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A Life Participation Approach to Primary Progressive Aphasia Intervention

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Abstract

Primary progressive aphasia (PPA) is a clinical neurodegenerative dementia syndrome characterized by deficits in spoken and written word retrieval, word usage, and/or word comprehension. Currently, there are no effective treatments to reverse or halt the underlying disease process; however, speech–language therapy may be helpful. The Communication Bridge Care Model was developed to address the unique communication and quality of life needs of individuals living with PPA. The core elements include person-centered care with dyadic instruction for disease education, and counseling, along with tailored levels of impairment- and compensatory-based communication strategy training. Our multicomponent approach incorporates guidance from the Life Participation Approach for Aphasia, including client-directed assessment and interventions that aim to maximize functional communication and participation in desired life activities. The direct and indirect use of technology is integrated into our tailored model of care to facilitate achievement of the client's functional goals. Here, we describe how to practically apply the Communication Bridge Care Model across treatment settings, including case examples from the Communication Bridge research study. This approach to care provides an opportunity to maximize communication effectiveness and quality of life for individuals living with PPA throughout the course of disease.

Keywords

Frontotemporal dementia; Alzheimer's disease; speech–language pathology; communication disorders; dementia

Primary progressive aphasia (PPA) is a clinical dementia syndrome characterized by deficits in language with relative sparing of other cognitive domains.^{1,2} Anomia is the most common presenting complaint³; however, individuals with PPA can have deficits in word usage, word

comprehension, and/or word retrieval. There are at least three clinical variants of PPA based on the nature of language impairment: agrammatic, semantic, and logopenic.^{4,5}

The most common neuropathologic correlates of PPA are frontotemporal lobar degeneration and Alzheimer's disease.² A definitive neuropathologic diagnosis can only be determined at autopsy; however, in vivo biomarkers, including molecular imaging (amyloid or tau positron emission tomography) and cerebrospinal fluid, are emerging.² Additional refinement of these biomarkers and more ubiquitous availability are needed. In vivo biomarkers are already offering advantages including improving confidence in assigning participants to therapeutic trials based on suspected underlying pathology, which allows for movement toward the "five rights" of medication administration: the right patient, the right drug, the right dose, the right route, and the right time. Enhancing the precision of the diagnostic process during life with in vivo biomarkers also offers the opportunity to bring increased clarity to disease education for individuals with a diagnosis and their families.

While there is currently a dearth of pharmacological options, there is promising evidence that nonpharmacological interventions and care options, including support groups, art therapy, music therapy, and speech-language therapy (SLT), may be useful for individuals living with PPA. Despite this positive research (for reviews, see studies of Croot et al, Carthery-Goulart et al, and Murray and Paek⁶⁻⁸), individuals living with PPA are still under-referred for SLT services.^{9,10} There are many potential contributors to this underutilization of SLT services for individuals living with PPA: a lack of large randomized control trials, minimal formal training for SLPs in the area of evidence-based interventions for treatment of dementia,¹¹ and a misconception^{6,12,13} that SLT services are not appropriate for individuals with neurodegenerative syndromes because of their progressive nature and the heterogeneity of symptoms among individuals. Initiatives to improve disease education and awareness, educational adjustments for inclusion of dementia-based curriculum, and opportunities for non-pharmacological research for individuals living with PPA or a related dementia are necessary to combat these misconceptions. To achieve this goal, organizational and systems changes will be required.

We developed the Communication Bridge Care Model to address the unique needs of individuals living with PPA. The core elements include person-centered care with dyadic instruction for disease education, counseling, and communication strategy training. Our multicomponent approach incorporates guidance from the Life Participation Approach for Aphasia (LPAA) and the Living with Aphasia: Framework for Outcome Measurement (A-FROM),¹⁴⁻¹⁶ including client-directed assessment and interventions that aim to maximize functional communication and participation in desired life activities. The direct and indirect use of technology is integrated into our tailored model of care to facilitate achievement of the client's functional goals. The Communication Bridge Care Model has been shown to be feasible for individuals living with PPA.¹⁷ It could also be adapted to meet the needs of individuals living with other dementia syndromes or other cognitive-communication disorders. The Communication Bridge Care Model is intended to be applicable throughout the course of the syndrome, not just when impairment is mild. The following sections will describe the rationale for this approach, along with practical examples for person-centered assessment, treatment planning, and intervention.

IMPORTANCE OF A PERSON-CENTERED, MULTICOMPONENT DYADIC APPROACH

Onset of PPA tends to be before the age of 65 years, which is younger than for those with amnesic Alzheimer's dementia.² This creates unique and substantial psychosocial and economic challenges compared with Alzheimer's dementia since adults with PPA are commonly in the prime-earning phase of their careers and often have dependent children at home.¹⁸ Thus, the biological, psychological, and social needs of the individual living with PPA as well as their family members and life situations should be considered when developing a plan of care. A recent report estimated the yearly costs were nearly three times higher for those with PPA or the behavioral variant of frontotemporal dementia compared with Alzheimer's dementia.¹⁹ Care is needed over a relatively long period as there is an average survival of 7 to 10 years,²⁰ and reports of as long as 20 years exist.²¹ There is heterogeneity in the initial symptoms, in the emergence of new symptoms, and in the pace of decline. Person-centered models of care offer a unique opportunity to address these needs because they allow for consideration of the bio-psychosocial needs of the individual living with PPA and their family. SLPs are in a unique position to provide communication strategies, disease education, and counseling for clients and families coping with a diagnosis of PPA.

In person-centered care, the client proactively informs the care plan through dynamic interactions with the clinician. This collaborative model of care between the clinician and client has been implemented for individuals with other neurodegenerative dementia syndromes and for those who have experienced stroke; it is also applicable for individuals living with PPA. Person-centered care is consistent with the LPAA, A-FROM,¹⁴⁻¹⁶ and the Care Pathway model.²² LPAA is a consumer-driven service-delivery model that supports individuals with aphasia and others affected by aphasia in achieving their immediate and longer-term life goals. This approach is compatible with the World Health Organization's International Classification of Functioning (ICF), Disability and Health.²³ A-FROM provides domains and interventions, which are important to consider when formulating a person-centered plan of care for individuals with aphasia. LPAA and A-FROM aim to go beyond the client's language or nonlanguage cognitive impairment by formulating goals that aim to increase engagement in desired life activities. The Care Pathway model²² recognizes the importance of person-centered multidimensional care for dementia based on their neurocognitive profile.

Initial reports suggest that personalized interventions may be effective at helping individuals living with PPA learn strategies to maximize their communication abilities (for a review see the study of Croot et al⁶), which in turn may improve independence, mood, and quality of life. In fact, person-centered care was found to be feasible for individuals with PPA in the initial Communication Bridge research study.¹⁷ Improvements in language performance and on functional communication participation measures were observed. The program is actively being assessed in a randomized-controlled trial to determine its effectiveness relative to a control intervention.

Multicomponent person-centered interventions including impairment-based strategies, compensatory strategies, and communication partner training and support (which form the dyadic aspect of our approach) have been endorsed by SLPs and also by social workers, neuropsychologists, and other dementia specialists.^{6,22} The goal is to maximize functional communication and life participation, not linguistic perfection.

PERSON-CENTERED ASSESSMENT AND TREATMENT PLANNING IN PPA

The heterogeneity of symptoms at the individual level and the progressive nature of PPA require a holistic and personalized approach, which includes assessment of the following: (1) individual's strengths and weaknesses in communication, (2) impact of the aphasia on the individual's participation in desired activities, (3) individual's (and communication-partner's) assessment of communication challenges and therapy goals, (4) individual's motivation and insight into deficits, and (5) communication-partner involvement/support. This information will help the SLP understand each client's barriers to participating in daily conversations and activities that are important to them. This approach focuses on the needs of the client and family rather than solely treating based on PPA variant. This is important since many individuals diagnosed with PPA do not fit neatly into a "subtype," especially over time as the disease progresses. It is also consistent with the notion that "one-size-fits-all" models of care are not appropriate for neurodegenerative conditions.²⁴

When organizing the assessment, the SLP should consider the nature of the assessment: Is it to assist with differential diagnosis or intervention planning? If the SLP is a member of a diagnostic care team, then impairment-based standardized testing maybe appropriate. For clinicians who are not part of a diagnostic team, but rather are seeing clients with PPA to formulate a treatment plan, solely focusing on the results of traditional standardized tests for intervention planning may result in the formulation of goals that are not person-centered or functional in nature. Impairment-focused standardized tests also may not help capture "progress" for insurance reimbursement, in a population where language symptoms worsen over time. Dr. Michelle Bourgeois's "flip the rehab model" provides a relevant guide for an evaluation that aims to increase life participation in meaningful daily activities.²⁵ The evaluation begins by identifying the client's goals and expectations as well as the self-reported barriers to achieving their goals, which "flips" the traditional clinician-directed assessment. This client-directed, motivational interview²⁶ identifies how life participation has been impacted by the communication deficits, and is followed by standardized testing to help document strengths and weaknesses to assist with achieving the therapy goals.²⁵

When selecting a standardized test to assist in formulating a treatment plan, elements from functionally focused assessments such as the Communication Activities of Daily Living - 3rd Edition (CADL-3; Pro-Ed Inc.), the Assessment for Living with Aphasia (ALA),²⁷ or the Social Networks Package (SN; Attainment Company) may be helpful to objectively document how the individual's impairments are impacting their participation in functional activities. The results from these assessments will help with the formulation of goals that are functional in nature and will help track progress in life participation in daily conversations along with other functional activities over time.

Goal writing and documenting progress for a neurodegenerative condition to ensure reimbursement are common concerns for practicing SLPs. Clinicians may need to take a step back and review their goals before stating that an individual is not “making progress.” The following guidelines may help establish goals that are person-centered, functional, and reimbursable. First, the goal formation process is a team effort, rather than clinician-directed process. Individuals living with PPA and their communication partners can be asked what their goals are, along with their expectations for SLT. Motivational interviewing can then be utilized to discuss desired goals, along with realistic expectations for goal outcomes. Formal client-reported goal formulation procedures, such as Goal Attainment Scaling,²⁸ may be a helpful tool to guide clinicians in this process. When the goals are focused on concerns and activities that are important to the individuals living with PPA and their family members, there may be increased motivation to participate in therapy interventions targeting these goals. Actively involving family members in treatment sessions may also help demonstrate goal progress, as many of the interventions may require participation of the communication partner to ensure proper implementation. Reimbursable goals can be crafted by answering each of the following questions: What evidence-based strategy/strategies will be used? What is a realistic target accuracy? What is a realistic level of support? What functional activity is being targeted?

The following goals, which were targeted for participants as part of the initial Communication Bridge study, provide practical person-centered goals.¹⁷

- The individual living with PPA will retrieve the names of 8/10 types of flowers in her garden in response to open-ended questions with use of communication wallet, given minimal verbal and gestural cues, to increase her ability to participate in conversations about her favorite hobby, gardening, with family and friends.
- The individual living with PPA will pronounce personally relevant multisyllabic words pertaining to sheep herding commands with 80% accuracy during structured tasks, with use of syllable segmentation and visual articulatory cues hierarchy, provided with moderate cues from spouse, to increase his or her ability to participate in occupation of sheep herding, by giving commands to his border collie.
- The individual living with PPA will increase verbal fluency by 50% (measured by length of time, number of errors) during script practice for ordering food at a fast food drive-thru, given min verbal/written cues, to increase ability to independently order food at *Dairy Queen* and *Steak n Shake drive-thrus*.
- The individual living with PPA will demonstrate comprehension of two or three statements about the daily schedule, when given written keywords on a Boogie Board (a low-cost electronic device for note taking) and picture cues in a communication book, provided with moderate verbal/gestural cues from spouse, to increase ability to comprehend daily conversations about the upcoming schedule.

As noted earlier, an important factor for demonstrating goal progress is ensuring the goals specify realistic target accuracies and level(s) of cueing. For example, suppose an individual living with PPA is having difficulty communicating where she would like to go shopping and the corresponding goal would specify using a communication wallet or picture board listing her favorite stores to help communicate in daily conversations. She is unable to independently initiate use of the communication aid to communicate her message at the conversation level, but with moderate gestural and verbal cues from her spouse, she is able to communicate her message with 80% accuracy. Adjusting the target accuracy and level of cueing to reflect a realistic communication goal allows clinicians to demonstrate progress over time for insurance reimbursement. As stated previously, the goal of SLT is facilitating communication, not achieving linguistic perfection.

Finally, goals need to have a functional component. It may be helpful for clinicians to ask themselves the following question when looking at a goal: “To do what?” For example, if a goal states, “Patient will complete a confrontational naming test with 80% accuracy, given minimal verbal cues,” it is very difficult to answer the question: “To do what?” Compare this generic goal to the person-centered goals provided.

Assessment of Speech–Language Therapy Gains

Maximizing functional abilities of the individual living with PPA could have quality of life benefits including improved mood, increased social engagement, and prolonged independence, which could translate into economic savings for the family and the community at large.¹⁸ In this model of care, it is appropriate to assess gains with patient-reported outcome measures (PROMs).²⁹ The inclusion of PROMs is important as Medicare is moving toward a patient-rated outcome reimbursement structure. Medicare has also instated an important coverage change, which is relevant for individuals living with PPA, whereby “coverage for therapy and nursing services is based on a beneficiary’s need for skilled care, not on the ability to improve.”³⁰ While the insurance landscape is constantly undergoing changes, the overarching themes of increased utilization of PROMs and documenting functional gains are likely to remain constant for insurance reimbursement in the years to come.

PERSON-CENTERED INTERVENTIONS IN PRIMARY PROGRESSIVE APHASIA

Our Communication Bridge Care Model uses a dyadic approach and considers communication partner training as a foundational element. Because the approach considers bio-psychosocial elements, disease education and counseling are also integral treatment components. The information gathered from the person-centered assessment is used to identify the required composite of impairment-based and compensatory-based strategies, which will be used during the treatment sessions for each client. The use of a multicomponent approach is supported by previous studies^{31,32} and by Croot and colleagues⁶ who acknowledged that care for individuals with progressive language decline will need to be comprehensive, including combined approaches. Because of the progressive nature of PPA, strategies will need to be adjusted to meet each individual’s changing

communication needs over time. Thus, individuals do not graduate from SLT, instead the SLP is a prominent team member providing care throughout the course of disease. The following sections describe the key elements of person-centered treatment sessions.

Communication Partner Training: It Takes (At Least) Two

By definition, communication requires the exchange of information between two or more people. Both individuals living with PPA and their communication partners will need to learn new communication strategies. Ideally, this will be achieved by including the communication partner in the SLT sessions. In cases where the communication partners are unable to attend the session, creative alternatives might be necessary, including using the phone or a video-chat program which would allow them to participate remotely. For individuals in an assisted living facility or memory care community, both family members and staff members will need to be involved in treatment sessions for training and education regarding the recommended communication strategies. The Supported Conversation for Adults with Aphasia (SCA) program³³ provides a framework for dyad conversation training, using partner training, real-time feedback, and compensatory aids to facilitate communication in various environments. Education and training may also include discussion of strategies known to facilitate lexical retrieval and motor speech production for people with stroke-induced aphasia/apraxia of speech (e.g., semantic circumlocution, phonemic self-cueing, pacing, and melodic intonation strategies). Communication partner training will also be essential for the successful implementation and continued use of both impairment-based and compensatory interventions, discussed in the following sections.

Disease Education and Counseling

Many individuals living with PPA have undergone a long journey to receive their diagnosis. Even after receiving this diagnosis, they still may not have a full understanding of the condition and its prognosis. Some may express relief that, “At least it isn’t Alzheimer’s,” demonstrating a lack of knowledge about PPA and its course. Others may become confused by the complicated nomenclature that is used to define the clinical syndrome versus the neuropathologic diagnosis: “I was told that I had PPA, but after my spinal tap my neurologist told me that I now have Alzheimer’s Disease...” SLPs play an important role in providing ongoing disease education and counseling for the individual living with PPA and family members to ensure that they understand the diagnosis and have the necessary resources to plan for the future. Referring families to a social worker who has experience in working with the dementia population may be helpful.

It’s important to assess the current level of understanding of the PPA diagnosis of both the individual living with PPA and their communication partner prior to providing disease education. Asking each person, “Tell me about your understanding of PPA.” may be helpful, followed by, “How much do you want to know?” Some individuals with PPA may not want to know the long-term prognosis and details of this condition. Others may want to know every detail: “How many years do I have left?” “How fast does PPA progress?” SLPs need to be thoughtful when providing disease education and may find situations where the communication partner would like more details than the individual living with PPA. SLPs will also need to be comfortable with uncertainty, by responding, “Every individual is

different, there is heterogeneity in the initial symptoms, the emergence of new symptoms, and in the pace of decline at the individual level,” when answering questions about the precise rate of progression, emergence of new symptoms, and life expectancy.

The ability to communicate through the use of speaking, reading, and writing is something that uniquely defines us as human beings. Being diagnosed with a degenerative condition that will slowly erode and eventually destroy these abilities can understandably cause emotional and psychological distress for both the individual living with PPA and their family members. There is risk of depression in this population in part because insight often remains intact in the earlier stages of PPA.³⁴ By providing ongoing counseling during treatment sessions, and by referring to external resources (psychiatrists, psychologists, and social workers), depressive or anxious symptoms can be carefully monitored and managed by the entire care team. Ensuring the emotional stability of the individual living with PPA will be necessary prior to launching into any treatment interventions to address communication strategies. SLPs need to be knowledgeable in how to counsel individuals with a neurodegenerative diagnosis. Offering words of “things will get better over time” or “we will work together to make your speech better” or “we will fix this problem” are not appropriate for this population. The skills of listening, demonstrating empathy, and validating emotions are a critical component of treatment sessions and will need to be utilized during “counseling moments” throughout the course of treatment.³⁵

Impairment-Based Interventions

Impairment-based interventions focus on restorative strategies using a rehabilitation approach to improve function in a specific cognitive domain/activity (e.g., improving lexical retrieval for targeted words).⁶ Examples of impairment-based interventions that may be applied for treatment of PPA symptoms include lexical retrieval and motor speech production cueing hierarchies, script practice, and copy and recall treatment (CART).^{36–39} Utilization of impairment-based interventions to support a life participation approach requires the integration of personally relevant stimuli into the tasks. Working with individuals living with PPA and their family members to establish a small lexicon of personally relevant words used in daily conversations maybe helpful prior to the initiation of the restorative intervention. Various impairment-based approaches may be considered depending on the individual’s unique symptom profile and desired life participation goal. When clinicians are considering whether an impairment-based approach may be appropriate for the individual living with PPA, many variables can be considered: Is the individual living with PPA interested in and motivated to practice word exercises? Do the exercises consistently cause feelings of anxiety or frustration? What is the level of support from a communication partner to ensure the exercises are being rehearsed correctly over time? Does the severity of the language symptoms or the presence of nonlanguage cognitive deficits make it difficult to complete the exercises? Is the individual living with PPA feeling “burnt out” after repeated practice over time? Do the exercises need to be modified over time to meet the individual living with PPA’s changing language profile?

Examples of impairment-based interventions applied to meet a life participation goal from the Communication Bridge study include the following: use of CART as writing practice for

personally relevant vocabulary related to her hobbies, gardening and golf; use of a lexical retrieval cueing hierarchy to increase retrieval of words related to his profession as a financial consultant; use of apraxia strategies (syllable segmentation and a modified version of Rosenbek's eight-step hierarchy) to increase motor speech production of sheep herding commands; and use of script practice to increase fluency. For example, one individual in our research program practiced saying the "Our Father" prayer to improve fluency during church services while another individual practiced ordering for a fast food drive-thru restaurant.

Compensatory Interventions

Evidence-based compensatory approaches can assist with expressive language, auditory comprehension, reading, and writing and can be applied to support person-centered, functional goals. This section will describe how to identify an appropriate array of compensatory tools for an individual living with PPA. Unlike CVA-induced aphasia, where there is a sudden onset of symptoms, individuals living with PPA have experienced a progression of worsening language symptoms over the course of many months or years. Oftentimes, the individual living with PPA and their communication partners will have already developed their own strategies for daily conversations. The role of the SLP is to identify which strategies are working well and to encourage the continued use of these strategies, while at the same time identifying any communication patterns that may not be as helpful, and offering additional strategies to facilitate conversation. SLPs also play a critical role in proactively introducing strategies in anticipation of impending decline and also adjusting strategies, when necessary, as the disease progresses. In our model, SLPs are routinely providing counseling and education regarding the use of a variety of compensatory strategies, rather than focusing on just one mode (e.g., a speech-generating device). Compensatory supports may be broken down into different categories, including high-tech versus low-tech and word-based versus picture-based aids, as well as training on how to engineer the environment⁴⁰ for optimal communication (e.g., turning off the TV/radio when having conversations, placing communication aids in functionally appropriate locations).⁴⁰ The dyad may be trained to use many different compensatory supports across environments, so that they are equipped with a variety of tools to enhance communication.

High-tech tools not only include formal speech generating devices but also built-in or purchased apps on smart phones or tablets, which may be creatively applied to help with communication. Examples of high-tech compensatory supports applied to a life participation approach from the Communication Bridge study include the following:

- Use of pictures on Photo Stream to facilitate stories about weekly activities, including sailing and attending plays.
- Use of the "Notes" section on smart phone to list important names and words by category for easy reference.
- Use of the "Notes" section on smart phone to list important phone numbers, date of birth, and zip code (to enter into the machine when paying for gas).

- Use of Pic Collage—Photo Editor App (2018, Cardinal Blue Software, Inc.) to create personalized picture aids that are stored on a smart tablet and are pulled up by spouse to facilitate comprehension during daily conversations.
- Use of audio book recording while reading along with paperback book for reading of favorite novels.
- Use of Voice Recognition Technology to write daily “To Do” and shopping lists.

Examples of low-tech compensatory supports applied to a life participation approach from the Communication Bridge study include the following:

- Use of a “PPA card” describing the condition when pulled over by a police officer.
- Use of a “PPA script aid” describing the condition to educate members of a Men’s Group about aphasia.
- Use of a communication wallet to retrieve words related to daily conversational topics, including the names of minor league baseball umpires and Shakespeare’s plays.
- Use of remnants (ticket stubs and theater programs) to tell about events attended over the past weekend.
- Use of a “Dinner Prayer” script aid to orally read the evening prayer.
- Use of a “daily schedule” index card kept in pocket to increase comprehension of times of daily events.
- Use of a picture visual aid showing the steps to making a salad.
- Use of a picture visual aid to retrieve the names of birds and other critters in the backyard, such as wild turkeys, pileated woodpeckers, and chipmunks.
- Use of Pic Collage – Photo Editor App (2018, Cardinal Blue Software, Inc) to create paper-based picture supports about classic Film Noir movies for film presentation discussions.

The question of when to introduce compensatory tools is likely going to be different for every individual with PPA. The introduction of compensatory tools earlier in the disease, even if they are not used on a regular basis at that time, may increase the likelihood of their use in conversations as symptoms worsen. SLPs can gradually introduce the idea of compensatory tools and aids to the individual living with PPA, depending on their comfort level. The use of personalized content may also help create “buy in” when introducing these strategies.

UTILIZATION OF TECHNOLOGY IN PERSON-CENTERED CARE: WHEN IS IT APPROPRIATE?

Modern society has become saturated with the use of technology, with the integration of smart phones, tablets, and computers into nearly every facet of daily life. For SLPs working

with individuals living with a neurodegenerative disease, the question of *if* and *how* they should use technology to support evidence-based and person-centered interventions is a topic that will only gain more significance with time. Use of technology can invoke excitement or fear depending on one's perspective. Here we offer some practical recommendations about the when, where, why, and how of technology for those with PPA.

In the Communication Bridge Care Model, technology is not a single entity but instead can be used both *directly* and *indirectly* to enhance communication. In direct use of technology, the client is using the device, while indirect use means the device is used to create nontechnological supports for communication, such as a paper-based aid.

Technology may be used directly as a vehicle to improve access to care. For example, telemedicine approaches allow an individual living with PPA to connect with an expert SLP irrespective of their geographic location. Telemedicine approaches have the potential to reduce the number of missed sessions and to maintain continuity of care over time because clients can connect with the same therapist while on vacation, or if they move to a new city. There are also added benefits of being in the comfort of their own home and no need for logistics around transportation to the clinic. Telemedicine can also be used to link communication partners, family, or other care team members into sessions that they might not be able to join in person.

Direct use of technology can also be used to facilitate the practice of impairment-based exercises (e.g., digital flash cards, video scripts) or to compensate for the communication impairment by creatively using built-in or purchased apps on a smart phone, tablet, computer, or other device.

SLPs can incorporate technology to assist with leisure activities that are important to the client. For example, an individual who has difficulty reading the newspaper may be able to read an aphasia-friendly form of the news (e.g., Lingraphica's TalkPath News, <http://talkpathnews.aphasia.com/>), or using an app or website that provides both text and audio versions of news stories (e.g., National Public Radio App; NPR app).

Several factors should be carefully considered when determining whether an individual can benefit from the direct use of technology in their care plan⁴¹: (1) Is the individual motivated and interested to use technology in daily life? (2) Does the individual have prior experience with computers or smart devices? (3) Can the individual easily operate everyday technological devices, such as the microwave or TV remote? If the answer is no to any of these questions, then direct use of technology is not recommended. Another factor, especially as symptoms progress, is whether there is a care partner or family member present, who is willing to be trained on the use of the electronic aids and to provide the appropriate level of cueing. These considerations should play an active role in the dynamic assessment of an individual living with PPA, when determining how to best use technology in the plan of care.

Indirect use of technology can assist with the creation of paper-based communication supports, such as personalized wallets and boards. The individual living with PPA, their communication partner, and the SLP should develop these supports collaboratively. For

example, an individual could use Microsoft PowerPoint (2010 Microsoft Corporation) or the Pic Collage – Photo Editor App (2018, Cardinal Blue Software, Inc.) to create personalized visual communication aids for items in the kitchen, which would be printed onto paper and strategically placed in a prominent location in the kitchen.

HOW TO USE TECHNOLOGY WHILE MAINTAINING PRODUCTIVITY REQUIREMENTS

Many SLPs report that they turn to workbooks and brain games apps because they have no preparation time or time to create materials outside of the therapy sessions and are constantly struggling to keep up with high productivity expectations. The interventions described in this article can be created with the individual during therapy sessions, while maintaining productivity and insurance requirements. While the materials may need to be printed and laminated outside of the session, the individual living with PPA can be cued to help cut and arrange the pages into a communication book or wallet within the treatment session as a skilled therapeutic activity.

Other clinicians describe a lack of funding for a computer, smart tablet, and expensive apps. The apps described in this article are free or less than \$5 in cost and are easily accessible to SLPs and individuals with dementia who own a smart device. When considering the cost of a smart tablet (~\$300) and laminator (~\$30) that can be synced with a rehabilitation department's printer and used by multiple therapists, it may be well within the department's budget, if discussed with the rehabilitation director. These tools are equivalent to the cost of one standardized test (~\$250) and two cognitive workbooks (~\$40). Clinicians may want to consider requesting purchase of these tools 1 year, rather than a new test or workbook. Many facilities are providing tablets for clinicians so that they may do point-of-service documentation during sessions, which may also be utilized for therapeutic interventions. Confidentiality considerations when creating aids with personal pictures need to be considered, but all are barriers that can be overcome with careful planning for data protection and discretion on the part of the clinician.

THE EVER-CHANGING WORLD OF TECHNOLOGY

For clinicians who are eager to integrate the use of technology into their therapy sessions, it is important to consider that technology is constantly changing and the creation of new apps that may potentially be helpful for integrating into evidence-based interventions are constantly evolving. Holland and colleagues⁴² discussed the importance of routinely monitoring new apps. Evidence-based practices and person-centered interventions provide the foundation of interventions for individuals living with PPA, while the use of different programs, software, apps, and devices should evolve over time, to align with the development of new technologies.

Case Examples Illustrating Practical Integration of Technology

As outlined in the case examples later, technology, when used appropriately, may play an important role in facilitating functional communication throughout the progression of the disease, in addition to enabling reading and writing ability for as long as possible.

Individual/Caregiver complaint: “We are constantly playing 20 questions; he is unable to think of important names and places during daily conversations.”

Person-centered interventions with direct and indirect use of technology:

- SLP targets ongoing conversation dyad training, reinforcing positive communication strategies that will enhance daily communication.
- SLP works with the individual living with PPA and family members/staff to create a list of 40 to 50 personally relevant words (people, places, interests), which are then used to formulate a home program targeting the oral and written retrieval of the words. Flashcards are created using Quizlet App (2018 Quizlet Inc) and worksheets are created on Microsoft Word (2010 Microsoft Corporation) for CART, for increased writing practice of the targeted words. The individual living with PPA is trained to utilize appropriate self-cueing strategies when practicing the personalized cards, such as semantic circumlocution, semantic feature analysis, or phonemic self-cueing.
- SLP uses the same list of 40 to 50 personally relevant words to create word and picture-based communication aids (communication wallet, book, and/or boards), with Microsoft PowerPoint (2010 Microsoft Corporation) and the Pic Collage – Photo Editor app (2018, Cardinal Blue Software, Inc). The individual living with PPA, family members, and staff are trained to refer to the aids during daily conversation for increased word retrieval and also to facilitate auditory comprehension. As the individual living with PPA continues to decline, more emphasis is placed upon use of the visual aids to communicate daily wants and needs.
- For an individual living with PPA who meets the criteria for use of an electronic communication aids, SLP trains the individual living with PPA, family members, and staff to use built-in and purchased apps on the smart phone or tablet to increase ability to communicate in daily conversations:
 - Creation of electronic word-based communication wallet, with lists of important words by category (people, places, interests) on the “Notes” section of phone.
 - Use of photo stream or DayOne Journal app (Bloom Built, LLC) to talk about recent events, trips, people.
 - Use of Story Creator app (Innovative Mobile Apps) or other photo album apps to organize pictures by category, with captions.

Individual/Caregiver complaint: “I have trouble speaking over the telephone, particularly with strangers... like ordering take-out or scheduling a haircut.”

Person-centered interventions with direct and indirect use of technology:

- SLP uses script practice to help the individual living with PPA formulate personalized scripts using a word processing program on a smart tablet or laptop. Scripts are developed for ordering take-out food at her favorite Chinese and pizza restaurants, in addition to a script for calling the hair salon to schedule an appointment. Scripts are printed and placed in a binder and are also listed in her communication wallet. The clinician trains the individual living with PPA to rehearse the scripts on a daily basis and then facilitates use of the scripts during actual telephone calls in therapy sessions.
- SLP creates smart phone videos of the scripts, with a focus on articulatory cues to increase speech production and fluency. The individual living with PPA is trained to rehearse the telephone scripts using the videos to facilitate oral production of script content.
- SLP may also consider adding keywords and phrases frequently used during telephone calls to the individual living with PPA's communication boards and wallet (favorite take-out items, name of hair salon, and her usual stylist).

Individual/Caregiver complaint: "My spelling is horrible. It takes me so long to write an email or a grocery list. I used to be such a good speller."

Person-centered interventions with direct and indirect use of technology:

- If the individual living with PPA is comfortable using a smart phone or tablet, he may be trained to use the voice recognition software (e.g., "Siri," "Cortana," or "Alexa") to dictate problem words into the technological device, to elicit a response and the correct spelling of the word. Grammar/spellcheck software may also be recommended, or an app that highlights and corrects incorrect spelling/grammar. The SLP focuses on training the individual living with PPA to use the technology while writing an email or a grocery list.
- Many individuals living with PPA may benefit from the creation of written aids, using a word processing program.
- Email or letter templates can be created and utilized.
- Personalized grocery list templates may be created, listing food items that the individual living with PPA most often buys by category.
- To do list, calendar, and phone message templates may also be helpful for many individuals living with PPA.

Practical Integration of Technology Summary

In all of the aforementioned scenarios, the clinician is utilizing technology as an accessory to support evidence-based treatment interventions that target the client's life participation goals. In keeping with the LPAA and ICF frameworks, technology is not used as a primary, standalone intervention; instead it is used to supplement personally relevant and specific treatment ideas to meet the goals of the individual and maximize life participation.

CONCLUSION

Research in the area of nonpharmacological SLT interventions for people with PPA is growing. The Communication Bridge Care Model has been shown to be feasible for individuals living with mild to moderate PPA using a telemedicine approach.¹⁷ Additional research is needed throughout the progression of the syndrome and across care settings. There is an urgent need to improve training of SLTs and awareness for other health professionals about the appropriateness of SLT services for individuals living with PPA. Through advocacy, research, and training, it is possible to improve access to high-quality person-centered care for individuals living with PPA. We urge you to toss the workbooks and start a conversation with your clients today.

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Learning Outcomes:

As a result of this activity, the reader will be able to (1) differentiate primary progressive aphasia (PPA) from other clinical dementia syndromes (e.g., Alzheimer's dementia) and summarize the difference between the clinical diagnosis and the neuropathologic diagnosis; (2) describe the difference between a diagnostic assessment and a person-centered assessment to develop a plan of care for an individual living with PPA and determine which type of assessment you are likely to complete at your current healthcare setting; (3) discuss the key components to writing a functional, reimbursable goal for an individual living with PPA; (4) discuss the difference between impairment-based and compensatory interventions and give examples of how these different approaches might be applied for an individual living with PPA in a way that is consistent with the life participation approach to care; (5) discuss the difference between the direct and indirect use of technology and list several examples of how technology might be applied to support evidence-based interventions that target a life participation approach.