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MISSION:
Empowering our members by providing opportunities for professional development, advocacy, and leadership development necessary to foster excellence in the services provided to individuals with communication and related disorders.

HISTORY:
Founded in 1945, the Ohio Speech-Language-Hearing Association (OSLHA) is a professional association representing speech-language pathologists and audiologists throughout Ohio. OSLHA is recognized by the national American Speech-Language-Hearing Association (ASHA) as the official professional organization for Ohio. OSLHA members provide services for the evaluation and rehabilitation of communicative disorders. Members work in a variety of settings including: clinics, health care facilities, hospitals, private practice, schools, and universities. Members must abide by the OSLHA Code of Ethics.

eHearsay, the electronic journal of the Ohio Speech-Language-Hearing Association, is designed to address the professional development needs of the state association. Issues are may be developed around specific themes and can include invited papers, research articles, review, tutorial, research forum, letter to the editor, clinical focus/forum or viewpoints.

eHearsay is published as a web journal annually. Continuing education credits will be available for each issue.
OSLHA’s members (speech-language pathology and audiology) are very diverse. As a journal editor, it can be challenging to find topics and/or themes that apply to all OSLHA members. When I think back to the eHearsay themes that OSLHA has published since I took on this role in 2013, we’ve covered Fluency, Medically-related Issues, Supervision & Ethics, Aphasia, Dyslexia and Autism. OSLHA has also previously published two issues that don’t have a unifying theme. This first issue of 2017 also does not contain articles on the same subject. However, this issue does contain five articles that cover a wide array of topics and one should appeal to you.

The first article applies to our members that work in school settings. Does a noisy environment bother you? Imagine how it can impact a child’s ability to acquire language and learn. Erika Squires and colleagues present criteria for classroom noise levels to optimize learning for students. They will discuss the importance of the auditory-learning environment on language development and how professionals can support and advocate for the students.

Jaime Michise and Scott Palasik discuss a unique intervention approach for people who stutter that uses acceptance and mindfulness strategies together with behavioral change strategies to learn to accept their stuttering and commit to behaviors needed to reduce the dysfluencies. When a person is mindful, they are able to observe their thoughts/feelings without judging them as good or bad. This allows the person who is practicing mindfulness to reduce some of the internal stressors and feel more empowered.

The third article by Mary Beth Mason-Baughman and colleagues discuss screening and assessment. Screening is a brief process that occurs soon after an event (e.g., admission to a hospital or skilled care center) and indicate whether the person is likely to have a communicative-cognitive disorder. Assessment occurs after screening and consists of gathering key information to collaboratively conceptualize the problem to develop a plan of care/treatment plan. OSLHA members also need to be cognizant that some of the speech-language pathology procedural codes mandate the use of standardized norm-referenced and/or criterion-referenced assessment tools.

Caroline Brindo’s article exposes some of the “urban legends” of dysphagia treatment. This is especially true since SLPs are frequently exposed to new treatment methods and many may be based on anecdotal statements. It is the ethical responsibility of the SLP to determine the validity of these treatments before putting them into practice.

The last article by Herr & Mitchell evaluates current applications available for Augmentative and Alternative Communication users by determining if there is a correlation between the price and various features.

Wishing you love, laughter and many blessings,

Laurie M. Sheehy
eHearsay Journal Editor
Measuring Classroom Acoustics

Erika S. Squires, Lori A. Pakulski, Emily Diehm, & Jennifer Glassman

Abstract
A classroom’s acoustic environment has the potential to profoundly impact student success because the majority of classroom instruction is conveyed from teachers to students through spoken language. To address this issue, the American National Standards Institute (ANSI) has established criteria for classroom noise levels to optimize learning environments for students.

Classroom acoustics have gained increasing attention in recent years. In 2015, the International Code Council (ICC) added an amendment to include the ANSI standards to the International Building Code A117.1 building standards. Once state and local agencies adopt the new International Building Code’s A117.1 building standards, all newly constructed schools must adhere to ANSI standards for classroom noise. However, this recent legislation does not require previously constructed school buildings to comply with the revised ANSI guidelines for classroom acoustics, but rather allows for voluntary compliance.

To gain a better understanding of the obstacles that school districts may face when attempting to comply with ANSI standards for classroom noise, the acoustic environments of six classrooms were surveyed. Findings suggest schools may have difficulty identifying acoustical consultants who are willing and able to survey classroom noise, struggle to secure adequate funding, and experience difficulty finding an optimal time to obtain representative measurements without disrupting teachers and students, among several other obstacles. This is problematic because while a school district may have the desire to improve its classrooms’ acoustics, there are several barriers that may prevent it from doing so. It is imperative that educational professionals, such as audiologists and speech-language pathologists (SLPs), support schools in addressing these barriers and provide realistic methods of improving classroom acoustics.

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Learning Objectives
1) Describe the American National Standards Institute (ANSI) standards for classroom acoustics.
2) Summarize recent changes in legislature that affect regulations for classroom acoustics.
3) List different professionals who can assist schools in planning for the measurement and modifications classroom acoustics and describe the role that each of these professionals may play in this process.
Within classrooms, instruction is generally provided to students through spoken language, and children spend as much as 75% of their time in school engaged in listening activities (Flexer & Rollow, 2009). Because classrooms are auditory-verbal learning environments, a child’s acoustic accessibility to spoken instruction will affect his or her ability to learn (Dahlquist, 1998; Hicks & Tharpe, 2002). Acoustic accessibility refers to a child’s ability to perceive intelligible speech including, “individual speech sounds at soft levels as well as average levels, at distances and up close, in noise as well as in quiet” (Madell & Flexer, 2012). According to the Acoustical Society of America (ASA), the speech intelligibility rating of many U.S. classrooms is 75% or less, meaning that even listeners with typical hearing can understand only three of four spoken words in classrooms (Seep, Glosemeyer, Hulce, Linn, & Aytar, 2000). This statistic was supported by a related study, which found that students with typical hearing recognize 30% of the speech they hear in listening environments with acoustics similar to those commonly reported in classrooms. However, when compared to more favorable classroom acoustics, children’s speech perception scores increased to 71% (Crandell & Smaldino, 2000). These statistics provide evidence of the profound impact that a classroom’s acoustic environment can have on a student’s ability to understand spoken instruction.

Importance of the Acoustic Environment for Student Learning

Klatte and colleagues (Klatte & Hellbrück, 2010; Klatte et al., 2010; Klatte, Lachmann, & Meis, 2010; Klatte, Meis, Sukowski, & Schick, 2007; Klatte, Wegner, & Hellbrück, 2005) provide comprehensive evidence of the significance and impact of the acoustic environment in classrooms and other learning spaces (e.g., preschool facilities). Their work is based upon several well-established premises about learning: (a) most classroom instruction is delivered orally, which necessitates the facilitation of listening for successful learning (Flexer, 1980; Klatte et al., 2010), (b) optimal acoustical conditions for instruction are essential to learning facilitation (Crandell & Smaldino, 2000; Flexer, 1980; Larsen & Blair, 2008), and (c) school-aged children are more negatively affected by poor signal-to-noise ratios (SNR) because their communication and listening skills are not fully developed (Klatte & Hellbrück, 2010; Shield & Dockrell, 2008; Talarico, Abdilla, Aliferis, & Balazic, 2007; Yang & Bradley, 2009), and those skills are more likely to be compromised when hearing loss exists (Daud et al., 2010; McFadden & Pittman, 2008).

Researchers have documented SNR, reverberation, and other measures of unfavorable classroom acoustics, and report negative outcomes for school children including reduced cognitive performance, annoyance, and altered social-emotional school attitudes. Highlights of this work, which strongly link school noise with psychological, physiological, and learning concerns, are below:

- Compromised language and reading acquisition (Evans & Maxwell, 1997; Haines et al., 2001; Maxwell & Evans, 2000), poor execution of oral instructions, and difficulty categorizing speech sounds (Klatte et al., 2007);
- Poorer scores on standardized tests of literacy, mathematics, and science (Shield & Dockrell, 2008);
- Decreased intelligibility of speech (Crandell & Smaldino, 2000; Yang & Bradley, 2009);
- Poorer performance on phonological discrimination tasks (Klatte et al., 2007);
- Self-reported increases in level of stress and annoyance (Klatte & Hellbrück, 2010; Klatte et al., 2010; Klatte et al., 2007);
Negative effects on cognition including short-term memory (Klatte et al., 2010), intentional, incidental, and recognition memory (Lercher et al., 2003) and disrupted memory for nonwords (Klatte et al., 2007), and

Less positive view of relationships with peers and teachers (Klatte et al., 2010).

In summary, noise exposure influences the capacity for learning and has the potential to have a profound, but not yet completely understood, impact on school children (Anderson, Pakulski, Squires, & Glassman, in preparation).

ANSI Standards for Classroom Noise

In an attempt to regulate classroom noise levels and provide students with sufficient auditory access to verbal instruction, the American National Standards Institute (ANSI) and the ASA created the Acoustical Performance Criteria: Design Requirements and Guidelines for Schools standard (ANSI S12.60-2002). This criterion established a series of standards that serve as guidelines for optimizing classroom acoustics. Considering the fact that acoustic accessibility is an essential component of academic success, striving to improve the quality of students’ education by implementing favorable acoustics into all classrooms is a logical pursuit (Palmberg, 2012).

The ANSI standards for classroom acoustics provide criteria for the following: background noise levels, reverberation times, noise isolation design requirements, the use of classroom amplification systems, and conformance testing (ANSI S12.60-2002). These guidelines also provide a list of recommended materials to use during the construction of schools to better-regulate background noise and reduce reverberation times. The American Academy of Audiology (AAA), the American Speech Language Hearing Association (ASHA), the ASA, and several other organizations have endorsed ANSI standards for classroom acoustics. It is important to note that in addition to supporting these guidelines, ASHA also provided specific recommendations for classroom acoustics, which address background noise levels, reverberation times, and SNR.

Factors Influencing Classroom Acoustics

Multiple factors contribute to a classroom’s acoustic environment, including background noise, reverberation, and SNR (Crandell & Smaldino, 2000; Flagg-Williams, Rubin, & Aquino-Russell, 2011; Flexer, 1980; Yang & Bradley, 2009).

Background noise can come from a variety of sources, including electronic equipment (e.g., projectors and computers), heating and cooling systems, moving chairs, shuffling papers, children’s voices, and traffic noise. Noise from adjacent areas, such as classrooms, playgrounds, and the kitchen, may also contribute to the background noise. The amount of background noise in classrooms may be especially detrimental to children’s learning because elementary school-aged children have greater difficulty understanding speech in noise compared to adults, which may also divert their attention as well (Lewis, Hoover, Choi, & Stelmachowicz, 2010). Fortunately, their skills in this area appear to improve as they develop and children typically achieve adult-like performance on speech perception tasks in noise between the 13-15 years of age (Bradley & Sato, 2008; Crandell & Smaldino, 2000).

Reverberation refers to the amount of time that sound continues to reflect in an environment after the sound source has stopped production. This acoustic variable has the potential to detrimentally affect individuals’ speech perception skills (Crandell & Smaldino, 2000). That is, as reverberation time increases, a person’s ability to perceive and understand speech decreases. Materials such as carpeting, area rugs, chair foot coverings, corkboards, and curtains help to reduce reverberation times in classrooms (Madell & Flexer, 2008). Tile floors, bare walls, and hard surfaces all contribute to increased reverberation times, which reduces a person’s ability to understand speech. The materials within a classroom affect the reverberation time of the learning space, which consequently has the potential to impact a student’s ability to understand a teacher’s verbal instruction and classroom discussion.

Compliance with ANSI Standards for Classroom Acoustics

Because mandated compliance with ANSI standards for classroom noise is not widespread, it is important to consider the scenario in which a school district may choose to voluntarily comply with these guidelines. By choosing to comply, the school district also accepts the
responsibility to (a) determine whether its classrooms’ acoustic environments meet the established criteria, (b) allocate the necessary funding to have the classrooms surveyed, and (3) allocate additional resources to satisfy the ANSI guidelines if testing reveals unfavorable classroom acoustics.

Obtaining classroom noise measurements and modifying a classroom’s acoustic environment can be costly. At a time when many school districts are struggling in response to steep budget cuts, and as budget gaps grow larger, schools are cutting funding in areas that have a profound impact on student achievement (Hull, 2012). Thus, even if school administrators are compelled to obtain measurements of classroom noise and modify learning environments to optimize acoustic accessibility, funding limitations may prevent them from adequately addressing these concerns. In fact, it is worth noting that budget cuts also frequently result in an increase the number of students per classroom. Because students are a primary source of classroom noise (Flexer & Rollow, 2009), one can infer that larger class sizes further increase classroom noise levels. As a result, given reports of the limited financial resources that schools have, it is difficult to imagine how financially strapped school districts can maintain small class sizes, address classroom noise levels, and subsequently modify those acoustic environments that are not conducive to student learning. In other words, when considering the scarcity of funds needed for existing educational programs, money for the assessment of classroom acoustics may be difficult to obtain (Hull, 2012; Leachman, Albares, Masterson, & Wallace, 2016).

**Current Attempts to Address Classroom Acoustics**
Historically, the International Code Council (ICC) has provided standards for accessibility (e.g., countertop heights, wheelchair ramps, required signage); however, the standards have never addressed noise levels. Until recently, the ICC refused to adopt ANSI standards for classroom noise because they contended that the cost of implementing these standards in buildings would be excessive (Palmberg, 2012). Therefore, cost is a common concern when deciding whether ANSI standards for classroom acoustics should be mandated. In 2010, the ICC rejected a proposal to include the ANSI standards into its 2012 International Building Code. While audiologists and an architectural director provided evidence to support the educational benefits and cost-efficiency of implementing the acoustic standards into the 2012 International Building Code, their evidence was met with opposition that ultimately prevented the ICC from accepting the proposal.

To continue advocating for legislation addressing classroom acoustics, ASHA, along with the creators of the ANSI classroom acoustic guidelines, Armstrong Industries, the U.S. Access Board, and the U.S. Department of Justice developed a proposal for an amendment that would include the ANSI standards into the International Building Code A117.1 building standards (ASHA Leader, 2015). In 2015, a committee of the ICC accepted the amendment and included it in their building standards, which determine design features for public facilities, including schools.

Once state and local agencies adopt the new International Building Code’s A117.1 building standards, all newly constructed schools under that agency’s jurisdiction must comply with ANSI standards for classroom acoustics. While the ICC’s adoption of the ANSI guidelines into its building standards is a sign of progress towards addressing classroom noise levels, it does nothing to fix problematic acoustic environments of existing classrooms. Educators, audiologists, SLPs, and other educational stakeholders, as indicated below, must further explore reasonable methods of modifying existing classrooms to improve the acoustic environment of these learning-spaces.

Several educational stakeholders will be affected by the mandated implementation of ANSI standards in new schools, including school administrators (who are responsible for managing the school’s budget), representatives of heating, ventilation, and air-conditioning (HVAC) system vendors, architects, educational audiologists, classroom teachers, parents, and students. Meeting ANSI criteria for classroom acoustics will likely be difficult considering the “demand for affordable schools that meet tough new environmental standards” (Lubman & Sutherland, 2004). Additionally, engineers hired for school construction and renovation will need to acquire the skills necessary to design classrooms that meet ANSI criteria for acoustics, which will likely require additional training.
Obtaining Classroom Noise Measurements and Meeting ANSI Criteria

As mentioned, a number of researchers have documented SNR, reverberation times, and other acoustic measures, which reveal significant amounts of background noise within the classrooms (Klatte et al., 2002; Kotus & Kostek, 2006; Larson & Blair, 2008; Shield & Dockrell, 2008); however, no large scale studies have been conducted to determine the percentage of American schools that comply with ANSI criteria.

While educational audiologists assess the acoustics of classrooms and students’ performance in a variety of learning spaces, these assessments do not typically include a formal survey of the acoustic environment (ASHA, 2005). In addition to having the skills needed to complete a formal evaluation of a classroom’s acoustics, an educational audiologist should be able to compare the classroom’s acoustic conditions to an acceptable standard (i.e., ANSI standards for classroom noise) to determine whether the acoustic environment is conducive to student learning.

While audiologists and acoustical consultants are qualified to survey a classroom’s acoustic environment, in order to successfully measure classroom noise levels and modify the acoustic learning environment as needed, several groups of professionals must work collaboratively (ASHA, 2005). Classroom teachers, SLPs, and school administrations should collaborate with audiologists and acoustical consultants to improve classroom acoustics. It is critical that educators realize the deleterious effect that poor classroom acoustics have on student learning in order to advocate for the learning needs of students.

Experience Surveying the Acoustics of Classrooms

In partial fulfillment of a master’s thesis project, the authors planned to conduct a study investigating the impact of classroom noise on student learning and general well-being based on several studies published by Klatte and colleagues (Klatte & Hellbrück, 2010; Klatte et al., 2010; Klatte et al., 2007). To complete this study, the authors aimed to measure the background noise levels and reverberation times of three third-grade and two second-grade classrooms.

In an effort to involve experts in measuring the classroom acoustics, the authors sought to hire a professional acoustic consultant to conduct the survey. Despite multiple conversations with acoustic consultants in northeast Ohio and southeast Michigan, no company agreed to measure classroom acoustics. As a result, the authors considered the cost of buying the necessary equipment to measure classroom noise; however, the cost of these tools far exceeded a restricted budget. After encountering several obstacles early into this project, the authors quickly realized that schools face many challenges when attempting to obtain classroom noise measurements, some which may be insurmountable.

Ideally, when measuring noise in a classroom environment, a dosimeter is the tool of choice because it is capable of measuring sound in an environment with variable and frequently changing noise levels. Dosimeters store acoustic information to calculate the average noise level of an environment over an extended period of time. Although the authors were unable to obtain a dosimeter for research purposes, an audiologist who conducts on-site testing for Occupational Safety and Health Administration (OSHA) compliance graciously lent the authors his company’s sound level meter (SLM), which is an instrument used to measure sound pressure level at a single point in time. There are several differences between dosimeters and SLMs. Dosimeters are better equipped than SLMs to determine average noise exposure in environments in which noise levels are variable (CCOHS, 2016). SLMs are most useful when measuring environments with relatively consistent noise levels. In environments with variable noise levels (e.g., classrooms) it is difficult to determine average noise levels over an extended period of time using a SLM (CCOHS, 2016). However, for the purposes of this pilot project, the authors used the SLM to document general classroom noise levels, despite its limitations.

Using the SLM, quasi-experimental sound level measures were recorded with a calibrated Type II Quest Permissible Sound Level Meter, model 215 coupled with an Octave Band Filter, model Q-45; it was capable of measuring from 30 to >100 dBA across the frequencies of 31.5, 63, 125, 250, 500, 1000, 2000, 4000, and 8000 Hz using the “A-weighting” curve (which provides a realistic approximation of how humans hear over a fairly wide range because humans do not hear linearly). The meter was set to a “slow” response that is designed for measurement of dynamic sound because it provides a one second averaging time resulting in consistent and
stable readings. The SLM microphone was positioned away from walls, floors or other large boundaries.

In an attempt to get an approximation of the average classroom noise levels, the researchers used the SLM to measure classroom noise levels several times over a period of approximately ten minutes and calculated an average intensity (volume) at each of the frequencies listed above. This approach was used to measure classroom noise level in two second-grade and three third-grade classrooms.

Given the lack of access to available tools used to measure reverberation time directly, the researchers chose to calculate it using Sabine’s Formula. When using this formula to estimate a room’s reverberation time, one must calculate the volume of the room and the surface area of all absorbing surfaces within that room (e.g., walls, ceiling, floor, windows, bookcases). In order to account for differences in sound absorption between surfaces (e.g., carpet compared to tile), surface coefficients are applied to each measurement of surface area based on the type of surface measured. The room’s volume and the surface area of the room’s objects, with their corresponding surface coefficients, are applied to Sabine’s Formula to make an indirect calculation of reverberation time.

To use Sabine’s Formula to approximate the reverberation time of a classroom, the authors took measurements using a standard tape measurer. This process took approximately thirty minutes for one classroom. Under the guidance and assistance of an audiologist, it took the authors approximately one hour to use Sabine’s Formula to approximate the reverberation time for the classroom. As the classrooms were all of similar size and contained similar items, the reverberation time from the first classroom was inferred to be similar for the remaining five classrooms and thus used in further calculations.

This experience allowed the authors to reflect on the difficulty that schools may encounter when attempting to measure classroom acoustics. Given the lack of available companies willing and able to professionally survey the acoustic environments of six classrooms, the researchers borrowed equipment from a local audiologist and completed research to decide the best way to approximate reverberation time. Measuring the noise levels in six classrooms and approximating the reverberation time for one classroom was a cumbersome process that required a significant amount of time and support from many professionals.

Summary of Findings
A summary of classroom noise levels is reported in Table 1. While teachers’ voices were typically >15 dB SNR, as recommended by ANSI guidelines, the overall intensity of the classroom (including the teacher’s voice, children’s voices, HVAC system, etc.) reached high levels, ranging from 44 dBA in the quietest occupied classroom (i.e., while students were taking a test/no instruction or talking) to a peak of 84 dBA in the loudest occupied classroom (i.e., less structured art class). Reverberation times ranged from 1.28 seconds at 125 Hz to 0.26 seconds at 4000 Hz as shown below (Fig. 1); only the RT at 125 Hz was outside of the normal range.

Standards address SNR and reverberation time, but less attention is given to overall noise dosage across the day. In other words, the classrooms of the school included in the current study meet ANSI guidelines for SNR by using a sound-field amplification system, and all but one reverberation estimate was within standards; however, when adjusted to account for background noise, the overall noise dosage is astonishing.

Through this project, the authors realized that schools may have to consider several important factors regarding the measurement of classroom noise. While ANSI standards provide clear guidelines for classroom noise in order to optimize the acoustic environment for learning, there are many obstacles that may prevent schools from adhering to these guidelines.
Most notably, finding reasonable ways to obtain classroom reverberation time and noise levels in a dynamic environment without significant funding may be problematic for schools.

Conclusions
Several organizations and individuals accept and endorse the ANSI standards because they aim to create learning environments that provide students with auditory access to spoken information. These guidelines were designed to improve the quality of education by establishing acoustic criteria for learning spaces. Classrooms are auditory-verbal learning environments and, because children are still developing language throughout their school years, it is critical that they have auditory access to verbal instruction in order to maximize their ability to learn.

Researchers have noted that “the challenges to full implementation of the ANSI standard are significant, but they are not insurmountable” (Lubman, Nelson, & Sutherland, 2004). Through the completion of the current project, the authors encountered difficulties that schools may face when attempting to measure classroom acoustics. Many school districts are facing continued budget cuts (Leachman, Albares, Masterson, & Wallace, 2016); however, even in scenarios in which sufficient funds are available, it may prove difficult to find individuals who are equipped and qualified to make
the necessary measurements of a classroom’s acoustic environment.

Beyond these potential barriers, if measurements were to indicate that a school’s classrooms were noncompliant with ANSI standards, administrators would need to decide whether or not they should invest money into modifying the acoustic environment of learning spaces, which would require additional funding, time, and support from various professionals. However, research suggests that noise exposure has the potential to have a significant impact on student learning; therefore, the benefits of improving the acoustic environments of classrooms may far outweigh the cost implementing these changes.

Progress has been made towards addressing classroom noise levels, which is evidenced by the adoption of the ANSI standards into the International Building Code’s A117.1 building standards (ASHA Leader, 2015). However, existing schools are not affected by this legislature; therefore, organizations and individuals must continue to advocate for acoustic modification of existing classrooms. Schools that were previously constructed are not mandated to comply with ANSI standards; therefore, it is important to consider whether schools have the support needed to voluntarily comply with these guidelines.

Classroom noise is an important issue that has not been adequately addressed in the past. As this topic is beginning to receive more attention, it is imperative that professionals, such as educational audiologists and SLPs, continue to provide evidence of the benefits that come from improving classroom acoustics, which include improved academic outcomes (Dahlquist, 1998; Hicks & Tharpe, 2002; Klatte et al., 2010; Klatte & Hellbrück, 2010). Given the difficulty that schools are likely to encounter when trying to measure classroom noise and modify the acoustic environment as needed, it is critical that educational professionals (e.g., audiologists, SLPs, administrative staff, teachers) support school districts in their interest in complying with ANSI standards.

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References


Acceptance & Commitment Therapy: An Experiential Journey for Clinicians & People Who Stutter

Jaime Michise & Scott Palasik

Abstract
Acceptance and Commitment Therapy (ACT) (Hayes, Strosahl, & Wilson, 2012; Harris, 2009; Luoma, Hayes, & Walser, 2007; Hayes, Strosahl, & Wilson, 1999) is a form of psychotherapy that focuses on helping clients live a valued-based life through the development of psychological flexibility. Clients can develop psychological flexibility by practicing the six core principles of ACT – 1) contact with the present moment, 2) acceptance and willingness, 3) thought defusion, 4) self as context, 5) defining values, and 6) committed action. By incorporating the principles of ACT into therapy, clinicians can guide their clients who stutter in practicing willingness to come in contact with all thoughts and feelings that may arise related to stuttering. Additionally, clients can learn to talk about their stuttering using less judgmental language and look at their stuttering from an outside perspective. This process can help them to more clearly define their values and create committed actions that allow them to live by these values – regardless of whether they stutter. In the following paper, we will guide you through exercises to help you better understand each of the core principles of ACT; and also provide clinical examples of using ACT with individuals who stutter. Furthermore, we will summarize some of the current research that exists about brain changes as they relate to the core principles of ACT.

Learning Objectives
1) List the six core principles of Acceptance and Commitment Therapy (ACT).
2) Describe six ways to implement ACT into therapy sessions with people who stutter.
3) Summarize one current finding regarding the ways in which mindfulness physically changes a brain.

What is ACT: A Brief Introduction
Acceptance and Commitment Therapy (pronounced as one word, ACT) is a clinical psychotherapy approach used to help clients address basic human suffering in the hope of becoming more psychologically flexible with all thoughts related to suffering (Hayes, Strosahl, & Wilson, 2012; Luoma, Hayes, & Walser, 2007). ACT suggests that by connecting with the language used during painful moments, clients can accept their suffering and therefore live a fuller life (Harris, 2009). There has been limited research and publications on ACT with People Who Stutter (PWS) (Palasik & Hannan, 2013; Beilby & Byrnes, 2012; Beilby, Byrnes, & Yaruss, 2012). However, with increased research and professional discussions with PWS and clinicians about ACT, this approach shows great promise with many potential applications.

Before clinicians can use ACT with clients who stutter, they must first understand each of the core principles. The six core principles of ACT are – 1) contact with the present moment, 2) acceptance and willingness, 3) thought defusion, 4) self as context, 5) defining values, and 6) committed action. The principles are displayed as a hexagonal shape, called a Hexaflex, and work in conjunction with one another; contributing to the central purpose of assisting clients in becoming more psychologically flexible and therefore living a values-based committed life.
The Power of Language

Words are powerful. They can shape our thoughts, guide our actions, and make/break our relationships. Sometimes, just the thought of a word can have almost as much, if not more, power than a spoken word.

For example, think of the following word – MILK. Do not say it out loud – just think of it a few times. What comes to your mind? Did you picture the white liquid? Or a bowl of cereal filled to the rim? What about a cow? Or even ice cream? If you lived in Japan, you might think about wheat-infused milk – something that is not commonly found in the United States. If you are a speech-language pathologist (SLP), you may even think about the way in which your articulators form the word or the various dialectal differences you have heard in the way that the word is pronounced.

What is fascinating about this exercise is that you never uttered the word MILK. You were not primed or forced to think a certain way; and yet, many thoughts arose. The human mind has the ability to make an infinite number of associations based on words, thoughts, and experiences. And this is where the journey of ACT begins.

Humans have the innate ability to associate the language we use with our experiences. Relational Frame Theory (RFT) (Hayes, Barnes-Holmes, & Roche, 2001; Hayes & Smith, 2005), which is one of the foundations of ACT, is a language learning theory about this very concept. RFT examines how humans think and associate information. The theory suggests that we relate to our world through language; and, through our life experiences we make associations tied to that language. Some of these associations may be direct links and seem rational – like picturing the white liquid most of us call milk. Other associations may seem completely random and yet make perfect sense to the speaker. When using the MILK analogy during a recent presentation, we had one participant tell us that our prompt to think of the word milk three times triggered a memory of a classical piece of music she played several years earlier. She went on to explain that the rhythm with which she silently recited the word milk led her to feel the beat of the song.

Now, MILK is a neutral word and does not usually evoke strong emotional responses when thought of or said; however, what if you had a bad experience with milk in the past? Perhaps you drank sour milk or you are lactose intolerant. How might this exercise be different? And, what might your reactions be to the thought of drinking milk (or encountering milk) in the future? It is possible that your associations are not nearly as neutral. And, that you might even feel a physical sense of nausea at the thought of milk.

In this example (Figure 1), your mind is being dominated by the conceptualized past and future. You might begin to experimentally avoid all dairy foods – some of which you enjoyed in the past. Your negative experience may lead you to cognitively fuse to thoughts like “Milk is bad.” And the more you tell yourself milk is bad, the more you believe it as fact. As you fuse to your thoughts, you may begin to make rules for yourself, like “I can never drink milk.” These all or nothing rules may dominate your mind and distort your values. You value health (and that once included drinking milk to keep your bones strong); however, now you begin to convince yourself that your bones are strong enough. And, with time, you might even begin to avoid others when they are drinking milk. These unworkable actions lead to the behavior of “not drinking milk” and make it difficult for you to think about this situation in a psychologically flexible way. Figure 1 details the process we just discussed.

Figure 1. Psychopathology of “Drinking Spoiled Milk” within the ACT Hexaflex

Let us do this exercise again. This time, instead of thinking of the word – MILK – think about something that causes you stress. Perhaps you think about the loss of your mother, the challenges of being a new dad, a
recent break up, or an argument with your best friend. Think about the word, thought, or idea several times. Are your reactions different? Perhaps this time, the exercise triggered stronger emotions – possibly fear, worry, self-doubt, or even rumination. All of which are examples of human suffering.

**Clinical Example**

Sam is excited about trying a new restaurant and calls to make a reservation. As he attempts to tell the receptionist his name, he blocks severely. The receptionist laughs and asks if he has forgotten his name. Sam quickly hangs up.

Now, let us ask Sam to complete the same exercise explained above. The word we ask him to think about is – PHONE. What are some thoughts that might possibly come to Sam’s mind? Perhaps he thinks of an actual phone and then remembers his experience being hung up on. As he recalls this memory, perhaps he feels tightness in his chest and a pit in his stomach.

The next time Sam wants to make a reservation, he may relive his past experiences and worry about stuttering on the phone in the future. The emotions tied to past experiences may lead Sam to avoid thinking about the phone altogether. Sam may begin to fuse to his past experiences and create judgmental thoughts like “The phone is evil” or “The phone makes me stutter more than anything.” These negative thoughts may distort Sam’s values. Perhaps Sam values sharing his thoughts and connecting with his family and friends who live in another state. He may begin to convince himself that “he does not need to talk on the phone” because “he will stutter” and so “it does not matter if he shares his thoughts or not.” Over time, these thoughts may lead to the creation of unworkable actions in which Sam avoids speaking on the phone and connecting with family and friends even though he really wants to.

We explained this thought process in detail; however, this entire process can occur in an instant when a person encounters something that causes them stress. In Sam’s case, as he continues in this automatic thought feedback loop (McKay, Davis, & Fanning, 2007), he may become more psychologically inflexible as he thinks about talking on the phone. And, he may possibly exhibit more physical disfluencies when he talks on the phone as a result. Figure 2 details this process.

The goal of ACT is to address human suffering and create psychological flexibility by targeting the six core principles of ACT. These principles are displayed in the ACT Hexaflex shown in Figure 3. The hope is that by increasing psychological flexibility, an individual will begin to live his life in a way that matches his values (who he is at the core).

Throughout the rest of the article, we will guide you through exercises to help you better understand each of the core principles of ACT; and also provide clinical examples of using ACT with individuals who stutter. Additionally, we will summarize some of the current research that exists about brain changes as they relate to the core principles of ACT.
The Science of Stress

Before we dive into our discussion of the ACT principles, let us begin by first discussing stress and anxiety. Think again about that one thing that causes you stress and anxiety. Perhaps this thing is a one-time traumatic event, like the Columbine shootings, or a repeated event like stuttering. Regardless, in addition to the thoughts and emotions that accompany thinking about or encountering this thing, you may experience physical reactions like sweaty palms, increased heart rate, body flushing, headaches, or nausea as well.

So, where does stress come from? And, when did our species learn to be stressed or anxious? According to Rozin and Royzman (2001), human beings possess an innate survival skill known as negative bias. Hundreds of years ago, before cell phones, running water, indoor plumbing, and even fire, people’s brains learned that negative experiences were more powerful than positive ones. Hanson (2013) gives a perfect example of how this negative bias may have developed. Let us say that our early ancestors saw a round shape in the distance. That shape could be a bush, in which case it would be snack time; or, that shape could be a bear, in which case our ancestors would be the snack. Through time, and unfortunately (for them) experience, our ancestors learned to avoid the round shape in the distance; thus, helping our species to survive and evolve to where we are today. While we are not fending off bears today, our ancestors would be the sna...
“Oh my gosh, how am I supposed to catch these M&Ms and focus on my story? I cannot do both at once.”

The interesting thing about this exercise is that we never told you that you had to catch the M&Ms, did we? Let us try the exercise again — this time we want you to tell us about your favorite movie in as much detail as you can. And, you can CHOOSE whether you catch the M&Ms or not. What would you do? What might be different about this experience if you chose to let the M&Ms fall as you talked? Some participants let the M&Ms fall. Other participants choose to catch the M&Ms — this time knowing what to expect and that they can choose to let the M&Ms fall at any time. In both cases, the participants’ speech rate slowed down, their speech became more fluent and focused, and their story flowed.

Some people who stutter can have a similar experience during speaking situations, in which they have many thoughts bombarding them all at once. In addition to processing the incoming information and formulating a response, an individual who stutters may also be thinking about possible listener reactions and feeling the need to be fluent. These thoughts may decrease willingness and acceptance, particularly if more negative thoughts surface with each moment of disfluency. Increased negative thoughts like, “I cannot talk,” can put the individual in conflict causing even more negative thoughts to emerge. Essentially, depleting the energy put into focusing on the message itself.

Choice is a powerful concept and can be an important one to discuss with our clients who stutter. While many clients often feel no sense of control when it comes to their stuttering, they may actually have more control than they believe. Especially when it comes to making choices regarding their thoughts about and reactions to situations involving their speech/stuttering.

In order to embark on this journey, it helps to be willing — willing to try new things, willing to talk about difficult situations, and even willing to sit with challenging emotions and painful memories. As therapists, we can ask our clients and ourselves two simple questions at the start of every session — 1) Are you willing to participate today? 2) Are you willing to be open to new ideas and perhaps even try something new? These two questions encompass the concept of willingness and allow all individuals present to begin each session fresh (open-minded) and to let go of assumptions from the past or expectations for the future. Both client and therapist can make the choice in that moment regarding what they are willing to tackle — no matter how big or little that step may seem.

Clinical Example
As therapists, we can address acceptance and willingness with our clients by encouraging them to be willing to examine options for negative thoughts about their stuttering. Let us say that your client — John — and you are talking about his goal of talking more in class and John says, “I am going to stutter on every word I say in class today, so why even bother raising my hand?” You might ask him to tell you a bit more about that statement and then follow up by asking him if he would be willing to role play a classroom situation with you. As the exercise plays out, John may begin to realize that he did not actually stutter on every word that he said. Perhaps this realization will evolve into a conversation about the language John uses — and the ways in which this language may be impacting his thoughts and actions.

John was willing to make the choice to explore the factors that may have been holding him back from participating in class. In many ways, beginning this conversation is no different than facing a fear (like singing karaoke in front of a group or sailing on the open ocean). John is observing his thoughts without evaluation and allowing them to come as they do. This conversation may help John to make realizations that bring him closer to acceptance of his stuttering as a small piece of who he is — among many, many more pieces.

Contact with the Present Moment
The present moment is all that we have. If we find ourselves dwelling on the past or fretting about the future, we are taking ourselves away from the present moment (Wilson & Dufrene, 2012). And yet, in the fast-paced society in which we live, it can be difficult to slow ourselves down enough to be in the present moment. Our breath can be a wonderful tool for helping to bring us back to the present moment — especially since it is always with us. Let us explore this idea a bit more.

Find somewhere quiet and comfortable to sit — it can be in a chair or on the floor. Sit up straight, plant your feet
firmly on the floor (or cross them if you are sitting), and place your hands face up on your lap. Now, close your eyes. Take the next minute to focus on your breath. Feel the cool air come in your nose as you inhale and the warmed air leave your nose as you exhale. Feel your stomach expand as it fills with air and deflate as you slowly let the air out. As you focus on your breath, your mind may begin to wander. You may begin to think about a conversation with a friend or even the errands you need to run before dinner. Take notice that your mind is wandering and come back to your breath. More thoughts may arise – and that is okay. Notice them and allow them to float by – as though they are clouds in the sky. Do this for a few more minutes and as you feel ready to “come back,” take six purposeful breaths and open your eyes.

How do you feel? What was this experience like for you? Was it easy or difficult? In what ways?

Mindfulness-Based Stress Reduction (MBSR) is one of the most widely used mindfulness training programs and has been reported to produce positive effects on psychological well-being and to decrease symptoms of a number of disorders (Kabat-Zinn, 1982). Hölzel et al. (2011) conducted magnetic resonance imaging (MRI) brain scans on participants before and after an eight-week MBSR course. They found that the MRIs revealed significant physical changes in the brain. Increased gray-matter density was found in the area important for learning and memory (hippocampus) and in the structures associated with self-awareness, compassion, and introspection. Decreased gray-matter density was found in the area known to play an important role in stress and anxiety (amygdala). One of the fascinating aspects of this study was that several mindfulness exercises were used (body scan, yoga, and sitting meditation) and participants reported that they only spent an average of twenty-seven minutes per week intentionally practicing mindfulness exercises.

The above study seems to indicate that it takes very little time to make physical changes in the brain. This time also allows an individual to create space, which gives him the opportunity to generate an outside perspective (self as context). We will touch on this concept later in the paper. This newly formed space can allow for new thoughts to emerge and the practice of psychological flexibility to continue.

Clinical Example
As therapists, we can help our clients to come in contact with the present moment by introducing them to a wide variety of mindfulness exercises – breathing meditations, loving kindness meditations, five senses meditations, walking meditations, body scans, mindful eating, mindful writing, yoga and six breaths on purpose (Wilson, 2012).

One of our clients, a nine-year-old boy who presented with a moderate-severe stutter, had been working on meditation and mindfulness breathing for about six months when he announced that he had made his baseball league’s All-Star Team. According to his mother, right before the game, as his team was warming up on the field by tossing the ball around and taking practice swings at bat, our client was on the sideline kneeling on one knee with his eyes closed. His mother walked up to him, surprised that he was not with the rest of his team, and asked, “Boy, what are you doin’?” Without hesitation and without opening his eyes he responded, “Momma shoosh, I’m breathin’!”

The amazing thing about this story (aside from the fact that our client made the All-Star Baseball Team!) was that no one had told him to transfer his breathing and meditation skills to the baseball field. He took it upon himself to create his own space when he felt anxious. And, he was performing the activity prior to an event where there was not any speaking pressure involved. He recognized, on his own, the value of pausing to create space and calm his body by stopping and connecting with the present moment. Even a child has the ability to recognize what his mind and body needs in both stressful and comfortable situations.

Defining Values
When you think of the word – VALUE – what comes to your mind? Can you quickly list five to ten of your values? Or do you find the question a bit open-ended, daunting, and difficult to answer?

Let us try this. Take out a sheet of paper and answer the question – Who are you? Take about a minute to write down your thoughts. What were some of your responses? Now, close your eyes and imagine the following – It is your 100th birthday party and the person who is closest to you emotionally is going to give a speech about you. What would you want that person to say? (Not – “What do you think they will say?” –
because that might be different). Write down your thoughts. Now, look back at your responses to the both prompts. Were your responses the same or different?

We have found that for the first question, participants often wrote down their roles – things like mother, daughter, father, son, speech-language pathologist, person who stutters, runner, musician, writer, etc. Were any of those responses on your list? And for the second question, participants often wrote down characteristics of themselves. Things like caring person, loyal friend, motivated student, empathetic listener, etc. These characteristics are our values – who we are at the core. While our likes, dislikes, appearance, hobbies, careers, and even fashion sense may change throughout our lives, our values remain rather constant. If we really stopped to think about it, it is our values that drive us to participate in the roles we choose (like our likes, dislikes, hobbies, careers, etc.).

Research in the field of neuroscience discusses the concept of a joyful amygdala in which happier people show more ability to handle and “respond appropriately to both opportunity and threat to their environment” (Cunningham & Kirkland, 2014; p. 766). So, it is possible that the more a person lives by her values and finds happiness in those choices, the more psychologically flexible she may be in both stressful and enjoyable experiences. Additionally, according to Roberts-Wolfe (2012), the more positive experiences a person has, the more dopamine is released. And, this increase of dopamine in one’s amygdala can help the brain to hold on to good experiences much longer.

The question “Who am I?” can be a difficult one to answer and may require a lot of thought and exploration. However, it is an important one. By understanding our values, we can better determine whether our daily words, thoughts, and actions are inline with who we are at the core. And, as we live a values-based life, we may even find ourselves feeling happier (and changing our brain’s function and chemistry in the process).

Clinical Example
We can guide our clients who stutter in exploring their values and answering the question “Who are you?” As you may have experienced, this is not an easy question and can be difficult for our clients to answer. In fact, this question may be one that they are constantly adding to – as we tend to learn new things about ourselves with every interaction and experience we have.

One way clients can experience their values is by creating a Values Tree (Ladner & Palasik, 2010) to help them visually represent their values (see Figure 4). Get creative – use poster board, have your client bring in pictures, cut words out of magazines, even use real twigs, if you wish! The more a client can touch the language they use and experience the person they wish to be, the more they might be able to live a values-based life.

The leaves and branches of the Values Tree are things that people see on the outside (perhaps some of the roles you listed earlier) while the roots are what people cannot always see (your values). The trunk represents your thoughts and feelings about the ways in which your values shape your behaviors. This is where the therapy conversation happens.

Clinical Example
We can guide our clients who stutter in exploring their values and answering the question “Who are you?” As you may have experienced, this is not an easy question and can be difficult for our clients to answer. In fact, this question may be one that they are constantly adding to – as we tend to learn new things about ourselves with every interaction and experience we have.

For example, Ryan was creating his Values Tree during therapy. I noticed that one of his leaves read, “quiet – someone who does not talk.” I also noticed that one of his values was “connecting with others.” This apparent discrepancy allowed for great conversation and exploration about the reasons why Ryan was not living by his value of “connecting with others” when at school and what steps he wanted to take to start the journey to living by this value more fully.
Thought Defusion
Let us again put ourselves in the shoes of person who stutters. Take out a sheet of paper and number one to six. Read the following statements and choose one of the answers in parentheses.

1. Life is (fair/unfair).
2. I am usually (right/wrong).
3. I (have to/don’t have to) talk fluently to be successful.
4. The way I talk is (always/never) good.
5. (Everyone/No one) accepts my stuttering.
6. I stutter on (all/none) of my words.

What were your reactions to this exercise? What was easy? What was challenging? Most participants found choosing only one response difficult. They could think of at least one situation in which the answer that they chose did not apply. Some individuals stated that having to choose only one response made them uncomfortable; and, others experienced a physical sensation as they made a choice (like an increase in heart rate and sweating). Wilson and DuFrene (2012) terms these all or nothing words – word prisons – because they trap an individual into making a choice and do not allow for any optional thoughts or psychological flexibility.

However, how often do you use these all or nothing statements in your inner dialogue? Have you ever made statements like “I cannot do this” or “I must get an A in this class?” What about “I should spend time with my friends today” or “I love my partner, but I get so angry at them?” What happens if you do not follow through with these thoughts? You fail. And what happens if you keep failing? You do not move forward.

Let us revisit the statements from above and change one word in each of them, so that they read as follows: “I can do this;” “I can get an A in this class;” “I can spend time with my friends today;” “I love my partner, and I get so angry at them.” What happens when you change your language to allow yourself more flexibility? You provide yourself with options.

Language is an important part of human existence. We use language to help us solve problems in our lives on a daily basis. If you think you are hungry, what do you do? You eat. If something smells in your house, what do you do? You look for it (and hopefully find it). If your car breaks, what do you do? You get it fixed. Now, if you do not want a thought, what do you do? Can you easily get rid of it every time? Why not? Well, because the more we try to suppress, avoid, or fight thoughts, the more they come back (Ciarrochi & Bailey, 2008). In other words, the more you try to experientially avoid a thought, the more that thought become fused in your mind.

Often times, when we fuse to our all or nothing thoughts we may feel as though we have no control over a situation. We give these rules a lot of power and we may feel helpless and stuck. Or, it is possible that we are so tightly fused to these rules that we do not realize their existence or power. And yet, these rules govern our actions. For example, I tell myself that “I cannot run a marathon” and so I do not even try. However, if I tell myself that “I can run a marathon and it will require a lot of training and dedication” – I might be more willing to consider the idea. By allowing for more flexibility in the language we use, we decrease judgment and create more realistic options for ourselves. And as we explore these options, we can create space (between these rules and ourselves) and regain power of the situation. The power of choice.

Clinical Example
Often times, our clients may not realize the power that their thoughts (and the rules they create) can have on their actions. The meaning created by this combination of words may prevent them from living their lives in a way that is in line with their values. There are many ways in which we can help our clients to defuse their negative thoughts thus lessening their power.

Some of the most popular exercises among our clients are ones in which they practice taking back the power and defusing from their thoughts. Some clients will write down all of their thoughts about their stuttering or a specific speaking situation and then rip the paper up into a hundred pieces. The scattered words no longer hold any meaning (and our clients relieved some stress in the process). Other clients have written their thoughts down and then recited them in silly voices, defusing the power (and producing a few giggles too). Ian, a seventh grader, loved paper airplanes and usually spent part of each session talking me through the process of making his newest paper airplane creation. He decided to write the rules that were “controlling his speech” down on the inside of paper airplanes. On a
sunny day, we went outside and threw them around the field. As our clients practice defusing from their thoughts, their emotional responses to those thoughts often lessen as well. And, after an activity like the ones mentioned above, they may be ready to explore the options they have in a more objective and less judgmental fashion. Thus keeping themselves in the present moment.

Self as Context
Imagine that you are about to encounter the stressful thing that we had you think about earlier in this paper. You are feeling nervous about the thought and are contemplating running in the opposite direction. Much like the contemplation a person who stutters may have before giving a class presentation. On a sheet of paper, take the next few minutes to write a pep talk for yourself (using third-person language – he, she, your name, etc.). What was the experience like? And, why did we have you write in the third-person perspective?

Kross et. al, (2014) conducted seven studies to investigate whether the language people use to refer to themselves during introspection influenced how they thought; how they felt; and how they behaved under social stress. What they found was that making small shifts in how we address ourselves during introspection (using third-person self-talk instead of first-person self-talk) can influence our ability to regulate our thoughts, feelings, and behavior under social stress. The participants who used third-person self-talk were able to create distance and ease the workload on their brains. Electrodes actually picked up a reduction in energy consumed by the frontal lobe and the amygdala. And, participants who used third-person self-talk reported feeling less anxious when they encountered social stress. The participants’ brains were responding as though they were talking to a friend – and we all know how much easier it is to give advice than to take it.

Our clients may say things, to themselves or others, like “I always stutter” or “I am a bad talker.” The use of the word “I” (first-person language) can be self-defeating and minimize the other qualities that our clients possess. Essentially, our clients are focusing on only a small portion of who they are (seeing one’s self as a content – in this case, stuttering), instead of viewing themselves as a whole like an outside observer might (seeing one’s self as a context) (Palasik & Hannan, 2013). Their stuttering may seem so big that they might forget that in addition to “person who stutters,” they are also a brother, a friend, a caring person, an honest person, etc.

Consider the following Indian parable, which explains the concept a bit more. There were six blind men who lived in a village. They had heard tales of elephants, but since they were blind they had never seen one. They argued about what elephants must look like constantly. So, they decided to travel to the palace and touch an elephant to get an idea of what it was like. When the six men were lead into a courtyard (where the elephant stood) by an old friend who could see, they each touched a different part of the elephant. As they were talking, they realized that their descriptions of the elephant were tremendously different – for they had each described one part of the animal and did not consider that their friends were right too. They only considered their own, individual perspectives. It was not until their friend explained to them that they were all right, that they realized they were missing the entire picture and had to put the pieces together in order to see the whole animal.

As this parable suggests, we often have the tendency to focus on a small part of the whole without stepping back. This may mean basing our sense of self-worth on just one or two of our qualities. Or, being so focused on how we think an argument with a friend played out that we do not consider other (and maybe less biased) opinions. By stepping back and seeing the whole picture, we can work towards taking ourselves out of the equation; thus, increasing our psychological flexibility as we allow ourselves the opportunity to explore options.

Clinical Example
In therapy, we can guide our clients in creating space and seeing the whole picture. One client we had was a college-aged client, who said that he did not care what people thought about his stuttering. He was a good-natured young man who said he valued honesty and kindness. One session, we asked him to talk in the third person about himself while we asked a few questions about a speaking situation he had engaged in over the weekend. We had practiced this technique a few times before, so the client was prepared. Once the client
started to talk, using third-person language, he said the following – “Tony often changes words when he knows he will stutter. It sometimes bothers Tony that people will think differently of him if they heard him stutter.” When he finished talking, he realized what he was saying and was surprised that he had admitted that stuttering does bother him at times and that he was not being honest with himself or others when he avoided or changed words. By stepping outside of the speaking situation, our client was able to create space and make new discoveries about his thoughts and actions.

If our clients are feeling fearful about an upcoming speaking situation, we may have them visualize or talk through the speaking situation using third-person language – as though they are watching the situation play out on a movie screen in front of them. They might also talk about the possible outcomes of the speaking situation and the reactions of the listeners present. You may then problem-solve each outcome or listener reaction to help your client feel more prepared going into the situation. This exercise not only assists our clients in seeing the big picture, but also desensitizes them to possible negative thoughts about stuttering and/or other speaking situations.

**Committed Actions**

Let us revisit that stressful thing one last time. You have sat with the thought of it and even written a pep talk for yourself in case you were to encounter it. Now, we want you to think about this question. What is your ultimate goal for this thing in your life? Write that goal down. If we checked in with you tomorrow, would you have accomplished that goal? We are guessing here, but most of you probably would not have. Does this make you a failure? Were you just not trying hard enough? No! In fact, we set you up for failure by not asking you a failure? Were you just not trying hard enough? In fact, we set you up for failure by not asking you to think about your own goals; and, to ultimately become your own therapist.

Let us say my ultimate goal is to run a marathon. I find a race and sign up. I spend the next week pumping myself up for the race on Sunday. I pick out my outfit, tell all of my friends, and picture the pride I will feel upon completion. On race day, the gun goes off, and I start running. By mile two, I am out of breath; by mile four, I am in excruciating pain; and by mile five, I have dropped out of the race. I have failed – I did not achieve my goal – and I CANNOT run a marathon. Who cares that I have only ran a maximum of three miles at one time before this – I will never consider running a marathon again. While this example is extreme, it reinforces the importance of setting realistic goals for ourselves.

**Clinical Example**

Our clients may set the same types of unrealistic goals for themselves – and may come to us feeling defeated and ready to give up. Parents may tell us that their child is “being lazy” and not using the modifications he learned last week in therapy. As therapists, we can help guide our clients (and their families) in creating a plan and setting realistic goals.

Quinton, a thirteen-year-old client, who stuttered severely, had the ultimate goal of ordering his own meal whenever he went out to eat. Until this point, even though he wanted to order, he allowed his parents to do so. As we talked about the thought of ordering, he stated, “I cannot do it.” He mentioned that every time he went out to eat – he planned to order – and then “chickened out.” When I asked Quinton about his plan, he replied, “I don’t have one – other than just to order.”

We spent some time creating smaller goals leading up to his ultimate goal. Some included printing out menus to his favorite restaurants, circling items he usually ordered, selecting one restaurant to focus on, writing out what he might say as he ordered, and role playing the situation during therapy. Each session, I would check in with Quinton about his plan. On one occasion, he commented that his “next step” goal suddenly seemed too big for him and he realized that he wanted to add a step. This is a perfect example of the fact that our goals and plans are constantly changing – and we can revise them whenever and as often as we would like.

As therapists, we guide our clients in achieving their goals. We support them and offer suggestions, but they do the hard work. By encouraging our clients to set their own goals, we instantly increase their “buy-in” to therapy because they are working on goals that matter to them. And they know themselves best! By creating a plan for each of their goals, we can help our clients to realize that they have the skills needed to work toward their goals; and, to ultimately become their own therapist.
Conclusion
Many clinicians have told us that they “do a lot of this already” and that our presentation “gave them a useful framework to organize their thoughts” about the affective aspects of stuttering. As they go forth in their exploration of ACT, it is important to keep in mind that ACT is not a specific technique, in which a clinician decides to “use ACT” with a certain client. Instead, ACT is a way of life, in which an individual develops psychological flexibility and learns to live by his or her values. ACT can be used individually or in concurrence with more traditional fluency shaping and stuttering modification techniques – depending on your client’s goals. With some clients, you may target all of the principles of ACT; while with others, you may only target a few. Again, it all depends on your client – as they are in the driver’s seat. Figure 5 and Figure 6 provide a brief summary of what clients and therapists can do to target each principle of ACT.

Figure 5. ACT Hexaflex – What a Person who Stutters Can Do

Figure 6. ACT Hexaflex – What SLPs Can Do

By simply experiencing ACT while reading this paper, we do not expect that you will feel completely confident to begin implementing ACT with your clients right away. If the topic of ACT peaked your interest – whether personally, professionally, or both – we encourage you to continue your journey in learning more about ACT. Read articles, try exercises, and talk with your colleagues. The clinical examples and activities we have provided in this paper and in Palasik & Hannan (2013) are just a few ideas to get you started. The opportunities are endless. As therapists, it is our responsibility to pass on as much knowledge as we can to our clients – so that they can ultimately become their own therapists. ACT can help clients to live life by their values and to show the world just how amazing they are!

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References


Cognitive-Linguistic Screening & Assessment Tools: A Review for Clinicians in Healthcare Settings

Mary Beth Mason-Baughman, Skye Raupp, & Chelsie Markle

Abstract
Screening and assessment are two skilled areas found in the Scope of Practice in Speech-Language Pathology (American Speech-Language-Hearing Association [ASHA], 2016b). It is important for speech-language pathologists (SLPs) working in all settings to understand the distinct purpose of each as well as the appropriateness of available tools. The purpose of this article is to provide a review of terminology and tools for screening/assessment that will help clinicians make appropriate decisions regarding tool selection, analysis, interpretation, documentation, and coding to support findings with respect to cognitive communication disorders. Cognitive-linguistic disorders involve deficits executive functioning skills (e.g., attention, memory, reasoning, organization, social skills) that impact communication (Elliott, 2003).

Learning Objectives
1) Describe the difference between a screening tool and an assessment tool.
2) Define the terms standardized, norm-referenced, and criterion-referenced.
3) Apply information about cognitive-linguistic and assessment tools to make appropriate clinical decisions regarding instruments to use.

Screening
The purpose of a screening tool is to determine if further testing is needed and to facilitate referral for appropriate follow-up in a timely and cost-effective manner (ASHA, 2016b). Screenings may include a brief review of medical history, patient interview, observations, and/or use of a more formal screening tool. Screening tools quickly test a broad area of function such as language or cognition and are not considered billable services. Screenings typically are based on a pass/fail score to determine if further testing is needed in specific areas. Screening results alone do not provide enough information for the SLP to make an appropriate treatment diagnosis or to develop a treatment plan. Individuals who fail screenings should be more completely assessed using a standardized cognitive-linguistic test.

Screening tools only offer one or two questions per area; thus, these are not comprehensive enough to be used as stand-alone diagnostic tools. Table 1 includes examples of screening tools for cognitive-linguistic function. It is important to note that many professionals can utilize these tools for screening purposes. Screening results alone do not provide enough information to make an appropriate treatment diagnosis or treatment plan. Some standardized screening tools may be used in conjunction with case history, communicative and environmental observations, and in-depth probes as part of comprehensive assessment. The fact that these screening tools are widely used can impact the validity of the current research.
of the instruments as individuals screened may respond appropriately because they are familiar with the stimulus items from repeated administrations.

<p>| Table 1. Examples of Cognitive-Linguistic Screening Tools |
|----------------------------------|---------------|----------------|</p>
<table>
<thead>
<tr>
<th>Limited Screens</th>
<th>Administration Time</th>
<th>Areas Screened</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alzheimer’s Quick Test (AQT)</td>
<td>3-5 minutes</td>
<td>Color-form naming</td>
</tr>
<tr>
<td>Assessment of Temporal-Parietal</td>
<td></td>
<td>Color-number naming</td>
</tr>
<tr>
<td>Function (Wiig, Nielsen, Minthon, &amp; Warkentin, 2002)</td>
<td></td>
<td>Color-letter naming</td>
</tr>
<tr>
<td>Mini-Mental State Examination</td>
<td>≤ 15 minutes</td>
<td>Orientation</td>
</tr>
<tr>
<td>(MMSE) (Folstein, Folstein, &amp; McHugh, 2010)</td>
<td></td>
<td>Memory</td>
</tr>
<tr>
<td>Montreal Cognitive Assessment</td>
<td>10 minutes</td>
<td>Attention and concentration</td>
</tr>
<tr>
<td>(MoCA) (Nasreddine, 2011)</td>
<td></td>
<td>Executive functions</td>
</tr>
<tr>
<td>Repeatable Battery for the</td>
<td>≤ 15 minutes</td>
<td>Orientation</td>
</tr>
<tr>
<td>Assessment of Neuropsychological Status (RBANS) (Randolph, 1998)</td>
<td></td>
<td>Memory</td>
</tr>
<tr>
<td>Saint Louis University Mental Status Examination (SLUMS) (Tariq, Tumosa, Chibnall, Perry, &amp; Morley, 2006)</td>
<td></td>
<td>Memory</td>
</tr>
</tbody>
</table>

Some screening tools are more extensive, testing specific areas in greater depth. These tools may be appropriate to use in conjunction with informal assessments and other standardized instruments to make diagnostic and treatment decisions. Table 2 provides examples of three such tools.

<p>| Table 2. Examples of Extended Cognitive-Linguistic Screening Tools |
|----------------------------------|------------------|----------------|</p>
<table>
<thead>
<tr>
<th>Extended Screens</th>
<th>Administration Time</th>
<th>Areas Tested</th>
</tr>
</thead>
<tbody>
<tr>
<td>Addenbrooke’s Cognitive Exam (ACE – III) (Neuroscience Research Australia, 2012)</td>
<td>10-45 minutes</td>
<td>Attention</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Memory</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Orientation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Expressive language/Verbal fluency</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Auditory comprehension</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Visuospatial skills</td>
</tr>
<tr>
<td>Cognitive Linguistic Quick Test</td>
<td>15-30 minutes</td>
<td>Attention</td>
</tr>
<tr>
<td>(CLQT) (Helm-Estabrooks, 2001)</td>
<td></td>
<td>Memory</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Executive functions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Language</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Visuospatial skills</td>
</tr>
<tr>
<td>Repeatable Battery for the</td>
<td>30 minutes</td>
<td>Immediate memory</td>
</tr>
<tr>
<td>Assessment of Neuropsychological Status (RBANS) (Randolph, 1998)</td>
<td></td>
<td>Visuospatial/constructional</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Language</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Attention</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Delayed memory</td>
</tr>
</tbody>
</table>

It is important to understand that while competent SLPs identify communication and swallowing disorders, diagnosing medical conditions is outside the clinician’s scope of practice (ASHA, 2016b). Comprehensive assessments reflect the World Health Organization’s *International Classification of Functioning, Disability, and Health*, appraising body structure/function, activity, and participation while considering personal factors (e.g., age, education level) and environmental aspects (e.g., work, family support) (ASHA, 2016b).

A comprehensive assessment has both objective and subjective components and may include a review of medical records, a case history, an interview of the individual or caregivers, behavioral observations, and administration and analysis of standardized/criterion-referenced tests as appropriate (ASHA, 2016b). These varied sources provide the SLP with information about current and previous diagnoses, medications, individual/family concerns, the individual’s performance in a realistic setting, and data about speech, language, hearing, and swallowing function. The goal of the comprehensive assessment is to analyze the available information to determine whether a communication disorder is present, qualify its severity, document the results, and prepare recommendations for treatment (ASHA, 2016b).
More in-depth standardized testing provides the means of collecting additional useful information about an individual’s impairments. A standardized test simply means that it is administered in a standardized fashion, i.e., everyone takes the test in the same way with the same instructions. The importance of standardization is that it allows the test results of an individual to be compared to scores earned by other people the same age.

Standardized tests are typically norm-referenced meaning the results are interpreted based on established results from a sample of neurotypical individuals. Norm-referenced tests yield a standard score that compare patient performance to neurotypical peers. Criterion-referenced assessments provide raw scores that are interpreted based on a person’s performance/ability to complete tasks or demonstrate knowledge of a specific topic. It is vital to keep these differences in mind when selecting a screening tool or test to administer for evaluative purposes. Several standardized tests assess specific disorders (e.g., traumatic brain injury, aphasia), but there are few that evaluate dementia. Therefore, clinicians should use task-specific tests to evaluate certain aspects (e.g., memory, cognition, language) of the disease. Just as it is important to understand what kind of assessment is being used, it is equally important to know exactly what that test or subtest is measuring (e.g., language, cognition, or both). Table 3 lists examples of standardized batteries that can be used to assess various cognitive and language areas.

<table>
<thead>
<tr>
<th>Standardized Assessment Tool</th>
<th>Administration Time</th>
<th>Normative Population</th>
<th>Subtests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arizona Battery for Communication Disorders of Dementia (ABCD) (Bayles &amp; Tomoeda, 1993)</td>
<td>30 minutes</td>
<td>18-80 years</td>
<td>Linguistic expression, Linguistic comprehension, Verbal episodic memory, Visuospatial construction, Mental status</td>
</tr>
<tr>
<td>Cambridge Prospective Memory Test (CAMPROMPT) (Wilson et. al., 2005)</td>
<td>25 minutes</td>
<td>16 + years</td>
<td></td>
</tr>
<tr>
<td>Dementia Rating Scale-2 (DRS-2) (Jurica, Leitten, &amp; Mattis, 2004)</td>
<td>15-20 minutes</td>
<td>56-105 years</td>
<td>Attention, Initiation/Perseveration, Construction, Conceptualization, Memory</td>
</tr>
<tr>
<td>Standardized Assessment Tool</td>
<td>Administration Time</td>
<td>Normative Population</td>
<td>Subtests</td>
</tr>
<tr>
<td>------------------------------------------------------------------</td>
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<td>----------------------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Functional Assessment of Verbal Reasoning and Executive Strategies (FAVRES) (MacDonald, 2005)</td>
<td>60 minutes</td>
<td>18-79 years</td>
<td>Verbal reasoning</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Complex comprehension</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Discourse</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Executive Function</td>
</tr>
<tr>
<td>Functional Linguistic Communication Inventory (FLCI) (Bayles &amp; Tomoeda, 1994)</td>
<td>30 minutes</td>
<td></td>
<td>Greeting &amp; naming</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Question answering</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Writing</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sign comprehension</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Object-to-picture matching</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Word reading &amp; comprehension</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Ability to reminisce</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Follow commands</td>
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<td></td>
<td></td>
<td></td>
<td>Pantomime</td>
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<td></td>
<td></td>
<td></td>
<td>Gesture</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Conversation</td>
</tr>
<tr>
<td>Kaufman Short Neuropsychological Assessment Procedure (K-SNAP) (Kaufman &amp; Kaufman, 1994)</td>
<td>30 minutes</td>
<td>Ages: 11-85+ years</td>
<td>Gestalt closure</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Number recall</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Four-letter words subtests</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Recall/closure composite</td>
</tr>
<tr>
<td>Measure of Cognitive-Linguistic Abilities (MCLA) (Ellmo, Graser, Krchnavek, Calabrese, &amp; Hauck, 1995)</td>
<td></td>
<td>Ages: 16-55+ Education Level: &lt;13 years - &gt;17 years</td>
<td>Receptive &amp; expressive language</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Fluency</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Pragmatics</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Reading</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Writing</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Oral motor functioning</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Family questionnaire</td>
</tr>
<tr>
<td>Ross Information Processing Assessment, Second Edition (RIPA-2) (Ross-Swain, 1996)</td>
<td>45 minutes ~3-10 minutes per subtest</td>
<td>16-90 years</td>
<td>Immediate memory</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Recent memory</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Temporal orientation (recent)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Temporal orientation (remote)</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Spatial orientation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Orientation to environment</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Recall of general information</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Problem solving &amp; abstract reasoning</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Organization</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Auditory processing &amp; retention</td>
</tr>
<tr>
<td>Ross Information Processing Assessment – Geriatric (RIPA-G) (Ross-Swain &amp; Fogle, 1996)</td>
<td>45-60 minutes ~3-10 minutes per subtest</td>
<td>65+ years</td>
<td>Immediate memory</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Recent memory</td>
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<td></td>
<td></td>
<td></td>
<td>Temporal orientation (recent)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Temporal orientation (remote)</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Spatial orientation</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Orientation to environment</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Recall of general information</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Problem solving &amp; abstract reasoning</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Organization of information</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Auditory processing &amp; comprehension</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Problem solving &amp; concrete reasoning</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Supplemental subtests:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Naming common objects</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Functional oral reading</td>
</tr>
</tbody>
</table>
A clinician may administer subtests of standardized assessments in place of the comprehensive test battery as some patients may have difficulty completing extended testing due to fatigue or lack of sustained attention over time. The information from individual subtests may be very useful as part of a comprehensive assessment battery. Please note that individual subtest scores may or may not yield a standard score for comparison to neurotypical individuals. Informal assessment of cognitive-linguistic function in naturalistic settings and the patient’s communication environment is also a vital component of the assessment protocol. The patient and his or her family can provide information about functional communication and participation that informs treatment. Evidence-based practice integrates scientific evidence with practice-based evidence (i.e., the SLP’s expertise and experience with similar individuals) and the patient’s perspective (ASHA, 2016a). Administering both formal and informal assessments gives the SLP a more complete picture of the patient.

**Documentation and Coding**

According to the Centers for Medicare and Medicaid Services (CMS), an evaluation is a separately payable comprehensive service that requires professional skills to make clinical judgments about conditions for which services are indicated based on objective measurements and subjective evaluations of patient performance and functional abilities. Evaluation is warranted, for example, for a new diagnosis that results in a change from prior level of function. These evaluative judgments are essential to development of the plan of care, including goals and the selection of interventions.

Procedural codes that can be used for evaluation of cognitive-linguistic deficits are:

- **Service-based CPT 92523:** Evaluation of speech sound production (e.g., articulation, phonological process, apraxia, dysarthria); with evaluation of language comprehension and expression (e.g., receptive and expressive language).
- **Time-based CPT 96125:** Standardized cognitive performance testing includes standardized cognitive performance testing (e.g., Ross Information Processing Assessment) per hour of a qualified health care professional’s time, both face-to-face time administering tests to the patient and time interpreting these test results and preparing the report. Per hour.
- **Time-based CPT 96105:** Assessment of aphasia (includes assessment of expressive and receptive speech and language function, language comprehension, speech production ability, reading, spelling and/or writing, e.g., Boston Diagnostic Aphasia Examination) with interpretation and report. Per hour.

In general, it is good practice to administer a complete standardized test battery as part of any assessment protocol for the reasons stated in the above section. Please note that use of CPT 96125 specifically states the use of standardized cognitive performance testing. Standardized protocols listed in Tables 2 and 3 would be appropriate to use in conjunction with this code.

For time-based evaluation codes, including CPT 96125, CMS states that for Medicare Part A patients “the therapist’s time spent on documentation or on initial evaluation is not included. The therapist’s time spent on subsequent reevaluations, conducted as part of the treatment process, should be counted” (CMS, 2015, p. O-19). Billing for Medicare Part B beneficiaries follows the definition of codes set forth per Local Coverage Determinations (LCD) definitions; therefore, SLPs may account for interpretation time in assessment.

**Conclusions**

It is important for clinicians to understand the purposes of screening and assessment. The purpose of a screening tool is to determine if further testing is needed; thus, screening protocols and tools are not appropriate to use as stand-alone diagnostic tools. The purpose of an assessment is to diagnose the communication disorder and develop a treatment plan. A comprehensive assessment protocol should include the use of a standardized test and informal assessment procedures. Some time-based CPT evaluation codes specifically require the use of standardized norm-referenced and/or criterion-referenced assessment tools.
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References


Screening Tools and Assessments
- ABCD
- ACE-III
- AQT
- Burns Inventory
- CVLT-II
- CAMPROMPT
- CLQT
- DRS-2
- FAVRES
- FLCI
- **K-SNAP**

- **MCLA**

- **MMSE**

- **MoCA**

- **RBANS**

- **RIPA-2**

- **RIPA-G**

- **SLUMS**
Fact or Fiction?: Urban Legends of Dysphagia

Caroline M. Brindo

Abstract
In the evolving field of dysphagia, opinions regarding best practice vary wildly. How is a clinician to know the truth? This article aims to take a close look at some of the urban legends surrounding dysphagia and the evidence that can lead clinicians astray...or back on the path to evidence based practice.

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Caroline M. Brindo M.A. CCC-SLP, BCS-S is employed at MBS Envision.
   Financial - Employed as the Ohio Clinical Manager with MBS Envision, a provider of mobile modified barium swallow studies.
   Nonfinancial – Is a Board Certified Specialist in Swallowing and Swallowing Disorders with over 16 years of experience in dysphagia diagnosis and treatment. Has presented at the state and national level on the topic of dysphagia.

Learning Objectives
1) List 2 key features of a robust research article.
2) List 2 urban legends of dysphagia management and one piece of evidence for each that disproves.
3) List 3 resources for continuing education in dysphagia.

Origins of Dysphagia Urban Legends
All too often, therapists that practice in the field of dysphagia are working under false assumptions regarding the best evidenced based practice that exists. This perhaps arises from the disparity that exists in our field between training requirements and clinical practice. According to the 2013 ASHA Health Care Survey, Speech-Language Pathologists (SLPs) working in adult settings spend 49% of their time in dysphagia management. Currently, less than 5% of the graduate course curriculum is focused on dysphagia, with recommendations (not requirements) that students spend 15% of their clinical training hours in dysphagia. Additionally, there are currently no requirements from ASHA that clinicians obtain continuing education units (CEUs) in dysphagia, unless they are a Board Certified Specialist in swallowing (www.asha.org). Dysphagia CEU courses, especially at the intermediate or advance level, can be hard to find. At the time this article was written there were currently four in-person courses on dysphagia scheduled in Ohio (www.asha.org/ceufind). The gap between spending such a small percentage of time training for an area of practice that clinicians often find themselves spending a large percentage of their clinical practice time lends itself to be filled with these urban legends.

Robustness of Research
When faced with new information in dysphagia management, the clinician has an ethical responsibility to complete his or her own investigation into the supporting research, rather than taking that information at “face-value” and implementing it into practice.

There are many systems in existence for classifying the strength of evidence in research. In the United States, The Agency for Healthcare Research and Quality (AHRQ) is the accepted descriptor. The examples of levels of evidence as published by AHRQ are as follows:

- Level 1A (highest level of strength)-Meta-analysis of multiple, well-designed controlled studies. This means that the results of multiple Level 1 studies were compiled into a larger analysis of data.
- Level 1-Well-designed randomized controlled studies. In this level, subjects are randomly assigned to groups, a control group exists for comparison, and the design of the study eliminates as many variables as possible (researcher bias, participant bias, etc.).
influenced by the knowledge and experience of the interpretation of swallowing assessment is highly studies have shown that the co informal checklist (Carnaby & Harenberg, 2013). Other most common swallowing evaluation used was an Special Interest Group 13 (Dysphagia) revealed that the clinicians. A survey of over 300 SLPs from ASHA’s In assessing dysphagia, methods vary widely between clinicians. A survey of over 300 SLPs from ASHA’s Special Interest Group 13 (Dysphagia) revealed that the most common swallowing evaluation used was an informal checklist (Carnaby & Harenberg, 2013). Other studies have shown that the conduction of and interpretation of swallowing assessment is highly influenced by the knowledge and experience of the examiner (McCullough, Wertz & Dineen, 1999). The use of the CSE in conjunction with an instrumental examination also varies among clinicians. In the 2011 survey, the authors concluded that in fact, there is currently no “usual care” in dysphagia practice (Carnaby & Harenberg, 2013).

**Modified Barium Swallow Study Legends**

The SLP completing a Modified Barium Swallow (MBS) will often hear afterwards, “Well, did he/she pass?.” The urban legend of the MBS as a pass/fail examination is prevalent in healthcare. When examining the purpose and scope of the MBS, ASHA is clear that several aspects of the swallow should be examined. ASHA’s preferred practice guidelines state that SLPs completing this evaluation should examine the anatomy and physiology of the swallow, airway protection, effectiveness of postures/maneuvers, determine optimum delivery of nutrition/hydration, determine therapy techniques, and gain information for collaboration with other healthcare professionals (www.asha.org). Very few aspects of these guidelines can be answered in either yes or no. In 2000, Dr. Bonnie Martin-Harris published a retrospective study in which the utility of the MBS was examined in 608 studies. In 10% of the studies, the swallow was found to be normal. Aspiration was identified in 32.4%. A swallow abnormality WITHOUT aspiration was identified in 57.2%. A referral to a specialist was made in 57.2% of the studies. Additionally, strategies that improved swallow function were identified in 48.4% of the studies (Martin-Harris et al, 2000). When used to the extent that ASHA recommends, and to which research has shown that it can reveal useful information, the MBS cannot simply be pass/fail.

Another urban legend that arises regarding the MBS is that the study should end when aspiration occurs. SLPs encounter this most frequently from radiologists. However, the American College of Radiology has published Practice Parameters for the performance of the MBS which state that the “examination may need to be terminated prematurely if the patient demonstrates severe aspiration and does not respond to protective or therapeutic maneuvers”. The use of the word ‘and’ instead of ‘or’ is an important distinction, as it indicates that the study should assess not just aspiration, but also the patient’s response to aspiration and the usefulness of maneuvers. The Parameters further describe specifically that maneuvers for body positioning and

**Urban Legends in Dysphagia Assessment**

In assessing dysphagia, methods vary widely between clinicians. A survey of over 300 SLPs from ASHA’s Special Interest Group 13 (Dysphagia) revealed that the most common swallowing evaluation used was an informal checklist (Carnaby & Harenberg, 2013). Other studies have shown that the conduction of and interpretation of swallowing assessment is highly influenced by the knowledge and experience of the

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Authors do not, however, need to identify their research as falling into a certain AHRQ level. It is up to the reader of the article to determine how robust the research is before implementation. Examination of the article with a critical eye is crucial. Clinicians may first want to find the “n”, which is the number of subjects that were included in the study. Higher “n” can produce more reliable results, because of the increased amount of data to draw conclusions from. Another component for clinicians to examine is the subject makeup. The results of a study that only includes subjects with a stroke diagnosis may not be applicable to patients with a Parkinson’s diagnosis. Thorough reading of the full-text of the study can give the clinician a better idea of how relevant the results are to their patient. A possible “red flag” for any clinician is a study that seems to show a “magic bullet”, that is a therapy technique that appears to be beneficial and applicable to all patients with dysphagia. Critically reading the full text of research, as well as looking into the research behind continuing education courses, can help the SLP determine not only the validity of an assessment or treatment method, but also its applicability to his or her patient with dysphagia.

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strategies to “improve swallowing physiology” can be assessed (American College of Radiology, 2014).

One other frequently overhead statement is that the MBS study and a Fiberoptic Endoscopic Evaluation of Swallowing (FEES) are interchangeable. When looking at identification of aspiration, diet recommendation and assessment of residues, studies have shown that the MBS and FEES are, in fact, in agreement 90-100% of the time (Aviv; 2000; Kelly, 2007; Rao, 2002). However, when looking at other aspects of the swallow, either the FEES or the MBS may be more appropriate. For example, the FEES can provide a view of the vocal folds to examine their function, while the MBS is unable to provide this information. Likewise, maximum base of tongue retraction and peak hyolaryngeal elevation cannot be directly viewed during the FEES, but are evident on the MBS. There are patients for which the FEES is more appropriate, and vice versa. The SLP should carefully consider which instrumental will be the most suitable for each patient. They are not interchangeable, since we cannot gather all of the same information from both.

Looking further into dysphagia assessment during an instrumental examination, it is a belief among some SLPs that penetration is an abnormal finding and as such, should be addressed with maneuvers or diet modifications. Research examining the swallow function of normal healthy people has found that penetration does occur without dysphagia. In 2008, Daggett at al assessed the swallowing of 98 normal individuals without dysphagia. This study found subjects below age 50 demonstrated penetration in 7.4% of swallowing, while in subjects age 50 and over, 16.8% of swallowing showed penetration (Daggett et al, 2007). In 2010, Allen et al evaluated 596 individual swallows on MBS studies, all of healthy volunteers with no dysphagia and found 11.4% demonstrated penetration (Allen et al, 2010). One interesting aspect of the Daggett study was that no incidences of penetration resulted in any sensorimotor response-no cough or throat clear. A sub-legend regarding penetration is that “silent” penetration should be of further concern to the evaluating SLP. When looking at this information from the Daggett study, an SLP should reconsider this assumption (Daggett el al., 2008). When faced with these studies showing that penetration can occur in a normal swallow, the SLP assessing penetration during an instrumental examination should carefully consider the patient, the physiological reason for the penetration and the severity of the penetration to determine if the penetration should be a cause for altering a diet or necessitate the use of a strategy.

Another common conclusion that SLPs completing instrumental assessments will sometimes draw is the presence of UES dysfunction and may attribute aspiration due to this finding. As SLPs, it is important to understand that bolus clearance through the UES depends upon relaxation of the cricopharyngeous muscle, hyolaryngeal elevation exerting traction forces to further pull open the UES, and adequate pharyngeal pressure to propel the bolus through. Incomplete relaxation of the CP (“true” UES dysfunction) can be non-evident on an MBS, because the traction forces provided by the hyolaryngeal elevation can work to overcome this incomplete relaxation (Sharma & Massey, 2012). Similarly, adequate relaxation of the CP can be masked by incomplete hyolaryngeal elevation which would not exert complete traction force on the CP to pull it open further (Shaker & Lang, 2000). Because of this nonspecific appearance of UES dysfunction on an MBS study, SLPs cannot attribute aspiration due to this dysfunction.

**Clinical Swallowing Evaluation Legends**

One common symptom that SLPs will look for during the Clinical Swallowing Evaluation (CSE) is the presence of a runny nose and watery eyes as an indicator of silent aspiration. To date, no studies have found any link between these symptoms and aspiration. We do know that gustatory rhinorrhea (runny nose) can be caused by eating warm temperature food, spicy foods, food allergies or intolerances, irritation of the nasal passages by food odor, or even neurological impairment (Jovancevic et al, 2010). Likewise, watery eyes when eating can be caused by food allergy or intolerance as well as neurological impairment (Jovancevic et al, 2010; Raphael et al, 1988; Shaker et al, 2012). Because of the lack of evidence associating these symptoms with silent aspiration, and the evidence linking these symptoms with other causes, they are not reliable indicators of silent aspiration and should not be used as justification to alter a diet.

Another point that is sometimes assessed as an indicator of silent aspiration is a drop in the SpO2, or pulse oximetry reading. This is a measurement of the oxygen saturization of blood using a sensor that is...
attached to a finger, toe, or sometimes an ear to assess the percentage of oxyhemoglobin in the blood in the capillary network. A drop in the level of this percentage during oral intake is thought by some SLPs to indicate silent aspiration. Multiple studies have been completed to examine this particular legend. One study in 2000 assessed 60 patients, recording vital signs, including the SpO2 for 5 minutes prior to, during and 5 minutes after the completion of a FEES. There was found to be no significant change in this measurement at any time for any of the subjects, regardless of the presence or absence of aspiration, with or without supplemental oxygen (Leder et al, 2000). In 2006, another study examined 189 patients and assessed SpO2 before during and after a bedside swallow evaluation in which the patients were given food and liquid with radio-opaque contrast. All subjects were given a chest x-ray immediately after the bedside swallow evaluation to determine “aspirators” vs. “non-aspirators”. This study found no drop in SpO2 in the silent aspirators. Interestingly, there was a 2% drop from the pre-bedside swallow evaluation level in 27% of the “safe swallow” (non aspirators) patients, and a 2% drop in 32% of the “unsafe swallow” (aspirators) patients (Ramsey et al. 2006). Other studies have also shown no clinical evidence to suggest that a drop in SpO2 level is a reliable indicator of aspiration (Collins et al, 1997; Perlman et al, 2000; Wang et al, 2005). Pulse oximetry varies throughout the day and a drop can be caused by many things, including fist clenching, poor sensor placement, as well as low hemoglobin related to the patient’s medical condition.

Another symptom that therapists often assess during the clinical swallowing evaluation is the presence of a wet vocal quality. The presumption is that if there are residues in the airway from aspiration or penetration, the patient will have a “wet” sound to their subsequent vocalizations. Multiple studies have examined the reliability of clinicians’ ability to hear a change in vocal quality and the association between clinicians’ perception of a wet vocal quality and penetration or aspiration. At this point, the research has largely shown that clinicians are overall not reliable at judging “wetness” and that the assessment of an abnormal post swallow voice quality does not reliably indicate aspiration or dysphagia (Groves-Wright et al, 2010; Warms et al, 2000; Waito et al, 2011). One study, completed in 2000, compared clinicians’ judgment of voice quality during the completion of a modified barium swallow study. The clinicians were unable to see the MBS, but were asked to judge for “wetness” as the patients vocalized. When post swallow residue was visualized in the vocal tract, 87.7% of the clinicians judged “no wetness” to the simultaneous vocalization of that patient. Additionally, when the clinicians did judge “wetness” only 17.5% actually showed residue. The study concluded “no association” between a clinician’s judge of “wetness” and the presence of residue (Warms et al, 2000). Another study concluded “observations of abnormal postsalvow voice quality can be misleading and are not a valid indication that penetration/aspiration or dysphagia exists” (Waito et al, 2011). Even the use of acoustic voice analysis has been shown to not be a reliable measure of penetration or aspiration (Chang et al, 2012).

Another possible indicator that is frequently assessed is the presence of a diminished or absent gag reflex as an indicator of aspiration risk. The basis for this urban legend perhaps arises from the origin of the sensory innervation of the gag reflex in the glossopharyngeal, or CN IX. This is the same origin for sensation in the area of the base of tongue as well as the faucial pillars. So one could draw an assumption that a lack of gag reflex could indicate a dysfunction in the onset of the swallow, as the sensation of the base of tongue and faucial pillars would be impaired as well. However, studies examining the gag reflex of healthy subjects have found that around one third of the normal population has no to minimal gag reflex (Davies et al, 1995). Furthermore, studies have assessed for correlation between the gag reflex and aspiration and have found none (Bleach, 1993; Leder et al, 1997). Furthermore, when the SLP considers that the vagus, CN X, not CN IX, provides sensation to the LOWER pharynx, where aspiration would occur, the correlation between the gag reflex and aspiration seems less likely (Bastian et al, 1999).

Urban Legends in Dysphagia Treatment
Urban legends are also common in the area of dysphagia treatment and compensatory measures. In a relatively new, constant evolving field such as dysphagia management, SLPs are frequently exposed to new treatment methods. It is the ethical responsibility of the SLP to determine the validity of these treatments before putting them into practice. Attending a course that describes a new treatment method or strategy and implementing without investigating the research (or sometimes lack thereof) behind the method does not
meet our standards for implementation of evidence based practice. Evidence based practice calls upon therapists to integrate clinical expertise, best current evidence and patient values into our therapeutic approach (Sackett et al., 2000). Failing to investigate for best current evidence for a treatment method leaves out this very important tenet.

**Chin Tuck**
One compensatory strategy, perhaps the most commonly used, is the chin tuck. This strategy can be useful for a delayed swallow as well as incomplete hyolaryngeal movement. The tucking of the chin to the front of the neck narrows the laryngeal vestibule, decreasing the distance from the arytenoids to the epiglottis and increasing airway protection (Logemann, 1993). Many SLPs then assume that this posture will always increase the safety of the swallow and will recommend its use based on clinical evaluation. However, the chin tuck is effective in around 50% of patients with dysphagia (Nagaya et al, 2004; Shanahan et al, 1993; Terre et al, 2012). It is less effective with thickened liquids, and less effective in patients with more severe dysphagia (Sacanato et al, 2016). Using the chin tuck strategy results in weaker pharyngeal contractions during the swallow, so the use of this posture can be ineffective or can actually increase the severity of aspiration in patients with inadequate pharyngeal constriction (Bulow et al, 1999). Because of the variability of its effectiveness, this particular strategy needs to be assessed during an instrumental assessment. The safety of the application of this posture during the CSE is another urban legend.

**Strengthening Base of Tongue**
A frequently heard legend is that the Masako maneuver increases the base of tongue retraction. This maneuver, in which the patient gently bites the end of their tongue and completes a swallow with the tongue protruding forward, will often be recommended as a therapeutic exercise for patients with poor base of tongue retraction. However, this exercise actually increases the strength and bulging of the pharyngeal constrictor muscles, not the base of tongue. This increased bulging results in increased base of tongue contact to the posterior pharyngeal wall (Fuju & Logemann, 1996). This differentiation is important to note, as an SLP would not want to use only this particular exercise for patients with base of tongue weakness, since it does not strengthen this deficit (Logemann, 1993).

A therapeutic technique that is also frequently used for base of tongue strengthening is the production of /k/ and /g/ words with force. SLPs will give patients lists of words that begin, end, or sometimes just contain these phonemes and instruct them to produce the words with emphasis on these glottal sounds. However, the movement of the tongue during production of these words does not, in fact, increase base of tongue retraction. Rather, the back of tongue moves to the palate and makes contact for these sounds (Logemann, 2013; Veis et al, 2000). This urban legend perhaps arises from a 1989 study in which the amount of muscle activity in the pharyngeal constrictor muscles was measured during non-swallowing tasks. In this research, producing a hard /k/ for several seconds was found to produce just over 20% of the muscle activity produced during a swallow (Perlman, 1989). Whatever the origin, we do know that this particular legend is not effective to improve the strength of base of tongue retraction.

**Use of Thickened Liquids**
A very prevalent legend, not only with SLPs, but also with healthcare providers in general, is that thickened liquids are safer. Frequently, patients will be given thickened liquids as a precaution, since they are “safer”, until an instrumental assessment can be completed. Before modifying the liquid intake of a patient, several factors should be considered. It has been well documented that many patients that are taking thickened liquids do not meet needed fluid intake (Vivanti et al, 2009; Whelan, 2009; Finestone et al, 2001; McGrail et al, 2012; Murray et al, 2014; Chichero, 2013). Patients on thickened liquids also have a higher incidence of urinary tract infections and dehydration (Logemann et al, 2008). Another consideration is that thickened liquids can impede the absorption and effectiveness of some drugs (Chichero, 2013). In perhaps one of the more important studies in the field of dysphagia, subjects who aspirated were randomized to one of two groups: either thin liquids with chin down, or thickened liquids. Subjects were followed and it was found that the group on thickened liquid was twice as likely to develop pneumonia as the thin liquid-chin down group (Robbins et al, 2008). When assessing a patient for thickened liquids, SLPs need to carefully consider all aspects of the patient to make the best recommendation.
**Compliance with Recommendations**

One final urban legend that all SLPs should carefully consider encompasses both assessment and treatment. This is the conception that if a patient (or a patient’s family in some cases) chooses not to follow the recommendations of the SLP, then that patient should be discharged from the caseload and/or required to sign a “waiver”. In 1990, a federal action was taken, called the Patient Self-Determination Act, which gave patients the right to make choices about their medical treatment. In this Act, it also stated that healthcare providers cannot refuse care or discriminate in any way based on a patient’s decisions (Koch, 1992). Patients must be given clear and adequate information on risks and benefits of a recommendation, they must have the capacity to make a choice, and they must be free to choose without coercion. When these three factors are all present, patients have the right to refuse a recommendation for medical intervention (Bernat, 2001). Informing a patient that they will no longer receive therapy if they refuse a diet modification can be considered as coercion (Berg et al, 2001). A patient does not have to agree to a diet recommendation to benefit from therapy. If the patient agrees to continue with therapy, and there continues to be progress toward functional goals, therapy should continue (Sharp, 2005). Continuing with therapy also provides an opportunity for discussion and documentation regarding risks and benefits of the recommended diet. This ongoing detailed documentation is more important than a waiver, which provides no real documentation that the patient fully understood, or that the risks and benefits were fully explained (Berg et al, 2001).

**Resources for Evidence Based Practice**

Clinicians practicing in dysphagia have a responsibility to maintain current knowledge of the field. As stated earlier, dysphagia management is a relatively new area of study and new research is being completed constantly. Attending courses, following social media, participating in special interest groups, staying abreast of new research are all vital in an evolving discipline. It is important for SLPs to know that ASHA approves CEU providers, not the courses. Once an individual or organization is approved as a CEU provider, it is the responsibility of the CE Administrator for an organization to approve the content of the courses (www.ashaceufind.org). SLPs attending courses need to thoroughly examine the research supporting the course, checking references, to ensure that what they are learning is evidence based.

Reading full text versions of research articles, rather than just the abstract is also an important tool in examining emerging research. In the full text, an SLP can find methods, subject size, subject makeup, and results. Some of these, if any, may or may not be described in the abstract. Sources such as PubMed, Google Scholar, ResearchGate and Elsevier can all be useful in obtaining these full text versions.

**Conclusion**

The management of dysphagia is a relatively new field, and as such, it is constantly evolving. New information regarding assessment and treatment methods are being developed nearly continuously. Because what we as clinicians know about dysphagia is actually still quite limited, it is our ethical responsibility to be vigilant in keeping up with current research. Furthermore, it is also our ethical responsibility to investigate that research before implementing any method into our practice of dysphagia management. Only by incorporating this vigilance and investigation together can we offer our patients our best evidence based practice.

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**References**


Feature Analysis for AAC Apps on iOS Platforms

Becky Herr & Pamela Mitchell

Abstract
This study aimed to compile and evaluate a list of important features available in well-rated Augmentative and Alternative Communication (AAC) apps on the iPhone Operating System (iOS) platform, and determine if there was a correlation between price and various features.

Author Affiliations & Disclosures:
Becky Herr B.A. is a graduate student at Kent State University.
Financial – Employed as a technical writer at Mainstream Software Inc.)
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Pamela Mitchell Ph.D., CCC-SLP is employed at Kent State University.
Financial – Associate Professor of Speech-Language Pathology at Kent State University.
Nonfinancial – Has previously received grant/research monies in the area of augmentative/alternative communication. Areas of interest include complex communication impairments, research methods and communicative-cognitive impairments.

Learning Objectives
1) Identify sources of online reviews for iPhone Operating System(iOS) Augmentative and Alternative Communication (AAC) applications
2) Summarize key features available on iOS AAC applications
3) Describe results of the current study

Augmentative and Alternative Communication (AAC) needs for some individuals with complex communication impairments may be met by accessing one of the increasing number of applications (apps) available through the Apple iTunes store and downloaded to iPad, iPhone, and iPod Touch devices (Sennott, 2011). Mobile technology has opened up a wider range of communication possibilities for individuals with complex communication needs and a rapidly expanding list of AAC apps is available to meet these needs (McBride, 2011), although information is lacking on feature matching and guidance for families in choosing AAC apps. The search for and use of AAC apps must use a clinical framework to find the best match (Gosnell, Costello, & Shane, 2011) and help promote successful use for communication. Families may look to professional advice from speech-language pathologists (SLPs) to help determine which AAC app for iPhone Operating System(iOS) devices such as iPads are best suited to meet the needs of their children with complex communication needs (Meder & Wegner, 2015). SLPs in particular need to be aware of the various features available on AAC apps to assist in feature matching between clients and the available apps.

The two questions this survey attempted to answer include: What basic features are included in well-rated AAC apps? How does price relate to available features?

Methods
Apps used for analysis included 46 AAC apps available for iOS chosen based on high ratings, which were listed on professional review sites APPS for AAC (http://appsforaac.net/applist) and Jane Farrall Consulting, from http://www.janefarrall.com/aac-apps-lists.

Data were retrieved and compiled from the Apple App Store™ and app company websites, and included the following features: number of voices, type of voice output, display organization, type of symbols used, number of symbols available, price, and level of support. Additionally, the availability of the following features was collected: switch access, demo or lite version, text-to-speech, subscription, in-app purchases,
and additional profiles. Data were analyzed for range and median of the following features: Price, Number of Synthetic Voices, Number of Symbols, and Number of Symbols per dollar (USD).

Following the descriptive summary of data, the authors examined potential bivariate correlations across features, which included: a) Price and Switch Access, b) Price and Number of Symbols, c) Price and Number of Voices, d) Price and Number of Displays, e) Price and In-App Purchases, and f) Price and Number of Features

A Price and Feature correlation was compiled using a multi-point scoring system. For features with binary options (e.g., availability of text-to-speech), apps were given 0 points when the feature was not available, and 1 point when the feature was present. For features such as symbol type, where apps were awarded points for having text, symbols, and/or photos, 1/3rd of a point was awarded to apps with only one feature, 2/3rd of a point was awarded to apps with two of the symbol types, and 1 point was awarded to any app which provided all three symbol types.

Results

Analysis

Descriptive Statistics. The minimum, maximum, range, mean, and standard deviation for price, number of voices, and number of symbols is listed in Table 1, below. The data indicated a relatively large difference in price, number of voices, and number of symbols available for the apps.

Table 1. Ranges and means of key features

<table>
<thead>
<tr>
<th>Feature</th>
<th>Price</th>
<th>Number of Voices</th>
<th>Number of Symbols</th>
<th>Symbols/Dollar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Maximum</td>
<td>299.99</td>
<td>105</td>
<td>15000</td>
<td>474</td>
</tr>
<tr>
<td>Range</td>
<td>299.99</td>
<td>104</td>
<td>15000</td>
<td>474</td>
</tr>
<tr>
<td>Mean</td>
<td>68.51</td>
<td>13</td>
<td>6544</td>
<td>85</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>77.23</td>
<td>22</td>
<td>5424</td>
<td>128</td>
</tr>
</tbody>
</table>

Frequency counts for various features are listed in Table 2. The description analysis of available features indicate that the majority of apps included in the study do not provide a demo or lite version, in-app purchases, multiple user accounts or profiles, switch access, or subscriptions. However, a majority of apps did include text-to-speech functionality, digitized and synthetic voices, preloaded or core vocabulary, and operate across various iOS devices, e.g., iPhone, iPads.

Table 2. Frequency Counts of AAC App Features across well-rated apps

<table>
<thead>
<tr>
<th>Feature</th>
<th>N</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lite Version:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>16</td>
<td>34.8%</td>
</tr>
<tr>
<td>No</td>
<td>28</td>
<td>60.9%</td>
</tr>
<tr>
<td>Free</td>
<td>2</td>
<td>4.3%</td>
</tr>
<tr>
<td>Text-to-Speech:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>31</td>
<td>67.4%</td>
</tr>
<tr>
<td>No</td>
<td>15</td>
<td>32.6%</td>
</tr>
<tr>
<td>Voices:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digitized Only</td>
<td>8</td>
<td>17.4%</td>
</tr>
<tr>
<td>Synthesized Only</td>
<td>14</td>
<td>30.4%</td>
</tr>
<tr>
<td>Both</td>
<td>24</td>
<td>52.2%</td>
</tr>
<tr>
<td>Preloaded Vocabulary:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>37</td>
<td>80.4%</td>
</tr>
<tr>
<td>No</td>
<td>9</td>
<td>19.6%</td>
</tr>
<tr>
<td>In-App Purchases</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>15</td>
<td>32.6%</td>
</tr>
<tr>
<td>No</td>
<td>31</td>
<td>67.4%</td>
</tr>
<tr>
<td>Multiple Profiles/User Accounts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>13</td>
<td>28.3%</td>
</tr>
<tr>
<td>No</td>
<td>33</td>
<td>71.7%</td>
</tr>
<tr>
<td>Switch Access:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>12</td>
<td>26.1%</td>
</tr>
<tr>
<td>No</td>
<td>34</td>
<td>73.9%</td>
</tr>
<tr>
<td>Devices Supported on iOS:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>iPad</td>
<td>17</td>
<td>37.0%</td>
</tr>
<tr>
<td>iPad, iPhone</td>
<td>3</td>
<td>6.5%</td>
</tr>
<tr>
<td>iPad, iPhone, iPod Touch</td>
<td>26</td>
<td>56.5%</td>
</tr>
<tr>
<td>Subscription:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>4</td>
<td>8.7%</td>
</tr>
<tr>
<td>No</td>
<td>42</td>
<td>91.3%</td>
</tr>
</tbody>
</table>

Figures 1 through 6 summarize key features to assist in evaluating the 46 AAC apps used in this study. Data are reported based on presence of the feature for each app profiled.
Figure 1. Switch Access Types. Number of access methods available for apps offering switch access.

![Switch Access Types Chart]

- APPlicator = 1
- Attainment Switch App = 1
- Therapy Box Switch Box = 2
- Ablenet Blue2 = 4
- RJ Cooper = 6
- iOS = 5

Figure 2. Available User Guides. Number of apps providing user guides and type of guides.

![Available User Guides Chart]

- None
- All
- Help Document, Video "How To" Tutorials
- Video Overview, Video "How To" Tutorials
- Help Document, Video Overview
- Video "How To" Tutorials
- Video Overview
- Help Document
Figure 3. Monthly and Annual Subscription Costs (USD) for subscription-based apps.

<table>
<thead>
<tr>
<th>App</th>
<th>Monthly</th>
<th>Annual</th>
</tr>
</thead>
<tbody>
<tr>
<td>News-2-You</td>
<td>$0.00</td>
<td>$50.00</td>
</tr>
<tr>
<td>Pogo Boards - AAC</td>
<td>$5.00</td>
<td>$10.00</td>
</tr>
<tr>
<td>Alexicom</td>
<td>$20.00</td>
<td>$35.00</td>
</tr>
<tr>
<td>Ola Mundo Messenger</td>
<td>$25.00</td>
<td>$40.00</td>
</tr>
</tbody>
</table>

Figure 4. Number of apps and different types of symbols available.

- **Types of Symbols**
  - Text, Photo, and Symbol
  - Photo and Symbol
  - Text and Symbol
  - Text
Figure 5. Number of apps with various display types.

Figure 6. Price and Number of Features Correlation. A multi-point system was used to determine the “Number of Features” totals for each app.
Correlation Analyses. The apps reviewed in the present study included a range of features which varied widely across apps, but the overall number of features for each app did not demonstrate a strong correlation to price. A weak correlation was demonstrated for price and switch access ($r=0.25$) as well as price and in-app purchases ($r=0.17$). Additionally, a weak correlation was found for price and number of symbols ($r=0.49$), as well as price and number or organizational displays ($r=0.31$). A moderate correlation ($r=0.61$) was demonstrated for price and the number of synthetic voices available for each app.

A correlation test for a range of features indicated a weak correlation ($r=0.44$) for price and available features. Fig. 6 displays the results of the available features count and price.

Conclusions
A comparison of AAC apps for iOS devices demonstrated a wide range of available features. Frequency counts for price, number of voices, number of symbols, and number of symbols per dollar demonstrated more items within categories at the lower end of each range.

The majority of apps (38 out of 46) allowed users to display symbols, text, and photos. This suggests that the majority of apps provide multiple symbol options in terms of types of symbols displayed.

A weak correlation was found between price and available features, based on a multi-point scoring system. Software development of features in AAC apps varies widely. The wide variation in features suggests the importance of knowledgeable SLP involvement in the selection of an AAC app. This suggests that choosing a good app is not just a matter of choosing the highest priced app, and supports the notion that feature matching per client should be considered best practice in AAC app selection.

Limitations
Apps were evaluated in September and October, 2015. Prices and features for the apps included in the present study may vary in the number of available features, based on updates since the time of data collection. Additionally, price for apps may vary based on company promotions and bulk purchase deals.

There were 46 apps included in the sample for the present study, although a much larger number of AAC apps for iOS are available for download via the app store. Apps selected for the sample received high ratings on professional review sites such as Jane Farrell Consulting (2013). Rating sites for AAC Apps help consumers and professionals evaluate the functionality of apps as well as compare features of highly rated apps. However, there is no source as significant as feature matching for the client, including the client’s needs, strengths, and preferences, which should be taken into primary consideration prior to purchasing an AAC app.

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References


Appendix A

Company names and apps used for study

Aacorn LLC.  *aacorn* [iOS app].  Parkville, VIC.
AbleNet, Inc., *SoundingBoard* [iOS app].  Roseville, MN.
Accolade Consulting UK Ltd, *iComm* [iOS app].  St. Guildford, UK.
Alexicom Tech LLC, *Alexicom AAC* [iOS app].  Phoenix, AZ.
App Consult Pte. Ltd., *Picture Can Talk* [iOS app].
App Consult Pte. Ltd., *Picture Can Plan* [iOS app].
App Consult Pte. Ltd., *Picture Can Talk Premium* [iOS app].
Appetizer.  *OneVoice – AAC* [iOS app].
AssistiveWare B. V., *Pictello* [iOS app].  The Netherlands.
AssistiveWare B. V., *Proloquo2Go* [iOS app].  The Netherlands.
AssistiveWare B. V., *News-2-You* [iOS app].  The Netherlands.
Attainment Company, Inc., *GoTalk Now!* [iOS app].  Verona, WI.
Claro Software Limited, *ClaroCom Pro* [iOS app].  Preston, UK.
Close 2 Home Apps, LLC, *So Much 2 Say* [iOS app].  Coram: NY.
Digital Scribbler, Inc., *Quick Talk AAC* [iOS app].  Palo Alto, CA.
Domene, J. G., *iPhonic* [iOS app].
Goatella, *iSpeak Button Series* [iOS app].  Markesan, WI.
Goatella, *iVocalize* [iOS app].  Goatella, WI.
Good Karma Applications, *Scene Speak* [iOS app].
Gus Communication Devices, Inc., *TalkTablet Neo* [iOS app].  Bellingham, WA.
Hearty Spin Pte Ltd, *Picture AAC* [iOS app].  Singapore.
Intuary, Inc., *Verbally Premium* [iOS app].  San Francisco, CA.
Invention Labs Engineering Products Pvt Ltd, *Avaz Pro* [iOS app].  India.
Jefferson Software, LLC, *My Words* [iOS app].  Ypsilanti, MI.
JCA-SOFT, *PAC – Personal Assistant Communicator* [iOS app].
Keller, Bryan.  *Posco AAC* [iOS app].
Media Foundations LLC, *AAC123* [iOS app].  Morgantown, WV.
Metova, Inc., *AvaTalker AAC* [iOS app].  Des Plaines, IL.
Ola Mundo Ltd., *Ola Mundo Messenger* [iOS app].  India.
Prentke Romich Company, *LAMP Words for Life* [iOS app].  Wooster, OH.
Pyramid Educational Consultants, Inc., *PECS Phase III* [iOS app].  Newark, DE.
Saltillo Corporation, *Touch Chat HD - AAC* [iOS app].  Millersburg, OH.
Smarty Ears, LLC, *Expressive* [iOS app].  Dallas/Fort Worth, TX.
Speak for Yourself AAC, *Speak for Yourself* [iOS app].
Speak for Yourself AAC, *AutisMate 365* [iOS app].  Newark, NJ.
Talk To Me Technologies, LLC, *Pogo Boards – AAC* [iOS app].  Cedar Falls, IA.
TapSpeak, LLC, *TapSpeak Sequence Standard* [iOS app].  Pittsburgh, PA.
TapSpeak, LLC, *TapSpeak Sequence Plus* [iOS app].  Pittsburgh, PA.
Therapy Box Limited, *Scene & Heard – Augmentative Communication* [iOS app].  London, UK.
Therapy Box Limited.  *Predictable – text based communication app* [iOS app].  London, UK.
Therapy Box Limited, *ChatAble* [iOS app].  London, UK.
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Timagine HB, *Talking Cards* [iOS app].  Sweden.
Tobii Dynavox LLC, *Sono Flex* [iOS app].  Pittsburgh, PA.
TOOKTY LLC, *I Click – I Talk Single Student* [iOS app].  Norfolk, VA.
USAGI Production Limited, *PicSmart* [iOS app].  Hong Kong.
Use2Talk, *Use2Talk* [iOS app].
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**Measuring Classroom Acoustics**

12. According to the Acoustical Society of America, what is the approximated speech intelligibility rating in many U.S. classrooms?
   - a. 40% or less
   - b. 65% or less
   - c. 75% or less
   - d. 90% or less

13. American National Standards Institute (ANSI) criteria for classroom acoustics address all of the following except:
   - a. Background noise levels
   - b. Signal to noise ratio
   - c. Reverberation time
   - d. Noise isolation design requirements

14. Which of the following materials would not help to reduce the reverberation in a classroom’s environment?
   - a. Carpeting
   - b. Cushioned chairs
   - c. Curtains
   - d. Cabinets

15. A sound level meter is the most effective at measuring:
   - a. Sound pressure over an extended period of time
   - b. Sound pressure at a single point in time
   - c. Sound pressure in environments with variable noise levels
   - d. Sound level meters do not measure sound pressure levels

**Acceptance and Commitment Therapy (ACT)**

16. Which of the following is a core principle of Acceptance and Commitment Therapy (ACT)
   - a. Self as content
   - b. Thought fusion
   - c. Self as context
   - d. Avoidance

17. Studies show that chronic stress can trigger what change in brain function?
   - a. Increase gray matter density
   - b. Decrease white matter density
   - c. Weaken the connection between the amygdala and hippocampus
   - d. Strengthen the connection between the amygdala and hippocampus

18. Studies found that use of mindfulness techniques may cause what changes in brain structure?
   - a. Increased gray-matter density in the areas important for learning and memory, self-awareness, compassion, and introspection; and, decreased gray-matter density in the area known to play an important role in stress and anxiety
   - b. Increased gray-matter density in the areas important for learning and memory, self-awareness, compassion, and introspection; and, increased gray-matter density in the area known to play an important role in stress and anxiety
c. Decreased gray-matter density in the areas important for learning and memory, self-awareness, compassion, and introspection; and, increased gray-matter density in the area known to play an important role in stress and anxiety
d. Decreased gray-matter density in the areas important for learning and memory, self-awareness, compassion, and introspection; and, decreased gray-matter density in the area known to play an important role in stress and anxiety

19. When can ACT be used?
   a. Only when paired with fluency shaping approaches
   b. Individually or in concurrence with more traditional therapy approaches (e.g., fluency shaping; stuttering modification)
   c. Only when paired with stuttering modification approaches
   d. ACT cannot be paired with other therapy approaches

**Cognitive-Linguistic Screening and Assessment Tools**

20. The purpose of a screening is to:
   a. Develop plan of care for patient
   b. Determine if assessment is needed
   c. Make clinical recommendations regarding compensatory strategies for patient
   d. Diagnose the presence of a communication disorder

21. Which is an example of a cognitive-linguistic screening tool?
   a. Mini-Mental State Examination
   b. Functional Assessment of Verbal Reasoning and Executive Strategies
   c. Functional Linguistic Communication Inventory
   d. Burns Brief Inventory of Communication and Cognition

22. Which is an example of a cognitive-linguistic assessment tool?
   a. Brief Cognitive Assessment Tool
   b. Saint Louis University Mental Status Examination
   c. Addenbrooke’s Cognitive Exam
   d. Arizona Battery for Communication Disorders of Dementia

23. For Medicare Part A patients:
   a. The therapist's time spent on documentation or on initial evaluation is not included. The therapist's time spent on subsequent reevaluations, conducted as part of the treatment process, should be counted
   b. The therapist's time spent on documentation or on initial evaluation is included. The therapist's time spent on subsequent reevaluations, conducted as part of the treatment process, should be counted
   c. The therapist's time spent on documentation or on initial evaluation is included. The therapist's time spent on subsequent reevaluations, conducted as part of the treatment process, should not be counted
   d. The therapist's time spent on documentation or on initial evaluation is not included. The therapist's time spent on subsequent reevaluations, conducted as part of the treatment process, should not be counted

**Fact or Fiction?: Urban Legends of Dysphagia**

24. A drop in a patient’s SpO2 can reasonably indicate:
   a. Trace silent aspiration.
   b. Decreased oxygenation of the blood.
   c. Poor laryngeal excursion.
   d. Inadequate base of tongue retraction.
25. The number of subjects in a study is important to the strength of a research article because:
   a. small numbers of subjects allows for better control of all the variables
   b. higher numbers of subjects produce more reliable results
   c. larger numbers of subjects is a waste of financial resources
   d. higher numbers of subjects doesn’t allow for extensive statistical calculations

26. If an SLP recommends that a patient should be NPO (nothing by mouth), and the patient decides to continue with PO (oral) intake, but still wants therapy for their dysphagia, the SLP should:
   a. Provide education and discharge the patient from the caseload.
   b. Provide education, ensure the patient understands, document and continue with therapy
   c. Have the patient sign a waiver and discharge.
   d. Refuse the patient’s wishes and prevent them from taking any PO (oral) intake, using restraints if necessary.

27. Use of the chin tuck:
   a. Decreases pharyngeal contraction during the swallow.
   b. Can be reasonably assessed at bedside.
   c. Is effective to improve airway protection in 95% of patients.
   d. Should only be assessed with supplemental oxygen.

**Feature Analysis for AAC Apps**

28. What are two key online sources of information about Alternative/Augmentative Communication (AAC) apps?
   a. zillow.com and saac.com
   b. janefarrall.com and appsforaac.net
   c. goaaac.org and google.com
   d. apple.com and aacfriends.net

29. What process is recommended for selecting AAC apps for clients?
   a. Maximal assessment
   b. Cost analysis
   c. Feature matching
   d. Candidacy model

30. The majority of AAC apps studied did not include:
   a. Text to speech
   b. Preloaded vocabulary
   c. Voice output
   d. Switch access

31. Moderate correlations were found for:
   a. Price and number of synthetic voices available
   b. Price and availability of switch access
   c. Price and number of symbols available
   d. Price and total number of app features
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  kboltik@gmail.com
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  Dora.Murphy@thechristhospital.com

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