

Common Questions by Speech and Language Therapists / Speech-Language Pathologists about Progressive Aphasia and Alzheimer's Disease in Bilingual / Multilingual Populations and Informed, Evidence-based Answers

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A woman of 65 years of age, who was a Moroccan-English-French trilingual speaker, recently had a diagnosis of Progressive Primary Aphasia (PPA). She migrated from Morocco to the USA in her 30s.

Should we look for a bilingual or trilingual Speech and Language Therapist (SLT) / Speech-Language Pathologist (SLP) to work with her?

Should we look for a bilingual or trilingual Speech and Language Therapist / Speech-Language Pathologist?

Interviews with the family should determine the individual's experience in each language, such as the age of acquisition and the level of proficiency that has been achieved in each language. This information is essential to establish the individual's knowledge prior to the neural injury. In this way, it may be possible to determine the preference of the individual being treated. If the lady requires extra support, the following options may be considered. If a bilingual or trilingual SLP is not available, it is essential to appoint a translator or an interpreter whose services are professional and reliable. A translator or a family member may be used who is trained to provide appropriate support

On the other hand, Battle (2012) stipulates that culturally competent care requires a commitment to understand and be receptive to different styles of communication, verbal and non-verbal language and cues, as well as to the attitudes and values of all clients and families served. Clinicians should be able to send and receive verbal and non-verbal messages appropriately in each culturally different context. In the case of an acquired language disorder, it still may be helpful to work with an SLP even if he or she does not speak all the languages spoken by the client because intervention in one of the client's languages may generalize to the languages that are not treated (Goral, Levy, & Kastl, 2010; Kiran & Roberts, 2010; Kiran, Sandberg, Gray, Ascenso, & Kester, 2013; Kurland & Falcon, 2011; Miertsch, Meisel, & Isel, 2009). However, the non-treated language may also interfere with the language being used in intervention (Goral et al, Naghibolhosseini, & Conner, 2013; Keane & Kiran, 2015). This problem may be determined once intervention begins.

Differential recovery may occur for the case of a neurodegenerative disease for an individual who has acquired different languages across her life. In the case of an individual who has acquired a Moroccan Dialect as the first language, Modern Standard Arabic as a second language, French as a third language, and English as a fourth language, therapy in French or English will probably help the recovery of Arabic. In the diglossic situation (when two dialects or languages are used), there is the potential to enable a systematic investigation of recovery patterns in between L1 (Moroccan Dialect) and L2 (Modern Standard Arabic). When languages are close or related, cross-linguistic transfer can occur, as when a speaker applies knowledge from one language to another. In therapy, generalizations from L2 to L3 or L3 to L4 depends on the presence of cognates and non-cognates in the target language. Cognates are

words in two languages that share a similar meaning, spelling, and pronunciation. Cognate examples from Spanish and English consist of accident/accidente, cause/causa, and importance/importancia. In therapy, individuals can be made aware of cognates for understanding or learning a second language.

Do multilinguals / speakers of more than two languages with Progressive Primary or Secondary Aphasia always recover the first language they learned or their most dominant language before the aphasia better than their second or weaker language?

Differential, selective, or successive recoveries would result from problems caused by a focal lesion in the case of progressive primary aphasia (PPA). An example of a diglossic situation can be illustrated by Moroccan Arabic, with various spoken dialects specific to each speech community (low or medium) and Modern Standard Arabic (MSA) that has formal linguistic variety (or “high”). Structural characteristics (e.g., syntax and semantics) are primary and allow us to measure the relationship between the two languages spoken by the bilingual/multilingual individual. There are languages that share many structural features, while other languages are more distant from one another. Indeed, when both languages are structurally close, they can rely on the same processing processes (Moroccan Arabic and Classical Arabic). This is not the case for two languages that are more distant from one another in structure, such as English and Arabic (Khamis-Dakwar & Froud, 2012).

Studies on language recovery in vascular and degenerative aphasia give us different conclusions. It's known that explicit knowledge is affected by pathologies that affect memory processing, such as Alzheimer's disease (AD). In contrast, a stroke allows knowledge to remain intact.

Multilingualism as a competence that is part of the “cognitive reserve” (the mind's resistance to damage of the brain). Multilingual and polyglossic aphasia individuals contrast with those with Alzheimer's disease. The aphasic individuals have greater explicit memory while preserving implicit knowledge, such as the knowledge of L1 (Dakwar, Ahmar, Farah, & Froud, 2018).

Zanini et al (2011) described a case of an elderly bilingual woman with primary progressive aphasia. The participant's native language was Friulian (L1), a predominantly oral Romance language, and her second language was Italian(L2). Results show that both languages were affected to a clinically significant degree, but with different profiles in terms of linguistic levels, suggesting the presence of greater phonological, morphological, grammatical and syntactic impairments in L2.

Is it important to know the language history of bilingual / multilingual persons before the aphasia to understand their aphasic symptoms?

According to Centeno and Ansaldi (2013), a multidisciplinary approach is needed to an appropriate interpretation of communication disorders in people with bilingual or multilingual background. Bilingualism includes experience-based socio-cultural, linguistic, cognitive and neurological processes that interact in a more complex way than is usually seen in monocultural and monolingual environments. It has been emphasized many times that it is essential to include all the patient's languages in the assessment of his or her language skills, provided that the patient consents and collaborates during a very lengthy investigation. In this interview, it is important to ask when the individual acquired the language or languages that are spoken, along with the individual's speaking proficiency in these language or languages. An assessment in each of the languages, however, requires the availability of appropriate, normed, validated, equivalent, and comparable tests for each language. If the SLP lacks the individual's languages, an interpreter or family members may be consulted.

What are bilingual approaches to intervention for aphasia?

Given the growing number of the bilingual population across the globe, clinicians must be aware of the factors involved in cross linguistic therapy (Ansaldi & Saidi, 2014). Centeno (2008) presented tasks for intervention with bilinguals to address recovery that consist of cognitive training, the use of cognates, and multi-modality stimulation through the use of speaking, writing, and reading. Multimodality stimulation facilitates access to preserved cognitive abilities in either language of a bilingual aphasic individual (Gil & Goral, 2004).

Lorenzen & Murray (2008) present additional intervention tasks for bilingual individuals with aphasia: the general stimulation approach (Watamori & Sasnuma, 1976), phonemic cueing (Roberts et al., de la Riva, & Rhéaume, 1997), cueing hierarchy treatment (Galvez & Hinckley, 2003), reading and naming treatments that focus on shared aspects of languages (Kiran & Edmonds, 2004; Laganaro & Venet, 2001), cognate therapy approach (Kiran & Tuchtenhagen 2005; Kohnert, 2004; Lalor & Kirsner, 2001; Roberts & Deslauriers, 1999), compensatory strategies capitalizing on dual language abilities (Lorenzen & Murray, 2008), and the use of one language to cue another (Goral et al, Levy, Obler, & Cohen, 2006).

Which intervention approaches and factors for bilingual / multilingual speakers with aphasia are recommended?

Based on research, the following factors have been shown to play a positive role in intervention relative to therapy approaches and factors that contribute to progress.

Some intervention approaches have been adapted to a variety of different languages, such as melodic intonation therapy (MIT), while other approaches can be adapted to different language speakers, such as MIT and Promoting Aphasics' Communication Effectiveness (PACE). In addition, the other approaches are appropriate for all language speakers (e.g., semantic, cognitive, and restorative approaches).

Cognates

One area to consider in intervention for bilingual clients are cognates (e.g., "tiger" in English and "tigre" in French). Another area of language to consider are clangs, a type of homophone (e.g., "bell" as metal object that rings and "bel" as a word denoting beauty).

Noncognates are words that share meaning but not phonology (e.g., "butterfly" in English and "Mariposa" in Spanish). Evidence is shown for word recognition and translation for cognates, with generalization from the treated first language to the untreated second language only for cognates (Kohnert, 2004). In addition, there is evidence for faster response time for cognates as compared to noncognates in picture naming, word recognition, and word translation (Ansaldi & Saidi, 2014).

Cross-Linguistic Transfer

Cross-linguistic transfer of therapy effects (CLTE) are as reported when therapy is provided in the postmorbid stronger language or when proficiency after stroke is equivalent in both languages (Ansaldi & Saidi, 2014). Research has also shown that transfer across languages has been found in Indo-European languages, regardless of the particular language learned (Goral, Levy, & Kastl, 2010; Kiran & Iakupova, 2011; Kohnert, 2004; Miertsch, Meisel, & Isel, 2009).

Semantic Intervention

Evidence shows better CLTE through the use of a semantic approach. Semantic intervention consists of lexical semantic retrieval strategies through word recognition, semantic association, and cueing (Kohnert, 2004). In this program, intervention begins with the use of the client's native language within two sessions in the first week. The second week follows this pattern through the use of the client's second language. A one-week interval is scheduled between these sessions. All productions are accepted and encouraged if produced in the first or second language learned. The words used in intervention are incorporated in both written and spoken language. Tasks included the identification of pictures of intervention items, matching written words with pictures, generation of semantic associations to target words (e.g., words with their pictured referent; generating semantic associations (rose, flower, red, smell, garden, water), the completion of cloze tasks, writing the names of dictated training words; and confrontation naming with varied levels of cues (such as phonological cues and carrier phrases) (Kohnert, 2004, p. 299). The potential for CLTE from the treated to the

untreated language depends on the word type, the degree of linguistic overlap between languages, the type of therapy approach, pre- and postmorbid language proficiency, and the status of cognitive abilities (Ansaldi & Saidi, 2014, p. 1).

The Restorative Approach

The objectives of the restorative approach are to restore and improve altered linguistic functions following the stroke. It is a set of strategies for learning, reconstructing the language of individuals with aphasia implemented on the basis of speech and language assessment, as shown in Schuell's intensive auditory stimulation approach (Schuell, Jenkins, & Jiminez-Pabon, 1964). In this approach, the auditory modality is the foundation, with task difficulty increased over time. Stimuli and tasks must be repeated to be effective, with adequacy of stimulation determined by the individual's ability to provide a response. Maximum responses must be elicited. In addition, sessions should begin with familiar and easily accomplished tasks.

Melodic Intonation Therapy (MIT)

Melodic Intonation Therapy (MIT) is a rehabilitative procedure with a neurobehavioral rationale (Albert, Sparks, & Helm, 1973; Sparks, Helm, & Albert, 1974; Sparks & Holland, 1976). This approach has been successful in intervention with varied linguistic populations, such as English, Romanian, Persian, and Japanese (Seki & Sugishita, 1983; Popovici & Mihailescu, 1992; Baker, 2000; Bonakdarpour, Eftekharzadeh, & Ashayeri, 2003), and Italian (Cortese, Riganello, Arcuri, Pignataro, & Buglione, 2015). In addition, MIT has been adapted to French (Van Eeckhout & Bhatt, 1984), Arabic (Al-Shdifat, Sarsak, & Ghareeb, 2018), and other languages spoken across the world. This approach has proven to be effective in the application to other languages. This is an essential factor, given the growing number of immigrants and refugees across the globe and the necessity to adapt to the needs of these populations. MIT uses a melodic and rhythmic approach in working with individuals with non-fluent aphasia (Norton, Zipse, Marchina, & Schlaug, 2009). MIT begins with singing 2-3 syllable phrases with progress to longer utterances. Stressed syllables are sung on higher pitches, with unaccented syllables on lower pitches. This approach begins with frequently used words (e.g., water) and social phrases (How are you?). MIT can be applied to various languages spoken by the individual given intervention, taking account of stress patterns that differ across languages.

The Cognitive Approach

It is known that aphasia is frequently accompanied by deficits of attention, short-term memory (STM) and working memory (WM), and that such memory impairments may negatively influence language abilities and treatment outcomes. Consequently, treating STM and WM impairments in PWA should not only remediate these memory impairments but also play a positive role in their response to language therapy

programmes (Murray, 2012). To address attention, sessions followed a pattern of traditional language treatment (e.g., treatment tasks progressed from matching letters to picture-word matching to matching colors and shapes and copying and recalling designs (Lincoln & Pickersgill, 1984). Findings were improved language and nonverbal reasoning. To address working memory, 17 weeks of sentence repetition was used in intervention (Francis, Clark, & Humphreys, 2003). Intervention began with two function words (e.g., go, had) to address auditory memory and semantic recall. The next step consisted of longer utterances that utilized a progression to more complex stimuli.

Promoting Aphasics' Communication Effectiveness (PACE)

This approach is based on the relationship between the PWA and the clinician. Promoting Aphasics' Communication Effectiveness (PACE) is a treatment designed to improve conversational skills. The positive aspect of the PACE program is that it can be adapted to any language used in a bilingual therapy approach. Given the positive effect of cognates in bilingual approaches to aphasia, the clinician can use cognates in the use of the PACE approach. In this approach, the PWA and clinician take turns as the message sender or receiver. Picture prompts for conversational messages are hidden from the listener, and the speaker uses his or her choice of modalities for conveying messages (Davis & Wilcox, 1981). The clinician is aware of the pictures used in this task, but the PWA is only aware

of the picture that is revealed to him or her. The client can use spoken language, gesture, pantomime, drawing, or pointing to communicate the topic within the picture. The clinician models the various methods of communication (e.g. gesture) to provide a guide for the client.

Computer-Based and Augmentative and Alternative Communication (AAC)

AAC is an approach that involves supplementing or replacing natural communication modalities with picture communication symbols, line drawings, Blissymbols, and tangible objects and/or manual signs, gestures, and finger spelling. AAC includes speech-generating communication devices (Beukelman & Mirenda, 2013). Computer-based treatment involves the use of computer technology (e.g., touchscreen tablets) and/or software programs to target various language skills and modalities (Kurland, Wilkins, & Stokes, 2014). Simple picture boards can also be used in intervention, with pictures chosen by client and family to enhance communication.

Counseling-based approach

In a philosophy inspired by the ICF, Hersh et al (2018) have proposed a new framework for a counselling-centered approach that is widely used to encourage behavioral which is the Motivational Interview (MI). It is a collaborative approach in contexts where there is some resistance and ambivalence to change. Data from a range of health areas suggest that when people are ambivalent, MI is more effective in inducing changes in client's behaviors than traditional approaches to counselling. However, people with

aphasia may not be offered a tailored and suitable MI in clinical settings and tend to be excluded from studies using such approach because their language disorders are supposed to prevent participation in the interview process. Furthermore, while MI is validated by the evidence-based approach in counselling, it's not applied with sufficient evidence in aphasia. People with aphasia (PWA), deemed disengaged or demotivated by health professionals, are at risk of being released or neglected, but through a clinical case study, the authors have identified some interesting theoretical arguments and practical solutions to encourage lifestyle adaptation and behavior change.

According to Holland and Nelson (2018), treatment for PPA does not necessarily diverge treatments that are useful from stroke-engendered aphasia. However, there is a rather special urgency concerning that nature of the stimuli that are the focus of treatment. In managing such neurological condition, clinicians loose the option of counting on generalization of many theoretically driven treatment approaches to everyday speech. As SLPs with "counseling skills", they also must listen very closely and very well to concerns in the entire family and help them to plan for uncertainty appropriately. Counseling seeks to implement proactive management for symptoms with an emphasis on fostering wellness in patients and their caregivers with a compassionate approach.

ICF which stands for International Classification for Functioning, Disability and Health (ICF) is a scaffolding component and a good framework for thinking holistically about clients in their interactions with their environment. It was developed by WHO (World Health Organization) and aims to encourage clinicians to think beyond addressing only the impairment to also consider levels of activity and participation, and people's contextual factors (both environmental and personal). The ideas in the ICF can be applied well to multilingual populations with acquired neurogenic language disorders by improving their wellness and quality of life.

Technological Approaches to Aphasia

There has been an emergence of non-invasive brain stimulation, specifically Transcranial Magnetic Stimulation (TMS) and Transcranial Direct Current Stimulation (tDCS), as potential treatments for post-stroke aphasia. Much remains unknown about how these techniques cause clinical improvement or about their long-term efficacy, side-effects, and safety (Torres, Drebing, & Hamilton, 2013). Specific treatment protocols will vary, based on each individual's unique language profile and communication needs with respect of his mono-lingual, bilingual or multi-lingual status. The goal of each treatment should be achievable and functional with an emphasis to maximize quality of life and communication participation and success with the best generalization to daily life activities.

What are the problems with those diagnosed with Alzheimer's Disease? Are there any solutions to supporting these problems?

Alzheimer's disease (AD) comprises 60–80% of all dementia cases in the world (Alzheimer's Association, 2015). Research has been pointing to bilingualism as a viable means for delaying or preventing Alzheimer's disease. Strong epidemiologic evidence has been shown that individuals who maintain an active social, mental, and physical engagement may be able to counter the onset of dementia (Craik, Bialystok, & Freedman, 2010). Evidence has also shown that lifelong bilingualism is a further factor contributing to cognitive reserve, which acts to compensate for other brain pathologies (Craik et al., 2010).

Alzheimer's dementia presents with decline in various areas of function that include memory/orientation, reasoning, visuospatial ability, word retrieval, and behavior changes. Most types of dementia get worse over time and do not have a cure (Korytkowska & Obler, 2016).

However, those with dementia can be provided with opportunities to engage in activities and social interaction (National Collaborating Centre for Mental Health, 2007). Visual and hearing tests should be provided to assure successful interaction. Finally, augmentative approaches can be used, such as picture boards, to assist communication.

It is important to inform caregivers that communication must be adapted to the difficulties found in this disorder. Given slowed processing of spoken language, communication must consist of slowed speech and simple sentences to aid comprehension (Small, Gutman, Makela, & Hillhouse, 2003). It is also recommended that speakers repeat utterances to aid comprehension.

In addition, yes/no questions are more effective than open-ended questions (e.g., WH questions, such as *who*, *what*, *where*, and *why*).

Stilwell et al (2016) conducted a review and searched three electronic databases for relevant articles and retrieved 186 articles. Various research methods employed in assessing language changes in bilingual individuals with AD were analyzed. Preliminary findings suggest that both controls and bilingual individuals with Alzheimer's disease (BIAD) were more able on language-related tasks in their dominant language compared with their non-dominant language. The current literature would suggest that both languages in bilingual individuals are equally affected by AD; however, there is room to explore preliminary data on the fact that the non-dominant language, and indeed the dominant language, is more sensitive to AD. According to the authors, future studies in bilingualism and AD are needed to test and develop current theoretical frameworks and to establish a corpus of empirical evidence.

What are the available therapeutic approaches for Progressive Primary Aphasia? Are there any solutions to supporting the patients and their families?

Although different current studies tried to decipher the primary progressive aphasia (PPA) at the early stages by exploring and screening multiple markers (neuropsychological, neurological, neurobiological, neuroradiological, neurolinguistic, acoustic and computational), research studies investigating intervention outcomes and trials have been very limited due to the progressive nature of the disorder. In this context, many researchers and clinicians are using different therapeutic approaches ranging from proactive management by Rogers (2000) to a successful use of Augmentative and Alternative Communication (AAC) in Polish (Góral-Pórola et al, 2016), in German, English, French and Hebrew (Beukelman & Mirenda, 2013). Further research is needed to replicate them in individuals with PPA in multilingually and multi-culturally in non-European languages (Taiebine et El Alaoui Faris, 2019). As the bi-and multilingual rehabilitation of aphasia has become a burning issue, many studies aim to determine whether there is a crosslinguistic transfer between treated and untreated language. In this context, Knoph, M. I. K. (2013) investigated whether the treatment offered in L2 of an Arabic-English bilingual aphasic will improve both treated and untreated L1. Language tests were conducted in both languages before and after treatment using the bilingual aphasia test (BAT) (Paradis, 1987; 2011). The results show a significant increase in overall BAT scores in both languages. Furthermore, there has been a positive change in the participant's language behavior at home according to his family.

Globally, speech and language therapy for PPA is very scarce, although several interventions have been shown to be effective in aphasia after stroke. The conventional approaches targeted the specific linguistic components as a part of PPA (i.e self-cueing strategy for treating lexical retrieval suggested by Beeson et al., 2011), however new technologies have demonstrated the potential to enable people with PPA (p-PPA) to improve their communication skills as well their needs in daily life activities. The effectiveness of such self-administered therapy using smart tablet could improve the anomia symptoms using flashcards and other applications like "ANKIT™" (Evans et al, 2016). The tablet as a promising tool was found very useful in generalizing the effects of the treatment to another area of the conversation which suggests the possibility of generalization in an ecological context. (Lavoie et al, 2016; Lavoie et al, 2019). Another example is CommFit™ which is a smartphone application that has been developed according to aphasia-friendly guidelines to measure the conversation time of people with post stroke aphasia. Currently, the ease of use of CommFit™ for people with PPA has not been studied, and there is little research on barriers and facilitators to the use of mobile technology for this population (Brandenburg et al, 2017).

Recent advances in mobile technology offer new perspectives in the implementation of the Augmentative and alternative communication (AAC) devices; however, it is not clear whether they meet the needs of people with PPA. Moffatt et al (2017) have conducted a web-based survey of aphasia. "Smart" mobile devices have been shown to be

accepted as a promising platform for high-tech AACs. The authors indicated the need to pair these high-tech devices with other traditional options (low-tech) in order to improve the communication strategies. These alternative modes of communication are not intended to discourage the individual from trying to speak, but rather as a means of supplementary communication tool as well as a "back up" option during a communication breakdown. SLPs should advise patients and their families on their need for another form of communication as the disease progresses and verbal production becomes limited. In this context, Script Training is a good therapeutic option for increasing functional communication (Youmans et al, 2011). Repeated practice of a specific task can improve automatic recovery in a functional situation consistently and intensively (Cherney, 2011). When creating a script, the SLP must take into account the needs and interests of the individual, the type of script (dialogue or monologue), the number and duration of conversational turns, its grammatical complexity and vocabulary selection (Cherney, 2011 cited by Khayum et al, 2012).

With the same philosophy, Volkmer et al (2018) have designed a therapeutic protocol for the management of PPA called "Better Conversations with Primary Progressive Aphasia-BCPPA -" which has the potential to reduce barriers and increase conversation facilitators and, as a result, to improve confidence in people's communication and quality of life living with PPA and their conversational partners.

Finally, we suggest that there is an urgent need for a range of interventions which are methodical, well conducted and targeting multiple types and variants of neurodegenerative diseases with a focus on the multilingual and multicultural aspects in terms of screening, assessment and clinical management.

References

- Al-Shdifat, K.G., Sarsak, J., & Ghareeb, F. A. (2018). Exploring the efficacy of melodic intonation therapy with Broca's aphasia in Arabic. *South African Journal of Communication Disorders*, 65(1), e1-e8, doi: 10.4102/sajcd.v65i1.567.
- Albert, M. L., Sparks, R. W., & Helm, N. A. (1973). Melodic intonation therapy for aphasia. *Archives of Neurology*, 29, 130-131.
- Alzheimer's Association. (2015). Alzheimer's disease facts and figures. *Alzheimer's & Dementia*, 11(3), 332.
- Ansaldi, A. I., & Saidi, L. G. (2014). Aphasia therapy in the age of globalization: cross- linguistic therapy effects in bilingual aphasia. *Behavioural Neurology*, doi: 10.1155/2014/603085.
- Baker, F. A. (2000). Modifying the melodic intonation therapy program for adults with severe non-fluent aphasia. *Music Therapy Perspectives*, 18, 110-114.
- Battle, D. E. (2012). Communication disorders in a multicultural and global society. In *Communication disorders in multicultural and international populations* (pp. 1-19). USA: Elsevier.
- Beeson, P. M., Rising, K., & Rapcsak, S. Z. (2011). Lexical Retrieval Treatment for Primary Progressive Aphasia
- Beukelman, D., & Mirenda, P. (2013). Augmentative and alternative communication: Supporting children and adults with complex communication needs (4th ed.) Baltimore: Paul H Brookes Publishing.
- Bonakdarpour, B., Eftekharzadeh, A., & Ashayeri, H. (2003). Melodic intonation therapy in Persian aphasic patients. *Aphasiology*, 17, 75-95.
- Brandenburg, C., Worrall, L., Copland, D., & Rodriguez, A. D. (2017). Barriers and facilitators to using the CommFit™ smart phone app to measure talk time for people with aphasia. *Aphasiology*, 31(8), 901-927.
- Centeno, J. G. (2008). Multidisciplinary evidence to treat bilingual individuals with aphasia. *Perspectives on Communication Disorders and Sciences in Culturally and Linguistically Diverse (CLD) Populations*. 66-71.
- Centeno, J. G., & Ansaldi, A. I. (2013). Aphasia in multilingual populations. *Aphasia and Related Neurogenic Communication Disorders*, 275-294.
- Cherney, L. (2011). Updates in aphasia rehabilitation for the practicing speech-language pathologist. Rehabilitation Institute of Chicago, Chicago, IL.
- Cortese, M. D. , Riganello, F., Arcuri, F., Pignataro, L. M., & Buglione, I. (2015). Rehabilitation of aphasia: Application of melodic-rhythmic therapy to Italian language. *Frontiers in Human Neuroscience*; 9, Article 520

- Craik, F. I. M., Bialystok, E., & Freedman, M. (2010). Delaying the onset of Alzheimer disease: Bilingualism as a form of cognitive reserve. *Neurology*, 75(19), 1726-1729.
- Dakwar, R. K., Ahmar, M., Farah, R., & Froud, K. (2018). Diglossic aphasia and the adaptation of the Bilingual Aphasia Test to Palestinian Arabic and Modern Standard Arabic. *Journal of Neurolinguistics*, 47, 131-144.
- Davis, G. A., & Wilcox, M. J. (1981). Incorporating parameters of natural conversation in aphasia treatment: PACE therapy. In R. Chapey (Ed.), *Language intervention strategies in adult aphasia* (pp. 169-193). Baltimore, MD: Williams & Wilkins.
- Evans, W. S., Quimby, M., Dickey, M. W., & Dickerson, B. C. (2016). Relearning and retaining personally-relevant words using computer-based flashcard software in primary progressive aphasia. *Frontiers in Human Neuroscience*, 10, 561.
- Francis, D. R., Clark, N., & Humphreys, G. W. (2003). The treatment of an auditory working memory deficit and the implications for sentence comprehension abilities in mild receptive aphasia. *Aphasiology*, 17, 723-750.
- Galvez, A., & Hinckley, J. (2003). Transfer patterns of naming treatment in a case of bilingual aphasia. *Brain and Language*, 87(1), 173-174.
- Gil, M., & Goral, M. (2004). Nonparallel recovery in bilingual aphasia: Effects of language choice, language proficiency, and treatment. *International Journal of Bilingualism*, 8, 191-219.
- Goral, M., Levy, E. S., & Kastl, R. (2010). Cross-language treatment generalisation: A case of trilingual aphasia. *Aphasiology*, 24(2), 170-187.
- Goral, M., Levy, E. S., Obler, L. K., & Cohen, E. (2006). Cross-language lexical connections in the mental lexicon: Evidence from a case of trilingual aphasia. *Brain and Language*, 98, 235-247.
- Goral, M., Naghibolhosseini, M., & Conner, P. S. (2013). Asymmetric inhibitory treatment effects in multilingual aphasia. *Cognitive Neuropsychology*, 30(7-8), 564-577.
- Hersh, D., Newitt, R., & Barnett, F. (2018). Change talk when talk has changed: theoretical and practical insights into motivational interviewing in aphasia. *Aphasiology*, 32(Suppl. 1), 85-87.
- Holland, A. L., & Nelson, R. L. (2018). Counseling in communication disorders: A wellness perspective (3rd edition). USA: Plural Publishing.
- Katz, R. C., & Wertz, R. T. (1997). The efficacy of computer-provided reading treatment for chronic aphasic adults. *Journal of Speech, Language, and Hearing Research*, 40(3), 493-507.
- Keane, C., & Kiran, S. (2015). The nature of facilitation and interference in the multilingual language system: Insights from treatment in a case of trilingual aphasia. *Cognitive Neuropsychology*, 32(3-4), 169-194.
- Khamis-Dakwar, R., & Froud, K. (2012). Aphasia, language, and culture: Arabs in the US. *Aspects of Multilingual Aphasia*, 8, 275-288.
- Khayum, B., Wieneke, C., Rogalski, E., Robinson, J., & O'Hara, M. (2012). Thinking outside the stroke: Treating primary progressive aphasia (PPA). *Perspectives on Gerontology*, 17(2), 37.
- Knoph, M. I. K. (2013). Language intervention in Arabic-English bilingual aphasia: A case study. *Aphasiology*, 27(12), 1440-1458.
- Kiran, S., & Iakupova, R. (2011). Understanding the relationship between language proficiency, language impairment and rehabilitation: evidence from a case study. *Clinical Linguistics and Phonetics*, 25(6-7), 565-583.
- Kiran, S., & Edmonds, L. A. (2004). Effect of semantic naming treatment on crosslinguistic generalization in bilingual aphasia. *Brain and Language*, 91(1), 75-77.
- Kiran, S., & Roberts, P. M. (2010). Semantic feature analysis treatment in Spanish-English and French English bilingual aphasia. *Aphasiology*, 24(2), 231-261.
- Kiran, S., Sandberg, C., Gray, T., Ascenso, E., & Kester, E. (2013). Rehabilitation in bilingual aphasia: Evidence for within- and between-language generalization. *American Journal of Speech-Language Pathology*, 22(2), S298-309.
- Kiran, S., & Tuchtenhagen, J. (2005). Imageability effects in normal Spanish-English bilingual adults and in aphasia: Evidence from naming to definition and semantic priming tasks. *Aphasiology*, 19(3-5), 315-327.
- Korytkowska, M., & Obler, L. K. (2016). Speech-Language Pathologists (SLP) Treatment methods and approaches for Alzheimer's Dementia. *Perspectives of the ASHA Special Interest Groups*, 1(2), 122-128.
- Kohnert, K. (2004). Cognitive and cognate-based treatments for bilingual aphasia: a case study. *Brain and Language*, 91(3), 294-302.
- Kurland, J., Wilkins, A. R., & Stokes, P. (2014). iPractice: Piloting the effectiveness of a tablet- based home practice program in aphasia treatment. *Seminars in Speech and Language*, 35(1), 51.
- Kurland, J., & Falcon, M. (2011). Effects of cognate status and language of therapy during intensive semantic naming treatment in a case of severe nonfluent bilingual aphasia. *Clinical Linguistics & Phonetics*, 25(6-7), 584-600.
- Laganaro, M., & Overton Venet, M. (2001). Acquired alexia in multilingual aphasia and computer-assisted treatment in both languages: Issues of generalization and transfer. *Folia Phoniatrica et Logopaedica*, 53, 135-144.
- Lavoie, M., Bier, N., Laforce Jr, R., & Macoir, J. (2019). Improvement in functional vocabulary and generalization to conversation following a self-administered treatment using a smart tablet in primary progressive aphasia. *Neuropsychological Rehabilitation*, doi: 10.1080/09602011.2019.1570943.
- Lavoie, M., Routhier, S., Légaré, A., & Macoir, J. (2016). Treatment of verb anomia in aphasia: Efficacy of self-administered therapy using a smart tablet. *Neurocase*, 22(1), 109-118.
- Lincoln, N. B., & Pickersgill, M. J. (1984). The effectiveness of programmed instruction with operant training in the language rehabilitation of severely aphasic patients. *Behavioral Psychotherapy*, 12, 237-248.
- Lorenzen, B., & Murray, L. L. (2008). Bilingual aphasia: A theoretical and clinical review. *American Journal of Speech-Language Pathology*, 17, 299-317.

- Miertsch, B. J. M. Meisel, J. M., & F. Isel, F. (2009). Non-treated languages in aphasia therapy of polyglots benefit from improvement in the treated language. *Journal of Neurolinguistics*, 22(2), 135-150.
- Mofatt, K., Pourshahid, G., & Baecker, R. M. (2017). Augmentative and alternative communication devices for aphasia: the emerging role of "smart" mobile devices. *Universal Access in the Information Society*, 16(1), 115-128.
- Murray, L. L. (2012). Direct and indirect treatment approaches for addressing short-term or working memory deficits in aphasia. *Aphasiology*, 26(3-4), 317-337.
- National Collaborating Centre for Mental Health (2007). Dementia: A NICE-SCIE Guideline on Supporting People with Dementia and Their Careers in Health and Social Care. NICE Clinical Guidelines, 42. Leicester, UK: British Psychological Society.
- Norton, A., Zipse, L., Marchina, S., & Schlaug, G. (2009). Melodic intonation therapy: shared insights on how it is done and why it might help. *Annals of the New York Academy of Science*, 431-436.
- Paradis, M. (1987). Bilingual aphasia test. New Jersey: Lawrence Erlbaum Associates.
- Paradis, M. (2011). Principles underlying the Bilingual Aphasia Test (BAT) and its uses. *Clinical Linguistics & Phonetics*, 25(6-7), 427-443.
- Popovici, M., & Mihailescu, L. (1992). Melodic intonation in the rehabilitation of Romanian aphasics with bucco-lingual apraxia. *Romanian Journal of Neurological Psychiatry* 30, 99-113.
- Rau, M. T., & Fox, L. E. (2009). Treatment approaches to aphasia: Contributions of VA clinicians. *Aphasiology*, 23(9), 1101-1115.
- Roberts, P. M., de la Riva, J., & Rhéaume, A. (1997). Effets de l'intervention dans une langue pour l'anomie bilingüe. Presentation at the annual Canadian Association of Speech-Language Pathology and Audiology conference, Toronto, Canada.
- Roberts, P. M., & Deslauriers, L. (1999). Picture naming of cognate and non-cognate nouns in bilingual aphasia. *Journal of Communication Disorders*, 32(1) 1-22.
- Sparks, R., Helm, N., & Albert, M. (1974). Aphasia rehabilitation resulting
- Schuell, H., Jenkins, J. J., & Jiminez-Pabon, E. (1964). *Aphasia in adults*. New York: Harper & Row.
- Seki, K., & Sugishita, M. (1983). Japanese-applied melodic intonation therapy for Broca's aphasia. *No to Shinkei* 35, 1031-1037.
- Small, J. A., Gutman, G., Makela, S., & Hillhouse, B. (2003). Interventions for persons with Alzheimer's disease: Strategies for maintaining and enhancing communicative success. *Journal of Speech, Language, and Hearing Research*, 46, 353-367.
- Sparks, R., Helm, N., and Albert, M. (1974). Aphasia rehabilitation resulting from melodic intonation therapy. *Cortex*, 10, 303-316.
- Sparks, R. W., & Holland, A. L. (1976). Method: melodic intonation therapy for aphasia. *Journal of Speech and Hearing Disorders*, 41, 287-297
- Stilwell, B. L., Dow, R. M., Lamers, C., & Woods, R. T. (2016). Language changes in bilingual individuals with Alzheimer's disease. *International Journal of Language & Communication Disorders*, 51(2), 113-127.
- Taiebine, M. El Alaoui Faris, M. (2019). Neurolinguistic and acoustic study of logopenic primary progressive aphasia in Arabic. *Acta Neuropsychologica*, 17(4), 469-485.
- Torres, J., Drebing, D., & Hamilton, R. (2013). TMS and tDCS in post-stroke aphasia: Integrating novel treatment approaches with mechanisms of plasticity. *Restorative Neurology and Neuroscience*, 31(4), 501-515.
- Van Eeckhout, P., & Bhatt, P. (1984). Rythme, intonation, accentuation: la rééducation des aphasies non-fluentes sévères. *Rééducation Orthophonique*, 22, 311-27.
- Volkmer, A., Spector, A., Warren, J. D., & Beeke, S. (2018). The 'Better Conversations with Primary Progressive Aphasia (BCPPA)'program for people with PPA (Primary Progressive Aphasia): protocol for a randomised controlled pilot study. *Pilot and Feasibility Studies*, 4(1), 158.
- Youans, G., Youmans, S. R., & Hancock, A. B. (2011). Script training treatment for adults with apraxia of speech. *American Journal of Speech-Language Pathology*, 20(1), 23-37.
- Watamori, T., & Sasnuma, S. (1976). The recovery process of a bilingual speakers with aphasia. *Journal of Communication Disorders*, 9, 157-166.
- Zanini, S., Angelis, V., & Tavano, A. (2011). Primary progressive aphasia in a bilingual speaker: a single-case study. *Clinical Linguistics & Phonetics*, 25(6-7), 553-564.