A System for Coding and Recording Events in Patient-Clinician Interactions during Aphasia Treatment Sessions

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The analysis of interactions between persons in clinician-client, parent-child, and teacher-student relationships has received a considerable amount of attention since the early 1950's. Bales (1950) is regarded by many to be the "father" of the present widespread interest in systems for the analysis of such interactions. Bales provided the first formalized system for quantification of the events which combine to make up interactions between pairs of individuals in communication situations. Bales' system was intended to provide a means of analyzing therapist-client interactions in psychological counseling or treatment settings. Bales' most recent (1970) version of Interaction Process Analysis assigns behaviors to twelve categories within four major areas.

Area	Category
A Positive and Mixed Emotional Reactions	1. Seems friendly 2. Dramatizes 3. Agrees
B Attempted Answers	4. Gives suggestion 5. Gives opinion 6. Gives information
C Questions	7. Asks for information 8. Asks for opinion 9. Asks for suggestion
D Negative and Mixed Emotional Reactions	10. Disagrees 11. Shows tension 12. Seems unfriendly

Flanders (1960, 1963, 1970) and Hough (1967), among others, have extended Bales' system to the analysis of teacher-student interactions in educational settings. Moskowitz (1967) has proposed a similar system for analysis of interactions between teacher and students in foreign language classrooms.

Systems for analysis of interactions between clinician and client in speech pathology treatment contexts have been proposed by a number of investigators (Johnson, 1969; Boone and Prescott, 1970; Schubert, et al., 1971, 1972; Mowrer, et al., 1968; and Diedrich, 1973). In general, all the systems proposed for analysis of clinician-client interactions in speech pathology treatment procedures make use of multiple-category systems by which occurrences within clinician-client interactions can be assigned to specific categories. The frequencies of occurrences within each category are then tabulated for the treatment session, and a graphic or written description which summarizes the treatment session in terms of the categories

employed is prepared. These summaries are used to record a client's progress, to check on the efficacy of treatment procedures, and to provide a means by which the clinical procedures can be evaluated, either by the clinician or by a supervisor, if the clinical session has been conducted by a student in the clinical training setting. The systems share a number of common elements. All the systems that we have mentioned provide a means of recording the stimuli which are presented to the client in the treatment session. All provide a means for recording the behavior of the client, and most provide a means for recording the behavior of the clinician, as the clinician responds to the behavior of the client. In the latter case, the recording system usually provides for recording of "consequent events." That is, the system allows one to record whether the clinician delivered "reinforcers" or "punishers" following given responses by the client.

Schubert, et al. (1971, 1972), Boone and Prescott (1970), and, to some extent, Johnson (1969) have developed systems which resemble that of Flanders (1960). Flanders' system of interaction analysis allows the observer to categorize events within the therapeutic interaction into any one of ten categories:

Teacher Behavior	1. Accepts feelings of students.
	2. Praises or encourages students.
	3. Accepts or uses ideas of students.
	4. Asks questions of students.
	5. Lectures students.
	6. Gives directions or instructions to students.
	7. Criticizes students or justifies teacher authority to students.
Student Behavior	8. Verbally responds to teacher.
	9. Initiates activity.
	10. No response, or no goal-directed response.

Boone and his co-workers (Boone and Prescott, 1970) have provided a system for the analysis of clinician-client interactions in clinical activities in speech pathology. Their system resembles, in some respects, that of Flanders, but their system appears to allow greater reliability and specificity in the analysis of clinician-client interaction than Flanders' system does. Boone and Prescott, like Flanders, divide events into "teacher" or "clinician" behaviors, and "student" or "client" behaviors. However, unlike Flanders, they have assigned an equal number of categories (five) to behaviors emitted by each participant. The events which occur within treatment sessions are quantified by means of a ten-category system (Boone and Prescott, 1970):

Clinician Behavior	1. Describe, explain.
	2. Model (demonstrate).
	3. Positive reinforcement.
	4. Negative reinforcement (punishment).
	5. Neutral and social.
Client Behavior	6. Correct response.
	7. Incorrect response.
	8. Inappropriate and social behavior.
	9. Positive self-reinforcement.
	10. Negative self-reinforcement (punishment).

Schubert (1973) presents a 12-category system which resembles, in some respects, those of Flanders and of Boone et al. Schubert apportions eight categories for recording of clinician behaviors, three categories for recording of client behaviors, and one category to recording of "no behavior.":

Clinician Behavior	1. Observing and modifying lesson. 2. Instruction and demonstration. 3. Auditory and/or visual stimulation. 4. Auditory and/or visual positive reinforcement of client's correct response 5. Auditory and/or visual negative reinforcement of client's correct response 6. Auditory and/or visual negative reinforcement of client's incorrect response. 7. Relating irrelevant information, asking irrelevant questions. 8. Using authority, demonstrating disapproval.
Client Behavior	9. Responds correctly. 10. Responds incorrectly. 11. Relates irrelevant information, asks irrelevant questions. 12. Silence.

Johnson and Diedrich (Johnson, 1969) developed a multidimensional scoring system which incorporates elements of Flanders' Interaction Analysis, Porch's multidimensional scoring system (Porch, 1971), and Lindsley's model for measuring and recording behavior (Lindsley, 1964). Johnson's system consists of 30 categories for observations and a multidimensional scoring system for scoring behaviors. Every behavior emitted by client or clinician is assigned to one of the 30 categories and scored using the multidimensional scoring system. The system has undergone limited validational study, and remains largely an experimental technique.

Diedrich (1973) has recently published a system for charting clients' or patients' speech behavior which allows the clinician to record the frequency of given behaviors over time on six-cycle logarithmic chart paper. Diedrich's technique would probably be a practical means for recording the behavior of the clinician as well as the behavior of the client. The technique's usefulness as a method for interaction analysis is compromised by the fact that behaviors that are to be recorded must be defined in advance, and each chart is a record of only one behavior. Consequently, the charting method does not have the flexibility that would be required, were it to be applied to interaction analysis.

We are left, then, with perhaps half a dozen techniques for recording and analyzing the sequences of events which occur in clinical treatment sessions. The methods resemble each other to a considerable degree, sharing the general format of Flanders' Interaction Analysis. They have generally proven helpful in the analysis of clinical interactions in speech pathology. However, they share a number of weaknesses which make them unsuitable for use as a means of recording the events which occur within therapy sessions with aphasic individuals, and equally unsuitable for recording the aphasic individual's response to those events. A recurring problem with all the

systems that we have discussed is that of reliability. Inter- and intra-examiner reliabilities for the systems discussed have generally been reported to be in the .80's and .90's. However, these stages of reliability have been reached only after examiners have received extensive training in the use of the system, and there has been a disturbing lack of reliability when examiners attempt to record events on the basis of the published descriptions of the recording systems.

Many of the problems in achieving high reliability of records generated by the systems for recording events in the treatment session appear to be related to ambiguity in the definitions of the categories to which events are to be assigned. The remedy which has been adopted for this has been to provide extensive training in categorization, by having the "novice" record the same events as an "expert" observer, with the "expert" providing correction and feedback to the "novice," until their recordings reach a specified level of agreement. This, however, results in "implicit," rather than "explicit," definitions of behavior (Hawkins and Dobes, 1973). "During his training, he (the observer) learns numerous discriminations regarding the behavior that are not in the written definition and that may even contradict the written definition." (Hawkins and Dobes, p. 5)

The resulting disadvantage is that no other observer can replicate the measurement employed unless he is trained by the person who knows the implicit definitions. "The published description of the measurement simply misrepresents the actual measure employed." A second disadvantage of reliance on observer training for reliability is that "data based in implicit definitions may be much more subject to various kinds of error than data based on explicit, written definitions to which an observer can repeatedly return for guidance. When the observer has no written definition to refer to, or only an incomplete one, his data may change over the course of an experiment due to such factors as his forgetting some of the discrimination he learned during training or his knowing the results that (others) would like to see." (Hawkins and Dobes, p. 6)

Hawkins and Dobes have convincingly demonstrated that recording procedures such as those mentioned earlier are surprisingly unreliable, unless prolonged training in the scoring system is given. They found that pairs of independent observers using categorization systems like those discussed earlier achieved only 15% scored-interval reliability in judging when an event within a given response category had occurred. The lowest agreement for a category was 0.9 percent, and the highest was only 32.8 percent. These percentages could no doubt be increased by prolonged training, but only at the cost of moving from explicit definition of categories to implicit definition of those categories.

All the recording systems discussed have concentrated upon describing interaction; they have not been concerned with the parameters of the treatment program. As a consequence, they fail to record perhaps the most important aspect of the therapy interaction: the nature and the complexity of the treatment tasks presented to the client, and the adequacy of the client's responses in those tasks. If one wishes to evaluate the efficacy of treatment programs, one cannot be satisfied with recording systems which provide only for measurements of behavioral interactions; one must also record pertinent information about the treatment tasks presented to the client, and the client's responses in those tasks. For example, one might generate the following log of a treatment session, using a system such as Boone and Prescott's (1970) system:

	Clinician Behavior	Client Behavior
	Describe, explain	Inappropriate, social
Time	Neutral, social	
	Describe, explain	Incorrect response
	Negative reinforcement	
	Describe, explain	Incorrect response
	Describe, explain	
	Model	Correct response
	Describe, explain	Correct response
	Describe, explain	Positive self-reinforcement
	Neutral, social	Inappropriate, social
	Model	Correct response
	Positive reinforcement	Positive self-reinforcement

(After Boone and Goldberg, 1969)

We can see from the log that the clinician increased his use of modeling during the session, and that he did not reinforce inappropriate or incorrect responses. We can also see that the client decreased the frequency of incorrect responses, increased the frequency of correct responses, and decreased inappropriate behavior. We have no way of knowing what the task was, what sort of models were provided, or what the criteria for a "correct" response were. Clearly, such a recording system, by itself, is inadequate for describing the content and the course of treatment in clinical speech pathology. A recording system which would allow one to record significant aspects of the treatment program, and to document client progress, should meet the following criteria.

a. High reliability. The system should be constructed so that an observer recording the same events at different times records the events identically on both occasions. Likewise, different observers recording the same events should record the events identically. However, high-reliability should not be achieved at the price of abandoning explicit definitions in favor of implicit ones, which are arrived at by discussions among observers.

b. Explicit definition of events to be recorded. The event must be described in such a way that the observer literally has no choice about the way in which it is to be recorded. In order to be explicit, definitions must be objective. That is, the

definition should refer only to observable and measurable characteristics of the event which is to be recorded. Inferential terms, such as "positive emotional reactions," or "relates irrelevant information" must be converted into more objective terms. Definitions should also be clear. That is, they should be so meaningful and unambiguous that the speech pathologist can read each definition and paraphrase it accurately. And finally, the definition should be complete. It should delineate the boundaries of the events that can be included within the definition of the event, so that the observer knows exactly what events are included in the definition and what events are excluded. "Complete" definitions leave nothing to the judgment of the observer. (After Hawkins and Dobes, 1973)

c. The recording technique should be sensitive. That is, it should provide a system by which even small changes in the events to be recorded can be noted. The ultimate sensitivity is verbatim recording of events. However, this method is cumbersome and does not allow for efficient comparisons across observers or across patients. A manageable recording technique must group events into some system of categories. In order to provide sensitive recordings of those events, the categories must be detailed enough so that small, but important, differences in events will cause those events to be assigned to different categories.

d. Simplicity. The recording technique should be as simple as possible, without compromising explicitness and sensitivity. It would do no good to devise a recording technique which was both explicit and highly sensitive, if it were so detailed and complex that it would be unmanageable for observers to use even with training in the use of the technique. In deriving a system for recording treatment procedures with aphasic individuals, there obviously must be a certain amount of "trade-off" between the need for sensitivity and explicitness and the requirements for simplicity.

e. Relevance. The system should provide a means of recording events which are relevant to an analysis of treatment procedures and patient progress in aphasia rehabilitation. The requirement for relevance precludes the use of systems such as those devised by Bales, Flanders, Boone, and others in analysis of treatment programs for aphasic individuals, because those systems do not sample or record relevant aspects of the treatment procedures.

DEVELOPMENT OF COPING SYSTEM

Our development of prototype coding systems began with observation of live and videotaped aphasia treatment sessions conducted by staff clinicians from the Aphasia Section, Minneapolis Veterans Hospital. The literature on aphasia was also reviewed, in order to compile information about the kinds of measures which might be suitable for discriminating among various

approaches to treatment of aphasic individuals. Our initial prototype systems attempted to provide an on-line analysis of treatment interactions. However, it soon became obvious that, even after considerable practice, observers had difficulty scoring more than two or three events in this continuous, on-line manner, because clinician-patient interactions occurred too rapidly to allow the observer to code and record every clinician and every patient behavior. We attempted to solve this problem by reducing the number and variety of clinician and patient behaviors that the observer was responsible for recording. In order to do this, we made the clinician request for a response the key unit of behavior. Observers were asked to code only those events in which the clinician asked for a response from the patient. Similarly, only those patient events that were responses to the clinician's request were scored. The first model which developed from this identification of the clinician request for response as the basic unit was the following:

> The clinician requests a response from the patient. The request is either conversational or task-related in "type," verbal, non-verbal or both verbal and non-verbal in "manner," and of _____words in length. The patient's "response" to the request is either acceptable or unacceptable. The clinician responds to the patient's response with "feedback" that is either positive, somewhat positive, negative or no feedback.

Our first efforts were directed toward devising a system in which observers could code "live" and "on-line" the events which occurred in patient-clinician interactions. However, it soon became apparent that, if we were to record the events in sufficient detail to allow us to describe the treatment interaction with anything close to what we considered the minimum level of detail necessary to be useful in a potential efficacy study, we would have to find some way of allowing observers more time to observe and code those events. Therefore, we decided to devise a relatively long and detailed coding system, and to allow observers to work from videotapes of treatment sessions, rather than from live sessions. By doing this, we could allow observers to go back and replay events which had occurred at rates too rapid for them to record, or to look at events about which observers were unsure, in terms of the way that they should be recorded. The long recording system went through a number of revisions, until, at this point, it contains 39 categories, into which events which occur within clinician-patient interactions can be apportioned. These event categories are themselves divided into a number of larger categories. Each event is numbered consecutively from the beginning to the end of the treatment session observed, and the time that each event begins is recorded on the observer's coding sheet. During the development of the system, a technique was perfected which allowed us to insert an indicator into videotape recordings of treatment sessions which counted the time, in minutes and seconds, that had elapsed between the beginning of the treatment session and any point within the session. By recording the time at which an event began, coders could uniquely identify that event, so that the judgments of several coders could be compared for any given event.

The major categories into which interaction events can be divided by one using the system are (a) Type of clinician behavior, (b) Complexity of request, (c) Support, (d) Manner, (e) Materials, (f) Expected response, (g) Patient's response, and (h) Clinician feedback. Nine separate and

relatively distinct events are categorized under "type of clinician behavior." The nine kinds of clinician behavior consist of:

Imperative - A request for response that consists of a command; e.g., "Point to the car."

Model - A request for response that requires the patient to imitate the clinician's behavior; e.g., "Say, 'The boy chased the dog.'"

Completion - A request for response that requires the patient to complete a linguistic unit which the clinician has begun; e.g., "I want a cup of _____."

Yes-No Question - A request for response which requires a "yes" or "no" response from the patient; e.g., "Have you had your breakfast?"

All Other Questions - A request for response in question form which requires a response other than a "yes" or "no" response; e.g., "What did you do this morning?"

Pause - A request for response which is signaled by the absence of spoken behavior by the clinician, which is accompanied by gestural or postural behavior which indicates that the clinician expects the patient to respond.

Explanation - This is not a request for response, but is coded when the clinician explains or instructs the patient about an upcoming task.

Clinician-Initiated Discourse - This is also not a request for response, but is coded when the clinician engages in a discourse with the patient, and when that discourse does not constitute a request for a response.

Patient Discourse - This is not clinician behavior, but patient behavior, and is coded when the patient initiates communication behaviors which are not in response to a specific request from the clinician.

The second major category of descriptors which are coded by the observers using our system is related to the complexity of the requests made by the clinician. There are two measures of complexity in the present system. The first, inference, is recorded when there is a mismatch between the structure of a request and the implied function of the request. In general, inference is coded when the clinician gives the patient only partial information about the nature of the expected response, or when the structure of the clinician's behavior does not match its implied function. For example, requests which have question structure but serve as imperatives, e.g., "Can you point to the dog?, are coded as + inference. Likewise, inference is coded whenever key words are deleted from a request, especially in repeated requests, e.g., "Point to the spoon.". . ."the napkin." The second measure of complexity is the number of words contained in the clinician's spoken request behavior. In our original version of the coding system, we had included a number of measures of complexity, including such things as structure, information density, and word order. Our analysis of our complexity measures indicated that none was a more valid measure of the complexity (or difficulty) of a clinician's request than length was.

Consequently, we employed length, the most easily coded of our many measures of complexity, as the measure to be retained in the present version of the system.

The third major category of events in the present system is concerned with the support given to the clinician's request for response. Support can be of two kinds; spoken unison, and gestural unison. Spoken unison is coded when the clinician produces a spoken expected response in unison with the patient. Gestural unison events are coded when the clinician produces a gestural expected response in unison with the patient, or when the clinician produces gestural cues in unison with the patient as the patient is producing a spoken response.

Requests for response can be delivered in three manners. Spoken manner is coded when the clinician's request involves any spoken behavior.. Gestural manner is coded when the clinician's request involves any gestural behavior. Melodic manner is coded when the clinician's request involves any humming or singing.

Two Event Categories are used to describe the materials used in the treatment session. One category describes the kinds of materials used, and the other category describes the complexity of the materials. Object-Picture is coded when objects or pictures are presented to the patient by the clinician in conjunction with the request for response. Written material is coded when written or printed materials of any kind are presented to the patient in conjunction with the request for response.

Seven aspects of the response which is expected from the patient at the time of a request for response are coded. The first aspect of the expected response to be coded is length. Length is coded as "0" when the expected response consists of a single word or single gesture and it is coded as "1" when the response consists of more than a single word or gesture. Spoken, Melodic, Gestural, and Written expected responses are coded, and if the expected response consists of a duplication of the immediately preceding response produced by the patient, it is coded as a Repeated Expected Response. If the patient is to wait for a period of time before responding to the clinician's request for response, the category Delayed Expected Response is coded.

The actual response emitted by the patient is described in terms of four parameters. Whenever the patient attempts any sort of response to the clinician's request, the presence of Response is recorded. If the patient's response is considered to be "normal" in all respects, then the presence of a Normal Response is recorded. If the response is unacceptable to the clinician, the presence of an Unacceptable Response is recorded. When the patient responds, then asks the clinician for information about that response, the presence of a Requests Information event is recorded.

Ten aspects of the feedback which the clinician may deliver following patient responses are recorded. First, the presence of feedback is recorded. Then, the number of words contained within the clinician's feedback behavior is recorded. The modality of the feedback (Spoken or Gestural), and whether the feedback is positive or negative is recorded. When the clinician provides the correct response to the patient after the patient has produced an unacceptable response, the presence of correction feedback is recorded. If the clinician repeats or elaborates upon the patient's response, the presence of repetition-elaboration is recorded. Finally, when any part of the feedback is delivered with unusual intensity or emotion, the presence of intense feedback is recorded.

In summary then, the events recorded by our system are of three major

kinds: (1) instances in which the clinician requests a response from the patient, (2) instances in which the clinician engages in certain other non-request behaviors, and (3) instances of patient discourse. Whenever a request for response occurs, the coder records:

(1) The number of the event
(2) The time at which the event begins
(3) The type of request
(4) Two aspects of the complexity of the request
(5) The kind of support present
(6) The manner in which the request is presented
(7) The kind of materials present
(8) The expected response to the request
(9) The patient's response to the request
(10) The clinician's feedback to the patient's response

Whenever a clinician non-request event occurs, the coder records:

(1) The number of the event
(2) The time at which the event begins
(3) The type of event
(4) The number of words in the event
(5) The support present
(6) The manner in which the request is presented
(7) The materials which are present

Whenever patient discourse occurs, the coder records only:

(1) The number of the event
(2) The time the event begins
(3) The type of event (patient discourse)

In order to determine whether our system is effective in discriminating among different approaches to the treatment of aphasic individuals, we have carried out a series of analyses to determine the system's efficacy in sorting out treatment approaches based upon characteristics shared by several practioners using a common approach. In this analysis, we first plotted, for a sample of videotaped treatment sessions, the frequency of occurrence of each category of events which occurred within each treatment session. We then rank-ordered, for each event category frequency-of-occurrence, all the treatment tapes. We then identified "discriminating categories"--those categories with large and abrupt differences in frequency-of-occurrence across the rank-ordered tapes. We then identified those groups of tapes which appeared to exhibit matching "discriminating categories." In order for a pair of tapes to be judged as belonging to the same category of tapes, they had to share at least five common "discriminating categories."

Our analysis of twenty-three ten-minute videotaped samples of treatment generated three major groups of tapes. One group--an "auditory stimulation" group--contained large numbers of imperative requests, gestural responses, high success rates, and high information feedback ratios. Another group of tapes--a "challenging, conversational" group--contained much repetitive feedback and high failure rates. A third group--a "melodic treatment" group--contained large numbers of requests having melodic, stress, and unison support, together with large numbers of repeated expected responses and high success rates. The mean number of common discriminators for the tapes within each of these three groups were 6.67, 6.70, and 7.00 for each of the three groups. The mean number of common discriminators across group boundaries ranged from 0.724 to 3.08, suggesting that our procedures generated groups with high intra-group similarity and low inter-group similarity. We are conducting further analyses of the discriminating ability of our coding system. The initial results of these analyses suggest that the system has

the power to discriminate among different approaches to treatment, and is a useful instrument for describing what those differences are.

In addition to describing differences among treatment approaches, the system also portends to be eminently useful in analyzing relationships which may exist among events within treatment sessions, and in analyzing relationships between those events and the outcome of treatment. At this time, we have hardly scratched the surface, in terms of exploring these relationships.

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