3. All of the following statements discuss challenges in using AAC with people who have aphasia, EXCEPT:

a. It is not appropriate to recommend AAC strategies for people with aphasia.

b. AAC assessments of people with aphasia have not done well at adequately matching the appropriate AAC system to the appropriate user.

c. People with aphasia must consciously "overlay" AAC communication strategies on communication attempts that were previously automatic.

d. People with aphasia are often not trained to use AAC approaches in contextually rich settings.

e. The psychosocial consequences of aphasia for people with aphasia and their families may influence their acceptance and use of AAC strategies.

4. During an evaluation, a person with aphasia reaches into his pocket to pull out a train schedule and uses this remnant to communicate a message. According to the categorical assessment protocol, which type of communicator is he?

a. Partner dependent

b. Independent accesser

c. Symbolic formulator

d. Advanced digitizer

5. All of the following are important components of an AAC evaluation for a person with aphasia, EXCEPT

a. needs assessment.

b. capabilities assessment.

c. voice assessment.

d. language assessment.

e. cognitive assessment.

Augmentative and Alternative Communication Considerations for Adults With Significant Cognitive Disabilities

Paris DePaepe
Southwest Missouri State University, Springfield, MO

Kathleen Feeley
Long Island University, Southampton, NY

Lisa A. Wood
Southwest Missouri State University, Springfield, MO

Adults who use augmentative and alternative communication (AAC) may include individuals who experience severe communication disorders throughout their lives. The population of adults with developmental disabilities would include persons who have a mental or physical disability (or combination of both), that occurred before the individual turned 22, with the condition causing significant limitations in at least three areas of life functioning (i.e., communication, mobility, self care, learning, self-direction and sufficiency, independent living; Developmental Disabilities Assistance and Bill of Rights Act of 1990 as cited by McLaughlin & Wehman, 1996). These adults may have the primary disabilities of mental retardation, cerebral palsy, or autism. Although adults with developmental disabilities are a very diverse group, this paper will focus on AAC considerations and issues related to individuals with significant cognitive disabilities.

Kangas and Lloyd (1988) strongly advocated the appropriateness of AAC for individuals with significant cognitive disabilities, and, over the past two decades, AAC services have been increasingly provided to these individuals. However, some of these adults still may not have access to the recent advances in technology and best practices in this area. Refer to McLean and colleagues (2001) for related information providing an update on the work of the National Joint Committee for the Communication Needs of Persons with Severe Disabilities regarding eligibility for services for these individuals.

Paul (2001) described how a system approach to language intervention would apply to individuals with severe disabilities. The individual with severe disabilities is not the sole focus of the intervention; the environment, and communication partners must also be considered. In the present article, considerations relevant to the AAC needs of adults with severe cognitive disabilities will be examined. These include, in part, the primary mode of communication and the intelligibility of the current communication system as well as the roles and responsibilities of interventionists and communication partners. Additionally, as some individuals with significant cognitive disabilities display challenging behavior (e.g., yelling) that serves communicative functions, functional assessment, and functional communication training are overviewed. Finally, issues related to vocabulary selection, transition, and literacy skills for these individuals are discussed.

Communication Modalities and Intervention Strategies

When selecting AAC systems for adults with cognitive disabilities, it is essential to consider all appropriate modes of communication, including gestural, graphic, and verbal, and to acknowledge that AAC communi-

cation, like all communication, is multimodal. With use of each of these modalities, one should recognize the importance of the communication partner as well as the necessary environmental supports that, in combination, enable individuals with severe disabilities to reach their maximal potential. Adults with significant developmental disabilities may display cognitive and language skills similar to those of beginning communicators. As a result, such individuals may warrant the use of nonsymbolic communication systems, including gestures and body movements. For example, an individual may greet communication partners by smiling and establishing eye contact. In this scenario, the role of the communication partner may be to acknowledge and respond to these nonsymbolic communication behaviors. See Beukelman and Mirenda (1998), who describe types of approaches that place an emphasis on the role of the communication partner to provide opportunities for communication and to respond to nonsymbolic messages.

In contrast, for individuals beginning to use symbolic means of communication, there are options including unaided symbols (e.g., manual signs) and aided symbols such as tangible objects, photographs, and line drawings. Beukelman and Mirenda (1998) provide a review of AAC symbols and research investigating the learnability of symbol sets and variation in learnability for individuals with severe disabilities. AAC graphic systems, such as line drawn symbols and photographs, can be used with communication boards, communication books, and wallets. For example, an individual may use a communication board to order food at a fast food restaurant. In this example, the role of the interventionists would be to support the use of the AAC system by ensuring access to the communication board at the restaurant and providing the individual with the opportunity to choose and request desired items. Although, many of the resources for implementing graphic symbol options are geared toward younger children, Elder and Goossens (1996), provide a number of intervention ideas and strategies for adolescents and adults with moderate to severe developmental disabilities.

Digitized switches and devices that provide voice output are also an option for adults with severe cognitive disabilities. These systems require recording and programming on the part of communication partners. For example, an individual who is capable of activating a single switch may have multiple messages programmed into a digitized device. With specific devices, each cell on the device might have a corresponding switch connection. Interventionists would provide support by recording appropriate messages on the device, placing the appropriate corresponding symbol on a switch, and connecting a switch to the appropriate outlet for a selected message. Numerous companies sell switches, devices, and related materials for such AAC interventions.

Some individuals with significant cognitive disabilities may use verbalizations as their primary mode of communication. However, these individuals may not be intelligible to unfamiliar communication partners. For these individuals, a simple AAC system can be developed and utilized to augment their existing system, resulting in increased intelligibility. In some instances, a traditional system, such as a book, board, or wallet, may be utilized with graphic symbols present. As the individual is engaged in a communicative exchange and a communication breakdown occurs (that is, the listener does not understand the verbalization), the AAC user may refer to his or her system and point to the corresponding symbol to assist in repairing the breakdown.

Another application of AAC for individuals who use verbalizations as a primary mode of communication is the use of graphic symbols as a means to orient the communication partners to the topic of conversation in order to increase the intelligibility of the message (Dowden, 1997). For example, if the listener is informed that the topic of conversation is baseball, he/she is more likely to understand the verbalizations emitted within the communicative exchange. For some individuals, the AAC system utilized may not take the form of a traditional system (e.g., communication boards, wallets, manual signs). Instead, a key chain, a logo on a jacket, T-shirt, *or* baseball cap, or a charm on a bracelet may be enough to reveal to the listener the context of the individual's conversation. For example, a young man whose favorite baseball team is the New York Yankees may wear a baseball cap with the corresponding logo. As he is about to engage his communicative partner in a conversation about baseball, he may gesture towards the logo on his hat. This informs the partner of the topic of the conversation, thus enhancing the intelligibility of the message in a natural context. This has been referred to as comprehensibility by Yorkston, Strand, and Kennedy (as cited by Beukelman & Mirenda, 1998). The use of such supplemental strategies with adults with severe communication disorders has been overviewed by Hustad and Beukelman (1999).

It is important to consider that the symbols utilized within these systems are likely to change as individuals' experiences and interests change. For example, the individual previously described may have recently acquired employment at a local discount department store. As a result, a T-shirt with the store's logo may now be used as a cue to the listener. For individuals who have broader communicative repertoires, a number of "symbols" could be accessible simultaneously. This may take the form of key chains attached to a backpack, or patches or buttons attached to a jacket. Refer to Dowden (1997) and Hustad, Morehouse, and Gutmann (2001)

who provide guidelines for determining the need for AAC systems in varying contexts as well as supplementation strategies for individuals who have severe speech impairments.

Communicative Functions of Challenging Behavior

Various AAC interventions utilizing different communication modalities have been described for use with adults with severe disabilities who have limited communication skills. As noted earlier, some of these individuals may also display challenging behavior (e.g., yelling, stereotypies) that interfere with instruction and skill acquisition and limit community integration (Doss & Reichle, 1991; Reichle, 2001). For these individuals, AAC interventions represent a means by which the challenging behavior may be replaced by a more appropriate communication response.

Carr and Durand (1985a) presented a social-communicative hypothesis to explain the emergence and maintenance of such challenging behavior, asserting that such behavior may be initially acquired and/or maintained by the social consequences which they produce. That is, challenging behavior may be emitted as nonverbal forms of communication that serve to communicate social functions for the individual (i.e., escaping aversive situations, obtaining attention, or tangibles). For example, yelling may function as an attention getting strategy in instances where the behavior is consistently followed with the consoling actions or attention of others. Similarly, an individual's object throwing following requests to complete work tasks may be consistently followed by the withdrawal of the task demand. In this instance, the individual's object throwing would serve an escape function in that it allowed the person to escape the task demand. In each case, the challenging behaviors would be viewed as socially motivated in that the consequences obtained require the mediation of another individual (Doss & Reichle, 1991). In order to develop appropriate interventions to treat challenging behavior of adults with significant cognitive disabilities, an identification of the function served by the problem behavior will be critical.

Functional Assessment

Functional assessments of challenging behavior are conducted to identify the variables (e.g., antecedent and consequent events) maintaining the behavior (Dropik & Reichle, 2001; Lennox & Miltenberger, 1989; McEvoy & Neilsen, 2001) and guide the development of effective, functional interventions. Iwata, Pace, Kalsher, Cowdery, and Cataldo (1990) asserted that isolating the variables maintaining a challenging behavior will best facilitate the "matching" of interventions to the function(s) served by the behavior. This should consequently lead to the selection of functionally equivalent responses (i.e., behaviors that serve the same function as the target behaviors) to be taught as replacements for the challenging behavior. When conducting AAC evaluations of adults with significant cognitive disabilities who display challenging behavior, functional assessment strategies must be utilized in order identify the function(s) served. If the challenging behavior displayed is determined to have a social function (i.e., escape, obtain attention, obtain tangibles), then an intervention can be designed to teach the individual a more appropriate communicative response to obtain the same function (e.g., teach an individual who has attention motivated yelling to request attention using manual sign language, a communication symbol, or voice output system).

Numerous strategies have been described for use in the functional assessment of challenging behavior of individuals with severe disabilities (Lennox & Milten-berger, 1989; Mace & Shea, 1990; McEvoy & Neilsen, 2001; O'Neill et al., 1997). These include, in part, informal and structured interviews, rating scales and questionnaires, direct observations in naturalistic environments using Antecedent-Behavior-Consequence (A-B-C) analyses, as well as formal functional analyses. See Donnellan, Mirenda, Mesaros, and Fassbender (1984) for a checklist that can be used to assess communicative functions served by challenging behavior as well as O'Neill and colleagues' (1997) Functional Assessment Interview Form, which can help identify variables that are predictive of challenging behavior and identify the possible function(s) served by the behaviors. The Motivational Assessment Scale (MAS) is also available for use in identifying four classes of functions (i.e., attention, sensory consequences, escape from aversive situations, and tangibles) of challenging behavior (Durand, 1988).

The utilization of A-B-C analyses, in which the behavior and related antecedents and consequences are documented and examined for patterns of relationships, may also assist in the identification of variables related to challenging behavior. The Functional Assessment Observation Form (O'Neill et al., 1997) allows for the collection of direct observations of the targeted behavior in the learner's natural environments. Finally, formal functional analyses or experimental manipulations of environmental variables designed to directly assess the functional relationships between the variables and behavior have been extensively reported in the professional literature. See Carr and Durand (1985b); Day, Rea, Schussler, Larsen, and Johnson (1988); and Durand and Crimmins (1987) for examples of formal functional analyses.

Functional Communication Training

After identifying a hypothesized "function" that is served by a chal-

lenging behavior through the use of functional assessment, appropriate interventions can be developed. Carr (1988), Carr and Durand (1985b), and Durand (1986) assert that challenging behavior may be most effectively eliminated by replacing it with a *functionally equivalent repertoire.* For example, an adult with limited oral communication abilities who hits others to escape ongoing work tasks might be taught to touch a symbol to request a break from the task. In this situation, hitting others and touching the symbol would be seen as functionally equivalent in that each response would be maintained by the same class of reinforcers (e.g., escape from the demands). Functional communication training, where an individual is taught a more appropriate communication response that serves the same communicative function as the challenging behavior he or she displays, has been successful in reducing the challenging behavior displayed by individuals with severe disabilities (Mirenda, 1997). Mirenda's (1997) review of 21 functional communication training studies described cases where challenging behavior (maintained by functions such as escape, attention, etc.) was significantly reduced through the teaching of functionally alternative or equivalent communication behaviors.

Clearly, research has indicated that challenging behavior of both adults and children can be reduced through the provision of functional communication training which in includes AAC interventions. Readers are encouraged to refer to O'Neill and colleagues' (1997) comprehensive description of functional assessment procedures which can be used to assess the challenging behavior of adults with significant cognitive disabilities. Finally, see Reichle, York, and Sigafoos (1991) and Reichle and Wacker (1993) for detailed discussions related to developing communication-based interventions to address such challenging behavior.

Additional Issues for Adults With Significant Disabilities

The lifestyles and, consequently, the participation needs of individuals with severe disabilities have changed in recent years. Individuals with significant disabilities who previously resided in state institutions or intermediate care facilities for persons with mental retardation may now be residing in group homes and assisted living settings. Although many individuals still work in sheltered workshops, supported competitive employment opportunities are increasingly being made available to individuals with more significant disabilities. The settings of residential, vocational, and social events will of course influence the participation needs of the individual using AAC (Beukelman & Mirenda, 1998). Expectations and opportunities within sheltered workshops will most assuredly differ from those within competitive employment (Mirenda, 1996). It is essential to analyze the long-term communication needs of individuals with significant cognitive disabilities. Consequently, AAC team members, including speech-language pathologists, need to be active participants in the transition process. This may include having the speech-language pathologist collaborate with job coaches and other appropriate personnel to determine the individual's communication needs and participation expectations within an anticipated environment (e.g., workplace, home). As adolescents progress through their secondary education, they should have an increasing voice in educational, social, vocational, and housing decisions to help them transition to adulthood. An AAC device may be programmed so that the individual using AAC can provide information regarding preferred leisure activities, living situations, and employment opportunities.

Appropriate vocabulary for adults who use AAC would be reflective of age appropriate materials, activities, and life experiences. Providing individuals with messages that allow them to interact in conversations, participate, learn, establish relationships, and meet their needs is vital to successful AAC intervention (Beukelman & Mirenda, 1998). Morrow, Mirenda, Beukelman, and Yorkston (1993) discussed the importance of using multiple communication partners in vocabulary selection. When examining vocabulary selection for adults with cognitive disabilities, multiple communication partners must be taken into consideration. Communication partners might include job coaches, employers, support staff, family members, members of the community, and friends. See Collier (2000), who provides vocabulary information appropriate for adults who use AAC.

Members of the medical community are also likely to be communicative partners, especially as one considers the effects of the aging process on the person's physical and emotional needs. In order to have successful communicative interactions with these partners, specialized vocabulary will need to be identified and incorporated into their AAC system. This should assist individuals with disabilities in accessing appropriate medical screenings and treatments. For specific information regarding strategies for medical teams interacting with adults with developmental disabilities, see Ball (2002).

In addition to vocabulary concerns, issues regarding literacy for individuals with severe disabilities have been raised. In 1991 Koppenhaver, Coleman, Kalman, and Yoder brought to the forefront issues regarding the lack of literacy experiences and instruction for children with developmental disabilities and the need to provide literacy opportunities to diverse groups of learners. In the past decade, increased literacy experiences have been generated for adults with cognitive impairments, some of whom use AAC, but do not have con-

ventional literacy skills. These activities include the use of intervention materials and software programs that use graphic symbols to provide functional literacy experiences. Software programs are now available that allow individuals who do not have conventional literacy skills to use graphic symbols to adapt written information. These adults may thus create journals about daily activities to assist them in documenting and sharing information with others. For example, an individual may create a story regarding the week's events in his or her home or workplace using graphic symbols. This story could then be used by the individual to share with various communication partners.

Adults with significant cognitive disabilities represent a unique population of AAC users. Appropriate AAC assessment and implementation of AAC interventions may assist these individuals in participating more fully in communicative interactions with numerous partners. Additionally, for some individuals, appropriate AAC interventions may be associated with decreases in challenging behavior. In order to maximize these positive outcomes, it will be important that professionals and families strive to provide optimal communication opportunities for these individuals and understand the unique AAC considerations for this population of individuals.

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Continuing Education Questions

1. Important considerations for adults with developmental disabilities using AAC include

a. symbol selection.

b. transition planning.

c. literacy experiences and intervention.

d. understanding of normal sensory changes with aging.

e. all of the above.

2. Which of the following is not true of applications of AAC systems with individuals with severe disabilities who are primarily verbal mode communicators?

a. The AAC system can be used as a means of clarifying an utterance that was not intelligible from the listener's perspective.

b. The AAC system can be used at the beginning of the conversation to make clear the topic of conversation.

c. The AAC system must consist of a formal set of symbols in order for it to be applicable.

d. The vocabulary in AAC systems is likely to change over time.

3. Challenging behavior can serve what social communicative functions for an individual?

a. Escape and attention

b. Control

c. Tangibles

d. a and b

e. a and c

4. A new behavior that allows an individual to obtain the same function currently obtained by a challenging behavior would be referred to as a

a. reinforcement behavior.

b. functionally equivalent behavior.

c. communicative response behavior.

d. conditioned behavior.