Impact of Phonological & Semantic-Focused Intensive Therapy in Reading, Writing, & Naming in Chronic Aphasia
DISCLOSURE

All of the authors and presenters are paid employees of Austin Speech Labs.

Presenters:
- Cassandra McGrath, M.A., CCC-SLP
- Megan Bunsey, M.S., CCC-SLP

If you have any questions regarding this study, please contact Shilpa Shamapant at shilpa@austinspeechlabs.org
WHO ARE WE AND WHAT DO WE DO?

- Austin speech labs is a non-profit organization founded in 2008:
  - We provide intensive speech and cognitive therapy for stroke survivors for as long as they need.
  - Clients come to therapy 1-5 days per week and 3 hours per day.
  - We offer individual and group therapy as well as tele-therapy.
  - We also offer music therapy, book clubs, health and wellness groups, reading and writing groups and more.

- Traditional belief is that stroke survivors only have a small window of time to recover after their stroke. Our data shows that survivors can continue to make progress as long as they are getting the therapy they need.
RESEARCH QUESTION:

- In patients with Post-Stroke Aphasia, how does Phonological Treatment compared to Semantic Treatment (SFA) improve reading, writing and naming skills?
APHASIA

- A neurological based language disorder
- Receptive language deficits
  - Auditory Comprehension
  - Reading Comprehension
- Expressive language deficits
  - Spontaneous Speech
  - Naming
  - Reading
  - Writing
**EXPERIMENTAL LANGUAGE DEFICITS**

<table>
<thead>
<tr>
<th>Naming deficits</th>
<th>Reading &amp; Writing deficits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Semantic knowledge</td>
<td>Lexical</td>
</tr>
<tr>
<td>▪ Description and functions of words</td>
<td>▪ Whole or sight word</td>
</tr>
<tr>
<td>Phonological</td>
<td>Phonological</td>
</tr>
<tr>
<td>▪ Sound to letter correspondence</td>
<td>▪ Sound to letter correspondence</td>
</tr>
</tbody>
</table>

*Participants in the study had deficits in the areas of naming, reading and/or writing*
PARTICIPANTS

- 12 clients receiving intensive speech therapy (IST) at Austin Speech Labs
  - 11 chronic post stroke, 1 acute post stroke
- 6 months – 10 years post stroke
  - Mean TPS: 3;3
- 23 -65 years old
  - Mean age: 46.9
- 6 males, 6 females
- Fluent & non-fluent
- Two participants are bilingual with English being their second language
INTERVENTION

- Administered in-office or via tele-therapy
- Two to five days per week
  - *Three hours per day*
    - Two hours of individual therapy
    - One hour of group therapy
- 240 total hours (One participant received 120 hours)
PRE/POST ASSESSMENTS

- Participants were assessed at baseline and after 16 weeks of intervention.
- Four participants were assessed again six months posttreatment.

<table>
<thead>
<tr>
<th>Test</th>
<th>Evaluation of...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psycholinguistic Assessment of Language Processing in Aphasia (PALPA) – Subtests</td>
<td>Phonologic and orthographic knowledge</td>
</tr>
<tr>
<td>The Pyramids and Palm Trees Test</td>
<td>Semantic knowledge</td>
</tr>
<tr>
<td>Western Aphasia Battery-Revised</td>
<td>Auditory comprehension</td>
</tr>
<tr>
<td>Boston Naming Test</td>
<td>Picture naming ability</td>
</tr>
</tbody>
</table>
PYRAMIDS AND PALM TREES TEST

We used this test to determine the participant’s semantic knowledge independent of reading or speaking. The participants only had to point.

Instructions for client: “Here are three pictures. You have to decide which one goes with the one on the top.”
EXPERIMENTAL GROUP
Phonological Based Treatment

Individual Tasks

- Visual Drills
  - Spoken letter sounding

- Auditory Drills
  - Sound to letter identification
  - Initial sound discrimination
  - Initial sound identification
  - Initial sound generation

- Blending & Segmenting Drills

- Reading
  - CVC Words

- Writing to dictation
  - CVC Words
<table>
<thead>
<tr>
<th>Weeks</th>
<th>Consonants</th>
<th>Vowels</th>
<th>Additional</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 &amp; 2</td>
<td>/b, f, d, k/</td>
<td>/æ, 3, ɪ, ɔ, ʌ, ə/</td>
<td>-</td>
</tr>
<tr>
<td>3 &amp; 4</td>
<td>/h, ɖʒ, l, m, g/</td>
<td>/æ, 3, ɪ, ɔ, ʌ, ə/</td>
<td>-</td>
</tr>
<tr>
<td>5 &amp; 6</td>
<td>/n, p, r, s, t/</td>
<td>/æ, 3, ɪ, ɔ, ʌ, ə/</td>
<td>-</td>
</tr>
<tr>
<td>7 &amp; 8</td>
<td>/kw, v, w, j, z/</td>
<td>/æ, 3, ɪ, ɔ, ʌ, ə/</td>
<td>-</td>
</tr>
<tr>
<td>9</td>
<td>Review all sounds</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>10</td>
<td>Review consonants</td>
<td>/i, e, ə, u, ʊ, o, a/</td>
<td>Spelling Rules</td>
</tr>
<tr>
<td>11 &amp; 12</td>
<td>/ð, ɻ/</td>
<td>/i, e, ə, u, ʊ, o, a/</td>
<td>Spelling Rules</td>
</tr>
<tr>
<td>13 &amp; 14</td>
<td>/ʃ, tʃ/</td>
<td>/i, e, ə, u, ʊ, o, a/</td>
<td>Spelling Rules</td>
</tr>
<tr>
<td>15 &amp; 16</td>
<td>Review all sounds</td>
<td></td>
<td>Spelling Rules</td>
</tr>
</tbody>
</table>
VISUAL DRILLS

Spoken letter sounding task

- Clinician will present the letter visually and ask the client to write the letter down and produce the sound.
  - **Cues**
    - If the client cannot produce the sound, the clinician will show a visual placement of the sound.
    - *If the client still cannot produce the sound, the clinician will provide the correct response and the client will imitate it and finger spell the letter on the desk.*
    - *The client will say and write the sound three times*
AUDITORY DRILLS

- Sound to letter identification
- Initial sound discrimination
- Initial sound identification
- Initial sound generation

*Will review on upcoming slides.*
AUDITORY DRILLS

- Sound to LETTER IDENTIFICATION
  - Clinician will cover her mouth and say the sound. Ex: /b/
  - Client will repeat the sound (correctly)
  - Client will identify the sound out of a field of 5 options. This is what it looked like.

![Diagram with letters A, E, I, O, U and N, P, R, S, T]
AUDITORY DRILLS

- Initial SOUND DISCRIMINATION
  - Clinician will ask the client if a word starts with a certain sound.
  - Ex: Does ‘bag’ start with /d/? (clinician will have her mouth covered)

This is the data collection sheet we used for initial sound discrimination.

2017 Austin Speech Labs
### AUDITORY DRILLS

**Initial SOUND GENERATION**
- Clinician will verbally provide a word and ask the client to produce the initial sound.

This is the data collection sheet we used for initial sound generation.

<table>
<thead>
<tr>
<th>Date-Response</th>
<th>Date-Response</th>
<th>Date-Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>What sound does 'queen' start?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>What sound does 'wig' start with?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>What sound does 'vase' start with?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>What sound does 'yarn' start with?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>What sound does 'zit' start with?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>What sound does 'quilt' start with?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>What sound does 'van' start with?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>What sound does 'web' start with?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>What sound does 'yak' start with?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>What sound does 'zipper' start with?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>What sound does 'quail' start with?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

2017 Austin Speech Labs
AUDITORY DRILLS

- **Initial SOUND IDENTIFICATION**
  - Clinician will provide the client with a word verbally and ask the client to identify the initial sound by pointing to the letter in a field of 5.

This is the data collection sheet we used for initial sound identification.
SEGMENTING & BLENDING DRILLS

■ Segmenting
  - Provide the client with a CV or VC or word and have them segment the sounds in the target

■ Blending
  - Provide the client with two sounds or a word with a pause in between
  - Client will repeat the sounds in isolation and then blend them together to produce the target
READING TASKS

- Reading CVC, CCVC or CVCC words. 10 words
  - Client will produce the initial sound and then read the word out loud

<table>
<thead>
<tr>
<th>Gum</th>
<th>Date-Response</th>
<th>Date-Response</th>
<th>Date-Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Goat</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ham</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hat</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hen</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jar</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jug</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jet</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lime</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lips</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leg</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Man</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moon</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mit</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Writing CVC, CCVC or CVCC words to dictation. 10 words.

- Provide the client with a word from the weekly word set
- Client will produce the initial sound and then write the word

<table>
<thead>
<tr>
<th>Writing CVC Words Week 1</th>
<th>Date-Response</th>
<th>Date-Response</th>
<th>Date-Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bug</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ball</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Car</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cup</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cow</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dog</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dice</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Duck</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fan</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foot</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fish</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kite</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Keg</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>King</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2017 Austin Speech Labs
EXPERIMENTAL GROUP
Phonological Based Treatment

Group Therapy
■ Phonological Generative Naming
■ Picture Naming (PCA Chart)
  - Verbal/Written Sentence Production

Reading
■ Sight Words
■ Sentences
GENERATIVE NAMING TASK

- Client will generate three words to a given sound. The sounds will be randomized within the weekly list for each client.
  - *Ex. Give me 3 words starting with /b/*
NAMING DRILLS

- Confrontation (Picture) Naming
  - Using the PCA (Phonological Component Analysis) Chart
  - Clinician shows a picture.
  - Client writes down the picture name
  - Client will use the self-cueing strategy to read word
  - Client will produce a sentence about the picture
Phonological Component Analysis (PCA) Chart

First Sound: /d/
First Sound Associate: duck
Final Sound: /g/

- “What sound does it start with?”
- “What other words start with the same sound?”
- “What sound does it end with?”
- “What does this rhyme with?”
- “How many beats does the word have?”

Rhymes: log
Number of Syllables: 1

2017 Austin Speech Labs
AUSTIN SPEECH LABS
stroke recovery one word at a time
READING

- Reading
  - Sight Words
  - Verbal/Written Sentence Production
  - Sentences

Doing sentence reading during tele-therapy.

/g/

Week 3 - Sight Words: That, me, I, for, at
Go for that gate.
She had gum for me.
He had the gun at home.
The boy and I had that goat for dinner.
The girl is in a barn at the ranch.

Week 4 - Sight Words: With, It, On, Can, Will
The girl can dance with me.
He will go to the breakfast with me.
Can you come to the garden with me?
She will go with me to that dinner.
He can give me a hug at the ranch.

Experimental Group
Phonological Based Tx
GROUP therapy
CONTROL GROUP
Semantic Based Treatment

Individual

- Reading
  - CVC Words
- Writing to dictation
  - CVC Words
- Word Identification
- Reading
  - Sight Words
    - Verbal/Written Sentence Production
  - Sentences
Semantic Feature Analysis (SFA) Chart

Group
It's a animal

Association
Reminds me of:
cat

Use
It is used for/to petting

Location
It is found:
yard

Action
Does what?
barks

Properties
It has/has not:
tail

2017 Austin Speech Labs

AUSTIN SPEECH LABS
stroke recovery one word at a time
CONTROL GROUP
Semantic Based Treatment

Group Therapy

- Phonological Generative Naming
  - Only phonological component used

- Picture Naming (SFA Chart)
  - Verbal/Written Sentence Production
# RESULTS

<table>
<thead>
<tr>
<th></th>
<th>Primary Outcomes Experimental Group</th>
<th>Primary Outcomes Control Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Letter Length Reading</td>
<td>.073</td>
<td>.191</td>
</tr>
<tr>
<td>Reading 3 to 6 letter words</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Syllable Length Reading</td>
<td>.018*</td>
<td>.421</td>
</tr>
<tr>
<td>Reading 1 to 3 syllable words</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Letter Length Spelling</td>
<td>.001*</td>
<td>.079</td>
</tr>
<tr>
<td>Spelling 3 to 6 letter words</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Picture Naming</td>
<td>.070</td>
<td>.892</td>
</tr>
</tbody>
</table>

Pearson Correlation (p=.05)
# RESULTS

<table>
<thead>
<tr>
<th>Significant Differences</th>
<th>Experimental Group</th>
<th>Significant Differences</th>
<th>Control Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Letter Sound</td>
<td>.012*</td>
<td>Command</td>
<td>.033*</td>
</tr>
<tr>
<td>Spoken Letter ID</td>
<td>.006*</td>
<td>Spoken Letter ID</td>
<td>.018*</td>
</tr>
<tr>
<td>Syllable Length Reading</td>
<td>.018*</td>
<td>Repetition</td>
<td>.006*</td>
</tr>
<tr>
<td>Letter Length Spelling</td>
<td>.001*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Pearson Correlation ($p=.05$)

2017 Austin Speech Labs
PALPA subtests Significant Improvements

- Spoken Letter Sound
- Spoken Letter ID
- Syllable length reading
- Letter length spelling

**PALPA**

Please Read These Letters Aloud

<table>
<thead>
<tr>
<th>F</th>
<th>Z</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>L</td>
</tr>
<tr>
<td>R</td>
<td>D</td>
</tr>
<tr>
<td>H</td>
<td>P</td>
</tr>
<tr>
<td>V</td>
<td>W</td>
</tr>
<tr>
<td>A</td>
<td>C</td>
</tr>
</tbody>
</table>

**PALPA**

Please Read These Letters Aloud

<table>
<thead>
<tr>
<th>s</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>r</td>
<td>n</td>
</tr>
<tr>
<td>l</td>
<td>h</td>
</tr>
<tr>
<td>d</td>
<td>p</td>
</tr>
<tr>
<td>c</td>
<td>v</td>
</tr>
<tr>
<td>w</td>
<td>a</td>
</tr>
<tr>
<td>q</td>
<td>y</td>
</tr>
</tbody>
</table>
MAINTENANCE
6 Month

- Four participants completed maintenance testing
- Wilcoxon Signed Ranked Test at 95% confidence interval
- Participant S2 showed significant difference .0037
- All other participants maintained or made additional improvements
DISCUSSION

- Both control group participants and one experimental participant who underwent maintenance testing received in-office and tele-therapy.
- S2 had a major seizure, requiring hospitalization, between post- and maintenance testing.
- Observationally, therapists and caregivers reported participants who received the phonological treatment self-cued when having word finding difficulty and in spontaneous speech.
FUTURE RESEARCH

- Compare the intensity
- Compare in-office vs teletherapy
- Larger sample
- How L1 influences reading, writing, & naming improvements in L2
RESEARCH AND CLINICAL NEED TO WORK TOGETHER

- In patients with Post-Stroke Aphasia, how does Phonological Treatment compared to Semantic Treatment (SFA) improve reading, writing and naming skills?
REFERENCES


Thank you to Austin Speech Labs’ clients, caregivers, staff, Dr. Maya Henry, Dr. Thomas Marquardt, & Dr. Martin Tombari
Shilpa Shamapant, M.S., M.A., CCC-SLP
President, Co-founder, Speech-Language Pathologist, Research Coordinator
shilpa@austinspeechlabs.org

Sarah Bennett, M.S., CCC-SLP
Speech-Language Pathologist, Research Assistant
sarah@austinspeechlabs.org

Megan Bunsey, M.S., CCC-SLP
Speech-Language Pathologist
megan@austinspeechlabs.org

Cassandra McGrath, M.A., CCC-SLP
Speech-Language Pathologist, Graduate Student Supervisor
cassandra@austinspeechlabs.org