Aphasia: Can It Be Taught? Can It Be Caught?

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Aphasiologists are beginning to employ unusual methods in their attempts to understand aphasia. For example, Gigley and Duffy (1982) proposed using computers to develop a model of language, simulate a lesion in the model, and observe whether the resultant computer performance was aphasic. While the process is still in its developmental stage, their results indicate one can create an aphasic computer.

However, Thomas (1983) has argued that the computer may be an inappropriate animal for the study of human behavior. He has never found "a computer, even a simple one, as dedicated to the deliberate process of forgetting information; losing it, restoring it out of context in misleading forms, or generating such a condition of diffuse, inaccurate confusion as occurs every day in the average human brain" (p. 86). Thus, Thomas believes, these two gifts--the ability to lose information unpredictably and to get relationships wrong--distinguish our brains from any computer he can imagine ever being manufactured.

If the computer is the incorrect experimental animal for the study of aphasia, what are some alternatives? The computer does not lose information unpredictably and it does not get relationships wrong. To understand aphasia, we need experimental animals that possess these two traits. And, to our way of thinking, no animals possess these abilities in more abundance than graduate students and clinicians. The purpose of this paper is to report a test of our belief that one's understanding of aphasia can be measured by one's ability to simulate it. We asked whether aphasia could be taught to graduate students, and, whether aphasia could be caught by clinicians.

METHOD

We studied two populations, graduate students before and after taking a course on aphasia and clinicians who spend their days treating aphasic patients. The Porch Index of Communicative Ability (PICA) (Porch, 1967) was administered to all members in each group. We asked participants to simulate aphasia while taking the test. The graduate students were not trained in the use of the PICA. All clinicians were trained and used the PICA clinically.

We speculated that graduate students would display PICA performance that was nonaphasic before taking an aphasia course. We believed that graduate students, after taking an aphasia course, would display PICA performance that simulated aphasia. The clinicians, we assumed, would have no difficulty in displaying aphasic performance.

To differentiate aphasic from nonaphasic performance, we utilized discriminant function analysis of PICA performance. Porch, Friden, and Porec (1976) employed this technique to differentiate aphasic patients from normal persons who were feigning aphasia. They believed that normal performance, when plotted on the PICA Ranked Response Summary, would show little difficulty on any subtest (Figure 1). Aphasic performance would vary, based on severity, but the aphasic profile would indicate poorer performance on more difficult subtests and better performance on easier subtests. When normal persons were asked to feign aphasia, the ranked response curve should differ from the curve generated by aphasic patients, because the normal persons could not predict how an aphasic patient would perform on a given PICA subtest.

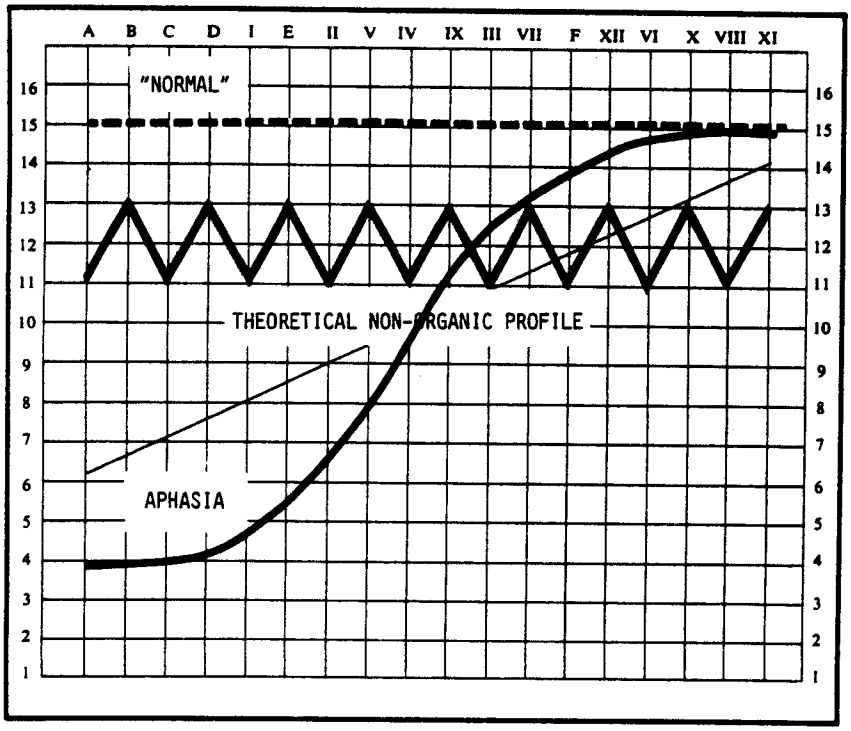

Figure 1. Assumed performance on the PICA by normal subjects, normal subjects feigning aphasia, and aphasic patients. (After Porch, et al, 1976)

Porch et al. employed discriminant function analyses to test their assumptions. They studied 145 aphasic patients, 25 normal persons feigning aphasia, and ten family members of aphasic patients. As shown in Table 1, the discriminant function analysis employs a series of weights for specific PICA subtests. Each weight is multiplied by the PICA subtest percentile, summed, a constant is added, and a discriminant function score is obtained. Only 14 subtests were used in the analysis, because four subtests--C, IV, VI, and VII--did not contribute significantly to discriminating among the Porch et al. groups. Finally, cutoff scores were established to differentiate aphasic performance from nonaphasic performance. Scores larger than -.211 indicate aphasia, scores less than -.279 indicate not aphasia, and scores in between the two values cannot be classified.

The Porch et al. results indicated that 144 of 145 aphasic patients were classified aphasic by discriminant function analysis. One was undetermined. All 25 or the normal persons feigning aphasia were classified nonaphasic, and nine of ten family members feigning aphasia were classified nonaphasic. One was classified undetermined.

Table 1. Example of how discriminant score is computed.

SUBTEST*	PERCENTILE	X	WEIGHT	=	PRODUCT
I	75		-.00214		-.18450
I	75		-.00471		-.35325
II	60		.00212		.12720
V	50		-.00421		-.21050
VIII	15		.00647		.09705
IX	65		-.00235		-.15275
X	50		.00154		.07700
XI	10		.00540		.01830
XII	60		.00183		.10980
A	75		-.00414		-.31050
B	65		.00217		.14150
D	70		-.00172		-.12040
E	45		-.00211		-.09495
F	10		.00251		.02510
			Sum of Products		-.83135
			Add Constant		+.10615
			Discriminant Score		-.72520

Discriminant score less than -.279 = Not Aphasia

*Subtests IV, VI, VII, and C are not used in the Discriminant Function Analysis.

RESULTS

We asked seven graduate students to simulate aphasia on the PICA prior to their taking a course in aphasia. Discriminant function scores ranged from +.117 to -.815. Table 2 shows that one student was classified aphasic, and six students were classified nonaphasic.

Four graduate students were tested before and after taking the aphasia course. Table 3 shows all four students gave nonaphasic performance on the PICA prior to taking the course. Discriminant function scores ranged from -.489 to -.815. After completing the course, one student simulated aphasia on the PICA, two were classified nonaphasic, and one could not be classified. Discriminant function scores ranged from +.376 to -.667.

Ten clinicians were asked to simulate aphasia on the PICA. Their clinical experience with aphasic patients ranged from one to twelve years. Discriminant function scores ranged from +.587 to -.053. As shown in Table 4, all clinicians were classified as displaying aphasia. Nine of the ten discriminant function scores were positive, well within the range of aphasia.

Table 2. Discriminant function analysis classification of seven gradute students prior to taking an aphasia course.

CLASSIFICATION	NUMBER OF STUDENTS
Aphasic	1
Nonaphasic	6
Undetermined	0

Table 3. Discriminant function analysis classification of four graduate students before and after taking an aphasia course.

CLASSIFICATION	NUMBER OF STUDENTS	
	PRE	POST
Aphasia	0	1
Nonaphasic	4	2
Undetermined	0	1

Table 4. Discriminant function analysis classification of ten clinicians.

CLASSIFICATION	NUMBER OF CLINICIANS
Aphasic	10
Nonaphasic	0
Undetermined	0

Figure 2 shows the mean performance by two of our groups--the seven graduate students who simulated aphasia prior to taking the course and the ten clinicians--on a PICA Ranked Response Summary. Performance was compared with that of an aphasic patient. Subtest scores are plotted in percentiles. Mean Overall performance in both groups was at the 62nd percentile as was the performance by the aphasic patient. While there is some variability in performance across subtests, the clinicians' profile resembles the aphasic patient's profile; poorer performance on more difficult subtests and better performance on easier subtests. Conversely, the graduate students' performance prior to taking the aphasia course shows the reverse, better performance on more difficult subtests and poorer performance on easier subtests.

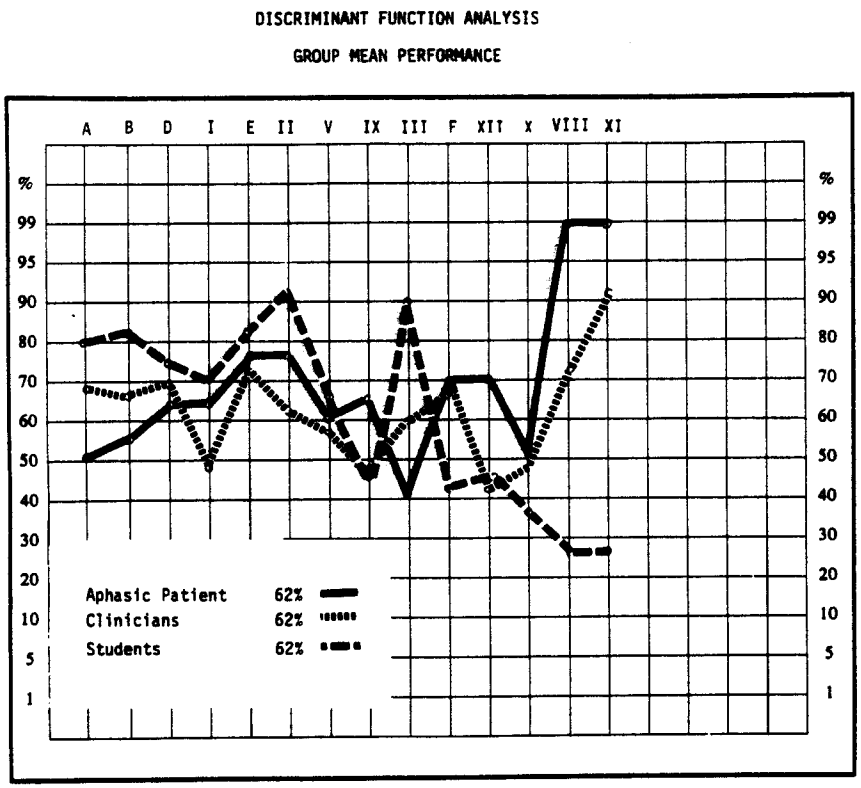

Figure 2. Mean group PICA subtest percentiles for graduate students prior to taking an aphasia course, clinicians, and an aphasic patient.

DISCUSSION

Our results indicate that aphasia is more likely to be caught than it is to be taught. The clinicians, spending hours in close proximity to aphasic patients, were able to simulate the disorder in their PICA performance. The graduate students, having received less exposure to aphasic behavior, were less able to produce aphasic performance on the PICA. We expected the students' performance to be nonaphasic prior to taking the aphasia course. Porch et al. (1976) included 20 graduate students in their group who feigned aphasia. None was classified aphasic by discriminant function analysis. Similarly, only one of seven of our graduate students was classified aphasic prior to taking the aphasia course. We speculated, however, that our graduate students would be able to produce aphasic performance on the PICA after completing the aphasia course. One of four confirmed our speculation, two did not, and one could not be classified.

Our efforts were prompted by the assumption that one's understanding of aphasia can be measured by one's ability to simulate it. If the assumption is correct (and this can be debated), our results indicate that clinicians have a better understanding of aphasia than graduate students fresh from one course on aphasia. This is comforting but somewhat less than amazing. Nevertheless, time and touch appear to influence one's ability to act aphasic. Perhaps there is a message here about the way we train graduate students. Walking a mile in an aphasic person's shoes may yield a better understanding of that person's problems than tiptoeing through the literature.

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