

## The Effects of Modified Multimodal Communication Treatment in People with Aphasia – A Case Study


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Hyejin Park, Ph.D., Elizabeth Burklow, M.A., CCC-SLP,  
& Elizabeth Peeler, B.S.

Communication Sciences and Disorders, University of Mississippi

## Life-Participation Approach to Aphasia (LPAA) & Functional Communication


- Life-participation approach to aphasia (LPAA)
  - emphasizes client-driven service delivery and achieving clients' short-term and long-term goals of re-engagement in life (Chapey et al., 2000)
  - Functional and pragmatic approaches
- Functional communication skills
  - Improve communication success
  - Include to their community and society






## Multimodal Communication Treatment (MCT)


- Dr. Sarah Wallace & Dr. Mary Purdy (Diehl & Wallace, 2018; Purdy & Wallace, 2015; Wallace et al., 2014)
- Initially designed for people with aphasia due to a stroke but extended to people with TBI and PPA
- Integrated inter-modal lexical representations via simultaneous, focused multimodal instruction that encourages the use of non-verbal and verbal modalities
  - The use of compensatory strategies such as gesture, drawing, and writing
- Emphasizing switching modality to increase communication competence and communication breakdown resolution skills






## Multimodal Communication Treatment (MCT)

- Targets: Common object nouns
- Referential Communication Task (RCT)
  - Conversation partner
  - Request a picture card by using any modality
- Modality Production Probes (MPPs)
  - Errorless type of training for each modality
  - Five modalities: Verbal, Gesture, Drawing, Writing, & Communication book




## Treatment Effectiveness & Limitations of MCT

- Improvement in a structured task to communicate object words
- Limited evidence in connected speech and daily communication
- Possible interferences for treatment success
  - Impaired auditory comprehension
  - Low executive functions interfere with treatment success
    - Executive functioning mediates problem solving skills when a participant has word finding difficulty



## Current Study

- Adopted the protocol of Modality Production Probes (MPPs) & Referential Communication Task (RCT)
- Additions to increase spontaneous switching modality skills in daily conversations
  - Cueing for problem solving
    - Identification of the error/difficulty
    - Review the multimodal communication strategies
    - Suggest another communication modality
  - Discourse (conversation)
- Research question
  - Whether including external cue for switching modality and conversation task improve spontaneous switching modality skills in conversation?



# Methods

# Participants

## Participant 1. SR

- Female
- Age: 50
- Lives with husband
- Non ambulatory (on a wheelchair)
- Onset of a stroke: March 1, 2021
- Severe Aphasia, consistent with Broca's type, characterized by minimal and non-fluent verbal expression

## Participant 2. JL

- Female
- Age: 58
- Lives alone
- Onset of aphasia following nontraumatic intracerebral hemorrhage



# Language Assessment

- WAB-R (Kertesz, 2006)
- CLQT+ (Helm-Estabrooks, 2017)
- BNT- 2 (Kaplan, Goodglass, & Weintraub, 2001)
- NAVS – Verb Naming Test (Thompson, 2011)
- Pyramids and Palm Trees (Howard, Patterson, 1992)
- CIPA – Verbal Fluency (Schretlen & Vannorsdall)
- Communicative Effectiveness Index (Lomas et al., 1989)
- Discourse Analyses (in progress)
  - Main concept analysis (Darlton et al., 2020; Richardson & Dalton, 2016)
  - Core lexicon analysis (Kim & Wright, 2020; Dalton et al., 2020)
  - Use of multimodal communication strategies

## WAB-R

### Picnic scene picture



### Pyramids and Palm Trees



### CLQT+



### Verb Naming Test



## CETI

38 items of the Communicative Effectiveness Index (CETI)

Please rate your performance for each particular communication situation.

Getting somebody's attention.	Not at all able	.....	able as before
Getting involved in group conversations that are difficult to join.	Not at all able	.....	able as before
Getting you and an audience's attention.	Not at all able	.....	able as before
Understanding that he or she understood what is being said by you or him.	Not at all able	.....	able as before

## SAQOL-39

How much trouble did you have?

Speaking?

Speaking clearly enough to use the telephone?

Getting other people to understand you?

Finding the word you wanted to say?

Getting other people to understand you even when you repeated yourself?

During the past week, did you:

Feel that you were a burden to your family?

Feel that your language problems interfered with your family life?

Go out (even when you would like)?

# Standardized Test Results

Test	SR	JL
WAB-AQ	Aphasia Quotient: 38.4 Classification: Broca's	Aphasia Quotient: 76.2 Classification: Broca's
Expressive One-Word Picture Vocabulary Test	Raw Score: 4	Raw Score: 68
Communicative Effectiveness Index (CETI)	Not able at all: 12.5% Sometimes able: 50% As able as before: 37.5%	Not able at all: 6.25% Sometimes able: 68.75% As able as before: 25%
Stroke and Aphasia Quality of Life Scale-39	Mean: 2.1538 Physical: 2.3125 Communication: 1.18571 Psychosocial: 2.125	Mean Score: 2 Physical Score: 2.3125 Communication: 1.7143 Psychosocial: 1.8125
Verbal fluency	Letter Word: 0 Category Word: 1 Action Fluency: unable to test	Letter Word: 2 Category Word: 8 Action Fluency: unable to test
The Pyramids and Palm Trees Test	Pictures: 84.6% (4/52)	Pictures: 75% (38/52)
Cognitive Linguistic Quick Test Plus (CLQT+)	Attention: 3 Memory: 1 Executive Function: 1 Language: 1 Visuospatial Skills: 3 Clock Drawing: 1 Composite Severity Rating:	Attention: 3 Memory: 1 Executive Function: 1 Language: 1 Visuospatial Skills: 3 Clock Drawing: 1 Composite Severity Rating: 1.8 (Mod)

## Materials

- Object picture cards (3 x 5 index card)
- Communication book or AAC on iPad
- Whiteboard & marker (for writing and drawing)



## Trained and Untrained Word Lists

Animals	Personal Objects	Vehicle	Instruments	Desk Supplies	Kitchen Utensils	Jewelry	Entertainment	House Items	Clothes
Dog	Razor	Car	Piano	Ruler	Oven	Ring	Book	Key	Hat
Cat	Toothbrush	Bike	Guitar	Paper	Table	Necklace	Puzzle	Light	Shirt
Bird	Glasses	Plane	Drum	Pencil	Fork	Watch	Cards	Remote	Mask
Cow	Comb	Train	Flute	Scissors	Pan	Earring	Camera	Letter	Shoes
Animals	Personal Objects	Vehicle	Instruments	Desk Supplies	Kitchen Utensils	Jewelry	Entertainment	House Items	Clothes
Horse	Deodorant	Ship	Trumpet	Stapler	Knife	Bracelet	Dice	Broom	Scarf
Chicken	Tweezers	Motor-Cycle	Fiddle	Tape	Cup	Barrett	Swim	Iron	Socks
Pig	Chapstick	Canoe	Cymbals	Computer	Grater	Pin	Sing	Telephone	Jacket

## Procedures

- Pre- & post-test (5 sessions each)
  - Standardized language assessment
  - Switching modality strategy during a conversation
- Treatment
  - Twice of one-hour sessions per week
  - 10 sessions
  - 3 target objects each session (total of 30 targets)

## 1. Treatment Protocol: MPP

- MPP 1
  - Present modality chart and review communication options (e.g., speak, gesture, draw, write, or use a communication book)
  - Show the participant the first picture and demonstrate each modality. Then ask the participant to imitate. Fade cues as participant progresses through multiple productions.
    - Verbal (8 productions)
    - Gesture (7 productions)
    - Drawing (5 productions)
    - Communication Book (8 productions)
    - Writing (5 productions)
  - When all productions of one word are elicited, repeat the sequence with a new word

## Treatment Protocol: MPP

- MPP Evaluating and Retraining
  - Present the first picture and ask participant to demonstrate the different ways the noun could be conveyed
  - Request specific modality if not elicited
  - If unable to provide correct production, guide participant through the training
  - When all productions of one word are elicited, repeat the sequence with a new word

## MPP Example video clips



MPP 1

MPP 2,3, or 4



## 2. Treatment Protocol: RCT

- Trials addressing communication repair
- Each client is paired with a communication partner
- Client requests card from partner
- Partner responds according to accuracy of participant's request
- Given 5 object cards (3 trained and 2 untrained)
  - Communicate and request all 5 objects using any modality
  - SR with her husband and JL with an undergraduate student



## RCT Example video clip

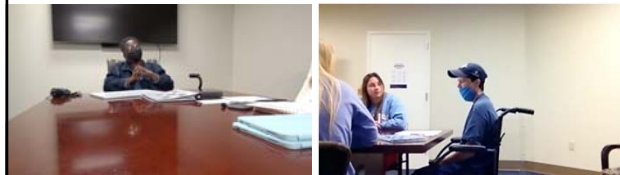


## 3. Conversation Activity

- After the training session
- Short (less than 5 minutes) casual conversation
- Related to the target objects practiced that day
  - e.g., Target: Violin -> conversation about any music instrument they played at school



## Conversation Example video clips

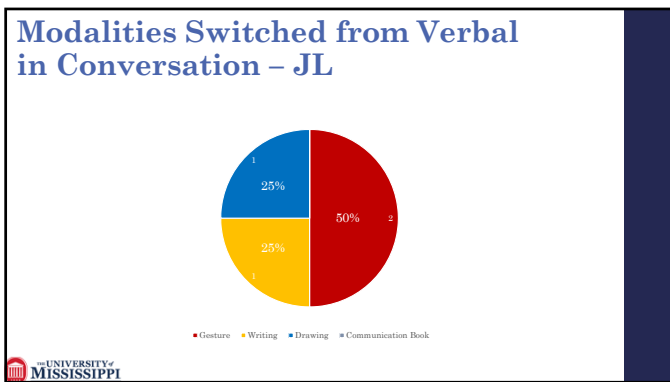
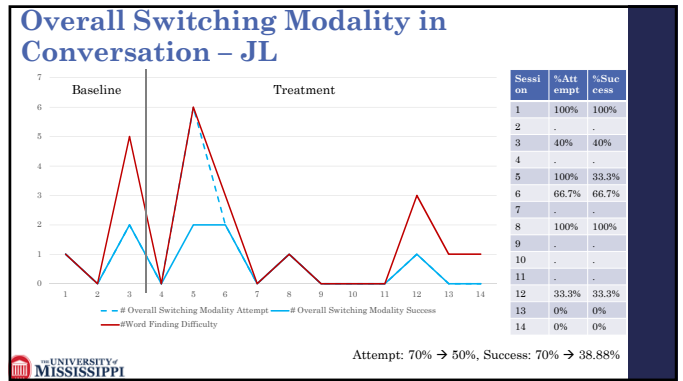
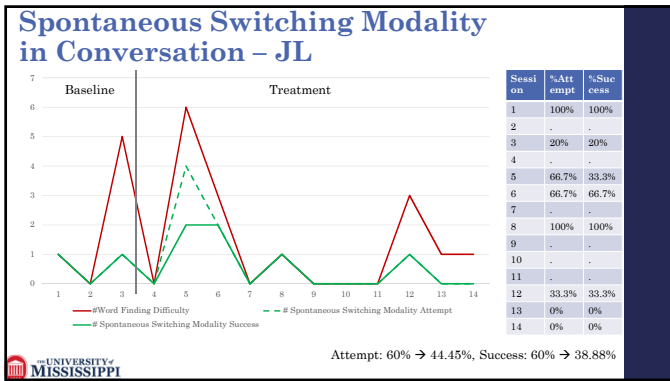


## Results

## Switching Modality in Structured Task-JL

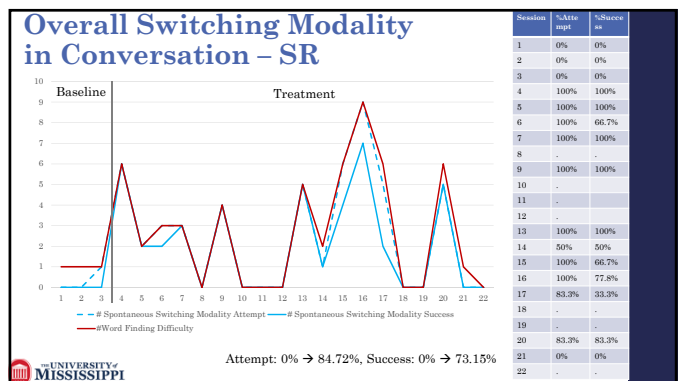
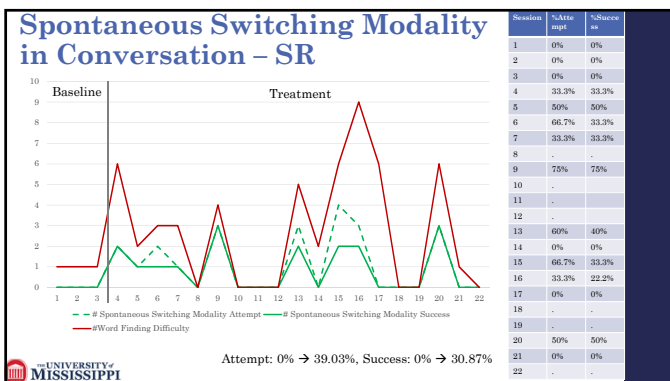
	03/31	06/21
Spontaneous recall of MPPs within the session	Client was able to independently demonstrate all modalities following training for 40% common nouns	Client was able to independently demonstrate all modalities following training for 60% common nouns for two consecutive sessions
Conversations	Client was able to independently utilize multimodal communication in 66% word-finding opportunities	Client was able to independently utilize multi-modal communication for 65% of word-finding opportunities for 2 consecutive sessions.



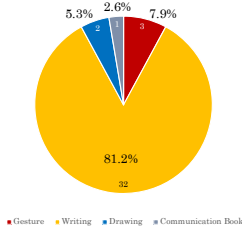


### Switching Modality in Structured Task – SR

	03/31	06/21
Spontaneous recall of MPPs within the session	Client was able to independently demonstrate all modalities following training for 40% common nouns	Client was able to independently demonstrate all modalities following training for 66% common nouns for two consecutive sessions
Conversations	Client needs moderate/maximal cueing when utilizing multimodal communication in word-finding opportunities	Client was able to independently utilize multi-modal communication for 50% of word-finding opportunities for 2 consecutive sessions



### Modalities Switched from Verbal in Conversation – SR



### Modality Switching in Conversation

JL switches spontaneously from a verbal modality to a written modality



JL switches spontaneously from a verbal modality to a gesture modality



## Discussion & Future Directions

### Discussion

- Switching modality skills in conversation
  - Increased in SR
    - More difficulty in verbal naming
  - Not increased in JL
    - Due to relatively preserved verbal naming skills
  - More effective to people with more naming difficulty
- Preferably used modality varied
- Limitation
  - Case study with two participants
  - Variability for the conversation task due to flexibility without a structure
    - Depending on topics, participants, and clinicians
    - Future study: more structure and controlled topics



### Modified-MCT & Group Therapy (on-going study)

- Individual treatment
  - MPPs
  - Structured task (RCT) with a communication partner
  - Discourse (Picture descriptions)
- Group treatment
  - Structured task between participants
  - Discourse (Collaborative story building)



### Telepractice MCT

- Benefits of telepractice for people with aphasia who
  - Live in the area with limited resources
  - Have difficulty with transportation
- Mississippi is the state with the highest prevalence ratio of stroke (4.3%)

