Verbal Self-Correction Behavior of Aphasic Subjects for Single Word Tasks

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Self-correction behavior may be defined as the ability to recognize an erroneous response and to initiate some effort to improve or correct it. Wepman (1958) indicates that these skills are well preserved in normal speakers, but almost always defective to some degree in brain-injured aphasic adults. Several writers have suggested that self-correction ability (or lack of it) has prognostic significance with regard to recovery from aphasia (Eisenson, 1964, 1972; Vignolo, 1964). Recent studies of aphasic patients' verbal self-correction efforts have focused on the description and the categorization of these events (Marshall, 1976; Farmer, 1977; Farmer, O'Connell and O'Connell, 1978). Although these investigations highlight the importance of self-correction behavior to aphasic symptomatology, they have for the most part dealt with correction events in connected speech. It is quite possible that a clearer picture of aphasic patients' self-correction abilities may be obtained from analyses of these events in short-answer and single-word tasks where behaviors can be easily defined and recorded. The present investigation attempts to analyze aphasic subjects' verbal self-correction efforts and successes for ten short-answer verbal production tasks. The following questions were examined:

1. Does the frequency of aphasic patients' verbal self-correction efforts differ for various short-answer tasks?
2. Does the success of aphasic patients' verbal self-correction efforts differ for various short-answer tasks?

METHOD

Subjects. Thirty aphasic patients (26 men, 4 women) ranging in age from 31 to 70 years (mean 55.7) participated in the study. Duration of aphasia ranged from 1 to 120 months, with a mean of 40 months. Etiology of aphasia was thromboembolic for 21, hemorrhagic for five, and traumatic for four subjects. Severity of aphasic deficit as measured by overall percentile scores on the Porch Index of Communicative Ability (PICA, Porch, 1967) ranged from the 34th to the 90th percentiles, with a mean of 69th percentile. Subjects were free from obvious vision or hearing defects, and were able to complete the battery of verbal production tasks described in the next section.

Tasks. Each subject was administered ten verbal tasks of ten items each. Tasks were selected to elicit brief predictable verbal responses, span a range of difficulty, and to typify those generally employed in aphasia therapy and testing.* Tasks were grouped in clusters according to anticipated degree

*Certain task stimuli were selected from the Minnesota Test for Differential Diagnosis of Aphasia (Schuell, 1965) and the Boston Diagnostic Aphasia Examination (Goodglass and Kaplan, 1972).

of difficulty. Three tasks--Simple Repetition, Difficult Repetition, and Oral Reading, made up the Verbal-Matching cluster. Four tasks--Paired Associates, Questions, Phrase Completions, and Descriptive Naming, comprised the Auditory-Verbal cluster. A Visual-Confrontation Naming cluster included three tasks--Simple Naming, Moderate Naming, and Difficult Naming. Examples of stimulus items for each task are given in Table 1. Standard instructions were employed in the administration of each task, and order of administration was kept constant for all subjects. All responses were videotaped for subsequent categorization and analyses.

Table 1. Short answer tasks within Verbal-Matching, Auditory-Verbal, and Visual-Confrontation Naming task clusters.

Verbal-Matching	
Task	**Stimulus**
Simple repetition	pie
Difficult repetition	artillery
Oral reading	house

Auditory-Verbal	
Task	**Stimulus**
Questions	What color is grass?
Paired association	Salt and _____
Phrase completion	A cup of _____
Descriptive naming	An animal that gives off a bad odor _____

Visual-Confrontation Naming	
Task	**Stimulus**
Simple naming	girl
Moderate naming	ladder
Difficult naming	alligator

Categorization of Responses. Responses were categorized as correct, incorrect, successful self-corrections, or unsuccessful self-corrections. Correct responses included responses in which the subject's initial and only task attempt, regardless of latency, was an intelligible, generally acceptable answer to the task item. Incorrect responses consisted of responses in which the individual's initial and only task attempt was an unintelligible or non-acceptable answer to the stimulus. Occasions in which the subject did the wrong task, responded nonverbally, or produced a grunt or subvocalization were also classified as incorrect responses. All other responses were categorized as self-correction behaviors. Successful self-corrections included three explicitly defined behaviors: Immediate, Effortful, and

Corrections. The salient characteristic of these events is that they culminate in the production of a correct response. Responses categorized as unsuccessful self-corrections incorporated four events: Rejection, Acknowledged Single Error, Multiple Errors, and Acknowledged Multiple Errors. The most obvious aspect of these behaviors is that they reflect an individual's awareness of and/or attempts to overcome response inadequacies, but do not terminate with generation of a correct response. Definitions for each successful and unsuccessful self-correction behavior are in Table 2.

Table 2. Definitions of verbal self-correction behaviors.

Successful Behaviors	Definition
Immediate Correction	The patient makes an immediate successful self-correction of a single task attempt.
Effortful Correction	The patient with noticeable effort makes a non-immediate self-correction of an erroneous task attempt or attempts.
Cued Correction	The patient gives one or more related verbal, gestural, or graphic responses that lead to verbal production of the correct response.
Unsuccessful Behaviors	
Rejection	The patient produces a clearly demonstrable verbal or gestural behavior indicating rejection or refusal, without attempting to respond to the task.
Acknowledged Single Error	The patient makes a single task attempt, after which he gives a clear verbal or gestural indication of the inadequacy of, or his dissatisfaction with the response, but does not attempt to change it.
Multiple Errors	The patient makes two or more unsuccessful task attempts, without acknowledging that the end product is in error.
Acknowledged Multiple Errors	The patient makes two or more unsuccessful task attempts, and clearly acknowledges, verbally or gesturally, that the end product remains in error.

Analyses. The present study focused on aphasic subjects' self-correction efforts and successes for the Verbal-Matching, Auditory-Verbal, and Visual-Confrontation Naming clusters, and for the various tasks within each cluster. Specific forms of successful and unsuccessful correction behavior were not analyzed separately. Self-correction effort was defined as the total number

of correction events divided by the sum of these events and the incorrect responses. Self-correction success was defined as the number of successful self-correction events divided by the total number of correction events. Proportions of self-correction effort and success were calculated for each subject, and averaged across all subjects for each task and task cluster. Single classification analyses of variance (Winer, 1971) were conducted for group cluster means. When analyses revealed cluster means to differ significantly, Neuman-Keuls tests were conducted to determine which of the means were significantly different.

RESULTS

Figure 1 shows group (N=30) mean proportions of self-correction effort and self-correction success for the verbal task clusters. Also given in Figure 1 are the mean percentages of initially correct responses for each cluster. As expected, the highest percentages of correct responses occurred on the easier Verbal-Matching tasks, with the fewest correct responses on the Visual-Confrontation Naming cluster, and the Auditory-Verbal cluster falling in between. Figure 1 reveals that as task cluster difficulty increased (as measured by percentages of correct responses), the group mean proportion of self-correction effort increased markedly. Mean proportions of self-correction effort for task clusters were found to be significantly different ($F=12.60$; df, 60,2; $p < .01$). Post-hoc Neuman-Keuls tests showed the Visual-Confrontation Naming cluster mean to differ significantly from the Auditory-Verbal and Verbal-Matching cluster means ($p < .01$), and the Auditory-Verbal cluster mean to differ from the Verbal-Matching mean ($p < .05$) Figure 1 further shows that this increase in verbal self-correction effort as cluster difficulty increased was not accompanied by a change in self-correction success. Group mean proportions for self-correction success were strikingly similar for the three task clusters, and did not differ significantly ($F=.11$; df, 60,2; $p > .05$).

Figures 2, 3, and 4 show group mean proportions for self-correction effort and success for the tasks within each cluster. These data, not subjected to statistical analysis because of high subject variability for specific tasks, reveal a pattern similar to that seen for the task clusters. Specifically, this consists of an increase in self-correction effort with little change in self-correction success as task difficulty increases.

DISCUSSION

Two findings emerge from this study. The first is that as verbal task difficulty increases, aphasic patients tend to make more verbal self-correction attempts. This is, of course, partially related to the fact that an increase in task difficulty would normally be accompanied by a greater number of incorrect responses, affording more opportunities for self-correction. The second finding is that increases in proportions of self-correction effort are not accompanied by changes in self-correction success. This finding may have some serious clinical ramifications for the aphasic individual. Conside the following hypothetical example. A particular aphasic patient averages 50% self-correction success, regardless of task difficulty. On an easy 10-item task, he gets eight correct, attempts to correct two errors, and succeeds on one of these attempts. On a very difficult task, he gets two items correct, attempts to correct six errors, succeeding on three attempts,

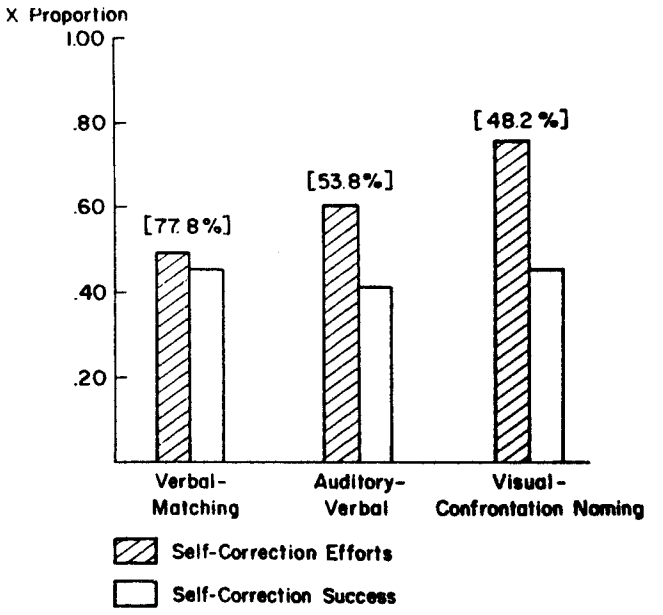

Figure 1. Group mean proportions of self-correction effort and success for Verbal Matching, Auditory Verbal, and Visual Confrontation Naming task clusters. Group mean percentage of correct responses for the task cluster is given in brackets above the cluster.

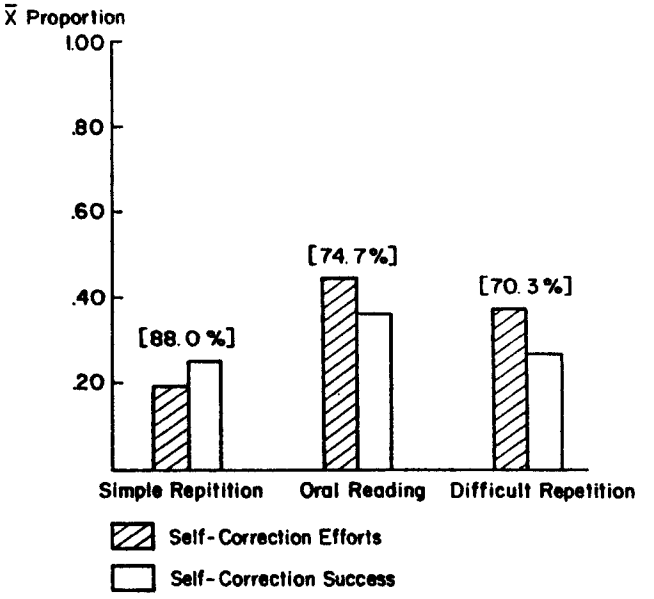

Figure 2. Group mean proportions of self-correction effort and success for tasks within the Verbal Matching cluster. Group mean percentage of correct responses for each task is given in brackets.

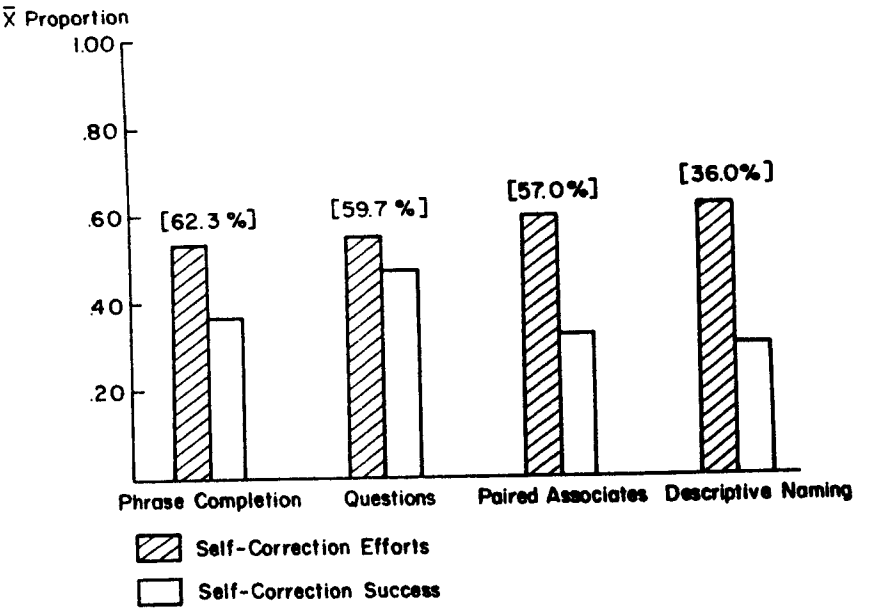

Figure 3. Group mean proportions of self-correction effort and success for tasks within the Auditory Verbal cluster. Group mean percentage of correct responses for each task is given in brackets.

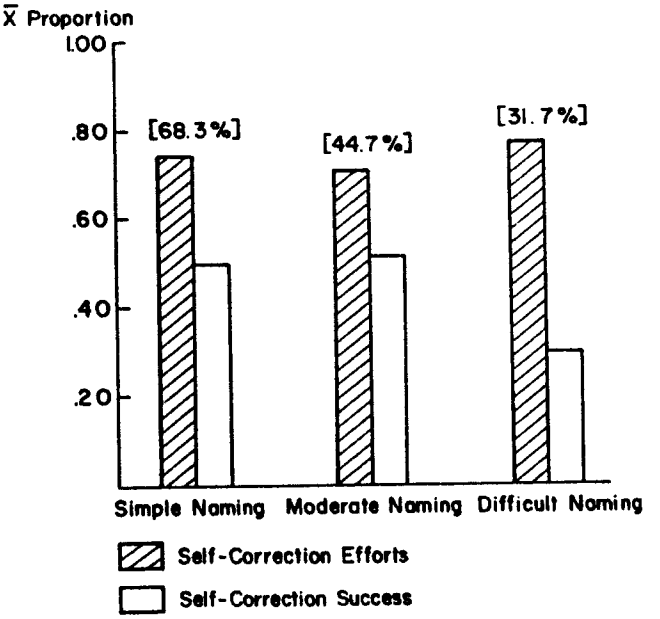

Figure 4. Group mean proportions of self-correction effort and success for tasks within the Visual Confrontation Naming cluster. Group mean percentage of correct responses for each task is given in brackets.

and makes two incorrect responses. The potential for accumulation of negative emotional reactions in the latter situation may outweigh the fact that the patient succeeds on half of his correction efforts. In addition, this intermittent success ratio may function as a variable reinforcement schedule, prompting more correction efforts in the absence of corresponding increases in success.

Aphasic patients' propensity for verbal self-correction may, of course, be related to other factors. One of these may be the type of verbal task that the patient is attempting. In this study, subjects generated their highest proportions of self-correction efforts on Visual-Confrontation Naming tasks. While these tasks were also the most difficult, the fact that a picture stimulus is placed in front of the patient and remains there as he attempts to name it may prompt repeated self-correction efforts. Conversely, on an Auditory-Verbal task with a lengthy stimulus presented once, the generation of self-correction efforts may be reduced by the fact that the patient forgets the stimulus. Finally, when given the opportunity to respond immediately to a brief stimulus, as in a Verbal-Matching task, the patient may generate even fewer self-correction events.

From a clinical perspective, the findings of this study suggest a need to consider suppressing self-correction tendencies of certain aphasic patients. These clinician controls would ideally be based on careful analyses of a patient's proportion of self-correction successes for specific tasks and/or accompanying increases in task difficulty. Finally, there appears to be a number of potentially fruitful paths toward understanding what Wepman (1958) termed the role of self-correction in recovery from aphasia. These include the study of self-correction abilities of individual subjects and aphasic groups, and a task by task analysis of specific successful and unsuccessful self-correction behavior forms.

REFERENCES

Eisenson, J., Aphasia: A point of view as to the nature of the disorder and factors that determine prognosis for recovery. Int. J. Neurol., 4, 287-295 (1964).

Eisenson, J., Language rehabilitation of aphasic adults: Some observations on the state of the art. Folia Phoniat., 29, 61-83 (1977).

Farmer, A., Self-correctional strategies in the conversational speech of aphasic and nonaphasic brain damaged adults. Cortex, 13, 327-334 (1977).

Farmer, A., O'Connell, P.F., and O'Connell, E.J., Sound error self-correction in the conversational speech of nonfluent and fluent aphasics. Folia Phoniat., 30, 293-302 (1978).

Goodglass, H. and Kaplan, E., The Assessment of Aphasia and Related Disorders. Philadelphia: Lea and Febiger (1972).

Marshall, R., Word retrieval behavior of aphasic adults. J. Speech Hearing Dis., 41, 444-451 (1976).

Porch, B.E., Porch Index of Communicative Ability. Palo Alto, CA: Consulting Psychologists Press (1967).

Schuell, H., Minnesota Test for Differential Diagnosis of Aphasia. Minneapolis: University of Minnesota Press (1965).

Vignolo, L.A., Evolution of aphasia and language rehabilitation: A retrospective exploratory study. Cortex, 1, 344-367 (1964).

Wepman, J.M., The relationship between self-correction and language recovery in aphasia. J. Speech Hearing Dis., 23, 302-305 (1958).
Winer, B.J., Statistical Principles in Experimental Design. New York: McGraw-Hill (1971).

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