Implications of a Multidimensional Model of Assessment for the Treatment of Children Who Stutter

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Abstract: This article provides an overview of the CALMS (Cognitive, Affective, Linguistic, Motor, Social) Assessment for School-Age Children Who Stutter. The assessment is published in partnership with the University of Nebraska and is available for use by school-based and clinic-based professionals who assess and treat disfluent children. The assessment is based on a model of stuttering, which emphasizes an interactive, multidimensional approach to assessment and treatment. The following sections of the article describe the assessment and discuss how assessment data can be used to plan treatment.

Key words: children who stutter, the CALMS, assessment and treatment for stuttering

Introduction

The purpose of this article is to provide an overview of the CALMS Assessment for School-Age Children Who Stutter. This assessment is published in partnership with the University of Nebraska and is available for use by school-based and clinic-based professionals who assess and treat disfluent children. The assessment is based on a model of stuttering, which emphasizes an interactive, multidimensional approach to assessment and treatment. The following sections of the article describe the assessment and discuss how assessment data can be used to plan treatment.

What is the CALMS Assessment?

The CALMS Assessment is a multiple-domain and data based guide for examining school-age children who stutter (CWS). It is intended to document a child's strengths and weaknesses in performance across the five CALMS domains. Speech-language pathologists (SLPs) can use the CALMS assessment to gather information about five factors that are thought to be key to stuttering in (CWS). The set of CALMS assessment materials is specifically designed to assist a clinician in planning for, and acquiring information about, the current profile of a child's stuttering through ratings of performance on 23 items. A rating from 1 to 5 is used for each item. Each rating is based on a level of concern about a child's performance ability on any particular item. A rating of 1 = "No Concern," 2 = "Borderline Concern," 3 = "Mild Concern," 4 = "Moderate Concern," and 5 = "Extreme Concern." Data derived from the assessment can then guide a clinician in the planning of treatment.

The CALMS assessment is NOT a standardized test or norm-referenced instrument. It follows the principle of criterion-referenced testing in that the data acquired from the CALMS assessment for each child reflects his/her current level of performance. That child's performance is independent of how other CWS perform and is not compared to children who are fluent speakers.

How is the CALMS Assessment Used?

The CALMS assessment was not developed to take the place of various standardized instruments available for stuttering such as the Stuttering Severity Instrument Fourth Edition (SSI-4; Riley 2009), The Behavior Assessment Battery for School-Age Children Who Stutter (Brutten and Vanryckeghem 2007), the Test of Childhood Stuttering (TOCS; Gillam, Logan, and Pearson 2009) and the Overall Assessment of the Speaker’s Experience of Stuttering (OASES; Yaruss and

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Quesal 2010). Some of the items used in the CALMS assessment are similar to those found in these standardized instruments; others were developed and field-tested in Nebraska and Iowa (USA) public schools over the past several years. Thus, this assessment can be used alone or in combination with other standardized measures of stuttering that will allow for a comprehensive assessment. Because many clinicians do not have access to the standardized instruments listed above, the CALMS could serve as a resource and guide for a clinician conducting an evaluation of school age CWS.

Why was the CALMS Assessment Developed?

Research has shown that SLPs do not feel comfortable or competent to work with CWS (Brisk, Healey, and Hux 1997, Cooper and Cooper 1996, Kelly, Martin, Baker, Rivera, Bishop, Kriziske, Stettler, and Stealy 1997, Tellis, Bressler, and Emerick 2008). Thus, the CALMS assessment was developed to: 1) help clinicians feel more comfortable and confident in evaluating stuttering, and 2) show how information from the CALMS assessment directly translates into specific therapy goals and objectives.

The Concept of Stuttering as a Multidimensional Disorder

An examination of several recent multidimensional models of stuttering focus on a child’s 1) speech-related neurophysiological processes, 2) linguistic skills and capacities, 3) emotional and attitudinal factors, 4) reactions to various listeners and speaking situations, and 5) cognitive skills. Some recent multidimensional models of stuttering include the Demands and Capacities Model (Starkweather 1987), the Revised Component Model (Riley and Riley 2000), the Multifactorial Dynamic Disorder Model (Smith 1999), and the Dual Premotor Model of Stuttering (Alm 2007). All of these models describe different ways various factors contribute to stuttering, which determines the level of fluency or stuttering an individual produces.

The CALMS Model of Stuttering

The CALMS model, developed by Healey, Scott Trautman, and Susca (2004), proposes stuttering is maintained by five domains or factors. These include Cognitive, Affective, Linguistic, Motor, and Social (CALMS) contributions to a fluency disorder. These factors interact in a complex way between and among factors (represented by the lines connecting the factors in the model below).

All five domains can contribute independently or in combination to create various frequencies and types of stuttering. It is proposed that each child has a different level of abilities in each of the five CALMS domains. The assessment is designed to evaluate the functional level of each domain, which can be illustrated by a profile of abilities once all of the information from the assessment has been collected.

In a general way, the five CALMS domains reflect the strengths and weaknesses within each component for each person who stutters. Everyone who stutters is different and the functional level of any one of the CALMS factors will dictate how child will manage his/her stuttering. This means we need to understand the current functional level of a child’s thoughts, awareness, understanding, and perceptions (Cognitive) as well as his/her feelings and attitudes (Affective). These factors will impact how well a message will be formulated (Linguistic). Once the message is formulated, the child’s speech motor system (Motor) will dictate how fluent or stuttered the message will be in a particular speaking situation given a particular listener or group of listeners (Social). The complex interplay between and among factors is thought to determine how effectively an utterance is produced within the context of an unstable speech motor system that sometimes functions along a fluency-stuttering continuum (Runyan and Adams 1981).

It is assumed that disruptions or difficulties in managing one or more of the CALMS domains will result in increased stuttering. For example, the types of thoughts, feelings, and attitudes will contribute directly to what the child says and how fluently it is spoken in a given situation with a particular listener. The variable levels of performance in each component can occur at any time.

A graphic representation of the CALMS Model (Fig. 1) is shown on the next page and reprinted with permission.

Applying the CALMS Model to Assessment and Treatment

The CALMS assessment focuses on existing circumstances at any given time that characterize a fluency disorder rather than a diagnosis of whether stuttering exists or not. In this sense, the CALMS assessment examines a child’s performance against him/herself rather than against another child who stutters or one
The CALMS Model of Stuttering

Affective
- Feelings
- Emotions
- Attitudes

Cognitive
- Thoughts
- Awareness
- Perceptions
- Understanding

Linguistic
- Language skills
- Message formulation
- Discourse complexity

Social
- Avoidance
- Effects of listener
- Impact of speaking situation

Motor
- Timing & coordination of speech movements
- Type & form of stuttering events
- Stuttering severity

What are the main goals of an integrated therapy approach relative to the CALMS Assessment?

A popular notion among speech-language pathologists (SLPs) who specialize in stuttering is that people who stutter represent a heterogeneous group of individuals (Yairi and Seery 2011). Therefore, the treatment should be tailored to meet the needs of each child. Stuttering can be treated from different perspectives but the philosophical approach that is consistent with the CALMS Model is an integration of fluency shaping and stuttering modification strategies (Bennett 2006, Conture 2001, Gregory 2003, Guitar 2006, Healey and Scott 1995, Manning 2010, Ramig and Bennett 1997, Shapiro 2011, Yairi and Seery 2011). These approaches encourage the child to use fluency-enhancing techniques with deliberate modification of stuttering severity and negative emotions tied to stuttering. The goals and objectives that are developed for treatment are individualized for each child based on the profile of performance from the assessment. In general, the main goals are: 1) to help school-age CWS communicate in an...
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easier way (i.e., through easier, less tense stuttering or talking fluently without extreme physical or mental effort), 2) to enhance children's awareness and understanding of their stuttering, 3) to improve children's feelings, emotions, and attitudes about stuttering, and 4) to have children feel comfortable saying what they want, to anyone, at anytime, in any situation, without fear or avoidance (Healey and Scott 1995, Ramig and Bennett 1995).

Finally, a clinician, the assessment team, and the child who stutters should set goals that meet the individual's needs. For example, even though it is important for CWS to learn to identify stuttering events in their speech, some will have a relatively easy time learning to do this while others might have difficulty recognizing when a stuttered moment occurs. Thus, a clinician needs to be flexible in setting goals early in treatment and be able to shift to other short-term goals that seem to move the child's stuttering management in a positive direction.

What's involved in an integrated treatment approach?

The process of changing stuttering takes considerable time and effort. Stuttering is not something that is "fixed" and changes don't occur in a short amount of time. Because therapy can last from months to several years, CWS or parents may get discouraged or be concerned that there is limited improvement through therapy. Clinicians, CWS, and parents need to realize that any treatment outcome is a by-product of several factors such as the amount of time devoted to treatment, the skills of the clinician, the motivation of the child, the support parents provide during the treatment process, and the development of appropriate treatment goals.

An integrated approach is designed to make therapy a positive experience. The clinician needs to have a positive perspective about stuttering and help a child understand what factors contribute to increases or decreases in stuttering. Specifically, an attempt has been made to include activities in therapy that address at least one or more of the CALMS components. For example, a clinician can help a child understand what happens when they stutter by discussing and modeling changes in how talking can be made easier. The clinician can imitate the stuttering behavior the child exhibits and then discuss what might be happening in the child's speech mechanism when stuttering occurs. At the same time, a clinician can ask the child how he/she feels emotionally when stuttering happens, what thoughts he/she is having, and how the stuttering might change depending on what is said and who is listening.

How does each CALMS component relate to treatment?

1. Cognitive Component:
   Before CWS can work on changing the way they talk, it is important to determine what they understand about their stuttering and what happens when they talk fluently. It is also important to help CWS to be aware of what they do when they stutter and what they think and feel about other peoples' reactions to their stuttering. Treatment should help children understand that their stuttering is, to some extent, under their control. The overall goal of the cognitive aspect of treatment is to help CWS learn how to think more positively about their stuttering and not perceive their stuttering as something bad or something they are doing is wrong. The focus too is on having them learn how to monitor their speech and be aware of stuttering events when they occur. Awareness of stuttering is an important part of the treatment process but a process that can take considerable time to develop. We also want children to understand how and why certain techniques they have been taught can improve the management of their stuttering.

2. Affective Component:
   This component addresses a child's feelings, emotions, and attitudes related to stuttering. If children have any negative feelings about their stuttering, then these need to be addressed in therapy. Included in this aspect of therapy is some discussion of being teased or bullied when they stutter and what they can do or say as a response. It is also common for CWS to avoid stuttering or hide the fact that they stutter. However, therapy should focus on reducing or eliminating the feeling of wanting to avoid or conceal stuttering. Through the course of therapy, we want children to know that it is OK to stutter, it is OK to fail, and it is OK to feel bad about stuttering. Children also need to understand that acceptance of their stuttering is one of the keys to managing it.

Acceptance of stuttering does not mean that one does not need to work on stuttering. In fact, it means quite the opposite. Without acceptance, anything CWS try to do to change the way they speak probably will not be maintained. Acceptance starts with learning what happens during a stuttering moment (Williams 1971) and is
the foundation of learning to use speech modification techniques. Helping children accept their stuttering will also lead to more positive feelings and reactions about the way they talk as well as help them realize that stuttering does not define who they are as a person (Murphy, Yaruss, and Quesal 2007a, Yaruss, Coleman, and Quesal 2012). The treatment environment can facilitate a child’s acceptance of stuttering when the clinician is comfortable addressing the stuttering in an honest, open manner. There is much each child can teach a clinician about how he/she is coping with stuttering. The clinician needs to be a good listener and discuss the child’s feelings openly without judgment.

3. Linguistic Component:
One well-known feature of stuttering is that short, simple phrases typically produce less stuttering than long, complex utterances. And, when the topic of discussion becomes more complicated, an increase in stuttering will be observed. When a clinician carefully manages the complexity of the spoken message, CWS can experience success at a level that produces the most fluent or less stuttered speech. Once some success is achieved at simple linguistic levels, a clinician can gradually increase the difficulty of what is said to see if the child can continue to manage his/her speech. The quantity and complexity of information conveyed could impact the level of stuttering. This is why a clinician needs to carefully monitor and plan the linguistic complexity of the materials that will be used during each treatment session.

4. Motor Component:
Speaking is a very complex motor act, so it takes a lot of skill and coordination to speak fluently. CWS are thought to have a fragile or unstable motor control system for speech (Smith 1999). Sometimes the speech motor system works smoothly (fluency appears) but at other times, the system shifts into a repetitive pattern and/or sounds/words become prolonged or blocked. To minimize these disruptions in the forward flow of speech, clinicians teach CWS to implement techniques for talking smoothly and easily. Some techniques are more helpful than others but the goal is to find techniques that compensate the most for disruptions in a child’s respiratory, phonatory, and articulatory speech processes. For example, if a child has difficulty initiating voicing at the beginning of a word or phrase, then the child will benefit from being taught a technique called an “easy onset of phonation.” At first, we might have the child talk in a slightly artificial or exaggerated way in order to practice this new voice initiation technique. With practice, the goal is to have the child develop enough skill in using any fluency enhancing and/or stuttering modification technique well enough so it can sound somewhat natural. We might also teach a child how to modify a stuttering event when it occurs. In all, we will try to give children lots of tools for talking more easily and eventually, let them choose which speech tools are the most helpful (Bennett 2006). The overall goal of therapy for the motor component of the CALMS approach is to teach motor speech strategies that facilitate a combination of improved timing and coordination of speech movements as well as a reduction in the tension and effort in producing speech.

5. Social Component:
The types of speaking situation and listener also impact how well children manage their stuttering. Some speaking situations will be quite difficult and others will be easy, so developing a hierarchy of speaking situations is one aspect of the social component that needs to be addressed in treatment. Another goal of treating the social component is to help CWS become good communicators. This implies that CWS should: a) not avoid talking to a person or avoid a situation because stuttering might occur, b) focus on being a good listener, c) provide an acceptable amount of eye contact with the listener, and d) tolerate interruptions by others. Clinicians can help children achieve these goals by role-playing various speaking situations and talking about what contributes to being a good or poor communicator.

CALMS Component Items
CALMS Assessment includes 23 items across the five domains that are related to the maintenance of stuttering. The goal of the assessment is to measure a child’s performance on each item in order to determine the status of performance. Each item is based on a 1–5 rating. The definition of each rating is described in sufficient detail in the assessment such that a clinician can assign a rating that matches a child’s performance. Some item ratings are more objective than others but field-testing has been conducted to ensure the rating criteria are as clear and objective as possible. The CALMS assessment also includes materials needed for data collection on each item within each component. The ratings for each item are then used to complete a profile of performance for each child who stutters (see sample at the end of this section).
Can I Assess the Components in Any Order?

Yes. There is no requirement that the testing be done in any specific order or during one session. Time constraints could limit how much testing is completed at any one time. Consequently, assessment of a child’s performance could be done across a few consecutive treatment sessions until all of the data are collected for the 23 CALMS items. Some clinicians might prefer to start with the short questionnaires associated with the affective and social components as well as administer the short true/false test regarding information about stuttering in the cognitive component (item #4). A clinician should probably allot one-to-one and half hours for assessing the remaining items under the cognitive, linguistic, and motor components.

Description of the CALMS Assessment Items

The following is a detailed discussion of each of the five CALMS components and the items under each component. The rationale underlying each item is provided in italics so it is clear how the information obtained will provide important insights about a child’s performance across the five CALMS domains.

COGNITIVE

1. Identification of stuttering during oral reading:
   To determine the level of awareness and identification of stuttering within a structured speech context like oral reading. A child cannot be expected to change the way he talks unless he can identify the stuttering he produces.

2. Identification of stuttering in spontaneous speech:
   To determine the child’s awareness and identification of stuttering under typical speaking circumstances. The aim of this assessment item is to document the level of self-monitoring of stuttering a child shows during connected speech.

3. Identification of stuttering from a clinician’s model:
   To determine a child’s awareness and identification of stuttering when produced by another speaker. A child might not be aware of his own stuttering but can hear stuttering when produced by someone else.

4. Child’s knowledge of stuttering:
   Children who stutter should know a few well-known facts about stuttering. Knowledge is empowering. The questions asked in this section mirror those commonly asked about stuttering (e.g., Stuttering Foundation website (www.stutteringhelp.org) “Did You Know”) and reflect general information about the nature of stuttering included in recent textbooks on stuttering.

5. Child’s knowledge of previously learned speech techniques:
   To examine a child’s knowledge of what speech modification techniques have been learned in previous treatments and to determine if the child understands why they make talking less stuttered.

AFFECTIVE

1. Measuring negative feelings about stuttering:
   This item examines how often a child’s negative feelings about stuttering are related to a few common real-life experiences.

2. Determining words that reflect feelings toward stuttering:
   This item seeks to determine how often a child uses or thinks of certain words to describe how he/she feels about stuttering.

3. Examining attitudes about talking:
   This item attempts to determine how a child feels about talking. As Brutten and Vamryckegehem (2007) have shown, there are statistically significant differences between children who stutter and children who do not stutter regarding each group’s attitude toward talking. The statements and types of responses used in the scale below are adapted from those used the standardized assessment called the Communication Attitudes Test (CAT).

LINGUISTIC

1. Determining the relationship between linguistic complexity and frequency of stuttering:
   Research has shown that there is a relationship between linguistic complexity and the frequency of stuttering. This item attempts to establish the level of complexity that creates a substantial increase in stuttering frequency.

2. Assessing overall language ability:
   Because verified language impairment or a subtle language deficit can co-exist with stuttering (Ardnt and Healey 2001) it is important to either formally or informally assess a child’s language abilities.

3. Assessing speech sound production and phonological skills:
   Research has shown (Ardnt and Healey 2001, Blood, Ridenour, Qualls and Hammer 2003) that about 33% to 45% of children who stutter will also have speech sound disorders or phonological disorders.
MOTOR
1. Examining the characteristics of a child’s stuttering (4 items):
   It is important to determine the different forms and types of stuttering in order to gain a full understanding of a child’s fluency disorder. Improvements in the form and type of stuttering that occur from treatment can be a positive indicator of progress, even if the frequency of stuttering has not changed or has changed only minimally.
   This item is divided into subcategories of a) types of stuttering, b) average number of units produced during part-word and whole-word repetitions, c) the overall tempo and regularity of the repeated units, and d) the degree of tension, effort, and struggle associated with stuttering events.
2. Measuring stuttering frequency in reading and spontaneous speech (2 items):
   One of the key aspects of a fluency evaluation is to obtain a measure of stuttering or disfluent speech. The frequency of stuttering or disruptions in the forward flow of speech is one measure of progress in treatment. By measuring stuttering in two speech contexts, such as oral reading and conversation, a comparison can be made relative to how structured (reading) or unstructured (conversation) speech contexts influence a child’s stuttering frequency.
3. Measuring the duration of stuttering events:
   The duration of the stuttering moment serves as one indicator of stuttering severity.
4. Determining the presence of secondary coping behaviors:
   The variations in secondary characteristics or behaviors that accompany a stuttering event are limitless among children who stutter. The more these behaviors are present, the more a child is trying to cope with stuttering. The presence of these behaviors is also important because it can be an indicator of stuttering severity.

SOCIAL
1. Determining the frequency of avoidance associated with words and people:
   It is important to know how often the child is avoiding stuttering and/or how stuttering is contributing to an avoidance of talking to certain people in his/her environment.
2. Determining the frequency of stuttering in various speaking situations:
   The type of speaking situation can directly affect the frequency of stuttering. Therefore, it is important to determine the child’s perceptions of how often they stutter in a few specific speaking situations he/she might encounter on a daily basis.
3. Determining how stuttering impacts peer relationships:
   Stuttering can impact how often a child interacts with his/her peers. It is important to know if stuttering is contributing to the child having few friends.
4. Determining how stuttering impacts school and extracurricular activity performance:
   Stuttering can impact how often a child stutters in various social situations within and outside of the classroom setting. The child’s responses to these statements about these situations can help define an educational disability.

After each item has been rated on a scale of 1–5, then a profile of item scores can be generated. An example of an item profile is shown below:

This profile gives a clinician a clear understanding of the items that need to be addressed in treatment. Initially, the clinical focus might be on items that are rated “3” or above because those are the items where the student has the worst performance and are areas of greatest concern.

Suggestions for Treating Stuttering Based the CALMS Profile

The following are recommended activities that follow the items on the CALMS Assessment. The goal is to address various aspects of stuttering while incorporating as many CALMS components as possible. After each activity in parenthesis is a list of CALMS components that particular activity includes.

Fig. 2 An example of the CALMS profile. In this case, treatment should be focused more on the Cognitive, Affective, and Social than the Linguistic and Motor components.
Overview

It should be obvious from previous information that treatment involves a multidimensional approach. That means that one approach or one set of procedures cannot be applied to all children who stutter (CWS). Treatment is not only about teaching children a series of techniques to be fluent or modify a moment of stuttering. A clinician and child need to work together to make treatment relevant and timely such that each person is willing to contribute to the overall success that might take place. For many school age CWS, a clinician has to be somewhat directive in the planning of treatment but that should not overshadow the needs of the child. Flexibility in meeting short-term and long-term goals is important (Ramig and Bennett 1997).

To assist a clinician in planning treatment, the CALMS item profile that is created at the end of the assessment can serve as a road map for what needs to be addressed. Nevertheless, the implementation of the treatment plan is joint venture between clinician and the child.

Because every child will show a different profile of scores on the CALMS assessment, it is not possible to describe in detail what a clinician might want to do in therapy. The discussion about treatment in this next section will focus on key concepts a clinician might want to consider when developing treatment activities that address specific CALMS components and goals.

Each activity will have the letters C (cognitive), A (affective), L (linguistic) M (motor), and/or S (social) behind the name of the activity. The letters stand for the component(s) that are being included in the activity.

Increasing awareness and understanding of stuttering (C, A, M)

One of the first steps in therapy, regardless of how long a child has been in treatment, is to determine a child’s current understanding and conceptualization of stuttering. No matter how much treatment a child has received, it is important to review what he/she knows about his/her stuttering before any strategies for managing stuttering are taught. Questions like these should be asked: How well can the child identify and recognize stuttering moments? How much does the child know about stuttering? How well does the child understand what has been taught in previous treatments? Recall that answers to these questions come from data collected in the cognitive component of the CALMS assessment.

One of the first treatment activities we use with many CWS is a discussion of different ways people talk, which emphasizes to a child that fluency and stuttering exist along a continuum of behavior (Runyan and Adams 1981). CWS need to understand that when they talk, it isn’t necessarily just fluent or stuttered. There are many variations of how speech can sound fluent or stuttered. Helping a child to understand that there are different forms of stuttering and that there are different ways to stutter could also help reduce negative emotions that are associated with moments of stuttering (Yairi and Seery 2011).

This activity involves taking a piece of paper and dividing it into four different sections, side to side or two sections above or below the middle of the page. Below is an example of how the page could be laid out and appear.

Questions to ask for all categories:
When you talk in that way (each category), what is happening?

a. Is your air coming out or do you feel tension in the chest or stomach areas?
b. Is there tension in your vocal cords?
c. Is there tightness or tension in your lips and/or tongue?
d. How do you feel inside (emotionally) when you talk that way?
e. How does your body or muscles feel (physically) when you talk that way?

In the upper-left section is a category called “Normal Talking or Easy Fluent Speech.” In this section, have the child count to ten and say the days of the week, like was done in the evaluation. Usually, children will be very fluent during these automatic forms of speech. Also, try to come up with short phrases that a child might produce fluently such as “hi” or “how are you?” or “Where are you going?” The focus here is to have the child talk about how it felt physically and emotionally to speak with easy, relaxed speech. Typically, a child will not report any tension during these types of simple speaking tasks and airflow and voicing are produced effortlessly. There usually aren’t any negative feelings attached to this form of speech but if there are, then discuss them and write them down in this section of the page.

In the upper-right section is the category “Normal Bumps or Typical Nonfluent Speech.” This type of speech conveys that all people produce occasional disruptions in their speech. Examples of phrases are “Well ... ya know ... um ... uh ... like ya know ... etc. This type of speech could also include one unit whole-
word and phrase repetitions and/or phrase revisions such as “Wh-What are you doing?” or “Can Can I go too?” Again, the focus is on the physical and emotional feelings associated with these types of responses that occur with both children who do and do not stutter. Ask the child what types of filler or interjections he/she uses or hears other children and adults use when they talk. It is important to convey to children that everyone is “normally disfluent” at times and this kind of speech is not the same as stuttering.

The lower-left section of the paper is the category “Easy or Little Stutters.” This is the first discussion of the child’s stuttering. The idea behind this category is to help a child differentiate between two basic forms of stuttering—ones that are very pronounced and others that are less involved. The “little stutter” category represents mild forms of stuttering the child produces. This type of stuttering usually involves minimal tension in the speech mechanism or stuttering events that are not pronounced. A clinician and the child together can use pseudo or voluntary stuttering as a way to purposely create an easier, shorter version of a real stuttered moment. As with the other sections, guide the child into a discussion of what it feels like physically and emotionally to have a “little stutter.”

The lower-right section of the paper is the category “Hard or Big Stutters.” These types of stuttering events involved multiple unit part-and whole-word repetitions, tense sound prolongations, or any severe form of stuttering the child produces. Again, voluntary stuttering is used so the child can identify the feelings he/she has during this type of stuttering. Imitate different forms of “hard or big stuttering.” Help the child talk about what he/she is doing with his/her speech mechanism, what thoughts are taking place during these stuttered moments, and how it makes him or her feel when stuttering is produced in this way.

Practice identifying stuttering events and improving self-monitoring skills (C, A, M)

After discussing the types of fluent and stuttered speech people produce, it might be of value to spend some time helping CWS identify and monitor their speech during oral reading and while producing spontaneous speech. This activity would be helpful for children who do poorly on the first two items of the Cognitive Component in the CALMS assessment.

Helping children identify stuttering events can be done using audiotape or videotape samples. Recording a short portion of reading or spontaneous speech allows the child to listen to the speech he/she produced. Clinicians can assist in asking the child to point out where stuttering events occur. Then, a discussion can take place about the physical and emotional features of a particular stuttering event. Improvements in a child’s ability to identify stuttering events can take a long time to occur so this activity should be included throughout a stuttering therapy program. Ultimately, we want CWS to catch the majority of stuttering events or recognize that they are about to take place. In this way, strategies taught later in treatment will be used effectively. However, CWS who do not self-correct or self-monitor after a long period of therapy usually will not improve their management of their stuttering.

Practice using voluntary stuttering—stuttering on purpose (C, A, M, S)

This activity follows logically from the previous activity because some voluntary or pseudo-stuttering was introduced while discussing little and big stutters. The intent of this activity is to help children accept the fact that stuttering is something they have some control over instead of something that is out of their control. By purposely using pseudo-stuttering or voluntary stuttering, a child can learn to reduce the fear of stuttering or reduce the need to conceal the fact that stuttering is present. The intent of this activity is for children to learn and understand what is happening when they stutter as well as show them they have some control over how they stutter. Ask children to imitate or “fake” stuttering in the same way they actually stutter. If they typically produce a multiple part-word repetitions like “c-c-c-can I go?” then stutter in the same way. Also ask if you are doing it the way he/she stutters and if not, then ask them to show you how to change what you are doing. It is important to tell the child that you are not imitating their stuttering to make fun of them or mock them. Rather, you are trying to understand how they stutter so you can understand what they do when they stutter.

Understanding what happens when stuttering occurs and what part of the speech mechanism is involved (C, M)

CWS will benefit from learning and understanding the link between stuttering events and disruptions in airflow, voicing, and articulation. This process involves teaching a child concepts related to the normal aspects of talking, the structures that might not perform cor-
rectly when a stuttered event occurs (Guitar 2006, Williams 1971), and terminology that will be used throughout the treatment program (Rentischler 2012). For example, typically say something like, “We talk normally by first inhaling some air and then gradually releasing that air slowly as we say what we want to say. As the air goes through the vocal cords, they come together to create a vocal sound. This process must be slow and gradual so the airflow helps to gradually bring the vocal cords together. After voicing is started, then movements of the tongue, lips, and jaw make the sounds into words.” Runyan and Runyan (2007) use the term “speech helpers” as another way to help a child understand the structures involved in producing speech.

As you discuss the relatively simple respiratory, phonatory, and articulatory movements needed for normal speech production, use a drawing of the speech mechanism. This diagram helps a child understand what happens at each level of speech that corresponds to one form of stuttering the child produces. For some children, it might be just one of the speech systems that is not working efficiently while with other children, it might be two or three systems that do not work in a coordinated fashion. An understanding of how the speech mechanism works for both fluency and stuttering sets up the learning process for specific techniques that help improve a child manage of his/her stuttering. As the speech mechanism is described, the child is asked to label each structure and discuss what role it plays in his/her stuttering. For example, when asked where the child feels tension while speaking, the child points to the larynx. That would suggest the child is aware of tension in the vocal cords but might not understand how tension in this part of the speech mechanism contributes to his/her stuttering.

Facilitating more positive attitudes and feelings about stuttering (C, A)

Many CWS have fears, apprehensions, frustration, and embarrassment about their stuttering, which can lead to more negative feelings such as shame and anxiety (Yairi and Seery 2011). Sometimes children are fearful because they do not have a good understanding or knowledge of a problem they have. This is where increased knowledge about stuttering can help reduce fears and negative feelings. Recognize that fears and anxieties about stuttering lead to negative perceptions and cognitions about talking.

Negative feelings can lead to negative attitudes that are reinforced by the negative reactions of others toward how the child speaks. If a clinician ignores or hopes the negative attitudes and feelings will go away as the child works on his/her speech, the child will most likely not show progress in managing his/her stuttering on a long term basis. Most of the time, successful treatment outcomes will not occur when a clinician focuses too much attention on fluency control or when too much time is spent on teaching a child to control each stuttering event. Addressing the children’s feelings and emotions about their stuttering and themselves as people who stutter is an important component to any stuttering therapy program (Chmela and Reardon 2001, Guitar 2006, Shapiro 2011).

Working on emotions and negative reactions toward stuttering should be done gradually and only after a clinician has established a good rapport with the child. Children need to trust the clinician before they will be willing to open up about their feelings about stuttering. However, once rapport is established, encouraging a child to talk about how he/she feels and reacts to stuttering should be included as an ongoing part of the treatment program.

Clinicians need to recognize that once an increase in the awareness and identification of stuttering as well as the use of voluntary stuttering have been addressed (i.e., like the activities described above), more direct work on feelings and emotions can be initiated. However, before approaching a child’s emotional reactions to stuttering, a clinician needs to determine how much the child knows about stuttering. Discussing the answers to the true/false test used in the Cognitive section of the assessment would be a good starting point. Depending on the age of the child, you also could discuss myths about stuttering and stereotypes of people who stutter (Murphy, Yaruss, and Quesal 2007a). Information concerning frequently asked questions about stuttering, facts about stuttering, and famous people who stutter can be found on the Stuttering Foundation website and the stutteringhomepage.com website in the “Just for Kids” section.

Once the child has a good understanding of stuttering facts and information, an activity that follows Murphy’s (2005) recommendations (as shown in the Stuttering Foundation DVD #9505) is to give the child a piece of paper and have him/her write down an emotion or feeling he/she has toward stuttering. For example, let’s say a child feels “mad” or “sad” when he/she stutters. After writing the word on a piece of paper, guide the child to think and talk about a time when that feeling occurred. It’s not critical that the child talk about a time or experience when a particular feeling was experienced but it
is helpful to link the emotion to a situation. After talking about the feeling, the next step is to have the child crumple the paper into a small ball of paper. The child can squeeze the ball of paper tightly and then release the tension while the clinician talks about the feeling. Finally, the clinician can have the child throw the piece of paper across the room, into a container, or at a target on a wall. This symbolizes that the child is a master over his/her emotion and “tossing bad feelings away” is better than bottling up them up inside. The paper ball also gives the child a concrete representation of a feeling toward his stuttering and tossing it away is a constructive way to deal with that emotion.

A child might also be receptive to the idea of doing a short classroom presentation on stuttering. With the help of the SLP and teacher, a child can talk to his/her classmates about many aspects of stuttering (Murphy, Yarrus, and Quesal 2007b). This activity works well for children who do not stutter to learn more about stuttering and how to help their classmate who is working on managing his/her stuttering.

An additional activity a clinician can try in therapy is to have a child draw a picture of what his/her stuttering looks like. Children can depict their stuttering in many ways and a drawing can sometimes give a clinician insight into how they conceptualize stuttering. Examples of children’s drawings of how they view their stuttering can be found on the Stuttering Foundation website (www.stutteringhelp.org). This section of the website also has letters from kids that might be helpful when talking about a child feels about stuttering compared to other CWS.

**Five strategies for facilitating improved fluency and/or reduced severity of stuttering (C, A, M, S)**

There are many ways to modify a child’s speech pattern but there are five strategies or techniques commonly used in stuttering therapy. These include easy onsets of phonation, light articulatory contacts, a reduction in conversational speech rate, pullouts, and cancellations (Guitar 2006). Each of these techniques is designed to help children feel like they have some control over how they talk and how they will modify any stuttering event that occurs. Most clinicians teach each child all of these strategies and then find two or three of them seem to work best and/or are ones a child remembers to use most of the time.

As stated above, an important aspect of teaching any of these strategies is to emphasize how and why any strategy helps make talking easier. If a child doesn’t grasp these two concepts, then the strategy will be used only during therapy. The goal is for a child to use a strategy without prompting and gradually use it outside of therapy in everyday speaking situations at home and school. Many children learn strategies but only use them when prompted by a clinician or parent. Children who don’t monitor themselves and make changes in their speech on their own will not improve a great deal. This becomes a frustration for the child, the clinician, and the parents. But, with a clinician’s guidance in structuring the training of the strategies, a child will have a better chance of learning and using what he/she has been taught.

**Easy Onsets of Phonation**

This strategy goes by a variety of terms such as easy voicing, easy starts, soft voicing onsets, and air voice. Use a term the child likes after the strategy is explained and practiced.

The rationale for this technique is to reduce laryngeal tension that is linked to a stuttering event. The strategy will also help children who have difficulty or feel that there is a loss of control over initiating and/or maintaining voicing while speaking. This technique is useful when a child points to the laryngeal area when asked what part of the speech mechanism he/she feels tense or where a sound “gets stuck.” Many children are aware of laryngeal tension or tightness in the vocal mechanism and point to that area when they experience a moment of stuttering.

An easy onset of phonation can be taught two ways: 1) using increased airflow prior to the onset of phonation or 2) gradually increasing the vocal intensity of a sound at the beginning of a word. For both types of easy onsets of phonation, it is important to teach the use of the easy onset of phonation in varying speaking contexts and situations. Also, variations in the amount of airflow or increased vocal intensity needs to be practice in order to produce relaxed and controlled voicing onsets. This ensures that CWS realize there is not just one way an easy onset can be produced. Ultimately, a child should be able to produce words or phrases with an easy onset with good control and that is shaped into natural sounding voicing onsets.

**Light Articulatory Contacts**

This strategy is sometimes called light contacts, light touches, or soft touches. The rationale for teaching the light articulatory contact (LAC) technique is to reduce
the tension and force used in the lip and tongue movements when producing consonants. It is an effective technique for children who are exhibiting struggle or repeated attempts at a consonant sound at the beginning of a word. In contrast, children who do not display or report any tension or excessive force in the tongue or lips during speech would not be candidates for this technique. Typically, CWS will show stuttering on voiced and voiceless stops because those sounds involve contact of the lips (/p/ or /b/), tongue against the alveolar ridge (/t/ or /d/) or the tongue against the palate (/k/ or /g/) followed by a release of airflow. The way LACs are taught and explained will depend on the age of the child. Attention should be paid to making sure all contacts are produced with lots of airflow so the production sounds like you are “blowing the sound out.” It’s important for the clinician to model the production of these sounds frequently and give children plenty of words to practice before expecting them to use this strategy effectively.

Speech Rate Reduction

It is well known that slowing one’s speech rate can facilitate improved fluency by reducing the timing and planning needed to move the articulators from one contact to another during connected speech (Guitar 2006). Thus, the rationale for using this technique is to have a CWS produce slower, smooth speech movements at a speech rate that facilitate improved fluency. The speech rate has to be slower than the rate a child usually uses in conversation. Focusing on a slight stretch or lengthening of the syllabic unit or using a slight vocal prolongation to all syllables in a phrase is the key concept behind a slower, smoother speech rate. A common term for this type of speech is “Stretchy Speech.” Teaching a slower rate than a child normally talks will help a child feel how much easier it is to make slower, less-tense speech movements. One approach is to tell the child to use three different rates: fast, slow, and one in between. The “in between” rate is the target speech rate; one that produces increased fluency and a feeling of greater speech control. Practicing these three speech rates in various speech contexts helps a child establish a target rate he/she can use on a regular basis. It is best if the rate can be measured in syllables per minute to provide a target rate for practice in and outside of therapy.

Pullout and Cancellation

The pullout and cancellation techniques for managing a moment of stuttering were developed by Van Riper (1973). These are two popular ways to modify stuttering events to make them less severe. Guitar (2006) discusses these techniques in detail. The rationale behind these techniques is to have a child change from a tense stutter to a more relaxed and controlled form of stuttering. The pullout (or the idea of “pulling out” of a stutter) means that once a stuttered sound occurs in a word, the child is taught to hold on to the sound being stuttered and then slowly prolong the rest of the sounds in the word, much like a car gradually moving out of mud or snow when stuck. Usually, children have to be well aware of their stuttering in order for this strategy to be used effectively. For example, if a child stutters on the word “really,” the child needs to immediately detect the stuttering moment and voluntarily shift to repeating the “r” sound a few times or prolonging the sound in its normal manner. As the sound is repeated or prolonged, tension is reduced and the child slowly produces the remaining sounds in the word. It would look like “r-r-rreecccaaalllllyy” or “r----rrrnrrreaaaaallllllyy” or “r-----ruh, ruh, ruh, really.” Once this technique is practiced in imitated stuttered words, then practice would be done with short phrases, sentences, and in conversational speech.

The cancellation technique is another strategy that can be used to modify a stuttered moment. Cancellations focus on reducing tension, force, and effort that is being used to produce a sound or word. As with pullouts, cancellations can be taught using imitated stuttering and then tried during actual stuttering events. The child is taught to focus on the feelings that accompany stuttering so an immediate recognition takes place that a stutter has begun. Once the child starts a stuttered word, he/she is instructed to cancel or stop the production. During the next few silent seconds, the child needs to change the tension in the musculature and/or shift to another way of producing the stuttered word. For example, if the child stutters on the word “thanks,” the “th” might be repeated or prolonged. At that point, the child stops the production of the “th” sound and then changes to do something different, which in this case might mean using an LAC on the “th” sound and then completing the word “thanks.” If the cancellation is done too quickly, it will sound like another stuttered word. So, it is important that a clinician talk about how this strategy is not about stopping and starting over but a new way to reduce tension and to plan a different (not necessarily fluent) way to change a stuttered sound or word into a less stuttered event that is accomplished without fear or apprehension.
Managing stuttering through the manipulation of the linguistic length and complexity of utterances (C, A, L, M, S)

One aspect of stuttering therapy that is important for a clinician to manage is the simplicity or complexity of the utterances the child will produce. Recall that the first linguistic component item on the CALMS assessment looks at the relationship between utterance complexity and the frequency of stuttering. As the length and complexity of what is said increases, CWS are more likely to stutter. Therefore, a clinician needs to plan speech material that elicits a particular level of speech production that facilitates less stuttering and/or increased management of stuttering events. In order to assist a child in feeling successful in managing his/her stuttering, the clinician should use a linguistic level where the child can talk in an easy way with minimal tension and struggle. Then, as the child produces consistent control and ease with simple linguistic utterances, the clinician needs to elicit utterances that involve a slight increase in linguistic complexity. The rationale for increasing the gradual length and complexity of utterances is well documented in the Ryan’s (1974) treatment approach and Costello’s (1983) extended length of utterance (ELU) program. It is probably not necessary to follow a strict sequential approach such as one word, two words, three words, short sentences, phrases, and then long connected speech as a way of gradually establishing increased fluency. We also do not believe that children have to be 100 percent fluent at any level of speaking in order for them to feel like they are making positive changes in their speech.

Below is a suggested linguistic complexity sequence that incorporates either the contextualization (diagrams, pictures, or reading material) or decontextualization (no contextual support) of a topic and a gradual increase in semantic difficulty. These aspects of the linguistic message then need to be used in conjunction with a speech-modification technique. We recommend using four levels of linguistic complexity while talking about a topic the child enjoys discussing and knows quite a bit about while using any or all of the fluency shaping or stuttering modification strategies above. These four levels are:

Level 1: Contextualized labeling and description of terms associated with a topic while using fluency
Level 2: Increased length of utterances through structured discussion of a topic using contextualized materials
Level 3: Inclusion of questions that require an inference or interpretation of contextualized or decontextualized information
Level 4: Decontextualized story telling or spontaneous speech

The child will be asked to use a technique or strategy taught in therapy while describing the terms. The usual sequence of questions to ask is as follows: “What technique are you going to use? What are you going to pay attention to or focus on while you tell me about (a term)? How and why does that technique make the phrase easy to say? Ok, when you are ready, tell me about the first term and then after that we will talk about how you did.”

Conclusions

It is hoped that the information in this article provides Japanese readers with a better understanding of a multidimensional approach to assessing and treating stuttering. The CALMS model serves as a theoretical foundation for the items selected for an assessment of stuttering. The model is also useful to explain to clients, parents, and teachers about how the disorder of stuttering can be conceptualized. The primary purpose of the CALMS model and assessment is to make sense out of complex disorder so that this model can be used in other countries including Japan. With the data derived from the assessment can supplement other data obtained from standardized measures of stuttering available on the market, it is possible for clinicians to feel more confident in knowing what information to gather in order to conduct a comprehensive evaluation of a child’s stuttering. As with any disorder, treatment plans should evolve from objective data from an evaluation. The CALMS model and assessment were designed with this specific purpose in mind.

References

Implications of a Multidimensional Model of Assessment for the Treatment of Children Who Stutter

Journal of Communication Disorders 36, 427–449.


(Received Jul. 31, 2013, Accepted Aug. 20, 2013)