

Response to Treatment in a Case of Crossed Aphasia

Robert T. Wertz

Veterans Administration Medical Center, Martinez, California

The left cerebral hemisphere appears to be responsible for language, and the right hemisphere appears to be responsible for nonverbal, perceptual, and spatial skills. However, sometimes our expectations are violated. A few folks display language deficits following damage to the right hemisphere, a condition called "crossed" aphasia.

Bramwell (1899) introduced the term. He applied it to two conditions, either right hemiplegia and aphasia in a left-handed individual, or left hemiplegia and aphasia in a right-hander. Today, because there are fairly satisfactory explanations for aphasia in left-handers following left brain damage (Goodglass and Quadfasel, 1954; Hécaen and Sauguet, 1971), Hécaen and Albert (1978) argue that the term "crossed" aphasia now refers to a language disorder in a right-hander following damage to the right hemisphere.

Zangwill (1967) has suggested that aphasic symptoms do not cluster within one of the recognized patterns. Agrammatism and agraphia are present regardless of the location of the lesion in the right hemisphere (Ettlenger, et al., 1955; Clarke and Zangwill, 1965; Brown and Wilson, 1973). Comprehension and naming are preserved or only mildly impaired.

Boller (1973) reports that only 23 percent of the reported cases have a vascular etiology. He cautions against over-interpretation of aphasia-like symptoms in right-brain-damaged right-handers when the etiology is tumor or trauma.

Although "crossed" aphasia is rare--estimates of incidence range from 0.4% (Hécaen, et al., 1971) to 10% (Branch, Milner, and Rasmussen, 1964)--a recent report by Carr, Jacobson, and Boller (1981) implies that crossed aphasia may be less interesting than traditionally believed. They present four cases that displayed language deficits and improvement that were essentially the same as the language deficits and improvement seen in patients who acquire aphasia by a more conventional route, subsequent to a left hemisphere lesion. Carr, et al., (1981) suggest that the intrahemispheric location of the lesion and the severity of the aphasia may have more influence on a patient's course of recovery than the interhemispheric location of the lesion. Thus, site and severity predict a patient's future more than side.

Nevertheless, aphasic patients, whether crossed or uncrossed, have common aspirations. Most want to improve their ability to communicate. Unfortunately, most cases of crossed aphasia are treated as interesting rather than treated. Even the well-documented four cases reported by Carr, et al., (1981) apparently had little, if any, contact with therapists, speech or otherwise. The purpose of this paper is to report the response to treatment displayed by a right-handed patient who suffered aphasia following a lesion in his right frontal and parietal lobes. The results of this treatment add an additional piece of information about how "crossed" aphasia is the same as or differs from aphasia resulting from a left hemisphere lesion.

REPORT OF CASE

J.C. collapsed at a football game on September 10, 1973, one week before his 51st birthday. A neuroradiological evaluation revealed an aneurysm at the junction of the right anterior cerebral artery and the anterior communicating artery. This was clipped during a craniotomy one week after his initial symptoms. J.C. had a stormy postsurgical course which waned in late October. This right-handed man displayed left hemiplegia and severe aphasia. Three months of rehabilitation composed of physical therapy and infrequent visits by a speech pathologist in a community center followed. In January 1974, four months postonset (MPO), J.C. was released from the community rehabilitation program, returned home, and entered outpatient aphasia therapy in our Veterans Administration Medical Center. He began a relationship composed of periods of treatment and periods of no treatment that has continued to the present.

At four MPO, J.C.'s severity of aphasia as indicated by his PICA (Porch, 1973) Overall score, shown in Figure 1, was the 59th percentile using left hemisphere norms. Token Test performance, measured by the Spreen and Benton (1969) adaptation, was at the 81st percentile. J.C.'s performance on the Boston Diagnostic Aphasia Examination (BDAE) (Goodglass and Kaplan, 1972) classified him as demonstrating Broca's aphasia. A motor speech evaluation indicated coexisting apraxia of speech. Speech therapy consisting of three individual sessions and one group session each week was initiated. Emphasis was on improving verbal performance. Melodic Intonation Therapy (Sparks, Helm, and Albert, 1974) supplemented by home practice with a Language Master took up the bulk of the treatment time.

Porch Index of Communicative Ability

MODALITY RESPONSE SUMMARY

Name	J.C.	Case No.	
Age	51	Birthdate	9-17-22
Sex	M	Race	
Handedness	R	Used	
Diagnosis	Right Hemisphere Aneurysm	Onset	9-16-73
Date	1-29-74	Overall	11.37
		Gestural	13.02
		Verbal	11.85
		Graphic	8.86
Date	9-17-74	Overall	13.66
		Gestural	14.28
		Verbal	13.52
		Graphic	12.93
Date		Overall	
		Gestural	
		Verbal	
		Graphic	

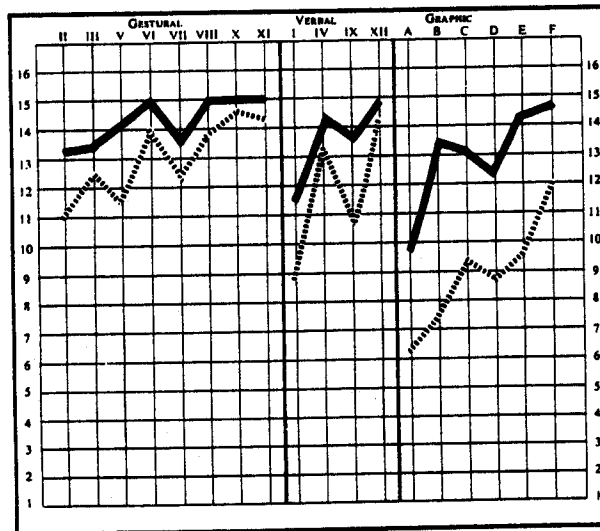


Figure 1. PICA Modality Response Summary showing J.C.'s performance at four months and at one year postonset.

At eight months postonset, after 140 hours of treatment, J.C. performed at the 87th percentile, Overall, on the PICA and at the 87th percentile on the Token Test. Treatment on the same schedule, continued until September, 1974, one year postonset. PICA Overall performance at that time, shown in Figure 1, was at the 89th percentile, and Token Test performance was at the 93rd percentile. BDAE performance continued to show a Broca's aphasia profile, and motor speech behavior continued to indicate apraxia of speech.

J.C. considered returning to his former employment as a purchasing agent for a large national corporation. However, he reached a mutually agreeable decision with the company to take early retirement. J.C. was discharged from speech therapy at one year postonset, but he was reevaluated at 18 MPO and two years postonset. PICA Overall performance had slipped to the 80th percentile at 18 MPO and to the 76th percentile at two years postonset. He declined any additional treatment and was not scheduled for systematic followup. J.C. did, however, participate in a cerebral localization investigation in another VAMC. A CT scan done in March 1976 confirmed that his lesion was confined to the right frontal-parietal area.

In October 1980, J.C. was hospitalized in our VAMC for persisting fever associated with a long bout of flu. BDAE performance, shown in Figure 2, profiled as Broca's aphasia. Reevaluation indicated that PICA Overall performance, shown in Figure 3, was at the 58th percentile, and Token Test performance was at the 74th percentile. Daily treatment was initiated and continued for one month while J.C. was an inpatient. In November 1980, he was reevaluated just prior to discharge. PICA Overall performance had risen to the 70th percentile. J.C. has been seen as an outpatient twice a week for the past year and one-half.

APHASIA SEVERITY RATING SCALE

0. No usable speech or auditory comprehension.
1. All communication is through fragmentary expression; great need for inference, questioning and guessing by the listener. The range of information which can be exchanged is limited, and the listener carries the burden of communication.
2. Conversation about familiar subjects is possible with help from the listener. There are frequent failures to convey the idea, but patient shares the burden of communication with the examiner.
3. The patient can discuss almost all everyday problems with little or no assistance. However, reduction of speech and/or comprehension make conversation about certain material difficult or impossible.
4. Some obvious loss of fluency in speech or facility of comprehension, without significant limitation on ideas expressed or form of expression.
5. Minimal discernible speech handicaps; patient may have subjective difficulties which are not apparent to listener.

RATING SCALE PROFILE OF SPEECH CHARACTERISTICS

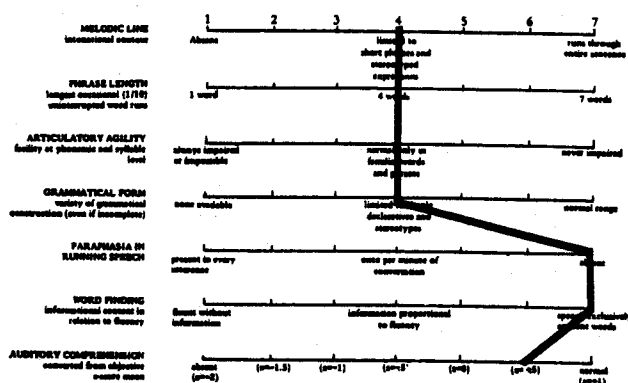


Figure 2. J.C.'s rating on the Boston Diagnostic Aphasia Examination at seven years and one month postonset.

Name _____ Case No. _____
 Age 58 Birthdate 9-17-22 Sex M Race _____ Handedness R - R Used
 Diagnosis Right Hemisphere Aneurysm Onset 9-16-73
 Date 10-17-80 Overall 11.30 Gestural 13.40 Verbal 12.97 Graphic 7.38
 Date 3-16-82 Overall 12.65 Gestural 14.16 Verbal 12.95 Graphic 10.43
 Date _____ Overall _____ Gestural _____ Verbal _____ Graphic _____

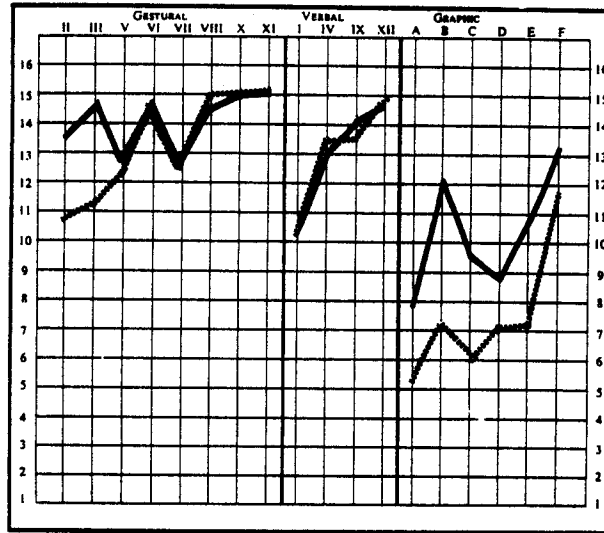


Figure 3. PICA Modality Response Summary showing J.C.'s performance at seven years and one month postonset and at eight years and six months postonset.

Treatment tasks have focused on speech. J.C. rejected continuing Melodic Intonation Therapy, and he rejected intersystemic reorganization (Rosenbek, Collins, and Wertz, 1976) that paired gesture with speech. He has received bouts of the Rosenbek *et al.* (1973) eight-step task continuum; contrastive stress drill (Rosenbek, 1978); and the Helm Elicited Language Program for Syntax Stimulation (Helm-Estabrooks, 1981). These have been coupled with traditional techniques designed to improve auditory comprehension, reading, and writing.

Periodic reevaluations yield Overall PICA performance that ranges between the 75th and 78th percentiles. Token Test performance has reached the 78th percentile, and he obtains a total CADL (Holland, 1980) score of 125. His BDAE performance continues to classify him as demonstrating Broca's aphasia, and mild to moderate apraxia of speech persists. A repeat CT scan, shown in Figure 4, done in February 1981 shows the initial right frontal-parietal lesion and the absence of any subsequent lesions.

DISCUSSION

J.C. is over eight years postonset. The right frontal-parietal lesion in this right-handed man qualifies him as a case of "crossed" aphasia. He has received two periods of treatment. The first, beginning at four months postonset, resulted in a 30 percentile increase in his PICA Overall score.



Figure 4. CT scan done when J.C. was seven years and five months postonset. The initial right hemisphere frontal-parietal lesion is shown, and there is absence of any subsequent lesions.

During a period of no treatment, PICA performance declined, and the second bout of treatment is yet to accomplish the performance attained during the first. Figure 5 shows J.C.'s PICA Aphasia Recovery Curve from four months postonset to the present

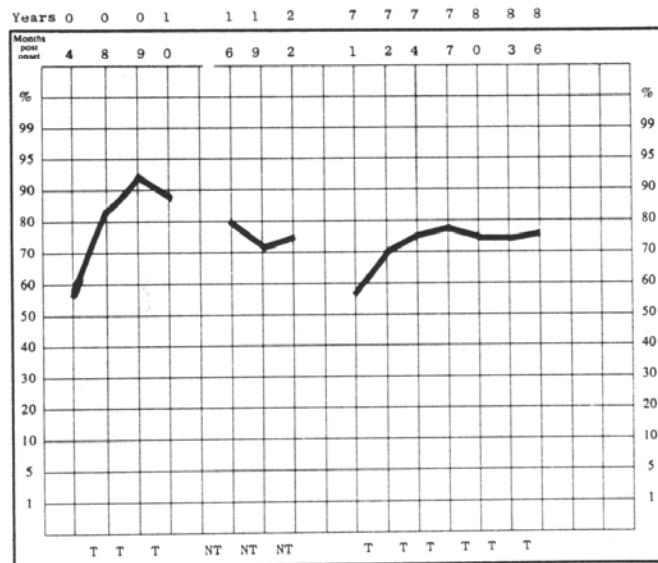


Figure 5. PICA Aphasia Recovery Curve showing J.C.'s performance from four months postonset to the present. (T) shows periods of treatment, and (NT) shows periods of no treatment.

J.C. responded to treatment, and his response is not unlike that of patients who suffer aphasia following a left hemisphere lesion. Further, the aphasic profile, Broca's aphasia, and the motor speech behavior, apraxia of speech, are quite similar to the profile and motor speech behavior seen in patients who have an infarct in the left frontal-parietal area. Finally, the improvement J.C. displayed in his PICA Overall performance, 20 to 30 percentile units, is consistent with the amount of improvement seen in patients demonstrating Broca's aphasia following a left hemisphere lesion (Wertz, Kitselman, Deal, et al., 1981).

J.C.'s symptoms are not consistent with Zangwill's (1967) suggestion that "crossed" aphasic patients do not display one of the recognized patterns of aphasia. J.C. is easily classified as a Broca's type on the BDAE taxonomy. Similarly, Trojanowski, Green, and Levine (1980) report a case of "crossed" aphasia that profiled as severe Broca's aphasia, and each of Carr et al.'s (1981) cases were classifiable; two displayed Broca's aphasia, one displayed transcortical sensory aphasia, and one displayed global aphasia. J.C. does support the literature that reports that "crossed" aphasic patients display agrammatism and agraphia but only mild impairment in auditory comprehension and naming. And, he is a member of the 23 percent that Boller (1973) reports display "crossed" aphasia following a vascular episode.

Therefore, to the extent that J.C. is representative of patients with "crossed" aphasia, he displayed essentially the same behavior, prognosis, response to treatment, and improvement one might expect in a patient who suffered aphasia from a left frontal-parietal lesion and received a similar management program. Of course, additional cases of "crossed" aphasia must be observed before a "no difference" in response to treatment between "crossed" and "uncrossed" aphasia can be reached. The paucity of reports on treatment of patients with "crossed" aphasia is surprising. Our experience with J.C. indicates that "crossed" aphasia may, in fact, be more treatable than interesting.

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DISCUSSION

- Q: Was the prosody of the patient's speech strange in any way?
- A: It was abnormal, essentially the same as one sees in patients who demonstrate apraxia of speech subsequent to a left hemisphere lesion.
- Q: Who read the CT scan?
- A: Dr. Margaret Naeser.
- Q: Was there any family history of left-handedness?
- A: None.

- Q: How did you establish that the patient was right-handed?
A: We asked him and we asked his wife. He was left hemiplegic and used his right hand as though he had preferred it since birth. Both his history and his performance indicated he was strongly right-handed.
- Q: Any previous brain damage prior to the CVA?
A: None.
- Q: How were his visual-spatial skills?
A: Dr. Dean Delis, our Neuropsychologist, evaluated J.C.. Dr. Delis tells me J.C. displays the visual-spatial deficits one expects to see in a right hemisphere brain-injured patient. One wonders what he was using his left hemisphere for.
- Q: I have two questions. First, would you speculate on the tremendous drop in PICA performance during this patient's period of no treatment? Second, most of his improvement during the second period of treatment seemed to result from improvement on the PICA Graphic subtests. Is that correct?
A: It is difficult to explain the drop in PICA performance. J.C. had been dropping in his PICA scores when he was seen for followup six months and one year after completing his first bout of treatment. When we saw him, he was debilitated by a long bout of flu. His PICA performance, even at that time, did not represent his functional communication. He was a communicator. He could convey his needs; he was enjoyable to talk with. The drop in PICA performance may have resulted from illness, a lack of stimulation for almost five years-- he had been spending most of his day interacting with his television set--and a lack of taking the PICA. Your second observation, most of his recent gains have been in writing, is correct. He also made marked improvement on PICA subtests II and III. But both areas are one we have not treated. None of our therapy has been gestural, and very little of it has been on writing. If you look at the literature, you see similar results. A lot of the PICA improvement in writing may reflect treatment in other areas, for example better ability to understand the auditory instructions used in the writing subtests; general practice with using language, and perhaps getting better at the testing game.
- Q: Did this patient have a right limb apraxia?
A: No.
- Q: I am surprised.
A: Maybe that is what he was using his left hemisphere for.
- Q: Did he have a left sided neglect?
A: He did early postonset. It is not apparent now.
- Q: Have you used any of the PICA predictive measures with him?
A: No. We have compared his performance with the results Kurt Kitselman, Leslie Deal, and I reported on recovery in Broca's aphasia patients with left hemisphere lesions. He profiled and recovered essentially the same as the left hemisphere patients.

Q: Is his behavior socially appropriate or is it like that seen in some patients with right hemisphere lesions.

A: His social behavior is quite appropriate.

Q: Hécaen mentions all of the similarities between patients with crossed aphasia and patients who are aphasic following a left hemisphere lesion, but he ends up saying there is still something a bit different about patients with crossed aphasia. Was there anything funny about your patient other than the visual-spatial problems?

A: Well, he has some difficulty with the concept of left and right, but so do some left hemisphere patients and some normals. He has difficulty with prepositions that indicate position, and I do not see this problem in left hemisphere patients at J.C.'s severity level. He has tremendous problems with the days of the week, and, again, the left hemisphere patient at his severity level does not show the same problem. So, if you look long and hard enough, there may be a few things that differentiate J.C. from his left hemisphere brethren.

Q: Just a comment. The problems with prepositions may be linguistic or they may result from the visual-spatial deficits.

A: Good point.

Q: I want to return to the earlier question about improvement on the PICA graphics. If you had done some diagnostic baselines, you may have seen similar improvement without treatment.

A: Another good point. J.C. may have needed a regular schedule of PICAs.