A Preliminary Model for Selecting Aphasia Treatment Type Based on Cognitive Profile

The implementation of evidence-based practice relies on organizational and systemic factors, such as personnel selection, training, and management support for evidence-based programs (Fixsen et al, 2005). At present, implementation of evidence-based practices in aphasia rehabilitation is dependent on the individual clinician's knowledge of evidence-based treatments, knowledge of candidacy for various evidence-based treatments, and knowledge and skill in applying the procedures of the treatments. One way in which we can begin to aid clinicians to implement evidence-based practices is to provide clinical decision-making models that provide an efficient means for selecting from a menu of evidence-based practices.

In this paper, a preliminary model designed to aid clinical decision-making in aphasia treatment is presented.

Development and Rationale for the Model

The model (see Figure) was developed based on a review of the literature, and adheres to principles of evidence-based practice.

Decision Point 1: Better or Poorer Cognition

The cognitive abilities of adults with aphasia are an important aspect of overall treatment success, and thus are one of the decision points in this decision-making model. Cognitive impairments, generally, are associated with poorer rehabilitation outcome (Donovan et al, 2008). Executive function is one of the most prevalent cognitive impairments after stroke, affecting approximately 30% of patients (Nys et al, 2005a; Nys et al, 2005b). Poorer executive functions after aphasia have been associated with more treatment time required to achieve a pre-established criterion, and lower maintenance as measured by performance at follow-up after treatment (Hinckley, Patterson & Carr, 2001). Executive functions, but not language abilities, predict success in the transactional aspects of conversation in aphasia (Ramsberger, 2005), treatment success in using a computerized augmentative system in aphasia (Nicholas, Sinotte, & Helm-Estabrooks, 2005), and treatment outcome in either errorful or errorless naming treatment (Fillingham, Sage, & Lambon-Ralph, 2006). In addition, many aphasia treatment approaches focus on the training and usage of various communication strategies, and impaired executive functions associated with strategy generation and usage may impede the success of this type of treatment (Keil & Kaszniak, 2002)

Decision Point 2: Identify Functional Contexts

Prioritizing functional abilities and contexts in rehabilitation has acquired so much evidentiary support that it appears in multiple national practice guidelines in stroke rehabilitation (e.g., Duncan et al, 2005).

Decision Point 3: Identify Strategies or Impairments

Once the personally relevant functional contexts are identified, the relevant strategies to be used in those contexts, or the impairments that present barriers to success in those contexts should be identified, consistent with numerous treatment guidelines (e.g., WHO, 2001).

Decision Point 4: Evidence-Based Treatment Menu

The critical links between treatment type and cognitive abilities are embedded primarily in this step of the model. Using available practice guidelines, systematic reviews, and other reviews of the literature, an initial list of evidence-supported aphasia treatments was created.

The criterion for considering an aphasia treatment evidence-supported was that there was a published review or similar publication demonstrating Class II evidence or greater, and that there were a sufficient number of participants across studies to acknowledge concerns about validity.

The resulting list of treatments was then classified based on their dependence on training strategy usage for a successful treatment outcome. So, for example, PACE (Davis & Wilcox, 1985; Davis, 2005) is primarily used to train the use of various communication strategies that are effective for the person with aphasia. In contrast, errorless learning (e.g., Fillingham, Sage, & Lambon-Ralph, 2006) depends on procedural learning and memory systems that do not require the explicit knowledge of a strategy or its conscious deployment.

Two Case Examples

As a preliminary assessment of the model, two cases are described. Both individuals had experienced a single left occlusive CVA resulting in a mild-to-moderate fluent aphasia and no hemiparesis. Both individuals were monolingual English speakers with no other history of previous neurologic or psychiatric disorder. Both were married to supportive spouses and lived at home at the time of the study.

Case 1

John was a 44-year old married gentleman who had been employed as a computer professional prior to his stroke 9 months prior to the study. John was diagnosed with transcortical sensory aphasia based on his profile on the *Boston Diagnostic Aphasia Examination* (Goodglass & Kaplan, 1983). Additional language and cognitive assessment data are displayed in the Table.

John was enrolled in an intensive aphasia treatment program where he both impairment-focused and activity-focused treatments were administered simultaneously. A notable outcome of John’s intervention was the rapidity with which he learned to use an assistive device, requiring only minimal instruction on the part of the clinician and approximately 5 days with the device before he began identifying novel ways in which to use it independently. His ability to store, retrieve, and use the strategies for using the device’s functions as well as ways to use the device in functional environments was excellent.

Case 2

Helen was a 56-year old married woman who had just retired from a position as a school teacher at the time of her stroke 15 months prior to the study. Helen was diagnosed with an anomic aphasia based on his profile on the *Boston Diagnostic Aphasia Examination* (Goodglass & Kaplan, 1983). Additional language and cognitive assessment data are shown in the Table.

Helen was enrolled in an intensive treatment program that provided both impairment-focused and activity-focused interventions. Because she was embarrassed by her inability to retrieve her neighbors’ names, one focus of intervention was the development of a compensatory strategy for recalling and using her neighbors’ names. With the reinforcement and assistance of her husband, Helen leanred to use this strategy independently and consistently after approximately 3 weeks of training. However, she was unable to identify other contexts to which she might transfer this same strategy.

With structured training, she was able to transfer the use of this strategy to calling the names of friends at a club meeting.

Discussion and Future Directions

These two case examples illustrate the possible use of this clinical decision-making model for aphasia treatment selection based on cognitive ability, and specifically, executive function. John demonstrated quite good executive function and other cognitive functions based on pre-test measures, and his ability to quickly and readily learn a strategy-dependent tool (assistive device) and innovate applications for it corresponded to this high executive function. Helen, whose language impairment was milder based on structured language testing, displayed quite impaired executive function and memory relative to John. Although she could learn a strategy, it required more treatment time. She also failed to spontaneously generalize the strategy to similar, high-transfer situations and required specific training to do so. These two cases illustrate the different patterns in treatment relative to cognitive profiles. The successful treatments were consistent with the decision points in the model. John benefit from learning and using strategies independently; Helen required context-specific training in order to use any strategy.

The model should be systematically and thoroughly tested. The next step will be to apply the model to a series of participants with aphasia with better or poorer cognitive profiles, and to observe particular treatment outcomes. It will be critical for us to develop clinical decision-making models that are based on current best evidence, but that are accessible to clinicians, to allow for implementation.

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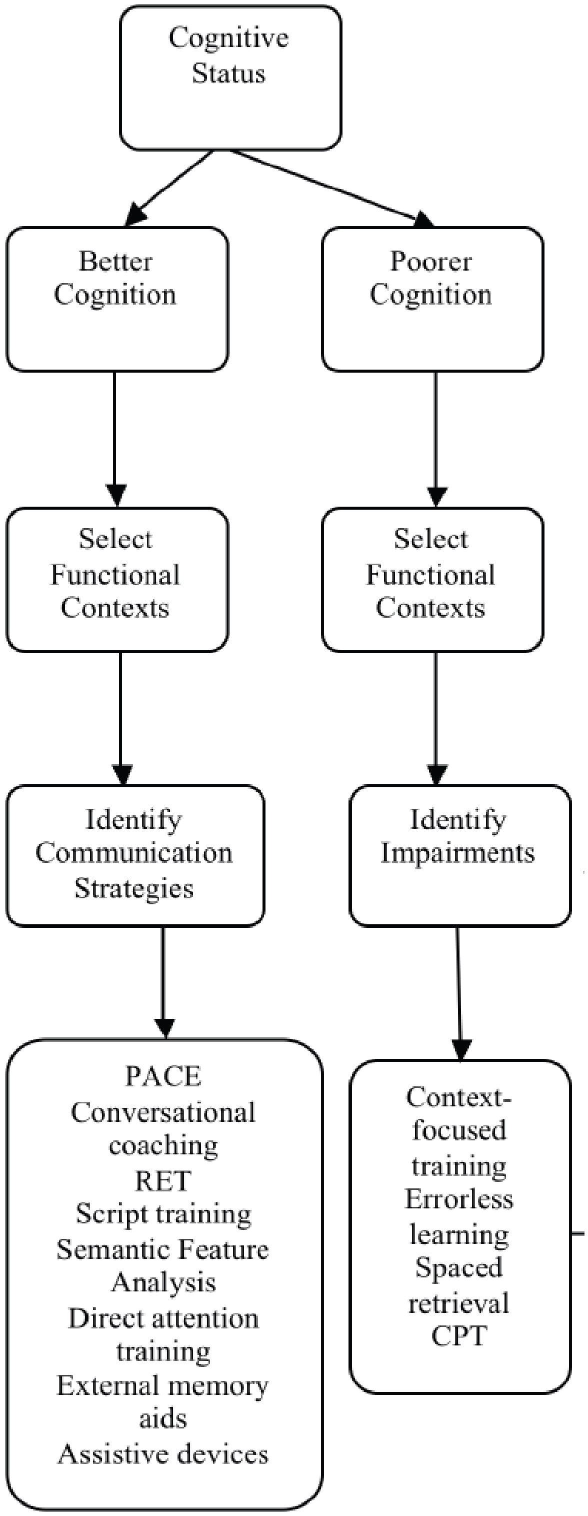

Figure. Preliminary clinical decision-making model for treatment choice in aphasia based on cognitive abilities.

Assessment measure	John	Helen
BDAE Profile	Transcortical Sensory Aphasia	Anomic Aphasia
BDAE Severity Rating	3/5	4/5
Auditory sentence-picture matching (*PALPA*)	70%	90%
Boston Naming Test	10/60 (18%)	15/60 (25%)
CADL-2	98%	98%
Visual cancellation	100%	100%
Object recognition subtest of *RBMT* (immed)	100%	55%
Face recognition subtest of the *RBMT* (immed)	100%	100%
Visual perception (*Developmental Visual Perception Test*)	100%	90%
Raven's Coloured Progressive Matrices	97%	92%
Wisconsin Card Sort	5 categories learned	0 categories learned

Table. Pretest language and cognitive assessment data for the two cases.