MELODIC INTONATION THERAPY: VARIATIONS ON A THEME

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INTRODUCTION AND PURPOSE

Clinical aphasiologists are continually concerned with selecting the most appropriate and effective therapy methods for those persons who have incurred language dysfunction. Melodic Intonation Therapy (MIT) is a newly-developed therapeutic procedure which has been reported to serve as a "catalytic process" in language rehabilitation.

The purpose of this presentation is to describe our clinicial experience with intoning procedures. Specifically, this investigation employs a two-section format. Section I consists of an overview of MIT with a case report. Section II describes the Marshall Modification which represents a variation of MIT in the form of three separate treatment plans.

S E C T I O N I

OVERVIEW OF MELODIC INTONATION THERAPY

Researchers Sparks, Helm and Albert have developed and demonstrated the efficacy of MIT with certain aphasic adults in the Aphasia Research Unit, Boston, VAH (Sparks, Helm & Albert, 1974). Sparks, et al., did not presume that MIT would be effective with all clinical types of aphasia, but have reported that "patients who profit from MIT seem to evolve to good examples of Broca's aphasia--four to five word sentences which are meaningful and substantive but dysarthric and agrammatic" (Sparks, 1974, p. 5). Their results with eight aphasic adults have indicated that a higher rate of success was achieved with candidates fulfilling the following criteria:

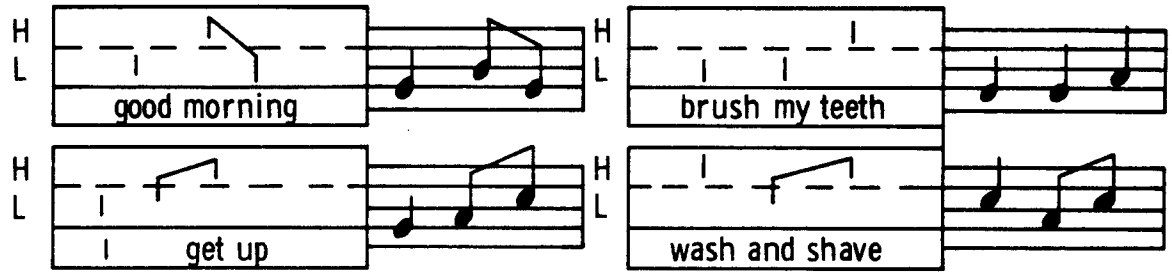
1. Good auditory comprehension
2. Facility for self correction
3. Markedly limited verbal output
4. Reasonably good attention span
5. Good emotional stability

Agreement on a rationale of the neurological bases accounting for the effectiveness of MIT has not been reached. Sparks et al. (1974) hypothesize that "increased use of the right hemisphere dominance for the melodic aspect of speech increases the role of that hemisphere in inter-hemispheric control of language, possibly diminishing the language dominance of the damaged left hemisphere" (pp. 313-314). Although there are many theories pertaining to the exact role of the right hemisphere in language related functions, this issue remains unsolved and continues to be investigated.

The melodic intonation patterns used in MIT retain the inflections, rhythm and stress of normal speech. The speech prosody contours are then transposed into melodic intonational patterns (Sparks, 1975). Figure 1 illustrates some samples of intoned stimuli and the corresponding melodic patterns which were extracted from the MIT Manual of Methods (Sparks, 1975).

FIGURE I

SIMPLE MELODIC INTONATION AND CONTOURS



H = higher pitch
L = lower pitch
I = single word
II = multi-syllabic word or phrase

Extracted from Manual of Methods, 4th revision (Sparks, 1975)

C A S E R E P O R T

Mr. E., a 49 year old male, was admitted to V. A. Hospital, New Orleans, October 5, 1975, with a medical diagnosis of left middle cerebral artery thrombosis with subsequent aphasia and right hemiplegia.

Melodic Intonation Therapy was initiated at nine months post-onset. The Porch Index of Communicative Ability (PICA) was administered pre- and post-MIT for the purpose of measuring possible change in language performance.

This patient exhibited a moderate degree of both aphasia and apraxia at the initiation of MIT. Although Mr. E. could repeat most single words accurately, mild prosodic disturbances were noted. He occasionally responded successfully on naming tasks but responses were more often unintelligible or rejected. His attempts to initiate an utterance spontaneously were characterized by the production of a potpourri of phonemes accompanied by intense struggle behavior.

PICA Overall scores immediately pre- and post-MIT remained unchanged. Improvement in Overall performance was observed, however, on subsequent PICA's administered three and six months later. The PICA Overall and modality percentile scores are illustrated in Figure 2.

The use of the PICA modality and cell scores proved to be a more sensitive measure than Overall scores for measuring language change. These scores further support the clinical impression that language performance had improved. A discussion of these results may be interpreted more easily following a brief presentation of MIT.

RESULTS:

A. MELODIC INTONATION THERAPY

The manner in which language behavior appeared to be influenced by MIT provided some interesting and unexpected results. That is, modifications of specific behaviors were noted during the course of MIT. A sampling of the overt behavior changes will be presented as they occurred during the four levels of MIT.

The MIT Manual of Methods (Sparks, 1974, 1975) outlines specific steps for each of the four MIT levels. However, some freedom is permitted in the manner in which the steps are administered. Certain administration "techniques" found useful with this patient are, therefore, included in the following presentation of MIT.

Level I

The patient adapted easily to the intoning procedures required at this level. For example, verbal instructions are minimized by utilizing hand signals to indicate when the patient should attend or respond. Further, the melodic pattern, which is presented at a reduced rate throughout MIT, is emphasized by the joint hand tapping (clinician and patient) of the rhythm and stress (R & S) pattern of the stimulus-response sequence.

Level II

Variability in syntactic structure of the stimulus is permissible; however, the semantic intent must be retained. Mr. E. lost only one point

Porch Index of Communicative Ability

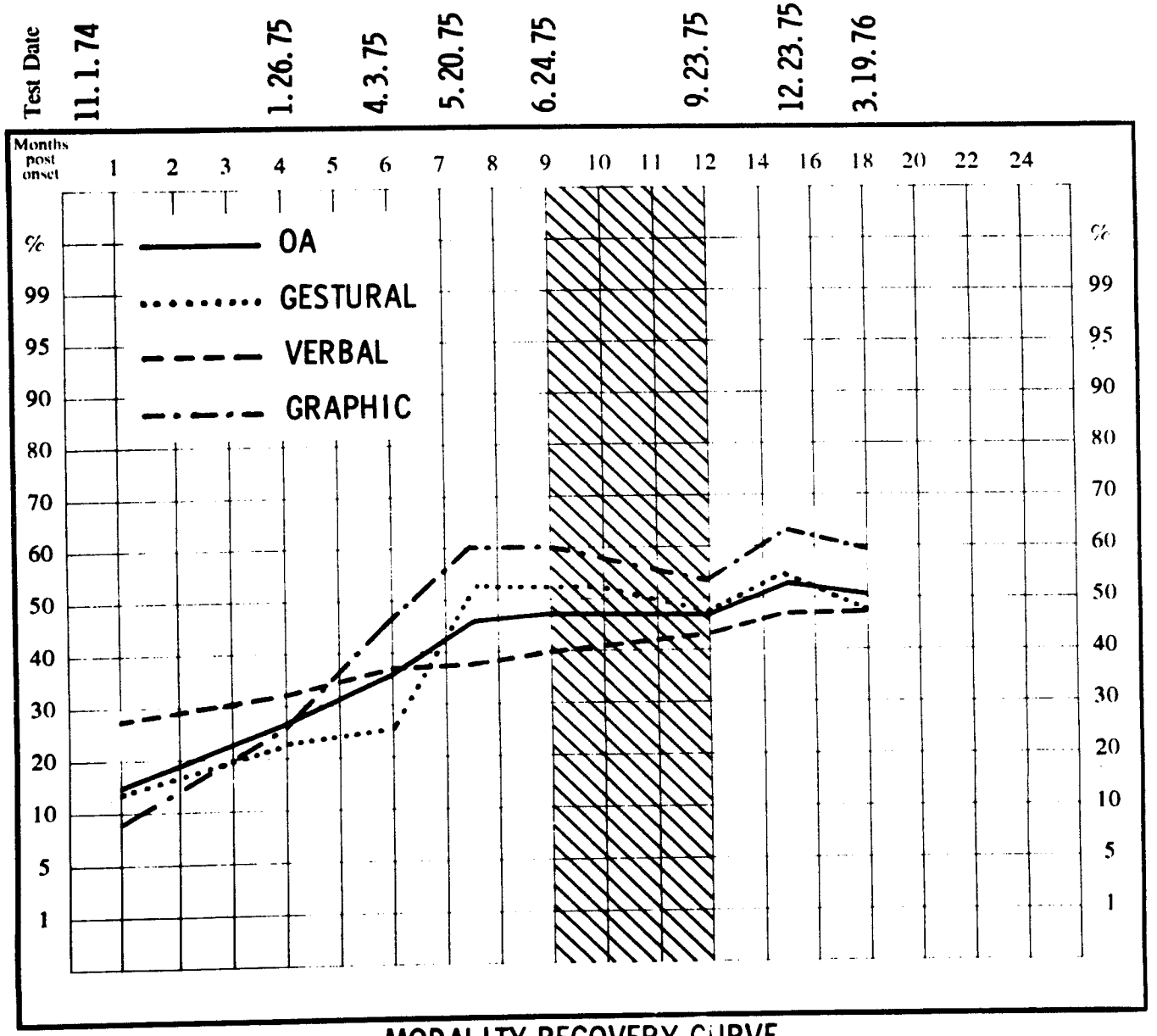
APHASIA RECOVERY CURVE

(Percentiles)

Name E. E. Case No. _____

Birthdate _____ Race _____ Onset 10/5/75

DX. Type Left middle cerebral artery thrombosis



MODALITY RECOVERY CURVE

FIGURE 2

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during Level II when he transformed an interrogative form to a declarative form. When the emergence of this pattern was detected during subsequent MIT levels, the interrogative form was deleted. At that time, it appeared to this clinician that it would be more productive to prepare a program implementing the interrogative form to be administered at the completion of MIT. This decision obviously had an effect on the scores. Thus, careful examination of the type of stimuli is advised when comparing the results of MIT, as this selection process can bias the results. Responses were further manipulated by ordering the presentation of the stimuli to maximize the patient's performance. For instance, when delays or self-corrections occurred, the clinician provided an easier phrase on the following item.

We found it useful to present stimulus-response sequences in multiples of three. The score sheet for the first day of Level II, shown in Table 1, illustrates 228 responses that were elicited from a total of 19 intoned stimuli. The struggle behavior (scored as (4)) which characterized verbal output prior to MIT occurred on only four of these responses.

A plus-minus scoring system is used in MIT. However, the 100% performance level that this patient achieved on eleven of twelve sessions at Level II does not reflect the reduction that occurred on both delay and struggle behavior.

The patient must achieve a score of 90% or better for ten consecutive sessions to proceed to the next level. This criterion obtains for the remainder of the MIT program.

Level III

Scores on Level III ranged from 95% to 100%. Backup steps (shown in Figure 3) are available to the patient if failure is encountered. During the first session the backup step was required three times at Step 3, but struggle behavior occurred in only one response.

MELODIC INTONATION THERAPY - LEVEL III

(STEPS 1 - 4)

STEP	STIMULUS	RESPONSE	SCORING	CONSEQUENCE
1	Present intoned item	Tap rhythm & stress (R & S)	No score	Proceed to Step 2
2	Intone item with fading	Intone in unison (R & S)	+ = 1 - = 0	Step 3 Discontinue item. Initiate new item at Step 1
3	Intone item, DELAY	DELAY - repeat (R&S)	+ = 2 -=Backup*	Step 4 Step 2
4	Intone question	Intone answer	+ = 2 - = Backup*	Item completed. Step 3

*Backup: Pass = 1 point

Fail = Discontinue item

FIGURE 3

MIT LEVEL II (Session 1)

	II	III	IV	V	Comments *		
GOOD MORNING	1	1	1	1 *	Morning = 13, 15, 13		
I GET UP	1	1	1	1	No struggle		
BRUSH MY TEETH	1	1	1	1	Noted during MIT that is noted in spont. speech		
WASH & SHAVE	1	1	1	1 *	15,13, ④ -15, 15, 15		
TAKE A SHOWER	1	1	1	1 *	k/t, 13, ④ —13, 13		
I GET DRESSED	1	1	1	1 *	④ —13,15, 15, 13		
SHOES & SOCKS	1	1	1	1 *	4 —13, 15, 13		
COMB MY HAIR	1	1	1	1 *	4 —13, 15, 13		
I PLAY BINGO	1	1	1	1 *	15, 13, 15		
I AM HUNGRY	1	1	1	1 *	13, 15, 15		
EAT BREAKFAST	1	1	1	1			
ORANGE JUICE	1	1	1	1			
BACON & EGGS	1	1	1	1			
CUP OF COFFEE	1	1	1	1			
PASS THE CREAM	1	1	1 *	1	④ -13, 15, 15		
THANK YOU	1	1	1	1 *	15, 13, 15		S/θ
TIME FOR DINNER	1	1	1	1			
SALT & PEPPER	1	1	1	1			
KNIFE & FORK	1	1	1	1			
	19/19	19/19	19/19	19/19	= 100%		
④ = Struggle on initiation					1= 3 responses		
4 = Potpourri of initial sounds, easy							

TABLE I

VA FORM MAR 1953 **7051b DATA SHEET**

Level IV

The patient was adept in making the transition from intoning to Sprechgesang (speech-song) to normal speech required at this level. (See Figure 4) Sparks (1974) defined Sprechgesang as the maintenance of tempo, rhythm and stress of the melodic line pattern with the constant pitch of intoned words replaced by the variable pitch of speech.

MELODIC INTONATION THERAPY - LEVEL IV

(STEPS 1 - 5)

STEP	STIMULUS	RESPONSE	SCORING	CONSEQUENCE
1	Intone item. DELAY	Repeat. (R & S)	+ = 2 - = Backup*	Proceed to Step 2 Intone in unison with fade
2	Sprechgesang with fade	Sprechgesang in unison (R&S)	+ = 2 - = BU*	Step 3 Step 1
3	Sprechgesang with delay	Repeat in Sprechgesang	+ = 2 - = BU*	Step 4 Step 2
4	Normal speech DELAY	Repeat in normal speech	+ = 2 - = BU*	Step 5 Step 3
5	Question in normal speech	Answer question	+ = 2 - = BU*	Item completed Step 4

Backup (BU)* Pass = 1 point

Fail = Discontinue item

FIGURE 4

Delays were more prevalent during the first three sessions of Level IV. However, these responses were not accompanied by struggle behavior. The extent of articulatory accuracy may vary with the individual patient. However, the responses must be at least 50% intelligible. Improvement of articulatory skills is not the objective of MIT and the patient was not penalized for his mild distortions and occasional substitutions. On the following presentation of the stimulus, however, the clinician emphasized the phoneme in error by increasing her volume or simply asking the patient to "watch me."

RESULTS:

B. PICA

The PICA was utilized to determine changes which might occur in the patient's language behavior. The interpretation of PICA Overall, modality and cell scores is presented in the following discussion.

1. PICA Overall and Modality Scores

The PICA Overall scores immediately pre- and post-MIT remained unchanged. It can be seen in Figure 2 that, while verbal responses did improve, a reduction of six percentile points on both the Gestural and Graphic modality scores averaged out a gain of three percentile points on the verbal modality scores.

The absence of printed stimuli during the administration of MIT may have contributed to the reduction observed in PICA Gestural (including reading tasks) and Graphic Modality scores.

2. PICA Cell Scores

Patterns relating to intelligibility may be observed in the Cell Scores on PICA Verbal subtests I and IV. Verbal responses on subtest I prior to MIT (Table 2) consisted of undifferentiated, unintelligible utterances (score of 3) and rejections (score of ⑤). Only one acceptable response was recorded on five administrations of the PICA prior to MIT. [That is, the patient responded with an acceptable response (score of 11 , incomplete delay) on only one out of 50 responses.] On the three PICA administrations post-MIT, a considerable increase of this response type was observed.

In addition to the unintelligible responses which occurred on subtest I, comparable responses occurred on subtest IV (naming tasks). Three unintelligible responses occurred on subtest IV pre-MIT; however, no unintelligible responses have occurred on PICA verbal subtests administered since the completion of MIT.

CELL SCORES ON PICA SUBTEST 1

	1 MPO	4 MPO	6 MPO	7½ MPO	PRE-MIT	POST-MIT	3 MONTHS POST-MIT	6 MONTHS POST-MIT
TB	5	4	⑤	3	⑤	5	6	⑤
CG	⑤	5	⑤	3	⑤	11	5	11
PN	4	⑤	⑤	5	⑤	9	11	6
KF	5	4	5	3	3	⑤	⑤	5
FK	4	5	⑤	⑤	⑤	5	6	11
QT	3	⑤P	⑤	3	⑤	⑤	6	11
PL	5	4	⑤	3	11	11	⑤	11
MT	5P	5P	4	3	⑤	5	7	7
KY	5	5P	⑤	3	5	⑤	11	7
CB	4	4	⑤	⑤	⑤	⑤	⑤	5
X	4.5	4.6	4.9	3.6	5.4	6.6	6.7	7.9

TABLE 2

FUTURE TREATMENT CONSIDERATIONS:

The application of MIT can be a highly profitable procedure with selected aphasic adults. However, further treatment considerations may be warranted at the conclusion of MIT.

Future treatment objectives for this patient were designed to incorporate the gains that occurred during the time MIT was administered, to insure maintenance of these and other language skills.

Intense struggle behavior characterized this patient's language performance prior to MIT. However, even during the initial levels of the program, the presence of struggle behavior was minimal. When intoning procedures were abruptly terminated at the completion of MIT, the patient demonstrated a reoccurrence of struggle behavior. Therefore, a program designed to provide a gradual "fading" of intoned stimuli was instituted.

As stated earlier, printed stimuli are not available to the patient during the administration of MIT. However, prior to MIT, printed stimuli had been used effectively to enhance verbal output. Therefore, in order to maximize performance, printed stimuli were incorporated into the post-MIT treatment program.

CONCLUSIONS:

The intervention of MIT appears to be an effective treatment procedure with certain aphasic adults. Verbal output appeared to be increased with this patient by the remediation of delays, rejections and struggle behavior.

The increase in PICA scores at three and six months post-MIT (Figure 3) are of particular interest. Examination of this patient's PICA scores three and six months post-MIT reveal that the patient has maintained the skills acquired through MIT and, further, that the Gestural and Graphic Modality scores have returned to the pre-MIT level, possibly as a result of the reinstatement of printed stimuli into his treatment program. Further gains may be attributed in part to this patient's more positive attitude toward communication and, additionally, improved articulatory skills. Documentation on a larger sample is indicated in order to identify the variables that might contribute to language changes post-MIT.

S E C T I O N II

INTRODUCTION

The initial portion of this clinical investigation presents an overview of Melodic Intonation Therapy (MIT) and discusses the implications of a language treatment program utilizing this procedure. Section II describes a variation of MIT, platonically dubbed by our Clinic the "Marshall Modification," but hereafter referred to as the M-Modification.

As reported here (Section I) and elsewhere (Sparks et al., 1974) MIT is an extremely profitable therapeutic procedure for use with certain individuals who have incurred language impairment secondary to neurologic insult. We have, however, encountered several patients who were not able to participate in an MIT program--particularly when administered in its "orthodox" form. That is, these patients demonstrated some potential for language retrieval using intoned stimuli, but the task structure of MIT appeared to perpetuate a defeating rate of non-success. Further, it is

necessary to state that these patients exhibited marked motor speech difficulty (apraxia/dysarthria) in addition to their aphasia.

In any case, an adaptation of intoned therapy procedures in conjunction with other models and principles of therapeutic intervention seemed warranted. The precise objective of the "variation" of MIT to be described (i.e., the Marshall Modification) is to report a procedure found to be useful and necessary in the rehabilitative process of three veterans seen at the New Orleans Veterans Administration Hospital. Further, MIT had been the first treatment mode considered, but attempts to employ this procedure were frustrating/unsuccessful for these individuals. (See Table 1 for a general comparison of MIT and the M-Modification.)

TABLE #1

GENERAL COMPARISON OF MIT AND MARSHALL MODIFICATION

	MIT	Marshall Modification
Program Construction:	a) 4 Levels: all 100% Clinician-directed	a) 3 Treatment "Plans": --Plans I & II: 100% Clinician-directed --Plan III: Independent practice
Intoned Stimuli:	b) Familiar phrases instructed once in program	b) "Intoned Sequence Units" instructed more than once; (Plan III can use "ISU's" and/or other phrases.)
Administration Techniques:	c) Tap rhythm and stress of utterance	c) Tap rhythm and stress for each "ISU"
	d) Hand signals to supplement instruction	d) Hand signals also employed
	e) Graphic representation of phrase is not incorporated into program	e) Graphic stimuli present throughout: --Plans I & II: printed cards --Plan III: language-master cards
Reinforcement:	f) Not specifically mentioned	f) Feedback provided to encourage self-monitoring skill

CONTRIBUTING RESEARCH

The M-Modification is composed of three treatment "plans" and reflects a synthesis of several available clinical tools. A review of contributing research and discussion of methods incorporated in our variation are presented below.

1. Melodic Intonation Theory: It is reported that intoned stimuli may facilitate language retrieval through activation of right cerebral hemisphere mechanisms (Sparks, et al., 1974). Consequently, intoned stimuli, although of a slightly different format, are used throughout our treatment plans. That is, since our patients could not readily "switch" familiar phrases nor (separate) melodic patterns, as required in MIT, an alternate

design was indicated.

a. Stimulus and Presentation: Specifically the M-Modification proposes an "Intoned Sequence Unit" or "ISU" as shown in Figure 1. An ISU is composed of a functional carrier phrase and core of five common nouns. A "Component-ISU" refers to one of the five core words in conjunction with the carrier phrase. Further, an ISU makes use of one melody reflecting a natural intonational contour of spoken speech. Specific phrase and word selection is tailored to each patient's needs. In general, the words and phrases used should reflect a high communication load, a phonemic analysis of the patient's speech pattern, and have therapeutic instructional value as well. (For example, the carrier phrase "It's a _____" can be readily absorbed into other therapy tasks designed to increase verbal output.)

FIGURE #1

SAMPLE OF INTONED SEQUENCE UNIT
Composed of 5 "Component ISU's"

It's a door.

It's a watch.

It's a coke.

It's a man.

It's a book.

Intoned Sequence Units are used throughout our variation; however, Plan III (independent practice) can incorporate unprogrammed phrases equivalent to those used in an MIT program. The use of hand signals and the tapping of phrase rhythm and stress are also incorporated in this variation. In contrast to MIT administration techniques, we always supply the patient with a graphic representation of the target component-ISU. Therefore, it can be said that a "stimulus power" (Bolinger & Stout, 1976) of one is always available. (Again refer to Table 1 for a general comparison between MIT and the M-Modification.)

2. Treatment Programming: Bollinger and Stout (1974, 1976) reviewed the merits of employing structured treatment methodologies and have delineated a "Response-Contingent Small Step Treatment" (RCSST) paradigm for use with "brain-injured communication-disturbed" patients. A task hierarchy similar in nature to that developed by Rosenbek, Lemme, Ahern, Harris and Wertz (1973) is an essential component of the RCSST.

Our modification also incorporates the idea of establishing task hierarchies. Further, Plans I and II consist of essentially two (graded) task continuums. In contrast to the Rosenbek et al. procedure and the RCSST program, the M-Modification does not make use of Porch's multi-dimensional scoring system (1967, 1971). Rather, it employs a "plus/minus" type scoring method to be explained later in this paper.

3. Accountability: Plans I and II of the M-Modification require that the patient's response behavior be quantified and graphically recorded following each session. LaPointe's (1974) Base 10 Response Forms are extremely useful. This accountability procedure allows assessment of task hierarchies and provides a measure of language behavior change resulting from therapeutic intervention, among other benefits.

4. General Learning Principles: Behavioral strategies can facilitate the language re-acquisition process of the aphasic population; however, the extent of recovery is also dependent upon the exact locus and amount of brain damage incurred. (See Tikofsky and Carson, 1967; and Goodkin, 1967, for further discussion.) Our modification reflects the implementation of several behavioral constructs (some to be described), e.g., describing stimuli, controlling antecedent events, defining acceptable responses, and scoring and plotting task performance.

In this discussion the terms "reinforcement schedule" and "reinforcement type" are of particular interest. In operant terms, Plans I and II of the M-Modification employ a fixed schedule of 1:1 social reinforcement. Plan III, an independent language activity, requires an intermittent or variable schedule of social reinforcement. However, our experience with the aphasic population inclines us to agree with Bollinger and Stout's (1976) assessment that: "feedback appears to be more a method for increasing response awareness than what would classically be defined as reinforcement" (p. 45). Therefore, through the provision of immediate feedback in Plans I and II, we ultimately encourage the patient to develop critical verbal-output monitoring skills. Efficient self-monitoring skill is a prerequisite to independent practice of Plan III.

TREATMENT PARADIGMS

M-Modification, Plan I

1. The task continuum embodied in Plan I is outlined in Table 2. This treatment plan is 100% clinician-directed and is composed of eight steps of increasing difficulty. The first two steps represent clinician-input procedures with no verbal response required on the part of the patient. It is only during steps three through eight that the patient's verbal output is (a) required, (b) judged, and (c) computed into the patient's performance score.

TABLE #2: MARSHALL MODIFICATION, PLAN I

Step	Key Stimulus	Typical Instruction
1	Auditory & graphic input	"Listen and read."
2	Auditory & facial cues	"Listen and watch my mouth."
3	Unison	"Let's sing it together--3 times."
4	First word in unison--retain mouthing cue	"We'll do the first word together then you finish it--but watch my mouth for hints."
5	First word in unison--fade mouthing cue	"Now we'll do the first word together, then you're on your own."
6	Repeat, 1:3 ratio	"Listen while I sing it once, then you repeat it after me--3 times."
7	Repeat after delay	"Listen while I sing it once--wait a few seconds--then you try it 3 times."
8	Intone questions	"I'm going to ask you 3 questions and I want you to answer using the sentence we just practiced."

2. The scoring procedure is similar in nature to a "plus-minus" scoring method. Each component-ISU is progressed through all steps in the continuum in multiples of three. The criteria for advancing to the next higher step equal 3/3 "acceptable" productions and a check-mark (✓) is then recorded in the appropriate column. (The definition of an acceptable utterance is predetermined by the clinician but should reflect realistic production capabilities, dialect, et cetera.)

On the other hand, if the criteria are not met, a zero (0) is recorded and all three responses are subsequently computed as incorrect/unacceptable responses. In this event, the component-ISU is immediately reinstructed at the preceding (successful) step and performance is once again judged and recorded, as indicated. (See Table 3 for scoring sample.) In the event that the patient continues to fail at a given step on three consecutive attempts, then that particular component-ISU is discontinued. Additionally, its inclusion in future treatment sessions is reevaluated, as this sequence may not meet proper word selection requirements.

A score of correct/acceptable (✓) can be redeemed by the patient at any given step. That is, if two of three responses are acceptable but the third only marginally accurate (e.g., mild distortion or self-corrective response), production of two extra acceptable responses could "save" the score. (Although this response unit is ultimately composed of five productions--four correct and one marginally accurate--it is still recorded using the check-mark symbol.) This feedback procedure encourages the patient to listen, judge and self-correct verbal output.

TABLE #3

SCORING SAMPLE OF MARSHALL MODIFICATION, PLAN I

Intoned Sequence	1	2	3	4	5	6	7	8	Responses
We go to work.	✓	✓	✓	✓	✓✓✓	✓oo✓	o✓	✓	36
We go to town.	✓	✓	✓	✓	✓	✓	✓	✓	18
We go to bed.	✓	✓	✓	✓✓	o✓✓	o✓	✓✓	o✓	36
We go to church.	✓	✓	✓	✓	✓	✓	✓	✓	18
We go to sleep.	✓	✓✓	✓o✓	o✓	✓✓✓	oo✓	✓	✓	39
									147
Percent Correct = 80% (117/147)									
Get my robe.	✓	✓✓	o✓	✓✓	o✓	✓	✓	✓	27
Get my chair.	✓	✓	✓✓	o✓	✓	✓	✓	✓	24
Get my clothes.	✓	✓	✓	✓	✓	✓	✓	✓	18
Get my water.	✓	✓	✓	✓	✓✓	o✓	✓	✓	24
Get my cane.	✓	✓	✓	✓	✓	✓	✓	✓	18
									111
Percent Correct = 89% (99/111)									

OVERALL PERCENT CORRECT = 84% (216/258 Correct Responses)

3. A patient's performance level is computed and recorded on appropriate Base 10 Response Forms following each session. Two different percentages were computed.

The first percentage indicates the percent correct for each ISU instructed in a session. (We usually completed three ISU's per 45 minutes.)

$$\text{(a) ISU \% Correct} = \frac{\text{\# of correct responses}}{\text{\# of responses}} \times 100$$

This score is then recorded in its appropriate session column.

The second percentage score determined is the "Overall Session Percent Correct." This represents the composite performance level for ISU's instructed in a given session.

$$\text{(b) OA \% Correct} = \frac{\text{total of correct responses}}{\text{total \# of responses}} \times 100$$

This figure was then plotted (and also recorded) in its respective Base 10 Response Form column. (Figure 2 contains a sample of how the Base 10 was incorporated into our variation.)

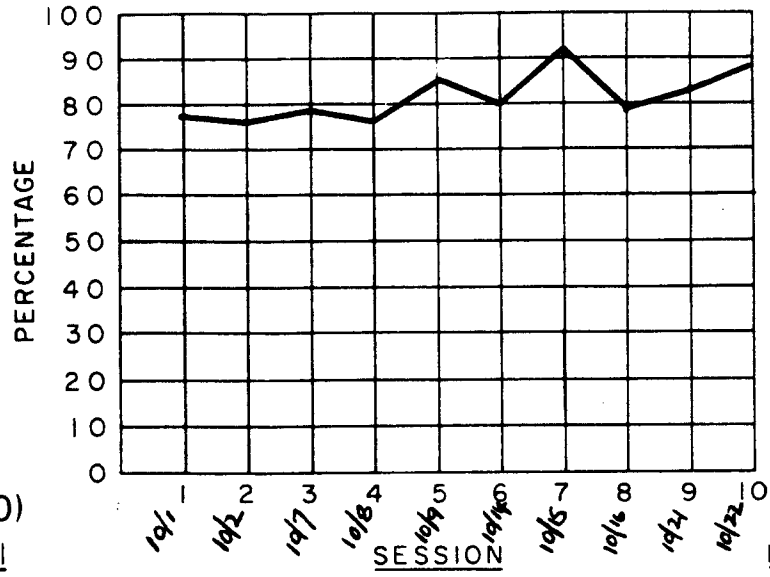
FIGURE #2

PROGRAMMED SPEECH-LANGUAGE STIMULATION

BASE 10 RESPONSE FORM

TASK MARSHALL MODIFICATION, PLAN I

CRITERION SAMPLE PLOTTING



(INTONED) STIMULI	1	2	3	4	5	6	7	8	9	10	MEANS
1. I want ____.	77	81	81	84	90	84	91			88	
2. I have a ____.		71	75	68	88	81	93		86		
3. It's a ____.					83	64		78	81	89	
4. _____											
5. _____											
6. _____											
7. _____											
8. _____											
9. _____											
10. _____											
OVERALL % CORRECT	77	76	78	76	85	80	92	78	83	88	

M-Modification, Plan II

The task continuum used in Plan II is presented in Table 4. Plan II--a more difficult construct--is similar to Plan I in that both are 100% clinician-directed therapy activities employing specific task continuums. However, several changes are present in Plan II and these are subsequently discussed.

TABLE #4

MARSHALL MODIFICATION, PLAN II

Step	Key Stimulus	Typical Instruction
1	Repeat core word—5 times*	"I want you to listen, then say this word after me--5 times. Say core word."
2	Auditory & facial cues	"Listen and watch my mouth."
3	Unison	"Okay, now let's sing it together, 3 times."
4	First word in unison--no additional cues	"Now we'll do the first word together, then you're on your own."
5	Repeat, 1:3 ratio	"I'll sing it once, then you sing it right after me--3 times."
6	Repeat after delay--add auditory interference**	"Now I'll sing it once, we'll wait a few seconds, then you sing the sentence 3 times."
7	Intone questions	"I want you to answer my questions using the sentence we just practiced."

*maximum cues can be provided
**initiate brief conversation during pause

1. The task continuum employed in Plan II is composed of seven steps and emphasizes expansion of a patient's "working" vocabulary by increasing the number of core words to further language retrieval. Step #1 is a preliminary task which requires five consecutively "correct" reproductions of the core word. Since the clinician can provide maximum facilitative cues at this point, a check-mark indicating only that this step has been completed is recorded. The objective of this step is to allow the patient sufficient word-drill in order to minimize failure at successive steps as well as strengthen (verbal) carry-over to other contexts. A graphic cue is presented throughout, but the patient's attention is no longer directed toward this stimulus.

Another point of departure is that Step #4 of Plan I (first word in unison--retaining mouthing cues) has been eliminated. Discontinuing this interim step theoretically develops a more difficult task continuum as the patient receives less practice with a highly cued stimulus.

Finally, unique to the second continuum is the incorporation of Step #6. This task requires the patient to repeat the component-ISU after a delay period during which the clinician has initiated some form of verbal exchange. This auditory interference prevents response rehearsal on the part of the patient and consequently represents a more difficult task.

2. The scoring procedure employed in Plan II is identical to that used in Plan I except that seven (as opposed to eight) response columns are necessary. Further, only those check-marks entered in columns three through seven are computed in determining the performance level.

3. A patient's performance level is determined and recorded on Base 10 Response Forms as in Plan I (Figure 2).

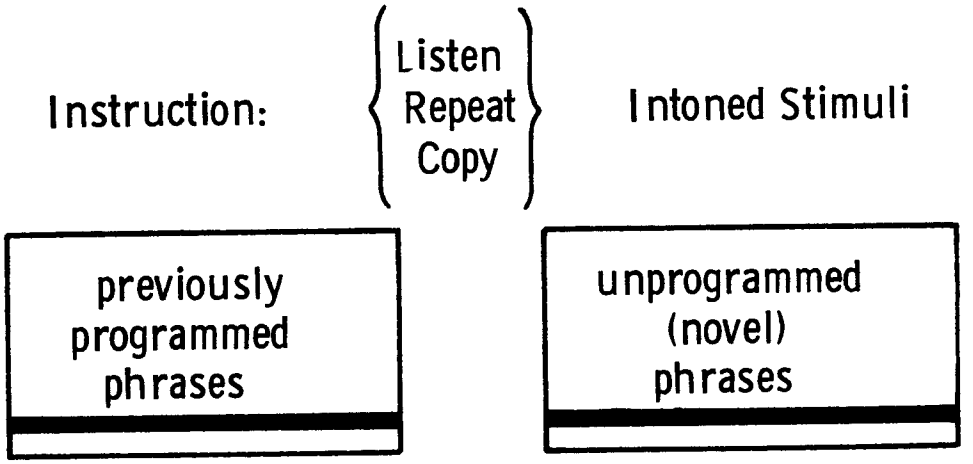
M-Modification, Plan III

This treatment plan is summarized in Table 5. Whereas Plans I and II cannot be implemented simultaneously, Plan III can be initiated at any point, in conjunction with either of the task continuums already described. As mentioned, initiation of independent practice is contingent upon the clinician's decision that the patient has developed efficient self-monitoring skills.

TABLE #5

MARSHALL MODIFICATION, PLAN III

Independent Study Using Language Master Machine



While the patient is involved with Plan I of the modification, the stimuli for Plan III should be component-ISU's which were part of the clinician-directed therapy program. Unprogrammed intoned stimuli (e.g., familiar phrases as used in MIT) would most likely coincide with Plan II of the Marshall Modification.

No formal scoring system has been devised at this point for use with Plan III. However, the patient's performance on the independent therapy tasks should be intermittently observed and subjectively reassessed.

CASE REPORT: I

Patient #1: G.V. is a 49 year-old male who was admitted to the New Orleans Veterans Administration Hospital in March, 1973. Subsequent referral to our clinic indicated a medical diagnosis of aphasia and right hemiplegia due to a small hemorrhage involving the lenticulostriate artery and left internal capsule and basal ganglia. Further, his medical history indicates that he remained comatose for a period of 12 days and that there was no prior history of CVA.

Since the time of initial referral, Mr. V. has been followed almost continually by our clinic and has participated in some form of language rehabilitation program. Our present discussion is particularly concerned with the assessment of language behavior change over a nine-month period relative to the implementation of the M-Modification. That is, we are concerned with the period which extends from June, 1975, to March, 1976, and with the results of the administration of four PICA's given at regular three-month intervals.

Mr. V.'s Aphasia Recovery Curve is summarized in Figure 3. Performance plateaus at approximately the 33rd and 43rd percentiles respectively are indicated by the blocked regions. The shaded area represents the implementation of the M-Modification.

In particular, note the three-month period preceding the shaded region, as this represents the non-treatment period alluded to earlier. It is evident that this patient's Overall Communicative Ability (OA score) maintained a stable level of performance irrespective of intervention. In other words, we consider the period from June to September, 1975, to represent a baseline measure. Subsequent fluctuation in language behavior (as reflected in PICA scores)are therefore considered to be the result of the form of therapeutic intervention--in this instance, the M-Modification.

G.V.'s Modality Aphasia Recovery Curve is presented in Figure 4. Note that the final nine-month period of the Aphasia Recovery Curve has been isolated, as this contains our three treatment intervals: (i.e., baseline, M-Modification intervention, and a generalization period). The results of the administration of four PICA's have been plotted for each modality (gestural, verbal and graphic) in addition to OA performance scores.

The first area (June-September) represents the baseline interval already discussed. The shaded region (September-December) represents intervention with implementation of Plans I, II and III of the M-Modification. During this period Mr. V. was seen three times a week for a total of five hours per week. Of these five hours, at least three were spent in individual therapy versus independent practice (Plan III) and/or a weekly social group.

Generalization effects can be measured during the final three-month period (January-March) recorded. During this time Mr. V. was seen for the same amount of therapy but he did not receive individual instruction during this treatment interval. Specifically, Plan III (using intoned sentences

Porch Index of Communicative Ability

APHASIA RECOVERY CURVE

(Percentiles)

Name Mr. G. V. Case No.

Birthdate 49 yrs. Race Onset 5 Mar 73

DX. Type Left CVA Site

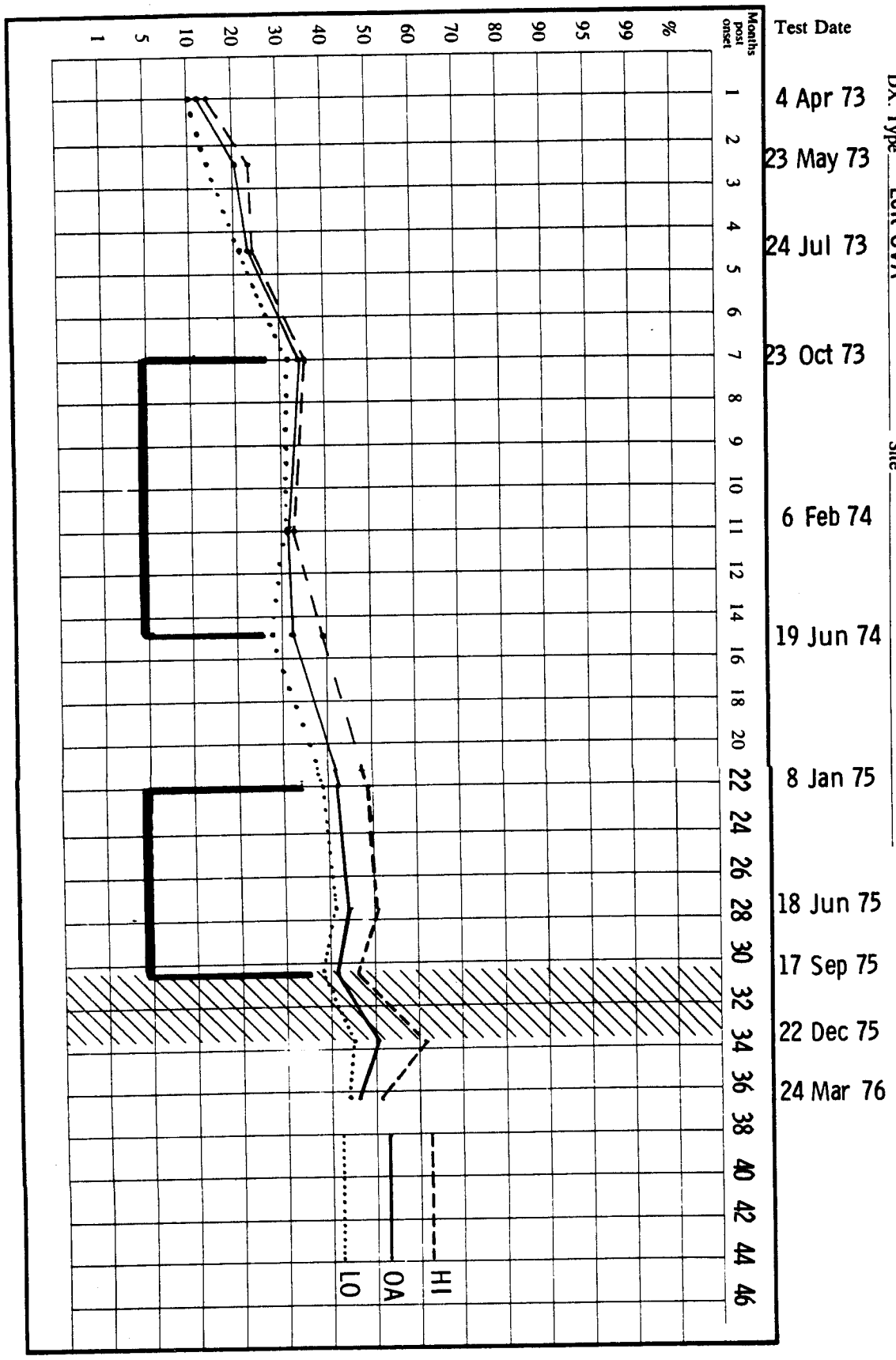


FIGURE #4

Porch Index of Communicative Ability

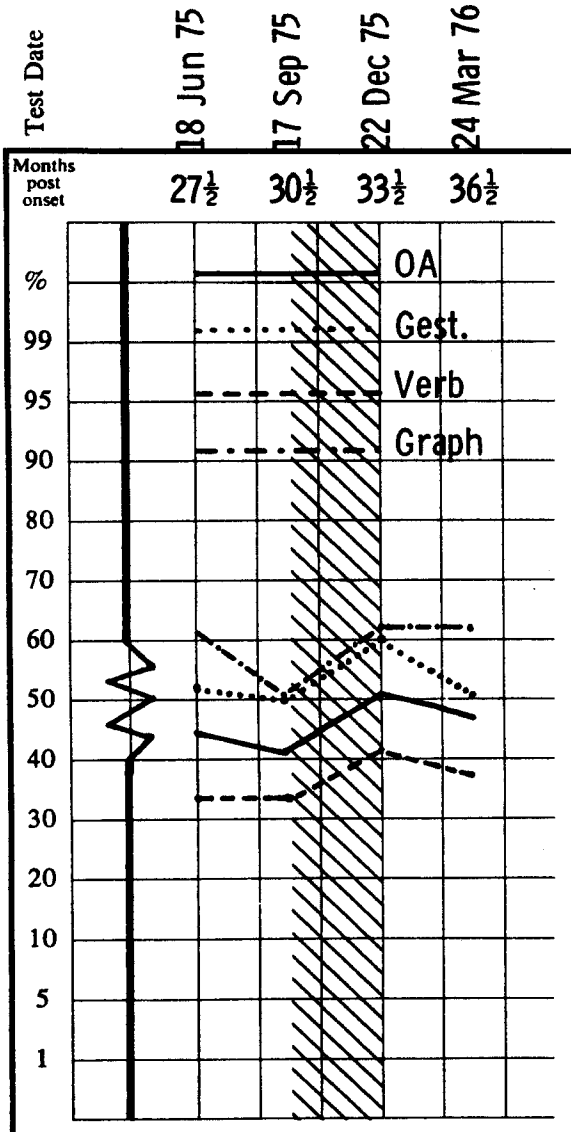
APHASIA RECOVERY CURVE

(Percentiles)

Name Mr. G. V. Case No.

Birthdate 49 yrs. Race Onset 5 Mar 73

DX. Type Hemorrhagic Site Left



THERAPY REPORT Re: VERBAL OUTPUT

Jun 18	PICA (27½ mpo) dismissed from therapy
Sep 17	PICA (30½ mpo)
Sep 18	MIT attempts unsuccessful--Initiated M.M., Plan I
Nov 13	Terminated M.M., Plan I
Nov 18	Initiated M.M., Plan II
Dec 3	Initiated M.M., Plan III
Dec 18	Terminated M.M., Plan II
Dec 22	PICA (33½ mpo)--Holidays
Jan 6	Continued M.M., Plan III
Feb 11	Initiated structured—group speech & language activities
Mar 24	PICA (36½ mpo)

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and phrases not contained in ISU format) was continued but now G.V. was one of four patients involved in a structured language activity group. He also continued to attend the Wednesday afternoon social group.

RESULTS AND DISCUSSION

In general, it can be seen that Mr. V.'s performance improved at comparable rates across all modalities when comparing the baseline period with the M-Modification intervention interval. (Figure 4) We suggest this finding reflects the benefit of a structured language rehabilitation process which potentially stimulates all input modalities simultaneously (i.e., tactile, visual (including graphic)and auditory).

a. December PICA Results: With reference to verbal output, Mr. V.'s percentile score shows an increase of 8 points (34th to 42nd) on the PICA administered immediately after our modification (December, 1975). In behavioral terms, before treatment, this patient's speech was composed of unintelligible fluent jargon with only an occasional intelligible word formulation. Post M-Modification performance on Subtest I of the PICA (telling the function of the test objects) reveals that all responses were intelligible but aphasic errors were still evident. That is, related and self-corrective errors were evident.

b. March PICA Results: Again referring to Figure 4, the results of the PICA administered in March, following the "generalization" interval, reveals a slight decrease across all modalities, save graphics. Several comments seem warranted: (1) although this patient's OA communicative ability decreased four percentile points (51st to 47th) it still hovers about the 50th percentile. This is significant as the 50th percentile is reportedly a crucial landmark relative to a patient's autonomous functioning. (2) Perhaps the increased performance level and/or more generalization effects would have been observed if the individual treatment period, using our modification, had been longer. (3) Finally, it might be argued that our treatment program only established a short-term "artificially high" level of performance. We do not think that this is the case, as a recent test (April, 1976) indicates Mr. V. has apparently plateaued at the 49th %ile Overall and at the 39th %ile in the verbal modality. These scores should have (theoretically) dropped to the previous plateau level as formal therapy had been discontinued. Rather, Mr. V.'s scores still remain constant about the 50th %ile (OA), negating the "artificial high" proposal.

CASE REPORT: II

Patient #2: Mr. G.B. is a 53 year old male admitted to the New Orleans V.A. Hospital in October, 1975, with a medical diagnosis of left middle cerebral artery thrombosis and right hemiplegia. Subsequent evaluation indicated marked aphasia, severe apraxia, and minimal dysarthria as sequelae to the neurologic insult.

Figure 5 presents Mr. B.'s Aphasia Recovery Curve plotted in percentiles by modalities. A summary of therapy concerning verbal output is also shown. The shaded region signifies implementation of the M-Modification, Plan I.

RESULTS AND DISCUSSION

Significant improvement in the verbal modality is evident. It should be obvious, however, that no definite conclusions can be drawn concerning the effectiveness of the M-Modification as incorporated in this patient's

FIGURE #5

Porch Index of Communicative Ability

APHASIA RECOVERY CURVE

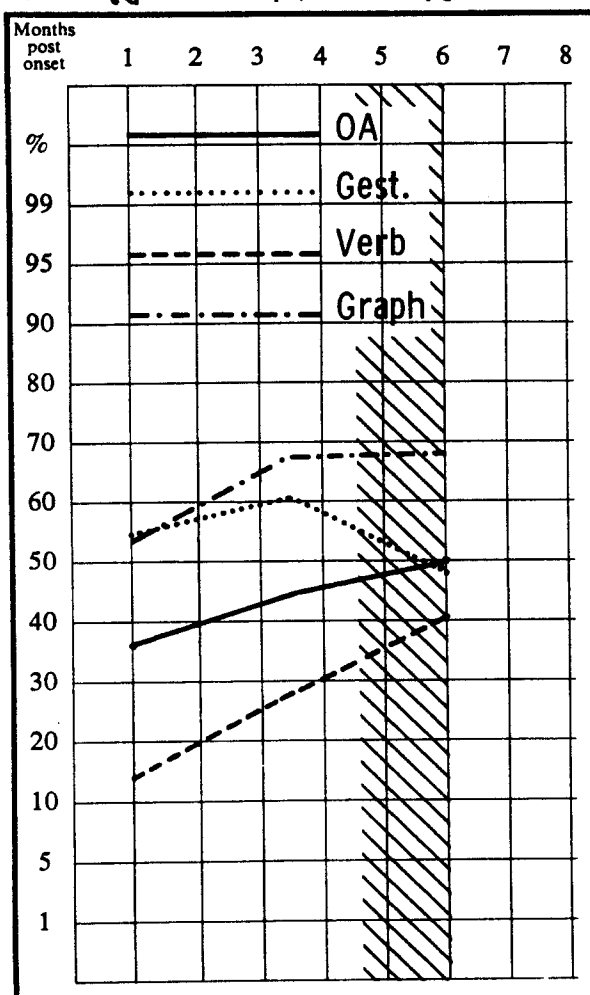
(Percentiles)

Name Mr. G. B. Case No.

Birthdate 53 yrs. Race Onset 31 OCT 75

DX. Type Thromboembolitic Site Left

Test Date: 28 Nov 75 | 10 Feb 76 | 27 Mar 76



THERAPY REPORT Re: VERBAL OUTPUT

Nov 28	PICA (1 mpo)
Dec 2	Melodic Intonation Therapy Attempts Unsuccessful
Dec 9	Initiated Individual Therapy Multi-phonemic approach
Jan 12–Feb 6	No Formal therapy (Med. Pbs.) Multi-phonemic home program
Feb 10	PICA ($3\frac{1}{2}$ mpo)
Feb 17	Resumed Individual Therapy Multi-phonemic approach
Mar 9	Initiated structured–group Speech and Language Activities
Mar 16	Initiated M.M., Plan I
Mar 23	Terminated Multi-phonemic Th.
Apr 27	PICA (6 mpo)

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language rehabilitation program. That is: (1) The physiological restitution variable interacts, as this patient was only 4½ months post onset when our modification was initiated; (2) No baseline measure can be projected; and (3) Discrete treatment and testing intervals were not possible to establish/manipulate.

The purpose in presenting this case is to make the point that MIT had been tried with this patient but attempts were unsuccessful. Secondly, the M-Modification offered a logical and useful interim procedure to bridge between a phonemic level of speech production (necessary with this patient) to a more functional level of communication emphasizing both speech and language skills. It is conceivable that MIT will eventually be again selected for use with this patient.

CASE REPORT: III

Patient #3: J.W. is a 41 year old male admitted to the New Orleans V.A. Hospital in September, 1975, with a medical diagnosis of a left thromboembolic cerebrovascular accident. PICA results at one month post onset indicated that he was functioning at the 25th percentile, and he was reported to be severely aphasic and severely apraxic.

Figure 6 summarizes Mr. W.'s recovery from aphasia, plotted in percentiles by modalities. A summary of therapeutic intervention with work on verbal skills is also included. The shaded area again represents use of the M-Modification.

RESULTS AND DISCUSSION

This patient's verbal output increased. However,we recognize that no conclusions can be drawn for reasons previously mentioned (i.e., months post onset, et cetera). This case report is presented because MIT had previously been tried with this patient with those attempts proving unsuccessful. The M-Modification therefore became the choice for treatment and was employed for a 2½ month period. Note in particular that at seven months post onset MIT was again attempted. At this time Mr. W. demonstrated ability to cooperate with this form of therapeutic intervention. This case report illustrates an instance in which the M-Modification served as a successful preliminary to a formal MIT program.

SUMMARY

To conclude, the Marshall Modification reflects an eclectic approach for language rehabilitation of adult aphasic patients in the form of three separate treatment "Plans." It is not meant to replace MIT, to serve as a "pre-MIT" program nor to function as a comprehensive language intervention program. What our variation does is to provide a clinical technique that was found to be necessary and useful to the language rehabilitation process of three veterans referred to our clinic.

FIGURE #6

Porch Index of Communicative Ability

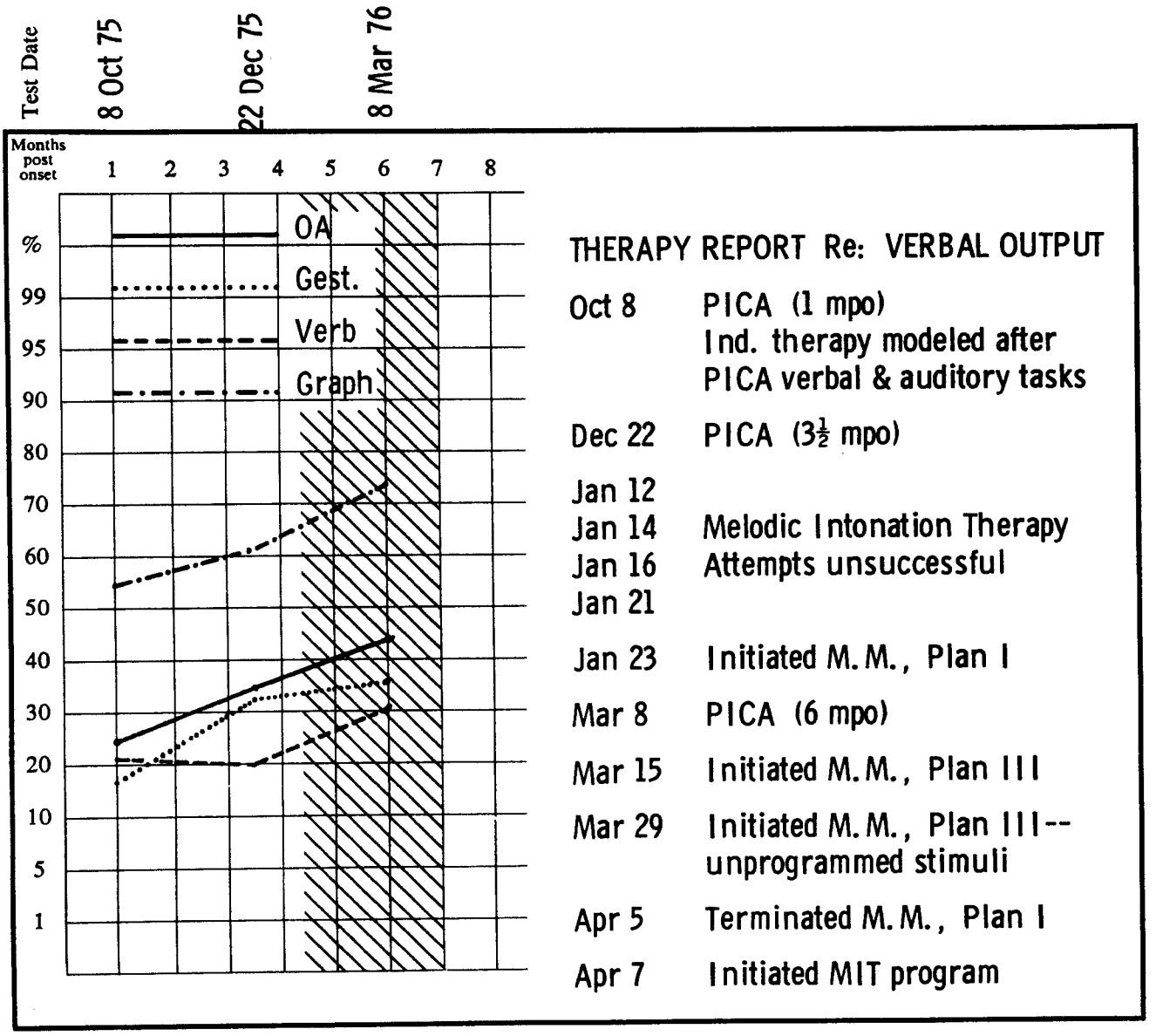
APHASIA RECOVERY CURVE

(Percentiles)

Name Mr. J.W. Case No.

Birthdate 41 yrs. Race Onset 9 SEP 75

DX. Type Thromboembolitic Site Left



THERAPY REPORT Re: VERBAL OUTPUT

Oct 8	PICA (1 mpo) Ind. therapy modeled after PICA verbal & auditory tasks
Dec 22	PICA (3½ mpo)
Jan 12 Jan 14 Jan 16 Jan 21	Melodic Intonation Therapy Attempts unsuccessful
Jan 23	Initiated M.M., Plan I
Mar 8	PICA (6 mpo)
Mar 15	Initiated M.M., Plan III
Mar 29	Initiated M.M., Plan III--unprogrammed stimuli
Apr 5	Terminated M.M., Plan I
Apr 7	Initiated MIT program

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DISCUSSION

Q: Where can MIT instructions be obtained?
A: To receive the most current revision of MIT, you should correspond directly with Robert Sparks, VA Hospital, Aphasia Research Unit, Boston, Mass.

Q: I am not too certain why the Marshall Modification was selected over MIT.
A: The Marshall Modification was not selected for use over MIT. As a matter of fact, MIT was the first choice of treatment in all instances. However, the particular patients reported in Section II of our report, were not able to participate in MIT when administered in its "orthodox" form. (One patient failed at Level I and two at Level II of MIT). A more structured and repetitious design was indicated; hence, our variation.

Q: Did you discover any perseverative tendency using the Marshall Modification?
A: Exactly the opposite. In fact, two of the three patients had exhibited extremely perseverative (verbal) behavior but the structure of the ISU's seemed to help them control this behavior. Additionally, change in core words as well as whole ISU's were emphasized to the patient.
Comment: That is the one thing we have found with very chronic patients who fit into the criteria for selection into MIT. Sometimes their speech does not get better but the tendency for perseverative and stereotyped behavior is reduced dramatically which improves the perception of verbal communication by the listener. MIT seems to have a facilitory effect on reducing perseverative behavior.

Q: I am concerned about generalization. When you were ready for generalization, then you went to MIT?
A: No, not necessarily, but this was certainly the case for Patient #3. Our treatment programs are individually designed; hence, we do not like to project such a rigid procedure. If indicated, MIT would certainly be considered as a generalization method.

Q: Both MIT and gestures seem to facilitate spoken language. Dr. Rosenbek (see paper included in these proceedings) suggested that the use of gesture is creating intersystemic reorganization. Why do you think MIT is?
A: The literature in MIT does not address itself to the specific role of gestures (tapping). That is, whether it is the use of the tapping (R & S) and/or the reduced rate and/or the intoning that contributes to improved language status has not been identified.
The instructions do not specify which hand should be used. Since most of these patients have right hemiplegia, the left hand is generally used.
The function of tapping in MIT certainly deserves further consideration.
Comment: This is so critical that sometimes you find that if the patient tries to take control of the tapping he loses control of his speech. When the clinician has control of the tapping, the patient has control of his speech, and you work toward fading out the tapping as well, and he is left with the control of his speech.
Response: Our patient on MIT was a very passive tapper. He did not tap the rhythm and stress patterns in spontaneous utterances. Of the three

patients with whom we used our variation, only one was an active tapper. Further, the initiation of an utterance seemed to be related to the initiation of the tapping.

Q: What is the function of the right hemisphere in MIT?

A: The authors of MIT suggest that the right hemisphere plays an active role. The reader is referred to the introduction of Section I for the exact quote and reference. Several theories were discussed during the round table discussion conducted by Michael Collins, Ph.D. One theory purported that the right hemisphere is used only as a circuitous route. Another idea suggests that MIT is utilizing the preserved suprasegmental features in the left hemisphere.