Effects of Patient Characteristics on Delivery of the Token Test Commands by Experienced and Inexperienced Examiners

Anthony P. Salvatore, Ph.D., Marcia Strait, M.A., and
Robert H. Brookshire, Ph.D.

Aphasia Section, Neurology Service
Veterans Administration Hospital
Minneapolis, Minnesota

The Token Test usually is administered in live voice in clinical settings. DeRenzi and Vignolo (1962) state that the commands are to be read by the examiner, "..speaking with a clear and measured voice, without any special prosodic emphasis." However, with these instructions, the clinician is free to vary the rate at which the test commands are administered. The possibility that an examiner may vary the rate at which he presents the test commands during the administration of the test is probably important, since recent investigations have shown that the rate at which test commands are presented does affect an aphasic individual's performance. It has been demonstrated that aphasic individuals make fewer errors to spoken commands when the rate of speech is slowed (Gordon, 1970; Parkhurst, 1970; Weindner and Lasky, 1973) or when pauses are inserted in commands (Liles, 1973; Salvatore, 1974).

During the administration of clinical tests, clinicians are assumed to present the test materials in a consistent manner. That is, it is hoped that clinicians would not be influenced during the test administration by the severity of the patient's deficit or by his performance during the test. To investigate the possibility that clinicians may be influenced by these variables, two experiments were carried out. The purpose of the first experiment was to determine whether experienced or inexperienced examiners altered their rate of speech when administering the Token Test to low-level and high-level aphasic individuals. The purpose of the second experiment was to determine whether clinicians delivered the test commands at a slower rate following errors by the aphasic individuals than when they delivered the command initially.

Ten subjects were selected from a group of patients diagnosed as aphasic at the Aphasia Section at the Minneapolis VA Hospital. To select subjects for the High and Low groups, a tape-recorded standard Token Test was delivered to patients from the treatment roster. The first five patients tested who scored at least three correct responses on Part II and four or fewer correct responses on Part III were assigned to the Low-Level Group. The first five patients who scored six or more correct responses on Part IV and at least six wrong on Part V were assigned to the High-Level Group.

The Experienced Examiners were two Speech Pathologists who had administered the Token Test to aphasic individuals several hundred times. The Inexperienced Examiners were two Speech Pathology undergraduate students who had taken one course in aphasia and had never administered the Token Test.

All tests were administered in adjoining single-wall audiometric rooms. The subject and the examiner were seated side-by-side at a table. A microphone was mounted over the table. The microphone was connected to the input of a Sony TC650 tape recorder in the adjoining room. The output of the tape recorder was connected to a graphic event recorder through the Grason-Stadler 1200 Series solid-state programming modules. From the graphic records thus generated, speech rate could be computed by converting inches to seconds.

Before each session began, the experimenter read the following instructions to the examiner:

"Read each test command once. Read each test command in a clear and measured voice, without any special emphasis on certain words in the commands. It is important that you maintain an even inflection."

For this experiment, Parts I-IV of the Token Test were administered. To avoid order effects, each exmainer tested the ten aphasic subjects in random order.

Since an examiner can vary his speech rate by prolonging phonemes or by the insertion of pauses within test commands, the duration of each command and the duration of pauses within each command were measured. Pause intervals less than 250 msec were difficult to measure reliably; therefore, only pauses 250 msec or more in duration were included in the analysis.

The total duration of the commands for the two groups of exmainers were compared using a t-test. The results indicated that Experienced Examiners' commands were longer and thus slower in rate than Inexperienced Examiners' (t= 4.90; df=19; p < .001). To determine more precisely the manner in which slower rates were generated, a further analysis was undertaken. Pause time for each group of examiners was totaled and was then subtracted from the total command duration for each group and the results were compared with a t-test. This resulted in a measure of the rate of articulation which permitted us to determine whether the slower rate of speech was accomplished by the prolongation of phonemes or by the insertation of pause time. The results indicated no significant difference between the total duration of phoneme articulation for the two groups of examiners (t= 0.368, df=19, p > .05).

Tables 1 and 2 show the mean pause time contained within each test command delivered by Experienced and Inexperienced Examiners to High-Level and Low-Level subjects. It can be seen from Figure I that Experienced Examiners placed more pause time within each test command that Inexperienced Examiners did. To determine whether this difference was statistically meaningful, a t-test was computed on the difference in mean pause time between Experienced and Inexperienced Examiners over all subjects. The results of the t-test indicated that the Experienced Examiners' commands contained more total pause time than Inexperienced Examiners' commands did (t=5.61, df=19, p < .002). This effect was true for both Low-Level (t=4.05, df=19, p < .01) and High-Level subjects (t=1.46, df=19, p < .05). However, on examination, Figure I suggests a tendency for both groups of examiners to provide commands of longer total duration to Low-Level

If we can return to Tables 1 and then 2, we can see that a subject's level of performance appeared to influence the examiner's behavior, although the effect was not significant as was reported earlier. That is, if we rank order the pause durations for each examiner, we find that the Experienced Examiners provided more pause time to nine of the ten Low-Level subjects than they provided to their High-Level counterparts. Similarly, the Inexperienced Examiners provided more pause time to eight of the ten Low-Level subjects than the High-Level subjects. These data suggest that the subjects performance level does tend to influence the examiner's speech rate.

Although the Experienced Examiners provided significantly more pause time to all subjects than did the Inexperienced Examiners, there were differences in insertion of pause time between the two experienced examiners. Experienced Examiner 1 (Figure I) provided more than twice as much pause time than the second Experienced Examiner. While the first examiner provided approximately the same amount of pause time to both groups of subjects, the second examiner provided almost twice as much pause time to the Low-Level subjects than to the High-Level subjects. This variability in the examiner's speech rate suggests that problems may exist for traditional ways of interpreting the results of the Token Test. The assumption is that the language stimuli in the Token Test are the independent variable; however, the present results suggest that the examiner's speech rate may also be a factor. For example: As figures 2 (Low-Level subjects) and 3 (High-Level subjects) suggest, subjects tended to perform differently with the same, and different examiners. This type of variability in performance also suggests that the subjects were responding to something other than the language stimuli in the test commands.

After completion of the first experiment, Experienced Examiner 2 and Inexperienced Examiner 1 participated in a second experiment. Each of the examiners administered Parts III, IV and V of the Token Test to High-Level subject 1. The examiners were given the original instructions, except that they were also instructed to repeat a command that was responded to incorrectly until the subject responded correctly, or until the command had been delivered three times.

For analysis purposes, each of the reptitions was compared to the initial delivery of the command to determine if the examiners varied their speech rate from repetition to repetition of the command.

A sign test (Siegel, 1956) was used to test the significance of the number of increases in total duration for each repeated command. There were 15 occasions when a command was repeated by Experienced Examiner 2. Of these 15 occasions, 13 were longer in duration than the presentation immediately preceeding it. The number of increases were significant at $p < .004$. However, only 5 of the 13 increases in duration were accomplished by an increase in pause time of 250 msec or greater. Inexperienced Examiner 1 repeated a command on 25 occasions, 19 of which were longer in duration than the preceeding presentation. The number of increases was significant at $p < .007$. Of the 19 increases in durations, only 3 were accomplished by an increase in pause time of 250 msec or greater. After replaying the tapes in an attempt to determine the possible causes for the increase in duration, it was evident that the examiners tended to prolong the initial /s/ phoneme in the words circle and square in the commands. This prolongation would appear to account for the increase in duration of the commands.

Results of the second experiment also demonstrate the effects of subject performance

commands. In experiment 2, examiners decreased their speech rate on commands which followed error responses. This result is consistent with a study by Longhurst and Siegel (1973) in which subject error responses resulted in examiners reducing their rate of speech when delivering instructions.

The present study suggests that the examiners may have responded to stimuli not intended to control their presentation of the test commands. The examiner's speech rate was influenced by the subject's level of severity and by the occurence of incorrect responses made by the subject. These findings suggest that the test either be presented via audio recording or by clinicians whose rate of delivery has been reliably established.

Bibliography

DeRenzi, E. and Vignolo, L.A. The Token Test: A Sensitive Test To Detect Receptive Disturbances in Aphasia. Brain, 1962, 85, 556-678.

Gordon, M.C. Some Effects of Stimulus Presentation Rate and Complexity on Perception and Retention in Brain-Damaged Patients. Cortex, 1970, 6, 273-286.

Liles, B.Z. The Effects of Pause time on Auditory Comprehension of Aphasic Subjects. Unpublished Doctoral Dissertation. University of Minnesota, 1973.

Longhurst, T.M. and Siegel, G.M. Effects of Communication Failure on Speaker and Listener Behavior. Journal Speech and Hearing Research, 1973, 16, 128-140.

Parkhurst, B.G. The Effect of Time Altered Speech Stimuli on the Performance of Right Hemiplegic Adult Aphasics. Convention Program Summary AHSA, 1970, 12, 440.

Salvatore, A.P. An Investigation of the Effects of Pause Duration on Sentence Comprehension by Aphasic Subjects. Unpublished Doctoral Dissertation. University of Pittsburgh, 1974.

Siegel, S. Nonparametric Statistics for the Behavior Sciences. McGraw-Hill Book Company, 1956.

Weinder, W.E. and Lasky, E.Z. The Interaction of Rate and Complexity of Stimuli on the Performance of Adult Aphasic Subjects. Convention Program Summary, ASHA, 1973, 12,

TABLE 1. MEAN PAUSE TIME PER TEST COMMAND.

EXAMINERS	SUBJECTS	
	HIGH-LEVEL	LOW-LEVEL
INEXPERIENCED EXAMINER 1	.019	.061
	.009	.0
	.006	.019
	.015	.0
	.051	.666
INEXPERIENCED EXAMINER 2	.054	.013
	.250	.109
	.016	.173
	.058	.054
	.0	.574

TABLE 2. MEAN PAUSE TIME PER TEST COMMAND.

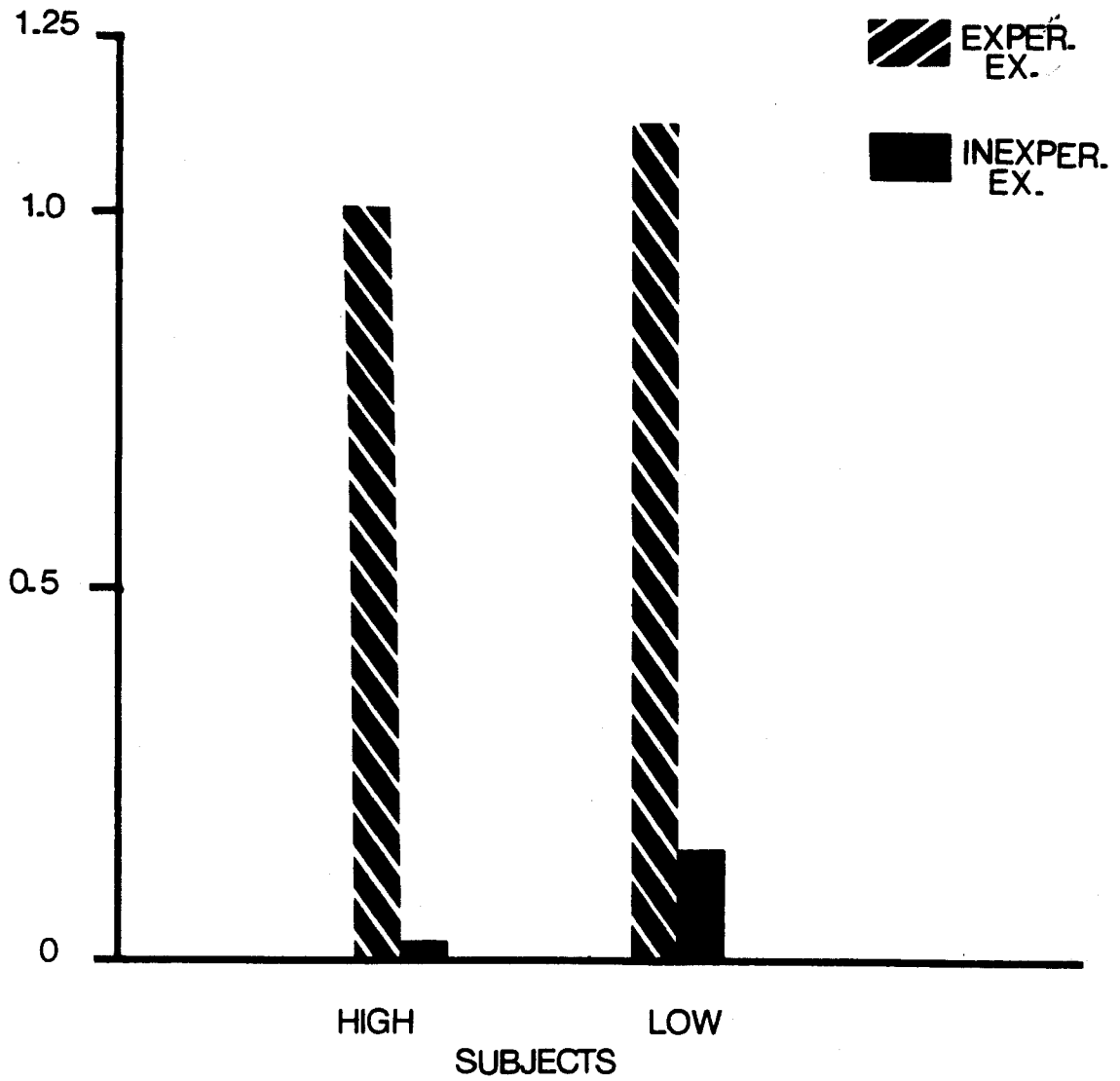| EXAMINERS	SUBJECTS	
	HIGH-LEVEL	LOW-LEVEL
EXPERIENCED		
EXAMINER 1	1.398	2.166
	1.870	1.459
	1.930	1.901
	1.375	1.920
	2.148	1.928
EXPERIENCED		
EXAMINER 2	.111	.561
	.570	.760
	.194	.543
	.288	.113
	.261	.536

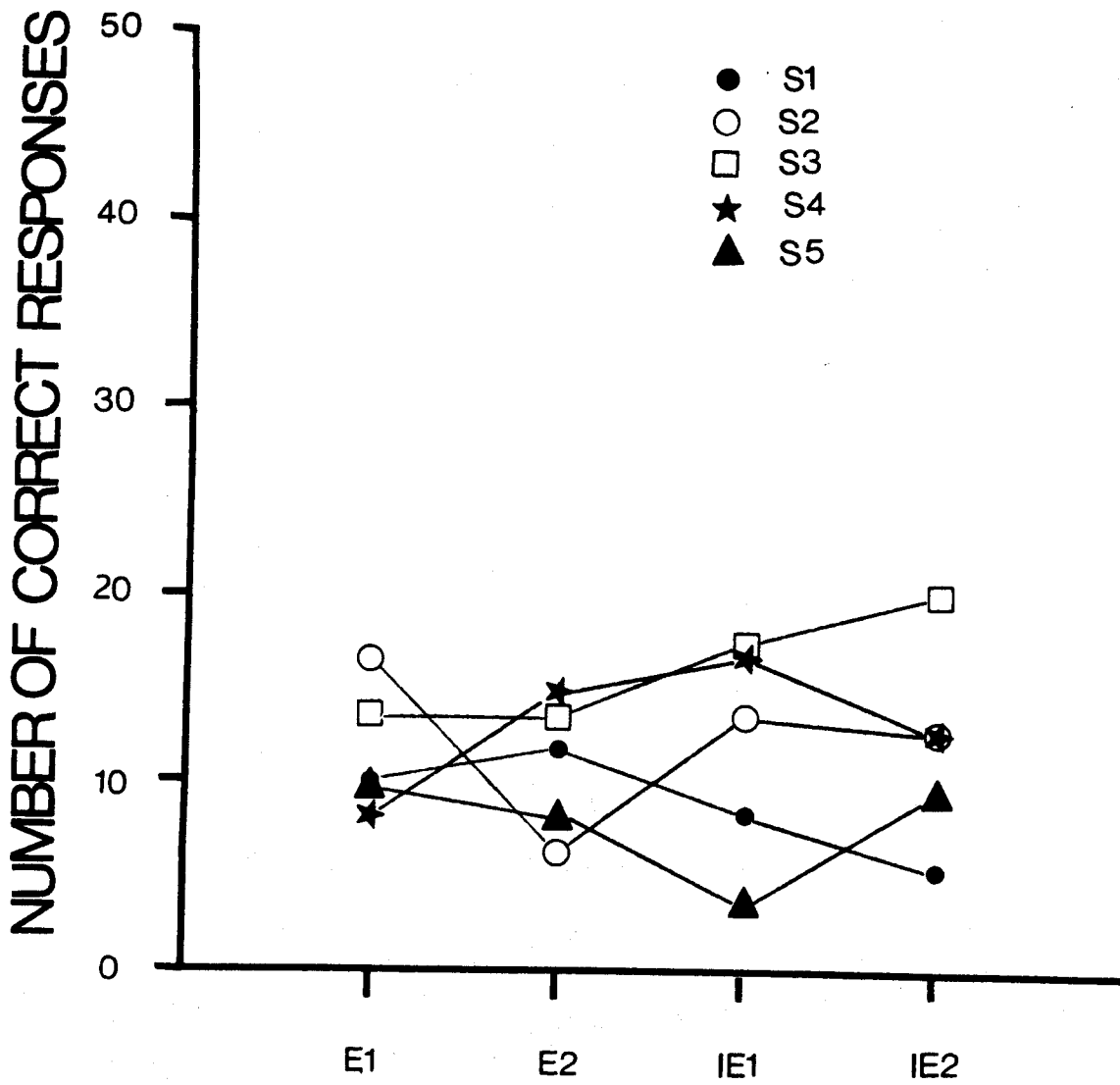FIG.1 MEAN PAUSE TIME PER TEST COMMAND.

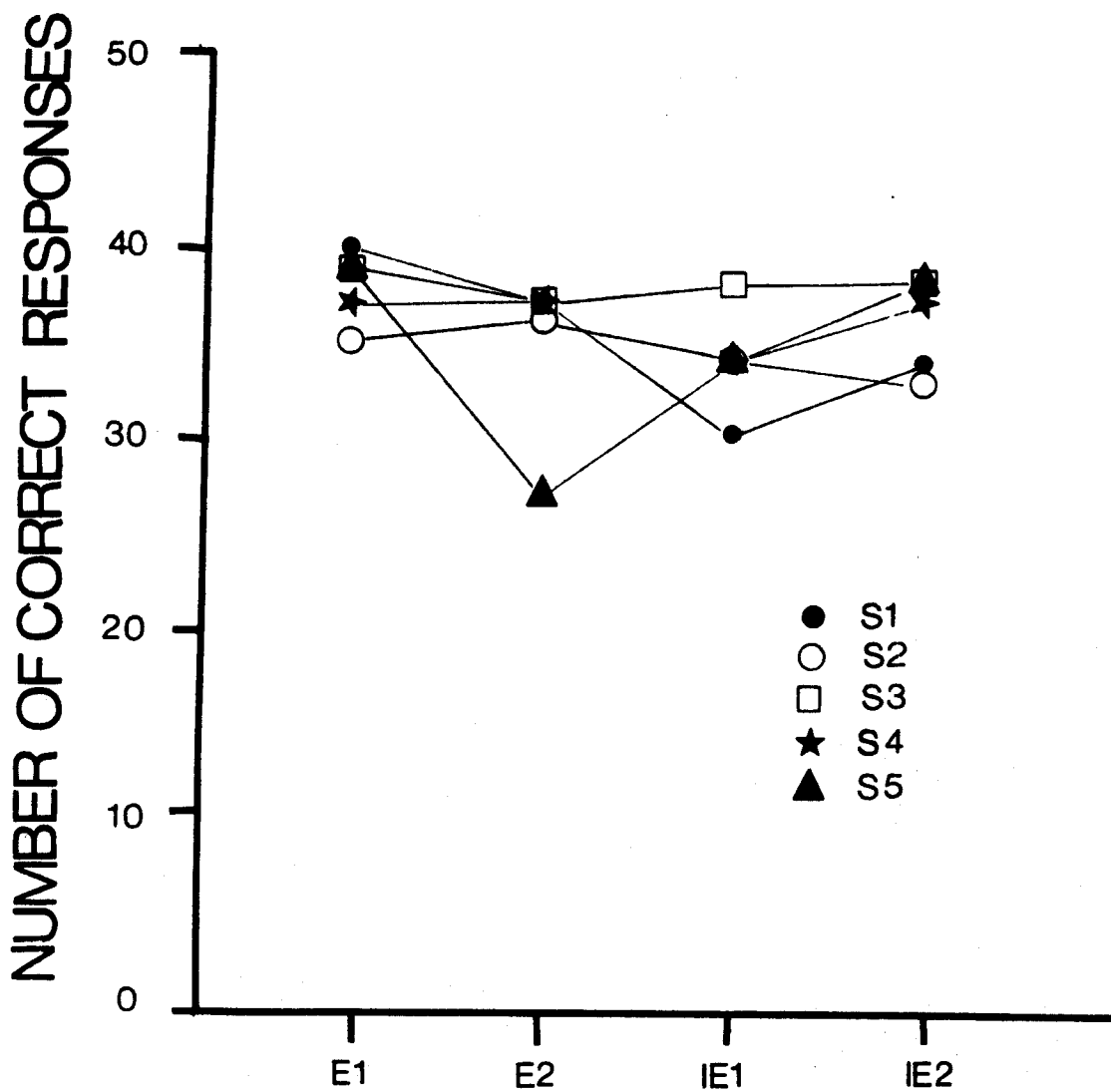FIG. 2 NUMBER OF CORRECT RESPONSES FOR EACH SUBJECT FOR EACH EXAMINER.

FIG. 3 NUMBER OF CORRECT RESPONSES
FOR EACH SUBJECT FOR EACH EXAMINER.