Auditory Comprehension in Aphasia: A Language Deficit or Reduced Efficiency of Processes Supporting Language? A Discussion Session

Malcolm R. McNeil
University of Wisconsin, Madison, Wisconsin

This discussion centered around two questions posed at the beginning of the session.

1. How much of the auditory comprehension deficits seen in persons with aphasia are due to a language deficit per se, and how much is due to the interaction of other disturbed processes with a relatively normal language system?

2. Do auditory comprehension deficits reflect a loss (competence) or an inefficiency (performance) in the system?

Evidence was presented from several sources that aphasia is best characterized as an inefficiency rather than a loss of language. The sources of this evidence came from studies which have shown that aphasia can be transient, that the aphasic patient is manipulable or stimulable through a variety of nonlinguistic means, that aphasia exists on a continuum from aphasic to normal, and that the aphasic patient is variable. Four criteria for instruments used to measure variability were presented. These were: 1) There must be an adequate number of items within a subtest for patterns to develop. Ten items have been shown to be sufficient on many tasks. 2) These items must be shown to be homogeneous within any given task (subtest). This homogeneity can be established by logic (evaluating the content of each test stimulus on those dimensions which have been shown to influence aphasic persons' performance) and by data (measuring internal consistency through a variety of statistical procedures). 3) High test-retest, interjudge, and intrajudge reliability must be established. 4) The evaluative system must be sensitive enough to and quantifiable enough to measure small behavioral changes accurately and reliably.

Given that the instrument is reliable, there are enough items of equal difficulty, and the behaviors are scored sensitively, a new method for quantifying variability was presented. This method was developed to account for the percentage of the patient's behavior which may be attributed to inability to do the task (competence deficit) versus the percentage of deficit which may be attributed to inefficiency in doing the task (performance deficit).

The method for calculating the percentage of deficit attributed to loss of function is to subtract the top score achieved from the score which would have been achieved if the patient performed the task as a normal (A). The second step is to determine the percentage of deficit which is attributable to something other than the task being performed. This can be done in one of two ways. The first is to subtract the lowest score from the highest score achieved. The second method is to subtract

the average of all scores below the top one achieved from the top one achieved (B). Next, the result of the second subraction (B) is divided into the result of the first (A) to derive a percentage of deficit which is attributable to a loss. The following set of hypothetical scores illustrate this procedure.

TARGET/COMPETENCE-	15	
TOP PERFORMANCE-	14	20% TASK/COMPETENCE
	8	DEFICIT
	11	
	12	80% PERFORMANCE DEFICIT
	13	
	9	
	10	
	8	
	11	
MEAN OF ALL SCORES BELOW THE TOP SCORE ACHIEVED	10.11	

In this illustration, 20% of the person's deficit can be attributed to things never done, while 80% of the deficit is attributed to something they didn't do despite the fact that their system demonstrated the capacity to do that particular task (albeit only once in this example). Data from thirty aphasic patients were presented using this method of calculating variability. Overall, 82% of all deficits on the Revised Token Test (McNeil and Prescott, 1978) can be accounted for by abilities that are potentially within the patient's repetoire (things that they can do). The next task is to describe and, if possible, account for the variability displayed between what the patient demonstrates he can do and what he does do. If the tasks are indeed homogeneous, the variability must be accounted for by something other than task difficulty. That leaves only something within the individual causing the variability. In the past, patterns of responses have been used as a means for describing this variability. Three such patterns have been hypothesized (Schuell, 1974; Porch, 1970; and Brookshire, 1974) and found to exist (DiSimoni, Keith, Holt and Darley, 1979; Horner, Lieberman and Riski, 1974; McNeil and Hageman, 1979) which could potentially describe different mechanisms for this variability. The first of these patterns is one whereby performance is improved after initial items are performed at a poorer level. This pattern has been described by various terms, one of which is "tuning in." A second pattern represents a decrement in performance on successive items. This pattern has been termed "tuning out." The third pattern is the most prevalent and probably the most important for describing the behaviors represented by the basic mechanisms for all patterns. This pattern is termed "intermittent." These patterns have been found in non-brain-damaged individuals on the Revised Token Test while performing under competing conditions (Hageman, 1980), to the same degree that they occur in left-hemisphere-damaged aphasic patients. Likewise, they have been shown to occur with equal

frequency in right-hemisphere-damaged nonaphasic patients (McNeil and Hageman, 1980). The patterns and their prevalence appear to be independent of the linguistic nature of the task being performed, with patterns occurring equally on verbal and nonverbal tasks as well as on word or sentence length material (Norris, 1980). Three possible mechanisms can account for these patterns of variability: (1) inertia, (2) adaptation or habituation, and (3) reduced and/or inefficient allocation of effort or attention.

The majority of discussion revolved around four points, most of which were clarifications of the main points discussed (above). The first major point of discussion posed was about the method for determining item homogeneity, (Question) Can an individual determine homogeneity of items? (Response) The answer is emphatically no. Homogeneity across items must be determined by logic and group data. In order to make a set of items homogeneous for an individual one would have to determine the exact pattern of variability and then change the stimuli to alter the normal variability which we are trying to capture with this method.

A second point was raised that since these patterns that describe the majority of deficits of aphasic patients also occur to the same degree in normals, right-hemisphere-damaged nonaphasic subjects, and across linguistic tasks, there might be a common source or mechanism. For example, attention. This suggests that there is a common source producing variability in performing a series of listening tasks that is not accounted for by the nature of the task per se. In fact, the data presented above suggest that nearly all of the deficit must be accounted for by something other than the task (a linguistic one in this instance).

The third question was in regard to the competence versus performance distinction. It was suggested that if a stimulus presentation was manipulated, such as slowing the rate of the stimulus, and if every subject received at least one target score (a 15 in this case) then all the deficit would be accounted for by a competence deficit and the distinction would lose its value. However, if every subject received one target score, then all of the deficit would be accounted for by a performance deficit, not a competence deficit because the subjects would have demonstrated that the knowledge and capacity to do those particular tasks would be within their repertoire. In fact, these types of manipulations should be effective in helping the subject with aphasia to do the task and is, in part, the reason why the original questions were proposed—Is aphasia best thought of as a language disorder or a disorder of those processes which support language? It was stated that the constructs which we use to describe language can offer little in the search for the mechanisms which produce these language deficits. In other words, language can describe but will offer little as explanation. Other constructs may offer more insight into the nature of aphasia. (Question) Aren't the competence and performance issues dependent on the specific tasks being performed? (Response) Yes, and if one carefully constructs a series of tasks (independent of their nature) one can measure the amount of deficit due to what is not in the subject's repertoire versus what is due to variability within the subject, for that particular task. The amount of deficit due to a performance factor should (and does) change with task difficulty. However, even with the most difficult linguistic task, the majority of deficit can be attributed to something causing variability within the subjects. (Question) I have trouble generalizing across patients. What I seem to find is a group of patients who either get them all correct at one level, or all wrong at

another level and at some level in between they give me the variability that I wish to explore. We have trouble doing studies with the Token Test because we find patients who get all of them right or none of them right and therefore I have trouble generalizing across patients. (Response) I believe that the problem may be accounted for by your evaluation system. If you score performance right/wrong your observations are probably correct. However, if you scale the behaviors more sensitively, aphasic patients will not get them all at a 15 level even for the easiest subtests.

Time expired before a model of information processing could be presented which might account for this intermittent variability. The discussion was concluded with a prayer "...give me good abstract reasoning ability, interpersonal skills, cultural perspective, linguistic comprehension, and a high sociodynamic potential."

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