VISUAL ACTION THERAPY FOR GLOBAL APHASIA

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Eight globally aphasic patients who had not responded to traditional treatment received Visual Action Therapy (VAT), a nonverbal approach which ultimately trains patients to produce symbolic gestures for visually absent stimuli. Statistical analyses of pre and post VAT scores earned on the Porch Index of Communicative Ability (PICA) showed highly significant improvement on those subtests which measure pantomimic and auditory comprehension skills. The theoretical and practical implications of these findings are discussed.

By definition, globally aphasic patients are severely impaired in all language modalities. These individuals neither produce understandable speech or writing nor comprehend spoken or written language. Unfortunately, attempts to rehabilitate global patients through these modalities generally have proven futile (Marks, Taylor, & Rusk, 1957; Samo, Silverman, & Sands, 1970; Schuell, Jenkins, & Jimenez-Pabon, 1964). Davis, Artes, and Hoops (1979), suggest that pantomimic training rather than linguistic intervention may enhance the communicative effectiveness of severely impaired patients by circumventing the linguistic deficits.

There are several theoretical rationales to support the training of gestural output systems of global patients: (a) Gestural communication may be used independently of vocal communication. (b) Hand gestures for manual communication require less refined motor control than the articulatory movements required for speech communication. (c) Limb movements, unlike facial movements, have more predominately unilateral control. The left arm and hand are innervated by right hemisphere pyramidal pathways which are presumably uncompromised in right hemiplegic global patients having exclusively left hemisphere lesions. (d) The hand arm, unlike the bucco/facial apparatus necessary for speech, is visible to the initiators and can be visually monitored.

Despite the theoretical advantages of using gesture with global patients, there are certain obstacles which may interfere with their learning a gestural system. Patients with global aphasia usually have severe limb apraxia of the nonhemiplegic left arm as part of their symptom complex. This limb apraxia may prevent patients from using representational gestures as a natural means of communication. In a 1977 pilot study Helm, Kaplan, and Vercruysse (Note 2) found that global patients with severe limb apraxia produced no spontaneous representational gestures during a confrontation naming task and no deliberate representational gestures during a task which demanded gestural representation of the same pictured items. Even when trained with practice items, the patients only tapped on or traced the pictures.

By the very nature of the language problem, these global patients were unable to name, so that neither verbal nor gestural labels were produced for the stimuli. The results imply that rehabilitation must first confront and overcome the limb apraxia if global patients are to learn a gestural system.

Another obstacle to teaching global patients any task is that severe auditory and reading comprehension disturbances may preclude the use of verbal or written instructions. There is evidence that this problem can be circumvented in one of two ways. First, global patients can use nonorthographic visual stimuli as a symbol system as well as for comprehension of commands. (Gardner, Zurif, Berry, & Baker, 1976; Glass, Gazaniga, & Premack, 1973). Second, right hemiplegic patients respond better to pantomimed instructions than to verbal instructions for the same tasks (Fordyce & Jones, 1966).

In this paper we will describe Visual Action Therapy, a new approach to facilitating gestural communication. This treatment procedure is based on the theoretical constructs and empirical evidence presented above. We shall report and discuss the responses of eight global patients to Visual Action Therapy.

METHOD

Treatment Program

Visual Action Therapy (VAT) is a nonverbal treatment program which ultimately enables globally aphasic patients to produce symbolic gestures for visually absent pictured object stimuli. The object is accomplished via a hierarchically structured, three level program which utilizes: (a) eight uni-manual objects each of which can be represented with a distinct gesture; (b) large, realistic, colored drawings of each object outlined in black and reproduced on 5 × 8 index cards; (c) small drawings of each object on 1½ × 3 cards and (d) eight drawings on 3 × 5 cards which depict a figure appropriately manipulating each object (see Figure 1). None of the VAT objects
Visual Action Therapy is divided into three levels. The first contains 12 steps, while Levels II and III contain 6 steps each. All directions and reinforcements are given nonverbally.

Patient responses for each item at each step are scored one point for fully correct, one half point for self corrected, and zero for incorrect. A new step is introduced when the patient produces correct responses for every item at the training step. Each session begins with a review of the preceding step. The step-by-step procedure is described in the Appendix.

Subjects

Eight globally aphasic stroke patients were treated with VAT. All were right-handed, right hemiplegic males who ranged in age from 37 to 70 (\( \bar{x} = 56.3 \)). Each had received some other form of language therapy before initiation of VAT. Number of weeks post onset ranged from 12 to 144 (\( \bar{x} = 46.8 \) weeks). Each patient had sustained unilateral left hemisphere damage as confirmed by computerized tomographical scanning. Patient information is presented in Table 1.

Prior to experimental treatment, a diagnosis of global aphasia was made for each patient. This diagnosis was made on the basis of aphasia severity ratings below 1 on the Boston Diagnostic Aphasia Examination (Goodglass & Kaplan, 1972), an overall auditory comprehension

<table>
<thead>
<tr>
<th>Patient</th>
<th>Age (yrs)</th>
<th>Etiology</th>
<th>Clinical Findings</th>
<th>CT Scan</th>
<th>S/P (wks)</th>
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<td>At least two lesions left temporal, frontal, parietal, occipital and subcortical</td>
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score no higher than $-1.25$ standard deviation, and the absence of naming, repetition, reading and writing skills. Overall scores on the Porch Index of Communicative Ability (PICA), ranged from $5.61$ to $8.22$ ($x = 7.2$) which indicates marked impairment on all tasks except those involving visual matching (PICA Manual Vol. 2, p. 72).

**Treatment Schedule**

Visual Action Therapy was administered in half hour sessions at the rate of approximately five sessions per week. Patients completed the treatment program in 4 to 14 weeks ($x = 6.36$) then were retested on the verbal and gestural subtests of the PICA.

**RESULTS**

Pre and post VAT scores on the 10 “gestural” and “verbal” PICA subtests were analyzed. These scores were divided into three groups for separate analyses of variance: Group I (PICA subtests II, III, VI, X) was expected to show significant post-VAT improvement; Group II (PICA subtests V, VII) might show significant improvement; Group III (PICA subtests I, IV, IX, XII) was not expected to improve significantly. The rationale for these expectations was as follows: (a) Group I gestural-pantomime scores (subtests II and III) should improve significantly as a result of generalization from the training program. (b) Group I auditory comprehension scores for the names of objects (subtest VI) and associated function verbs (subtest X) should improve as a result of internal verbal monitoring during the training program. (c) Group II reading comprehension scores for function verbs (subtest V) and nouns (subtest VII) might improve as a result of training in visual attention and visual discrimination. (d) Group III verbal scores for sentence production (subtest I) naming (subtest IV), sentence completion (subtest IX), and noun repetition (subtest XII) should not improve because VAT provides no facilitation of either oral praxis or speech.

Three separate within-subject analyses of variance (Meyers, 1966, p. 152) were performed (see Table 2). Each analysis had two variables: subtests and replication (pre VAT and post VAT testing). The expectations for all groups were confirmed. The over-all pre/post treatment effect for Group I was highly significant $p = .01$. Pair-wise $t$-tests were conducted using the Newman-Keuls post hoc procedure for multiple comparisons. Comparisons of pre and post treatment scores for all four subtests were significant. The effect was significantly larger for subtests II and III than for VI and X ($p = .05$). While the overall pre/post treatment effect for Group II approached significance ($p = .075$), the overall pre/post treatment effect for Group III showed no trends toward significance ($p = .15$).

Finally, a Spearman rank order correlation coefficient was used to measure the relationship between time post onset of aphasia and response to VAT as measured by Group I PICA subtest scores. Response to VAT was not correlated significantly with time post onset ($r = -.42; p > .05$).

**DISCUSSION**

The prognosis for globally aphasic patients is considered poor. Lomas and Kertesz (1978) reviewed various studies of recovery in aphasia and concluded that the only unequivocal finding is that global patients may be expected to have poor recovery. Schuell et al. (1964) were so impressed with the failure of this group to respond to treatment that they coined the phrase “irreversible syndrome.” These authors characterize aphasia as “impaired retrieval of a learned code,” but given the poor response of global patients it is not surprising that other authors describe this disorder as a “massive language loss” (Glass et al. 1973) and have questioned whether global patients have the conceptual or cognitive basis for regaining language skills. A successful treatment approach was reported by Glass et al. who trained global patients to use an artificial language system by arranging cutout paper symbols to express various relationships such as same/different, negation and subject-predicate-direct object. This finding led these investigators to conclude that global patients retain a rich conceptual system despite a massive language loss and do not suffer cognitive impairment in direct proportion to their language impairment. Further support for functional cognitive skills was reported by Risse (Note 3). She reported that five global patients demonstrated nearly intact conceptual performance on various Piagetian type developmental problem solving tasks.

Gardner, et al. (1976) reported on eight global patients who learned a visual communication system which
utilized a series of index cards, each containing either a simple, arbitrary (geometric) or representational (ideographic) form. The findings indicated that at least some of the cognitive operations necessary for natural language are intact despite global aphasia.

Visual Action Therapy, like the system of Gardner, et al. is a nonverbal method which relies heavily on the use of visual cues. The ultimate goal of the VAT program, however, is to train global patients to produce representational gestures for visually absent stimuli through the manipulation of real objects. It, therefore, could be considered a program for training limb praxis. Indeed, VAT patients improved significantly in their ability to perform pantomimes with the untrained PICA objects on subtests II and III.

In addition to the expected improvement in pantomimic ability, patients improved significantly in their ability to respond to PICA auditory comprehension subtests VI and X which require patients to select real objects from an array of 10 on hearing associated noun and verb stimuli. There was a trend toward significant improvement in ability to read noun and verb stimuli for subtests V and VII, while there was no such improvement on subtests of verbal expression (I, IV, IX, XII).

Several hypotheses may explain why improvement in auditory and reading comprehension should occur subsequent to treatment with this nonverbal method. They include: (a) Patients may employ internal verbal monitoring during the training program; (b) VAT may improve general attentional skills; (c) VAT may improve visual spatial and visual search skills; or (d) VAT may reintegrate some of the conceptual systems necessary for linguistic performance (Helm & Benson, Note 1). Phenomena 1 and 2 also may result in improved scores in verbal expression. That this did not occur might be explained by the fact that the patients in this study had severe facial apraxia which may have inhibited verbal expression. The VAT program, as presented, treated limb praxis but did not train bucco/facial praxis. In order to explore the contribution of bucco/facial praxis to the speech skills of global patients, another VAT program has been developed for training patients who have completed a course of limb VAT.

ACKNOWLEDGMENTS

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REFERENCE NOTES


REFERENCES


APPENDIX

PROCEDURE FOR VISUAL ACTION THERAPY

General Instructions

Visual Action Therapy is a nonverbal treatment program for severely aphasic patients. All directions, reinforcements, and procedural steps are nonverbal. The program follows a hierarchy of difficulty requiring nearly 100% success for each step before progressing to the next step. It is advisable to review previous or easier steps at the beginning of each session. Sessions are approximately ½ hour long.

The materials used are eight objects (razor, telephone, cup, toy pistol, saw, hammer, screwdriver, and blackboard eraser) and their contextual prompts if indicated (block of wood, block of wood with protruding nail, block of wood with protruding screw, and slate), eight colored, large line drawings, and eight colored, small line drawings of these objects (object picture cards), and eight drawings depicting the objects being manipulated by a stick figure (action picture cards).
Level I

Step 1: Tracing

This step is designed to help the patient understand that line drawings of objects can represent real objects.
1. Trace the patient's hand on a large piece of unlined paper.
2. Help the patient trace your hand on a second piece of unlined paper.
3. Help the patient trace two objects (e.g., hammer and screwdriver) on separate pieces of unlined paper.
4. Arrange the four line drawings in front of the patient and hand each object to the patient. Point to the object associated with each line drawing and silently encourage the patient to do the same with his hand.

If the patient is unable to do this task, try coloring the pictures and tracing additional objects. If the patient continues to show confusion, this treatment program is probably inappropriate and should be discontinued.

Step 2: Large Picture Matching

1. **Object to Picture Matching.** Arrange the eight object picture cards randomly in a straight line in front of the patient. (Hemianopic patients are taught to scan for eight items.) In random order, hand each object to the patient to be placed on the matching picture. Do not remove each card before presenting the next one.
2. **Picture to Object Matching.** Arrange the eight objects randomly in a straight line in front of the patient. In random order, hand each large object picture card to the patient to be placed on the matching object. Do not remove each card before presenting the next one.
3. **Picture to Object Pointing.** Arrange the eight objects randomly in a straight line in front of the patient. Hold up each large object picture card and nonverbally indicate to the patient to point with the index finger to the object that matches the card. Do not permit the patient to pick up the object.
4. **Object to Picture Pointing.** Arrange the eight large object picture cards randomly in front of the patient. Hold up each object and nonverbally indicate to the patient to point with the index finger to the card that matches the object. Do not permit the patient to pick up the card.

Step 3: Small Picture Matching

Using the small object picture cards and the eight objects, follow the steps outlined in 2A, 2B, 2C, and 2D.

Step 4: Manipulating Objects

Demonstrate the function of each object using a contextual prompt when indicated (e.g., pounding the nail with the hammer), then place the object in front of the patient who must pick it up and correctly demonstrate its function. If the patient has persistent difficulty manipulating a particular object, remove it from the array and select a permanent substitution (e.g., a paintbrush).

Step 5: Action Picture "Command" Instruction

Place an object and contextual prompt if indicated and the corresponding action picture card in front of the patient. Point to the action picture card, pick up the object, and demonstrate its function. Place the object in front of the patient, point to the card, and encourage the patient to manipulate the object.

Step 6: Following Action Picture "Commands"

Arrange the eight objects and contextual prompts in front of the patient. Hold up an action picture card and encourage the patient to find the appropriate object and demonstrate its function.

No contextual prompts are used for the following steps:

Step 7: Pantomimed Gesture Demonstration

Place one object within the patient's visual field. Produce the pantomimed gesture most commonly associated with the object. Follow this procedure with all eight objects. The patient is not required to respond.

Step 8: Recognizing Pantomimed Gestures

Place the eight objects in a line in front of the patient. Produce a representational gesture for each object and encourage the patient to point to the object associated with the gesture.

Step 9: Pantomimed Gesture Instruction

Place one object within the patient's visual field and encourage him to produce a correct pantomimed gesture for the object. Follow this procedure with all eight objects. If the patient fails or has difficulty, provide assistance until the patient can produce the gesture without assistance.

Step 10: Producing Pantomimed Gestures

Hold up an object and encourage the patient to produce a pantomimed gesture for the object. Follow this procedure with all eight objects. If the patient is unable to initiate appropriate gestures, review Step 9.

Step 11: Pantomimed Gesture for Absent Object Demonstration

Place two objects in front of the patient. Produce the appropriate pantomimed gesture for each object. Hide the two objects under a box and bring 1 of 2 objects into the patient's view. Produce questioning gestures while pointing to the box and then produce the pantomimed gesture associated with the hidden object. Follow this procedure for four pairs of objects. The patient is not required to respond.

Step 12: Producing Pantomimed Gestures for Absent Objects

As in Step 11, place two objects in front of the patient, hide the objects under a box, and bring one of the two objects into the patient's view. Produce questioning gestures while pointing to the box and then produce the pantomimed gesture associated with the hidden object. Repeat this procedure for each combination of pairs hiding each of the eight objects at least once.

Level II

Repeat Steps 7-12 of Level I substituting the action picture cards for the objects.

Level III

Repeat Steps 7-12 of Level I substituting the small object picture cards for the objects.