecular and biological mechanisms underlying the condition. Early research using twin studies revealed that monozygotic twins, who share identical genes, are at greater risk of stuttering compared to other twins (Domingues CE et al., 2015). Advances in genetic sequencing have pinpointed mutations in four specific genes—AP4E1, GNPTAB, GNPTG, and NAGPA—that are related to stuttering. These genes play a role in the lysosomal enzyme-targeting pathway, and mutations in them account for roughly 20% of stuttering cases (Frigerio-Domingues & Drayna, 2017; Kang et al., 2010; Han et al., 2019; Raza et al., 2015).

Genetic variations in the highly conserved regions of GNPTAB, GNPTG, and NAGPA genes have been strongly associated with stuttering, while changes in the AP4E1 gene are linked not only to stuttering but also to other developmental disorders (Kang et al., 2010; Raza et al., 2015). In mouse models, males carrying a mutation similar to the one found in humans exhibited longer pauses and fewer vocalizations, closely mirroring speech disruptions seen in individuals with stuttering (Barnes et al., 2016).

Further research found a correlation between grey matter size differences in individuals who stutter and NAGPA and GNPTG expression levels (Chow et al., 2020). Interestingly, mutations in these genes are also linked to poorer outcomes from speech therapy among individuals who stutter (Frigerio-Domingues et al., 2019).

More recently, mutations in additional genes such as ARNT2, SSUH2, CYRIA, and ZMAT4 have been suggested as potential contributors to stuttering (Below et al., 2023). Furthermore, genetic factors not only influence susceptibility to stuttering but may also play a role in whether a child recovers, relapses, or continues to stutter over time (Ambrose et al., 1997). This growing body of evidence emphasizes the complex genetic landscape underlying stuttering and its impact on therapy outcomes.

The lack of effective medicines, along with the complex neurological and genetic causes of stuttering, makes it a difficult condition to understand and treat.

Are safety behaviours supportive measures or anxiety maintenance in the context of stuttering?

Stuttering, a medical condition with no definitive cure, requires a thoughtful approach to understanding safety behaviours. Unlike other conditions, where fears exist only in the mind, safety behaviours are seen as maintaining anxiety, stuttering presents a different perspective as it is a neurological and genetic, physical condition that involves actual disruptions in speech. These behaviours also serve as coping mechanisms, helping individuals manage challenging communication situations while building confidence and promoting participation.

Anxiety in stuttering is a natural response because speech is a fundamental part of communication. When someone cannot use their speech effectively, it can lead to significant emotional stress. Speaking is essential for expressing thoughts, connecting with others, and managing daily life. For a person who stutters, struggling to say certain words or maintain fluency can be frustrating and overwhelming.

This experience is not something only people who stutter go through, in other physical or neurological conditions, anxiety often accompanies the inability to control specific functions. For instance, individuals with motor disorders like Parkinson's disease may feel anxious when their muscles fail to respond as needed, especially during critical tasks like

walking or writing. Similarly, people with chronic pain disorders often experience anxiety when they anticipate physical activities that could worsen their pain.

In these cases, anxiety stems from the real and immediate challenges of a body part not functioning as expected. Similarly, for those who stutter, the unpredictable and uncontrollable nature of speech disruptions makes anxiety a natural and understandable response.

In stuttering, safety behaviours such as controlled breathing and word substitutions can be adaptive or maladaptive, depending on how they are used. For example, using filler words during a public presentation might help someone maintain fluency and feel more confident. In such cases, these behaviours act like tools to navigate feared situations, much like a wrist brace that supports a pianist's hand, allowing them to keep playing even if they're in pain. These strategies, when used to engage in valued activities, can be seen as adaptive rather than avoidance tactics.

The motivation behind these behaviours plays a crucial role in determining their impact. If the behaviour is driven by fear of stuttering and leads to avoidance will reinforce anxiety. On the other hand, if it is used to support participation in important activities like workplace communication or social events, it can build self-confidence and reduce anxiety over time.

The key to understanding whether a behaviour is adaptive or maladaptive is why it's being used. For example, if someone who stutters uses a strategy because they're afraid and want to avoid speaking situations, it might increase their anxiety over time. But, if they use the strategy like avoiding certain words or speaking very slowly, to manage their speech in social situations. it can reduce anxiety and help them feel more comfortable. This is similar to how a person who feels dizzy might use a walking stick to stay steady and avoid falling. The stick provides extra support, helping them move around safely and with more confidence despite their dizziness. They might start by taking small steps near a wall to see if they need the stick. Over time, as they feel more confident, they might try walking without it. Similarly, people who stutter also use safety behaviour for not only anxiety reduction but also meaningful participation in valued activities

Challenging the CBT Perspective

Cognitive-behavioural therapy (CBT) often labels safety behaviours as maladaptive because they prevent individuals from confronting their fears directly, maintaining anxiety in the long term. However, stuttering involves real difficulties in controlling speech, and adding to this complexity, research has revealed that genetic factors play a role in therapy outcomes for stuttering. Mutations in genes have been linked to poorer therapy responses (Frigerio & Domingues et al., 2019).

Several questions emerge Do safety behaviours in stuttering always reinforce anxiety or can they provide valuable coping mechanisms that allow individuals to handle challenging social interactions? Is it appropriate to label all such behaviours as maladaptive, or some are necessary adaptations to manage a condition where speech control is limited? Moreover, instead of focusing exclusively on eliminating safety behaviours, should therapeutic approaches aim to differentiate between those that hinder progress and those that offer a sense of control and agency over communication? These questions highlight the need for a deeper understanding of the role of safety behaviours in stuttering and how they impact anxiety and speech management.

Conclusion

Safety behaviours in stuttering should not be dismissed as mere anxiety maintenance. They can play a significant role in helping individuals manage their condition, navigate social interactions, and build confidence. By carefully assessing and distinguishing between adaptive and maladaptive safety behaviours, therapy can support individuals in maintaining their participation in meaningful activities while gradually reducing unnecessary avoidance.

References

1. Thwaites, R., & Freeston, M. H. (2005). Safety-seeking behaviours: Fact or function? How can we clinically differentiate between safety behaviours and adaptive coping strategies across anxiety disorders? *Behavioural and Cognitive Psychotherapy*, 33(2), 177–188. <https://doi.org/10.1017/S1352465804001924>
2. Craske, M. G., Hermans, D., & Vervliet, B. (2018). State-of-the-art and future directions for extinction as a translational model for fear and anxiety. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 373(1742), 20170025. <https://doi.org/10.1098/rstb.2017.0025>
3. Craske, M. G., Treanor, M., Conway, C. C., Zbozinek, T., & Vervliet, B. (2014). Maximizing exposure therapy: An inhibitory learning approach. *Behaviour Research and Therapy*, 58, 10–23. <https://doi.org/10.1016/j.brat.2014.04.006>
4. Craske, M. G., Kircanski, K., Zelikowsky, M., Mystkowski, J., Chowdhury, N., & Baker, A. (2008). Optimizing inhibitory learning during exposure therapy. *Behaviour Research and Therapy*, 46(1), 5–27. <https://doi.org/10.1016/j.brat.2007.10.003>

5. Mitchell, J. M. (2013). Urologists' use of intensity-modulated radiation therapy for prostate cancer. *New England Journal of Medicine*, 369(17), 1629–1637. <https://doi.org/10.1056/NEJMoa1307528>
6. Asmundson, G. J., & Katz, J. (2009). Understanding the co-occurrence of anxiety disorders and chronic pain: State-of-the-art. *Depression and Anxiety*, 26(10), 888–901. <https://doi.org/10.1002/da.20600>
7. Scott, A. J., Sharpe, L., Hunt, C., & Gandy, M. (2017). Anxiety and depressive disorders in people with epilepsy: A meta-analysis. *Epilepsia*, 58(6), 973–982. <https://doi.org/10.1111/epi.13769>
8. Scott, A. J., Sharpe, L., Loomes, M., & Gandy, M. (2020). Systematic review and meta-analysis of anxiety and depression in youth with epilepsy. *Journal of Pediatric Psychology*, 45(2), 133–144. <https://doi.org/10.1093/jpepsy/jsz072>
9. Smith, K. J., Béland, M., Clyde, M., Gariépy, G., Pagé, V., Badawi, G., ... & Schmitz, N. (2013). Association of diabetes with anxiety: A systematic review and meta-analysis. *Journal of Psychosomatic Research*, 74(2), 89–99. <https://doi.org/10.1016/j.jpsychores.2012.11.013>
10. Livermore, N., Sharpe, L., & McKenzie, D. (2010). Panic attacks and panic disorder in chronic obstructive pulmonary disease: A cognitive-behavioral perspective. *Respiratory Medicine*, 104(9), 1246–1253. <https://doi.org/10.1016/j.rmed.2010.03.019>
11. Simard, S., Thewes, B., Humphris, G., Dixon, M., Hayden, C., Mireskandari, S., & Ozakinci, G. (2013). Fear of cancer recurrence in adult cancer survivors: A systematic review of quantitative studies. *Journal of Cancer Survivorship*, 7, 300–322. <https://doi.org/10.1007/s11764-013-0272-z>
12. Marker, C. D., Carmin, C. N., & Ownby, R. L. (2008). Cardiac anxiety in people with and without coronary atherosclerosis. *Depression and Anxiety*, 25(10), 824–831. <https://doi.org/10.1002/da.20369>
13. Leeuw, M., Houben, R. M., Severeijns, R., Picavet, H. S. J., Schouten, E. G., & Vlaeyen, J. W. (2007). Pain-related fear in low back pain: A prospective study in the general population. *European Journal of Pain*, 11(3), 256–266. <https://doi.org/10.1016/j.ejpain.2006.02.002>
14. Gonder-Frederick, L. (2013). Fear of hypoglycemia: A review. *Diabetic Hypoglycemia*, 5(3), 3–11.
15. Klainin-Yobas, P., Ng, S. H., Stephen, P. D. M., & Lau, Y. (2016). Efficacy of psychosocial interventions on psychological outcomes among people with cardiovascular diseases: A systematic review and meta-analysis. *Patient Education and Counseling*, 99(4), 512–521. <https://doi.org/10.1016/j.pec.2015.10.026>
16. Noble, A. J., Reilly, J., Temple, J., & Fisher, P. L. (2018). Cognitive-behavioral therapy does not meaningfully reduce depression in most people with epilepsy: A systematic review of clinically reliable improvement. *Journal of Neurology, Neurosurgery & Psychiatry*, 89(11), 1129–1137. <https://doi.org/10.1136/jnnp-2017-317478>
17. Gandy, M., Sharpe, L., Perry, K. N., Miller, L., Thayer, Z., Boserio, J., & Mohamed, A. (2015). Anxiety in epilepsy: A neglected disorder. *Journal of Psychosomatic Research*, 78(2), 149–155. <https://doi.org/10.1016/j.jpsychores.2014.11.016>
18. Fordyce, W. E., Lansky, D., Calsyn, D. A., Shelton, J. L., Stolov, W. C., & Rock, D. L. (1984). Pain measurement and pain behavior. *Pain*, 18(1), 53–69. [https://doi.org/10.1016/0304-3959\(84\)90121-1](https://doi.org/10.1016/0304-3959(84)90121-1)
19. Kohler, H., Bäuerle, A., Schweda, A., Weismüller, B., Fink, M., Musche, V., ... & Skoda, E. M. (2021). Increased COVID-19-related fear and subjective risk perception regarding COVID-19 affects behavior in individuals with internal high-risk diseases. *Journal of Primary Care & Community Health*, 12, 2150132721996898. <https://doi.org/10.1177/2150132721996898>
20. Gonder-Frederick, L. A., Shepard, J. A., Grabman, J. H., & Ritterband, L. M. (2016). Psychology, technology, and diabetes management. *American Psychologist*, 71(7), 577. <https://doi.org/10.1037/a0040383>
21. Simard, S., Thewes, B., Humphris, G., Dixon, M., Hayden, C., Mireskandari, S., & Ozakinci, G. (2013). Fear of cancer recurrence in adult cancer survivors: a systematic review of quantitative studies. *Journal of cancer survivorship*, 7, 300–322.
22. Blumgart, E., Tran, Y., & Craig, A. (2010). Social anxiety disorder in adults who stutter. *Depression and anxiety*, 27(7), 687–692.
23. Iverach, L., O'Brian, S., Jones, M., Block, S., Lincoln, M., Harrison, E., ... & Onslow, M. (2009). Prevalence of anxiety disorders among adults seeking speech therapy for stuttering. *Journal of anxiety disorders*, 23(7), 928–934.
24. Menzies, R. G., Onslow, M., Packman, A., & O'Brian, S. (2009). Cognitive behavior therapy for adults who stutter: A tutorial for speech-language pathologists. *Journal of fluency disorders*, 34(3), 187–200.
25. Stein, M. B., Baird, A., & Walker, J. R. (1996). Social phobia in adults with stuttering. *The American journal of psychiatry*, 153(2), 278–280.
26. Craig, A., & Tran, Y. (2014). Trait and social anxiety in adults with chronic stuttering: Conclusions following meta-analysis. *Journal of fluency disorders*, 40, 35–43.
27. Vanryckeghem, M., Brutten, G. J., Uddin, N., & Van Borsel, J. (2004). A comparative investigation of the speech-associated coping responses reported by adults who do and do not stutter. *Journal of Fluency Disorders*, 29(3), 237–250.

28. Cream, A., Onslow, M., Packman, A., & Llewellyn, G. (2003). Protection from harm: the experience of adults after therapy with prolonged-speech. *International Journal of Language & Communication Disorders*, 38(4), 379-395.
29. Corcoran, J. A., & Stewart, M. (1998). Stories of stuttering: A qualitative analysis of interview narratives. *Journal of Fluency Disorders*, 23(4), 247-264.
30. Crichton-Smith, I. (2002). Communicating in the real world: Accounts from people who stammer. *Journal of fluency disorders*, 27(4), 333-352.
31. Plexico, L., Manning, W. H., & DiLollo, A. (2005). A phenomenological understanding of successful stuttering management. *Journal of fluency disorders*, 30(1), 1-22.
32. Guitar, B. (2013). *Stuttering: An integrated approach to its nature and treatment*. Lippincott Williams & Wilkins.
33. Jackson, E. S., Yaruss, J. S., Quesal, R. W., Terranova, V., & Whalen, D. H. (2015). Responses of adults who stutter to the anticipation of stuttering. *Journal of fluency disorders*, 45, 38-51.
34. Lee, A., Van Dulm, O., Robb, M. P., & Ormond, T. (2015). Communication restriction in adults who stutter. *Clinical Linguistics & Phonetics*, 29(7), 536-556.
35. Thomasson, P., & Psouni, E. (2010). Social anxiety and related social impairment are linked to self-efficacy and dysfunctional coping. *Scandinavian journal of psychology*, 51(2), 171-178.
36. Lowe, R., Helgadottir, F., Menzies, R., Heard, R., O'Brian, S., Packman, A., & Onslow, M. (2017). Safety behaviors and stuttering. *Journal of Speech, Language, and Hearing Research*, 60(5), 1246-1253.
37. Brundage, S. B., Ratner, N. B., Boyle, M. P., Eggers, K., Everard, R., Franken, M. C., ... & Yaruss, J. S. (2021). Consensus guidelines for the assessments of individuals who stutter across the lifespan. *American journal of speech-language pathology*, 30(6), 2379-2393.
38. Smith, A., & Weber, C. (2017). How stuttering develops: The multifactorial dynamic pathways theory. *Journal of Speech, Language, and Hearing Research*, 60(9), 2483-2505.
39. Drayna, D., & Kang, C. (2011). Genetic approaches to understanding the causes of stuttering. *Journal of neurodevelopmental disorders*, 3, 374-380.
40. American Psychiatric Association. (2015). *The American Psychiatric Association practice guidelines for the psychiatric evaluation of adults*. American Psychiatric Pub.
41. Maguire, G. A., Nguyen, D. L., Simonson, K. C., & Kurz, T. L. (2020). The pharmacologic treatment of stuttering and its neuropharmacologic basis. *Frontiers in neuroscience*, 14, 158.
42. Maguire, G. A., LaSalle, L., Hoffmeyer, D., Nelson, M., Lochhead, J. D., Davis, K., ... & Yaruss, J. S. (2019). Ecopipam as a pharmacologic treatment of stuttering. *Annals of clinical psychiatry: official journal of the American Academy of Clinical Psychiatrists*, 31(3), 164-168.
43. Shaygannejad, V., Khatoonabadi, S. A., Shafiei, B., Ghasemi, M., Fatehi, F., Meamar, R., & Dehghani, L. (2013). Olanzapine versus haloperidol: which can control stuttering better?. *International Journal of Preventive Medicine*, 4(Suppl 2), S270.
44. Brignell, A., Krahe, M., Downes, M., Kefalianos, E., Reilly, S., & Morgan, A. T. (2020). A systematic review of interventions for adults who stutter. *Journal of fluency disorders*, 64, 105766.
45. Menzies, R. G., O'Brian, S., Onslow, M., Packman, A., St Clare, T., & Block, S. (2008). An experimental clinical trial of a cognitive-behavior therapy package for chronic stuttering.
46. Yairi, E., & Ambrose, N. (2013). Epidemiology of stuttering: 21st century advances. *Journal of fluency disorders*, 38(2), 66-87.
47. Chang, S. E., Erickson, K. I., Ambrose, N. G., Hasegawa-Johnson, M. A., & Ludlow, C. L. (2008). Brain anatomy differences in childhood stuttering. *Neuroimage*, 39(3), 1333-1344.
48. Smith, A., & Weber, C. (2016, November). Childhood stuttering: Where are we and where are we going?. In *Seminars in Speech and Language* (Vol. 37, No. 04, pp. 291-297). Thieme Medical Publishers.
49. Ellis, J. B., & Ramig, P. R. (2009). *A Handbook on Stuttering*. O. Bloodstein, N. Bernstein Ratner, Delmar Learning, Clifton Park, NY (2008), 552 pp., Softcover.
50. Blumgart, E., Tran, Y., & Craig, A. (2010). Social anxiety disorder in adults who stutter. *Depression and anxiety*, 27(7), 687-692.
51. Iverach, L., Jones, M., Lowe, R., O'Brian, S., Menzies, R. G., Packman, A., & Onslow, M. (2018). Comparison of adults who stutter with and without social anxiety disorder. *Journal of fluency disorders*, 56, 55-68.
52. Iverach, L., & Rapee, R. M. (2014). Social anxiety disorder and stuttering: Current status and future directions. *Journal of fluency disorders*, 40, 69-82.
53. Yang, Y., Jia, F., Siok, W. T., & Tan, L. H. (2017). The role of anxiety in stuttering: Evidence from functional connectivity. *Neuroscience*, 346, 216-225.
54. Neef, N. E., Hoang, T. L., Neef, A., Paulus, W., & Sommer, M. (2015). Speech dynamics are coded in the left motor cortex in fluent speakers but not in adults who stutter. *Brain*, 138(3), 712-725.
55. Chow, H. M., Garnett, E. O., Ratner, N. B., & Chang, S. E. (2023). Brain activity during the preparation and production of spontaneous speech in children with persistent stuttering. *NeuroImage: Clinical*, 38, 103413.

56. Chang, S. E., Zhu, D. C., Choo, A. L., & Angstadt, M. (2015). White matter neuroanatomical differences in young children who stutter. *Brain*, 138(3), 694-711.
57. Garnett, E. O., Chow, H. M., Nieto-Castañón, A., Tourville, J. A., Guenther, F. H., & Chang, S. E. (2018). Anomalous morphology in left hemisphere motor and premotor cortex of children who stutter. *Brain*, 141(9), 2670-2684.
58. Neef, N. E., Anwender, A., Bütfering, C., Schmidt-Samoa, C., Friederici, A. D., Paulus, W., & Sommer, M. (2018). Structural connectivity of right frontal hyperactive areas scales with stuttering severity. *Brain*, 141(1), 191-204.
59. Han, T. U., Root, J., Reyes, L. D., Huchinson, E. B., Hoffmann, J. D., Lee, W. S., ... & Drayna, D. (2019). Human GNPTAB stuttering mutations engineered into mice cause vocalization deficits and astrocyte pathology in the corpus callosum. *Proceedings of the National Academy of Sciences*, 116(35), 17515-17524.
60. Kang, C., Riazuddin, S., Mundorff, J., Krasnewich, D., Friedman, P., Mullikin, J. C., & Drayna, D. (2010). Mutations in the lysosomal enzyme–targeting pathway and persistent stuttering. *New England Journal of Medicine*, 362(8), 677-685.
61. Raza, M. H., Mattera, R., Morell, R., Sainz, E., Rahn, R., Gutierrez, J., ... & Drayna, D. (2015). Association between rare variants in AP4E1, a component of intracellular trafficking, and persistent stuttering. *The American Journal of Human Genetics*, 97(5), 715-725.
62. Frigerio-Domingues, C., & Drayna, D. (2017). Genetic contributions to stuttering: the current evidence. *Molecular genetics & genomic medicine*, 5(2), 95.
63. Barnes, T. D., Wozniak, D. F., Gutierrez, J., Han, T. U., Drayna, D., & Holy, T. E. (2016). A mutation associated with stuttering alters mouse pup ultrasonic vocalizations. *Current Biology*, 26(8), 1009-1018.
64. Chow, H. M., Garnett, E. O., Li, H., Etchell, A., Sepulcre, J., Drayna, D., ... & Chang, S. E. (2020). Linking lysosomal enzyme targeting genes and energy metabolism with altered gray matter volume in children with persistent stuttering. *Neurobiology of Language*, 1(3), 365-380.
65. Below, J., Polikowsky, H., Scartozzi, A., Shaw, D., Pruett, D., Chen, H. H., ... & 23andMe Research Team. (2023). Discovery of 36 loci significantly associated with stuttering.
66. Ambrose, N. G., Cox, N. J., & Yairi, E. (1997). The genetic basis of persistence and recovery in stuttering. *Journal of Speech, Language, and Hearing Research*, 40(3), 567-580.
67. Wu, J. C., Maguire, G., Riley, G., Lee, A., Keator, D., Tang, C., ... & Najafi, A. (1997). Increased dopamine activity associated with stuttering. *Neuroreport*, 8(3), 767-770.
68. Alm, P. A. (2004). Stuttering and the basal ganglia circuits: a critical review of possible relations. *Journal of communication disorders*, 37(4), 325-369.
69. Maguire, G. A., Nguyen, D. L., Simonson, K. C., & Kurz, T. L. (2020). The pharmacologic treatment of stuttering and its neuropharmacologic basis. *Frontiers in neuroscience*, 14, 158.
70. Shaygannejad, V., Khatonabadi, S. A., Shafiei, B., Ghasemi, M., Fatehi, F., Meamar, R., & Dehghani, L. (2013). Olanzapine versus haloperidol: which can control stuttering better?. *International Journal of Preventive Medicine*, 4(Suppl 2), S270.
71. Maguire, G. A., Yoo, B. R., & SheikhBahaei, S. (2021). Investigation of risperidone treatment associated with enhanced brain activity in patients who stutter. *Frontiers in neuroscience*, 15, 598949.
72. Rachman, S., Radomsky, A. S., & Shafran, R. (2008). Safety behaviour: a reconsideration. *Behaviour research and therapy*, 46(2), 163–173. <https://doi.org/10.1016/j.brat.2007.11.008>
73. Rachman, S. (1984). Agoraphobia—a safety-signal perspective. *Behaviour Research and Therapy*, 22(1), 59-70.
74. Asnaani, A., McLean, C. P., & Foa, E. B. (2016). Updating Watson & Marks (1971): How has our understanding of the mechanisms of extinction learning evolved and where is our field going next?. *Behavior Therapy*, 47(5), 654-668.