Gesture As A Deblocking Modality In A Severe Aphasic Patient

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Introduction. Our case, Mr. P.J., presented severe aphasia following left hemisphere surgery for aneurysm repair. On initial evaluation, his repertoire of gestures, though very limited, was a significant residual in the context of otherwise severely impaired language.

Questions of theoretical interest which arise from this case study are several: 1) What is the relationship of "verbal and nonverbal" communication codes? 2) What is the significance of preserved pantomime and onomatopoetic vocalization relative to neurolinguistic models? 3) What is the validity of Sidman's (1971) definition of aphasia as deficient input-output relations, as contrasted to the traditional description of aphasic disorders as either input or output deficits?

Theoretical issues aside, the specific purposes of this presentation are clinical. We propose, 1) to describe how gesture was used to "deblock" both receptive and expressive skills in an aphasic individual; and 2) to offer tentative prognostic indicators for the success of a deblocking program using gesture.

Background. Mr. P.J. is a right-handed 38 year old male who had completed a B.S. degree and was self-employed. He is married with two children. Pertinent medical history is as follows. P.J. reportedly suffered headaches on May 28, 1976, followed by confusion and lethargy. An aneurysm at the bifurcation of the left internal carotid artery was identified. Craniotomy and aneurysm clipping were performed. The patient awakened from surgery"... with a profound right hemiplegia and was mute." P.J. did not receive speech/language therapy prior to his initial visit to the VA Hospital, Fort Howard, Maryland in December '76.

Table 1 shows P.J.'s communication status as was measured at the time of initial evaluation, 6 months post onset. He presented profound receptive-expressive aphasia. Speech was nonfluent, spontaneously neologistic, with generally poor imitation. Error awareness was poor. A mild manual apraxia was observed. Social orientation and motivation were good. In addition, he achieved 26 out of 36 on Raven's Coloured Progressive Matrices.

Positive prognostic indicators included the patient's age (38), education (B.S.), and good motivation. Negative indicators included the apparent extent of lesion, severity of overall deficit, months post onset without therapy (6), poor stimulability in all areas, and persistent drainage of surgical scar. Overall prognosis for return of functional communication was judged to be guarded.

Table 1. Deblocking Via Gesture

Auditory vs. Gesture Recognition		
Listen (Object Name)	-- Point	60%
Watch Gesture	-- Point	100%
Point vs. Gesture Response		
Listen	-- Point	60%
Listen	-- Gesture	100%
Deblocking via Gesture		
Listen	-- Gesture then Point	90%

(A videotape was then presented showing P.J. at beginning of therapy showing severe comprehension deficit for "whole body" commands.)

During the first few weeks of therapy, P.J. used a limited but effective repertoire of gestures. He began to gesture spontaneously (though inconsistently) to mediate auditory commands and speech. The necessary mediation of conventional linguistic channels with gesture suggested that a feature of P.J.'s aphasia was loss of automaticity of transcoding processes. This interpretation arose from two theoretical models.

Competence/Performance. First, in the competence/performance model, aphasia has been described alternately as 1) a competence deficit, wherein acquired language skills are believed to be "lost," or 2) as a performance deficit, wherein the efficient use of language is "interfered with" (Weigl and Bierwisch, 1970). P.J.'s preservation of gesture suggested that actual performance was far below potential linguistic competence. Gesture was to become our means of access to conventional "language" processes.

Transcoding. A theory of transcoding helped us explain our clinical findings. In this model, the integrity of the channel linking receptive and expressive modalities is emphasized (Weigl & Fradis, 1977). Sidman's (1971) definition of aphasia is consistent with the transcoding model. He stated:

> "Language...is a relational process. It is neither a particular type of input nor is it merely speech or any other single output, but is a process that includes many types of input, output, and their interrelations.

"Deblocking" is a therapy strategy based on the concept of transcoding. Collins, Wertz & Rosenbek (1976) defined deblocking as:

> "...the unique pairing of a disturbed function... with a more intact function..."

Johnson and Rubens (1975) presented a case study entitled "Visuo-linguistic disturbances following left occipital lobectomy." Naming errors by their patient inhibited subsequent recognition of objects. The so-called "visual agnosic" misnaming response was circumvented by 1) inhibiting the verbal response, and 2) training the patient to gesture with the object prior to verbalizing. Johnson and Rubens offer this as an illustration of the use of subsidiary sensory channels to compensate for a visual agnosic disturbance. Using our terminology, oral-verbal responses "blocked" subsequent expressive performance and as such was a poor transcoder of visual information. Gesture, when interpolated between visual input and naming output, proved to be a good transcoding modality; thus, gesture effectively "deblocked" visual deficits.

Therapy Program. The therapy program for P.J. will be described in terms of 3 phases: Phase I, Auditory Comprehension, from 6 - 9 mpo; Phase II, Amerind plus Traditional therapy, 10 - 20 mpo; Phase III, Deblocking Stabilization and Carryover, 20 - 24 mpo.

The first 2 months of treatment followed traditional lines, as depicted in Table 3. Stage 1 focused on yes/no response reliability, and comprehension of object names. Stage 2 focused on comprehension of objects described by function, with the goal of developing a communication book. During Stage 3, P.J. was re-evaluated. On the PICA, he performed at the 35th percentile overall. Subtests II and III were notable, with means of 12.0 and 13.7, respectively. The Schlanger-Koller Index of Pantomime Recognition was also administered. This test, the SKIPR, involves pointing to an array of action pictures in response to videotaped pantomime recognition tasks.

Diagnostic therapy using gesture to deblock auditory commands yielded encouraging results. The top of Table 1 shows that comprehension of gestures was superior to auditory comprehension. The middle of Table 1 shows that gestural output was superior to pointing. When instructed to listen, then gesture, then point, "listening' scores improved significantly.

Thus, the strength of the gestural modality for P.J. was demonstrated as an input modality, an output modality and, most important, as a transcoding modality.

P.J.'s use of gesture served to deblock ostensibly nonfunctional input and output modalities. Initially, almost no information was perceived or conveyed unless gestural transcoding took place. At 10 mpo, P.J. was enrolled in an Amerind group concurrent with this on-going traditional therapy regime. At this time, he exhibited severe receptive-expressive aphasia, resolving oral-verbal imitation at the single-word level, good pantomime recognition and pantomime object use, and emerging spontaneous gesture (pantomime and vocal elaboration).

In Stage 1 of the Amerind program (group), he acquired 20 Amerind sign selected for their relevance to ADL communication. In Stage 2, 100 signs and Amerind questions were taught. Twenty agglutinates and three sign sequences were introduced in Stage 3. Stabilization and carryover drills were emphasized in Stage 4.

In Stages 1 through 3 of concurrent traditional therapy (Table 2), deblocking of auditory and oral-verbal skills was emphasized, using gestures in the patient's Amerind repertoire. During Stage 2, memory tasks were drilled to enhance speech and gesture. Quantitative skills relevant to ADL needs were introduced in Stage 3.

Table 2. Therapy Program

Phase II b - Traditional* (10 -20 MPO)

Stage 1	Deblocking of Auditory & Oral - Verbal (Listen -- Sign then Point) (Look -- Sign then Say) Oral - Verbal Imitation (Single Words)
Stage 2	Auditory Memory (Object - name sequences) (Gesture sequences)
Stage 3	Quantitative Skills (Numeral Recognition) (Making Change) (Telling Time) (Simple Calculations using Sign)

*individual; multimodal

Table 3 shows the patient's acquisition of Amerind signs over time. On a nonstandardized test of 100 Amerind signs using both auditory and printed stimuli, P.J. progressed from 5% to an 80% level of proficiency.

Table 3. Amerind Acquisition

	Stimulus		
	Auditory (max = 60)	Printed (max = 40)	Total (max = 100)
Feb '77 Pre-Amerind	5	0	5
Apr '77	37	7	44
Nov '77	48	26	74
Dec '77 Post-Amerind	50	30	80

At 20 months post onset listening and reading, as well as oral-verbal accuracy and fluency were showing slow but continuing improvement. Error awareness and self-correction were emerging. Most exciting was P.J.'s functional use of Amerind in conjunction with pantomime and vocal elaboration. Vocal elaboration, which had appeared early, was onomatopoetic in character. For example, given the stimulus "what do we cut paper with?" he responded "snip, snip, snip." For a stimulus depicting falling, he

said "whoops"; for dripping, "drip, drip, drip"; for fast, "whoosh"; for clock, "tick, tick, tick," In place of animal names he typically would respond as follows: "whiney, whiney"; "ruff, ruff, ruff"; "mooo", etc. P.J. responded and propositionalized via gesture with 2- to 3- sign sequenc Gesture was frequent, appropriate, and imaginative.

Performance by P.J. on standardized aphasia tests (Table 4) only partl reflects his improved communicative abilities. On the PICA, P.J. improved from the 35th to the 45th percentile overall. Most significant change was on gestural subtests. Subtest II and III were initially high as you may recall, so change from the 26th to the 48th percentile reflects improvement on auditory, reading and visual subtests.

Table 4. PICA, Pre- & Post - Amerind + Traditional Therapy (10-20 MPO)

	Pre - Amerind Mar '77	Post - Amerind Nov '77
	(%-ile)	
Gestural	26 th	48 th
Verbal	37 th	39 th
Graphic	46 th	54 th
Overall	35 th	45 th

The third and most recent phase of therapy (21-24 mpo) focused on stabilization and carryover of available gestures to conventional receptive expressive language. In Phase II, consistent deblocking using gestures was emphasized. In Phase III, as the automaticity of input and output relations returned, gesture was no longer used as a deblocker, but rather as a facilitator. P.J. now uses an overt gesture to self-cue, as required.

At 24 months post onset, the automaticity of P.J.'s transcoding between modalities was significantly improved. Oral-verbal and gestural expression were equally distributed on spontaneous and responsive tasks. Gesture, consistently accompanied by "vocal elaboration," was fluent and communicative.

Summary. P.J. presented severe aphasia at 6 months post onset, with residual abilities in the gestural-pantomimic realm. In our judgment, gestura input and gestural output were the only viable modalities through which to access residual linguistic competence. Therefore, we initiated an intensi Amerind program. Gesture was systematically paired with other inputs and outputs during Amerind plus traditional therapy programs. At the present time, gesture is the most fluent and productive modality for this patient, while access to the conventional linguistic code—both receptively and expressively—has improved markedly. Despite persisting deficits in auditory memory, phonologic sequencing, reading and writing...P.J. is a functional communicator.

Based on this case study, we would like to highlight those features of potential prognostic value for a deblocking program using Amerind. At 9 months post onset, we observed the following strengths, which we feel, post hoc, are relevant to P.J.'s improvement: 1) gesture recognition ability; 2) gesture production, including object use, imitation of gesture, spontaneous use of pantomime; 3) facilitation of auditory and visual comprehension when paired with gesture; 4) verbal imitation of single words; 5) good performance on Raven's Coloured Progressive Matrices and finally; 6) motivation to communicate.

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Discussion.

Q. Did you inhibit verbal output at any point in time?
A. No. At no point did it appear to interfere with any of the other work.

Q. Do you think what you did reflects a process or a cognitive model?
A. In my definition of language and aphasia, I would view process and cognitive models as relatively synonymous. Perhaps you could distinguish those for me. Relevant to the discussion the other day, when we were talking about the operant approach versus a processing approach—I am a behaviorist and yet I feel this case study does reflect what we can do with processing abilities. When I spoke of automaticity of transcoding processes I was talking about how long does it take to get from a conventional input to the conventional output, and what we do in between those two to facilitate performance. To me, this is a processing model, in terms of temporal factors and cognitive abilities.

C. Relative to yesterday's discussions about group versus single subject studies, this highlights another advantage of single subject studies in that while group studies are capable of establishing what may be called rules, single subject designs are more capable of identifying the exceptions to the rule. What you presented, if our results are valid and your results are valid, is an exception to the rule.

Q. Would you say his gestural or pantomime abilities were intact or relatively intact?

A. At the very beginning we saw so little behavior in any modality, I would have to say relatively intact. As this came along, we never trained pantomime, only Amerind, and the pantomime abilities became extremely refined; interpret that as you will. I think they were relatively intact but pretty strong.

I would also like to address your initial comment. The one thing I disagreed most with based on this study is your comment that perhaps we should not be using gesture to deblock the verbal problems with aphasia. However, I see a lot of consistency in what we're talking about. I tried to work out in my own mind whether the verbal skills and the nonverbal were really distinct. From the interpretation that I have made, I think that these two areas can function independently, but that they have the same conceptual base. By this I mean, the onomatopoetic vocalization, some visual capabilities that he showed and certainly the gesture, the pantomime, did reflect conceptual abilities. They were used in the act of communication. So I see these systems, the verbal and nonverbal, as being highly overlapping and complementary, despite perhaps separate function at times.

C. I think what I tried to be very careful about in summarizing our results was to be skeptical of undocumented recommendations to tap those skills.

Q. At what point in time did you work on auditory skills and oral-verbal imitation relative to the Amerind program, and could he move on to closure (sentence completion)?

A. The Amerind program was concurrent with the more traditional approach. During the 10 - 20 months post onset, we maintained both regimes. In the Amerind program we did not encourage verbalization; in the traditional individual treatment we did. He has shown improvement on Subtest IX (PICA); the improved auditory comprehension abilities which you could see from the (videotaped) segment showing Amerind facilitated his performance on that type of task as well.

Q. Are there any standardized instruments that might help us offer a prognosis for individuals of this sort?

A. Standardized tests were not very adequate in helping us discern what his strengths were. He did come out at the 35th percentile on the PICA when we first evaluated him; Subtests II and III were strong, so perhaps we could look at these again in a case like this. But on the Boston (Diagnostic Aphasia Exam), the Functional Auditory Comprehension Task, and a whole range of other clinical measures, we were not seeing strengths. In fact, he was very severe in the auditory modality, so we were gambling.

Q. What is the relative importance of the prognostic indicators you did mention? Do you think his spontaneous use of gestures might have been the most important thing?

A. I think the gesture recognition and gesture-pantomime—spontaneous use, object use and gesture imitation—were the two most important. And thirdly, when we paired gesture with auditory and visual materials at the beginning, there was a facilitative effect. These three things would be the most important prognostically.