The Effectiveness of Conversational Script Training for Acquired Apraxia of Speech

Jenna Brusie, B.S.
Jaclyn Boyce, B.A.A.
Kathryn Atkinson, M.A., CCC-SLP/BC-ANCDS

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Script Training Principles

• Based on the Instance Theory of Automatization (Logan, 1988)
  – Automaticity occurs due to retrieval from memory of complete, context-bound, skilled performances

• Script Training was initially developed to promote verbal communication on client-selected topics (Holland, Milman, Munoz, & Bays, 2002)
  – Goal is for individuals for whom speech is no longer automatic to produce islands of fluent speech in conversation

• Previously used as a treatment approach to improve automatic language production in adults with aphasia

• To become automatic, scripts must be practiced as phrase or sentence-length units vs. syllable or ‘one word at a time’ approach (Youmans, Holland, Munoz, & Bourgeois, 2005)
  – For individuals with aphasia resulting in expressive speech difficulties, repeated practice of phrases and sentences can lead to automatic and effortless speech productions
Acquired Apraxia of Speech

• **Definition**

  “A neurologic speech disorder reflecting an impaired capacity to plan or program sensorimotor commands necessary for directing movements that result in phonetically and prosodically normal speech. It can occur in the absence of physiologic disturbances associated with the dysarthrias and in the absence of disturbance in any component of language” (Duffy, 2005).

• **Apraxia & Script Training** (Youmans, Youmans, & Hancock, 2010)

  – Apraxia of speech is associated with disturbance in the automaticity of fluent speech production

  – Script training is hypothesized to be a functional therapy approach for individuals with acquired apraxia of speech in order to improve ease of speech production in the functional contexts targeted
“Script Training Treatment for Adults with Apraxia of Speech”
(Youmans et al., 2010)

• Published in *American Journal of Speech-Language Pathology*, August 2010
• Previous published research revealed script training is functional treatment approach successful for persons with aphasia (Youmans et al., 2005)
• Had not been applied to persons with apraxia of speech.
• This study revealed script training was successful & functional for 3 subjects with apraxia of speech.
Participant

- Mr. J – Caucasian, middle-age male; lives in rural area of Michigan
- Sustained cerebral vascular accident (CVA) in 2005
- Diagnosed with mild receptive/expressive aphasia; severe apraxia; right hemiplegia
- Mr. J received treatment through an outpatient facility until 2006 until insurance coverage was maximized
- Mr. J initiated speech-language services at the Carls Center for Clinical Care & Education/Speech-Hearing Clinic (CMU Speech-Hearing Clinic) at Central Michigan University in May 2009
- At time of initial evaluation at the CMU Speech-Hearing Clinic, Mr. J relied heavily on writing telegraphic messages with his left/nondominant hand, gestures & facial expressions
- Mr. J was able to communicate during initial assessment that he desired to verbally interact with others socially in daily interactions
Overall Description of Speech & Language Skills

- Spontaneous speech noted to be laborious with overt oral groping on verbal attempts to open-ended questions
- Used nonverbal modalities to communicate via facial expressions, head nods, and writing telegraphic responses
- Verbal responses consisted of “yeah,” “no,” & “wow”
- Receptively, understood questions & statements if modified for rate and complexity
- Able to communicate during initial assessment that he desired to verbally interact with others socially in daily interactions
Initial Treatment Approach

- Initial treatment focused on:
  - Imitation of CV/VC words
  - Imitation of functional vocabulary words
  - Following written contextualized one-step directions
  - Responding to functional questions and initiating question forms via an AAC device (owned device recommended from previous therapy setting)

- Cueing hierarchy for imitative verbalizations based on the *Integral Stimulation Method/Eight-Step Task Continuum* (Rosenbek, Lemme, & Ahern, 1973)
Summary of Previous Therapy Outcomes

- Therapy conducted 2-3 times/week, dependent on client-clinician-supervisor availability
- Duration of therapy approximately 6-8 months
- Clinic followed academic calendar, so ‘breaks’ in therapy every 12-14 weeks
- Verbal production had not progressed beyond immediate and delayed imitation skills of single syllable words & short phrases
- Discontinuation of AAC
- Discontinuation of computer/internet support networks
Purpose of Current Study

• This case study was intended to provide further support for the use of conversational script training for a client with acquired apraxia of speech & mild non-fluent aphasia.
Rationale

- Youmans et al. (2010) provided convincing evidence for use of script training for adults with apraxia of speech
- Decision made to replicate study based on participant’s:
  - Desire to communicate verbally
  - Indication that traditional apraxia treatment was not motivating
  - Limited progress beyond immediate and delayed imitation of single syllable words & short phrases
  - Refusal to use AAC device (given to him by previous clinic) to communicate
Procedure

• Therapy conducted 2-3 times/week, dependent on client-clinician-supervisor availability

• Script training therapy was conducted from September 2010 - Present

• Clinic followed academic calendar with breaks in therapy every 12-14 weeks

• Therapy Sessions Included:
  – 10 minutes of unstructured conversation
  – 40 minutes of blocked/random practice of phrases
    • Breaks as needed based on client frustration level
  – 10 minutes targeting other goals (sentence writing, computer use)
Treatment Sequence

*Modified from Youmans et al. (2010)*

- **Script Development**
  - Client and clinician formulated scripts (4-8 sentences in length) to use in personally relevant contexts

- **Phrase Acquisition**
  - Scripts were trained one phrase at a time in *blocked* practice
  - After 90% accuracy was achieved for 3 phrases in blocked practice, phrases were rehearsed in *random* trials
  - Continued practice of mastered phrases to promote maintenance
Treatment Sequence Continued

- Feedback
  - Opportunity to correct errors independently before given feedback
  - Specific feedback on articulator placement and accuracy of production
  - Knowledge of performance (KP) and knowledge of results (KR) feedback
  - Positive reinforcement of verbal attempts

- Data Collection
  - Data collected at baseline, treatment, and maintenance periods
  - Based on number of words correct independently in blocked and random trials
Cueing Hierarchy
Modified from Youmans et al. (2010)

• **Blocked Practice**
  – Clinician model of target phrase
  – Target phrase in unison with visual cues
  – Target phrase with clinician fading voice
  – Independent productions with visual cues
  – Independent productions

• **Random Practice**
  – Random trials with visual cues
  – Independent productions in structured conversation
  – Random trials with unfamiliar communication partners given visual cues
  – Independent productions in structured conversation with unfamiliar communication partners

**Types of Visual Cues**
- Sentence Strips
- Silent Posturing
- *Moving Across Syllables* Visual Cues
  (Kirkpatrick, Stohr, & Kimbrough, 1990)
- Individualized cues for vowel production
Client’s Scripts

Client determined settings that he would most like to communicate and created meaningful phrases that could be used in his environment.

- **Conversation Starters**
  - Hi! How are you?
  - Would you like to get dinner?
  - When are you free?
  - How should I get a hold of you?
  - Great! See you then.

- **Aphasia**
  - I had a stroke in 2005.
  - Speaking is hard for me.
  - But I can understand you.
  - Please slow down.
Script Acquisition

Conversation Starters

<table>
<thead>
<tr>
<th>Conversation Starter</th>
<th># Sessions to Reach 90% Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hi! How are you?</td>
<td>8</td>
</tr>
<tr>
<td>Would you like to get dinner?</td>
<td>16</td>
</tr>
<tr>
<td>When are you free?</td>
<td>14</td>
</tr>
<tr>
<td>How should I get a hold of you?</td>
<td>12</td>
</tr>
<tr>
<td>Great! See you then.</td>
<td>2</td>
</tr>
</tbody>
</table>

Aphasia

<table>
<thead>
<tr>
<th>Aphasia State</th>
<th># Sessions to Reach 90% Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>I had a stroke in 2005.</td>
<td>8</td>
</tr>
<tr>
<td>Speaking is hard for me.</td>
<td>16</td>
</tr>
<tr>
<td>But I can understand you.</td>
<td>6</td>
</tr>
<tr>
<td>Please slow down.</td>
<td>4</td>
</tr>
</tbody>
</table>
Summary of Script Acquisition

Conversation Starter

• Hi! How are you?
  – Met 90% accuracy in 7 sessions
• Would you like to get dinner?
  – Met 90% accuracy in 14 sessions
• When are you free?
  – Met 90% accuracy in 12 sessions
• How should I get a hold of you?
  – Met 90% accuracy in 7 sessions
• Great! See you then.
  • Met 90% accuracy in 3 sessions

• Script Mastery
  • Met 90% accuracy of all 5 lines in 34 sessions
Summary of Script Acquisition

Aphasia

• I had a stroke in 2005.
  – Met 90% accuracy in 8 sessions

• Speaking is hard for me.
  – Met 90% accuracy in 12 sessions

• But I can understand you.
  – Met 90% accuracy in 6 sessions

• Please slow down.
  – Mastery still in progress

• **Script Mastery**
  – Mastery of the script is still in progress
Effect Size

- Effect size calculated to contrast pre-treatment and post-treatment levels of performance (Cohen, 1988)

- Benchmarks used for determining degree of effect (Beeson & Robey, 2006):
  - Small Effect- 6.0
  - Medium Effect- 12.0
  - Large Effect- 18.0

Conversation Starters

- 111.96 (large effect)

Aphasia

- 38.26 (large effect)
Conclusions

• Overall, script training was a functional, effective treatment for this client

• Met objective of obtaining relatively fluent and errorless production of the “conversation starters” script and the first 3 phrases of the “aphasia” script
  – “Hi! How are you?” was mastered relatively quickly
    • May be attributed to automaticity of the phrase prior to his CVA and/or previous treatment targeting the phrase in isolation
  – Subsequent lines were mastered with gradually fewer sessions over time
    • 14 sessions for “Would you like to get dinner?” – 3 sessions for “Great! See you then.”
Conclusions

- Often self-corrected errors during independent productions
- Demonstrated generalization of script production in other settings with clinicians present
  - Began producing the scripts outside of the clinic setting with a significant other
  - Generalization to other non-therapy environments is minimal
- Maintained mastery of phrases over a 6 month period including breaks in therapy
  - Maintenance of each phrase was highly variable session to session and was likely influenced by:
    - Client frustration level, fatigue, and/or illness reducing accuracy of verbal productions
    - Frequent breaks in therapy due to academic calendar
    - Limited trials of phrases in random practice when new lines were introduced in blocked practice
Conclusions

• Client’s productions continue to contain minor errors during maintenance periods and random practice
  – However, he is able to use self-monitoring to restart and correct errored phrases

• Often has difficulty initiating lines of the script
  – Once initiated, script is typically executed fluently due to motor automaticity

• Client’s prosody continues to have limited inflection
  – Prosody continues to sound more natural with random practice
Limitations

• Although script training was proven effective for this client, continued research is suggested in order to determine the overall effectiveness of script training for all individuals with apraxia of speech

• Scripts are limited to one context, making generalization to other speaking contexts difficult

• Breaks in therapy negatively influenced motor automaticity and rate of script acquisition for this client

• Clinician changes each academic semester may have led to variability in cueing, feedback provided, and data collection during script acquisition
References


References


