

A PRELIMINARY REPORT ON THE DEVELOPMENT AND USE OF THE  
GESTURAL RECOGNITION TEST (GRT)

Robert J. Duffy  
University of Connecticut

Joseph R. Duffy  
University of Maryland

Karen Leiter Pearson  
Gaylord Hospital

INTRODUCTION

Although historically both the research and clinical emphases in aphasia have been on the verbal aspects of the problem, it has long been recognized that nonverbal communication abilities are also frequently impaired. In this regard, Goodglass and Kaplan (1963) state:

The literature on aphasia from the middle 1800's includes references to the ability of aphasic patients to indicate, by means of pantomime, their awareness of certain things which they cannot verbalize, as for example, how to use an object which they cannot name. However, in practice, we were impressed with the rarity with which such pantomiming is comprehensible, and the frequency with which it consists of aimless waving which leaves the examiner guessing and the patient frustrated.

Even Broca's first reported case of aphasia suggests the possibility of gestural impairment. Head (1925) quotes Broca as stating that "...certain questions, which a man of ordinary intelligence would have means of answering by gestures even of the left hand, remain without reply..."

Although authors such as Head (1925), Critchley (1939; 1970), Goldstein (1948), Jackson (1958), and Brain (1961)

have remarked on the occurrence of alterations in gesture<sup>1</sup> as an accompanying feature of aphasia, present day aphasiologists have demonstrated relatively little or no interest in the nonverbal aspect of aphasia. Major texts in clinical aphasiology and journal articles virtually ignore this area and concentrate almost exclusively on the verbal aspects of aphasia.

It is precisely to the fundamental question of whether aphasia is limited to impairment of verbal behavior only that an investigation of gestural behavior would contribute. If it can be demonstrated that nonverbal symbolic behavior, such as gesture, is usually impaired in the aphasic patient, then the concept of aphasia must be broadened and greater attention by aphasiologists must be given to the nonverbal aspects of the problem.

In addition to these theoretical considerations, our clinical experience and observations of aphasics' impaired use of spontaneous gestural communication as well as their inability to learn compensatory means of communicating through signs, gestures, and picture boards have stimulated us to undertake an investigation of gestural impairment in aphasia.

#### METHODOLOGY

One approach to the study of the relationship of gestural to verbal language abilities is to ask, does the same linguistic competence underlie both behaviors and do they differ only in their modes of performance? Chomsky (1964) has described linguistic competence as a speaker-hearer's knowledge of his language code, that is, the implicit internalized set of rules which govern the correct production and reception of his language. Performance, on the other hand, is behavior and refers to the actual use of this competence in concrete situations. (A parallel example is the case of the pianist who breaks his hands; his knowledge or talent [competence] remains intact, but his performance would be impaired.) Performance presumes underlying competence, but competence can exist apart from performance. Speaking, auditory comprehension, reading, and writing are, therefore, simply different modes of performance of the same linguistic verbal competence.

Although Chomsky's discussion referred specifically to verbal language competence and performance, the same concepts

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<sup>1</sup>The term gesture is used here to refer to manual activities which take the place of speech when for some reason speech is not possible or desirable. It is used as a synonym for pantomime and does not include those extraverbal conventionalized movements which merely accompany or complement speech.

can be applied to the study of the relationship of gestural to verbal behavior in aphasia. We can ask whether there is a single symbolic competence underlying both gestural and verbal communicative performance. Such a view would be consistent with Sapir's (1921) view of language as a "system of voluntarily produced symbols" with "gestural language" and "auditory vocal language" only incidentally different in their physiological expression.

### Measurement of Gestural and Verbal Competence

Competence cannot be observed directly but must be inferred from performance. Because there is only one underlying system basic to the decoding and encoding of language, competence is involved in both processes. It is, therefore, possible to infer language competence from observations of either receptive or expressive language performance. Indeed, within the last few years a number of receptive tests of phonology, vocabulary, syntax and morphology, from which linguistic competence can be inferred, (Ross and Lerman, 1970; Dunn, 1959; Carrow, 1968; Lee, 1970) have been developed. Similarly, in regard to gestures, the competence underlying gestural communication could be inferred from either gestural usage or from gestural reception.

Currently available tests of gestural behavior utilize procedures which may limit their appropriateness as measures of gestural competence in the aphasic patient. All three tests of gestural performance which have been developed (McCarthy and Kirk, 1968; Porch, 1967; Goodglass and Kaplan, 1963) rely on verbal instructions to the subjects who then respond with a pantomimed performance. This type of gestural performance may be invalid as a test of gestural competence in aphasic subjects because (1) aphasics may fail to comprehend the instructions due to their verbal comprehension impairment and/or (2) they may have some specific impairment of motor performance such as apraxia.

A preferred method, therefore, for inferring the gestural competence of aphasics may be the use of a gesture recognition task. Since the same competence underlies receptive and expressive processes, the aphasic patient could be given the task of recognizing the gestural code as the more adequate and valid test of his gestural competence. Also, verbal instructions can be eliminated. To meet the need for a method which avoids verbal instructions, requires demonstration of gestural competence through receptive rather than expressive processes, and requires only a simple motor response from the subject (i.e. pointing), development of the Gesture Recognition Test (GRT) was begun in June, 1971 and is expected to be completed by June, 1972. The GRT consists of 50 test items. The test items are pictures of common objects whose use can be pantomimed by an examiner, e.g. glass,

scissors, umbrella, etc. The use of each test item is pantomimed by the examiner, and the subject demonstrates his recognition of the examiner's gestural behavior by pointing to the picture of that item from among four pictures presented to him. Nonverbal conditioning procedures are used to instruct the subject in the task performance in order to eliminate dependence on verbal instructions.

### Procedure

Our basic strategy in studying the relationship between gestural and verbal impairment in aphasia was twofold: first, to determine whether aphasic patients demonstrate unique impairment of gestural ability as measured by the GRT when compared with other populations; and second, to determine the strength of the relationship between impairment in verbal ability and gestural recognition. For, if aphasics, as a group, demonstrate a unique impairment of gestural ability and/or there is a high correlation between gestural and verbal impairment in aphasia, these findings would be consistent with and strongly suggestive of the conclusion that there is a general symbolic impairment underlying and common to defective verbal and gestural performance in aphasia.

### Subjects

Three groups of subjects were used: aphasic patients, left hemiplegics, and non-neurologically impaired patients. Patients in the aphasic group had medically verified right sided motor deficit, scored below the 95th percentile on the Porch Index of Communicative Ability (PICA) (Porch, 1967), and exhibited a PICA profile consistent with the diagnosis of aphasia. Patients in the left hemiplegic group had verified left sided motor deficit by the hospital medical report. Hospital patients without neurological impairment such as amputees, lung problems, diabetes, etc. comprised the non-neurologically impaired group.

All groups were drawn from five hospitals in Connecticut. All available patients were used. Because gestural behavior may be influenced by cultural background, patients with gross indications of different cultural background (e.g. foreign birth or foreign dialect) were excluded from the study.

### Tests Administered

All three groups were administered the GRT as a measure of gestural ability. In addition a Verbal Recognition Test (VRT) and a Naming Test were administered as measures of verbal ability. The VRT consisted of the same 50 stimuli and plates used in the GRT. The examiner said the word and the

subject pointed to the corresponding picture on the plate of four pictures. In the Naming Test, the examiner pointed to the picture and the subject named it. The order of administration was the GRT, VRT, and Naming Test.

In addition, the PICA was administered to all right hemiplegic patients not only for purposes of identifying aphasic subjects, but also as an overall measure of language impairment (primarily verbal language impairment).

## RESULTS

Our first question was, "Do aphasics show unique impairment of gestural recognition?" Table 1 presents the GRT scores for the three groups of subjects. Aphasic patients obtained the lowest scores indicating the greatest impairment

TABLE 1. Means, standard deviations, and ranges on the Gesture Recognition Test (GRT) for three groups of subjects.

Groups	Mean	S.D.	Range
Aphasics (N-36)	42.3	8.7	17 - 50
Left Hemiplegic (N-26)	46.9	2.3	42 - 50
Non-neurologically Impaired (N-23)	47.4	3.1	41 - 50

of gestural recognition. Table 2 shows the results of T tests computed for differences between group means. The aphasic group performed significantly lower on the GRT than the non-neurologically impaired group and the left hemiplegic group ( $p < .01$ ). The left hemiplegic group and the non-neurologically impaired group did not differ significantly ( $p > .05$ ), however, there is a trend throughout the data for left hemiplegic patients to score lower than the controls.

Our second question was, "What is the strength of the relationship between verbal impairment of gestural recognition in aphasic patients?" We computed correlation coefficients between the GRT scores obtained by the aphasic patients with the scores they obtained on the three measures

of verbal ability, Verbal Recognition Test (VRT), Naming Test, and the overall PICA score. Table 3 shows the correlation

TABLE 2. Comparison of group means obtained on the Gestural Recognition Test (GRT).

Group Comparison	Mean Difference
Non-neurologically Impaired vs Aphasic	5.1*
Non-neurologically Impaired vs Left Hemiplegic	.5**
Left Hemiplegic vs Aphasic	4.6*

\* Significant at the .01 level.

\*\* Not significant at the .05 level.

coefficients between the GRT and three verbal language tests. The results indicate a strong, positive relationship between gestural and verbal impairment. As a matter of fact, these are unusually high correlations for measures of concurrent validity for psychological tests. Cronbach states that "It is very unusual for a validity coefficient to rise over .60..." (p. 115, 1960).

TABLE 3. Correlation coefficients (Pearson "r") between Gestural Recognition (GRT) scores and scores obtained on three tests of verbal impairment for 35 aphasic patients.

Comparison	r
GRT and PICA Overall	.80
GRT and Verbal Recognition Test	.83
Naming and Naming Test	.62

## SUMMARY AND CONCLUSIONS

Data being gathered in the development of the GRT were used to investigate the relationship between gestural ability (as measured by a gestural recognition task) and verbal impairment in aphasia. Administration of the GRT to 36 aphasic patients, 26 left hemiplegic patients and 23 nonneurologically impaired patients demonstrated that aphasics had unique impairment of gestural ability. Furthermore, high correlations were obtained among GRT scores and scores of verbal abilities (PICA overall scores, verbal recognition, and naming). These results are consistent with and supportive of the hypothesis of a common underlying symbolic impairment in the aphasic patient which affects both verbal and gestural behavior.

The uncommonly high correlations obtained are strong evidence that nonverbal behavior is a significant aspect of the problem of aphasia. Fuller understanding of the extent of these nonverbal problems is essential to the development of a complete and adequate theory of aphasic behavior. The clinical implications are of equal importance. Unfortunately, investigations of nonverbal impairments as they relate to evaluation, prognosis, and treatment in aphasia are virtually nonexistent. We hope that the future will see more concern and interest directed toward the study of nonverbal problems, and we believe that the GRT can contribute to such investigations.

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