

Finger Counting as an Intersystemic Reorganizer in Apraxia of Speech

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Treatment of apraxia of speech in adults has been a major topic in speech and language literature in recent years. Clinical study has introduced a range of techniques applicable to diagnosis and remediation of apraxic speech (Dabul and Bollier, 1976; Deal, 1975; Rosenbek *et al.*, 1973; Skelly *et al.*, 1974). One such discussion of remediation was set forth by Rosenbek, Collins and Wertz (1976); they discussed A.R. Luria's (1970) model for reorganization of cortical processes after cerebral insult as a basis for apraxia therapy. As Rosenbek, Collins and Wertz point out, Luria feels it is only by major reorganization of cortical processes that apraxic speech can be improved.

Rosenbek and his colleagues (1976) utilize manual gesturing to reorganize the speech process. Meaningful gestures or "signs," largely Amerind (Skelly, 1974), are introduced into the act of speaking to increase meaningful verbalizations. While these signs communicate information themselves, the primary purpose is to facilitate the rebuilding of spoken language. There seems to be some interaction between the act of gesturing and the act of speaking such that the former contributes to the rebuilding of the latter. Luria calls this intersystemic reorganization, defined as "the rebuilding of speech by the introduction into the act of speaking a system or set of responses in a unique form or with a unique regularity" (Rosenbek, Collins, Wertz, 1976). The introduction of something new, such as Amerind, into the speech act reorganizes the language system, facilitating verbal expression.

Although the signs utilized by Rosenbek, Collins and Wertz were meaningful gestures, mention is made of the use of less meaningful gestures or "illustrators" as a form of intersystemic reorganization. These simple gestures paired with speech may relate to phrasing, loudness or voice contour, and serve to reorganize verbal output. I realize that all of us have probably utilized simple nonmeaningful gestures in therapy many times. Pacing motions are used routinely with the dysarthric patient and we "tap" our way through Melodic Intonation Therapy; however, I wish to share with you a dramatic example of the utility of nonmeaningful gestures as "reorganizers" in apraxia therapy. This case served to remind me that simplistic techniques should not be overlooked in dealing with complex problems.

Case Presentation

M.B., a 48 year old female, had suffered a ruptured aneurysm with surgical intervention in April, 1976 resulting in aphasia and marked apraxia of speech (see PICA scores, Table 1). Right hemiparesis had resolved by October, 1976. M.B. was scheduled for eight hours per week of speech and language therapy, and showed steady improvement until January, 1977, after which time PICA scores indicated a plateau in performance;

subjective impressions substantiated this. For the next five months a variety of therapy regimes (including language tasks, melodic intonation therapy (Sparks, 1976), imitation, articulatory posturing, contrastive stress drill (Rosenbek, 1976), Amerind (Skelly, 1974) and language master programming) were continued or initiated with little change in performance.

Table 1. Results of Porch Index of Communicative Ability administered three months post onset.

Name: M.B.	
Test Date: 7/20/76	
Overall Percentile	37 %
Mean	9.23
Gestural Percentile	49 %
Mean	12.68
Verbal Percentile	21 %
Mean	4.43
Graphic Percentile	54 %
Mean	7.85

Procedure

In June, 1977 a new technique using nonmeaningful gestures was introduced with surprising results. The program introduced was an outgrowth of a complex task hierarchy aimed at retention, sequencing, reading and verbal facilitation. This task hierarchy was introduced repeatedly with little success. Then a gestural act was added. We described this act as "finger counting." It involved equating each spoken word with a simple gesture.

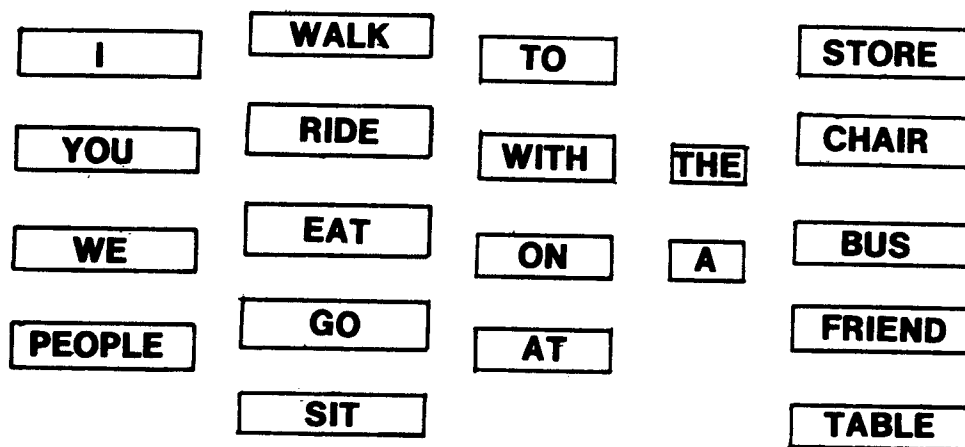


Figure 1. Example of arrangement of stimulus cards.

The task utilized printed word cards placed before M.B. as pictured in Figure 1. Sentences in the form subject (s), verb (v), and prepositional phrase (pp) were presented as follows (a video tape was used to demonstrate the procedure):

- 1) The clinician said a sentence; with each word the clinician held out one finger (as in counting on fingers). The client listened and watched.
- 2) Unison production using finger counting was completed.
- 3) The client produced the sentence with finger counting while the clinician provided mouthing or counting cues as needed.
- 4) The client "counted" off each word and chose from written words in proper sequence.
- 5) The client answered related questions using finger counting.

Finger counting was then incorporated into other therapy tasks such as simple imitation, sentence formulation and role playing.

Results

M.B. began to generalize the use of finger counting to spontaneous utterances. Family and friends noticed marked increases in sentence length and fluency. By September, 1977 PICA verbal scores had jumped 21 percentile points. Improvement portrayed by PICA profiles (Figure 2) was immediately obvious in M.B.'s conversation.

Porch Index of Communicative Ability

MODALITY RESPONSE SUMMARY

DATE	OVERALL	GESTURAL	VERBAL	GRAPHIC
9/30/77	82%	13.09	87%	14.22
6/1/77	72%	12.19	96%	14.63
1/24/77	73%	12.29	94%	14.47
9/16/76	55%	11.11	71%	13.58

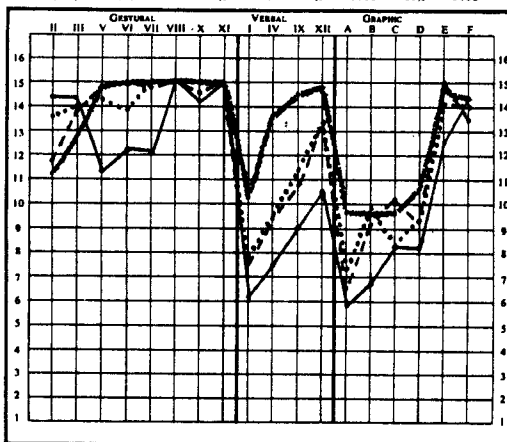


Figure 2. PICA modality summary for M.B.

- _____ 9/16/76
- 1/24/77
- 6/1/77
- xxxx 9/30/77

Conclusion

M.B. showed objective improvement following the use of finger counting, where she had ceased showing improvement with prior therapy regimes. Whether this improvement was related to alterations of prosody, rate, concentration, or sequencing is a matter for discussion; however, labeling this an intersystemic reorganizer seems plausible, in light of the permanent change in speech behavior following the introduction of this new gesture into the act of speaking. While gestures to punctuate rhythm and stress are common both in normal speech and as adjuncts to therapy, I felt that the systematic and exaggerated use of this simple nonmeaningful gesture in a facilitory task hierarchy resulted in a reorganization of the speech process.

References

- Dabul, B. and Bollier, B. Therapeutic approaches to apraxia, J. Speech Hear. Dis., 41, 268-275 (1976).
- Deal, J. and Resler, C. Diagnosis and treatment of apraxia of speech in adults. Paper presented to the annual meeting of the American Speech and Hearing Association, Washington, D.C. (1975).
- Luria, A.R. Traumatic Aphasia: Its Syndromes, Psychology and Treatment. The Hague: Mouton (1970).
- Porch, B.E. Porch Index of Communicative Ability. Palo Alto: Consulting Psychologist Press, Inc. (1967).
- Rosenbek, J.C. Treatment of apraxia of speech: prevention, facilitation and reorganization. Paper presented to the annual meeting of the American Speech and Hearing Association, Houston, Texas (1976).
- Rosenbek, J.C., Collins, M.J., and Wertz, R.T. Intersystemic reorganization for apraxia of speech. In R.N. Brookshire (Ed.) Clinical Aphasiology Conference Proceedings 1976. Minneapolis, BRK Publishers (1976).
- Rosenbek, J.C., Lemme, M.L., Ahern, M.B., Harris, E.H., and Wertz, R.T. A treatment for apraxia of speech in adults. J. Speech Hear. Dis., 38, 462-472 (1973).
- Skelly, M., Schensky, L., Smith, R., and Fust, R. American Indian Sign (Amerind) as a facilitation of verbalization for the oral verbal apraxia. J. Speech Hear. Dis., 39, 445-456 (1974).
- Sparks, R. and Holland, A. Method--Melodic Intonation Therapy for Aphasia. J. Speech Hear. Dis., 41, 287-297 (1976).

Discussion

- Q. Please talk about this gesture as compared to gestures more semantically related. Do you think the counting served to reorganize the particular item itself, or was it more of a retrieval cue to how many words were in the utterance?

- A. We have tried other retrieval strategies which did not work, including things that were more semantically related. Amerind was used for some time, and the gestures got worse; it complicated the situation because she was required to retrieve signs and verbal symbols. Indeed, the success of finger counting may have related to "how many words in the utterance." In her spontaneous speech, however, I'm not sure she was anticipating the number of words in the utterance; rather, she was able to tune in on each specific word as she came to it.
- Q. You think, then, that it's a different kind of intersystemic reorganizer than Amerind?
- A. I don't know if I can make that distinction. Both are gestures, but every time we talk about a reorganizer it is going to be different. Take the Parkinson's patient who is walking by stepping over lines; of course this is tapping into a different reorganization process than Amerind, but we still call it intersystemic reorganization. So, we could be tapping into something different with a different technique.
- Q. Did you try any other nonmeaningful gesture as a reorganizational technique, such as tapping?
- A. At one point we did try to make the gestures less obvious by having her hold her hand down and tap her fingers against her leg; this was not effective. Perhaps the visual system, seeing her hands, was important. Also, tapping was done with MIT, and that had not seemed to help.
- Q. Was her speech dysfluent in a context of fluency, or dysfluent in a context of dysfluency? Was the spontaneous, "throwaway" speech fluent or dysfluent? According to the Boston system these are two different kinds of patients; one is conduction aphasia, the other is Broca's aphasia.
- A. She was pretty much nonfluent across the board. The only fluent expression was "Oh Damn." Even with very non-propositional types of things, she exhibited a great deal of struggle behavior.
- Q. Did you work directly with fading the finger counting?
- A. Not really. She faded it herself.
- Q. What about the stairstep recovery pattern of an aneurysm patient and the fact that you may have hit at a peak?
- A. That is a good point. She has shown no other "spurts" of progress.
Comment: There is an ABAB design that might have answered this question.
- Q. You have a good example of some data that might be persuasive to the medical community. Relative to this, did you do the testing or do you have a colleague who can do testing for you?
- A. Unfortunately I am in a facility where I am the only speech person and must do testing myself. This is a problem because of bias, expectations and such.

Comment: We talk about two kinds of therapy for apraxia of speech. Facilitation is very effective for a patient who has the speech and language system to participate. For the patient who does not have a strong language system we need reorganization. Your nice presentation

helps me see the bridge between these. There are patients who are in the middle; they get to a point where they are not using Amerind--they no longer need it! This may be a nice way to take that patient to the point where we can facilitate speech.

Comment: Well, that wasn't a question, that was a speech.

Comment: I think this is a good example of where the single subject design can be dramatic. Your data are convincing, yet the technique appears that it could be compared to something else quite easily. What you have here is kind of a BC design where you tried some procedures early, they didn't work, so you tried something new. It would have been interesting to make continuous time series measurements, then revert back to your original B just to see if she would have done worse.

- Q. Do you think it is possible that the finger counting acted as a distraction device, to keep the flow of speech going and get her off the struggle behavior?
- A. I think there were a lot of things it could have been tapping into, and that is one of them. She is a very tense lady, and we had done lots of things to distract and relax her. Maybe this particular thing, with the tactile and visual components, could have been just the thing to distract her!
- Q. Could you tell about the stress used in this technique versus that used in previous techniques. Was there a difference?
- A. We had worked to focus in on the rate of speech at one point; seeing if I could slow down my speech, equalizing stress, and make it easier for her to imitate. That had not helped appreciably. Later we worked on what has been called contrastive stress drill; she was able to participate in the drill to a degree, but after a month of this, it had not changed her fluency. In free speech she really didn't have enough fluency at that point in time to have stress patterns. Now, her finger counting speech tends towards equalized stress.
- Q. In words of more than one syllable, did she use this technique to try to break up syllables?
- A. It is interesting because she did not do that. If she started to struggle on a long word, I would remind her that she could do that, but she did not seem to use it. However, when we did this video tape, we did an apraxia battery and where she said "sit, city" etc., at "citizenship" she broke it up into syllables. That was the first time I had seen her do this.
- Q. Was she familiar with the visual array from which she selected the words to be spoken? Was this new material?
- A. We used new words; they were usually in the same pattern with subject, verb, preposition, article, noun, but the words were changed.