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Memory Support for Adults with Alzheimer's Disease:  
Applications for Speech-Language Pathologists

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### Abstract

Alzheimer's disease (AD) is the most common form of dementia and is known to cause progressive and severely debilitating impairments in cognition, especially in memory. Deficits in memory and cognition are clearly reflected in the communication of people diagnosed with this progressive, degenerative, incurable disease, placing speech-language pathologists as important members of a care team for adults with AD. Speech-language pathologists provide treatment to support memory, and therefore communication, in people with AD through direct and indirect methods. Some examples of memory supportive strategies include spaced-retrieval learning, the use of external memory aids and assistive technology, Montessori methods, and manipulations to the physical and communicative environment. As the number of people with AD in America is projected to triple by 2050, knowledge of these effective memory supports to improve communication and quality of life among people with Alzheimer's disease is essential. It is important to consider these effective interventions and supports when forming policy regarding access and delivery of health care to older adults, development and management of environments where they reside, and education of their caregivers. This literature review will explore recent evidence-based literature regarding direct and indirect treatment of memory for adults with Alzheimer's disease, illustrate the relationship between these findings and the development of policy, and relate the significance of these findings relative to the scope of practice and the role of the speech-language pathologist.

## Memory Support for Adults with Alzheimer's Disease:

### Applications for Speech-Language Pathologists

Adults diagnosed with Alzheimer's disease (AD) and their caregivers often benefit from using uniquely designed memory and communication tools and strategies to maintain meaningful communication. The hallmark symptom of Alzheimer's disease, which accounts for 60 to 80% of dementia cases, is a progressive and debilitating loss of memory (Alzheimer's Association, 2016). Though often seen as purely a neurological disease impairing memory and cognition, AD also presents with cognitive-communication impairments that interfere with successful communication. Components of effective human communication such as topic maintenance, attention, and semantic content depend on different forms of memory (Manasco, 2014). It is critical to recognize that the deleterious effects of AD on cognition are much more complex than affecting only memory. In fact, a diagnosis of AD calls for the expertise and intervention of the speech-language communication professional, the speech-language pathologist (SLP).

People with AD often forget specific instances and events due to an impairment in what is called episodic memory (Mahendra, Scullion, & Hamerschlag, 2011). Mahendra, Scullion, & Hamerschlag (2011) define episodic memory as "a component of declarative or explicit memory that allows us to consciously recall episodes and events," (p. 279). Impairments in short term memory and working memory are typically the first indicators of AD (Mahendra, 2011; Toner, Shadden, & Gluth, 2011). However, memories that have already been encoded into long-term remain intact until much later in the disease's progression (Toner et al., 2011). For example, while adults with mild or moderate AD might be able to tell a story from when they were young with great accuracy, they may not be able to remember if they took their morning medication, or remember a recent family birthday party. During the early stages of AD, individuals also

experience mild forgetfulness, difficulty word-finding, and impaired sensory memory (e.g. visual or auditory perception) that continue to decline with disease progression (Toner et al., 2011). Personality changes may be present, and usually indicate to the affected individual and family members that these cognitive changes are not a part of a typical aging process (Manasco, 2014). During the middle stage of AD, affected individuals may become environmentally disoriented and begin wandering (Alzheimer's Association, 2016). As memory and attention continue to worsen in the middle stage, expressive language may become disfluent due to word finding impairments, and people with AD may forget their own personal history (Manasco, 2014). As AD is a degenerative disease, memory and cognition impairments will worsen with time (Alzheimer's Association, 2016). The dementing illness reveals itself in conversation through "confused, incoherent, perseverative, and ambiguous [utterances] with few factual and on-topic statements" (Andrews-Salvia, Roy, & Cameron, 2003, p. 51). In the late stage of AD, memory and cognition impairments become profound and speech and language carry little or no meaning or the person with AD may become mute (Manasco, 2014).

Although AD is a debilitating disease, some cognitive functions may remain relatively spared (Mahendra, 2001). These include visual receptive language abilities, reading comprehension, sustained attention, implicit and procedural memory, and pragmatic language skills such as conversational turn taking (Mahendra, Scullion, & Hamerschlag, 2011). SLPs and the professional or family caregivers can develop and maintain communication and thereby improve quality of life by capitalizing on these relatively preserved skills (Fried-Oken et al., 2012). SLPs' knowledge of these less affected cognitive-communication abilities guides their methods of intervention (American Speech-Language-Hearing Association [ASHA], 2016). Effective treatment and management methods reduce stress on impaired communication

functions and capitalize on those that are better preserved (Mahendra, 2001). By leading their clients to recreate and maintain lines of meaningful communication with caregivers and loved ones, SLPs can facilitate better relationships, reduce anxiety, and improve quality of life among people with AD (ASHA, 2016).

### **Role of the Speech-Language Pathologist**

Memory and cognition are classified as service delivery areas for speech-language pathologists, according to the American Speech-Language-Hearing Association (ASHA) Scope of Practice (2016). SLPs are involved in the procedures of screening, assessment, diagnosis, and treatment of people with dementia, including individuals diagnosed with Alzheimer's disease (ASHA, 2005). The expertise of the SLP includes cognitive aspects of communication that are typically damaged by AD, such as selective attention, working and episodic memory, sequencing, and problem solving (ASHA, 2016). In other words, persons with AD require an SLP's support and intervention to continue communicating at the highest functional level throughout the disease's course.

A common misjudgment regarding Alzheimer's disease is that the best way to care for someone with AD is by simply making them be comfortable and not correcting their idiosyncrasies (Malone, Loehr, & Camp, 2008). Family and professional caregivers of AD patients often adopt an attitude of what Mahendra, Scullion, and Hamerschlag (2011) call "therapeutic nihilism," meaning a conviction that those with AD have little to no potential to benefit from any type of memory intervention. However, more and more researchers and health professionals have rejected this myth (Mahendra, Scullion, & Hamerschlag, 2011).

By using evidence-based practices, SLPs can provide highest-quality services to bring about the best possible outcomes. All SLPs should also consider the client's motivation, social

support network, compliance, and expectations of clients and families when choosing and designing memory and communication intervention (ASHA, 2016). In response to presenting problems, SLPs develop communication goals for people with AD (Bourgeois, Fried-Oken, & Rowland, 2010). These goals include examples such as using an external memory aid, remembering to reference a calendar, or responding to a question by reading or pointing to a typed phrase or picture. SLPs provide comprehensive communication care for adults with AD by making assessments, developing individualized goals, and administering interventions and support (ASHA, 2016).

SLPs use two major approaches to deliver communication intervention for people diagnosed with AD. These approaches may be categorized as direct and indirect (Clark, 1995), and Manasco (2014) describes these as follows,

Direct therapy strategies are those in which the speech-language pathologist provides individual or group therapy sessions to direct deficits. Indirect therapy strategies are strategies that focus on modifying or manipulating the physical or communicative environment of the affected individual to best support communication and activities of daily living. (p. 227)

Similarly, Clark (1995) describes direct approaches to communication intervention as those in which the SLP and client work to maintain and capitalize on as many of the remaining communication strengths and to develop communication strategies. Clark (1995) continues to describe indirect approaches as those in which the SLP works with the patient's family members, caregivers, and other professionals to enhance communication. Whether the SLP provides intervention that is direct, indirect, or a combination of the two, the chosen method focuses on improving the client's quality of life and communicative success to the most effective degree the

disease will permit (Manasco, 2014). Bayles and Tomoeda (2007) provide guidelines to accomplish this goal. The SLP must focus on strengthening spared abilities and knowledge bases which are capable of improvement. Skills and abilities of a person with AD may change throughout the disease progression. Effective interventions shift demand from impaired cognitive abilities, such as declarative memory, to those that are intact, such as reading comprehension, implicit memory, and pragmatic skills. Finally, clinicians must provide a positive environment while evoking positive emotions and responses through stimuli to make treatment an encouraging experience (Bayles & Tomoeda, 2007).

### **Direct Approaches**

A common approach SLPs use to facilitate maximum memory and conversation function in adults with AD is by circumventing impaired cognitive processes and building on the strengths of those that are still intact. This method is called a direct approach (Mahendra, 2001). Such methods include using external memory aids (EMAs), spaced-retrieval training (SRT), or Montessori methods. All of these interventions focus on using remaining abilities, while providing a new, more accommodating way for people with AD to support memory and communication.

Regardless of the method used, early intervention regarding memory support is critical (Fried-Oken et al., 2013). Although language abilities in those with AD are spared at first, they diminish with disease progression due to impaired memory. Language of an adult with AD is characterized by “relatively empty speech characterized by lack of specific content and information, frequent use of indefinite pronouns, and repetition of the conversational partner’s remarks” (Toner et al., 2011, p. 174). In late stage AD, language problems become noticeably severe, and some may even become mute (Toner et al., 2011). The potential for rapid

deterioration that comes with AD makes planning and intervention crucial during the disease's early stages. Simply put, earlier intervention is more likely to bring more positive and longer-lasting results (Fried-Oken et al., 2013).

### **External Memory Aids**

As early as 1990, Michelle Bourgeois began to study communication interventions and memory support for people diagnosed with AD, focusing on memory aids and training procedures. Knowing the success of using tangible aids such as diaries, display boards, watches, and signs in maintaining reality orientation for people with dementia, Bourgeois began research regarding the effectiveness of facilitating and enhancing communication in older adults with dementia by using similar aids (Bourgeois, 1990). The results of her pilot study and her further research surrounding memory aids for people with dementia shattered misconceptions and past beliefs regarding the abilities of adults with AD. She reported that people with AD are able to learn new information by capitalizing on remaining cognitive functions rather than on those impaired by the disease (Bourgeois, Camp et al., 2003; Neely, Vikström, & Josephson, 2009).

Studies such as those by Fried-Oken and others (2012) demonstrate that when adults with AD learn to use memory supports early in the disease progression, they are able to utilize these supports longer, as further decline occurs. User training is vital to the successful use of any external memory aid; as Oriani and others (2003) stated, “[A memory aid’s] usefulness in the AD patient’s everyday life depends on the methodology that is adopted to help the patient learn how to use these methods,” (p. 25). Similarly, Fried-Oken and others (2012) emphasized that simply giving a communication device to an individual with AD does not necessarily lead to effective use of the device. Bourgeois, Fried-Oken, and Rowland (2010) suggest that a memory aid is more likely to retain its effectiveness with a person with AD when the aid is introduced

early in the disease progression and with occasional reminders and modifications. Directly supporting memory functions of adults with AD through these types of interventions is an effective method for setting the stage and facilitating more meaningful communication and social interaction (Mahendra, 2001).

**Non-technological aids.** Michelle Bourgeois' pioneering research began in 1990 by investigating the effectiveness of prosthetic memory aids on the conversation skills of people with Alzheimer's disease. She initiated a study involving three women diagnosed with probable AD and their caregiving husbands who were trained to use a communication wallet. Communication wallets were developed for each of the three women. Each husband helped researchers determine "facts of personal relevance to the subject and topics for which the subject may have been experiencing memory failures (e.g., names of family members, orientation facts, etc.)" (Bourgeois, 1990, p. 31). Researchers and husbands chose a statement to describe one of each of ten pre-determined facts and placed each statement in a laminated wallet, with or without pictures or drawings (Bourgeois, 1990). When the women were trained to use their communication wallet to assist in conversation, they produced significantly more on-topic statements in conversation when compared to their baseline data (Bourgeois, 1990). They were also rated as "making more sense, staying on topic longer, providing more varied and unambiguous information, and using appropriate referents more often than they did during baseline" by their observers (Bourgeois, 1990, p. 38).

Continuing this research, Bourgeois and Mason (1996) confirmed that adults with moderate AD who used memory wallets containing relevant and personal information, such as familiar people, places, and events, had a greater number of novel, accurate, on-topic statements than when these memory wallets were not present. Using memory aids to support

communication becomes even more effective when conversation partners are also familiar with their use (Bourgeois, Dijkstra, Burio, & Allen-Burge, 2001). In this study, Bourgeois, Dijkstra, and others (2001) trained nursing aids of a memory care facility how to use effective communication strategies for adults with AD and taught them to use memory books, which are similar to memory wallets but slightly larger at about 10-30 pages (Bourgeois, Fried-Oken, & Rowland, 2010). When adults with AD were provided with a memory book and a trained communication partner, the number of utterances from both partners increased; and people with AD had significantly more informative conversations with the nursing aids (Bourgeois, Dijkstra et al., 2001).

Non-technological aids, such as memory books and memory wallets, are highly individualized, and therefore can be customized to the specific memories and communication needs of the user (Toner, Shadden, & Gluth, 2011). “[Memory book/wallet] content capitalizes on preserved long-term memories for this population, and simple text accommodating these pictures capitalizes on relatively preserved reading ability” (Toner, Shadden, & Gluth, 2011, p. 189). The level of personalization utilized in these types of aids allows SLPs to provide individualized care with personally relevant information and enhance the overall communication experience for persons with AD.

**Assistive technologies.** As technologies such as cell phones, digital calendars, voice recorders, computers, and tablets have become more commonplace in everyday activities, as well as in communication intervention, some SLPs have studied using assistive technology as communication aids for adults with AD (Bourgeois, Fried-Oken et al., 2010). The ASHA Practice Portal on dementia (2016) defines assistive technologies:

Assistive technology (AT) is a generic term that includes assistive, adaptive, and rehabilitative devices and services for individuals with disabilities. An assistive technology device is any item, piece of equipment, or system—whether commercial, modified, or customized—that is used to increase, maintain, or improve the functional capabilities of a person with disabilities. (Treatment section, para. 13)

Assistive technological devices for communication can be dynamic, interactive, and highly personalized to the user, while also making logging client performance and progress simple or automatic (Mahendra, 2001). Because assistive technology can be specifically tailored to the user's preferences as well as mobility and cognitive abilities, these tools have the potential to serve diverse clients on a wide range of dementia severity (Kenigsberg et al., 2016).

In a trial involving five mild-moderate probable AD participants, Oriani and others (2003) demonstrated that using an electronic memory aid was more effective than using a written list. Each participant was instructed to remember to accomplish a task at a specific point in the future. This treatment targeted prospective memory, or remembering a task that needs to be done in the future (Oriani et al., 2003). All participants performed significantly better when using an electronic memory aid with a timer and recorded instruction than when using a non-technological support. The researchers found no significant improvement in performance when participants used a written list as a memory aid versus no memory aid (Oriani et al., 2003). In contrast, Fried-Oken et al.'s (2012) pilot study on the effectiveness of electronic augmentative and alternative communication (AAC) for adults with moderate AD found that electronic devices that emit voice and other sounds appeared to be distracting to participants and actually led to performance decline. The findings of both of these studies highlight the importance of tailoring

intervention to the particular needs of the client, as some individuals with AD may benefit more from using assistive technologies while others may need non-technological aids.

Of course, typical technological problems commonly faced by all users also pose a greater barrier for those with AD. Interference, expense, maintenance, hardware/software malfunctions, and data and alert management may cause even more confusion or discomfort in the AD user (Carillo et al., 2009). SLPs should evaluate these possibilities alongside the person with AD's individual capabilities and needs to determine what level of technology may be most beneficial for them.

### **Spaced Retrieval Training**

Spaced retrieval training (SRT) is a formal training method which utilizes repetitive instruction from a clinician that occurs at consistent and progressively increasing intervals, depending on the client's success in previous trials (Bourgeois, Camp et al., 2003; Oren, Willerton, & Small, 2014). Because standard spaced-retrieval training requires immediate corrective feedback and guidance to the correct answer, some professionals consider this intervention a type of errorless learning (Mahendra, Scullion, & Hamerschlag, 2011). Sustained attention (enough to answer questions and follow 2-step commands) and procedural memory remain relatively unaffected in the early stages of AD, making SRT an effective direct intervention method (Mahendra, Scullion, & Hamerschlag, 2011). SRT is used to train clients to remember facts (semantic memory), operations (procedural memory), and future appointments/activities/tasks (prospective memory). People with AD relearn previously known information, such as names of family members, significantly faster than new information (ex: using how to use a new external memory aid) through SRT (Oren et al., 2014).

In other words, the repetitive instruction used in SRT allows people with AD to relearn information such as family members' names, cue task orientation, recall prospective memory tasks, and exchange communication with caregivers. Repeated conceptual knowledge builds and strengthens neural connections and activations in implicit memory, which is relatively spared by the disease (Mahendra, 2001). Some SLPs call the process of strengthening and creating new connections in the brain for memory and communication "priming" (Mahendra, 2001). When neuronal connections are strengthened through priming, people with AD more easily able to use a stimulus, such as a word, phrase, or picture, to generate correct and conversationally relevant information. Mahendra (2001) explains the process of priming:

When a concept, event, or word is activated, related concepts, events, and words also are activated through the spreading of electrochemical energy. For example, when the concept of birthday is activated, energy spreads to the concepts associated with birthday, such as cake, candles, and presents. This increased activation of related concepts is called priming. (p. 292)

Repetition allows information to become more accessible in a person with AD's brain by strengthening and creating new neural associations, allowing the person to relearn previously inaccessible information, and learn new information (Mahendra, 2001). Related or unrelated activities can fill the increasing intervals between instructions with no significant effect on client performance. (Oren et al., 2014).

Other researchers confirmed the success of spaced retrieval training across the continuum of dementia severity by calling SRT a promising intervention (Hopper et al., 2013). When SRT was used to train AD patients' recall of their caregivers' names, 80% of participants successfully identified their caregivers by name and maintained this knowledge for 8 weeks after the training

period (Mahendra, Scullion, & Hamerschlag, 2011). According to Oren and others (2014), using SRT as a method to train memory in adults with AD is economical and easily applied by formal and informal caregivers. They also recommend that SRT training targets be limited to one or two items during a session and suggest using relevant training targets that are personally significant to the client.

Oren and others (2014) present studies in which SRT has been successful in helping people with AD remember face-name associations by presenting pictures and asking the person with AD to say the name of the person in the picture. Anderson, Arens, Johnson, and Coppens (2001) used SRT to train people with AD on their own personal information, such as the person with AD's name, room number, current year, city, or information about close family members. Across all participants, the only item of information that was not successfully relearned was a personal phone number, for which Anderson and others suggest a chunking strategy for future research (2001). According to Oren and others (2014), people with AD relearn personal information more quickly than irrelevant or novel information.

Speech-language pathologists also use SRT as a training process in conjunction with learning to use other memory supports, such as referring to a list or memory wallet (Mahendra, Scullion, & Hamerschlag, 2011). In a study by Bourgeois, Camp and others (2003), 25 older adults with various forms of dementia were successfully taught to use an external memory aid, such as an activity list or reality orientation board, by using SRT as the training method. The researchers found SRT was much more effective than other approaches in teaching clients how to use external memory aids. Learning maintenance with SRT was also significantly higher when using SRT than when using other approaches, achieving 70% maintenance vs. 50% maintenance (Bourgeois, Camp et al., 2003).

### **Montessori-Based Methods**

Another direct treatment method is the Montessori intervention. It provides multisensory stimulation and purposeful tasks for adults with Alzheimer's disease, which reflect positively on cognitive performance (Vance & Johns, 2002). Direct memory interventions containing Montessori principles provide meaningful stimulation, engagement, and social interaction in people with AD and also promote independence (Mahendra, Hopper, Bayles, Azuma, & Cleary, 2006; Malone, Loehr, & Camp, 2008). Hopper (2001) describes the core of Montessori methods as having four crucial components. First, interventions comprise complex task breakdown, ordered from most simple to most difficult. Second, extensive external cuing guides and assists in the client's success. Third, the SLP must provide the client with immediate and situationally appropriate performance feedback during the activities. Fourth, cognitive and sensory stimulating activities are incorporated throughout the intervention. Other Montessori activities adapted for adults with dementia and AD include word and memory bingo, identifying pleasant scents, question-asking reading, and simple sensory activities such as listening and singing along to familiar music, arranging flowers, folding laundry, or sorting dry pasta (Mahendra, Hopper et al., 2006; van der Ploeg et al., 2013). These activities circumvent impaired memory and allow persons with AD to take advantage of external cues, which lessen dependence on impaired working memory and minimize cognitive language demands (Mahendra, Scullion, & Hamerschlag, 2011; Padilla, 2011).

Montessori methods provide appropriate intervention for all levels of AD progression because they are designed to be highly personalized to the user (Manasco, 2014). These therapeutic interventions are effective by taking advantage of implicit and procedural memory, which is less affected by AD than other types of memory such as explicit and declarative

(Mahendra, Scullion, & Hamerschlag, 2011). Multisensory cues provided by Montessori activities also aid in cognition and lead people with AD to become more actively engaged with their surroundings when compared to non-Montessori intervention (Mahendra, Hopper et al., 2006; Padilla, 2011). Because Montessori-based interventions generally do not rely on spoken language, clinicians can promote engagement and nonlinguistic communication in clients who have progressed in AD, as well as in nonnative English speakers with AD (Levy & Crowley, 2012; van der Ploeg et al., 2011).

In a study examining one-to-one interaction with personalized Montessori-based activities, participants with dementia were rated by highly-trained facilitators and observers as having increased and positive affect, less negative engagement, and more constructive engagement and participation, when compared to the control group who received generic one-on-one interaction that was not based on Montessori principles (van der Ploeg et al., 2013). When compared to the initial affect and engagement ratings, people with dementia who participated in Montessori activities experienced a 50% reduction in agitation and negative engagement. In the same study, van der Ploeg and others (2011) demonstrated that Montessori interventions were significantly more effective than only typical social interaction (conversation surrounding newspaper articles and pictures) at reducing levels of agitation in previously bilingual participants who had lost their English fluency. van der Ploeg and others (2011) asserted that personalized Montessori-based interventions evoke constructive interactions, higher interest, and positive emotions, making communication and conversation with loved ones more pleasant.

Bourgeois, Brush, Elliot, and Kelly (2015) describe a new, person-centered model of care based on evidence surrounding the efficacy of Montessori methods for AD called

DementiAbility Methods: The Montessori Way. This model “focuses on the abilities, needs, interests, and strengths, of the person and creating worthwhile and meaningful roles, routines, and activities for the person within a supportive physical environment” (p. 209). Through this method, people with AD are engaged in their environment and are cognitively stimulated through activities such as serving drinks at mealtimes, making beds, and setting tables. In fact, an assisted living community in Miami, Florida has reported more resident engagement and positive attitude as well as increased staff satisfaction after adopting the DementiAbility Method (Bourgeois, Brush et al., 2015). Bourgeois, Brush, and colleagues (2015) present this person-centered and Montessori-based approach as a potential by revitalizing culture change to the long-term care community for adults with dementia.

According to Mahendra, Scullion, and Hamerschlag (2011), participants and leaders of Montessori activity and intervention groups display more positive engagement and affect when compared to other activities. “Elderly individuals tend to focus their more limited attention on topics and activities that they find personally engaging or important,” (Toner et al., 2011, p. 185). Incorporating personally pleasing and familiar sensory therapy cues in communication therapy may very well lead to improved communicative and memory performance, while evoking positive and uplifting moods and actions (Mahendra, 2001).

### **Indirect Approaches**

SLPs also often work to improve the communicative function of adults with Alzheimer’s disease through indirect methods by modifying the person with AD’s external factors, including the physical environment, communicative environment, and caregiver behaviors (Hopper, 2001). Creating a comfortable environment for communication eases strain and encourages initiation of conversation in adults with AD (Brush, Sanford, Fleder, Bruce, & Calkins, 2011).

### **Modifying the Physical Environment**

Physical environment and ambiance affect mood, behaviors, and perceptions (Brush & Calkins, 2008). It is important to create or modify an environment that promotes the maximum level of communicative function and provides multiple opportunities for conversation (Clark, 1995). Modifications and supports added to a person with AD's physical environment encourages successful communication by creating a safe and supportive environment that reduces stress on cognitive systems (Brush & Calkins, 2008).

According to Brush and Calkins (2008), memory care residents could be misclassified as having a "behavior problem" such as yelling, wandering, or physical aggression, when they are in actuality responding to an unsupportive environment. "Poorly designed environmental features contribute to unsatisfactory responses or behaviors in individuals with cognitive impairment [such as Alzheimer's disease]" (Brush et al., 2001, p. 32). Mahendra (2001) agrees stating, "individuals with dementia require a structured environment and predictable routine and activities and are often upset when changes occur in their immediate environment," (p. 300). Similarly, Toner and others, (2011) state that when AD patients are distracted, unsettled, or discomforted by their physical environment, their social engagement, conversation skills, and emotional management suffer. SLPs can alleviate these concerns by fostering the creation of a supportive, safe, and comfortable physical environment for people with AD, in other words, by treating the environment.

Modifying the content and layout of environmental spaces such as in long term care facilities, adult day centers, and homes supports effective communication by eliminating distractions, providing clear contexts for conversation, and reducing stress on impaired memory functions (Brush et al., 2011). When assessing the environment, potential distractions from

sound, lighting, and visible clutter can be identified and removed, as they may cause confusion and discomfort in a person with AD, leading to communication breakdowns (Hopper, 2001). Bayles and Tomoeda (2007) recommend more changes for home and care settings, such as removing mirrors, storing dangerous objects (knives, chemicals), and posting identifying signs on doors (e.g. bathroom, bedroom, closet).

Focusing on engagement and communicative interaction during mealtimes, Brush and Calkins (2008) demonstrated that when SLPs evaluated and modified the physical environment of a memory care facility's dining room (by increasing lighting, reducing glare, and providing high visual contrast eating tools), residents showed statistically significant increases in positive engagement with each other and with caregivers. In this environment, residents of the facility were able to apply their cognitive effort on conversation rather than on ignoring glare or distracting sounds (Brush & Calkins, 2008).

**Visual supports.** Visual cues such as signs and labels are common and promote communicative support, since the ability to read remains intact in many people with AD until much later in disease progression (Mahendra, Scullion, & Hamerschlag, 2011). Visual aids support orientation, sequencing, and topic maintenance in conversation (Brush et al., 2011). Caregivers can fill the environment with memory cues and familiar objects, and maintain consistent organization throughout frequented spaces. This management creates a predictable, supportive, and comfortable environment promoting healthy living and communication (Toner et al., 2011). "Use of personal, sensory stimuli helps access the spared recognition memory system in individuals with AD by appealing to existing memory traces," (Mahendra, 2001, p. 297). For example, a photo album or an old quilt placed in the room of a person with AD may serve as an environmental visual cue that supports conversation centered on that person's family. Beyond

bringing comfort and familiarity to adults with AD, prominently displaying personal items fosters remembering people, places, and objects, by lessening dependence on compromised declarative memory (Brush et al., 2011; Hopper, 2001).

One aspect that is often overlooked in creating a memory and communication supportive environment is sufficient lighting (Brush, Sanford et al., 2011). When communicators, especially those with memory disorders, cannot see their conversation partners well, they lose the opportunity to receive nonverbal cues such as gestures and facial expressions, which typically aid in comprehension (Brush et al., 2011). “Shadows from windows and glare from floors are confusing to AD patients and may contribute to anxiety or restrict movements within the facility” (Hopper, 2001, p. 312). Lighting must be efficiently designed and periodically evaluated, as intensity and glare can lead to discomfort and agitation, which is counterproductive to supporting memory in those with AD (Brush et al., 2011).

While relevant objects can be very helpful and supportive of communication, disordered objects can be overly stimulating and distract a person with AD from their intended task (Brush et al., 2011). Areas frequented by adults with AD should remain clutter free. An abundance of unorganized and unnecessary objects, such as too many personal grooming items on a counter, can overwhelm the AD patient’s visual perception. Visually distracting objects make focusing on a task, locating an object, or participating in an activity (such as a conversation) more difficult than it would be in a well-lit and clutter-free area (Brush et al., 2011).

As a part of communication intervention for adults with AD, SLPs must control environmental visual influences. When designing a memory care facility, treatment room, or when modifying a home environment to support memory, cues (signs, labels, arrows, nametags,

etc.) should be prominently displayed, personal objects should be incorporated into the environment, and lighting should produce minimal glare (Hopper, 2001).

**Auditory supports.** According to studies reviewed by Padilla (2011), ambient music aims to create a safe and peaceful environment, and is modestly effective in reducing agitation, calming anxiety, and discouraging wandering. However, if sound is inefficiently incorporated into or amplified by the environment, it can have the opposite effect. Communication becomes even more difficult for the person with AD because of loud, irrelevant, and distracting noises (Mahendra, 2001). Brush and others (2011) emphasize that older adults with AD have difficulty filtering out irrelevant sounds, especially when they are simultaneously hearing the noise and trying to attempt another task, such as conversing with a partner. Televisions, radios, appliances, fans, and other noise-producing devices should be turned off when possible to promote attention and hearing in people with AD (Brush et al., 2011). Sound reverberation occurs because of sound waves bouncing off hard surfaces and leads to distracting and disturbing background noise. Irrelevant noise makes communicating effectively and participating in other social activities much more difficult for adults with AD (Brush et al., 2011). By reducing the surface area of hard, reverberant surfaces such as hard flooring and tile ceilings in spaces frequented by adults with AD, background noise will lessen, leading to a more optimal environment for conversation. A peaceful setting with little to no background noise is the most supportive communication environment for people with AD.

### **Optimizing the Communication Environment**

Another important role of the SLP regarding Alzheimer's disease involves optimizing the client's communication environment, usually through caregiver training and education (Zeintz et al., 2007). In AD, communication often occurs between the patient and a caregiver such as a

family member, nurse, or health professional; therefore, caregiver communication training is vital to improving overall communication (Clark, 1995). Training the communication skills of caregivers increases their ability to gain perspective of the AD patient, builds understanding of communicative challenges, and increases feelings of caregiver control, leading to better quality of care (Eggenberger, Heimerl, & Bennett, 2013).

As early as 1995, Ripich, Wykle, and Niles developed and tested a caregiver communication program designed to improve interactions between people with AD and their caregivers. Ripich, Wykle, and Niles (1995) trained nursing assistants of a long-term care facility to effectively communicate with people with AD, and evaluated the assistants' attitudes and communicative satisfaction post training. The FOCUSED program, which was used to train caregivers in this study, is an acronym for what Ripich, Wykle, and Niles (1995) identify as the seven major elements to successful communication maintenance. FOCUSED stands for face-to-face, orientation, continuity of conversation, unsticking (assist the person with AD when they become "stuck" and cannot find the word they want to use), structure, exchanges, and direct (Ripich, Wykle, & Niles, 1995). After communication program training, nursing assistants reported significantly heightened communication satisfaction and more positive attitudes toward adults with AD (Ripich, Wykle, & Niles, 1995). "[Results of this study suggested] that nursing assistants and informal (family) caregivers can benefit from training in communication strategies and that this training may improve the quality of life for AD patients," (Ripich, Wykle, & Niles, 1995, p. 19). FOCUSED, the systematic caregiver training program, has continued to be used with formal and informal caregivers for years after its introduction in 1995 (Egan, Bérubé, Racine, Leonard, & Rochon, 2010).

Neely, Vikström, and Josephson (2009) investigated the effectiveness of memory intervention with caregiver collaboration versus intervention directed only interaction between the clinician and dementia client. They found significantly beneficial outcomes for people with AD when intervention included caregiver participation (Neely, Vikström, & Josephson, 2009). In this study, researchers compared the effectiveness of having caregivers (in this study, spouses) actively participate in a memory supportive program for a person with dementia. This memory program involved tasks such as face-name association, object recall, and table setting, using spaced-retrieval training and additional cueing (Neely, Vikström, & Josephson, 2009). In the control group, intervention occurred only with the person with dementia, whereas the collaborative groups heavily involved the person with dementia's spouse in the training sessions. The only difference in training sessions among participants was the presence or absence of a caregiving spouse. Spouses were encouraged to provide cues for each person with dementia while collaboratively setting a table and recalling names (Neely, Vikström, & Josephson, 2009). After training, all people with dementia performed the same tasks with their spouse, who had been present or absent in the training process. In the collaborative group, Neely, Vikström, and Josephson (2009) found that people with AD significantly increased their recall performance from pre-test to post-test, and caregiving spouses had reduced their number of recall instances. Even though people with dementia in the control group received the same intervention without caregivers, their recall performance did not change post-test. Neely, Vikström, and Josephson (2009) state that the outcome of their research "suggests that active collaboration between the spouses may be a critical prerequisite for transfer of learning to occur," (p. 710).

Caregiver education directed toward enhancing or increasing access to more effective communication is also an essential step in teaching people with AD to use external memory aids

(Oriani et al., 2011). Bourgeois, Dijkstra, Burgio, and Allen-Burge (2001) educated nursing home professional caregivers on effective communicative strategies for those with dementia and in the use of an external memory aid. The researchers trained the nursing aides over 2 to 4 weeks in external memory aid use and effective verbal communication strategies for adults with AD (Bourgeois, Dijkstra et al., 2001). Interactions between caregivers and people with AD were observed for 4 weeks post-training, and again 3 months later. After training, Bourgeois, Dijkstra and others (2001) found that when compared to the control group, residents with trained nursing aides had an increased number of on-topic utterances in conversations with and without the external aid present. Nursing aides who did not receive this training increased their own utterances during the observation period, thereby giving people with AD fewer opportunities to communicate with or without an aid (Bourgeois, Dijkstra et al. 2001). Training caregivers in effective communication strategies for adults with AD also led to fewer communicative breakdowns, and therefore more satisfying conversations for both conversation partners (Bourgeois, Dijkstra et al., 2001). Additionally, caregivers reported heightened perceptions of residents' feelings, which led to more satisfying interactions among residents and caregivers (Bourgeois, Dijkstra et al., 2001).

After reviewing multiple studies, Eggenberger and others (2013) recommend periodic “booster” training sessions and regular feedback regarding professional caregiver feedback to provide the highest quality of care. Bayles and Tomoeda (2007) provide suggestions for facilitating successful conversation with adults with dementia as follows: speak slower than usual, use short sentences, use appropriate facial expressions, gestures, and nonverbal cues, focus on concrete rather than abstract topics, and provide ample time to process and respond.

Eggenberger and others (2013) conclude:

[C]ommunication training by itself is insufficient to bring about change unless one also pays attention to organizational factors, obstacles, and influences. There is a strong need for an organizational framework that is supportive of communication as a crucial part of care and to facilitate changes in communication. (p. 357)

Family members typically take on the role of caregiver, but often are unsuccessful in adapting their own behavior and communication styles to adapt to the person with AD's unique needs, which can contribute to a communication breakdown (Hopper, 2001). Before initiating any kind of caregiver intervention, it is important to establish caregiver understanding that adults with AD are capable of benefitting from training and thereby improving communication. Bourgeois, Fried-Oken, and others (2010) urge caregivers to not challenge a loved one with AD to remember specific objects or events in an attempt to strengthen their remaining memory; rather, family members and caregivers should redirect conversation and use cues that may help the person with AD maintain communicative independence.

### **Other Considerations in Intervention**

When designing communication intervention, SLPs must consider their client's personal characteristics to provide individualization of care (ASHA, 2016). Toner and others (2011) assert that when clinicians are designing interventions for adults with AD, they must be aware of their client's visual and auditory abilities. Choosing, designing, or modifying intervention that is tailored for the individual's needs and abilities will lead to more engagement and participation and increase likelihood of generalization (Camp, 2010). Research has found that there is an association between sensory impairment, such as vision or hearing loss, and an increased risk of developing dementia (Kenigsberg et al., 2016). Therefore, it is especially important to be aware of the coexisting conditions in people with AD.

**Visual Considerations**

According to Toner and others (2011), SLPs must consider their client's visual abilities when designing communication interventions. Behaviors that are commonly attributed to dementia and AD such as wandering, agitation, and physical aggression may be provoked by diminished visual abilities rather than memory impairment (Toner et al., 2011). Therefore, these factors should be considered when designing memory intervention. Many aids, such as memory books or AAC, rely on visual cues and texts (Bourgeois, Fried-Oken et al. 2010). However, if the individual with AD cannot effectively use the aid because of visual impairment or spatial neglect, the SLP must either address this detail directly by referring the individual for vision testing or design intervention that bypasses the visual system. Although an environment may be supportive of communication, visual impairments may prevent a person with AD from being able to utilize them. Informative signs, labels, pictures, familiar faces, and external memory aids provide no real assistance if a person with AD has an uncorrected visual impairment. Before assessing or providing support for persons with AD, the SLP should refer them for vision assessment to avoid confounded assessment results and to ensure the person with AD and vision loss benefits the most from visual memory interventions (ASHA, 2016).

**Auditory Considerations**

Especially when considering the interdependence among speech, language, and hearing, SLPs must be aware of the hearing status when designing and delivering intervention to a person with AD (ASHA, 2016; Pichora-Fuller, 2015). Pichora-Fuller (2015) suggests a relationship between cognitive decline and hearing loss in older adults. Individuals with a hearing loss are two to five times more likely to develop dementia than those with normal hearing (Pichora-Fuller, 2015). If a person with AD has an undiagnosed hearing loss, presenting communication

deficits may quickly, but inaccurately be attributed to a memory disorder (Kenigsberg et al., 2016). Similarly, a client's inability to hear may be misinterpreted as cognitive decline, falsely classifying them as needing memory intervention (Pichora-Fuller, 2015). To adults with both AD and hearing loss, having a supportive communication environment is even more critically important. By being aware of a client's hearing status, SLPs can support audiological interventions and avoid false diagnoses of probable AD.

When working with adults who do have AD, SLPs tailor direct and indirect interventions to compensate for hearing loss (ASHA, 2016). For example, a person with both AD and hearing loss may benefit more from visual- and tactile-based interventions such as using memory books and Montessori methods than selecting auditory-based intervention. SLPs may use spaced-retrieval training to teach people with AD to put in their hearing aids. If a person is identified as having a hearing loss, a coexisting diagnosis of AD should not discourage prescription for a hearing aid fitting (ASHA, 2016). Because auditory aspects of an environment influence effective communication, an untreated hearing loss may prevent a person with AD from being able to utilize the indirect supports they need.

### **Cultural Competence**

Health professionals are under an obligation to provide the best care for their clients, which includes being aware of and being responsive to clients' cultural and linguistic backgrounds (ASHA, 2016). "[W]hen selecting cognitive-communication screening instruments and subsequent tests for comprehensive evaluation, the clinician considers the cultural and linguistic background of the client, using tests that have normative samples of culturally and ethnically diverse groups when available," (ASHA, Assessment section, para. 2). SLPs who work with adults with AD must also take accent and dialect into consideration when choosing

intervention methods. Little is definitively known about the effect of accented speech in intervention for clients with cognitive communication disorders (Levy & Crowley, 2012). Because a client's cultural background influences their verbal and nonverbal communication, SLPs must be able to distinguish between communicative differences and communicative disorders (ASHA, 2016). In 2004, Burda, Hageman, Brousard, and Miller found that adults with dementia had more difficulty comprehending words and statements when spoken with a foreign accent, suggesting that a client with dementia may perform best with a clinician whose cultural and linguistic features match their own.

### **Implications on Policy**

Just as research findings influence standards in health care and drug safety, evidence-based findings should guide policy and legislation for memory support for adults with AD (Alzheimer's Association, 2015). Changes and improvements to policy surrounding those with cognitive communication disorders call attention to communication in ways that can significantly improve their daily activities and quality of life (Blackstone, Beukelman, & Yorkston, 2015).

While current policies surrounding AD mainly focus on research, advocacy, and health and care coverage, very little exists to guarantee memory and communicative support for those with AD, even in professional medical care settings (Alzheimer's Association, 2015). One of the responsibilities of health care organizations and professionals is to ensure that people have communicative support (U.S. Department of Health and Human Services [HHS], 2015).

Some policies and initiatives are already in place and support cognitive intervention in Alzheimer's and dementia. The Omnibus Budget Reconciliation Act of 1987 requires that in order to keep all residents of nursing homes, including those with memory disorders, at the

highest functional level, residents must be regularly evaluated by professionals, and their care plans must be updated in accordance with this evaluation (Bayles & Tomoeda, 2007). These therapy services are reimbursable by law, if an SLP determines that the resident's quality of life can be improved by targeting specific cognitive functions (Manasco, 2014). Clients who may need memory and communicative intervention from SLPs are more likely to receive the assistance they need when regular evaluations and service reimbursements are guaranteed.

The Alzheimer's Association and Intel launched the Everyday Technologies for Alzheimer's Care initiative in 2003. The initiative focuses on examining assistive technologies, especially information and communication technologies (ICT), and their role in the lives of those affected by AD. Specific features of assistive technology suggested for study are diagnosis, progression tracking, treatment, and caregiver assistance (Dishman & Carillo, 2007).

Updated in July of 2015, the White House Conference on Aging's (WHCoA) National Plan to Address Alzheimer's Disease (NPAAD) intends to support clinicians, caregivers, and AD patients through a variety of methods (HHS, 2015). One strategy addressed involves the translation of evidence-based practice into public health programs and clinical guidelines. This goal would be accomplished by collaborating with other health communities to provide efficacious resources for clinicians and dementia services community (HHS, 2015). The NPAAD also seeks to identify high-quality care guidelines and to continuously explore the effectiveness of emerging care models for AD. Both of these initiatives in the NPAAD give SLPs easy access to evidence-based practice for memory and communication intervention with AD clients. These initiatives make it easier to share their own findings, potentially providing better quality care across a global network of clinicians (HHS, 2015).

With the knowledge that direct and indirect supports and strategies provided by SLPs and other professionals can lead to significant improvements in cognition, communication, and quality of life in the AD patient, potential future policies have substantial grounding. Lack of funding poses a limitation to the effectiveness of some supports, such as external memory aids (Fried-Oken et al., 2012). Providing funding and financial support for researching and supplying long-term care facilities with communication aids and assistive technologies may lead to improvements in quality of care and resident and quality of life, as well as caregiver job satisfaction (Bourgeois et al., 2001). Similar to the way the Americans with Disabilities Act (ADA) sets criteria for public spaces and buildings, standards could be put in place regulating the internal structure of memory care facilities. Requiring best practices in use of lighting, contrast, and acoustic structure could foster an efficient communicative environment for adults with AD and their caregivers (Brush et al., 2011). Regular evaluations of the internal structure of these facilities would maintain this memory supportive environment.

While some focus is being placed on professional and informal caregiver education and support (HOPE for Alzheimer's Act), Eggenberger and others (2013) bring to attention the lack of dementia communication training for general practitioners and the "clear need for training incentives in hospital and day care units" (p. 356). Practitioner communication is critical because adults with AD are often admitted to general or geriatric medical facilities during the course of their illness. By creating a formal, mandatory training and feedback program for general practitioners who have a likelihood of treating someone with AD, policymakers can help ensure complete medical care and reduce communicative barriers between patients and practitioners.

Even on a smaller scale, changes in policy have the potential to bring about positive and meaningful outcomes. Blackstone and others (2015) describe a scenario in which a cleanliness

policy took precedence over having communication aids readily accessible. Instead of having memory books and wallets and AAC equipment throughout the facility for patient and caregiver use, they were placed in unlabeled drawers and unable to be located by the clients' friends and family members. Although the facility eventually labeled the locations of the communication aids for caregiver and family member use, this incident—and consequently many communication breakdowns—could have been prevented through the incorporation of what Blackstone and others (2015) call a designated communication coordinator. Individual facilities may consider creating the policy and position of assigning a coordinator to expertly assist in training residents, caregivers, and family members with communication supports, training, and access.

Regarding the direction of future policy surrounding AD, Keingsberg and others (2016) predict:

Public policies are likely to pursue improving awareness and understanding of dementia; providing good quality early diagnosis and intervention for all; improving quality of care from diagnosis to the end of life, using clinical and economic end points; delivering dementia strategies quicker, with an impact on more people... Faced with funding shortage, new professional dynamics and economic models may emerge...research could be viewed as an investment in quality of care, rather than an academic achievement in a few centers of excellence. (p. 7)

In the formation of policy surrounding adults with AD and other cognitive communication disorders, SLPs also play the role of an advocate. SLPs are leaders with the knowledge, skills, experience, and vision that ultimately influence policymakers to support their clients with cognitive communication disorders from a legislative, rather than only a clinical, perspective (Blackstone et al., 2015).

### **Interprofessional Collaboration**

Determining the communication needs of a client with a cognitive communication disorder is usually a team effort (Blackstone et al., 2015). According to the World Health Organization, many health professionals participate in interprofessional education programs; however, very few participating professionals are SLPs (Blackstone et al., 2015). Memory and cognition has a direct relationship with communication. It is because of this relationship that all professionals who serve people affected by a dementing disorder have knowledge and skills relating to both areas (ASHA, 2016). Ideally, in a formal caregiving setting, an individual with AD will have the support of an interprofessional care team rather than being treated by only one caregiver or health professional. A care planning and management team of multiple specialists in different areas provides complete and holistic treatment and support for the individual with AD and their loved ones. SLPs, nurses, social workers, neurologists, occupational therapists, and other health professionals may comprise the interprofessional care team. According to the ASHA Scope of Practice:

Referral and collaboration between members of the team, particularly during the assessment process and treatment planning, are important to help ensure quality service for individuals affected by communication and cognitive disorders. Coordinating assessment can prevent overlap in test selection. (Interprofessional Collaboration, 2016)

### **Conclusion**

Because of memory's crucial role in communication, a disease that rapidly destroys memory will negatively affect an individual's ability to communicate (Manasco, 2014). AD puts strain on loved ones, creates feelings of isolation and hopelessness, and can delay treatment of other health problems if patients cannot communicate discomfort. SLPs support communication

and memory in adults with AD by addressing the memory deficit directly and by indirectly optimizing secondary communicative factors (ASHA, 2016). By utilizing preserved memory functions and reducing strain on those that are most negatively affected, individuals with AD can compensate for their losses and communicate in new ways. Enhancing physical and communication environments through modification and caregiver training also supports successful communication in AD patients (Brush, Sanford et al., 2011; Hopper, 2001).

In treating clients with AD, SLPs decrease the stress on lost cognitive systems, utilize the strengths of existing ones, and maximize communication resulting in a higher quality of life (Hopper, 2001). According to research conducted by SLPs, directly intervening in an AD patient's memory and communication skills by means of memory aids, spaced-retrieval training, or Montessori based activities, improves communication skills by capitalizing on intact cognitive systems (Mahendra, 2001). Similarly, many researchers demonstrate that modifying the AD patient's external influences, such as the physical environment and their communication partner's skills, reduces cognitive and communicative stress on the patient. These memory supports increase comfort, lead to more on-topic utterances, and improve overall communication in adults with AD (Brush, Sanford et al., 2011).

When combined with proper support from SLPs and caregiving professionals, policy regarding care for clients with AD and other dementias helps to ensure the best quality of care and improved quality of life. Policy can support the needs of people with AD by regulating interior structure of a memory care facility and conducting routine evaluations. Policies may also provide funding for direct memory interventions such as Montessori-based programming or electronic memory aids. While research and funding fervently try to find a cure for Alzheimer's disease, other policies and funding must address the current needs of those affected by AD

(Keningsberg et al., 2016). Although researching and publishing these findings regarding intervention for adults with AD is already beneficial to clinicians, patients, and caregivers, using evidence backed findings to create and promote policy for AD patients can further ensure that they can receive the best services available.

In accordance with the International Classification of Functioning, Disability, and Health (ICF), the framework for the Scope of Practice for Speech-Language Pathology, SLPs strive to promote and optimize the client's life activities and social participation (ASHA, 2016). Hopper (2007) stresses that the idea of the skilled direct and indirect interventions provided by SLPs are not intended to change or cure AD patients' conditions, but rather to positively impact their life activities and participation, regardless of diagnosis. Toner and others (2011) urge SLPs to use their extensive knowledge of human communication sciences, and work with staff and caregivers of a memory care facility to create actively engaging environments. "The role of the SLP must be expanded to include both direct and indirect communication intervention programs," (Clark, 1995, p. 49). To provide the highest quality of services, as called for by the ASHA Scope of Practice (2016), SLPs may need to use one or more interventions for clients, and deliver services according to the individual cognitive and communicative needs of persons with AD.

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