Applying Principles of Motor Learning to Group Therapy for Adults With Apraxia of Speech

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Disclosure Statement

I am speaking on using principles of motor learning to treat aphasia and apraxia of speech in the group setting. I have no relevant financial or non-financial relationships to disclose.
Generalized Motor Programs (GMPs)

• Generalized motor programs (Schmidt, 1975)
  – Stored in the brain as units
  – Represent relative *timing* and muscle *force* required to carry out a specific movement
  – In SLP: not clearly defined
    • Syllables, sounds with same manner and place, words
    • For our purposes 1 GMP = 1 Phrase
Motor Learning Research

• Primary: sports medicine and PT for elite athletes
  – Emerging research on persons with physical disabilities following CVA

• Research goal: Understand how to build or rebuild muscle memory and automaticity
  – the ability to perform a motor task without conscious effort
    • riding a bike, walking, sequencing phonemes to form words

• Newer research: Use these principles to repair “damaged” motor plans in persons with limb apraxia and apraxia of speech (AOS)
  – Consider connected speech as a series of GMPs
  – In AOS, motor programs are interrupted or distorted

(Buxbaum et al., 2008; Gilmore and Spaulding, 2001; Hess, 2001; Smania et al., 2006)
Principles Used in Treatment

• Adapted from Motor Learning Guided Approach
  (Steirwalt, Hageman & LaPointe, 2004, Seo, Kim, Stierwalt, LaPoint, 2005, Fountain, Lasker, & Stierwalt, 2007)

• Questions:
  – How to improve generalization?
  – How to increase functional use of trained stimuli?
Principles of Motor Learning (PML)

- Specificity
- Intensity
- Practice Schedule
- Feedback
Principle 1: Specificity

• Practice the desired *outcome*
  – phrases/sentences vs. individual components (sound/word drills)

• *Generalization* is more likely if the person practices more complex utterances
Principle 2: Intensity

• No specific studies/guidelines in SLP yet
  – Experience suggests *more practice leads to better accuracy of productions*
    • *Evidence-based treatments such as LSVT ®*
    • *Better maintenance results with increased amount of practice* (Wambaugh, Nessler, Cameron & Mauszycki, 2013)

• Group therapy 2x per week, individual therapy as well, encouraged home practice
  – Now working on incorporating technology into home practice
Intensity and differentiated instruction
Principle 3: Practice Schedule

• True “motor learning” treatment incorporates both **blocked** and **random** practice

• Blocked practice: faster acquisition, less retention/generalization
  – Preferred at start of training to encourage errorless learning

• Random practice: greater retention/generalization
  – Practicing specific sounds in various positions has transferred to untrained sounds *(Knock, Ballard, Robin & Schmidt, 2000)*
  – Practice phrases in different order
  – Variability is key!
Blocked and Random Practice

Blocked

Random

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Knowledge and Compassion Focused on You
Principle 4: Feedback

• **Infrequent/Summary feedback**
  – Example: after 5 trials vs. each one
  – Enhance intrinsic learning
  – Facilitates error detection and self-evaluation
  – Decreased dependence on feedback
  – Leads to enhanced retention of a novel speech skill *(Adams & Page, 2000)*

• **Delayed feedback (e.g., several seconds after trial or production)**
  – Better intrinsic learning and error detection

• **Immediate feedback**
  – Better for errorless learning but does not lead to retention or generalization
Types of Feedback

• Knowledge of performance (KP):
  – provides information about how to correct the incorrect production
    • producing a /k/ instead of a /t/

• Knowledge of results (KR):
  – provides information only on the resulted production as compared to the goal.
    • e.g. You said, “How have you been doing?” instead of, “What have you been doing.”

• KP feedback better in early learning stages

• KR feedback is better in later stages
  – leads to better generalization
KP and KR Feedback
Applying PML to Group Therapy

1. Generate functional phrases with patient/family
   - Not just wants and needs

2. Train phrases in *blocked* practice
   - Rosenbeck’s Apraxia Continuum
     • start with most support, fade out as productions continue and improve

3. Practice phrases in *random order* providing least amount of cuing needed

4. Practice phrases with other group members in structured dialogue or spontaneous conversation
   - to encourage generalization
Applying PMLs to Group Therapy: Why Does It Work?

• Group environment creates an organic, naturalistic setting for phrase practice
  – Encourages and creates environment for random practice
  – Allows for immediate, and direct feedback when successful
  – Gives opportunities for members to cue each other
    • Leading to greater intrinsic learning and carryover
Applying PMLs to Group Therapy: Next Steps

• Technology assistance
  – Videos on iPad of different phrases with different levels of cuing for home practice
  – Use of text to speech applications to self-cue
    • Independence with first phoneme or first word cues

• Group therapy as a continuum of care

• Standardizing treatment for future use in research

• Determining measurable outcomes
Questions and Comments?
References:


Fountain, Lasker, & Stierwalt. (2007). Improving speech production in profound apraxia using MLG and AAC. A poster session presented at the ASHA Annual Convention, Boston, MA.


References Continued…


Stierwalt, Hageman, & LaPointe. (2004). The motor learning guided approach to apraxia of speech. Symposium conducted at the meeting of the World Congress of the International Association of Logopedics and Phoniatrics, Brisbane, Australia.
