ECHO

A Vocal Language Program for Easing Anxiety in Conversation

Cesar E. Ruiz, SLPD, CCC-SLP, BCS-S
Evelyn R. Klein, PhD, CCC-SLP, BCS-CL, ASHA Fellow
Louis R. Chesney, BSc

PLURAL PUBLISHING INC.

PLURAL PUBLISHING
INC.

5521 Ruffin Road
San Diego, CA 92123

e-mail: information@pluralpublishing.com
Website: https://www.pluralpublishing.com

Typeset in 11/14 Stone Informal by Flanagan's Publishing Services, Inc.
Printed in the United States of America by Integrated Books International

Library of Congress Cataloging-in-Publication Data

Names: Ruiz, Cesar E. author. | Klein, Evelyn R., author. | Chesney, Louis R., author.
Title: ECHO : a vocal language program for easing anxiety in conversation / Cesar E. Ruiz, Evelyn R. Klein, Louis R. Chesney.
Description: San Diego, CA : Plural Publishing, Inc., [2022] | Includes bibliographical references and index.
Identifiers: LCCN 2021031193 (print) | LCCN 2021031194 (ebook) | ISBN 9781635503302 (paperback) | ISBN 9781635503319 (ebook)
Subjects: MESH: Speech Disorders--therapy | Speech Therapy--methods | Child | Adolescent | Anxiety--therapy | Phobia, Social--therapy
Classification: LCC RC427 (print) | LCC RC427 (ebook) | NLM WL 340.3 | DDC 616.85/506--dc23
LC record available at https://lccn.loc.gov/2021031193
LC ebook record available at https://lccn.loc.gov/2021031194

CONTENTS

ACKNOWLEDGMENTS

We would like to thank the team at Plural Publishing for the opportunity to publish the ECHO Program. The completion of this work would not have been possible without their assistance and the involvement of the individuals acknowledged below. Their contributions have added to the value of this work and are sincerely appreciated and gratefully acknowledged.

We are exceptionally grateful to our contributors, Liz Eckert, MFA, and James Mancinelli, PhD, CCC-SLP. As a cofounder of "Beyond Fluency" and a theater educator, Liz Eckert's work has been invaluable. She has incorporated her experience with improvisation, role-playing, and actor training (including those with disabilities or English as a second language) in the ECHO module on role-play simulations for conversation. We also appreciate the knowledge and clinical experience of Dr. James Mancinelli for his work as a professor and researcher in the field of fluency disorders with specialization in the social aspects of stuttering. His insightful commentaries and clinical suggestions have been incorporated into the ECHO text to support people who stutter.

We are also grateful for the input of Meet Singhal, an engineer by training, and cofounder of Stamurai, for meeting with us and providing insight into the ECHO modules from a person-who-stutters perspective in addition to his own work on program development.

A special thank you is also extended to Katya Pronin for her initial input to the role-play simulations as an educator in the field of applied linguistics. As a cofounder of "Beyond Fluency," she has helped speakers become more expressive.

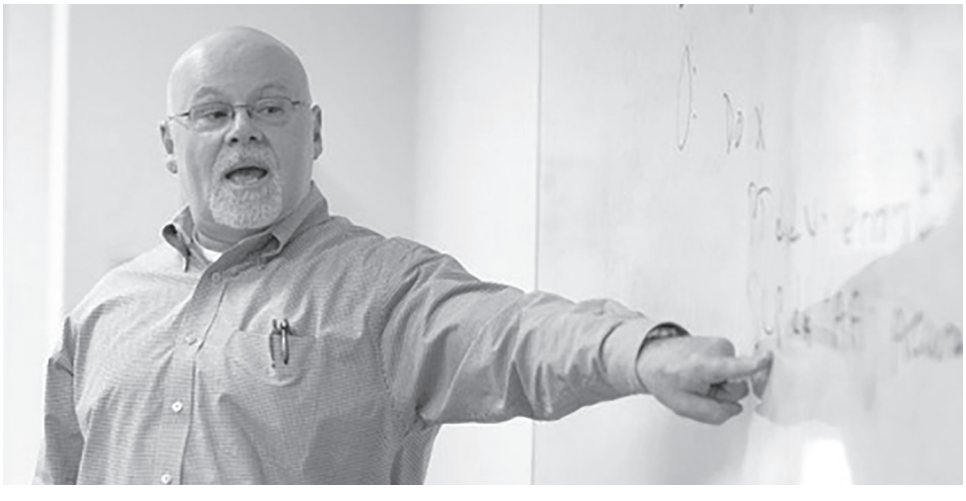
We thank Rachel Rapp, a former graduate student in the field of communication disorders, for reviewing the ECHO manuscript and online activities, and for providing insightful suggestions about selective mutism from her personal experience.

We would also like to thank our graduate assistants in Communication Sciences and Disorders, Mary Buckley, Taylor Clark, Hannah McKeown, Jacklyn Shragher, and Maureen Stevens, for their help in securing pertinent information for use in this text.

We have been fortunate to work with a very talented editor, Christina Gunning, who was always available to answer our questions and provide expert guidance throughout the writing of this text. We are grateful for the support of Valerie Johns, Executive Editor, and all the talented professionals who work at Plural Publishing for their knowledge and support. In addition, the contributors and reviewers listed are gratefully acknowledged for their expert reviews and suggestions that led to an improved final product.

ABOUT THE CONTRIBUTORS

Liz Eckert, MFA, has been a New York–based Designated Linklater Voice Teacher for over 10 years and is currently transitioning her practice to her new home in London. She has held positions on faculties of actor training programs throughout New York City and cofounded Beyond Fluency to help speakers of English as a second language find ease and confidence by engaging with language physically, musically, and sensorially. She has led public speaking workshops at Columbia Business School and conducted role-play training modules with schools and businesses throughout the United States.



James M. Mancinelli, PhD, CCC-SLP, is an Assistant Professor in the Department of Communication Sciences and Disorders at La Salle University in Philadelphia, Pennsylvania. He has 35 years of clinical experience in medical speech-language pathology and has held senior speech-language pathologist positions at major hospitals in the greater Philadelphia area. He served as the Director of Clinical Education at La Salle University from 2003 to 2019. He teaches the graduate course in Fluency and Stuttering at La Salle University. His research interests include the sociological aspects of stuttering, ethnographic applications to stuttering, conversation analysis as applied to people who stutter, and clinical education/supervision.

REVIEWERS

Plural Publishing and the authors thank the following reviewers for taking the time to provide their valuable feedback during the manuscript development process. Additional anonymous feedback was provided by other expert reviewers.

Kristin Droste, MA, CCC-SLP
Speech-Language Pathologist
Expressions Speech Language and Communication Services, LLC
Garden Grove, California

Joleen R. Fernald, PhD, CCC-SLP, BCS-CL
Speech-Language Pathologist
Joleen R. Fernald Pediatric Therapy Services
Trinity, Florida

Steven Kurtz, PhD, ABPP
Senior Psychologist and President
Kurtz Psychology Consulting PC
New York, New York

Juliana O. Miller, MS, CCC-SLP
Clinical Instructor, Director of External Clinical Practicum
University of South Carolina
Columbia, South Carolina

Robyn M. Newman, PhD, CCC-SLP/L
Speech-Language Pathologist
PediaTalk, LLC
Evanston, Illinois

Rachel Rapp, BA
Graduate Student
Department of Communication Disorders and Sciences
University of Oregon
Eugene, Oregon

Donna Spillman-Kennedy MS, CCC-SLP
Speech-Language Pathologist and Partner
Integrated Speech Pathology, LLC
Watchung, New Jersey

France Weill, PhD, CCC-SLP
Associate Professor
Touro College
New York, New York

INTRODUCTION

The ECHO Program

When choosing a name for this program, we decided on ECHO as an echo involves sound that is produced and reflected back to be heard again. Speech includes a series of sounds that are carefully combined to form words for meaningful language in order to communicate and engage in conversation. Echoes can be heard in such remote places as caves or mountain ranges. This makes an echo a powerful source of sound. We believe that, as humans, we can use communication to achieve meaningful results in our lives.

The ECHO Program was developed for older elementary children and teens who can benefit from social communication experiences to generate voice and ease anxiety with social language skills for conversations and storytelling. This program provides many targeted opportunities to practice through game-like activities and role-play simulations.

Within the ECHO program, there are three targeted modules to expand functional communication in conversation. Module 1 introduces voice initiation techniques and speech sound production from a physiological and mechanical standpoint to make vocalization easier. Module 2 teaches targeted social pragmatic skills to build spontaneous verbal communication for conversation in a hierarchical manner with 11 interactive activities beginning with spontaneity for words and extending to initiating topics during conversation. Module 3 builds on the previous two modules, providing conversational role-plays in simulated settings that incorporate cognitive restructuring. All modules attempt to provide a basis for experiential learning.

Our rationale for serving children and teens with selective mutism or stuttering has to do with the fact that both disorders are impacted by social anxiety related to the demands of speaking. To reduce anxiety, people often avoid situations and that limits their communication experiences over time. Limited experiences speaking can create feelings of discomfort when the person is called upon or expected to engage in speaking tasks that are unfamiliar.

There are many programs available that target social communication and conversation for children and teens. However, none have focused on the impact social anxiety has on voice production and communication, specifically related to selective mutism and stuttering. In our experience as therapists and individuals who have been personally impacted by these disorders, our objective is to offer treatment materials and activities that the therapist or facilitator can readily use to engage and inspire the child or teen to communicate.

Whom the ECHO Program Serves

The ECHO Program was developed for children and teens who have been identified as having selective mutism, childhood-onset fluency disorder (stuttering), and/or have social (pragmatic) communication difficulties. *Selective Mutism* falls within the Anxiety Disorders classification of

the *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition* (*DSM-5*). These disorders are exemplified by excessive fear and anxiety related to behavioral disturbances with anticipation of a future threat. There is a consistent failure to speak in specific social situations in which there is an expectation for speaking such as at school, despite speaking in other situations. *Childhood-Onset Fluency Disorder* falls within the Neurodevelopmental Disorders classification of the *DSM-5*. Normal fluency and time patterning of speech that are inappropriate to the child's age and language skills may be disturbed. Sound and syllable repetitions, prolongations, broken words, blocks, word substitutions, in addition to physical tension are some of the common characteristics. The disturbance causes anxiety about speaking or limitations with effective communication, social participation, or academic or occupational performance. There are persistent difficulties using verbal and nonverbal communication socially for both groups.

According to the American-Speech-Language-Hearing Association (ASHA; https://www.asha.org/Practice-Portal/Clinical-Topics/Selective-Mutism/), while speech-language pathologists are considered appropriate professionals to coordinate the care team for an individual with selective mutism, ASHA urges the

> collaboration between the speech language pathologist (SLP) and behavioral health professionals (such as a school or clinical psychologist, psychiatrist, or school social worker), as well as the classroom teacher and the child's family . . . for appropriate assessment and treatment planning as well as implementation because selective mutism is categorized as an anxiety-based disorder. (Schum, 2002, p. 4)

The same holds true for the information presented on stuttering. Stuttering is a complex, multidimensional disorder for which tension and avoidance are only parts. According to Yaruss, Coleman, and Quesal (2012), "By addressing the child's entire experience of stuttering, clinicians can help children minimize the adverse education and social impact of the disorder while improving children's overall communication success" (p. 542).

Criteria about these disorders from the *DSM-5* are presented in detail in Appendix A (American Psychiatric Association, 2013).

The Modules

Using the ECHO Program, the child or teen is exposed to strategies and situations through 35 face-to-face and interactive activities and games in three modules.

Module 1: Vocal Control

Module 1 introduces voice initiation techniques and speech sound production from a physiological and mechanical standpoint. Oral placement, manner, pitch, and loudness variations are introduced using seven activities for greater ease of vocal initiation and speech production. The activities support individuals with selective mutism and/or stuttering.

Laryngeal/neck tension has been identified in individuals who have selective mutism and those who stutter. The tension and difficulty producing voice have been implicated as a physiological consequence of anxiety. Using surface electromyograph (sEMG), Ruiz and Klein (2018) identified anxiety as a contributor in interfering with the ability to initiate purposeful vocalizations for speech. Their study found that with heightened anxiety there was increased difficulty

engaging the vocal system to initiate voice for speech. They found that children with greater laryngeal/neck tension at the level of the thyrohyoid muscle (measured by sEMG) had significantly more laryngeal/neck tension when asked to say their names, prior to initiating any vocalization. This was in contrast to remaining silent, when there was no vocal request. With more time and greater familiarity in the evaluation session, children with selective mutism had significantly decreased levels of anxiety and laryngeal/neck tension. For children and adolescents who stutter, there is increased muscular tension as well. When dysfluencies occur, the individual often recruits muscle groups from surrounding articulatory areas to help overcome blocks. Such behaviors often become classically conditioned and involve recruitment of more muscles that results in the struggle and tension seen in areas of the face, head, and other parts of the body. Irregular breathing, quivering, or tremulous movements may also become evident as stuttering progresses (Ramig & Dodge, 2005). Frustration, pressures, and stigma further exacerbate tension and difficulties for children and teens who stutter or those with selective mutism.

Module 2: Social Pragmatic Communication

This module teaches targeted skills to build spontaneous verbal communication for conversation in a hierarchical manner with 11 interactive activities. This module supports three primary areas of social communication: (1) using language for different reasons, (2) changing language for the listener or situation, and (3) following rules for conversations and storytelling (ASHA, 2020). Within these three categories, interactive and engaging activities build conversational skills with a focus on enhancing communication and reducing anxiety associated with selective mutism, stuttering, and social (pragmatic) communication. Each of the 11 activities include background research and suggestions for modifications when appropriate.

For children who experience selective mutism or stuttering, avoidance is generally a concern. For those with selective mutism, they avoid participating when uncomfortable or remain mute in speaking situations in which they have higher anxiety. For those who stutter, avoidance is also common. Word substitutions may be used when the person who stutters anticipates stuttering on a specific sound or word. There may also be repetitions or prolongations of phonemes or syllables, blocks, pauses, circumlocutions, and physical tension.

This module provides skills to build daily conversations. With the 11 interactive activities and games, the child/teen gains experience to say what comes to mind, expand utterances, engage in and create scripts, follow directions and cope with mistakes, ask and answer yes-no and *wh*- questions, open and close a conversation, keep a conversation going with questions and commenting strategies, stay on topic and move to related topics, share information, tell a story or relate an event, agree and disagree with someone, show appreciation, give compliments, apologize, request clarification, state a problem, make an excuse, make a complaint, and ask for help as well as offer to help someone.

Module 3: Conversational Role-Play Simulations

Module 3 builds on the previous two modules, providing conversational role-plays in simulated real-life settings. Individuals will use their knowledge and training to practice their skills with options for assuming new roles. The conversational role-plays begin with common real-life scenarios based on recollections from people who have had conversational challenges. Photos are used to help imagine the scenarios for the role-plays. Each of the 17 scenarios begins with

a story to complete during the role-plays. The individual has the opportunity to finish the story with their own positive, negative, and neutral endings.

The role-play simulations presented in this module correspond to speaking situations in the Selective Mutism Questionnaire (SMQ) (Bergman et al., 2008). The role-play simulations include two different scenarios and interpretations for cognitive reconceptualization from which children and teens can learn new coping skills based on cognitive behavioral therapy. The following cognitive distortions are represented within the 17 scenarios. They include: dichotomous thinking, fortune-telling, catastrophizing, discounting the positive, emotional reasoning, labeling, magnification, minimization, selective abstraction, mind reading, overgeneralization, personalization, should statements, jumping to conclusions, blaming, what if, and unfair comparisons (Kaplan et al., 2017).

The *Cognitive Distortions Questionnaire* (de Oliveira, 2015) was used to help provide information specific to social anxiety (*CD-Quest*). This measure was developed to identify an individual's errors in thinking, consequent emotional states, and maladaptive behaviors (Lang et al., 2016) and formed the framework for the section on cognitive distortions in Module 3. This questionnaire helps measure success for behavioral training and contingency management.

How to Initiate the ECHO Program

Through our clinical experiences as authors and practitioners engaged in therapy with ECHO treatment, we have the following recommendations:

- When meeting the child or teen for the first time, include the parent or someone with whom they feel comfortable. During this time, it is helpful to discuss the treatment and approach you will take.
- The child or teen should agree and want to be part of the treatment process. For older children and teens, they may or may not want their parent to be included during the sessions. With time, it is a good idea for the parent or guardian to leave the sessions, at least partially, to provide time for the child or teen to gain comfort by themself with the facilitator or clinician in a one-on-one or small group setting.
- The communication partner should gather information using the *Information About Me* questionnaire (Appendix C) to learn more about the child or teen. This helps build rapport.
- The sessions should be captivating, using the high-interest activities that are provided. The ECHO activities are available in both print and online versions.
- The facilitator should be perceptive toward the individual's tolerance for environmental stressors. Reduce eye contact and sit next to the child/teen (if in person) instead of across the table. Keep focus on the materials instead of directly on the individual's face. Glancing is a good initial alternative to direct eye contact. See the hierarchy presented in Module 1 for structuring online sessions that systematically introduce exposures from limited visual and verbal interactions to full visual and verbal interactions.
- It is never a good idea to trick or coerce the child or teen to speak or take videos without permission. Some children will allow a video to be made and shared with others, but that cannot be taken for granted and doing so can compromise future interactions.

- Once the child or teen speaks (selective mutism) or talks with less tension about fluency (stuttering), do not make a fuss or show excitement. You can provide labeled praise (saying something positive about what the child actually did) without being overly animated.
- It is best not to interrupt or attempt to fill in words for an individual who is trying to speak. Let them say what they want to say in the time it takes them to say it. You can let them know you have time to listen. If working on decreasing pauses and hastening spontaneous speech output, a visible timer may be used to increase awareness.

Setup for Face-to-Face and Virtual Online Sessions

If working in a private outpatient setting, we recommend meeting with the child or teen and a parent or guardian to introduce the program and tell them what you will be doing together prior to administering any checklists or rating scales. We tell them about the three modules and what is included and why. For children or teens with selective mutism, we tell them that we are not expecting them to speak during this first meeting (online for virtual teletherapy or in person), but they can if they want to. After a few days have passed, we ask the parent/guardian to let us know if their child/teen wants to take part in the program. If so, we proceed with gathering information and scheduling. If the child/teen does not want to engage in treatment, we may try again to find out more about why; if they refuse, we let them know that they can change their mind at any time and tell their parent or guardian to contact us. The ECHO Program can also be part of the school-based therapeutic plan.

Gathering Information

Checklists and rating scales are suggested in addition to a formal clinical evaluation to determine a diagnosis, rule out disorders, and provide additional services, if needed. When beginning to gather information about the client, the following are suggested depending on needs:

1. *The ECHO Checklist* helps the child or teen and facilitator learn about communication skills they believe they have and/or need (Appendix B).
2. The *Information About Me* form helps the facilitator learn more about the interests, hobbies, activities, and things the individual likes to do. The child/teen can complete it in writing and/or through interview (Appendix C).
3. The *Social Communication Skills—The Pragmatics Checklist* (Goberis et al., 2012), also in Module 2 of this book, provides an array of social pragmatic skills for the child or teen to rate themselves and to learn more about how much they communicate using 45 social communication skills (Appendix D).
4. The *Selective Mutism Questionnaire* (Bergman et al., 2008) is a norm-referenced measure with 17 items that are rated for speaking frequency in school, at home, and in social situations outside school. The measure can be accessed at the following link: https://www.oxfordclinicalpsych.com/view/10.1093/med:psych/9780195391527.001.0001/med-9780195391527-interactive-pdf-002.pdf
5. An online *Case History Form* (Super Duper, 2004) is provided to gather important information about the individual's background. The form can be accessed at the following link: https://www.superduperinc.com/caseHistory/caseHistory.pdf

6. The *EXPRESS Selective Mutism (SM) Communication Questionnaire* (Klein et al., 2018) provides background information with a matrix for rating whom the child or teen speaks to, where, and how (Appendix E).
7. The *Screen for Child Anxiety Related Disorders (SCARED) Questionnaire* (Birmaher et al., 1999) has both child and parent versions for rating characteristics of related anxiety disorders that may be ruled out or require referral for additional support. The measure can be accessed at the following link: https://www.midss.org/content/screen-child-anxiety-related-disorders-scared (Scroll to the bottom of the main page for parent and child scoring forms.)
8. A *Stuttering Attitudes Checklist* can provide useful information about the individuals and thoughts about stuttering in their life. The checklist can be accessed at the following link: http://trittspeech-language.pbworks.com/f/fluency.pdf
9. The *Person-Centered Focus on Function for School-age Children* incorporates the International Classification of Functioning, Disability, and Health model with guidance from the ASHA about stuttering. See the information at the following link: https://www.asha.org/siteassets/uploadedFiles/ICF-School-Age-Stuttering.pdf
10. The CALMS Rating Scale provides measurement guidelines for cognitive, affective, linguistic, motor, and social ratings related to stuttering (Kaufman, 2005). See the rating scale at the following link: https://hhs.uncg.edu/csd/wp-content/uploads/sites/1009/2020/06/2.D.._CALMS_rating_form1.pdf

Connections Between Social Anxiety and Communication

Social anxiety is a concomitant concern for children and teens with selective mutism and/or stuttering. Social anxiety can negatively impact communication, disrupting working memory that is needed to attend to and process what someone else says and respond or initiate with ease (Moran, 2016). Individuals experiencing social anxiety feel uncertain about what to say and over time lack practice speaking and conversing. Their fearfulness takes up much needed working memory capacity. With increased concern or worry about speaking, individuals attempt to reduce their level of anxiety by avoiding people and places.

Stuttering and selective mutism can be concomitant disorders. Speech and language difficulties are known to be risk factors for developing stuttering (Seery et al., 2007) as well as selective mutism (Sharp et al., 2007). Both have a relationship to social anxiety and fear of negative evaluation (Iverach, Menzies, et al., 2011). According to K. Scaler Scott (2018), negative reactions related to stuttering have been known to manifest in outward symptoms of selective mutism.

The anxiety-based thought process for people experiencing selective mutism or stuttering may be experienced according to Clark and Wells (1995) and Rapee and Heimberg (1997). Following are thoughts that may be anticipated by an older child or teen who encounters a social situation in which they are expected to speak:

- There is an anticipation of a social situation that will incite fear *(Everyone will hear me)*.
- Then negative thoughts and beliefs arise about oneself in the social situation *(I am no good in social situations, I have trouble talking)*.

- The individuals then extend their attentional biases and self-focus on external cues *(People will be looking at me and think poorly of me)* and internal cues *(I will blush, my heart will beat fast, I'll be lightheaded, I'll feel like I am choking)*.
- Next, strategies and safety behaviors such as avoidance rush in to reduce the anxiety and discomfort *(I will try to rehearse what I need to say, I'll avoid eye contact, I won't say certain words, I won't speak, I'll escape)*.
- After the event, there are post-event thoughts and processing that take place *(I couldn't get my words out, I failed)*, which leads back to negative thoughts and beliefs about oneself in the situation and consequent self-focus, which once again repeats the cycle of avoidance for eye contact, words, and situations or other safety behaviors such as mental rehearsal, using safe words, staying with selected people, or escaping. This leads to feelings of defeat in situations where the individual is expected to speak socially (Iverach, Rapee, et al., 2017, p. 543).

Koç and Dündar (2018) investigated social anxiety and communication skills in 382 school students. They found that students with poorer communication skills (measured with the Communication Skills Scale; Korkut, 1997) had significantly higher levels of social anxiety ($p = .003$) as measured by the Social Anxiety Scale (Ozbay & Palanci, 2001). Those with higher social avoidance scores had lower basic communication skills and experienced greater feelings of worthlessness and overall social anxiety. As basic communication skills increased, social avoidance, anxiety, and feelings of worthlessness decreased. As self-expression increased, social avoidance, evaluation anxiety, feelings of worthlessness, and social anxiety also decreased. There was an inverse relationship with social anxiety and communication skills. With reduced experiences talking to a variety of people in various situations, speaking becomes less comfortable and more challenging.

Halls, Cooper, and Creswell (2015) investigated communication deficits and social anxiety disorder. Parents completed the Social Communication Questionnaire (SCQ) (Rutter et al., 2003) about their children. A total of 262 children had a diagnosis of social anxiety disorder, and 142 were identified as being anxious but without a diagnosis of social anxiety disorder. The children with social anxiety disorder scored significantly higher on all domains of the SCQ (i.e., poor social interaction, communication difficulties, and repetitive, restrictive behaviors) indicating more impairment than the children with nonsocial forms of anxiety. The authors concluded that social communication skills are important in treating social anxiety disorder. Rapee and Spence (2004) also believe that communication deficits may underlie social anxiety disorder and suggest that those with social communication difficulties receive treatment to improve social skills and reduce avoidance in social situations.

In a study by Klein, Ruiz, Morales, and Stanley (2019), parents of 38 children diagnosed with selective mutism rated their children using the Behavior Assessment System for Children, Third Edition (BASC-3). Parents identified *Withdrawal* as "clinically significant" and *Social Skills* and *Functional Communication* as "at-risk" in their children. Teachers rated the same group of children. Those with better social skills scored statistically, significantly higher on standardized and norm-referenced measures of vocabulary, narrative language comprehension, and auditory serial memory (Peabody Picture Vocabulary Test-4, Test of Narrative Language-2, and Test of Auditory Processing Skills-3, respectively).

Gary Renschler (2014), in his manual, *A Clinician's Guide to the Stuttering Clinic*, clearly stated that when demands become too overwhelming for the speech system, disruptions of fluency

occur, and effortless speech becomes effortful and uncoordinated. Speech also becomes difficult when muscles used for producing voice become tense. The tension generally comes from anxiety, specifically related to potential frustration and embarrassment the individual feels. In response, people who stutter (PWS) may avoid situations or words to help reduce demands on their speech system. By avoiding, they limit their experiences.

According to Renschler (2014), anxiety and fear are central to stuttering. Consequently, beliefs arise that intensify the person's fears and begin to cultivate negative perceptions related to speaking. Negative thinking from past experiences and negative memories further impacts the person's ability to speak with ease. Some people experience a "fight-or-flight" sensation that makes communication nearly impossible. When this happens, respiration is usually affected, and higher-order thinking becomes challenged. Some people who stutter would rather not speak than stutter. Renschler believed that anxiety and fearfulness could be a bigger problem than stuttering itself. When a person is in a state of heightened anxiety, they can have trouble thinking and experience a rapid heart rate, perspiration, dry mouth, headache, stomachaches, and other physiological symptoms. This negatively impacts communication.

Adolescents who stutter have an increased rate of social anxiety (Gunn et al., 2014). Iverach, Rapee, Wong, and Lowe (2017) support the notion that social anxiety in stuttering is maintained by fear of negative social evaluation and cognitions, use of safety behaviors, self-focus, and anticipatory and postevent processing. Research with a large sample of school-age children who sought treatment for stuttering found that 24% also met criteria for a diagnosis of social anxiety disorder (Iverach, Jones, et al., 2016). The percentages increase with age. According to Blumgart, Tran, and Craig (2010), between 22% and 66% of adults who stutter have been diagnosed with a comorbid anxiety disorder. Anxiety with anticipation of an oncoming speech struggle can make a person who stutters worry about being criticized. With anxiety, the person who stutters may want to avoid responding, and that impacts their conversational experiences.

Dysfluencies have been associated with both stuttering and selective mutism (Scott, 2018). Difficulties engaging in social language can lead to hesitations, reformulations, use of frequent filler words, and intermittent dysfluencies in children who stutter as well as children with selective mutism. According to Weiss (2004), pragmatic language intervention has been found to support children who stutter.

The ARC Model—Generalizing Skills

The ARC (*Anxiety Tolerance, Rescue Reduction*, and *Communication Confidence*) Model (Klein et al., 2021) is presented to gain a better understanding of anxiety as it impacts communication. The model provides information that can be shared with parents or guardians to help them gain a greater understanding of the anxiety-rescue-communication cycle. With this information comes awareness of a conceptual change that may seem counterintuitive at first but should help move the child or adolescent from safety-seeking behaviors to greater confidence communicating.

The ARC Model (Figure 0–1) was developed to help the facilitator of the ECHO Program integrate three characteristics of anxiety, specifically related to children and teens who experience anxiety and social communication deficits. Figure 0–1 provides a visual image of the model, moving from safety-seeking behaviors toward confidence that supports functional communication. The goal is to move up the hill from reliance on safety behaviors that limit communication

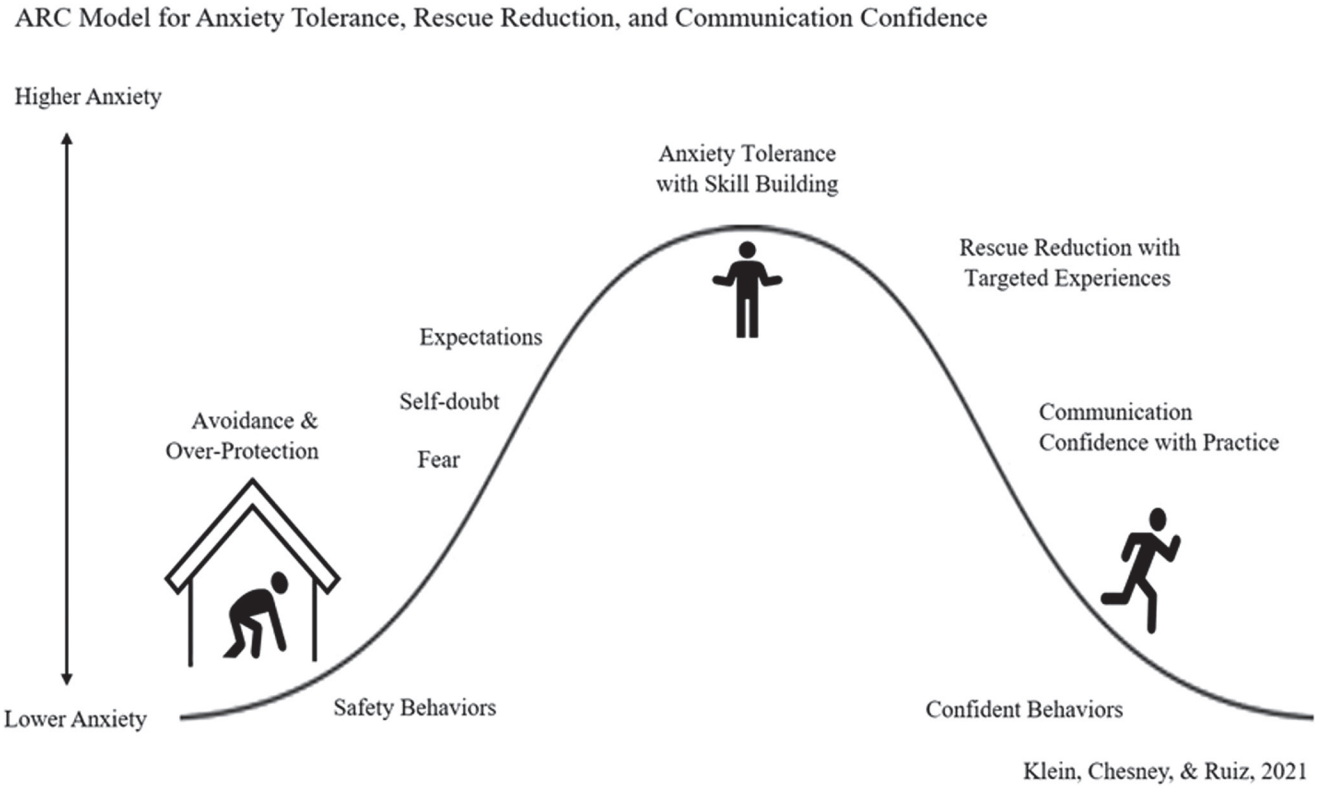


FIGURE 0–1. ARC Model for anxiety tolerance, rescue reduction, and communication confidence.

experiences and progress down the other side toward feelings of confidence during communication experiences. Progression generally occurs in the following manner.

Anxiety Tolerance

Anxiety tolerance can be beneficial in reducing the need for safety behaviors. Safety behaviors are actions people take when feeling anxious to reduce their discomfort, uneasiness, or worry. Avoidance and escape are common safety behaviors and may include not talking or staying away from places or people where there is an expectation to speak. However, this does not help the person eliminate anxiety related to expectations, self-doubt, and fear in the long term. In fact, it does the opposite, and with greater avoidance comes less interactions and less opportunities. By not avoiding but tolerating anxiety in stages, it becomes minimized, desensitized, and ultimately extinguished. This requires *anxiety tolerance*.

Rescue Reduction

Rescue reduction is a process that reduces negative reinforcement. Negative reinforcement is a powerful contributor in keeping a behavior going. The person who continues to rescue the child or teen by speaking for them or accepting avoidance is enabling the problem in some way. The

rescuer is usually unaware of the effects. In fact, they think they are helping the person. To combat learned avoidance, individuals cannot run away from their difficulties, they must address them.

Communication Confidence

The ultimate goal within the ARC Model is *communication confidence*. We want to help the child or teen cope with not being rescued unnecessarily, and we want to guide and support them to participate in the many joys that come from interacting and communicating with others at school, in public social settings, as well as at home when people other than the immediate family visit. Even when the child or teen refuses to attempt a skill or states they cannot do a specific task, they need to know it can be modified and made easier for them or tried later when they feel more capable. Encourage them to think about things that were once difficult but that they learned to do. Riding a bike, learning to read, and using a computer or cell phone are just a few common examples. Help the child or teen change their mental imagery of themselves. This has been found to reduce social anxiety during conversations (Leigh et al., 2020).

Some characteristics that reduce social anxiety and make an individual a more comfortable communication partner include an easygoing nature, being non-judgmental, non-critical, non-intimidating, non-pressuring, not overly enthusiastic, and presenting as a calm, humble, and supportive person.

Documentation and Progress

Parents of children with whom the authors have worked noted, *"Your program has given a tremendous boost to our child's progress, beyond anything that we have seen in prior therapies!"* When asked to rate sessions on a scale of 1 (not very helpful) to 5 (very helpful), a teenage client rated sessions as "6" and indicated that she has a *"fear of being judged"* and that *"the activities are giving me practice and more confidence to speak."* Another client's teacher noted that, *"He is having more of a presence in the class with his peers."* And, another client noted, *"I am improving with my tone of voice and expression when I speak."* As a result of using ECHO, children who have been mute have gained skills in making phone calls to a variety of stores to learn about a product, to recreational establishments for information, and to restaurants for ordering food. They have delivered prepared presentations in front of the class, and spoken to teachers, asking for needed information. They have also greeted others and engaged in conversations with friends. These were children who had not made progress previously with other programs. The vocal control approach was the initial strategy used. We have used the vocal control approach with 42 children and adolescents who have come to the University Community Clinic for speech-language evaluations for selective mutism (Ruiz & Klein, 2018) and did not speak upon entry and in most public encounters of their lives. Approximately 93% of the children were able to initiate their voices with ease by the end of the session. Parents were consistently surprised and elated at what they learned and saw during the initial comprehensive evaluation.

The following information represents average case improvements on the SMQ (Selective Mutism Questionnaire; Bergman et al., 2008).

> Scores on the SMQ range from 0 = *never*; 1 = *seldom*; 2 = *often*; to 3 = *always* and relate to frequency of speaking in 17 situations.

At School	(pre) 1.33/(post) 1.83
With Family	(pre) 1.4/(post) 2.2
In Social Situations	(pre) 0.6/(post) 1.6
Total	(pre) 18/(post) 30 points (out of total 51 possible)

Interpretation of the SMQ indicates substantial improvements.

Additional speaking has extended to teachers and school staff, peers at school, family members who do not live with the child, family members in unfamiliar places, family friends, doctors, waiters, and clerks.

Noted improvements in communicative interactions:

- Reduction in hesitations (extended pauses) from an average of 20 seconds to less than 4 seconds in response to saying an associated word.
- Responses to questions increased from answering with one word to using complete sentences.
- (Child's name) learned to make comments to others' statements and ask *wh-* questions in response to someone else speaking.
- (Child's name) sentence completion responses improved to include the following:
  - □ "When I share information with someone, *I try to make them understand what I say*."
  - □ "When someone else is talking, *I listen to them and respond.*"
  - □ "When speaking with someone, *I want to have a good conversation with them.*"
  - □ And they are spontaneously expanding answers to questions beyond the single word responses previously given.

Comments from parents:

- "I was so surprised and thrilled that (child's name) was able to tell the waiter what she wanted for dinner! That was just wonderful, and she even was answering my questions when we were out on the parking lot."
- A grandparent, who reported after engaging in dialogue with her teenage granddaughter for the first time, told parents of the child, "You must be so happy with her progress!"
- "The role-playing is surely good practice for (child's name). In terms of results, at the competition last week, (child's name) engaged with another child and said, 'I did a good job.' "
- "Last week (child's name) went with a group of friends to a farm for a hayride. She was not inhibited in front of other parents! Afterward we went for ice cream. We were in line and she asked for money since a few friends were buying on their own and she wanted to do the same. . . . After a few seconds, she said 'chocolate' for the flavor."
- "(Child's name) told us that she asked her teacher a question in school and that was the first time she has ever done that."
- "[For a class project,] she did a rap song as a project in front of class with another student."

- Toward the completion of the ECHO Program, a client who attended an orientation at a new high school, spontaneously gave their name and said what they were interested in studying for the future, in front of the group.
- "Our child has been seen by some of the biggest names in the field over the past 6 years. Using this program, it is the best result we have had to date!"

Comments from teachers:

- "(Child's name) did a great job today. (Child's name) came right up and the two got started [speaking in front of the class for their debate project.] After the other child presented her perspective, (child's name) looked at her and asked three questions she had practiced. When it was (child's name) turn to present her perspective, she did a great job. She began to read aloud, and [other students] said that others could hear her loud and clear in the back of the room. As she was reading, she would look up at the audience here and there as she was presenting her piece."

References

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.).

American Speech-Language-Hearing Association. (2020). *Person-centered focus on function for school-age children*. https://www.asha.org/siteassets/uploadedFiles/ICF-School-Age-Stuttering.pdf

Bergman, R. L., Keller, M. L., Piancentini, J., & Bergman, A. J. (2008). The development and psychometric properties of the selective mutism questionnaire. *Journal of Clinical Child and Adolescent Psychology*, *37*(2), 456–464. https://doi.org/10.1080/15374410801955805

Birmaher, B., Brent, D. A., Chiappetta, L., Bridge, J., Monga, S., & Baugher, M. (1999). Psychometric properties of the Screen for Child Anxiety Related Emotional Disorders (SCARED): A replication study. *Journal of the American Academy of Child and Adolescent Psychiatry*, *38*(10), 1230–1236.

Blumgart, E., Tran, Y., & Craig, A. (2010). Social anxiety disorder in adults who stutter. *Depression and Anxiety*, *27*, 687–692.

Clark, D. M., & Wells, A. (1995). The cognitive model of social phobia. In R. G. Heimberg, M. R. Liebowitz, D. A. Hope, & F. R. Schneier (Eds.), *Social phobia: Diagnosis, assessment and treatment* (pp. 69–93).

de Oliveira, I. R. (2015). Introducing the Cognitive Distortions Questionnaire. In I. R. de Oliveira (Ed.), *Trial-based cognitive therapy: A manual for clinicians* (pp. 25–40). Routledge.

Goberis, D., Beams, D., Dalpes, M., Abrisch, A., Baca, R., & Yoshinaga-Itano, C. (2012). The missing link in language development: Social communication development. *Seminars in Speech and Language*, *33*(4), 297–309.

Gunn, A., Mexzies, R. G., O'Brian, S., Onslow, M., Packman, A., Lowe, R., . . . Block, S. (2014). Axis I anxiety and mental health disorders among stuttering adolescents. *Journal of Fluency Disorders*, *40*, 58–88.

Halls, G., Cooper, P. J., & Creswell, C. (2015). Social communication deficits: Specific associations with social anxiety disorder. *Journal of Affective Disorders*, *172*, 1, 38–42. https://doi.org/10/1016/j.jad.2014.09.040

Iverach, L., Jones, M., McLellan, L. F., Lyneham, H. J., Menzies, R. G., Onslow, M., & Rapee, R. M. (2016). Prevalence of anxiety disorders among children who stutter. *Journal of Fluency Disorders*, *49*, 13–28.

Iverach, L., Menzies, R. G., O'Brian, S., Packman, A., & Onslow, M. (2011). Anxiety and stuttering: Continuing to explore a complex relationship. *American Journal of Speech-Language Pathology*, *20*(3), 221–232.

Iverach, L., Rapee, R. M., Wong, Q. J. J., & Lowe. R. (2017). Maintenance of social anxiety in stuttering: A cognitive-behavioral model. *American Journal of Speech-Language Pathology*, *26*¸ 540–556.

Kaplan, S. C., Morrison, A. S., Goldin, P. R., Olino, T. M., Heimberg, R. G., & Gross, J. J. (2017). The cognitive distortions questionnaire (CD Quest): Validation in a sample of adults with social anxiety disorder. *Cognitive Therapy Research*, *41*, 576–587.

Kaufman, E. (2005 October 22). *Using the Calms model as a thematic approach to fluency therapy*. Louisiana State University at Baton Rouge. https://www.mnsu.edu/comdis/isad8/papers/kaufman8.html

Klein, E. R., Armstrong, S. L., Gordon, J., Kennedy, D. S., Satko, C. G., & Shipon-Blum, E. (2018). *EXPRESS: Expanding receptive and expressive skills through stories.* Plural Publishing.

Klein, E. R., Chesney, L., & Ruiz, C. E. (2021). *The ARC model* [Lecture notes]. Department of Communication Sciences and Disorders, La Salle University.

Klein, E. R., Ruiz, C. E., Morales, K., & Stanley, P. (2019). Variations in parent and teacher ratings of internalizing, externalizing, adaptive skills, and behavioral symptoms in children with selective mutism. *International Journal of Environmental Research and Public Health*, *16*(21), 4070. https://doi.org/10.3390/ijerph16214070

Koç, M., & Dündar, A. (2018). Research on social anxiety level and communication skills of secondary school students. *Asian Journal of Education and Training*, *4*(4), 257–265. https://doi.org/10.20448/journal.522.2018.44.257.265

Korkut, F. (1997). Evaluating communication skills of university students. *National Educational Sciences Congress 4th* (pp. 208–218). Anadolu University, Eskisehir.

Lang, C., Nir, Z., Gothelf, A., Domachevsky, S., Ginton, L., Kushnir, J., & Gothelf, D. (2016). The outcome of children with selective mutism following cognitive behavioral intervention: A follow-up study. *European Journal of Pediatrics*, *175*, 481–487. https://doi.org/10.1007/s00431-015-2651-0

Leigh, E., Chiu, K., & Clark, D. M. (2020). The effects of modifying mental imagery in adolescent social anxiety. *PLOS ONE*, *15*(4), e0230826. https://doi.org/10.1371/journal.pone.0230826

Moran, T. P. (2016). Anxiety and working memory capacity: A meta-analysis and narrative review. *Psychological Bulletin*, *142*, 831–864. https://doi.org/10.1037/bul0000051

Ozbay, Y., & Palanci, M. (2001). *Social anxiety scale: Validity, reliability study.* VI. National Psychological Counseling and Guidance Congress. Ankara, ODTÜ.

Ramig, P. R., & Dodge, D. M. (2005). *The child and adolescent stuttering treatment and activity resource guide*. Thomson Delmar Learning.

Rapee, R. M., & Heimberg, R. G. (1997). A cognitive-behavioral model of anxiety in social phobia. *Behavior Research and Therapy*, *35*, 741–756.

Rapee, R. M., & Spence, S. H. (2004). The etiology of social phobia: Empirical evidence and an initial model. *Clinical Psychological Review*, *24*, 737–767.

Renschler, G. J. (2014). *Clinician's guide to the stuttering clinic.* http://www.mnsu.edu/comdis/kuster/teaching/rentschler/Rentschler-StutteringClinicManual.html

Ruiz, C. E., & Klein, E. K. (2018). Surface electromyograph to identify laryngeal tension in selective mutism: Could this be the missing link? *Biomedical Journal of Scientific & Technical Research*, *12*(2), 1–4. https://doi.org/10.26717/BJSTR.2018.12.002222

Rutter, M., Bailey, A., & Lord, C. (2003). *The social communication questionnaire*. Western Psychological Services.

Schum, R. (2002). Selective mutism: An integrated approach. *The ASHA Leader*, *7*(17), 4–6. https://doi.org/10.1044/leader.FTR1.07172002.4

Scott, K. S. (2018). *Fluency plus: Managing fluency disorder in individuals with multiple diagnoses.* Slack.

Seery, C. H., Watkins, R. V., Mangelsdorf, S. C., & Shigeto, A. (2007). Subtyping stuttering II: Contributions form language and temperament. *Journal of Fluency Disorders*, *32*(3), 197–217.

Sharp, W. G., Sherman, C., & Gross, A. M. (2007). Selective mutism and anxiety: A review of the current conceptualization of the disorder. *Journal of Anxiety Disorders*, *21*(4), 568–579.

Super Duper Publications. (2004). *Speech-language-hearing case history form.* https://www.superduperinc.com/caseHistory/caseHistory.pdf

Weiss, A. L. (2004). Why we should consider pragmatics when planning treatment for children who stutter. *Language, Speech, and Hearing Services in Schools*, *35*, 34–45.

Yaruss, J. S., Coleman, C. E., & Quesal, R. W. (2012). Stuttering in school-age children: A comprehensive approach to treatment. *Language Speech Hearing Service School*, *43*(4), 536–548. https://doi.org/10.1044/0161-1461(2012/11-0044)

Module 1

VOCAL CONTROL: GAINING CONTROL OF YOUR VOICE FOR SPEECH INITIATION

Background Introduction and Theoretical Framework

Voice production starts at the time we are born. Our cry signifies the beginning of life as well as a future communication tool. Voice initially manifests itself in a spontaneous manner and gradually develops into speech sounds. Voice production, however, is a complex process that requires the coordination of several systems (Bouchard et al., 2013; Davis et al., 1996; Jürgens, 2009).

The activities are presented in a hierarchical format with goals to teach how speech sounds are made and to improve purposeful voice initiation and control to express wants and needs. This module is valuable even if one can make speech sounds with ease. As children/teens engage in these activities, the mystery about how we talk is reduced. This helps them feel less anxious and more at ease about speaking. Children/teens learn how to manipulate their voice, modify loudness and pitch, produce speech on demand, and use intonation to identify and convey emotions. Each activity in this module contains the goals of the activity, materials, and how to play. The seven activity titles follow in italics:

1. *Sound Off:* Speech sound production
   - Airflow (continuous or stop)
   - Variations in mouth, nose, and throat sounds (feeling vibration and placement)
2. *Pitch Pipe:* Changing pitch
   - Voice pitch activities (high, normal, low)
3. *Ramp It Up:* Changing loudness
   - Voice loudness activities (loud, normal, soft, whisper)
4. *Vocal Marathon:* Freeing the voice
   - Learning to control and release vocal tension purposefully
5. *Tag Along:* Generation of new words
   - Increasing awareness of sound placement, manner, and voicing (coarticulation)
6. *What's Up?* Answering questions
   - Using vocal control to answer direct questions (who, what, where, when, why, and how)

7. *Let's Face It:* Emotions with voice
    - Using voice to convey emotions (happy, sad, angry, anxious, and disgusted)

Proposed Hierarchy for Face-to-Face and Online Sessions: How to Begin

For in-person face-to-face work, the parent/guardian may be present for some or all of the initial session to facilitate communication as needed. Table 1–1 provides some guidance on how sessions may need to be structured. (This information is based on the authors' professional clinical experiences.)

Children/teens with Selective Mutism often need support when beginning therapy with someone new. Therefore, an extra table has been added with specific modifications to the heirarchy for teletherapy. Depending on the age of the child, we advise that the parent or guardian be part of the first session. We also advise that the facilitator be able to modify audio and video components when using teletherapy format. For in-person face-to-face work, the parent/guardian may be present for some or all of the initial session to facilitate communication as needed. Table 1–2 provides guidance on how sessions with children with selective mutism may need to be structured. The proposed charts may be modified as needed.

In working with children/teens who stutter, we encourage comfort with stuttering and spontaneous fluency (Sisskin, 2018). Using a multifactorial model, dysfluent speech incorporated a

TABLE 1–1. Hierarchy for Face-to-Face Sessions for Selective Mutism

Step 1	Introduction session with parent and child/teen—Facilitator provides information about self and the program and what they will be doing together related to the work within the modules. Child/teen may speak directly or through parents.*
Step 2	Parent is present initially. The facilitator begins discussing how sound production and voicing take place. It is best if the child/teen tolerates their voice to be heard by the facilitator as they speak to the parent. Responses from child/teen may also include pointing, nodding, circling or underlining responses, or drawing, as communication is the primary intention.
Step 3	Parents may be involved to help with activities. Facilitator may avert eye contact and use defocused communication at times (so attention is not always on the child/teen). Responses from child/teen are verbal (reading aloud, simple phrases, and responding). Audible whispers (whispers that can be heard) are acceptable as this reduces vocal fold tension.
Step 4	Parents close by, if needed. Child/teen responses are verbal, may face away or use a barrier between facilitator and child/teen. *Open-ended* (*wh*-) questions may change to *choice* questions (giving two or three options) and then to *yes/no* questions, depending on responses. Child/teen may record their response on a recording device, away from the facilitator, and return to play it. Audible whispers are acceptable as this reduces vocal fold tension.
Step 5	Parents may or may not be close by. Child/teen responds with words, phrases, sentences, and spontaneous verbal output. *Open-ended* (*wh*-) questions may change to *choice* questions (giving two or three options) and then to *yes/no* questions, depending on responses. Voice may be quiet but audible, not a whisper.
Step 6	Child/teen responds and initiates using words, phrases, sentences, and spontaneous verbal output. Voice is audible.

Note: *Parents or guardian or sibling or selected friend may be part of the follow-up sessions, as determined.

dynamic pathways theory (Smith & Weber, 2017). Overtime stuttering is impacted by the struggle to maintain fluency compounded by tension, embarrassment, and feeling of lack of control. Using the Avoidance Reduction Therapy for Stuttering (ARTS) approach by Vivian Sisskin (2018), the goal is to reduce avoidance reactivity and detrimental thinking that often leads to greater struggle. Responses from child/teen include reduction of effort to control or manage one's stuttering. This is a framework that we want to incorporate within the ECHO Program (Table 1–3).

TABLE 1–2. Heirarchy for Online Sessions for Children/Teens With Selective Mutism

Step 1	For this part, the facilitator will be speaking primarily to the parent so the video and sound are best to be on. At this point, the child/teen can remain silent, use the chat tool or speak through parents or directly to the facilitator.
Step 2	The child/teen may want to leave the video and sound off initially. They may use the chat feature to communicate with the facilitator.
Step 3	Parents close by. Leave the video on and turn the audio off. Responses from child/teen may be with gestures and online *chat* feature to communicate in writing.
Step 4	Parents close by, if needed. Video *on* and sound *off*, but to come *on* for responses. Child/teen may turn away from view if needed.
Step 5	Parents close by, if needed. Video and sound remain *on* for the duration of the session. Child/teen may turn away from the camera, but responses are to be verbal.
Step 6	Parents close by, if needed. Video and sound remain *on* for the duration of the session. Child/teen should face the camera, and responses are to be verbal.

Note: Parents or guardian or sibling or selected friend may be part of the follow-up sessions, as determined.

TABLE 1–3. Hierarchy for Face-to-Face and Online Sessions for Children/Teens Who Stutter

Step 1	Introduction session with parent and child/teen—Facilitator to provide information about self and the program and what they will be doing together related to the work within the modules.
Step 2	*Parent may be present initially. Orientation to sound production and voicing. It is best if the child/teen exhibits less reactivity related to stuttering and at the same time does not suppress dysfluencies. If online, video may be off initially, if desired.
Step 3	Facilitator may avert eye contact and use defocused communication at times (so attention is not always on the child/teen). Responses from child/teen are verbal (reading aloud, simple phrases, and responding). The child/teen focuses on the task rather than trying to maintain perfect fluency. Encourage child/teen to avoid escape behaviors such as using filler words, word substitutions, and loss of eye contact, and to disclose that they stutter. The goal is to stutter more easily.
Step 4	Child/teen responds and initiates using words, phrases, sentences, and spontaneous verbal output. Voice is audible. It is important for children or teens who stutter to learn about how voice and speech are produced, and how to stutter with greater ease, including voluntary stuttering.

Note: *Parents or guardian may be part of the follow-up sessions, as determined.

When working with people who stutter, we want to take the mystery out of stuttering, and we want to consider the components that make up stuttering. The iceberg analogy is worth introducing because it takes into consideration the child/teen's dysfluent behaviors and concealment or hidden emotions. They typically focus on their repetitions, blocks, and prolongations of speech. However, avoidance and feelings of guilt and shame need to be considered. Those feelings, when disclosed, are often easier to diminish (Sheehan, 1970).

Process of Vocal Control

To vocalize, the respiratory, phonatory, and resonatory systems must work cohesively. The respiratory system (air from lungs) provides the fuel to get the voice started. The phonatory system (sound from the vocal folds or voice box) uses the airflow to set the vocal folds into vibration and to change the pitch (high and low/deep voice). The resonatory system shapes the voice into speech sounds that can come out of the mouth as in the sound /a/ as in apple, or via the nose as in the sound /m/ as in milk. Another aspect of voice production is that it can be produced reflexively/involuntarily (like when one coughs, cries, laughs, or screams) or purposefully/voluntarily (like when one produces sounds to form words for speech purposes).

When one speaks, one must be able to turn the voice ON and OFF depending on the sound the person is attempting to produce. For example, the sound /s/ as in *soap* does not use voice from the vocal folds. As one holds that sound, one only hears air coming out of the mouth. The sound /m/ as in milk requires vibrations from the vocal folds and through the nasopharynx with sound coming from the nose. Vibrations can be felt on the throat and on the nose. Timely voice initiation and good ability to turn the voice ON and OFF are necessary for adequate vocal control during speech production.

Voluntary and involuntary voice production are controlled by two different parts of the brain. For the purpose of this module, the focus will be on voluntary voice production. Voluntary voice production is essential for the initiation of speech. It is the responsibility of the anterior cingulate cortex (ACC) which translates intentions into actions, that is, it helps to provide vocal control for speech purposes (Paus, 2001). It is a specialized area of the brain that learns and adapts over time (Allman et al., 2006). The ACC plays an important role in initiation, motivation, and goal-directed behaviors. It is essential and crucial in the voluntary initiation of speech and vocalization via connections with brainstem nuclei that control the muscles of articulation and phonation (Jürgens, 2009; Medford & Critchley, 2010). According to Holroyd and Yeung (2012), the ACC shares connections with limbic structures and serves as a bridge between the decision-making process of the frontal lobe and the "emotional" world of the limbic system. Besides its role in voluntary vocal control, this part of the brain also integrates cognitive and emotional processing including anxiety (Caruana et al., 2018; Yamasaki et al., 2002). It plays an important role in regulating cognitive control over goal-directed behavior (Shenhav et al., 2013; Sheth et al., 2012). According to Shang et al. (2014), anxiety has a direct effect on the ACC as demonstrated by reductions in the right anterior cingulate gyrus and the left inferior frontal gyrus gray matter volumes, in patients with anxiety disorders. A compromised ACC lacks the ability to adequately perform its role of translating intentions into voluntary actions, and of regulating and monitoring distractors to ensure production of the intended target sound (Piai et al., 2013). Therefore, when people are uncomfortable within a situation where they are expected to speak, it becomes more difficult to purposefully initiate their voices for speech purposes (Ruiz & Klein, 2014, 2018).

Children and adolescents with selective mutism or those who stutter have difficulty initiating voice with ease for speaking. Research indicates difficulty with tension in the laryngeal area (Ruiz & Klein, 2014). Children and teens with selective mutism have identified this problem that impedes their ability to get their voice started to speak.

Using sEMG (surface electromyography), we have identified laryngeal tension during silent periods in children with selective mutism (Ruiz & Klein, 2018). Level of tension, identified by placing sensors on the individual's neck, was significantly above normal levels in children with selective mutism when asked to imitate a vowel sound or asked to say their name. By instituting a humming sound (directing voice through the nasopharynx—nose—instead of the oropharynx—mouth), we have been able to "turn the voice on" for modification of vocal control.

Success With Vocal Control

The vocal control approach has been helpful with people with selective mutism or those who stutter (PWS). We have used the vocal control approach with 42 children and adolescents who have come to the University Community Clinic for speech-language evaluations for selective mutism (Ruiz & Klein, 2018). Approximately 93% of the children were able to initiate their voices with increased ease. PWS have been reported to have longer vocal reaction times, suggesting difficulty in rapidly updating their speech/voice plans (Mock et al., 2015). The systematic and hierarchical methodology of the vocal control approach addresses reported vocal reaction time issues for people who stutter. Central control abnormalities in stuttering are a system dysfunction that interferes with rapid and dynamic speech/voice processing for production (Ludlow, 2005; Ludlow & Loucks, 2003; Ward, 2017). According to Watkins, Smith, Davis, and Howell (2008), "stuttering is a disorder related primarily to disruption in the cortical and subcortical neural systems supporting the selection, initiation and execution of motor sequences necessary for fluent speech production" (p. 50). Stuttering tends to be cyclic and difficult to irradicate completely once it becomes chronic. Vulnerabilities for chronic stuttering include social anxiety (Messenger et al., 2004) and the disruptions in the speech motor system (Kleinow & Smith, 2000). Attempts to stutter more easily and reduce escape behaviors instead of "trying to fix stuttering" are worthwhile.

Purposeful vocalizations and verbalizations may also be further compromised by our interpretations of others' emotions. According to Caballero and Díaz (2019), emotional expressions influence peoples' expectations for social decision-making, even if they have not experienced a similar interaction. Social interactions are closely dependent on our ability to decode cues and effectively respond to emotional information carried in the human voice (Grossmann et al., 2013; Hawk et al., 2009). Lima (2019) reported that individuals are able to recognize emotions within the first 500 ms of exposure of hearing someone's voice, with 90%-plus accuracy. This module dedicates a section on establishing the individual's performance for recognition, imitation, and reproduction of emotions related to voice.

To implement the skills and work toward attaining these goals, there are seven interactive activities/games, also available online for teletherapy. The companion website to access these online activities can be found in the manual.

Activity Game 1: Sound Off

This activity has three parts: (1) Nasal vs. Oral Sounds, (2) Placement and Distinctive Features of Sounds, and (3) Identification of Sound Production in Words.

Goals

- To increase awareness of nasal vs. oral and throat speech sound production.
- To increase awareness of voicing and distinctive features (nasal/oral/throat, airflow continuation or stop, voice vibration or no vibration) for speech sound production.
- To increase awareness of articulatory contacts (lips, teeth, palate, tongue, or glottal) for speech sound production.
- To identify voicing and distinctive features for speech sound production in words.

When we speak, we usually focus on the words that come out of our mouths but very little on what it takes to produce them. This section details each of the sounds in English by describing where we produce them (lips, front-mid-back of the tongue, teeth, roof of the mouth, etc.) and how we produce them (with voice, without voice, ability to hold the sound, etc.).

Anatomical illustrations are provided to aid visualization of the structures within the oral and nasal cavities. Practice sheets, found in the tables, are available to assess initial understanding of the concepts introduced in this section.

Note: Letters in brackets or slashes should be said as the sounds they make, for example, /s/ is to be said as "ssssss" and not the name of the letter "es" or /b/ is to be said as "b" and not the name of the letter "be." This is important to differentiate the concepts of airflow and voicing.

Materials: Nasal Sounds vs. Oral Sounds vs. Throat Sounds

These three categories of sounds are used to simplify speech that is produced in the nasal cavity from that produced in the back of the mouth (velars) from all other consonant sounds in English. These groupings tend to be easier for children and teens to differentiate. Illustrations showing the pathway for nasal (nose) sounds production (/m/ as in *mom*, /n/ as in *no*, and /ng/ as in *king*) (Figure 1–1).

- Illustrations showing pathway for oral (through mouth) sounds production. All vowels, all consonants except /m/, /n/, and /ng/ are primarily directed through the oral cavity (Figure 1–2).
- Illustrations showing pathway for oral/throat (back of mouth) sounds production: /k/, /g/ and /ng/, and /h/ (Figure 1–3).
- Illustrations showing all contact points of articulation for all sounds in English (Figure 1–4).

How to Play: Nasal vs. Oral and Throat Sounds

Nasal Sounds

To feel the nasal sounds, place two fingers over one side of the nose. Produce and hold the sound /m/. Feel the vibrations. Sound is traveling through the nose. Emphasis is placed on differentiating mouth from nose sounds by feeling the vibration on the nose. In order to produce these sounds, have the child/teen close their mouth and only allow the sound to come through their nose.