Evidence Based and Person-Centered Treatment Methods for AOS

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Learning Objectives

❖ Participants will be able to identify evidenced based treatment methods for acquired apraxia of speech

❖ Participants will be able to describe identified evidenced based treatments for acquired apraxia of speech

❖ Participants will be able to apply identified treatments for acquired apraxia of speech within a clinical setting utilizing a person-centered approach

Behavioral Management Approaches

Articulatory-Kinematic Approaches

Articulatory-Kinematic (A-K) approaches

1. **Sound Production Treatment**

   a. **Efficacy data are more adequate for SPT than for any other tx for AOS**

   b. Can yield improvements in AOS speakers with varying severity, chronicity, age, and accompanying aphasia severity

   c. Flexible, but theme of orderly progression, minimal contrasts, integral stimulation, modeling, phonetic placement cues, and feedback are constant

 Duffy, J. R. (2020); Wambaugh & Mauszycki (2010); Wambaugh et al., (2020)

Articulatory-Kinematic (A-K) approaches

1. Sound Production Treatment

Step 1   Produce a target item containing a target sound after a model (e.g., "say, sit")

        Step 1.1a.: If correct, pt. repeats target 5x, then goes to next target item

        Step 1.1b.: If incorrect, SLP presents minimal pair item (e.g., "kit")

            Step 1.1b.1: If correct, return to target word in step 2

            Step 1.1b.2: If incorrect, work on production with integral stimulation up to 3x, then go to step 2 with target word

Step 2   SLP shows printed letter representing target sound, says target word, & requests repetition

        Step 2.2a: If correct, pt. repeats target 5x, then goes to next item

        Step 2.2b: If incorrect, go to step 3

 Duffy, J. R. (2020); Wambaugh & Mauszycki (2010); Wambaugh et al., (2020)

Articulatory-Kinematic (A-K) approaches

1. Sound Production Treatment

Step 3 SLP uses integral stimulation to elicit target word, up to 3x
          Step 3.3a: If correct, pt. repeats target 5x, then goes to next item
          Step 3.3b: If incorrect, go to step 4

Step 4 SLP provides articulatory placement cues, then requests production after providing integral stimulation
          Step 4.4a: If correct, pt. repeats target 5x, then goes to next item
          Step 4.4b: If incorrect, go to next item

 Duffy, J. R. (2020); Wambaugh & Mauszycki (2010); Wambaugh et al., (2020)

Articulatory-Kinematic (A-K) approaches

2. The 8-Step Integral Stimulation Continuum

a. Emphasis on task continua to ensure high levels of success, intensive/extensive drill, **meaningful** communication as soon as possible, self-correction, & the importance of selecting and ordering stimuli as a function of observed phonetic breakdowns.

b. Integral stimulation is stressed in the early steps of tx (watch me, listen to me, say it with me)

   i. Phonetic derivation and placement techniques are used when integral stimulation fails

c. Overall theme: auditory and visual stimulus prompts are initially maximal and gradually are faded; response requirements are gradually increased

Duffy, J. R. (2020)

Articulatory-Kinematic (A-K) approaches

2. The 8-Step Integral Stimulation Continuum

Step 1   Integral stimulation: clinician presents target, pt. imitates while watching & listening to the SLP's simultaneous production

Step 2   Same as Step 1: but, pt.'s response is delayed & SLP mimes the target during the pt.'s production (simultaneous auditory cue is faded)

Step 3   Integral stimulation: followed by imitation without any simultaneous cues from the SLP

Step 4   Integral stimulation: with several successive productions without any intervening stimuli or simultaneous cues

Step 5   Written targets: presented without auditory or visual cues, followed by patient production while looking at the written target

Step 6   Written targets: with delayed production after removal of the written stimuli

Step 7   Response elicited: with an appropriate question

Step 8   Response elicited: in an appropriate role-playing situation

9   Duffy, J. R. (2020).

Articulatory-Kinematic (A-K) approaches

3. Motor Learning Guide Treatment

a. Several case studies have shown speech gains in response (some of which used telehealth and/or a considerable amount of computer guided self practice)

b. High emphasis placed on functionality of phrases when selecting targets (e.g., Johnson, R. K., et al., (2018))

c. Organized to increase self-awareness of errors and promote development of strategies to correct them

 Duffy, J. R. (2020); Johnson, R. K. (2018); Johnson, R. K., et al., (2018); Kim, I. S., & Seo, I. H. (2011)

Articulatory-Kinematic (A-K) approaches

3. Motor Learning Guide Treatment

- ❖ Practice of randomly organized words/phrases in varying contexts with delays between each production (~3-4 sec.)
- ❖ During delays, pt. judges the adequacy of their production and make adjustments before their next attempts
- ❖ Delayed knowledge of results feedback provided by SLP after ~ every 3rd production

11 Duffy, J. R. (2020); Johnson, R. K. (2018); Johnson, R. K., et al., (2018); Kim, I. S., & Seo, I. H. (2011)

Articulatory-Kinematic (A-K) approaches

Differences Btwn. MLG & Traditional A-K Approaches

MLG	Traditional A-K
Imposed 2-4 sec. pause time in between productions	Serial, repeated productions
Delayed feedback provided by SLP after ~ every 3rd production	Higher frequency of feedback provided
Knowledge of results feedback (e.g., the 2nd production was closest); more general statements	Knowledge of performance feedback w/ specific statements (e.g., articulatory placement cues; "round your lips more")

Articulatory-Kinematic (A-K) approaches

4. PROMPT

❖ Use of tactile cues to provide touch pressure, kinesthetic, & proprioceptive cues to facilitate speech production
  ➢ Tactile-kinesthetic input is typically paired with auditory and visual stimulation

❖ Likely good for pt.'s w/ chronic, severe AOS who have limited speech and for whom traditional methods have failed

❖ Therapist training needed for correct application due to complexity of cues provided

 Bose, A., et al., (2001); Duffy, J. R. (2020)

Additional/Adjunctive A-K Approaches/Techniques

Additional A-K approaches & techniques

1. Multiple syllable utterance level techniques

❖ Using phonetic contrasts may be useful for some pt.s to establish articulatory control across syllables/ across multiple syllables

➢ Contrasts may be similar to those used in SPT (minimal differences in voicing, placement, manner, vowels, consonant singletons vs. clusters, etc.)

Duffy, J. R. (2020)

Additional A-K approaches & techniques

2. Sound, syllable, and word level approaches & techniques

❖ [Phonomotor tx](#) → individuals w/ severe AOS & concomitant aphasia; highly systematic

❖ Other techniques for sound level: push on abdomen; reflexive yawn/cough; hand placement on larynx and instructing to say "ah;" pressure on or lowering of thyroid cartilage

❖ Mental practice/ implicit phoneme manipulation

❖ Cueing strategies

❖ Response parameters

 Bislick et al., (2014); Bislick (2020); Duffy, J. R. (2020); Farias et al., (2014)

Rate/Rhythm Approaches

Rate &/or rhythm approaches

1. Metronome & Pacing Techniques

❖ May use: metronome, pacing board, hand/finger tapping or counting etc.; vowel/word prolongations

2. Metrical Pacing Therapy

❖ Uses auditory rhythmic templates to guide utterance production

3. Speech-Music Therapy for Aphasia

❖ Improved articulation & communication in daily life

❖ Reductions in aphasia severity seen in 4 out of 5 participants

❖ May be effective treatment for AOS

 Duffy, J. R. (2020); Hurkmans et al., (2015)

Rate &/or rhythm approaches

4. Melodic Intonation Therapy

❖ Systematic and structured therapy technique originally developed for severe nonfluent aphasia pts.

❖ Requires departure from a normal speaking mode, so use of other speech treatments concurrently is not recommended

❖ Good candidates→ Good verbal comprehension, preserved self-criticism, a paucity of spontaneous verbal output, and "non-fluent" speech characteristics

 Duffy, J. R. (2020); Mauszycki et al., (2016); Zumbansen et al., (2014)

Additional Approaches/Techniques

Combined Aphasia and Apraxia of Speech Treatment (CAAST)

❖ Relatively new approach; research is ongoing
❖ Combination of *M-RET & *SPT
❖ Increases in production of accurate content in narrative discourse, sound production accuracy & speech intelligibility reported; generalization across contexts observed
❖ Also seems to improve morphosyntax, lexical diversity & novelty of content
❖ Evidence of similar results when delivered remotely

21 Bunker et al., (2018); Kallhoff et al., (2023); Wambaugh et al.,(2014 & 2018)

Combined Aphasia and Apraxia of Speech Treatment (CAAST)

Intro Present sentence frame one time at start of session with directives seen in Supplemental Appendix E within Wambaugh et al., 2018

Step 1 Present each of the 8 treatment pictures one at a time in random order along with one or more of the specified prompts (e.g., "Tell me about this picture")

Step 1.1a.: Appropriate response (any utterance related to picture)→ Go to Step 2

Step 1.1b: Incorrect response→ Verbally provide 2 response examples & request a response;

Step 1.1b.1: Appropriate response given→ Go to Step 2

Step 1.1b.2: Incorrect response→ Provide 1-word model (i.e. noun or verb related to picture) & request response

Step 1.1b.2a: Appropriate response→ Go to Step 2

Step 1.1b.2b: Incorrect response→ Use integral stimulation with a max of 4 attempts to elicit the noun or verb modeled; Appropriate response→ Go to Step 2; Incorrect response→ Present the next item

Step 2 Repeat pt.'s production with feedback provided (e.g., "Man...good"); Write pt.'s response under correct part of the sentence frame following pt.'s direction (e.g., "Man can be the doer or theme... where should we put it?"); If pt. gives appropriate response→ follow their directive; Incorrect or no response→ select yourself and move on

Combined Aphasia and Apraxia of Speech Treatment (CAAST)

Step 3   SLP asks a question to elicit another element of the frame
Step 3.1a.: Appropriate response→ Go to Step 4
Step 3.1b: Incorrect response→ Verbally provide 2 response examples & request a response;
    Step 3.1b.1: Appropriate response given→ Go to Step 4
    Step 3.1b.2: Incorrect response→ Provide 1-word model (i.e. noun or verb related to picture) & request response
        Step 3.1b.2a: Appropriate response→ Go to Step 4
        Step 3.1b.2b: Incorrect response→ Use integral stimulation with a max of 4 attempts to elicit the noun or verb modeled;
        Appropriate response→ Go to Step 4;
        Incorrect response→ Present the next item

Step 4   SLP reinforces pt.'s production in Step 3, prints response in the frame, and models a phrase/sentence that combines the productions from Steps 1 & 3 (e.g., "Right…shaves. Man shaves"); Go to Step 5

Combined Aphasia and Apraxia of Speech Treatment (CAAST)

Step 5 SLP models the combine production again & requests repetition

Step 5.1a.: Response has all target words produced w/ correct articulation→ request 3 repetitions w/ integral stimulation used as needed→ Go to Step 6

Step 5.1b: Incorrect response→ Underline sounds in error on frame; Say "Let's think about these sounds and try again."; Model sentence & request response

Step 5.1b.1: Correct response→ request 3 reps→ Go to Step 6

Step 3.1b.2: Incorrect response→ Give feedback; "Let's try again;" use integral stimulation up to 3x for each target sound in each word; "Let's try the entire phrase again;" Request 3 reps w/ integral stimulation as needed; Go to Step 6

Step 3.1b.2a: Incorrect response→ Give articulatory placement for all sounds in error (up to 3 sounds) while referring to the frame; try entire phrase again w/ integral stimulation for 3 reps

Step 3.1b.3a: Correct→ request 3 reps→ Go to Step 6

Step 3.1b.3b: Incorrect→ give feedback on target sounds→ Go to Step 6

Step 6 SLP removes the picture→ waits ~5 sec.→ returns picture→ ask pt. to describe it again

Step 6.1a.: Correct→ reinforce→ Go to next picture

Step 6.1b.: Partially correct→ assist w/ integral stimulation

Step 6.1c.: Incorrect→ model & request repetition using integral stimulation

ActionSC Treatment

❖ Research is ongoing; needs more replication & continued development for later stages of therapy
  ➤ Based on the 3 principles Optimal Theory of Motor Learning
    ▪ Expected performance competence
    ▪ Learner autonomy
    ▪ External attentional focus
❖ **VERY person centered**
  ➤ Pt. has an active role in: evaluating their own performance, administering/adjusting cues, & organizing their own home practice

 Harmon et al., (2018); Duffy, J. R. (2020); Haley et al., (2021; Harmon et al., (2017))

ActionSC Treatment

- ❖ Single subject case study (Haley et al., 2021)
  - ➢ "Moderate AOS & Nonfluent aphasia"
  - ➢ Pt. met w/ clinicians 2x per week
    - ■ Reviewed practice strategies
    - ■ Developed/adjusted self-modeled video cues
    - ■ Worked on pt.'s speech directly
    - ■ Progress monitoring
  - ➢ Results→ Autonomy supportive & confidence building therapy format may be feasible & effective

Haley et al., (2021)

ActionSC Treatment

Intro Pt. told she will be in charge of her own practice and that, though the SLP would be available to provide various tools that could help make speaking easier, she would make the majority of the decisions regarding treatment; Pt. given a specially developed app on a tablet for practice

Session 1 Video cues recorded for the first 10 phrases treated in the 1st conversational topic selected by the pt. (e.g., movies). App provided 3 different video cue place holders to help the pt. produce the target by giving a model, tip, or hint while practicing

- Pt. was featured in most videos delivering the cues; Pt. decided how to make them most helpful
- Initial cues showed pt.'s face while they produced portions of the targets in unison with the SLP (these were modified as tx progressed)

Haley et al., (2021)

ActionSC Treatment

Subsequent Sessions   Followed similar format
- SLP reviewed practice log w/ pt. & discussed how practice unfolded since last visit
- Pt. guided SLP on what worked for them and challenges that occurred by demonstrating phrase productions and cues they utilized at home
- Pt. decided how many cues were recorded (up to max of 3) for each target, who participated in the video models, how many words to model, & how fast/clearly to speak
- Clinician made suggested but honored pt.'s beliefs on what would help
- Coaching format implemented; Pt. decided what was reviewed & in what order
- SLP responded to requests for assistance, encouraged more repetitions when the pt. determined they were successful & provided options for the next steps
- Intermittent general & specific feedback provided
- Pt. decided when productions were good enough, when they needed new video cues, help modifying cues, or strategies for making tasks more simple or challenging
- At the end of each session, SLP shuffled targets to make practice more flexible & a confirmed practice plan was established until the pt.'s next visit
- Once pt. began to produce some targets independently, a semi-structured dialogue was implemented at the end of sessions so the pt. could use the targets as she chose to

Haley et al., (2021)

Techniques for Non-Speaking/Severly Impaired Patients

Techniques for mute/severely impaired pts.

1. Automatic speech tasks
2. Carrier phrase completion
3. Pairing highly used symbolic gestures with its associated sound or word (e.g., waving + "hi"/"bye"; index finger on lips coupled with /sh/)
4. Social questions may elicit an automatic response
5. Nonspeech oromotor movements
6. Artificial larynx occasionally facilitates articulation or phonation in some mute apraxic pt.s

Duffy, J. R. (2020).

Making Therapy Person-Centered

Person-Centered Care

❖ Client & clinician determine priorities
❖ Client's priorities are primary focus of clinician's assessment
❖ Client & clinician set goals collaboratively
❖ Clinician selects treatment based on client's priorities & goals
❖ Have a communication plan in place

Hinckley, 2023

Factors to Consider During TX Planning

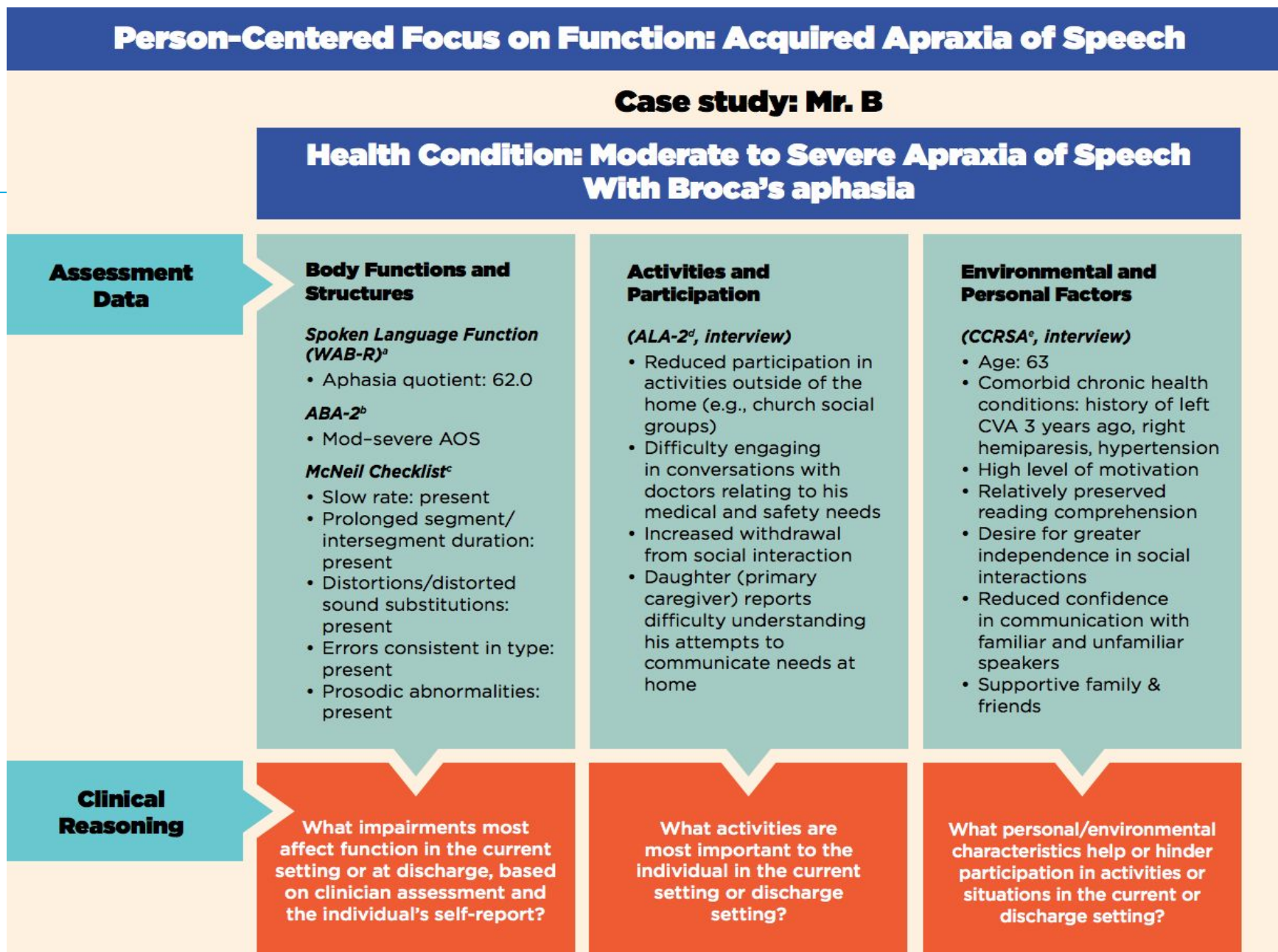| TABLE 16.1	Factors that influence management decision making and treatment duration
MEDICAL PROGNOSIS	Improvement or resolution Chronic Worsening Fluctuating
LIMITATIONS AND RESTRICTIONS OF FUNCTION	Activity limitations (disability) Participation restrictions (handicap) Environment (physical, social, attitudinal influences)
ENVIRONMENT AND COMMUNICATION PARTNERS	Environment (e.g., noise, distance, distractions) Partners (e.g., familiar/unfamiliar, number of listeners, cognitive and sensory problems, psychosocial relationships)
MOTIVATION AND NEEDS	Motivation to communicate and to improve communication Need to communicate, as influenced by multiple factors (e.g., personality; lifestyle; motor, sensory and cognitive status; general health; participation environments)
ASSOCIATED PROBLEMS	Motor Sensory (especially hearing loss) Language and cognition Psychosocial
HEALTH CARE SYSTEM	Access Setting (acute, acute rehabilitation, skilled nursing facility, nursing home, home) Cost, reimbursement, service coverage limits

Table taken from: Duffy, J. R. (2020)

Treatment Goals for AOS

❖ Should be person centered and functional
  ➢ Maximizes outcomes leading to functional improvements
  ➢ Increases motivation for participation
  ➢ Ensures the patient/family have a voice
  ➢ Demonstrates the value of skilled services

American Speech-Language-Hearing Association; Accessed 2024

Case Example

Person-Centered Focus on Function: Acquired Apraxia of Speech

Case study: Mr. B

Health Condition: Moderate to Severe Apraxia of Speech With Broca's aphasia

Assessment Data

Body Functions and Structures	Activities and Participation	Environmental and Personal Factors
Spoken Language Function (WAB-R)[a] • Aphasia quotient: 62.0 *ABA-2[b]* • Mod–severe AOS *McNeil Checklist[c]* • Slow rate: present • Prolonged segment/ intersegment duration: present • Distortions/distorted sound substitutions: present • Errors consistent in type: present • Prosodic abnormalities: present	*(ALA-2[d], interview)* • Reduced participation in activities outside of the home (e.g., church social groups) • Difficulty engaging in conversations with doctors relating to his medical and safety needs • Increased withdrawal from social interaction • Daughter (primary caregiver) reports difficulty understanding his attempts to communicate needs at home	*(CCRSA[e], interview)* • Age: 63 • Comorbid chronic health conditions: history of left CVA 3 years ago, right hemiparesis, hypertension • High level of motivation • Relatively preserved reading comprehension • Desire for greater independence in social interactions • Reduced confidence in communication with familiar and unfamiliar speakers • Supportive family & friends

Clinical Reasoning

What impairments most affect function in the current setting or at discharge, based on clinician assessment and the individual's self-report?	What activities are most important to the individual in the current setting or discharge setting?	What personal/environmental characteristics help or hinder participation in activities or situations in the current or discharge setting?

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Case Example

Goal Setting

Mr. B's Functional Goals

Long-Term Goal:

Mr. B will initiate communicative turns to participate in at least two community based activities of choice using customized scripts and gestures, as well as thematic vocabulary and picture lists with 90% success as measured by self and partner report.

Short-Term Goals:

- Mr. B will utilize 25 self-identified high-frequency words via verbal or nonverbal modalities with 90% consistency to improve communicative success when indicating home, community, medical and safety needs with familiar and unfamiliar speakers.
- Mr. B will utilize functional conversational scripts to effectively respond to questions from familiar and unfamiliar speakers relating to self and immediate needs with 90% accuracy with written cues.
- Mr. B will utilize augmentative methods (e.g., communication book and gestures) to expand on/supplement conversational scripts with no external cues in 90% of practice trials with familiar and unfamiliar speakers during treatment sessions.

[a] WAB-R: Western Aphasia Battery—Revised (Kertesz, 2006)
[b] ABA-2: Apraxia Battery for Adults—2nd edition (Dabul, 2000)
[c] McNeil Checklist (McNeil, Robin, & Schmidt, 1997)
[d] ALA-2: Assessment for Living with Aphasia—2nd edition (Kagan et al., 2007)
[e] CCRSA: Communication Confidence Rating Scale for Aphasia (Babbitt, Heinemann, Semik, & Cherney, 2011)

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For clinical and documentation questions, contact healthservices@asha.org.
The interpretation of ICF and examples above are consensus based and provided as a resource for members of the American Speech-Language-Hearing Association.

USA

Stimulus selection, & ordering

❖ Obtain info on:
- ➢ estimates of intelligibility/efficiency of communication
- ➢ presence/degree of associated deficits
- ➢ **pt.'s communication needs/goals**
- ➢ **motivation**
- ➢ **speaking environments**
- ➢ **communication partners**
- ➢ **difficult vs. easy communication situations**
- ➢ **perception of others' reactions to their deficits**
- ➢ nature of articulatory errors & accurate articulatory responses
- ➢ factors that influence speech adequacy*

Duffy, J. R. (2020)

Person-Centered Therapy Tips

1. Use motivating stimuli
2. Pick personally relevant words/phrases
3. Consider: Activities that help increase their independence & decrease reliance on caregivers
4. Consider: access to help with home programs/ how much help do they desire?
5. Check in frequently to see if their needs/wants have changed

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Thank You!

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