

# Application of Verbing Strategies to Aphasia Treatment

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## Introduction

Treatment plans, research describing the disabilities of patients with aphasia, and measurement studies pertaining to recovery in the past years have stressed the noun as a key element in aphasia (Goodglass, Klein, Carey, 1975; Schuell, 1955; Wepman, 1975). While differing types of aphasia have often been described, treatment paradigms appear to continue to stress the noun element. One language theory which is quite common in fields of cognitive psychology and generative semantics proposes a case grammar in which the verb is the predicate core of all simple sentences (Fillmore, 1968). A predicate can be defined as a "general function that specifies the relationships that might exist among some set of concepts." Utilizing the verb as the propositional core of sentences has allowed several researchers (Rumelhart and Norman, 1975; Rumelhart and Levin, 1975; Norman and Rumelhart, 1975; Lindsay and Norman, 1971) to postulate that language and memory are in fact built around the verb. Most commonly, events of the data base (knowledge and memory) are represented by centering all language procedures around the action. Therefore action, in our opinion, is the central node.

For an individual to utilize language it is first necessary to identify the relationships of the language concept to the action being described. To generate the meaning of an event without dealing with the ambiguities at the surface structure, the action must first be identified. The verb is chosen because it is the only terminal element in the structure. Any change in the verb form would necessarily change the meaning of the event (Chafe, 1970).

A system based on the verb as the central node specifies that (1) the individual who carries out the action is the agent or actor, (2) the person or thing which is affected by the action is the object and, (3) any object that the actor uses is the instrument (Miller, 1972) (Figure 1). Definition of the constituent elements into the actor-action-object (instrument) form simplifies the grammatical complexities resulting from transformations, such as passive transformations. The actor-action-object framework further simplifies approaches to language in the manner discussed by Bever (1970). He called this actor-action-object framework the primary internal structure of a sentence. Bever also found this form to guide the procedure by which we perceptually segment sentence units. In other words, perceptual segmentation proceeds in terms of internal structure organization into sentences. Bever (1970) found that the segmentation of compound and embedded sentences occurred in actor-action units. In order to tap the most useful and meaningful aspect of language it appears advantageous to use the internal

structure. Since transformations are operations applied to the internal structure they may be superfluous in terms of language stimulation. The actor-action-object framework, by previous definition, supercedes grammatical function and therefore transformations.

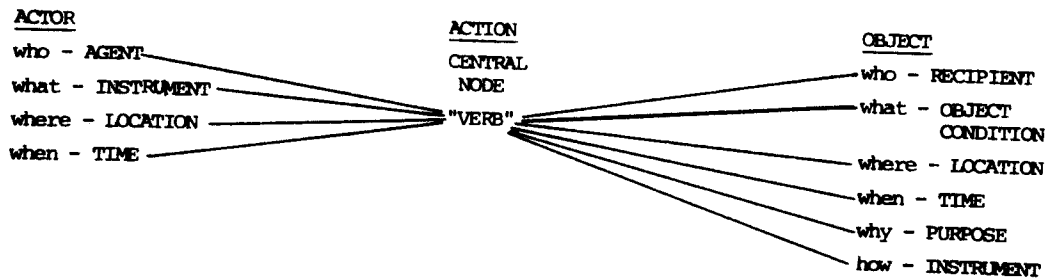


Figure 1. Model of system based on verb as central node.

Shafto in 1973 examined memory for similar sentences in twelve undergraduate students. He found that memory is a function of the predicate structures of the main verbs rather than of the surface structure or noun elements of the sentences. These results further support the notion that the internal structure is the center point for language and that the verb is the pivot point for language knowledge as well as for memory. Further, theorists have developed computer languages (Rumelhart and Levin, 1975) and language models (Miller, 1972; Rumelhart and Norman, 1975; Norman and Rumelhart, 1975) based on the verb that have provided a structural framework wherein language concepts can be fastened.

The previous flexible, highly functional model of language representation appears to be applicable to the field of aphasiology. Yet, investigations into the linguistic deficits of aphasic patients have neglected the verb and its application to internal structure. Nouns, transformations, and morphology are among the most researched areas in aphasiology (Goodglass, Klein, Carey and Jones, 1975; Schuell, 1955; Sarno, Silverman and Sands, 1970; Zurif and Caramazza, 1978) while only a few researchers have included the verb in their analyses of aphasic disorders. Wepman, Bock, Jones, and Van Pelt (1975) considered the disorder of anomia. In addition to difficulty in noun naming, their aphasic subjects showed an absence of all but the most frequent verbs and adjectives. Both Halpern (1965) and Siegel (1959) examined repetition of nouns, verbs and adjectives and their findings indicated that both verbs and adjectives were more severely disturbed than were nouns in their aphasic patients.

In 1973, Goodglass observed agrammatic patients. The results of these observations may shed an interesting light on the preponderance of noun-centered approaches in aphasiology. Goodglass found that his subjects tended to produce one-word sentences, where all words, whether they represent nouns or verbs, were transformed to a nominal function. Nouns (or the nominal case) appear on the surface to be what is least disturbed and therefore should be an adequate stepping stone from which to build language rehabilitation. In fact, the opposite may be true. Perhaps it is the nature of the disorder to nominalize all language forms and therefore cause a dead end to further language facilitation.

There are a few observations on aphasia in the most recent literature that begin to point toward the importance of the verb core sentence, West (1977, 1978) has been particularly interested in "action imagery" and the right hemisphere, and commonly has used actions as the stimuli with which to tap a gestalt image. Waller and Darley (1978) utilized a propositional analysis of Kintsch (1974) where a network of semantic propositions consisting of a predicator and various arguments is used for encoding in the preparation of paragraphs to study the influence of context on the auditory comprehension of adult aphasic patients. The results of this study indicated that, "...ease of recall correlated with the number of different arguments in a passage." This work further suggests the possible value of systematic treatment for aphasic patients based on the verb. Gallagher and Guilford (1977) were directly interested in the aphasic patient's ability to comprehend wh-questions. They argued that some tests for aphasia include some, but not all, of these wh-questions and that all forms should be considered in attempts to differentially diagnose aphasia. Their findings showed that wh-questions dealing with location and time (where and when) were more difficult to comprehend than were wh-questions dealing with naming and description (who and what). This study was another step toward applying a verb model directly to aphasia. However, it did not yet deal with the treatment of aphasic deficits. Shewan (1976) in a study of error patterns in auditory comprehension of aphasic adults found that aphasic patients and normals demonstrated identical rank orderings for error proportions with the exception that a reversal of NP for VP was noted for the Wernicke's patients studied. This rank ordering from most to least was the same for all other aphasic patients studied.

Another report concerning the use of verbs in the treatment of aphasia was presented by Wiedel (1976). She presented an approach to aphasia treatment which was aimed at facilitating language skills by use of wh-questions and complex transformational forms of sentences; i.e., Determiner + Noun + Auxiliary + Verb + ing endings + noun phrase. Stimulus items included an entire picture sequence (agent-action-object) and the subject was required to read, write, and/or talk about the items in the picture. Sentences were cued using wh-questions. While this approach is close to the verb model previously described, there appeared to be some limitations. First, the Wiedel paper presented a treatment approach and lacked any treatment outcome data for patients with aphasia. Second, the program lacked, in our opinion, the flexibility necessary to illustrate the conceptual aspects of language.

Utilizing the same stimuli repeatedly fails to teach the many possibilities of actors and objects that could be used to complete any verb framework. This approach may tend to teach the words for each stimulus but not the relationships necessary to generate spontaneous language. Finally, the Wiedel program appears to us to be very complicated and in our opinion attempts to include too many transformations. Our conclusion based on the research discussed is that the actual internal structure of language is the actor-action-object form. Use of this form would simplify treatment programs while providing avenues for "functional" communication.

It was the purpose of this investigation to examine the applicability of the "verb as core" model to treatment for patients exhibiting aphasia. We used verbs as the pivot-stimuli and wh-questions as cues to provide a framework for the generation (both graphically and verbally) of complete sentences in the actor-action-object form. Our aim here is to present our

rationale for utilizing the verbing approach and to draw conclusions based on our limited findings and not to present the actual verbing program developed, which is currently being refined.

**Subjects.** The subjects were two adult aphasic outpatients from the Denver Veterans Administration Medical Center. In order to be included in the study, subjects had to have a left hemisphere brain lesion as confirmed by at least three of the following four methods, angiogram; CAT scan; motor signs; and brain scans. Any subjects exhibiting evidence of right hemisphere lesion were excluded from the study. Second, subjects must have exhibited significant change on PICA overall score ( $\pm$  5%ile points) for a period of three consecutive months. Finally, all patients were at or above the 50%ile on the PICA overall.

**Procedure.** Subjects were scheduled for treatment on a 3-5 times weekly program. Prior to the onset of treatment, a PICA was administered to each subject. At each session the subject was presented with thirty verbs as stimuli for generation of sentences.

The treatment task involved two major levels each of which had two sublevels (Figure 2). The sublevels were designed to make the task more structured and easier for those patients who were unable to score at 60% or greater on the initial session (using the first level). Once a subject began the first sublevel (Ia) he advanced through the program in the following manner: Ia, Ib, I. The same approach was used for level II. If the subject scored at or above the 60% level on the initial session, level I was administered without sublevels. Overall, level I involved the verb stimulus designed in a manner to elicit an actor-action sentence.

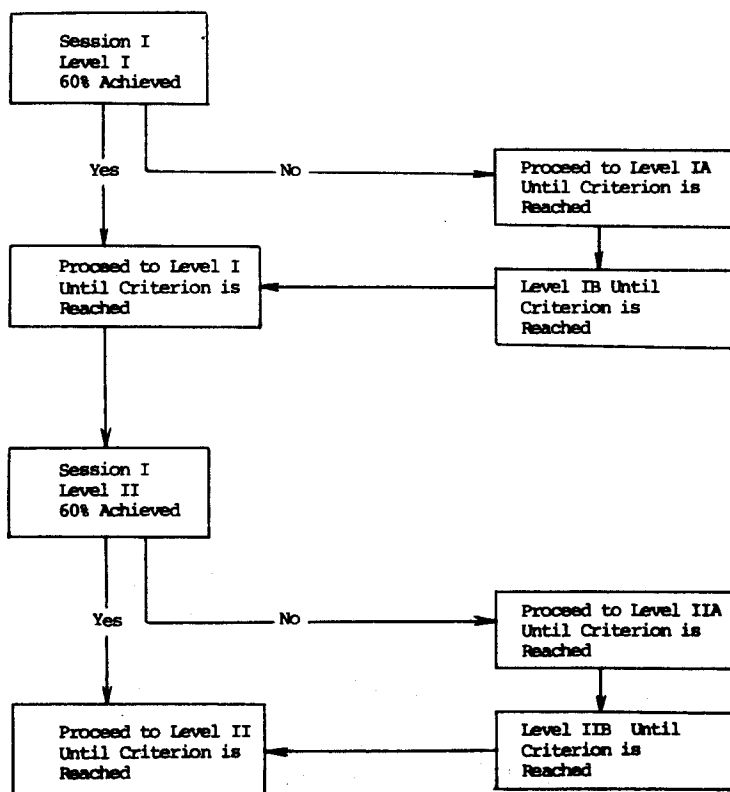


Figure 2. Verb program flow chart.

Subjects were cued for the actor with auditory and verbal input of "who" or "what." Following each stimulus item, the patients were required to generate the entire actor-action sequence both graphically and verbally. Sub-levels required the subject to copy and repeat the actor-action sequence, given all elements, or to choose the best actor sequence from an array of subjects. Overall level II's framework was identical to Level I. The difference was that the second level was more complex (e.g., it required actor-action-object sentences). Cues for these levels involved

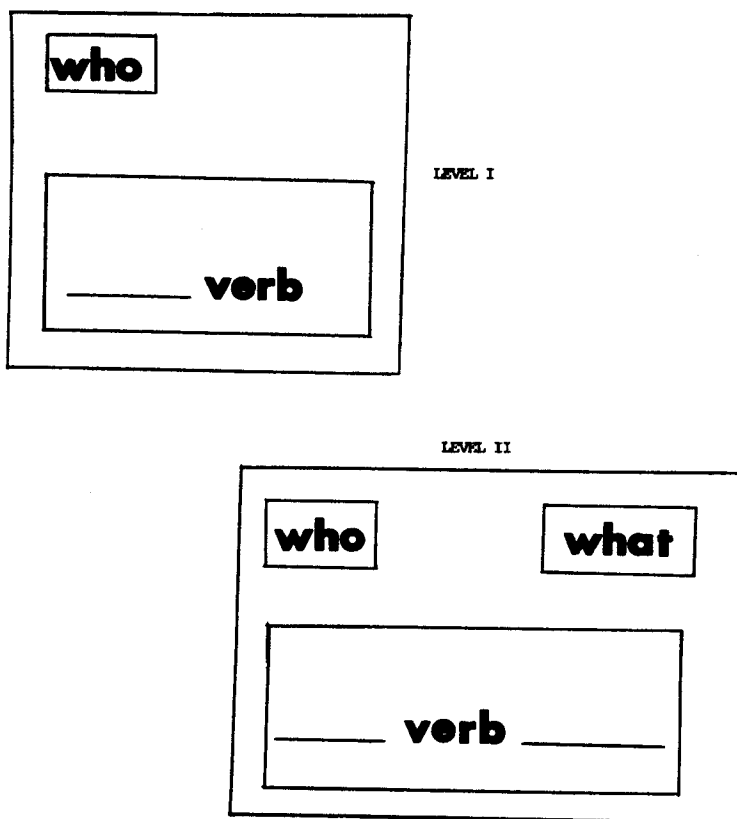


Figure 3. Format for Levels I and II of program.

"who" and "what" for the actor and "how," "when," "where" and "why" for the object. Sublevels required copying the model or choosing from an appropriate array. Following completion of any level, the PICA was again administered to each patient. Patients were also tested one month post-treatment.

Scoring. The treatment program was administered to each patient and included thirty verbs at every session. Both the graphic and verbal output for each verb was scored. This scoring system was liberally adapted from the multidimensional scoring system for the PICA (Porch, 1967). Criterion scores were PICA scores of 13, 14, 15. Any score falling out of the criterion range was considered incorrect. Scores were tallied for each session and the percentage correct was graphed. Scores of 90% for three consecutive sessions were considered criterion for moving on to the next level. Patients were given scores for their initial response. Since this was a treatment technique, treatment interactions were initiated only after the first response was obtained and scored.

Results. Following the completion of all testing procedures, test results were subjected to a series of analysis of variance procedures. Data for each subject were analyzed individually over time and individual analyses were computed for PICA Overall, Gestural, Verbal, Graphic and individual subtest data as summarized in Table 1. Statistically significant ( $p < .05$ ) differences were noted for the Overall PICA scores over time as well as for the Graphic, Verbal and individual subtests I and C. The locus of these differences was determined by computing the significant gap ( $p < .05$ ) (Edwards, 1963) for each mean comparison. In addition, subject #2 showed statistically significant differences on PICA subtests D and VI.

Table 1. Summary of analysis of variance results.

SUBJECT # 1		SUBJECT # 2	
OVERALL	P < .05	OVERALL	P < .01
GRAPHIC	P < .01	GRAPHIC	P < .01
VERBAL	P < .05	VERBAL	P < .01
SUBTEST # I	P < .01	SUBTEST # I	P < .01
SUBTEST # C	P < .05	SUBTEST # C	P < .05
		SUBTEST # D	P < .05
		SUBTEST # VI	P < .05

With the exception of the results for subtest C, both patients ( $p < .05$ ) improved significantly, as measured by these PICA scores, and maintained these gains for one month following the termination of treatment. For subtest C, subject #1 improved his abilities and maintained the gains following treatment. However, subject #2 reverted to the original PICA level for subtest C. Subject #2 made statistically significant ( $p < .05$ ) gains on PICA subtests VI and D. These findings were similar to those described earlier, with the exception of subtest C, and again were maintained for one month following treatment. Figures 4 and 5 summarize the improved verbal abilities achieved by both patients as measured by PICA subtest I.

Conclusions. It was concluded that the verbing program, as applied to our two subjects, was a worthwhile task resulting in statistically significant improvement in communicative ability as measured by the PICA. It is possible that the PICA is not the best measure of improvement for this task. Subjective analysis of our subjects' graphic improvement on Subtest A indicated an increased ability to sequence and utilize linguistic elements. The increased syntactic complexity exhibited by our subjects was not reflected in PICA scores, due to spelling errors. If the PICA is to remain the principle means for evaluation of the verbing program, we feel that additional linguistic analyses are called for to further measure changed abilities

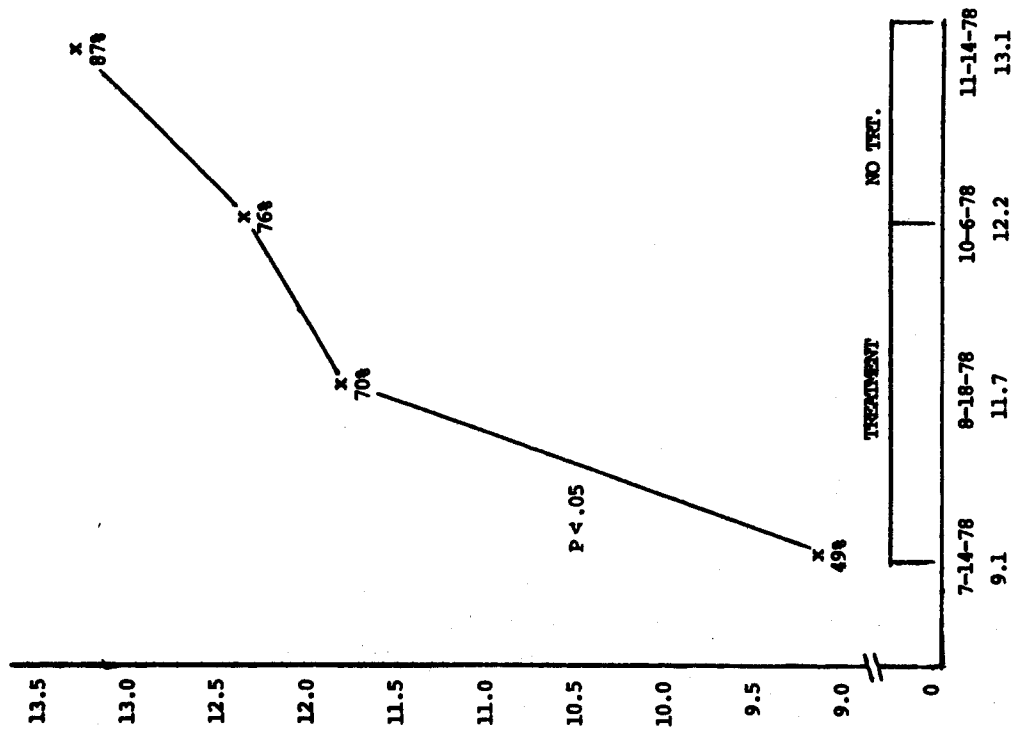


Figure 4. PICA scores for Subject 1 during treatment and no treatment periods.

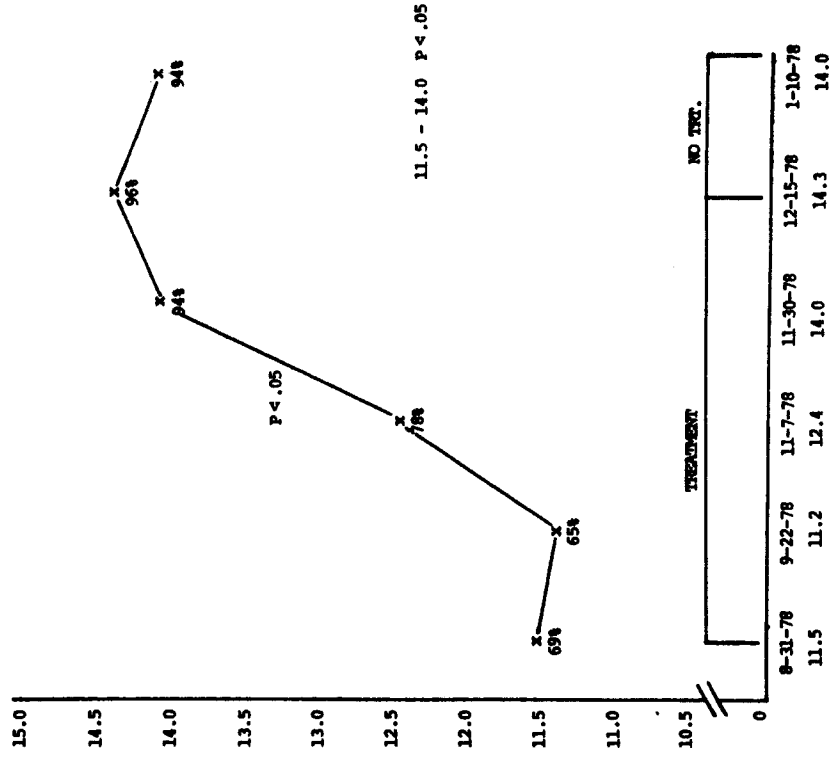


Figure 5. PICA scores for Subject 2 during treatment and no treatment periods.

The findings reported here suggest that emphasis in treatment may more appropriately be placed on the verb than on the noun and, in our opinion, postential for resultant "functional" communication is enhanced with this treatment emphasis. Effects were most pronounced following completion of Level I. Such findings suggest that the verbing program could possibly be simplified by eliminating the second level and concentrating on the actor-action structure alone.

Preliminary findings on subjects who are now undergoing the treatment program tend to suggest that different types of aphasic patients may do less well than others on this task. Both of our subjects who did well in the program were posterior lesion patients. As Shewan, 1976, pointed out, posterior patients make more errors on verb phrases. Those findings led us to speculate that posterior patients may be facilitated more by centering treatment on the verb. Data for the two subjects studied strongly suggested that the treatment paradigm described is a meaningful one and warrants further study. Demonstrated gains were maintained following the termination of treatment for both subjects, with the exception of Subtest C gains for Subject 1. Continuation of this study with increased numbers and types of aphasic patients is now underway in our clinic.

It is our belief and one that was confirmed by family member reports that functional communicative ability is enhanced because utilization of the verb as the pivot training unit results in the application of problem solving strategies (wh-questions) on the part of the aphasic patient. In addition, by specifying function, the patient is able to narrow the semantic field referring to the ideas he wishes to communicate. Consequently, there is an increase in the probabilities for eliciting utterances appropriate to the communication situation.

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#### Discussion

- Q: This concept is basic to the work that we are doing in our clinic. This framework also accounts for 75% of what we say in daily communication. We are using secondary measures to assess functional communication.

- A: I agree totally with what you have said about using additional measures.
- Q: I am curious where you went with these patients after the verbing program's completion.
- A: These patients were terminated from treatment when they completed this program.
- Q: Upon the initiation of this program, what were these patients PICA scores for subtest I and A?
- A: These patients on subtest I were not giving the verb a specifying function in many instances. Their mean scores were 6 to 7 and on completion they were scoring in the mean ranges of 12 to 14.
- Q: So you did not see this as a problem of sequencing, and what can we look for to start this program?
- A: We did see a decrease in the utilization of verbs with these patients and this was one of the reasons we created this program. Once we did emphasize verbs in treatment it was very easy to start attaching other linguistic elements to the verb via wh-questions to generate complete syntactically correct sentences. Not only were they syntactically correct, but they were semantically more appropriate to the situation they wanted to communicate about. The interesting thing here is that we saw generalization to a functional level not only as evidenced by subtest I of the PICA but also as reported by family members.
- Q: I didn't quite understand all your methods. You didn't use gestures, did you, to help call up verbs?
- A: No we didn't.
- Q: Did you find the patients used gestures?
- A: When I was in the sessions I did not observe the patients relying on gesture.
- Q: You reported these patients were posterior patients. Did you use this program with any other types of aphasia?
- A: We have been using this program with a total of 6 patients, some of which were anterior lesion patients. They are progressing through this program much more slowly and generalization appears to be less than for the posterior lesion patients. It is too soon to draw any specific conclusions on these other patients, because they have not yet finished the treatment program.
- Q: Did you mention time-post-onset for both patients?
- A: For subject #1 it was 8 months post onset and for subject #2 it was 7 years post onset.
- Q: Do you think you could attribute the gains made by the patient who was 8 months post onset to physiological restitution rather than to the experimental program?
- A: We used a single-case-time-series design and included a stability measure which was defined in the context of the paper. Because of the use of this stability measure we feel that the gains made by the patient were a result of the experimental program.