Objective Review of Therapies for Agrammatism Due to Aphasia

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Goals of this seminar
- Describe several different treatment approaches for agrammatism
- Identify research evidence supporting the different treatment approaches for agrammatism
- Identify the effect size for the different treatment approaches for agrammatism, based on general measures of syntax, semantics, fluency, and length, as well as measures specifically targeted in therapy

Effect sizes
- Group design:
  \[ d = \frac{(M_{post\ tx} - M_{pre\ tx})}{SD_{pre\ tx}} \] (Glass, McGaw & Smith, 1981)
- Single subject design:
  \[ d = \frac{(M_{maintenance} - M_{baseline})}{SD_{pooled}} \] (Beeson & Robey, 2003)
  \[ d = \frac{(M_{last\ 3\ Tx} - M_{baseline})}{SD_{pooled}} \] (Wisenburn et al., 2013)
- Approximate interpretation of effect size
  - Repeated specific probe measures:
    - small < 0.5, large > 1

Overview of general treatments for agrammatism (based on Davis, 2007)
1. Mapping Therapy: Focuses on recognizing the agent, action, and recipient and ordering them in a well-formed sentence.
2. Movement Therapy: Teaches syntactic movement for wh-questions, passives, or object cleft sentences. Often referred to as Linguistic Specific Treatment (LST) or Training Underlying Forms (TUF).
3. Verb Therapy: Focuses on identifying, producing, and building on the verb/action to produce the agent and recipient to generate a sentence.
4. Direct Production: Includes modeling, chaining, and feedback in structured activities.

Overview of general treatments for agrammatism (continued)
5. Constraint Induced Language Therapy (CILT): Intense therapy using only verbal communication of increasing sentence complexity. Constraint Induced Aphasia Therapy (CIAT).
6. Melodic Intonation Therapy (MIT): Uses singing or increased melodic intonation to improve fluency.
7. Response Elaboration Training (RET): Client’s spontaneous productions are shaped, chained, elaborated and repeated.
8. Sentence Production Program (SPP): Uses a story completion format to improve structure through 11 sentence types. Helm Elicited Language Program for Syntax Stimulation (HELPSS).

Overview of measures
- General measures
  - Syntax: e.g., % grammatically correct
  - Semantics: e.g., #CIU
  - Fluency: e.g., WPM
  - Length: e.g., MLU
- Specific measures: more precise measures of expressive language
  - E.g., % correct object cleft sentences, passives, Who questions
Mapping therapy

- Focuses on comprehension (and resulting production) of verb-noun relations at the sentence level
- Tries to map the thematic roles (who does what to whom) from the syntax of the sentence

Mapping therapy procedures

- Client would be shown an SVO written sentence and picture
  - perhaps with a paired one differing in one aspect
  - May be on cards for each NP or VP phrase
- Client was asked to find agent, action, and patient
  - underline them with different colored pens or place the NP or VP cards on colored lines
  - Verb is different color than NPs
- Client verifies correctness
- Repeat without color cues
- Repeated with different sentence structures, verbs

Mapping therapy general measures

<table>
<thead>
<tr>
<th>Study</th>
<th>Syn</th>
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<th>Flu</th>
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Mapping therapy specific measures

- Fink et al. (1995)
  - Actives: 1.15
  - Passives: 0.89
  - Embedded: 1.23
- Jacobs et al. (2000)
  - Passives: 2.45
  - Obj. Clefts: 1.06

Movement therapy

- Focuses on specific complex syntactic productions
  - active: “The artist chased the thief.”
  - passive: “The thief was chased by the artist.”
  - object clefts: “It was the thief the artist chased.”
  - object-extracted matrix: “Who has the artist chased?”
  - embedded questions: “I know who the artist chased.”
  - embedded actives: “I believe that the artist chased the thief.”
  - subject-raising sentences: “The artist seems to have chased the thief.”
  - object-relative clause: “The man saw the thief who the artist chased.”
- Uses more complex sentence types than mapping therapy
- Shows the movement from simple sentences to complex

Procedures for Movement therapy: Initial demonstration

- Use of cards with Subject and Object NP, verb, and other word cards (was, by, it was, who, what, etc.)
- Demonstration of active sentence using cards along with pictures, usually with its reverse.
- Clinician would state sentence. Client would use this model to describe the other picture.
- Either clinician would identify verb and thematic roles or else ask client.
  - E.g., “Point to the action.” “Point to the person doing the action.” “Point to the recipient of the action.” or “Point to the person being verbred.”
Procedures for Movement therapy: Movement of cards

- Clinician would move cards to make the target structure, adding other cards as needed.
- Clinician read sentence and client identified verb and thematic roles.
- Client then constructed target sentence for the other picture, produced it, and identified verb and thematic roles.

Movement therapy general measures

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Movement therapy specific measures

- Ballard et al. (1999)
  - Object Cleft: 1.67; Matrix Questions: 2.07; Embedded Questions: 2.73; Embedded Actives: 4.03
- Den Ouden et al. (2009)
  - Object Cleft: 14.29; Object Relative: 8.39; Object extracted WH: 0.87
- Dickey et al. (2007)
  - Object Relative: 1.47
- Mack et al. (2017)
  - Passives with locative adjunct: 6.42; Simple passives: 3.88
- Thompson et al. (1998)
  - Object Cleft: 2.09; Who questions: 1.82
- Thompson, den Ouden et al. (2010)
  - Object Relative: 1.80

(continued)

- Thompson et al. (1993)
  - Who Question: 2.19; What question: 1.61
- Thompson et al. (1997)
  - Object cleft: 1.87; Simple passives: 1.72; subject raising: 2.39
- Thompson et al. (2003)
  - Object cleft: 1.88; Object relative: 1.73; WH questions: 1.88
- Thompson et al. (1996)
  - Who questions: 1.84; What questions: 1.49; when questions: 1.97; where questions: 1.95

Verb treatment

- Focuses on identifying (retrieving) verb, then building sentence from the verb.

Verb treatment: Simple verb to agent/patient production

- Takizawa et al. (2015);
- Shown a picture card with action, while clinician stated the action
- Client would produce agent and patient related to the verb
- Clinician would put the words on a frame, and client would produce sentence
- Thompson et al. (2013) would include instruction of themes, and shuffling word cards afterwards for client to put in sentence form
### Verb treatment focusing on semantic class
- **Schneider and Thompson (2003)**
- Show action picture of a verb
- Explain the semantic category of the verb
  - E.g., motion \((run)\) or change of state \((melt)\)
- Define the verb
- Client then named the verb

### Verb treatment focusing on argument structure
- **Schneider and Thompson (2003)**
- Show action picture of a verb
- Explain the argument structure of the verb
  - Two state: someone doing something to someone/thing
    - The girl is jumping over rope.
  - Three state: someone is doing something with something to someone/thing
    - The girl is filling the pitcher with water.
- Define the verb
- Client then named the verb

### Verb treatment focusing on production in sentences
- **Bastiaanse, Hurkmans & Links (2006)**
- Action picture is shown for client to name verb
- Action picture is shown with written sentence with infinitive verb omitted. Client reads sentence and fills in verb.
- Action picture is shown with written sentence with tensed verb omitted. Client reads sentence and fills in verb.
- Action picture is shown for client to state the entire sentence.

### Verb treatment with morphophonological focus: Recognition
- **Faroqi-Shah (2008)**
- Action picture is shown for client to name in all three tenses
- Pairs of the same verb are stated for client to discriminate (e.g., \(washed\), \(washes\))
- Clinician would present words and pseudowords (\(washly\)) for client to verify

### Morphophonological verb treatment: Written production
- Client was given verb to think of as many different forms as possible \((sink, sinks, is sinking, will sink, sank)\)
- Clinician gave model of sentence for client to change target verb in same way ("Call can be changed to called. Please change wash in the same manner.") Client stated and wrote the sentence.
- Clients repeated task with each variation of the verb

### Verb treatment with morphosemantic focus: Recognition
- **Faroqi-Shah (2008)**
- Action picture is shown for client to name verb
- Clinician stated sentences with temporal mismatch with verb ("Yesterday the boy will wash his hands.")
- Clinician would state sentence for client to match with 3 pictures in all 3 tenses of the verb ("The boy will kick/kicks/kicked the ball."))
Morphosemantic verb treatment: written production

- Client was given written sentence with verb missing to write the verb related to a picture (“The boy _____ his hands.”)
- Client was given shuffled word cards to form a sentence to match the picture (i.e., anagram task)

Verb therapy general measures

<table>
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Direct Production therapy

- Includes modeling, chaining, and feedback in structured activities.

Implicit Structural Priming

- Lee & Man (2017)
- Instead of explicitly explaining grammar, simply model the target grammar in sentences and have client repeat

Implicit Structural Priming Procedures

- Review nouns and verbs in isolation
- Provide two written sentences in target form read (e.g., “the boy is giving a guitar to the singer”); feedback as needed
- Provide four filler sentences to read (e.g., “The sky is blue”)
- Show picture, with written verb, for client to describe in target form

Computer-based Direct therapy

- Linebarger, Schwartz, & Kohn, (2001)
- Focus on prepositions in reversible sentences (e.g., “The cat is above the bird”).
- Picture was shown on screen (with arrows to clarify preposition) for client to describe
- Speech recognition would automatically recognize sentence and provide feedback
Direct Production and Auditory-Visual training

- (Thompson & McReynolds, 1986)
- **Direct Production:** A picture was shown, client was instructed to ask a question about the picture. Feedback was given, with model as needed.
- **Auditory-Visual Training:** Picture and written sentence were shown; clinician repeated target 3 times; Written sentence was removed and client was instructed to ask a question about the picture

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**Specific Measures**

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Constraint Induced Language/Aphasia Therapy (CILT/CIAT)

- Intense group therapy over a short time
- Barriers (constraints) are implemented to eliminate use of AAC, gestures, etc.

Constraint-Induced Language Therapy (CILT) procedures

- Faroqi-Shah & Virion (2009); similar for others
- Intense training (24 hours over 10 sessions)
- Go Fish game (requesting cards)
- Cards had a picture of a child holding one or more items of a semantic category (e.g., animals, fruits, clothing)
- Only verbal responses were allowed

CILT responses

- Faroqi-Shah & Virion, p. 982
  - Level 1: agent + action + object
    - Boy hold apple
  - Level 2: Level 1 + request
    - Boy hold apple. Card?
  - Level 3: Level 2 + polite request
  - Level 4: Level 3 + color adjective
    - Boy hold red apple.
  - Level 5: Level 4 + article for all nouns
  - Level 6: Level 5 + plurality for object

CILT/CIAT general measures

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Melodic Intonation Therapy (MIT)

- Focuses on using intact musical skills (typically associated with right hemisphere) to improve expressive language

MIT procedures

- Schlaug, Marchina & Norton (2008)
- Patients learn to intone (sing) a series of 2-syllable words or phrases
  - *Water, ice cream*
- Sing 2-3 syllable social phrases
  - *Thank you, I love you*
- As each level is mastered, longer phrases are introduced

MIT general and specific measures

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Specific Measures

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Response Elaboration Training (RET)

- Designed to build upon client’s spontaneous productions
- Clinician models and elaborates on client’s production

RET procedures to elicit production

- Introduce stimulus
  - Conversational topic
  - Action picture
- Cue for response (“Tell me about this picture.”)
- If correct, reinforce. If not, provide cues or model possible words (e.g., “You could say *shoe* or *tie.*”) until correct or else move on to next item
- Repeat and reinforce correct answer, then ask for other phrase (e.g., “What is happening with the *shoe*?”)
- If not correct, give two models (e.g., “tie” or “brown”). If still wrong, use integral stimulation (“watch me, listen, and say it with me—TIE. TIE”).

RET procedures to elaborate on production

- Clinician reinforces and repeats production of second phrase. Then, clinician combines the two words (e.g., “Right, tie. Tie shoe.”)
- Clinician models full production and prompts client to repeat it 3 times.
- Clinician removes picture, waits five seconds, shows picture again to elicit the production. Cues are provided if necessary.
RET for conversational questions

- Doyle, Goldstein, Bourgeois, and Nakles (1989)
- Clinician presents conversational topic, prompts client to ask a relevant question
- If ambiguous, clinician gave content prompt to supplement production.
- If still ambiguous, clinician modeled question

RET, general and specific measures

General Measures

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Specific Measures

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Sentence Production Program (SPP)

- Also called Helm Elicited Language Program for Syntax Stimulation (HELPSS)
- Structured program to model and elicit sentence types of increasing complexity
- SPP: $111 from Pro-Ed

Helm Elicited Language Program for Syntax Stimulation

- Helm-Estabrooks & Ramsberger (1986)
- Story completion to elicit 8 (originally 11) sentence types of increasing complexity
- Two tasks:
  A. Clinician relates short story that ends with target sentence, then asks question
  B. Clinician relates short story without the target, and asks question to complete story

SPP sentence types

1. Imperative Intransitive: “Wake up.”
2. Imperative Transitive: “Lock the door.”
3. Wh-Interrogative (what and who): “What are you eating?”
4. Wh-Interrogative (where and when): “When are you going to eat?”
5. Declarative Transitive: “He paints houses.”
6. Declarative Intransitive: “He sings.”
7. Comparative: “He is taller.”
8. Yes-No Questions: “Did you buy the paper?”

HELPSS example stimulus

Helm-Estabrooks & Ramsberger (1986), p. 40

Level A: Rob’s grandchild is bored. Rob gets a book, and he reads his grandchild a story. What does he do?
Level B: Rob’s grandchild is bored. Rob gets a book, and what does he do?
Target response: He reads his grandchild a story.
SPP general measures

General Measures

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Conclusion

Numerous treatment approaches are available for treating agrammatism due to aphasia. These approaches have been tested in therapy and have demonstrated some efficacy. These approaches vary in their focus, so decide which is best for your client. All studies have a low n, and usually large variance. Therefore, caution is needed in interpreting results.

References (continued)

References (continued)


