

RESEARCH ARTICLE

Simultaneous Natural Speech and AAC Interventions for Children with Childhood Apraxia of Speech: Lessons from a Speech-Language Pathologist Focus Group

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Abstract

In childhood apraxia of speech (CAS), children exhibit varying levels of speech intelligibility depending on the nature of errors in articulation and prosody. Augmentative and alternative communication (AAC) strategies are beneficial, and commonly adopted with children with CAS. This study focused on the decision-making process and strategies adopted by speech-language pathologists (SLPs) when simultaneously implementing interventions that focused on natural speech and AAC. Eight SLPs, with significant clinical experience in CAS and AAC interventions, participated in an online focus group. Thematic analysis revealed eight themes: key decision-making factors; treatment history and rationale; benefits; challenges; therapy strategies and activities; collaboration with team members; recommendations; and other comments. Results are discussed along with clinical implications and directions for future research.

Keywords: *AAC; Childhood apraxia of speech; Speech therapy; Intervention*

Introduction

The American Speech-Language-Hearing Association (ASHA, 2007a) defines childhood apraxia of speech (CAS) as a “...neurological childhood (pediatric) speech sound disorder in which the precision and consistency of movements underlying speech are impaired in the absence of neuromuscular deficits (e.g., abnormal reflexes, abnormal tone).”

Characteristics of CAS include but are not limited to difficulty sequencing and transitioning between sounds and syllables in words, inconsistency in the production of correct and incorrect sounds and words, increase in errors with length and complexity of utterances, incorrect prosody, and groping of articulators (ASHA 2007a; Hall, 2000a). Shriberg, Aram, and Kwiatkowski (1997) estimated that CAS occurs among one to two in 1000 children. Others estimate the prevalence of CAS to be between 3.4–4.3% (ASHA 2007b; Delaney & Kent, 2004). Given the variability and severity of speech impairments, and the long road to effective use of speech for functional communication in children with CAS, augmentative and alternative communication (AAC) must be an early consideration (King, Hengst, & DeThorne, 2013; Weitz, Dexter, & Moore, 1997), especially in children with severe CAS

(Hall, 2000b). Successful service delivery for children with CAS requires speech-language pathologists (SLPs) to manage interventions around improving natural speech skills through guided and deliberate practice, while at the same time developing both language and communication skills. Such a task requires significant management across multiple domains.

Interventions focusing on natural speech can be classified as linguistic or motor programming approaches (Hall, 2000b). Examples of techniques adopted with this population include drill exercises, rate control therapy, PROMPT, Adapted Cueing Technique, Melodic Intonation Therapy, etc. (Morgan & Vogel, 2008; Weitz et al., 1997). Keeping in mind the slow prognosis in natural speech development in children with CAS, particularly when the focus in therapy transitions to productions requiring complex sequencing activities (Yoss & Darley, 1974), treatment sessions are usually structured to ensure intense intervention with an extended duration of services (Hall, 2000b).

AAC strategies facilitate improvement in receptive and expressive language abilities, because such strategies provide an augmentative or alternative modality for communication without the challenges associated with natural speech production (Branson & Demchak,

2009; Weitz et al., 1997). Binger (2007) provided an overview of aided AAC interventions used with children with suspected CAS and the effects of specific AAC techniques on functional communication. AAC strategies have been shown to help with specific aspects of communication with children with CAS, such as repair of communication breakdowns, topic initiation, message length, and complexity (Binger, 2007). Cumley and Swanson (1999) observed improved speech and functional communication skills in children with CAS following implementation of a multimodal AAC intervention. Also, improved quantity and quality of natural speech was observed secondary to implementation of an integrated multimodal AAC intervention in children with severe speech sound disorders (King et al., 2013). Depending on their natural speech abilities and progress with therapy, children may move from using AAC as an alternative strategy toward using AAC as an augmentative strategy (Cumley & Swanson, 1999). Such transitions must be continually monitored and managed.

Clearly there are benefits that can be achieved through natural speech interventions and through multimodal AAC interventions. What is lacking is elucidation of what an integrated program might look like and how exactly it could be implemented. Given the rigorous demands of the interventions listed above and the time required to implement the interventions, it might be difficult for new SLPs, or SLPs new to intervention with children with CAS, to manage the dimensions of treatment.

Gaining the perspectives of individuals who have managed this problem repeatedly can be particularly important in developing new research questions and in guiding new clinicians in their practice. Hustad, Keppner, Schanz, and Berg (2008) performed a retrospective analysis to compare therapy goals adopted by SLPs who were AAC experts and those who were not for preschool children with developmental disabilities. The authors stated that goals developed by AAC experts tended to be more functionally oriented. AAC experts have identified many categories of intervention goals when implementing AAC strategies for children, namely: social participation, early cognitive skills, language development, multimodal communication, and communicative intent (Hustad et al., 2008). Dietz, Quach, Lund, and McKelvey (2012) examined the decision-making process adopted by SLPs with varying AAC expertise during the AAC assessment process. The authors developed a framework depicting the assessment process adopted by AAC specialists, which aimed to serve as practice guidelines. Adopting AAC strategies in intervention requires SLPs to be resourceful and systematic about targeting numerous goals, especially when considering the limitations in therapy time and parental expectations of communication using natural speech (Blackstone, 1989; Weitz et al., 1997).

Although AAC interventions should always be multimodal in terms of meeting daily communication needs, there is also a need to focus on management in

balancing the extensive practice required for natural speech improvement, and the development of operational and linguistic competence (Light, 2003; Light & McNaughton, 2014) where AAC is concerned. In work with individuals with acquired disabilities, the management of interventions related to both restorative and compensatory therapy is a deliberative process where attention is paid to each portion and there is recognition of the significant efforts needed to balance the time required to provide services in both areas (Weissling & Prentice, 2010). There certainly is a wealth of information related to intervention outcomes and children with CAS (Murray, McCabe, & Ballard, 2014), but guidance is needed on the exact management of interventions leading to these outcomes in clinical settings. The term dual paradigm is used in this paper to emphasize the focus on simultaneous management of two intervention approaches. Such a paradigm emphasizes the augmentative aspect of AAC, and is similar to the “integrated multimodal intervention (IMI),” discussed by King et al. (2013, p. 196). This study aims to address a gap in the literature (Hustad, Morehouse, & Gutmann, 2002; Light & Drager, 2007) by shedding light on how a dual paradigm approach is implemented in therapy.

Given the numerous goals in therapy, the slow prognosis observed in speech skills in children with CAS, and the lack of research regarding the decision-making process adopted by SLPs, the researchers felt it compelling to address the following questions: When addressing intervention for children with CAS, among the areas of participation, literacy, language, and speech, how do experienced clinicians adopting the dual paradigm approach make decisions regarding the frequency and duration of therapy goals targeting natural speech? Specifically, for children with CAS: (a) What have been SLPs’ historical use of and rationale for simultaneous treatment within intervention sessions? (b) What are the challenges of targeting natural speech along with AAC intervention strategies? (c) How do SLPs make decisions about time allocation in therapy sessions when working with children who present with more challenges versus those who present with fewer challenges? (d) What are the therapy strategies and activities used with children who present with more challenges versus those who present with fewer challenges? (e) How do SLPs collaborate with others to ensure treatment goals focusing on natural speech and AAC are generalized outside of therapy sessions? (f) What recommendations do SLPs have for new clinicians in managing treatment where goals involve both natural speech and AAC?

Method

Design

This study adopted a focus group methodology, a commonly used qualitative research method (Barbour, 2010). Vaughn, Schumm, and Sinagub (1996) defined focus groups as a small group of people, “relatively

homogenous” (p. 5), from whom opinions and discussions are obtained regarding a certain topic. The authors also emphasized that the purpose of a focus group methodology is to obtain the points of view from a group of people regarding certain issues. A focus group discussion was considered the most suitable design to address the research questions because viewpoints were sought from SLPs with experience in the area of day-to-day integration of the dual paradigm approach where such information was lacking. Conducting the focus group in an online setting enabled the participation of those professionals with extensive clinical knowledge in this area without being restricted by geographical location (Tates et al., 2009; Williams & Robson, 2004). Adopting an online focus group methodology also provided an opportunity for the participants of the study to share their points of view in a convenient setting. In the AAC field, there have been several studies that have adopted the online focus group methodology (e.g., McNaughton, Light, & Groszyk, 2001; McNaughton, Light, & Arnold, 2002; McNaughton et al., 2008; Soto, Muller, Hunt, & Goetz, 2001). The online focus group discussions for this study were set up based on the suggestions by Vaughn et al. (1996), and were modified for online purposes based on McNaughton et al. (2002).

Participants

To identify and elaborate on clinical decision-making strategies adopted during intervention, this study aimed to recruit certified SLPs who satisfied the following three criteria: (a) at least 5 years of clinical experience, (b) significant experience providing some type of AAC intervention services (unaided, low tech, or high tech) to children, and (c) significant clinical experience providing direct intervention services to children with CAS. These inclusion criteria were adapted from Hustad et al. (2008).

The recruitment flyers, which listed the inclusion criteria, were sent via email to (a) SLPs who published in AAC and CAS areas in peer reviewed journals, (b) SLPs who identified themselves as AAC service providers in societies and forums such as the International Society of Augmentative and Alternative Communication (ISAAC), and (c) SLPs who were members of the Special Interest Group on AAC of the American Speech Language Hearing Association. Only those individuals who reported that they satisfied the previously stated inclusion criteria were sent the consent forms and completed the screening questionnaire. The Institutional Review Board (IRB) of the university approved the study.

Initially, 10 participants were recruited to participate in the online focus group discussions. Prior to the first week of focus group discussion, two participants withdrew from the study citing personal reasons that would prevent them from completing the study. Thus, the study consisted of eight participants who consistently contributed to all of the six discussion questions. The

eight participants were female SLPs working in the United States of America and were ASHA certified. The participants ranged in age from 32–74 years ($M = 44.5$ years), and their clinical experience with AAC users ranged from 9–28 years. The participants provided services to a range of age groups: three out of the eight participants provided services to children between the ages of birth to 3 years, six participants provided services to preschool-aged children, and seven participants provided services to school-aged children. Table I provides additional demographic information regarding the eight participants.

A screening questionnaire was used to gather information through self-report of experience and perceived competence. The intent of the questionnaire was to ensure that the respondents had skills in speech-language therapy and AAC intervention, and experience with integrating the two with children with CAS. Participants were considered “experienced” by nature of their experience in dealing with the realities of integration. All participants met the minimum years of experience (see Table I). The participants were asked to rate their level of experience, based on their clinical experiences and continuing education, on a rating scale ranging from 1 (*no experience*) to 7 (*significant experience*) for providing some type of AAC intervention services to children. The participants also rated their experience on a rating scale ranging from 1 (*no experience*) to 7 (*significant experience*) for providing direct intervention services to children with CAS. It was predetermined that a rating of 4 would be considered as the cut-off for these questions, and that the researchers would follow-up with the participants if a low score was reported.

For the first question, three participants responded with a rating of 5, two with a rating of 6, and one with a rating of 4. Two participants responded with a rating of less than 4. Follow-up emails were sent to the participants seeking an explanation as to why these lower ratings were reported. In their responses to the email, both participants indicated that they had extensive clinical experience, 10 and 20 years, respectively. One of the participants stated that she had responded with a rating of 2, because the majority of children she had worked with had the diagnosis of CAS along with other disorders. She indicated a level of 6 with this question when CAS was included with other diagnoses. The participant who responded with a rating of 3 said she scored as she did because her current caseload did not contain many children with CAS. She stated that her response would have been above 3 if she considered all of her past experiences. Based on these clarifications, these participants were deemed appropriate for the study. The targeted participants for this study were those who were implementing both AAC and natural speech services simultaneously. Thus, an AAC intervention specialist according to the definition by Beukelman, Ball, and Fager (2008, p. 258), “...providing direct AAC intervention services...to people with complex communication needs at least 50% of the

Table I. Demographic Information of Participants.

	1	2	3	4	5	6	7	8
Education	MA	MA	PhD	MA	MA	MA	MA	MA
Clinical experience with AAC (years)	9	10	20	13	11	12	10	28
Work setting(s)	<ul style="list-style-type: none"> • Public school • Hospital • Private practice 	<ul style="list-style-type: none"> • Public school 	<ul style="list-style-type: none"> • Pre-school • Public school 	<ul style="list-style-type: none"> • Hospital • Private practice 	<ul style="list-style-type: none"> • Hospital 	<ul style="list-style-type: none"> • EI^a • Hospital • Public school • Private practice 	<ul style="list-style-type: none"> • Pre-school 	<ul style="list-style-type: none"> • Pre-school • Public school • Hospital • Private practice
Age range(s) of children with CAS (caseload)	<ul style="list-style-type: none"> • Pre-school 	<ul style="list-style-type: none"> • School age 	<ul style="list-style-type: none"> • Pre-school • School age 	<ul style="list-style-type: none"> • 0 to 3 • Pre-school • School age • None 	<ul style="list-style-type: none"> • 0 to 3 • Pre-school • School age • None 	<ul style="list-style-type: none"> • Pre-school • School age 	<ul style="list-style-type: none"> • 0 to 3 • Pre-school 	<ul style="list-style-type: none"> • School age
Specialist training	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • Kaufman approach • (2-day course) • Informal • PROMPT training 	<ul style="list-style-type: none"> • Kaufman approach • (2-day course) • Informal • PROMPT training 	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • PROMPT (Bridging level)
Self-report of level of AAC experience ^b	6	5	5	5	7	6	5	5
Self-report of experience with CAS	6	3	6	5	7	6	5	5
Category of AAC used	<ul style="list-style-type: none"> • No-, low- & high-tech 	<ul style="list-style-type: none"> • Unaided • Low-, no-, & high-tech 	<ul style="list-style-type: none"> • Unaided • High-tech 	<ul style="list-style-type: none"> • Unaided • Low-, no-, & high-tech 	<ul style="list-style-type: none"> • Unaided • Low-, no-, & high-tech 	<ul style="list-style-type: none"> • Unaided • Low-, no-, & high-tech 	<ul style="list-style-type: none"> • Unaided • Low-tech 	<ul style="list-style-type: none"> • Unaided • Low-, no-, & high-tech

Note. ^a EI = early intervention; ^b Participants reported their level of experience on a scale of 1-7 where 1 = no experience and 7 = significant experience.

time,” was not the target. Rather the interest was in getting information from those providing both natural speech and AAC services at the same time.

Materials

The focus group discussions were held on a password protected online forum developed using phpBB™¹, a free bulletin board software program. The researchers, as the administrators of the forum, were able to create and control the settings for the multiple forums within the site. After providing informed consent, the participants completed a demographic and screening questionnaire. There were 12 questions in the demographic and screening questionnaire, which helped the researchers gather additional demographic information and ascertain whether the participants met the inclusion criteria.

In total, there were six moderator-proposed questions. The discussion topics were open-ended questions designed to elicit responses regarding clinical implications, benefits, and challenges of adopting the dual paradigm approach with children with CAS. The questions were created by the researchers based on prior research and targeted areas of interest, best practices in conducting and moderating focus groups, and feedback from six clinicians and/or researchers in the field of communication sciences and disorders. Participants had a week to respond and discuss each weekly question posted on the forum. New questions were posted on a weekly basis, but the participants continued to have access to all the questions throughout the timeline of the study. The discussion topics for the focus group are listed below.

- Have you always conducted treatment for children with CAS with this dual paradigm approach? If yes, what factors do you believe led you to this philosophy of treatment? If no, what factors led you to change your treatment philosophy?
- What are the challenges/barriers when targeting natural speech in children with CAS who use AAC?
- When you think about the most and least challenging case (child with CAS) where you worked on natural speech and AAC goals: How did you and/or the educational team make decisions regarding the time allotted for goals targeting natural speech during intervention? How often did you target the goals focusing on natural speech over the course of intervention and were you satisfied with that? Please elaborate why or why not for the latter part of the question. In one session, how long did you target the goals focusing on natural speech and were you satisfied with that? Please elaborate why or why not for the latter part of the question. Describe how you targeted natural speech and AAC goals for this child with CAS. The participants discussed these questions with respect to the most challenging case (child with CAS) during the third week, and with respect to the least challenging case (child with CAS) during the fourth week.

- How do you work with different members of the team to ensure generalization of skills targeted during the session?
- What recommendations would you have for a clinician who is just learning how to integrate working on natural speech and AAC?

Procedures

The participants were directed to the online focus group discussions after completing the demographic questionnaire. During the course of the online discussions, the researchers provided the participants the option of identifying themselves with their first names or using pseudonyms. In this paper, numbers are used to represent the participants. The first author served as the moderator of the focus group and was responsible for posting weekly discussion topics, sending follow-up messages, and thanking the participants for their contributions each week. In addition to posting a welcome message and instructions for operating the online forum prior to the first week of discussions, the moderator also reminded the participants not to reveal any confidential information regarding clients or sites of clinical experiences. The focus group ran from May–June 2011.

Data Analysis

The responses to the discussion questions were transcribed into thought units, based on the definition by Vaughn et al. (1996): “. . . smallest amount of information that was informative by itself” (p. 106). Thought unit separation was then independently checked for reliability (see below). Within the eight participants’ responses to six discussion questions, 795 thought units were identified. Thought units were given context in brackets when only a portion of a larger sentence was extracted. In working with the total list of thought units, each unit was considered independently for a coding theme regardless of the forum where it was posted. The researchers developed and modified operational definitions to define the themes for the thought units based on an iterative review of all participant responses. The authors conferred on themes to establish mutually exclusive categories. After an initial assignment of themes to all thought units, the data were sorted according to potentially overlapping and similar themes and were collapsed into larger themes to encompass similar ideas in a single theme. The process was continued until no further meaningful combinations could be made while retaining mutually exclusive categories. The operational definitions developed for the coding themes are provided in the Supplementary Appendix (to be found online at <http://informahealthcare.com/doi/abs/10.3109/07434618.2014.1001520>). Eight themes and 32 subthemes were identified from all the responses to the focus group topics.

Reliability

Interrater reliability for the generation of thought units was calculated by having a second coder independently

identify thought units from 20% of the responses posted to the discussion questions. Two responses were randomly chosen from each weekly discussion to ensure equal representation of all discussion questions. Prior to coding the randomly chosen responses, the second coder was trained in this activity by reviewing samples of text and identifying thought units with the primary researcher. The percent agreement was calculated by dividing the number of agreements by the total number of agreements, disagreements, and omissions. The overall percent agreement between the raters was calculated to be 89.4%. Interrater reliability for categorization of thought units into subthemes was established by having the second coder identify themes from 20% of the total thought units after practice sessions. The 159 thought units were randomly chosen from all the discussion questions, and were provided in context to the second coder. Cohen's Kappa was calculated to be 0.92, which is an excellent value based on Landis and Koch (1977), who stated that values above 0.81 were considered to be "almost perfect" (McNaughton et al., 2008, p. 62).

Results

The eight themes in the study were: treatment philosophy, history, and rationale; benefits; challenges in simultaneous treatment; key decision-making factors; therapy goals, strategies and activities; generalization through collaboration with team members; recommendations for new clinicians; and other.

Treatment Philosophy, History, and Rationale

This theme was constituted by five subthemes, namely: (a) implementing the dual paradigm approach in a complementary way, (b) providing the rationale for implementing the approach, (c) stating the treatment philosophy, (d) ensuring that all approaches are client-driven and individualized, and (e) ensuring all modalities are explored. There were 48 thought units in this theme.

All the participants responded that they adopted the dual paradigm approach in therapy for children with CAS. In general, a primary goal for adopting the dual paradigm approach was to increase the client's communication, thereby reducing the frustration experienced by the child. Participants stated that it was important to provide a means of communication via AAC while simultaneously working on speech. As stated by Participant 1, "I believe it is imperative to give individuals a means to communicate through an AAC system (SGD, pictures, sign language etc.) while simultaneously working on speech." As stated previously, this approach was adopted by focusing on AAC, while supporting the child's existing speech skills. With regard to treatment philosophy, Participant 3 stated the following:

As for treatment philosophy, I found that the social constructivist philosophy as in Vygotsky's emphasis on bypassing and finding alternatives for communication breakdowns

to be most compelling. The importance of social interaction for developing communication drives development of both natural speech and the effective use of AAC. The focus becomes communication in [the] context of activities and participation, as in the International Classification of Functioning, Disability, and Health – Children and Youth, developed by the World Health Organization in 2007. Personal factors of individuals must be integral to any "treatment" plan.

Participant 4 explained her rationale for implementing the dual paradigm approach during therapy. In addition to her interest in AAC, "an early in my career understanding of the benefits of AAC" influenced her to adopt such an approach in treatment for children with CAS. She (Participant 4) also stated that, "I guess I believe my role as therapist is not just to get a child to 'talk' but to begin to communicate more appropriately via any means necessary, particularly when it is needed to decrease children's frustration levels."

The participants emphasized that choosing therapy goals and approaches was client-driven and a highly individualized process, often spanning several sessions. Participants also ensured that all modalities were adopted by using signs, verbalizations, gestures, picture communication, and imitation therapy for children with severe CAS.

Benefits

A total of 38 thought units were identified as a being part of this theme. The theme contained the subthemes of the benefits observed in the use of AAC in general and benefits observed when introducing multiple modalities of communication specifically in therapy. When discussing benefits related to the use of AAC, it was stated that the use of AAC strategies complemented the child's natural speech skills while providing access to language and technology. Other benefits of AAC focused on the augmentative aspect of AAC such as supporting gestures, vocalizations, word approximations, facial expressions, etc. Participant 3 expressed her belief regarding the benefits of AAC in the following words: "AAC, I believe, begins by augmenting the child's gestures, vocalizations, word approximations, facial expressions, eye gaze, etc. (unaided communication) as much as possible."

Participants also believed that providing access to language via AAC helped replace negative behaviors in children. Participants reported that other goals can also be focused on in therapy sessions without adding the stress of natural speech production for the child. As stated by Participant 8, "The goal is to increase communication with a family, and reduce the amount of frustration the child has utilizing a total communication approach. Once the frustration is reduced, many times the child begins to develop some means of verbal communication." Participant 6 felt that it was essential to use AAC and continue targeting language acquisition in children, specifically in the area of morphology, in order

to prevent greater delays in the child's language abilities even when the primary focus was on speech skills.

Participant 7 expressed that children with CAS would benefit from both low and high tech AAC devices and strategies. Another benefit regarding the implementation of AAC in therapy was that AAC provided cues to the child in different modalities that could be used specifically to cue speech and language skills in addition to providing multiple modalities for the child to learn to speak. Participant 1 considered AAC as an "extremely valuable tool" for clinicians in this regard.

Challenges in Simultaneous Treatment

This theme consisted of six subthemes and 58 thought units. Subthemes included the following: general challenges, challenges with natural speech therapy, challenges with implementing AAC, client specific challenges, challenges generalizing skills, and process barriers. General challenges identified from the discussions related to lack of training or expertise in a specific area, limited time in therapy to address goals targeted, and an understanding that young children have difficulty empathizing with others and changing their manner of speaking accordingly. Depending on the work setting and time, lack of collaboration among members of the team was also cited as a challenge. For example, in response to the questions during Week 4, participants stated that educational team meetings were not held to discuss natural speech goals. Also, absence of and lack of participation among the members of the team during such meetings were noted.

Challenges involved in targeting natural speech in children with CAS included maintaining interest in producing consonant and vowel sounds, generalizing isolated productions into meaningful utterances in different environments, and communication breakdowns that increased frustration in both the child and the family. Participant 7 commented that a barrier she faced was obtaining vocalizations and verbalizations from a child with CAS. Another issue that was raised in the discussions was the child's frustrations with unintelligible speech and communication breakdowns, which in turn affected the child's motivation in therapy. This was reflected in the response posted by Participant 2: "Intelligibility is the most difficult issue for my students. When attempting to converse at a normal pace, my students' intelligibility is significantly affected." Another participant stated that children with CAS primarily sought to communicate using natural speech and noted that it was challenging to help these children utilize tools, such as AAC, to improve comprehensibility of their communication.

The SLPs also discussed the challenges faced when implementing AAC in the sessions. Addressing parents' or caregivers' concern about adopting AAC in therapy was brought up during the discussions, especially parental concerns whether adopting AAC would affect the child's natural speech skills. The introduction of

AAC in therapy sessions when the child was unable to functionally communicate using speech was not always welcomed because parents wanted their child to communicate primarily using natural speech.

Challenges generalizing skills taught in therapy was another subtheme that emerged from the discussions. Some clinicians expressed difficulty with having parents follow through with a home program, transferring isolated production into meaningful utterances in different environments, and having parents practice techniques taught in therapy at home. For example, Participant 7 added this comment to the discussion: "The families are usually very supportive at first. However, if progress doesn't happen fairly quickly then they quickly get discouraged and then getting them to follow through with a home exercise program is difficult."

Other challenges involved in therapy were client specific including the severity of CAS, which in turn influences the intelligibility of speech, stimulability, presence of concomitant conditions, age of the child, avoidance to speech tasks, and lack of willingness to attempt speech. This subtheme also included difficulty sustaining the interest of young children in articulation therapy. Such challenges were reflected in the following statement by Participant 5:

When it comes to children with severe apraxia of speech, I find the biggest barrier to be the child's own willingness to participate in exercises targeting natural speech. I find that most often, at this level of severity, they shut down, avoid interacting, and won't participate even in the most simple exercises. This is when it becomes so much more motivating to work on successful communication via AAC strategies – typically they love that!

The participants also discussed process barriers in therapy, which were associated with lack of insurance coverage for the recommended intensive therapy, difficulty arranging transportation to the therapy sessions, and scheduling conflicts for both the clinician and the families of the client.

Key Decision-making Factors

There were 43 thought units and four subthemes related to key decision-making factors, namely: (a) client-specific factors, (b) recommendations and input from members of the team, (c) factors related to prognosis, and (d) mode of communication. Primarily, the participants discussed how client-specific factors influenced their decision making. Specifically, the following client-specific factors influenced SLPs' decision making: (a) the children's view of themselves as communicators (i.e., whether or not the children with CAS saw themselves as only using natural speech to communicate), (b) their age, (c) the severity of CAS, (d) their current level of speech intelligibility, (e) the presence of concomitant conditions, (f) their attention span and motivation to communicate, (g) communication needs,

(h) their receptive and expressive language skills, and (i) their willingness to communicate in speech activities. For example, Participant 5 stated that children with CAS were different from other populations that regularly used AAC especially in their desire to communicate using natural speech. Participant 6 took the client's attention span and motivation into consideration when deciding the time allotted for each task in therapy. Also, decision making regarding whether to spend more time on AAC or natural speech in therapy was based on the severity of CAS.

Recommendations and input from members of the team was considered to be another factor that influenced decision making among clinicians. Parental preferences for natural speech communication and parental involvement in take home activities were influential in determining the time spent on natural speech goals in therapy. Team meetings or conferences were another venue in which decisions regarding goals and time spent in therapy were made. Factors related to prognosis also seemed to have an important role in decision making. Several participants indicated the time spent on natural speech goals was decided based on progress exhibited in functional communication skills. The specific mode of communication that the child preferred also played a role.

Therapy Goals, Strategies, and Activities

This theme consisted of 348 thought units and the following subthemes: (a) natural speech goals, (b) AAC goals, (c) frequency and duration of goals targeting natural speech and other areas, (d) AAC strategies, (e) natural speech strategies, (f) strategies for implementing the dual paradigm approach, (g) strategies for generalization of skills, and (h) general strategies. Specific examples of natural speech goals for children with CAS are listed in Table II. It was recommended that, for children with severe CAS, natural speech goals be targeted in quick repetitive segments. The client-driven and individualized process of formulating goals was restated when Participant 4 commented that for children with

mild to moderate CAS, goals focused primarily on natural speech. Participant 1 provided the following example of a goal focusing on natural speech skills: "Add syllable shapes to expand the phonetic repertoire (e.g., add CV, VC, CVC, CVCV)."

The participants also discussed and provided examples of goals focusing on AAC, which are also summarized in Table II. Reasons for developing AAC goals in children with CAS included increasing types of communicative functions, learning the use and power of core words (frequently used small word set; Cross Baker, Klotz, & Badman, 1997), combining core words to form two to three word utterances, and combining core words and fringe vocabulary. Participant 1 provided the following example of a goal focusing on AAC: ". . . teach core words to provide an efficient means to generate novel language across environments."

With regard to the frequency and duration of goals targeting natural speech, the participants discussed different strategies, taking into consideration the severity of CAS. For children with severe CAS, therapy time spent on natural speech goals varied from 10 min per session to up to 50% of the session. Frequency of sessions per week varied from setting to setting, but most of the participants reported seeing their clients once a week. Table III lists recommendations for frequency and duration of goals targeting natural speech in clients with mild to moderate and severe CAS, respectively. The frequency and duration of other goals such as AAC, language, and literacy depended on the setting, frequency of sessions scheduled per week, and time spent on natural speech skills.

The aims, applications, and types of AAC strategies that were highlighted by participants included general AAC strategies and AAC strategies for improving language and literacy skills in children. For a child with severe CAS, participants expressed satisfaction in focusing on AAC as it became an avenue to reduce the child's frustration when dealing with communication breakdowns. The importance and application of AAC,

Table II. Examples of Goals Adopted in Therapy by the Focus Group Participants.

Nature of goal	Examples cited by the participants
Natural speech goals	<ul style="list-style-type: none"> • Target sounds that the child is stimulable for and those that have the greatest impact on intelligibility • Add syllable shapes that expand the phonetic repertoire • Target words that are most meaningful for the child's daily functioning • Target sounds that provide the best chance of success • Add sound classes that are absent from the child's repertoire • Enhance functional verbal language based on the sounds the client is capable of producing • Create and target a functional word list (with sounds that the child can produce) • Build a functional phrase list from the functional word list
AAC goals	<ul style="list-style-type: none"> • Reduce communication breakdowns by using AAC strategies for communication repair • Use AAC strategies for enhancing self-expression to reduce challenging behaviors • Expand vocabulary, phrase length, and grammatical output using AAC strategies • Enhance motivation for communication by combining core words with key fringe vocabulary • Combine core words to create two to three word utterances • Teach/increase variety of language functions • Teach core words to help generate novel language across environments

Table III. Recommendations from the Focus Group Participants Regarding the Frequency and Duration of Goals Targeting Natural Speech.

Severity of CAS	Recommendations
Mild to moderate	<ul style="list-style-type: none"> • Spend more time on goals focusing on and developing home programs for natural speech skills • Spend half the time in the session focusing on natural speech goals and the other half on AAC goals • Focus primarily on natural speech and integrate AAC as needed during the hour allotted for the session
Severe	<ul style="list-style-type: none"> • Target speech goals every session • Shift balance from spending all the time in the therapy session on natural speech to splitting the time between natural speech and AAC • Target oral goals during the first session and AAC goals in the second session (for therapy twice weekly) • Target natural speech goals in a structured manner for 50% of the time • Focus on the use of natural speech with the AAC device for support in at least one session per week • Do not spend more than 3- to 5-min for a task if the client has a short attention span • Target natural speech goals 45–50% of the time depending on the client's abilities • Target natural speech in repetitive segments: target speech sounds for 5 min, move onto another activity, and return to initial activity for another 5 min

in such an instance, is reflected in the following contribution from Participant 3:

Introducing alternatives such as speech generating devices and communication boards is yet another strategy that goes beyond labeling. The child uses these ways to demonstrate receptive language skills and then goes on to build expressive vocabulary and sentence structures. Of vital importance is to discover the topics that the child is likely to initiate interaction around.

For children with severe CAS, participants provided many examples of using AAC strategies for improving language and literacy skills. An example provided was developing literacy skills using Intellikeys™² to spell target words and name letters during spelling. Other specific AAC tools that were discussed were the use of Classroom Suite™³ software to associate sounds with letters, Tech/Talk™⁴ to exchange jokes with communication partners, Unity™⁵ program for specific training on grammatical patterns, and the Step-by-Step™⁶ communicator. Providing visual cues to assist in expressive language through an application for an iPhone®⁷ or iPad®⁸, which transformed typed words/messages into a video of speech production was also reported. Participant 3 provided examples of using these AAC tools:

The student was to use yes/no switch to answer questions on science, math, and language arts. He was to develop literacy skills by writing his name using Intellikeys with a key guard, all letters except those letters used in his first name were covered to facilitate success. Each letter was named as he touched it and then the full name repeated when the space bar was hit. The student was to develop literacy by associating sounds with letters (n), (a), and (l) on the Classroom Suite software. A Tech Talk 8 was programmed with a “Knock, knock” joke for him to tell the general education peer buddy who came in to be with him at the noon recess. He was to use a Step by Step programmed by the paraprofessional to order lunches in the cafeteria daily. The school SLP was to work on sound production as well as AAC.

For a child with severe CAS, participants also expressed satisfaction in focusing on AAC as it became an avenue to reduce the child's frustration when dealing with communication breakdowns. For children with mild to moderate CAS, Participant 6 provided examples incorporating low tech AAC: using a small ABC board to cue listeners regarding the phonemes, and a communication ring with “...with important messages such as their name, photos of family members or events that had taken place with descriptions of the events on the backside of the card.”

The participants also highlighted different strategies for improving natural speech skills in children with CAS. The participants offered strategies such as providing meaningful responses to the child's initiation, speech models of the child's attempts of the target word, and encouraging the use of natural speech skills with familiar partners and in structured tasks while supporting any attempts at natural speech. Participant 5 stated that she attempted to re-address speech goals every 4–6 months if a lack of progress was noted. Others focused on: (a) practicing natural speech goals through functional and high occurrence messages, (b) judging progress on a sliding scale where closer and closer approximations of target words were accepted, (c) targeting words based on caregiver feedback, (d) reinforcing utterances by mirroring client's productions, (e) providing opportunities for imitation within natural play activities, and (f) using structured tasks only if the child experienced success. Two participants reported adopting specific approaches: Participant 6 reported using the Kaufman™ Speech to Language protocol (a protocol to increase the intelligibility of speech) with a child with severe CAS; and Participant 7 reported using PROMPT (a program designed to develop motor skills in children or adults with speech disorders) with a child with mild to moderate CAS. Participant 1 provided another example of a strategy for improving natural speech skills in children with severe CAS: “I will always reinforce natural speech attempts at speech and I will look towards where the child is experiencing success with speech in order to build upon it.”

Strategies for implementing the dual paradigm approach varied depending on the severity of the disorder.

der, but reflected primary emphasis on natural speech skills, use of natural speech in conjunction with AAC to experience success when communicating, and use of AAC to enhance the child's natural speech skills. Participant 2 discussed how she used speech tasks, with which the client had experienced success, in conjunction with AAC. She provided an example of an instance where a child used the dual paradigm approach:

For example, he often asks about a delivery truck that sometimes parks outside my window "where is the big truck" – comes out "wehbigu." He has independently crafted this to verbally asking "where" and using [the] AAC device to articulate "truck."

Strategies for generalization included providing homework to share with the school team, maintaining a smart chart and note book with current vocabulary, and developing a card ring. Participant 6 talked about how the smart chart was helpful as it showed other members of the team how to locate a specific word on the AAC device. She also used a card ring that had target words written on one side of a card with the best approximations of the child on the other side. Parents and the school team were encouraged to review the card ring every day. Also, Participant 8 talked about how programs were sent home at the end of the semester to facilitate generalization of skills learned during the semester. Participant 1 talked about developing a functional word and phrase book for children with CAS, which was shared across environments. Another participant discussed targeting goals and vocabulary not addressed at school. Specifically, Participant 5 provided the following examples for the latter strategy:

For example, if there is no access to an AAC device for practice at school (prior to completion of the funding process) – I would put more emphasis on teaching AAC strategies while the school-based clinician can target speech. Or if the child is largely practicing AAC and/or speech goals in isolation or in academic contexts, I can often target social activities and/or games, work or partner-focused questions, social exchanges, and story-telling strategies, and try to set up peer groups or dual therapy sessions if possible.

The participants also discussed general therapy strategies such as adopting evidence-based strategies, keeping therapy fresh, and engaging the client and family.

Generalization through Collaboration with Team Members

There were 136 thought units in this theme, and the subthemes included general strategies for collaboration, collaboration with family, and collaboration with the school team. General strategies for collaboration included regular contact within the team through different means such as email, phone, and face-to-face meetings. The need for mutual respect of different learning and teaching styles was highlighted by Par-

ticipant 3. She discussed the need for professionals to share responsibilities, which in turn required "...offering specific solutions to the concern, selecting strategies, setting motivation priorities, agreeing on meaningful goals, finding communication opportunities, removing communication barriers..." She also stated that she liked the Vermont model (an interdisciplinary assessment model primarily used for children with autism, described by Prelock, Beatson, Bitner, Broder, & Ducker, 2003).

Participants collaborated with family members by having them participate in or observe weekly sessions and identify meaningful vocabulary and targets for home activities. Parents also helped in identifying strategies that were most successful with their children and topics that were most motivating for their children. Siblings were also involved in sessions, if appropriate. Participant 7 provided written instructions for reference at home or had the parents videotape the session to facilitate the understanding of "...the what and whys of therapy." Participant 4 reported that she provided weekly homework and developed goals in conjunction with the parents. Participant 8 had the clinician model the use of AAC, and then requested the parent to try the technique, followed by discussions regarding the effectiveness of the technique. Participant 3 indicated that her collaboration with parents was important and that she asked "...the parents to be the accurate and sensitive interpreters of their child's language, use of nonverbal communication as a starting point...." This participant also used tools such as Hearing Them into Voice⁹™ (a tool used to evaluate communication proficiency in children).

Collaboration with the school team involved regular contact with the school SLP and teachers via email or meetings, and comparison of goals with the school SLP (when the SLP was an outside consultant). Participant 8 also talked about the use of a communication notebook to communicate with the school team. Participant 3 discussed responsibilities of members of the school team:

Educators can specify classroom routines and curriculum needs that will incorporate the child's participation as they communicate using natural speech and AAC. SLPs know language development and can pinpoint vocabulary, semantics, syntax, morphology, and pragmatic areas of strength and need. Paraprofessionals contribute consistent support as the child increases independence by offering them physical prompts.

Recommendations for New Clinicians

This theme contained many recommendations for new clinicians with respect to client and session, collaboration with members of the team, and general recommendations. This theme consisted of 117 thought units. For example, Participant 1 stated, "I would advise clinicians not to be afraid to use various AAC strategies in conjunction with natural speech. Know that it's not an either/or."

With respect to the client and session, a recommendation provided was to emphasize success in communication rather than speech during therapy sessions, which instilled trust in the clients. Participant 2 abided by the principle that "...communication success = trust in the therapist = better work ethic by the student = better opportunity for overall success." Participant 3 also echoed this principle and stated that "communication is more than speech." Accurate and sensitive interpretation of the client's communication was stressed, especially taking into consideration unaided communication such as facial expressions, gestures, partial words, and body movements. Teaching reading and writing was considered essential for those clients with unintelligible speech, because these avenues would increase the possibilities of learning. Also, as indicated by Participant 3, in a positive way, writing would "slow down the process of communication."

The following recommendations were provided for new clinicians: (a) modeling speech and meaningful communication using AAC tools, (b) re-evaluating frequently, (c) not giving up, and (d) expecting slow progress with natural speech and AAC goals. The importance of simultaneously targeting natural speech and AAC was discussed in an example by Participant 7. She indicated that it was not about having the child choose between the device and speech, but modeling both and allowing the child to choose his or her preferred mode of communication. In her experience, children with CAS would go back and forth between the two systems. Participant 6 discussed the importance of using an AAC

device for prompting language in addition to increasing communication.

The participants provided recommendations for team work. One of the participants talked about the importance of meaningful involvement of the family as one of the driving forces of therapy. Expectations from team members in terms of participation included daily participation in addition to weekly meetings, modeling, measuring progress, and celebrating success. Also, developing a workable treatment plan in collaboration with the team was pointed out. Other general strategies, recommendations with respect to the client and session, and team work are summarized in Table IV.

Discussion

Natural speech is one communication modality among many. Researchers in AAC have worked to clarify the relationship between AAC and natural speech development, with a view to assuaging fears that AAC will replace speech (Millar, Light, & Schlosser, 2006; Schlosser & Wendt, 2008). Targeting AAC and speech simultaneously in a dual paradigm approach could offer a platform for intervention that strikes a balance between honoring multiple modalities in communication and deliberate and repeated practice related to natural speech. Perhaps the idea of a dual paradigm is an important intermediate step in achieving a broader picture of communication intervention. Such strategies are needed for family-centered intervention to be possible (Cress, 2004; Iacono & Cameron, 2009).

Table IV. Strategies Recommended by the Focus Group Participants for New Clinicians.

Recommendations	Examples cited by the participants
Regarding new clinicians, the client, and the session	<ul style="list-style-type: none"> • Use AAC as a supplement • Experience success in communication first before targeting speech goals • Interpret the child's messages with accuracy & sensitivity • Be caring communication partners to the child • Establish meaningful relationships with the client • Explore the client's interests & motivation when choosing topics • Develop age appropriate activities that would help increase the child's confidence and success in the school environment • Create opportunities and reduce barriers to increase the use of AAC across multiple environments • Teach increasingly complex sentence structures and vocabulary • Teach language that helps resolve conflicts & honors the integrity of the child • Model speech and thought processes • Know the client's strengths and weaknesses • Be patient, be flexible, and listen
Regarding team work	<ul style="list-style-type: none"> • Involve the family meaningfully • Determine cultural and personal preferences that drive therapy • Provide light tech solutions if the family is not ready to accept SGDs • Know that team members contribute alternate solutions, provide communication opportunities, & help in selecting priorities • Expect day-to-day participation of the team in practicing AAC strategies, taking notes and measuring progress
General recommendations	<ul style="list-style-type: none"> • Be familiar with evidence-based practices (e.g., AAC does not hinder the development of natural speech skills) • Do not hesitate to ask for help; ask for support & resources • Provide a rationale for choosing an intervention strategy

Note. SGD, speech-generating device

Understanding the different levels of the complex system in which a child is situated is an important consideration in achieving successful interventions with individuals with children with complex communication needs (De Bortoli, Arthur-Kelly, Mathisen, & Balandin, 2014). In studying supports and obstacles related to interventions with students with complex communication needs, SLPs in a qualitative study by De Bortoli et al. reported that there were strong attitudes within the education system against AAC as being equal to natural speech. A qualitative study of SLPs working in early intervention settings noted similar barriers (Iacono & Cameron, 2009). The current study focused on understanding individual child factors and dealing with day-to-day interventions and goals. Generalization of skills was discussed in terms of bringing these individual pieces out into classroom and home environments in deliberate ways. Understanding the perspectives of parents relative to their expectations was also important. In this regard, the findings of the current study are consistent with previous research. A difference in collaboration findings noted in the current study versus those in De Bortoli et al. was the benefits noted in working with teachers to either debrief or to provide additional ideas. Participants in the current study focused on ensuring generalization and not on benefits or challenges of collaboration.

Another contribution to the current study involved asking participants to consider their most challenging and then least challenging case. Certainly this frame had an impact on participants discussing interventions relative to severity, however it also highlights a consideration in research with individuals with complex communication needs. Although experienced clinicians and researchers may be able to conceptualize children with complex communication needs as a single group, it can be difficult to establish a cohesive construct of a child with complex communication needs within a focus group discussion. The idea of anchoring discussion around contrasting cases or by focusing discussions around a more specific case (Kent-Walsh & Light, 2003) is an avenue to explore in conducting focus groups aimed at understanding the micro-view of problems with more specific populations or relative to specific challenges.

The numerous intervention strategies discussed in this study may serve as a resource for new clinicians, providing them with an opportunity to pick the best combination of strategies for their clients with CAS. However, it is noteworthy to state that although these resources are available and may be important, decision making for intervention strategies ultimately depends on the communication needs of the client, and should be driven by assessment findings. ASHA (2007b) has highlighted the challenges associated with the diagnosis of CAS and the importance of provisional diagnoses, especially in very young children with developmental disabilities and comorbid conditions.

Limitations and Future Directions

This study adopted an online focus group methodology, where SLPs were able to share their experiences using the dual paradigm approach for CAS. The online forum proved to be a convenient setting that facilitated the participation of SLPs working in different geographical locations and settings. However, it was observed that during the online focus group discussions, the frequency of follow-up posts or discussions among participants was limited. There may be several possible reasons why there were a limited number of follow-up posts. The majority of participants were employed full-time and had demanding schedules; they may not have had time to follow up. The lack of follow-up posts among the participants does not necessarily imply lack of participant interaction in the focus group; rather it may suggest that there was consensus among the participants with respect to ideas put forth about various facets of the dual paradigm approach and they perceived no need for follow up posts.

This study focused primarily on intervention in children with CAS. Although assessment was briefly discussed during certain weeks, the next step would be to focus primarily on decision-making during assessment, types of assessment tools, and strategies for children with CAS. In addition, given the importance of collaboration and team work with respect to supporting children with CAS, it would be beneficial to include family members and teachers of these clients in focus group discussions of the dual paradigm approach. This would provide different viewpoints regarding the application and carryover of this approach in different settings. It would also be of interest to have both clinicians and team members rate the perceived success of strategies, using a numerical rating scale, in addition to listing/describing the strategies and activities adopted. This approach might prompt further discussion of the topic and facilitate comparison of the strategies targeting a goal across settings.

Another limitation of this study is that it did not include information relating to the children's diagnoses (e.g., how and when they were diagnosed with CAS, at what age, and at what site). The study also did not include information on where participants learned about dual paradigm strategies, and the specific number of clients with whom the dual paradigm approach was adopted. This information could have been collected either via the demographic and screening questionnaire or during the focus group discussions.

This study recruited participants who reported that they had significant clinical experience implementing simultaneous AAC and natural speech interventions with children with CAS. However, it was beyond the scope of this study to determine if the participants implemented best practices working with children with CAS. Like previous qualitative research focused on understanding SLP perspectives (De Bortoli et al., 2014; Iacono & Cameron, 2009), this study did not require that participants hold

advanced or specialty certification or have a peer-reviewed publication record or doctoral level degree; rather this study sought to characterize the state of practice. At the same time, the goal of the current study was to ensure that recommendations were from individuals who were not novices in managing natural speech and AAC interventions. The extent to which the ideal pool of participants was captured does potentially limit the results.

Adopting an online focus group methodology (McNaughton et al., 2001, 2002) focusing on the dual paradigm approach in children with different communication disorders would provide a wealth of information, it would serve as an effective platform for experienced clinicians to exchange ideas, and it would function as an important resource to which new clinicians could refer. Given the importance of clinical perspectives in evidence-based practice (ASHA, n.d.b), and the limited guidelines and systematic reviews related to this topic in the compendium developed by ASHA (n.d.a), such continued discussions would be valuable.

Notes

1. phpBB is a free bulletin board software that was used to create the password protected forum for the weekly online discussions.
2. Intellikeys is manufactured by Intellitools, Inc. of Frederick, CO.
3. Classroom Suite 4 is a software developed by Intellitools, Inc. of Frederick, CO.
4. Tech/Talk is a multi-level AAC device manufactured by Advanced Multimedia Devices, Inc. of NY.
5. Unity is a language system developed by Prentke Romich Company of Wooster, OH.
6. Step-by-Step is manufactured by AbleNet of Roseville, MN.
7. iPhone is manufactured by Apple, Inc.[®] of Cupertino, CA.
8. iPad is manufactured by Apple, Inc.[®] of Cupertino, CA.
9. Hearing Them Into Voice is a 16-page instrument with 18 sections designed to outline the means by which a child communicates a variety of topics. It was developed by Sharon Rogers, PhD, CCC-SLP. Further information, including additional references related to development, can be found at: <http://www.drsharonrogers.com/hearing-them-into-voice/>

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Supplementary material available online

Supplementary Appendix

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