EFFECTS OF TREATMENT ON RECOVERY FROM APHASIA: THE TREATMENT PROTOCOL

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There have been a number of studies of the effects of treatment on recovery from aphasia, and the adequacy with which the treatment procedures have been described varies tremendously across the studies. Perhaps the briefest description of treatment procedures is that contained in the report of a study done at Michigan by Aaron Smith and his associates. The study generated a 150 page report, which described the subject population utilized, the manner in which data were analyzed and summarized, and which drew extensive conclusions about the rehabilitation of "chronic" aphasic patients. The description of the treatment program was limited to a portion of a paragraph in the middle of the report. I quote from the report (Smith, 1972):

> Each (subject) received a minimum of five hours of individual and group therapy daily for at least five weeks (125 hours). The therapists were graduate students, most with no prior experience in aphasia therapy. They were supervised by clinicians with experience varying from one to four years. Individual programs of therapy were designed by the students and clinicians and administered to each aphasic by three or four students. Although the supervising clinician for each aphasic was usually constant, the student therapists usually changed each five (summer) or ten (fall and winter) terms.
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> The progress of each patient was reviewed by the clinician shortly before the end of each five-week session. When the clinician staff felt that a patient had achieved maximal benefits, the patient was discharged. (Pp 99-100)

The report concludes that treatment does indeed have an effect upon recovery from aphasia, but the report is compromised in terms of its believability by the absence of any adequate description of the procedures which were utilized to achieve that recovery.

There are a number of published reports of therapy with aphasic patients which fall somewhere in a mid-range, in terms of the adequacy with which treatment procedures are described. They are generally poor to mediocre in terms of the amount of detail that they provide about their treatment programs. Two of the better-documented reports are those of Sarno (1968) and Holland (1969).

The Sarno report to which I refer is the famous (or perhaps infamous) report on the effects of programmed instruction on rehabilitation of severe aphasic patients. As you know, Sarno found little or no difference between groups of subjects who were treated with programming techniques, subjects who were treated with more traditional therapy, and a control group of patients who received no treatment. Although the design and subject-selection procedures utilized by Sarno contained serious deficiencies, she did a fair job of specifying the treatment that the aphasic patients in her study received, at least for those subjects who received programmed treatment. Unfortunately, the techniques used in the programmed therapy section of the study was considerably better detailed and reported than the techniques used in the non-programmed part of the study. This difference in specificity between the description of programmed therapy and "traditional" or non-programmed therapy has appeared in other reports, and seems to reflect difficulties in anticipating what a given aphasic patient is going to need, in terms of treatment programs, before he is actually seen in the study. The difficulty appears to be more pronounced with the non-programmed "traditional" therapy than it is with programmed therapy. This is because treatment objectives in programmed therapy are usually highly specific and restrictive, the range of responses which will be accepted from the patient is carefully defined, and the clinician's behavior is almost completely dictated by the program. As a consequence, it is easier to report the content of programmed therapy than it is to report the content of traditional therapy because traditional therapy usually requires that the treatment situation be free to change in response to moment-to-moment developments in the treatment situation. It is not surprising, then, that Sarno documents quite extensively the exact stimuli which are to be presented, the responses which can be expected, and the criteria for moving the patient from level to level within programmed therapy, but is non-specific and ambiguous in her description of non-programmed therapy. The reader of Sarno's report can be fairly certain of what happened to the patients subjected to programmed therapy, but can be much less certain of what happened to patients in non-programmed therapy. As a result, the reader of such a report cannot be certain that any differences in recovery of patients in programmed and non-programmed treatment found in the study reflect differences in treatment received, because one just does not know how, or how much, the treatments differed. By the same token, one cannot be very comfortable with findings of "no difference," because we cannot be certain that the different treatment techniques used in the study were meaningfully different. As a consequence, one cannot in this case speak with any confidence about Sarno's findings.

Audrey Holland, in 1969, published a report on the development and evaluation of programmed instruction techniques for aphasia rehabilitation, in which she presented the results of an extensive evaluation of programmed instruction with aphasic patients. The project covered a two-year period. Holland's description of the techniques utilized in programmed instruction is somewhat better than such descriptions in most of the other studies of treatment which are in the literature, but still falls short of the amount of specificity which would be required if the reader of the report were to be able to replicate her procedures from her description. Holland's treatment procedures were based on a single-subject approach. That is, treatment procedures were devised for each individual subject in the study, and the results are reported in terms of individual subjects, rather than for groups of subjects. Because Holland devised treatment procedures which were based on the needs of each of her subjects, it was somewhat easier for her to talk about specific treatment techniques, because the treatment techniques were tailored to individual subjects, and she made no attempt to devise a priori treatment techniques for large groups of subjects. Even so, it would be difficult or impossible for the reader of Holland's report to replicate Holland's procedures, because her descriptions of procedures for individual subjects are only general descriptions and are generally "for example" descriptions. To illustrate, Holland describes "A program to work on 'in' and 'out' (or 'out of') presented using both pictures and writing. For example, 'The foot is _____ the shoe,' leading to actual objects." Holland gives only examples of typical program items for her patients. She does not describe the stimuli presented, the responses elicited, the criteria for moving from level to level, or whether or not there were "fallback" programs which were utilized when patients made errors. Consequently, it would be impossible for a reader to replicate Holland's procedures from the descriptions provided in her report. Even if one could, it would not be appropriate, because Holland's procedures were a posteriori; that is, therapy techniques and procedures were devised to suit each patient, as it became clear what the patient needed, rather than being devised a priori, on the basis of common speech and language deficits which might be expected in these patients.

In summary, then, previous studies of the effects of treatment programs employed in recovery from aphasia have generally suffered because of inadequate or incomplete definition or description of the treatment programs employed in those studies. Studies which have utilized single-subject or subject-as-his-own-control approaches have encountered problems because it was impossible to define in advance treatment programs which would be appropriate to those subjects. Furthermore because the treatment for individual subjects within single-subject designs varies considerably, it is usually not possible to describe the general similarities or likenesses among treatment programs for the various individual subjects

within the study. Studies which have employed group designs have had problems in describing their treatment procedures, because treatment procedures are generally not identical for every subject in the group, because any unselected sample of aphasic patients is likely to contain a heterogenous mixture of speech and language deficits.

As we began to consider the organization of treatment programs for the cooperative study, we were faced with the same problems that everyone else who has attempted to construct such a study has faced. First of all, we had to devise two different treatment programs. Ideally, these treatment programs would reflect current opinions as to what sorts of treatment programs are appropriate for aphasia individuals. The treatment programs also had to be feasible; that is, they had to be of such a nature that they could be carried out in hospitals, administered by clinicians who had had considerable experience in treatment of aphasic patients, but who did not necessarily possess a great degree of familiarity with both of the treatment approaches that might be chosen for the study.

The treatment programs also had to be appropriate for use in a study in which a relatively large group of aphasic patients who receive a given treatment is compared with a second large group of aphasic patients who receive a different treatment. The problem that is generated by this requirement is that the treatment programs have to be designed to treat any and all kinds of "aphasic" patients, at a wide range of levels of severity. Furthermore, the treatment programs had to be described efficiently, and summarized in some fashion, so that it would be manageable in terms of the number of words required to define the treatment programs, both for our production of the programs and for the sake of the sanity of those who were attempting to understand and follow the treatment programs. We wished to minimize "hospital effects;" that is, we wanted to insure that, insofar as possible, different hospitals did not obtain different treatment effects because of gross differences in the kinds of treatment they were providing to their patients. However, we did not wish to be so restrictive that clinicians were not free to modify treatment procedures and objectives based upon their perception of what was appropriate for a given patient's treatment. As we shall see, the description of treatment procedures which we eventually settled upon represents a compromise between the need for detailed, specific description of treatment procedures, and the need for allowing clinicians appropriate amounts of free choice in their selection and administration of treatment procedures for given aphasic patients.

To return now to the choice of treatment programs, we wished to choose for the study two treatment programs that were quite

dissimilar, in order to maximize the probability of demonstrating differences between the two treatment programs chosen. Most, if not all, of the participants in the cooperative study were already employing what might be called "directive," or "stimulus-response" therapy in their treatment programs for aphasic individuals. This approach makes use of directed treatment activities in which the stimuli that are presented to the patient are carefully chosen and controlled. Responses are elicited from the patient under highly controlled conditions, and when appropriate, specified consequences are delivered to the patient contingent upon his responses. Because most of the participants in the cooperative study were already conducting treatment which was more or less based upon such directive, stimulus-response models, it appeared appropriate to choose such treatment procedures for one of the groups of patients to be enrolled in the study.

After reviewing other treatment rationales and descriptions of treatment procedures employed by other practitioners, we decided that a "non-directive," "supportive" approach promised to provide the best contrast with directive stimulus-response therapy. The supportive-non-directive approach to treatment has several proponents among professionals who are concerned with treatment of aphasia. Perhaps the best known proponent of this approach is Joseph Wepman, who for many years has maintained that the best program for aphasic patients is one which provides a great deal of support to the patient and does not force the patient to perform directed drill or prolonged practice with speech and language materials. For these reasons, we decided that one group of patients would receive "directive, stimulus-response" treatment, while the other group would receive non-directive therapy. Deciding on the treatment rationales, however, proved to be the simpler of the two questions that we had to consider. Formulation and description of the treatment procedures to be used in the two programs of treatment proved to be a much more formidable task. Development of the procedures to be used in the treatment program required considerable discussion and time, and the description of the treatment procedures that was finally formulated proved to be a compromise between the need for detail and the need to allow the clinician reasonable flexibility in structuring treatment programs according to the patient's needs.

Now, in the time remaining to me, I will summarize the general principles which governed the establishment of the two treatment programs, and describe some of the procedures that were included in the two treatment programs. For the purpose of brevity, I will heretofore refer to those subjects who received the directive, stimulus-response treatment program as Group A, and those subjects who received the non-directive treatment program as Group B.

First, let me outline several general principles which governed the selection of treatment procedures for patients in Group A. Then I will describe, in some detail, the kinds of procedures that we included in the treatment program for patients in Group A. First of all, treatment stimuli were usually delivered in either auditory or visual input modalities. We did not choose to include provisions for tactile delivery of treatment stimuli, because the tactile modality is not sufficient, in terms of information transmission capacity, to serve as an adequate means of language input, and the tactile modality is rarely used as a major input modality in most programs of treatment for aphasic patients. However, we decided that the treatment program for Group A should allow the patient to respond in all three output modalities -- gestural, verbal, and graphic, because all three output modalities can be used to communicate, and because most current programs for treatment of aphasic patients allow or encourage the patient to respond in any or all of the three output modalities. Because we anticipated that Group A would include some patients who exhibited motor speech problems, we decided that performance in the verbal modality could emphasize either the linguistic or the motor speech aspects of the responses. In order to maximize the amount of information provided to the patient, treatment stimuli would generally be presented in more than one stimulus modality, although this characteristic of the treatment program could be modified, based on the needs of the patient. In like manner, the intensity of treatment stimuli could be increased, if the clinician felt it appropriate, in order to elicit the most accurate and efficient performance from the patient. If multiple-modality stimulation and increased stimulus intensity interfered with the patient's performance, then multiple-modality stimulation and increased stimulus intensity would not be employed in the treatment program, until the patient had progressed to the point at which he could tolerate it.

Our general philosophy for the treatment program for Group A was that the patient should always be working at levels of task difficulty which generated slightly impaired, but not completely deficient performance. The criterion which we tried to maintain in terms of task difficulty was that the patient should always be working at levels of task difficulty at which approximately 80% of his responses were correct; however, correct responses could include both delayed and self-corrected responses. Changes in the treatment program or in treatment stimuli could be instituted as the patient's performance improved, to insure that the patient was always working at task difficulty levels which generate approximately 80% correct responses, including delayed or self-corrected responses. In general, when less than 20% of a patient's responses in a given task at a given difficulty level were delayed or self-corrected, the difficulty of the task would be increased until the task generated from 40-80% delayed or self-corrected responses. As a general rule, we would not allow treatment tasks to generate more than 20%

absolute errors. In order to keep the patient working at a level at which performance was just beginning to break down, several parameters of the stimuli and response requirements would be manipulated. First, stimulus intensity could gradually be diminished as the patient's performance improves, until the patient reaches the point at which he is working with stimuli which are not augmented. Second, in those cases in which multiple modality stimulation is employed, the number of modalities stimulated could gradually be decreased as the patient's performance improves. For those patients who demonstrate minimal tolerance for intense and multiple-modality stimulation, treatment would focus upon developing tolerance for increased stimulus intensity and multiple modality stimulus presentation.

Within the general guidelines that I have outlined, a number of specific treatment methodologies were developed for Group A. Treatment for the patients in Group A is aimed at establishing appropriate speech and language skills through controlled stimulation, predetermined response requirements, and delivery of consequences, when delivery of consequences is appropriate. The stimulus variables that we chose to manipulate include length, complexity, duration, familiarity, discrimination, level of abstraction, the modality in which the stimulus is presented, and the syntactic characteristics of the stimulus. For those patients with motor speech problems, we also provide for the manipulation of the phonemic context in which treatment stimuli were delivered.

The adequacy with which patients responded to treatment stimuli will be assessed on the basis of Porch's five charactersitics -- accuracy, responsiveness, completeness, promptness, and efficiency. Consequences for the patient's responses to treatment stimuli are delivered when appropriate and can include reinforcement of behaviors which approximate target behaviors, withdrawal of reinforcement for errors, or feedback to the patient concerning the accuracy of his responses.

Patients in Group A will receive approximately four hours per week of individualized therapy with the clinician. Individual therapy will include the following kinds of activities: (a) Pointing to pictures or objects named by the clinician. (b) Pointing to pictures or objects described by the clinician. (c) Pointing to pictures or objects when shown the printed name of one of them. (d) Pointing to pictures or objects when shown a printed description of one of them. (e) Matching printed words to pictures. (f) Choosing sequences or combinations of items from a group in response to spoken commands of controlled linguistic complexity. (g) Repetition of words, phrases, and sentences. (h) Formulation of phrases and sentences. (i) Writing words, phrases, sentences, and paragraphs.

For the patient with motor speech disorders, treatment procedures in the individualized treatment sessions may include: (a) For the patient with apraxia of speech, repetition of materials of graded difficulty, with the clinician providing verbal, auditory, and visual cues. For these patients, emphasis will be on sequencing of articulatory movements, rather than production of specific sounds in isolation. (b) For the patient with dysarthria, repetition and production of materials of graded difficulty with the clinician providing verbal, auditory, and visual cues. For these patients, emphasis will be on articulatory positioning, voice, and prosody.

In addition to four hours per week of individualized treatment sessions, each patient in Group A will spend four hours per week in self-directed speech and language activities. Self-directed activities for the aphasic patient will include the following kinds of activities: (a) Choosing pictures or objects from a group in response to its printed name. (b) Choosing pictures or objects from a group in response to its recorded spoken name. (c) Choosing pictures or objects from a group in response to recorded spoken descriptions. (d) Choosing pictures or objects from a group in response to recorded spelled names. (e) Spelling words of controlled length and frequency of occurrence in response to recorded spoken words. (f) Following a variety of spoken directions involving spelling, naming, pointing by name, pointing by function, pointing by description, and including a variety of tasks like those described above, in which the responses required from the patient change in non-systematic fashion throughout the program. (h) Basic vocabulary lists and programmed reading materials, including local and commercially-produced basic and remedial reading programs.

Self-directed speech and language activities for the patient with apraxia of speech will include speech production exercises, using tape records, Language Masters, and similar machines. Self-directed activities will emphasize retraining points of articulation and sequences of articulatory movements. Speech production abilities will be developed by training in compensatory movements, and in production of words, phrases, and sentences of graded difficulty, in which length of utterance and distance between successive phonemes is gradually increased.

For the patient with dysarthria, independent treatment activities will include exercises which are desgined to remediate respiratory, phonatory, and resonance deficits which may be exhibited by these patients. Self-directed activities for these patients will involve repetition of materials of graded complexity in response to spoken models, the use of Language Masters or similar devices, with which the patient

records and listens to his own production, and occasionally the use of a listener to pass judgment upon the patient's speech production in independent activities. These self-directed activities will be directed toward compensatory movements, such as over-articulation and successive approximation, toward reducing articulatory rate, toward increasing the intensity of the voice and the duration of phonation of vowels, in order to increase intelligibility.

Independent treatment activities for all patients in Group A will be structured according to the principles that govern the structure of clinician-client treatment sessions. It is anticipated that independent treatment activities may include the use of any of the following equipment and materials: audio records, slide projectors, Language Master or EFI units, electronic programming equipment, movie projectors, and therapist-prepared, or commercially prepared workbooks.

Treatment activities for patients in Group B will resemble those for patients in Group A in that patients in Group B will also receive eight hours of treatment each week, divided into four hours of activities with the clinician present, and four hours of independent, self-directed activities. Patients in Group B will be seen in a group by the clinician, rather than one by one, as is the case for patients in Group A. The groups will be composed of from two to eight patients; group members may be patients who are in Group B or the group may include patients who are not in the study. Treatment sessions for patients in Group B will emphasize interactions among group members. Emphasis will be placed upon communication of ideas, discussion of problems, expression of feelings, and discussion of attitudes. There will be no direct manipulations of the speech and language aspects of the interactions by the clinician. Emphasis will be placed upon the communication of ideas, on discussion of problems, and on expression of feelings and attitudes. In general, the group session will provide multimodality, nonprogrammed, generalized stimulation, in which attention is directed toward content and organization of thought and expression of feelings, attitudes, and emotions, and not toward performance of specific language tasks. The clinician's role in group sessions will include: (a) Choosing activities which are appropriate to the interests and abilities of the group. (b) Encouraging participation by all members of the group by employing appropriate group discussion techniques and appropriate reinforcement for participation. (c) Mediation of disputes and summarization of group discussion when such mediation or summarization is appropriate. (d) Encouraging the patients to participate in creation and direction of group activities.

Specific treatment activities for the group sessions for patients in Group B may include; (a) Content-centered discussions in which all group members are encouraged to participate. The therapist will direct these discussions, within the guidelines previously described. Topics may be selected either by group members or by the clinician. (b) Activities of special interest to group members, such as card games, contests, and group recreational and creative activities. (c) Problem-solving (e.g., exploring personal and family adjustment problems), and so forth. During any of these activities, reinforcement of correct language usage, correction of errors, or provision of cues may arise between group members, but will not be accomplished, controlled, or encouraged by the clinician.

As I said earlier, patients in Group B will receive approximately four hours of participation in activities not requiring the presence of the clinician. Independent activities for patients in Group B may consist of combinations of the following activities: (a) Films, plays, concerts, lectures, and so forth. (b) Athletic activities, such as golf, bowling, and so forth. (c) Community or hospital service projects. (d) Hobby activities, such as stamp collecting, painting, weaving and so forth, (e) Group excursions and tours.

I have now completed the major portion of what I wished to talk to you about today. In looking back over what I have presented, I am struck by the fact that my description of the treatment programs in the cooperative study is somewhat reminiscent of those previous descriptions that I talked about when I reviewed some of the literature on studies of the effects of treatment on aphasia. I find that, like Sarno and Holland, the descriptions of treatment programs for both groups of subjects have consisted of lists of the principles which govern the treatment for each group, along with general descriptions of the procedures involved in the treatment programs. I find that, like Sarno, my description of treatment for the group which receives directive treatment is somewhat more precise and detailed than the description of treatment for the non-directive treatment program. It may be that it is impossible to specify, in advance, specific treatment techniques which would be appropriate for large numbers of aphasic patients. I am fairly satisfied that we have done an adequate job of specifying the exact nature of our treatment programs, but I'm not sure if, or how, we might do better. We welcome your comments and suggestions with regard to this question, as well as the other aspects of the methodology that I have described today.

REFERENCES

Holland, A.L., The development and evaluation of programmed instruction techniques for aphasia rehabilitation. HEW Social and Rehabilitation Service Project RD-2361-S-68-C1 Final Report (1969).

Sarno, M. T., Speech therapy and language recovery in severe aphasia. NYU Medical Center, Department of Rehabilitation Medicine (1968).

Smith, A., R. Champoux, J. Leri, R. London, A. Muraski, Diagnosis, intelligence, and rehabilitation of chronic aphasics. HEW Social and REhabilitation Service Project 14-P5519815-01 Final Report (1972).

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