

Longitudinal Assessment of Narrative Discourse in a Mildly Aphasic Adult

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Traditionally, clinicians have been faced with the problem of identifying measures of communicative change for patients with mild aphasia. Such patients often present functional communication skills yet demonstrate subtle deficits that are difficult to quantify. Recent investigations of verbal communicative ability in adults with brain injuries have focused on the analysis of narrative discourse. Populations studied have included individuals with traumatic brain injury (e.g., Liles, Coelho, Duffy, & Zalagens, 1989; Mentis & Prutting, 1987), those with right hemisphere damage (e.g., Gardner, Brownell, Wapner, & Michellow, 1983; Joannette & Goulet, 1990), and aphasic individuals (e.g., Bottenberg, Lemme, & Hedberg, 1985; Ulatowska, North, & Macaluso-Haynes, 1981). Accurate narrative production and comprehension require a complex interaction of cognitive, linguistic, and social abilities and may be sensitive to particular deficits present in mildly aphasic patients.

The purpose of this study was to assess the sensitivity of various measures of narrative discourse for detecting changes in communicative performance throughout the course of recovery in a mildly impaired fluent aphasic patient.

METHOD

Subjects

Aphasic. AJ was a 55-year-old, right-handed male who was 1 month post onset of a single unilateral left thromboembolic cerebrovascular accident

(CVA) at the time this study was initiated. He was a high-school graduate working as a realtor. The *Porch Index of Communicative Ability* (PICA) (Porch, 1967) overall score at 1 month post onset was 12.65, placing him at the 71st percentile. On the four auditory comprehension subtests from the *Boston Diagnostic Aphasia Examination* (BDAE) (Goodglass & Kaplan), he scored at the 86th percentile. The Rating Scale Profile of Speech characteristics from the BDAE was consistent with anomic aphasia.

Normal. Three adult males with a mean age of 56 years, having no history of neurologic disease and matched with AJ on the basis of the Hollingshead Four Factor Index of Social Status (Hollingshead, 1972), served as controls.

Story Elicitation Procedure

Subjects were presented a picture story entitled "The Bear and the Fly" (Winter, 1976) via a filmstrip projector on an 8-by-10-in. screen. The story has 19 frames (with no sound track) showing how a bear inadvertently wrecks his house and abuses his family while attempting to kill a fly. After viewing the filmstrip the subjects were asked to retell the story.

Data Collection

Stories were elicited from the control subjects on one occasion. Stories were elicited from AJ on a monthly basis and, eventually, every other month up to 1 year post CVA. Each story was audiotaped and transcribed verbatim. Transcriptions were distributed into T units prior to analysis. Measurement of story narrative performance was made at three levels: sentence production, intersentential cohesion, and story episode structure.

Sentence Production. A T unit is defined as an independent clause plus any dependent clauses associated with it (Hunt, 1970). T units are roughly equivalent to sentences but are more reliably identified. The primary measure of sentence production was the number of subordinate clauses per T unit (total number of subordinate clauses in each story divided by the total number of T units). This ratio permitted comparisons across stories that varied in length. The frequency of clause use may be considered to measure the complexity of sentence-level grammar.

Intersentential Cohesion. The occurrence of any of Halliday and Hasan's (1976) five cohesive categories (Reference, Lexical, Conjunction, Elipsis, and Substitution) was noted. Each occurrence of a cohesive tie was then

judged as to its adequacy using Liles's (1985) procedure. Three categories of adequacy were used:

1. Complete—a tie was judged complete if the information referred to by the cohesive marker was found easily and defined with no ambiguity.
2. Incomplete—a tie was judged to be incomplete if the information referred to by the cohesive marker was not provided in the text.
3. Error—a tie was judged to be an error if the cohesive marker referred the listener to ambiguous information elsewhere in the text.

The measure of intersentential cohesion selected for analysis was the percentage of complete ties relative to the total number of cohesive ties used within each narrative. The percentage of complete ties represents the use of complete ties minus incomplete or error ties and is considered to be a general indicator of cohesive adequacy.

Story Grammar. The number of complete episodes in each story was counted and used as the measure of story grammar performance. According to Stein and Glenn (1979), an episode must consist of (a) an initiating event that causes a character to formulate a goal-directed behavioral sequence; (b) an action; and (c) a direct consequence marking attainment or nonattainment of the goal. These three components must be logically related. An episode was judged complete only if it contained all three components.

Severity of Aphasia

The *Porch Index of Communicative Ability* (PICA) served as a general measure of aphasic impairment. The PICA was administered on a monthly basis and eventually every other month for 12 months.

Reliability

All reliability measures were based on point-to-point scoring. Interexaminer reliability for the sentence-level measures of total number of T units and number of subordinate clauses identified independently by two scorers was 96% and 94%, respectively. Interexaminer reliability was 96% for identification of episodes and 91% for the cohesion measures.

RESULTS

Severity of Aphasia

Figure 1 depicts AJ's aphasia recovery curve as measured by the PICA. From the initial administration at 1 month post onset, AJ's overall score demonstrated a fairly steady recovery, rising from the 71st percentile to the 93rd at 12 months post onset.

Narrative Discourse Performance

Various aspects of AJ's story narrative discourse performance were measured over the same 12-month period, including measures of sentence

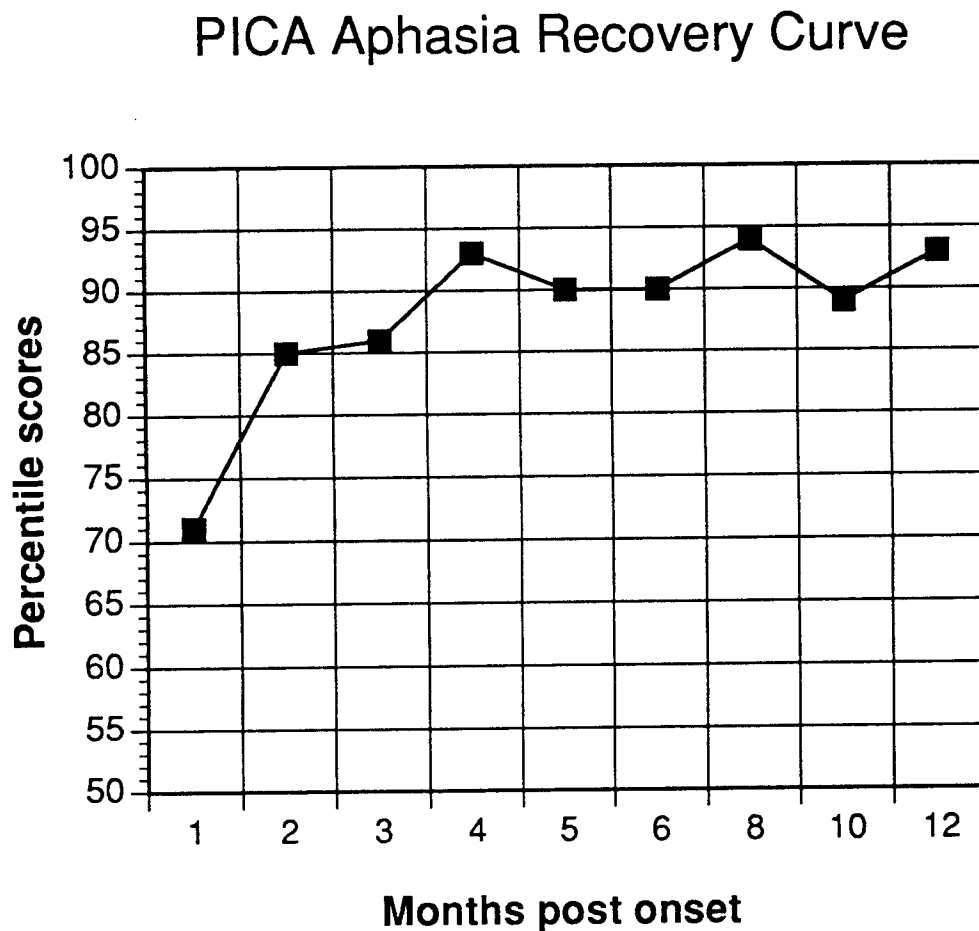


Figure 1. *Porch Index of Communicative Ability (PICA) aphasia recovery curve for AJ from 1 to 12 months post onset.*

production, intersentential cohesion, and story grammar. AJ's scores on these measures were converted to Z scores for the purpose of comparing them to the average performance of the normal controls.

Sentence Production. The measure selected for sentence production was the ratio of the total number of subordinate clauses in each story divided by the total number of T units. Figure 2 depicts AJ's scores on the story-telling task. On this task, the complexity of AJ's sentence-level grammar was variable but fairly close to that of the normal controls. In many instances AJ's production of subordinate clauses, throughout the 12-month period it was sampled, surpassed that of two of the control subjects.

Intersentential Cohesion. Intersentential cohesion may be thought of as an organizational system for the content introduced in a narrative. The

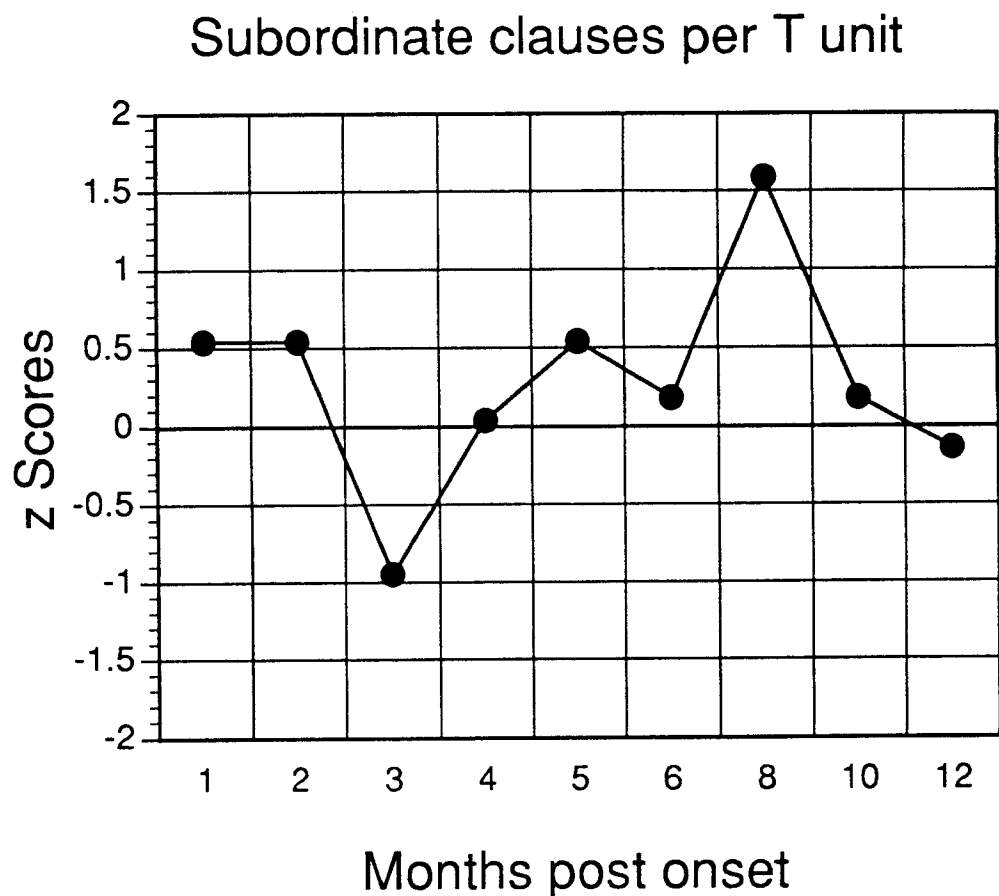


Figure 2. AJ's performance on the sentence production measure (subordinate clauses per T unit in each story) over the 12-month period monitored.

measure of intersentential cohesion selected in this study was the percentage of complete ties per story. Figure 3 illustrates that AJ's performance for the retelling task, although variable, improved steadily over the 12-month period monitored. At 1 year post onset, cohesive adequacy was comparable to that of the normal controls. Therefore, as AJ's language function recovered, his ability to produce a well-organized narrative also improved.

Story Grammar. The production of complete episodes is evidence of story grammar knowledge. Episodes may be considered to be a measure of the integration of a story's content. In the present study, number of complete episodes was selected as the measure of story grammar. Figure 4 depicts AJ's performance on this measure. Initially AJ was unable to generate a single complete episode in the story-retelling task, and he never generated more than two complete episodes over the 12-month period. The normal controls generated four and five complete episodes

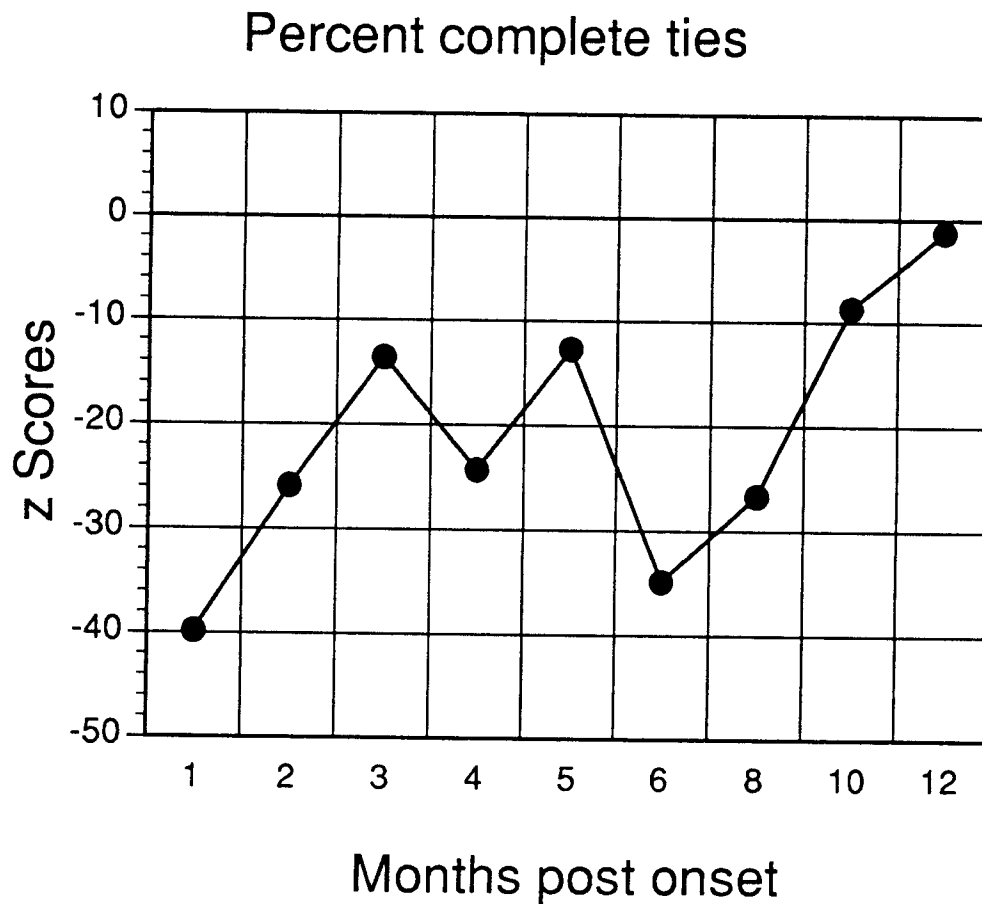


Figure 3. AJ's performance on the intersentential cohesion measure (percent complete ties in each story) over the 12-month period monitored.

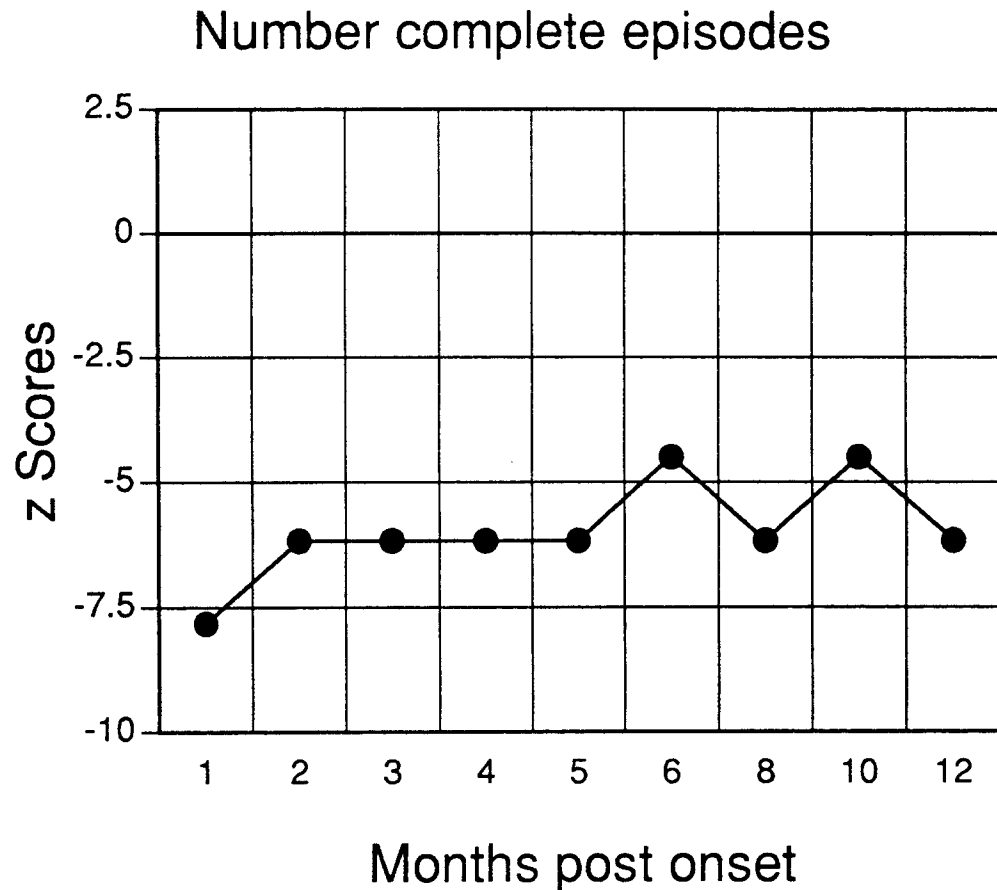


Figure 4. AJ's performance on the story grammar measure (number complete episodes in each story) over the 12-month period monitored.

on the same task. Therefore, in the presence of language recovery, story grammar ability remained relatively impaired and only slightly improved.

DISCUSSION

The findings of this study have both clinical and theoretical implications related to the management of individuals with mild aphasia and to the nature of discourse abilities in patients who have sustained brain injuries.

It is relatively common practice for clinicians, faced with the need to prioritize their limited resources, to discharge those aphasic clients who have either recovered functional language skills or whose language impairments are relatively subtle. Those aphasic clients who are moderately to severely impaired and whose language impairments are more chronic in nature often receive language remediation services that are more inten-

sive and continue for longer periods of time. This is unfortunate, for mildly impaired aphasic individuals may ultimately benefit more from language therapy, in terms of returning to work and resuming near-normal communicative functioning, than more severely involved aphasic patients. If one accepts the notion that mildly aphasic patients should receive at least the same amount of therapy as more severely involved aphasic patients, then clinical measures need to be identified that will delineate the extent and nature of their communicative impairments. Analyses of narrative discourse appear well suited for assessing change in communicative performance over the course of recovery in such patients.

In the present investigation we studied a special form of narrative discourse, that is, story narratives. The use of story narratives permitted an examination not only of sentence-level grammatical ability and intersentential cohesion but also of the cognitive abilities underlying the organization and production of a text. Interactions among sentence-level grammar, intersentential cohesion, and story grammar knowledge required to produce a story may place a communicative load on mildly aphasic patients' performance that reveals problems not observable in other forms of discourse. The longitudinal application of these multilevel analyses enabled us to document the differences in AJ's recovery curves for the three measures. Sentence-level grammar, although variable, was relatively normal and showed no significant change over the 12-month trial period. Cohesion yielded a curve similar to that of AJ's aphasia recovery curve, showing some variability but with overall improvement. A flat curve was noted for story grammar, with little apparent change from its moderately impaired status throughout the entire period.

The multilevel analyses also prevented the over- or underestimation of AJ's discourse performance. For example, analysis of just sentence-level grammar or cohesion may have given the impression that AJ's discourse abilities were intact, even though story grammar abilities were moderately depressed. Further, although his cohesion gradually improved, early in the 12-month period it was significantly impaired in the presence of near-normal sentence grammar. Clearly, one could not have predicted the adequacy of AJ's sentence organization from his sentence-level grammar.

With regard to treatment implications, although neither cohesion nor story grammar abilities were directly addressed in the language therapy AJ received, during the 12-month period in which his discourse abilities were monitored, cohesive adequacy appeared to have benefitted from the traditional language-based approach to therapy, whereas story grammar abilities did not. This finding, together with those of previous investigations that have documented improved cohesion in the story narratives produced by normal adults over multiple trials of the same task (Coelho, Liles, & Duffy, 1990), suggests that cohesion may be a promising target for remediation. It should be noted, however, that AJ produced the same one

or two episodes in each presentation of the story-retelling task. Over time these episodes became better organized, as indicated by his improved cohesion score. Had he attempted to introduce additional episodes into his retelling of the story we may well have seen a concomitant drop in his cohesive adequacy. It remains to be seen whether therapy, either language-based or cognitively based, directed specifically toward the remediation of story grammar abilities would be effective.

In spite of AJ's recovery of considerable language function by 12 months post onset and his high degree of motivation, he was unable to return to work. Critical elements of language use (perhaps including story grammar ability) not tapped by traditional aphasia batteries remained depressed in AJ, and this affected his functional status. Study of this issue is certainly warranted.

The findings that AJ's intersentential cohesion improved while story grammar abilities remained moderately depressed have theoretical implications as well. Dissociations of microlinguistic (e.g., sentence-level grammar and cohesion) and macrolinguistic (e.g., story grammar) abilities in different groups of brain-injured patients have been hypothesized (see Glosser & Deser, 1990, for a review). For example, fluent aphasics would be expected to have language-specific deficits in the microlinguistic realm but not in the macrolinguistic; patients with Alzheimer's dementia, who demonstrate deficits with higher-order cognitive processes, would be expected to show significant disturbances on macrolinguistic abilities with relative preservation of microlinguistic skills; and patients with closed head injury, with both focal and diffuse brain injuries, would potentially demonstrate deficits in both the microlinguistic and macrolinguistic realms. Our findings are not in agreement with the particular dissociation that has been hypothesized for fluent aphasics, that is, impaired microlinguistic and intact macrolinguistic abilities; in fact, AJ's pattern was just the opposite. Previous studies of this issue have not been based on longitudinally collected discourse samples, and therefore, there is no information available regarding the stability, or the impact, of recovery on such dissociations. Therefore, the notion that specific dissociations are attributable to specific etiologies may be misleading. For example, Coelho, Liles and Duffy (1991) documented distinct dissociations in two patients with closed head injuries, one with relatively intact macrolinguistic abilities (story grammar) and impaired microlinguistic abilities (cohesion), and a second with very poor macrolinguistic abilities and intact microlinguistic abilities. Again, dissociations in discourse abilities may not always be predicted from etiology alone.

Finally, dissociations aside, we suggest two potential explanations for the finding that AJ's cohesive adequacy improved and his story grammar abilities remained depressed, while the severity of his aphasia, as measured by the PICA, decreased: (1) his story grammar impairment may be

more attributable to brain injury in general than simply to aphasia, or (2) AJ's pattern may be one example of a variety of discourse deficit patterns that may result in aphasia. Research of these issues is also warranted.

In any event, the clinical application of story narrative analysis holds great potential for assessing brain-injured patients with subtle communicative deficits, as well as for increasing our understanding of the interaction between linguistic and cognitive abilities.

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