

A NEW THERAPEUTIC APPROACH TO AUDITORY PROCESSING
DEFICITS IN CHILDREN AND ADULTS

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Porch suggested that we "visualize all communication tasks as being placed on a continuum of difficulty with each task ranked according to its complexity or the amount of processing required to successfully complete it." (p. 73, 1971). During the course of recovery, the patient moves through the task continuum, beginning with the simplest processing tasks and progressing toward the more complex.

In depicting auditory processing of verbal input, i.e., following verbal directions (Tests VI and X), as the initial step on this recovery curve, Porch demonstrated that realization of potential at more complex levels of language functioning is contingent upon remediation of auditory processing involvement. This finding bears important implications for therapy. We, as speech and language pathologists, must increase the efficiency of this underlying processing mechanism if we are to maximize receptive and expressive language recovery.

Numerous authors have analyzed the factors in auditory processing in attempting to compensate for related involvement (Liberman, 1957; Liberman et. al., 1967; Halle & Stevens, 1959; Broadbent, 1958; McCarthy & Kirk, 1968). However, such analyses have been concerned primarily with the verbal aspects of language functioning. It is this author's feeling that effective remediation of auditory processing deficits must begin with the non-verbal conceptual foundation of language. Let us consider the model of initial language learning for its possible application to the language impaired.

Stravss and Lehtinen (1955) related this model to the child, describing language as an outgrowth of perceptions by which the child learns to understand his external environment. They proposed that learning first occurs on the visual-perceptual level. Based on an innate need for structure and stability, the child gradually begins to draw conclusions and generalizations from series of visual experiences, thereby increasing his understanding of external events. Following initial stabilization on the perceptual level, the child superimposes verbal labels on his perceptions and subsequently mediates analysis and prediction through these labels.

Further, they stated:

Language at first is not communication to others but is communication to oneself. It is a registering of events so that they become stable and acquire permanence in a changing world. Only later does it serve a communicative function. (p. 95)

Myklebust (1954) further analyzed the components of language functioning into inner, receptive and expressive levels. He stressed the importance of the initial "registering of events", or visual-verbal associations, described by Strauss and Lehtinen, and labeled inner language as the site of this interconnecting conceptual groundwork.

His affirmation of the dependence of receptive and expressive language development on a firm foundation in inner language holds important diagnostic and therapeutic implications. Inefficient functioning of this interconnecting verbal-non-verbal system may contribute to the characteristic latency in patients with auditory processing deficits. Receptively, such patients may lack the normal automaticity in pairing the verbal label with its non-verbal referent. It is essential to strengthen this visual-verbal groundwork in therapy in order to increase the over-all efficiency of the processing mechanism.

Diagnostically, we must evaluate the patient's underlying level of inner language and realize its importance as a necessary prerequisite for development of higher level language functions. Myklebust (1954) felt that degree of inner language could best be assessed through the gestural modality. This interrelationship of gesture, visual imagery and inner language has served as a basic premise in formulation of the multi-modality approach to be presented here.

A MULTI-MODALITY APPROACH TO LANGUAGE THERAPY

The patient with auditory processing deficits presents a history of frustration, confusion and anxiety, resulting from attempts to function in an auditory-verbal environment. These experiences, in turn, have led to his rejecting, or "tuning out", portions of the verbal world. Thus, for effective remediation, we must initially eliminate all verbal stimuli in therapy and demonstrate the essential foundation of language in gestural and visual imagery.

In order to establish comprehension of an object's name and function, we should begin on the gestural level. The rationale for this approach is based on the theory of gesture

as a non-verbal, abstract system of communication (Critchley, 1970; Goldstein, 1948). Although Critchley and Goldstein made some distinction between gesture as concrete or automatic, and pantomime as abstract or voluntary, this paper will refer to the two terms interchangeably to connote abstraction.

This position is in contrast to Goodglass' and Kaplan's (1972) theory of gestural deficiency in aphasics as an ideokinetic apraxic disorder specific to movement. However, in their study, severe receptive and global aphasics were excluded due to an inability to comprehend oral instructions. It seems irrational, then, to categorize gestural deficits as an apraxia when we have excluded that segment of the population which most dramatically illustrates the fundamental role of gesture in development of a symbolic communicative system. This author believes, as does Myklebust (1954), that impairment of gesture and pantomime is evidence of a disruption in the formulation of inner language. Therefore, therapy for processing deficits must begin with the development, or re-development, of such a mediating system if goals for receptive and expressive language are to be realized.

We often hear the spouse report, "At home, my husband knows how to eat with a fork or open the door with his key". Certainly this is true, but he cannot convey such a message out of context - his functioning is limited to the concrete level. Therefore, it is essential to begin with this initial underlying level of ability before generalizing to more abstract verbal labels. Auditory-visual matching, as exemplified through gesture, must be utilized in establishing a firm groundwork for receptive language.

Other authors (Eisenson, 1957; Robbins, 1939) have suggested use of gestural manipulation in remediation of receptive deficits in adult aphasics; however, they advocated immediate pairing of gesture with the appropriate verbal label. This simultaneous presentation of gesture, object and spoken word should initially be avoided, as this verbal-non-verbal linkage is not immediate or automatic in the population discussed here.

Let the patient first learn by what he sees - and by what he does. During the initial stages of therapy, eliminate the verbal emphasis and move directly to gesture, followed by introduction of a visual representation, i.e., picture, of that gesture. The principle of simultaneity should be applied only after the patient can successfully relate gesture to object and gesture to picture. In order to establish the connection between gesture, picture, object and spoken word, first introduce the object-word relationship while demonstrating the function of that particular object. Then, reinforce the verbal stimulus by relating it to the appropriate picture.

For example, show the patient a comb. Demonstrate the action of combing your hair, and have the patient imitate your pattern of movement. Introduce the spoken word only after the patient can independently illustrate the appropriate gesture. At this point, you may utilize additional visual feedback by performing such activities in front of a mirror. Following successful gestural demonstration, present a picture of a person combing his hair. Require the patient to imitate the illustrated action before again reinforcing the verbal label.

Through such a graduate approach, we more closely approximate the steps in initial language learning by first laying the non-verbal conceptual framework and then superimposing verbal labels after readiness has been established.

We need to use underlying gestural and visual representations to help the patient accomplish what he has been unable to achieve himself, i.e., a structured approach to processing of verbal stimuli. Schnorr and Atkinson (1969) and Johnson and Myklebust (1967), discussed the benefits of organization through revisualization on short-term auditory memory tasks. This principle should be extended to all aspects of auditory processing. In therapy, we can direct the patient to draw a particular object or to create a mental image, i.e., visualization, of that object in response to the spoken word. Have the patient draw a comb in response to the word "comb". Suggest that he picture himself using the comb, as in standing in front of a mirror, combing his hair.

Through implementation of this technique, we enable the patient to "work through" his latency in auditory processing. By giving him "something else to do" while processing the auditory stimulus, we provide organization and direction to his latency period. Now he can direct his attention to a visual translation and representation of verbal input, rather than futilely attempting auditory sorting and retrieval. Through a combination of the abstraction of the auditory and concreteness of the visual, we may assist the patient in realizing a practical and efficient approach to language functioning. This technique has been most effective in development, or redevelopment, of receptive language in severely involved patients.

Consider, for a moment, how we function in this verbal culture. As we drive to a specific destination, we frequently remember travel directions by familiar sights, rather than by designated street names. How often have we said, "Your face looks familiar, but I can't remember your name". We should relate these examples to our patients so that they may realize the normalcy of this approach. This is especially important

with aphasic adults. In the past, they may have utilized such techniques, yet probably have never analyzed them due to their automaticity in normal language functioning. However, as a result of a breakdown in their auditory processing mechanism, resumption of a visually-oriented approach has not been realized. It is hoped that by introducing visual assistance in an atmosphere of minimal frustration, i.e., decreased verbal pressure, we can increase the probability of resumption of visual self-cues.

In children with auditory processing involvement, initial concept development is mediated through the stronger visual modality. Difficulty is experienced in the necessary conversion of visual concepts to auditory-verbal symbols. In order to facilitate this translation, and subsequent auditory-verbal learning as well, we should utilize the visual avenue as an adjunctive, compensatory technique.

When confronted with expressive language difficulties, the patient overtly demonstrates more anxiety and struggle behavior in organization and retrieval of output. This anxiety generally contraindicates processing through the latency period. Therefore, we must introduce a technique through which the patient can learn to work through his latency - independently. The gestural-visual approach is one of the most promising techniques for the realization of this goal. As mentioned in discussion of the receptive channel, we are attempting to bring abstract auditory-verbal searching down to a concrete level - providing the patient with a specific target upon which to focus his attention throughout latency.

In application of the gestural-visual approach to formulation of output, it is again necessary to eliminate all verbal stimuli by beginning with the gestural modality. Reinforce the communicative aspect of gestures by having the patient demonstrate the function of common objects. The complexity of his gestural system may first be revealed in an initial language evaluation using the Porch Index of Communicative Ability, Tests II and III (1971). On these particular tasks, the patient is instructed to "show me what you do" with each of the ten objects placed before him. Some patients begin the task with an appropriate gesture, but then persevere on the remainder of the objects presented. Others, despite comprehension of verbal instructions, give inappropriate responses throughout the task. It is important to note attempts at self-correction or self-monitoring of errors, as these illustrate awareness of the purposefulness of the task.

Once a simple gesture-object association has been established, a more elaborate gestural system may be introduced. For example, you may want to extend the patient's use of pantomime to an illustration of a sequence of activities, e.g., driving a car to the store, making purchase and returning home. In addition to enhancing the patient's communicative ability, this technique clearly demonstrates the range of information conveyed solely through the gestural modality.

Drawing pictures to communicate via the visual modality should be introduced through a similarly graduated approach. Begin with illustrations of single objects, and, in keeping with the patient's abilities, expand such drawings into stories or organized sequences of events. For example, an illustration of a trip to the supermarket might include:



Visual associations can provide another source for independent cueing and organization throughout the latency period. The therapist should initially evaluate the patient's visual association abilities through the visual association sub-test on the Illinois Test of Psycholinguistic Abilities (McCarthy and Kirk, 1968). If deficits are evidenced in this area, the complexity of the task should be decreased to the level of association between objects.

Verbal association techniques, e.g., bread and _____, have been utilized to facilitate recall (Goldstein, 1948; Longerich & Bordeaux, 1954; Johnson & Myklebust, 1967; Schuell, Jenkins & Jimenez-Pabon, 1964); however, particularly in adults, this recall is often on the automatic level and does not assist the patient in attempts at independent retrieval for expressive purposes. In contrast, once the patient is introduced to visual association as a cueing technique in verbal recall, he may draw objects related to a response he is otherwise unable to communicate; this drawing, in turn, may facilitate the desired verbal output. For example, begin by drawing a fork and require the patient to draw all other related objects visualized in his mind, e.g., knife, plate, spoon.

The associative technique may be abstracted one step further by internalizing visual imagery to cue the desired verbal response. This has been found particularly beneficial for the patient with word-finding difficulties. As he struggles to label an object, or to relate an experience, suggest that he first close his eyes and imagine using that object. Have him visually relive the experience and describe what he sees. Change his orientation from the frustration of "words" to the reinforcement of "pictures".

Through revisualization, as through gesture, we are directing the patient to another modality in order to realize the desired goal, i.e., recall of appropriate verbal response. In the past, techniques of copying or writing have been used to reinforce and stabilize the spoken word. (Baker and Sokoloff, 1952; Wepman, 1951; Eisenson, 1957; Schuell et al, 1972). Yet often his graphic response is dependent on a previous auditory-verbal stimulus; and practice in writing a word does not ensure recall of that stimulus. Instead, this author suggests that the patient substitute pictures, i.e., non-verbal illustrations, or visual imageries, for verbal graphics. In order to create such images, the patient must process and delineate specific features of the proposed output and, thereby, achieve an organized and purposeful approach to processing. In therapy, it has frequently been noted that through unconscious, but concomitant processing of verbal correlates with non-verbal illustrations, patients evoke appropriate verbal descriptions without evidence of expressive deficits.

Thus, in planning therapy sessions according to the multi-modality approach, we may program goal-oriented activities as follows:

1. Development of simple gesture-object association;
2. Reinforcement of gesture through visual modality, e.g., mirror, picture;
3. Drawing of single objects;
4. Elaboration of gestures into sequence of related movements;
5. Expansion of drawings into story form;
6. Internalization of visual images.

Depending on the level of the patient, such activities may be adapted to remediation of receptive or expressive involvement.

As we well know, these goals may not be realized by every patient. We are dealing with a brain damaged individual and, implicit in this diagnosis, is an inconsistent, fluctuating organism. Although, at times, verbal output is elicited with minimal difficulty, at other times no verbal response is forthcoming. It is at such times that the gestural-visual approach can be used to supplant, rather than cue the desired verbalization. Clinically, it is our goal to devise some means of communication. By encouraging an equally intelligible response in another modality, the patient is reinforced, not frustrated, as when struggled for a "word". This positive reinforcement facilitates continued processing so that the patient may resume verbal functioning in subsequent responses. In light of total failure, i.e., inability to communicate the desired message, frustration and anxiety gain control and prevent processing not only of the initial response, but of successive responses as well.

SUMMARY AND DISCUSSION

Certainly, the gestural-visual approach has not been recommended to the exclusion of all other techniques. However, based on its foundation in the developmental language model, it is believed that this technique best fulfills the goal of devising an independent means of communication for all patients, regardless of age and level of disability. By reverting to the pre-verbal stages, we are ensuring an adequate non-verbal conceptual groundwork upon which to superimpose verbal symbols. Should deficits be evidenced in non-verbal abstraction, we begin our therapy at that level, and do not proceed to a higher level until an adequate foundation for language has been laid.

Perhaps we have unknowingly done an injustice to our patients by beginning therapy above, rather than at their functional level, and accordingly, have been unsuccessful in the realization of our goals. Sarno, Silverman and Sands (1970) studied a sample of severely aphasic adults and concluded that therapy yielded no significant gains. However, before initiating therapy, the most essential question may not have been answered - that is, where is the patient functioning at this time? Possible disregard of non-verbal deficits would necessarily result in an inadequate development of relearning of inner language, and accordingly, receptive and expressive abilities as well.

Implicit in the approach discussed here are alternate modes of communication, which serve to assist verbal comprehension, mediation and retrieval. As additional supportive modalities,

they provide direction to the patient, allowing him to positively, and independently, process through his latency period. Further, as alternate means of expression, they offer flexibility in output, thereby decreasing the characteristic rigidity and frustration of the patient searching for a specific "word".

As speech and language pathologists, our major therapeutic goal is to maximize the patient's functional language abilities so that he may function independently within the limits of his disability. We must remember that our patients may experience deficits at any and all levels of the auditory mechanism; further, they may be plagued with secondary frustration and anxiety. In an attempt to overcome these deficits, the gestural-visual approach was devised. It has been my experience that this method most adequately meets therapeutic goals and is applicable to all patients, regardless of degree of involvement.

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