Using WebCam Interactive Technology to Implement MLG and AAC Treatment for Severe Apraxia: A Case Example

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Motor Learning Guided (MLG) Treatment

- hierarchical training incorporating elements of motor learning
- randomized practice in varying contexts
- use of meaningful, complex stimuli
- large number of practice opportunities
- delayed clinician feedback regarding adequacy of results on 30% feedback schedule
- prior study (Lasker et al.) conducted with an older client 4 years post 3 strokes
  - (Schmidt & Wrisberg, 2000; Hageman, Simon, Backer, & Burda, 2002; Maas, Robin, Austermann Hula, Wulf, Ballard, & Schmidt, 2008; Lasker, Stierwalt, Hageman, & LaPointe, 2008)
Speech Generating Device (SGD)

• LG uses a DynaVox V speech generating device.

• In addition to other pages, clinician programmed device with target stimulus items.

• LG completed homework practice log.

• LG practiced once daily for a total of 30 minutes.

<table>
<thead>
<tr>
<th>mom</th>
<th>dad</th>
<th>Noles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loren</td>
<td>pizza</td>
<td>FSU</td>
</tr>
<tr>
<td>okay</td>
<td>rock</td>
<td>stroke</td>
</tr>
</tbody>
</table>
Participant LG

- 28 year-old electrician
- 2.5 years post left CVA due to blood clot in carotid artery
- apraxia of speech
- moderate receptive and expressive aphasia
- attended 4 sessions per week for 8 weeks
  - 2 Skype per week; 2 face-to-face per week
Skype Sessions

Clinician presents target item.

Client produces target item.
Protocol

• modified alternating treatment design
  ♦ 15 trained items “face-to-face”
  ♦ 15 trained items Skype
  ♦ 15 untrained items

• 4 individual treatment sessions each week
  ♦ 2 sessions in clinic face-to-face
  ♦ 2 sessions via Skype

• all session probes were video recorded
  ♦ Call Recorder™ software for Skype

• untrained items probed weekly

• criterion met when client scored 10 or 11 on 12 of 15 items in each set over 2 consecutive sessions
Sample Training Items

• I can’t hear you.
• There’s a fire.
• Call me on my cell.
• I use my left hand to write.
• My computer is not working right.
• What does it pay?
• What’s available?
• When will you contact me?
• I was an electrician.
• lpg81@live.com
• What kind of person are they looking for?
MLG Training

• Step 1
  ♦ Clinician selects 5 stimulus items at random from the group of 15 treated items.
  ♦ Clinician randomly selects 1 of the 5 stimulus items to present to client.
    ▪ Clinician provides model.
    ▪ Client says item 4 times with at least 4 second pause between.
    ▪ Clinician provides feedback of results.

• Step 2
  ♦ Clinician shuffles 5 cards used in Step 1.
    ▪ Clinician presents card to client.
    ▪ Client attempts target without clinician model. Says item 3 times.
    ▪ Clinician says item and provides feedback.
MLG Steps 3 and 4

• Step 3
  ♦ Clinician and client repeat steps 1 and 2 with another block of 5 stimulus items until completion of all 15 stimulus items.

• Step 4
  ♦ Clinician randomly selects 1 stimulus card at a time from entire set of 15 stimuli for client to produce. Client produces each card 4 times (repeating of Step 2). Clinician provides feedback.
# Retention Measure Rating Scale

<table>
<thead>
<tr>
<th></th>
<th>Accuracy</th>
<th>Immediacy</th>
<th>Naturalness</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>accurate articulation, intelligible</td>
<td>immediate production of all elements of utterance</td>
<td>natural sounding speech quality</td>
</tr>
<tr>
<td>10</td>
<td>accurate articulation, intelligible</td>
<td>delayed production of all or some elements of utterance [searching, groping]</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>distortion; sound addition or deletion</td>
<td>immediate production of all elements of utterance</td>
<td>natural sounding speech quality</td>
</tr>
<tr>
<td>8</td>
<td>distortion; sound addition or deletion</td>
<td>delayed production of all or some elements of utterance [searching, groping]</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>incomplete articulation (missing elements of production but does not interfere with general message)</td>
<td>immediate production of all elements of utterance</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>incomplete articulation (missing elements of production but does not interfere with general message)</td>
<td>delayed production of all or some elements of utterance [searching, groping]</td>
<td></td>
</tr>
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<td>Accuracy</td>
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<tr>
<td>5</td>
<td>self-correction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>incomplete articulation (missing crucial elements of production so that utterance is not intelligible)</td>
<td>immediate production of all elements of utterance</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>incomplete articulation (missing crucial elements of production so that utterance is not intelligible)</td>
<td>delayed production of all or some elements of utterance [searching, groping]</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>error/wrong target – related paraphasia</td>
<td>immediate production of all elements of utterance</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>error/wrong target – related paraphasia</td>
<td>delayed production of all or some elements of utterance [searching, groping]</td>
<td></td>
</tr>
</tbody>
</table>
Number Productions Rated 10 or 11: Face to Face, Skype, and Untrained
Average Rating Per Item
Reliability

• primary investigator scored all items with student clinicians at start of cycles to establish reliability of scoring
  ♦ discrepancies were resolved immediately with student clinicians after session by viewing or listening to recording
• clinicians scored online and then used recordings to correct any transcription or scoring errors
• primary investigator rescored 20% of all retention probes
  ♦ 120 of 600 potential responses
• overall interrater agreement for retention probes drawn randomly from all sets
  ♦ 107 agreements/120 total = 89% agreement
Progress and Retention

- **WAB: Aphasia Quotient**
  - prior to treatment (2/2009): 69.8/100
  - post treatment (12/2009): 77.1/100
    - most consistent with Broca’s type

- **Apraxia Battery for Adults**
  - pretest: most consistent with "severe" AOS
  - posttest: most consistent with "moderate" AOS

- **Overall intelligibility in probe conducted 2 months after completion of training [ratings 5 and above]**:
  - face to face: 14/15
  - Skype: 14/15
  - untrained: 12/15
## WAB Picture Descriptions

### February, 2009
- boot [book]
- wine
- sit [fish]
- and un girl [and a girl]
- hite [kite]
- dog
- talboat [sailboat]
- dees [trees]
- house
- boy
- that [flag]
- cowfole [castle]

### December, 2009
- a boy blying [flying] the kike [kite]
- the man is reading a book
- the woman is reading a radio
  - probe: playling [playing] the radio
- the girl is building a castle
  - probe: sand
- the man is fissing [fishing]
- the tog [dog] is tasing [chasing] the boy
- the house is in the busses [bushes]
- the 2 men on the boat is wavin’ [waving]
Discussion

• the combination approach (MLG and SGD practice) appeared to improve production of trained items vs. untrained items for a client with severe apraxia of speech 2 1/2 years post L CVA

• treatment sessions conducted via Skype and face-to-face methods resulted in similar outcomes in terms of intelligibility, immediacy, and naturalness ratings
  ✷ may prove to be a viable alternative for clients with computer access living at distance from clinic

• changes in speech production “uncovered” nature of client’s aphasia; however, overall language output increased
  ✷ as evidenced by changes in narrative discourse tasks and conversation

• ongoing study to explore “dosage” question:
  ✷ how much practice is necessary for change?

• client’s age, time post onset, multiple training opportunities and personal motivation are all positive prognostic factors
References