Assessing the MENTALLY RETARDED

Edited by

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Grune & Stratton
A Subsidiary of Harcourt Brace Jovanovich, Publishers
New York London
Paris San Diego San Francisco São Paulo
Sydney Tokyo Toronto

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Language

Effective communication plays a very important role in human affairs. It can provide a person with a great deal of reinforcement (e.g., the ability to ask for help or for a drink of water), and it can allow one to avoid possible punishment (e.g., reading "walk" versus "don't walk"). The outstanding problem for most mentally retarded individuals usually involves some degree of delayed or inappropriate communication skills. For some, emphasis should be placed on developing the rudiments of language while others need to acquire verbal repertoires such as those concerning current events, society, mathematics, or reading. The function of a language assessment is to determine which repertoires are weak, and where to begin instruction.

A person without language is at a great loss (Lovaas, 1977). Many problems and discomforts are experienced but are never understood and it becomes reasonable to expect that various inappropriate behaviors might occur in the absence of language. For example, aggressive behavior such as hitting and kicking may be emitted if a response similar to "Leave me alone," is not in a person's repertoire. Inappropriate social behavior may likewise result from unsuccessful attempts at communication. And after several years, these behaviors become a strong part of a person's repertoire and are difficult to change. Unfortunately, many behavior change programs focus on modifying a certain behavior (e.g., head banging) without considering its possible link to defective verbal skills.

Linguists and cognitive psychologists may de-emphasize actual language instruction by viewing mental retardation and delayed language as by-products of defective cognitive processes. Salzinger (1978) points out in his analysis of the current state of psycholinguistics that "the cognitive psychologists and the generative grammarians have abandoned language as behavior . . . by focusing their interests on the mental events assumed to underlie it" (p. 277). As a result, when

language is delayed, emphasis is often placed on developing the "prerequisite" cognitions rather than developing language behavior.

Skinner (1957) presented an alternative view of language in his *Verbal Behavior*. Basically, Skinner analyzes language as behavior that is controlled by its relation to antecedent and consequent events, as well as to motivational variables (Michael, 1982a). The unique feature of Skinner's approach is his ability to explain language without the use of any mediating or cognitive variables. The body of the book consists of a careful analysis and classification of the independent variables mentioned above, and of how they control verbal behavior. The following program for language assessment is based on Skinner's book. There are six sections: receptive language, duplic, mand, tact, intraverbal and codic. Each section contains a definition and overview of the repertoire being tested, methods of assessment, and guidelines for interpreting the assessment (including suggested sources for training materials).

The Definition of Verbal Behavior

Prior to discussing the specific features of the classification scheme, it is important to point out two features of Skinner's approach. First, he defined verbal behavior as behavior that achieves its effect on the environment through the behavior of some other person (Skinner, 1957, pp. 1–2). For example, one can open a box by the appropriate hand and arm movement, which achieves this effect directly; or one can say, "Open the box," in the presence of an appropriate listener, and achieve the same effect indirectly. It is this indirect reinforcement that characterizes verbal behavior and is responsible for many of the important features that distinguish verbal from non-verbal behavior. This use of "verbal" is not synonymous with "vocal"; nor is it defined here as "verbal" contrasted with "quantitative" or "mathematical." Second, Skinner analyzed language as the behavior of a speaker (Skinner, 1957, p. 2) and not as the behavior of a listener. What is typically called receptive language is not technically verbal behavior from Skinner's point of view. This will be discussed in more detail in the receptive language section.

The Parsons Language Sample

The first published attempt to use Skinner's analysis to assess verbal skills was the Parsons language sample (Spradlin, 1963). The assessment concerned several different kinds of verbal behavior: Tact, Echoic, Echoic Gesture, Comprehension, Intraverbal, Intraverbal Gesture and Mand. Spradlin's program was quite different from most language assessments and it was never adopted (nor well understood) by most speech and language clinicians. There were however, as Spradlin (1967) pointed out, several problems with the assessment program. First, it was not clearly stated how the behavior sample related to language usage in the natural environment. This issue was amended by Spradlin (1966), but it

seemed that the main problem was that most people were unfamiliar with Skinner's *Verbal Behavior* and didn't know what such things as mands, tacts, and intraverbals were. Another issue was that the results of the test did not indicate where training should begin; specifically, the test was not in any clear way connected to a language curriculum. Also, the test only required single-word responses and most speech and language therapists could not accept such fragmentation as any indication of language ability. A final point discussed by Spradlin (1967) was that the Parsons language sample did not contain any predictions as to which students could be trained by a given procedure and which could not. In general, the results of the sample did not help the teacher or parent design an individualized training program. In retrospect, Spradlin* felt that his heavy emphasis on statistics was also a major deterrent to his program. However, Spradlin's assessment program was clearly a step in the right direction. Most of the problems can be rectified since the theoretical basis upon which Spradlin operated seems quite sound. Spradlin was a pioneer in the application of Skinner's analysis and there were few precedents in the literature to support this work. Now, however, a number of theses, dissertations, research projects and books have been written about Skinner's analysis of verbal behavior and its application is becoming more widespread (Sundberg & Partington, 1982).

Pre-Assessment Activities

Prior to the actual assessment of a mentally retarded person's verbal repertoires it is important to establish rapport with the individual. This aspect of assessment is usually viewed as somewhat of a luxury and dealt with hastily because of the cost of the speech therapist's time. However, failure to know the person who is being assessed will most likely result in an inefficient assessment and an inadequate program, and ultimately greater overall costs.

It is essential that the tester have stimulus control over the person's behavior. That is, the person being assessed must be willing to respond in the best possible way. Such control develops as a function of reinforcement and usually over an extended period of time. The failure to obtain this control will result in an assessment of a very atypical verbal repertoire. This is usually one of the main contributors to the often large discrepancies found between formal speech and language reports and informal observations by parents.

Usually it is easy to establish a positive relationship with a mentally retarded individual. The best procedure seems to be one that utilizes a large amount of reinforcement. The first step, therefore, (after reviewing the case and considering possible etiologies) should be the assembly of potential forms of reinforce-

*Spradin, JE. Personal Communication, 1982

ment (e.g., food, drinks, toys, tickling) to be used during the assessment. Each individual is susceptible to different types of reinforcements. These may be identified by asking questions and carefully observing what activities or items the person seems to prefer. Skillful use of the identified reinforcers will be helpful in obtaining an accurate measure of verbal behavior. The tester should ask those most familiar with the person for descriptions of items and activities that seem to interest (reinforce) the person. In addition, the tester should conduct independent observations.

The next step involves the tester's actual development of rapport with the person. The first contact should be extremely positive and the tester should be paired with the student's most powerful reinforcers and deliver them contingent on any appropriate behavior (e.g., following eye contact: praise, tickle, and give some food to the person). Slowly, the tester should make the delivery of reinforcement contingent upon some requested behavior (e.g., "look at me"). The key is for the tester to become a conditioned reinforcer for the student so the student will listen and respond to instructions. These techniques for developing rapport and stimulus control should occur in the student's most typical environment and in a very unstructured and unthreatening way.

There are several other aspects of the student's behavior and living environment that will provide useful information to those conducting the assessment. First, a measure of inappropriate behavior (e.g., excessive crying, tantrums, aggression, withdrawal) along with its antecedents and consequences can help in understanding the person's current method of communication. These data can also serve as a baseline of the current level of functioning. The lack of verbal skills is closely related to behavior problems and an effective language assessment and intervention may help to reduce these inappropriate behaviors. It is also important to observe the student's social interaction and regular behavior patterns in the natural environment. For example, you may note that the person approaches several people, although not saying anything, and may give them things or sit next to them. Knowledge of such social behavior can be very useful. A careful observation of several aspects of the student's environment will also be helpful. For example, with what objects does the person regularly come in contact? What actions does the student prefer to do or observe? What people or animals evoke interest? These data are critical for determining the first words or signs to teach a student and to further individualize the language program.

All of these preliminary observations can be conducted while establishing rapport with the student. These activities can be time-consuming and it is tempting to skip them; however, without them the results of the assessment can only be less than optimal. If one is pressed for time and money, an attempt should be made to approximate this procedure, even for higher-functioning individuals. If a tester presents the first test item shortly after meeting a person he will observe behavior that reflects that short and uncertain relationship.

The Form and Function of Language

At this point it is important to make a distinction between two major aspects of language—form and function. The form of language concerns the topography or structure of language. The form can be auditory (e.g., English, Spanish, Mandarin), visual (e.g., writing, sign language, fingerspelling, pointing) or tactile (e.g., braille). Thus, asking for water can involve many different response forms (languages), all of which will result in receipt of water given the appropriate conditions and audiences.

The functional aspect of language concerns the environmental circumstances under which a form is emitted. For example, one may say (sign, or write) "water" (the form) because someone else says (signs, or writes) "water"; the behaver wants some water; or, sees or hears a river or stream; or is asked, "What else do you need to make coffee?" and so on. In all examples the same form or word is emitted for different reasons, that is, for different functions (to get water, or to get someone to look at water, etc.). The functional aspects of language can become quite complex and elusive, but it is important to account for as much of the functional environment as possible. The goal of this assessment is to provide the reader with a behavioral account of the different circumstances under which language occurs. These different conditions or functions make up the basic outline of Skinner's book *Verbal Behavior*. Michael (1982b) has suggested some alterations in Skinner's categories and the current assessment will make use of those changes (Table 10-1).

THE RECEPTIVE REPERTOIRE

Receptive Language and Its Relation to Expressive Language

It is typical to view language development as occurring in two major steps: receptive, then expressive (Piaget, 1926, Kent, 1974). Receptive language is characterized as reacting to items such as the expressive commands, instructions, or directions, of others (Table 10-1). That is, one stands up because he was asked to do so. Expressive language is, of course, the actual emission of words or signs. A speaker is engaging in expressive language when he asks someone to "Stand up." It is common to equate these two repertoires by referring to them as part of the "understanding of the meaning of words"; and, expressive and receptive skills are viewed as the two ways to demonstrate such understanding. If one of these language skills fails to develop, usually expressive, then extensive training is often given to further strengthen the "good" repertoire with the general notion that the two are somehow equivalent. The two repertoires, however, are actually quite

Table 10-1
Skinner's Verbal Relations

Controlling Variables	Response	Consequence
Verbal stimulus with point-to-point correspondence and formal similarity	Duplic (echoic, imitation copying a text)	Social, educational, facilitative
Establishing operation (deprivation, aversive stimulation) or establishing stimulus	MAND (asking)	Specific thing or action manded
Non-verbal stimulus (an object, action, relation, property)	TACT (naming)	Social, educational facilitative
Verbal stimulus without point-to-point correspondence and formal similarity	Intraverbal word associations	Social, educational, facilitative
Verbal stimulus with point-to-point correspondence without formal similarity	Codic (reading aloud, taking dictation)	Social, educational, facilitative
Verbal stimulus (usually a mand)	Receptive Behavior* (compliance to the speaker's mand)	Social

Modified by Michael, J.L. Skinner's verbal operants: Some new categories. VB News, 1982, *1*, 2.(b)
*A special non-verbal relation

different (Guess, 1969; Sundberg, Ray, & Rueber, 1980), but they may facilitate one another. The current assessment approaches receptive language as an additional repertoire that a student must acquire. No attempt is made to equate it with expressive language or to consider it verbal behavior.

Assessing Receptive Language

To assess the receptive repertoire one should start with very simple commands such as, "Look at me," or "Come here." Then, complexity should be increased to include multiple component commands such as, "Pick up the book and touch the pen." The objective is to determine the degree to which the student complies with the tester's instructions.

Data collection is a very important aspect of a language assessment. A data sheet should be used that allows one to record the antecedent events, the actual

behavior (i.e., correct, approximation, wrong or no response) and the consequences. The tester should present the antecedent stimulus, reinforce correct responses or approximations and record the data. It is extremely important to reinforce during the assessment. A more accurate assessment of a person's skills is possible when correct responses are reinforced rather than ignored as is suggested in the instructions for most standardized tests (Breuning & Davis, 1981; Breuning & Zella, 1978; Young, Bradley-Johnson, & Johnson, 1982).

Interpreting the Receptive Assessment

If a person readily complies with the tester's requests, but has a weak expressive repertoire, then little time should be spent on teaching more complex aspects of the receptive repertoire. Emphasis should instead be placed on developing the expressive skills, even if the person can only comply with simple commands. It is important, however, for a person to continue to develop his or her receptive repertoire but it should not be viewed as a prerequisite to expressive behavior. Instead, both repertoires should be developed simultaneously. In a session, for instance, receptive and expressive trials should be interspersed with each other. Techniques and procedures for teaching instruction-following can be found in the behaviorally-oriented journals (e.g., Zimmerman, Zimmerman, & Russell, 1969; Striefel & Wetherby, 1973), and language programs (e.g., Engelmann & Osborn, 1969; Guess, Sailor & Baer, 1976).

THE DUPLIC REPERTOIRE

The duplic (Michael, 1982b) is a type of verbal relation in which the form of the response (what is said, signed, written, etc.) is controlled by a verbal stimulus that has point-to-point correspondence, and in which there is formal similarity between the stimulus and the response product (i.e., they are in the same sense mode and the stimulus and the response resemble each other). The consequences for duplic behavior usually involve some kind of conditioned reinforcement (Table 10-1). Two types of duplic behavior will be covered in this assessment; echoic, which involves the vocal muscles and auditory response products; and imitation, which involves the appendage muscles and visual response products.

Assessing Echoic Behavior

The tendency to emit a vocal response (e.g., "late") that matches an auditory stimulus (e.g., "late") exemplifies the echoic relation. The objective for this part of the assessment is to find out what sounds a person can copy and if he can continue to do so when the sounds are blended together, or when they occur in larger units. Echoic behavior plays a very important function in language

instruction, and knowledge of the strength of this repertoire is necessary to determine an appropriate language curriculum. There are four general levels to the echoic evaluation: phonemes, blends, words, and phrases.

The easiest type of echoic relation to produce is usually a single phoneme that matches the presented stimulus (e.g., say "mmm," can you say "mmm?") There are 42 phonemes in the English language and it is important to be able to echo or duplicate each one. Some sounds are easier than others, for example, "ah," "mmm," "oh," and "e" are easy because there are very few muscles involved. Other sounds such as, "f," "ch," "s," and "j" involve more muscles and more complex responses, hence, they are more difficult to say. For an individual who has very little vocal behavior, a good place to start is with the sounds he emits in the natural environment. In the phonetic section of the evaluation the tester is interested in identifying which sounds can be echoed in isolation. (Note: Many mentally retarded individuals can easily copy sounds. For these persons little time should be spent on this aspect of the assessment.)

The ability to blend sounds is a more difficult skill. A person may be able to emit an "s" sound in isolation but not when followed by a "p" phoneme (e.g., "spill" becomes "pill"). Combining sounds requires some fine muscle movements from one vocal position to another and is generally more difficult than emitting sounds in isolation. Some blends are much easier than others and the trials should be arranged in a simple-to-complex order. It is important to note that the assessment only samples behavior, thus, it is not necessary to assess all possible vocal combinations. The objective is to assess the strength (not the size) of a person's echoic repertoire. If a person can copy phonemes and blends, often whole words and phrases are not much more difficult. The presentation of words in the assessment should be ordered from simple (e.g., say "hat") to complex (e.g., say "exasperate"). Phrases can also be ordered from simple (e.g., say "red car") to complex (say "the big yellow ball fell into the old gutter"). The tester should collect data in the manner previously suggested and reinforce each correct response or approximation.

Assessing Imitative Behavior

The tendency to emit motor responses (e.g., clapping) that match visual stimuli (e.g., clapping) exemplifies the imitation relation. The objective for this part of the assessment is to determine if the person can copy physical movement modeled by the tester. The stimulus, "Do this," should be presented in conjunction with the movement (be careful not to include a specific instruction like, "Do this, touch your nose," because that involves the blending of two repertoires (i.e., imitative and receptive) and will confound the results of the assessment). Data should be collected and both correct responses and approximations reinforced. The tester should begin with very gross motor movement (e.g., clapping, raising hands over the head) and progress to finer movements (e.g., touching the finger-

tips together, picking up small objects). The task is not to determine the total number of imitative responses, but rather the strength of the imitative repertoire in terms of stimulus control (i.e., do visual stimuli appropriately control matching motor responses and at what level of complexity does stimulus control weaken?).

Interpreting the Duplic Assessment

The echoic evaluation is basically an articulation test, although it is much less formal. If the person has a strong echoic repertoire, this will be detected early in the assessment and the tester should move on to other sections. If echoic behavior is weak, then upon completion of the assessment, techniques should be used to strengthen such behavior (Lovaas, Berberich, Perloff, & Schaeffer, 1966; Sundberg, Ray, Braam, Stafford, Rueber, & Braam, 1980).

If the student can't make any vocal sounds or does very poorly on an echoic evaluation it may be reasonable to consider sign language as an alternative to vocal behavior. In terms of the effect, there is not much difference between signing "water" and saying "water." The form is not as important as the function. Unfortunately, some form is necessary to serve a function. If vocal behavior is delayed or somehow impaired and imitative behavior is strong (or even somewhat stronger than echoic behavior), one should not hesitate to consider sign language (Sundberg, 1980*). However, if imitative behavior is impossible because of physical impairments, then other non-vocal systems such as symbol boards or electronic devices should be considered (Partington & Sundberg, 1977).

There are several reasons why a mentally retarded individual can often acquire sign language more quickly than vocal speech. First, it is much easier to teach the person sign as a response form. The hands can be placed in the appropriate position and prompts can be easily faded out. Sign language allows the trainer to make clear and unambiguous examples of the appropriate response form and the shaping process is much quicker and more positive. The vocal apparatus on the other hand, cannot be manipulated into correct position sufficiently to produce desired sounds. Therefore, indirect speech therapy usually develops new skills slowly and is often aversive for the learner.

Another advantage of a signing system is that the form of a large number of signs closely resemble features in the environment. The sign for "cup" for example, which looks somewhat like a cup, is made by placing a C-shaped hand on a flat palm. This relation results in a powerful prompt already in existence between the controlling variable (e.g., the object) and the form (the signed response "cup"). English has only a few of these iconic or onomatopoetic relations (e.g., "buzz," "hiss") and they are of little help in early language instruction.

A final, and more subtle, issue deals with the history of reinforcement and

*Sundberg, ML. *Developing a verbal repertoire using sign language and Skinner's analysis of verbal behavior.* Unpublished doctoral dissertation, Western Michigan University, 1980

punishment, related to vocal behavior, that has prevailed for many of the individuals with weak vocal skills. Such histories typically involved frequent failure to communicate vocally and considerable urging on the part of others to attempt communication. This is a situation that has a high probability of developing various negative emotional reactions and similarly a variety of inappropriate behaviors. Effective instruction in signing may, to some extent, avoid involvement in this undesired social and emotional repertoire.

The decision to use a sign system should be a careful one. The main problem is that the success of the program is largely dependent on developing a signing environment for the person (Sundberg, Milani, & Partington, 1977). That means other people must learn and use sign language with the student. Most schools, parents, and programs approach this as a difficult task, which indeed does involve some effort; however, the gains of successful communication and intellectual development are sufficiently important and reinforcing to justify the effort. Trainers, parents, siblings, and staff should be able to learn the signs at least as fast as students with defective verbal skills.

THE MAND REPERTOIRE

The mand (Skinner, 1957, p. 35) is a type of verbal relation in which the form of the response is controlled by motivational variables, or what Michael (1982a) calls establishing operations (EO) and establishing stimuli (S^E). The consequences for the mand are quite different than those for the other types of verbal relations in that the mand specifies what would function as reinforcement for the speaker (Table 10-1). For example, under conditions of food deprivation, a person may mand, "Food please," which specifies to the listener the reinforcing value of food. If the speaker receives food it will strengthen such behavior, if not, the hungry person will probably seek another listener or engage in non-verbal methods to obtain food.

Establishing operations and establishing stimuli are very important in controlling verbal behavior. Michael (1982a) defines the EO as "any change in the environment which alters the effectiveness of some object or event as [unconditioned] reinforcement and simultaneously alters the momentary frequency of the behavior that has been followed by that reinforcement" (pp. 150–151). While the EO is restricted to unconditioned reinforcement (e.g., food, water, heat), the S^E deals with conditioned reinforcement. Michael (1982a) defines the S^E as

> a stimulus change which establishes another stimulus change as conditioned reinforcement without altering the effectiveness of the relevant unconditioned reinforcement. If the behavior which has previously obtained such conditioned reinforcement now becomes strong we have an evocation relation like that produced by the establishing operation but where the effect depends upon an organism's individual history rather than the history of the species. (p. 152)

For example, the first stimulus change might be the receipt of a taped box, which might establish a knife as conditioned reinforcement, and behavior that has been reinforced in the past comes to strength, such as the mand, "Please give me a knife." The relevant source of control here involves conditioned reinforcement (obtaining the knife) rather than unconditioned reinforcement (obtaining food). For a typical speaker, a large amount of verbal behavior is controlled by the EO and S^E. Asking for help, directions, instructions, locations, and so on exemplify manding, as do all the "question words" (who, where, when, why, etc.).

Assessing the Mand Repertoire

The natural environment provides the best circumstances to assess the strength of verbal behavior, especially responses controlled by EO and S^E. The objective is to assess the person's tendency to emit a verbal response when the motivational variable is present. First, we will consider verbal behavior controlled by the EO. For example, when an individual is thirsty, does he ask for a drink? When he is hurt, does he ask for help? When he has a full bladder, does he ask for a restroom? When he is cold, does he ask for a coat? EOs occur throughout the day and many language-delayed individuals simply do not have the verbal skills to respond appropriately in these situations. Usually, the response emitted by these persons is non-verbal, non-existent, or some general response form (e.g., crying when any of the above mentioned EOs are in effect). A specific response is of course essential to the listener so that specific reinforcement can be delivered. A person who has learned to cry when EOs are present creates a situation in which a caretaker may find himself guessing as to which EO, if any, is controlling the crying behavior. The ability to emit a specific response for each EO is essential to effective communication and will greatly improve a person's probability of obtaining the desired reinforcement.

The natural environment is also useful in assessing a person's tendency to emit verbal behavior under the control of S^Es. For example, if you give a person who eats with a spoon both a plate and food without a spoon, does he ask for a spoon? Or does he cry, wtihdraw, or just look at you? There are naturally occurring S^Es in the environment and the assessment should be conducted across a variety of settings and time. Also, the S^E can be contrived or arranged for testing purposes. This type of mand assessment involves direct intervention by the tester, who sets up certain conditions in order to assess the existence and strength of the mand repertoire. The procedure begins with a chain of behaviors that the person being assessed can emit non-verbally. For example, putting dry Tang in a cup, adding water and drinking it. After the person has demonstrated the ability to complete the chain and name all the objects, remove one of the objects (e.g., the water) and ask the child to complete the chain. The question of interest is, will the person ask for the water? If so, give them the water and score the mand response correct. Another example of a contrived S^E is a chain of behaviors involv-

ing the assembly of a toy car, which includes the body, wheels and battery. After the person has demonstrated the ability to complete the chain and name the objects, remove one of the pieces. Does the person ask for the missing item?

Manding is often quite weak for a language-delayed person because the majority of traditional language instruction mainly involves receptive language and procedures for teaching the names of objects and actions. Thus, the verbal behavior that does exist is almost entirely under the control of non-verbal stimuli. When those non-verbal stimuli are removed, so is the verbal behavior. A person's response, "wheels," may be strong when the wheels are present but non-existent when the wheels would be reinforcing but are absent.

Questions are also mands, and it is important to assess the person's ability to ask questions under the control of the relevant EOs and S^Es. The natural environment constitutes the best circumstances for assessing a person's tendency to appropriately emit the responses: who, what, which, when, where, how, and why; when the relevant EOs and S^Es are present. Since the variable that controls the mand is less concrete than other controlling variables (e.g., objects), the mand assessment should be conducted across a variety of settings and people.

Interpreting the Mand Assessment

The objective of the mand assessment is to examine the degree to which verbal behavior is controlled by EOs and S^Es or motivational variables as opposed to non-verbal stimuli or verbal stimuli. If a person fails to mand in the natural environment or under contrived conditions, then procedures should be used to transfer control to those motivational variables (Guess et al., 1976; Hall, Sundberg, & Stafford, 1979; Halle, Baer, & Spradlin, 1981; Sundberg, Ray, Braam et al., 1980). If a person already mands then techniques for strengthening this repertoire should be implemented (Hart & Risley, 1978, 1980; Rogers-Warren & Warren, 1980; Sundberg, Ray, Braam et al., 1980).

THE TACT REPERTOIRE

The tact (Skinner, 1957, p. 82) is a type of verbal relation in which the form of the response is controlled by a prior non-verbal stimulus (e.g., an object, action, relation, property). The consequences for the tact usually involve some type of conditioned reinforcement (Table 10-1). In common sense terms, tacting can be thought of as the naming of items such as things, actions, and relations in the environment. Because non-verbal stimuli can effect any one, or more, of the senses and because there are a great number of non-verbal stimuli in the world, the tact repertoire can be quite large. Like the other aspects of the assessment, non-verbal stimuli should be arranged in a progression from simple to complex. The following assessment items proceed in such a manner, beginning with single component visual stimuli, then progressing to compound stimuli, and then to stimuli that affect the other sense modes.

Assessing the Tact Repertoire

Responses controlled by visual, non-verbal stimuli make up a large part of the tact repertoire, and the most basic of these stimuli are common objects in a person's environment. Such objects might be items such as books, shoes, paper, cups, or spoons. It is important that the person eventually learn the names of these items so that he can ask for them or talk about them in a conversation.

The objective of this assessment is to test the strength of the tact repertoire, that is, the degree to which non-verbal stimuli control verbal behavior. The evaluation should begin with common objects (nouns) and slowly progress to complex items. The common objects should consist of those items that are familiar to the student (i.e., those items that were noted in the pre-assessment observation). The person should be presented with the object (e.g., a toy car) while the tester says, "What's that?" Correct responses or approximations should be reinforced and the relevant data recorded.

Pictures can be used during the assessment of common objects but the tester should note that pictures are more difficult to identify than real objects. However, for complex items (e.g., circus, supermarket), pictures are often necessary and can vary from a silhouette to a color photograph.

The next level of complexity consists of visual actions (verbs). Since actions are transitory they may represent a more difficult type of stimulus control. The assessment should contain samples of actions ranging from simple movements (e.g., jumping) to more complex ones (e.g., adjusting). The student should be presented with the action (e.g., pushing) while the tester says, "What am I doing?" Correct responses or approximations should be reinforced and the relevant data recorded.

A combination of objects and actions (or multiple features of one object) should be assessed next. For example, a trial may consist of placing several objects on a table and asking the person, "What do you see?" The aim is to determine the extent to which the individual can emit multiple responses (e.g., "book and shoe," "blue hat," or, "girl jump").

Prepositions are even more complex than nouns and verbs because they represent relations such as those that exist between nouns, verbs, or nouns and verbs. A spoon and a table can easily be seen and identified, but what about the word "on"? It cannot be touched or picked up because it is a non-verbal spacial relation between two items. Thus, the stimuli controlling such responses as "in," "on," or "above" are more vague than those of "book," or "jump." As a result, they usually develop later in a typical child's repertoire. Combinations of nouns, verbs, and prepositions should also be tested. For example, place a red ball in a green cup, and a blue car on a white plate, and ask the person, "Where is the ———?"

Adjectives and adverbs represent properties or specific features of objects and actions. Many adjectives are relative in nature. A pencil might be long com-

pared to a toothpick, but that same pencil is short when compared to a baseball bat. Acquiring this relative discrimination can be difficult and usually takes considerable time to learn (Skinner, 1957, p. 107). Learning colors involves the acquisition of behavior which is controlled by a single feature of an object (its redness versus its squareness, texture, size, etc.). An object can have many different attributes; it can be clean, dry, fast and blue or it can be old, sick, and tired. Learning to name these properties of objects and actions often requires many training trials and these tacts do not develop until nouns and verbs are strong in a person's repertoire. Again, combinations should be presented to assess the person's ability to emit multiple responses.

It is also important to be able to name things or events that affect the other sensory systems. First, there can be many tacts under the control of non-verbal auditory stimuli. Hearing a phone ring and saying "phone," or hearing an airplane and saying, "plane," are examples. Visual stimuli are not always present when talking, so if one only learns to tact objects and actions visually (i.e., the object itself), then he may not react effectively when just the auditory stimulus is present (i.e., the noise produced by the object). To assess this repertoire the tester should block the visual system (e.g., turn out the lights, use a blindfold) and ask the person, "What do you hear?" Auditory tacts of common sounds (e.g., water running) are more easily acquired than those of less common sounds (e.g., a falling tree). Auditory discriminations, like visual discriminations, are behaviors that are learned by contact with the environment (shaping). An example of a strong auditory tact repertoire is that of a musician who can discriminate among slight tone differences.

The tactile sensory system also plays a role in language. Often a person must know the names of things without the benefit of seeing or hearing them. In a dark room, for example, a parent may ask a child to help her find the cat and to reach under the bed and to tell her if he feels it. Tactile stimuli can range from simple to complex. During the assessment, the tester should block the visual system (e.g., having the person reach into a box, turning off the lights) and ask the question, "What do you feel?" Examples of simple tactile items might be cups, balls, or books, while more difficult items might involve textures, shapes and mechanical objects. An example of a strong tactile repertoire is that that is obtained by a blind person who must depend heavily on tactile stimulation for survival. The blind person acquires these skills not because of any extra biological equipment but because of the environmental contingencies (e.g., a blind person quickly learns to feel his way around because it allows him to successfully get places without being hurt).

Language also occurs under the control of olfactory (smell) stimuli. These make up a much smaller part of a typical verbal repertoire. A person usually acquires the names for common smells such as cake, soap, or flowers. But it is important that the person eventually have names for other smells such as spoiled meat, gas or smoke. The olfactory tact repertoire can be assessed in the same

manner as the others (i.e., blocking off the other senses) and going from simple to complex. The tester should present the person with the stimulation and say, "What do you smell?" Correct responses or approximations should be reinforced and the relevant data recorded.

The last of the more common sensory systems to be assessed is the gustatory (taste) system. These tacts comprise only a small part of our language skills but are still important. Consumption of some poisons and harmful substances may be prevented if the taste can be identified. The four basic tastes that affect the human are sweet, sour, bitter, and salt. The combinations of these are almost endless. We can name many of the foods we eat by taste alone; some, we cannot identify in this way. Assessment of the gustatory tact repertoire should be conducted while the other senses are blocked. The tester should present the person with a specific taste and ask, "What does that taste like?" As always, appropriately consequate the response and record the data.

A final, and complex, aspect of the tact repertoire involves the ability to tact stimuli that arise within the body. Inside a person's skin there are sensory systems (e.g., mechanoreceptors, thermoreceptors, free nerve endings) that are affected by various environmental changes. For example, improper eating and dental care can result in aversive stimulation arising from the free nerve endings in the teeth and gums. This stimulation can control several different forms of non-verbal behavior (e.g., holding the jaw, clenching the teeth) and, for an advanced speaker, several forms of verbal behavior (e.g., "My tooth hurts," or, "I need a dentist"). The non-verbal behavior presents no special problem but the verbal behavior does.

How does a person learn to tact this private stimulation? The problem is that only the person with the toothache is affected by the stimulus, hence, how does the trainer know when to punish incorrect responses and reinforce correct ones? It is much easier to teach a person to tact objects that both the teacher and the student have access. For example, to teach a person to tact "book," a trainer has access to the presence or absence of the book. When the stimulation is private, differential shaping is impossible. Yet, typical children and mentally retarded persons do acquire verbal behavior that is controlled by private events (albeit the behavior is weak in many cases).

Skinner (1945, 1953, & 1957) has described four methods that the verbal community uses to teach people to tact private stimuli. These four are called public accompaniment, collateral responses, common properties, and response reduction. The methods will be described and offered as a tool for assessing the level of a person's verbal behavior under the control of private events.

Frequently a private event is accompanied by an observable public stimulus. For example, a painful internal stimulus may be accompanied by blood or bruises. Or, an observer may see a person fall down, bump into something, or poke themselves, all of which usually accompany painful stimuli. The verbal community uses these circumstances to teach people to correctly identify painful sensations.

A language assessment can make use of these public stimuli to determine if

an individual appropriately tacts private events. The natural environment constitutes the best conditions for assessing this repertoire. The tester should observe the person during typical activities and determine if accurate verbal behavior is emitted (e.g., "ouch") when the public stimulus is observed (e.g., pricking himself with a pin). If not, can the person emit the response with a prompt such as, "What's wrong?" If so, mark it as correct and record the occurrence of the prompt.

A person may also engage in specific collateral behavior (e.g., holding the stomach) when a private stimulus is present (e.g., stomachache). These collateral behaviors can also be used to teach and assess verbal behavior controlled by private stimulation. The tester should watch for these collateral behaviors and record the relevant verbal behavior. If no responses occur when, say, a person is pacing by a locked bathroom door (collateral behavior), the tester should prompt by asking, "What's wrong?" or, "What do you want?" If the response "bathroom" or something similar occurs it should be scored as correct and the prompt noted.

The final two methods, common properties and response reduction, are relevant for those persons who already have a fairly complex verbal repertoire. Common properties involve circumstances where private stimuli share some of the features of public stimuli. A sensation in the leg may be described as, "a mushy leg with tingles." Thus, metaphors may be used to describe private stimulation (exemplified by the responses often emitted by a patient who is asked by a physician to describe his pain). Some higher-functioning mentally retarded individuals may emit metaphors to describe these stimuli. If so, the responses should be recorded and appropriately consequated.

Response reduction consists of conditions in which a response is learned under public conditions and is later transferred to private conditions. For example, the verbal community may teach a student to tact his arm as "moving in circles." Along with the visual (public) stimuli there are kinesthetic (private) stimuli (i.e., the sensations from the muscles, tendons, and joints). A student may initially be able to say, "moving in circles," when both visual and kinesthetic stimuli are present, but eventually the response can come under the control of the kinesthetic stimuli alone, which are always present. For example, a student may look, see his arm rotating, and feel his muscles moving in a similar manner. Soon, he learns that he doesn't need to check his arm because whenever his muscles move in that manner his arms rotate, and eventually there is no need to check the public stimulus because the private ones are usually reliable. This is the process by which one learns to describe his bodily conditions in the absence of visual stimuli (e.g., in a dark room).

Assessing a person's ability to tact kinesthetic stimulation can be done by blindfolding the person and asking them to identify their body position or movement (e.g., sitting, standing, jumping, squatting, etc.). The limbs can be moved up, down, or rotated, and the tester should ask, "What are your arms doing?" Correct responses or approximations should be reinforced and the data recorded.

Accurate verbal behavior under the control of private stimulation represents a rather advanced form of communication. Many mentally retarded individuals suffer from the inability to tact bodily conditions. Such obvious suffering often encourages trainer to immediately begin a language program with procedures to teach this behavior. Frequently, the need to tact private events is given as the rational for a language program (e.g., "He needs to learn language so he can express his wants and needs."). However, tacting private events is complicated and a person should have a fair amount of simple mands and tacts before such training is heavily emphasized. The reader who is interested in the study of private events is encouraged to read the relevant sections in Skinner's writings.

Interpreting the Tact Assessment

Often, weaknesses in the tact repertoire are very obvious. A person may be able to tact objects and actions but not relations. The individual may be only able to emit single tacts under the control of visual stimuli. The results of the tact assessment can clearly suggest areas of intervention. This repertoire (except private events) has received a great deal of professional attention (unfortunately, at the expense of the other repertoires), and the literature contains several procedures and methods to teach this behavior (Engelmann & Osborn, 1969; Guess et al., 1976; Sundberg, Ray, Braam et al., 1980; Welch & Pear, 1980).

THE INTRAVERBAL REPERTOIRE

The intraverbal (Skinner, 1957, p. 71) is a type of verbal relation in which the form of the response is controlled by antecedent verbal stimuli that lack point-to-point correspondence to the verbal response (approximately the opposite of the duplic relation). The consequences for the intraverbal usually involve some form of conditioned reinforcement (Table 10-1). Word associations like a tendency to say, "cat," when someone says, "dog and ———," exemplifies intraverbal behavior. The ability to fill in the missing words, as in, "put on your shoes and ———," or, "you wake up in the ———," depends on the strength of one's intraverbal repertoire.

In the early stages of eductional training, a considerable amount of intraverbal behavior is developed in activities such as counting, reciting the alphabet, singing songs, listing the colors, or listing types of animals. Eventually educators work on the development of more complex intraverbal repertoires (e.g., conversations, mathematics, history, political science, psychology). This training usually results in fairly strong tendencies for certain verbal stimuli to evoke verbal responses other than echoic responses. Some are relatively trivial in their communicative effect, such as tendencies to say "pool" on hearing or seeing the word "swimming." These word associations are not trivial, however, in their role in

facilitating effective verbal behavior by a speaker or signer. The intraverbal repertoire is quite important for rapid and effective speaking and listening. For example, it is relatively important that verbal responses such as, "pool," "sun," "cooler," "towels," and "beach," be readily available when "swimming" is introduced into a conversation.

Assessing the Intraverbal Repertoire

The task for a tester is to determine the strength and complexity of the intraverbal repertoire. As with the other aspects of the assessment, a careful analysis of the stimulus control involved and the response unit emitted will provide a frame for the intraverbal assessment.

The most basic form of a verbal stimulus is probably one that contains a single feature or unit such as "bread and ———," and is somewhat relevant to the person being tested. The tester should begin by presenting the person with open-ended phrases and recording the topography of the person's responses. The point is to see if a word (e.g., eat) evokes a related responses (e.g., apple). Examples of single controlling variables might be ones such as asking the person to name a food, drink, animal, color, body part, or clothing item. These single stimuli should then be increased in complexity of content to include such items as naming a state, president, or automobile. A person's ability to emit an appropriate response is dependent on his verbal history, as well as the current contingencies. A careful sequencing of stimuli will provide the tester with some indication of the strength of that history.

Another indication of the strength of the intraverbal repertoire is the number of responses that the person is able to emit when presented a single verbal stimulus. For example, given the verbal stimuli, "Name some vegetables," how many can the person name? A strong history regarding talking about vegetables should allow one to easily emit several appropriate responses. Note that this part of the assessment is concerned with verbal behavior that is controlled by other verbal behavior, not by non-verbal stimuli, EOs or S^Es, thus the tester should be careful that such variables are not present during this aspect of the assessment.

The verbal stimuli that control verbal behavior in day-to-day conversations usually involve more than one component. For example, a teacher might ask a student, "Did you see the baseball game last night?" To respond correctly the student's behavior must be appropriately controlled by the three main variables in the questions (i.e., see versus go, baseball versus football, last night versus last week). An incorrect response may be emitted if one or more of the variables fail to control the student's response. An assessment of a person's ability to respond to multiple verbal stimuli should begin with two or three components on an easy topic (e.g., name some hot foods, cold drinks, or land animals) and progress to several components (e.g., "Name some hot foods that you eat in the morning," or, "What do you wear on your hands when it's cold?"). Then the

topics should be increased in complexity, for example, "What's seven plus seven?" or, "What's your home address?"

A final method to assess the strength of a person's intraverbal repertoire is to pick a topic and ask a series of questions (what, when, which, where, who, how, and why) about that topic. This can be done with easy topics (e.g., ice cream, chairs, paper) and more difficult topics (e.g., fish tanks, stores, machines). The tester should pick a topic, for example, "cars" and ask, "What is a car?" "Where do you see cars?" "When do you need a car?" or, "How do you drive a car?" This procedure can be conducted with any number of different topics and at varying levels of complexity. The entire verbal episodes should be recorded and responses appropriately consequated.

Interpreting the Intraverbal Assessment

The intraverbal repertoire, like the mand repertoire, is often quite weak for a language-delayed person. A person may have hundreds of tacts but only a few intraverbal responses. This situation is usually due to ineffective training as opposed to a lack of ability to acquire such behavior. The assessment will provide the language trainer with the strength of this repertoire and will suggest a starting point for training. For example, if the person can only make single responses to a few verbal stimuli, then training should begin at that level. However, if the person can easily respond to compound stimuli, then developing an intraverbal repertoire for specific topics would be appropriate.

The basic procedure for teaching intraverbal behavior involves the transfer of stimulus control from non-verbal or duplic sources to verbal stimuli (Braam, Sundberg, Ray, Braam, Stafford, Rueber, Thompson, Stang, & Jackson, 1979; Raymore & McLean, 1971, Partington & Bailey, 1980; Sundberg, 1980; Sundberg, Ray, Braam et al., 1980).

THE CODIC REPERTOIRE

The codic repertoire (Michael, 1982b) includes what Skinner (1957, pp. 65–71) calls "textual behavior" and "taking dictation," as well as some additional relations. Michael (1982b) defines the codic as a type of verbal behavior in which the

> response form is controlled by 1) a verbal stimulus, with which it 2) has point-to-point correspondence, but there is NO formal similarity between stimulus and response product. Formal similarity is Skinner's term for the case where the controlling stimulus and the response product are 1) in the same mode (both are visual, auditory, tactile, etc.) and 2) resemble each other in the physical sense of resemblance. *Textual* and *taking dictation* are special types of codic behavior. the textual relation is where the stimulus is visual (written or printed "words") and the response consists of speaking. In common sense terms textual behavior is reading aloud (without the implication that the reader "understands" what

is being read). Taking dictation is where the stimulus is auditory (the result of someone's vocal behavior) and the response consists of writing what is heard. (p. 1)

The consequences for codic behavior usually consist of some type of conditioned reinforcement (Table 10-1).

Michael's broadening of Skinner's categories allows us to include such verbal relations as reading written sign language (Stokoe, Casterline, & Croneberg, 1965), and reading Braille. In written sign language, the stimulus is visual (as in textual behavior) but the response is also visual (Skinner's definition restricts the use of textual to only those conditions in which the response is vocal). In Braille, the stimulus is tactile (as opposed to visual) but the response is still "reading aloud."

In some respects, codic behavior is like duplic behavior except the response does not produce a stimulus that matches the controlling stimulus. When you read aloud, you do not produce a written visual stimulus, but produce instead an auditory stimulus. This auditory stimulus matches the written one, but not in the strict use of "match" since they are in different sense modes. Still, saying "hat" as a result of seeing "hat" written on a chalkboard seems more of a match than saying "shoes" as a result of seeing "hat." Skinner used the term "point-to-point correspondence" to refer to this "lesser" type of matching, thus, in codic behavior the beginning of the stimulus, for example, is closely related to the beginning of the response, and the middle of the stimulus is closely related to the middle of the response.

Reading and writing are often viewed as complex behaviors that are beyond the reach of many mentally retarded individuals. Unfortunately, this position is maintained by psychologists and generative grammarians who have focused "their interest on the mental events assuming to underly [language]" (Salzinger, 1978, p. 277). As a result, many programs focus on developing cognitive "reading readiness skills" that are viewed as necessary before actual reading instruction can begin. Furthermore, when it does begin, it is usually of poor quality (Engelmann, 1975).

Sundberg (1980,* experiment 8) conducted a study to determine if two mentally retarded 4.5-year-old girls could acquire the basics of a textual repertoire. Six months prior to the start of the study, both girls had virtually no functional language. Earlier experiments in the Sundberg study described the procedure that was used to teach sign language to the girls. Both acquired a fairly large sign repertoire and some vocal behavior during the six months of training; they began the textual study with that signing history. During approximately one month of echoic-to-textual transfer training, the girls were able to produce the sounds for 15 to 20 fingerspelled letters and sight-read two to four words. Sundberg (1980) concludes the following.

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*Sundberg, M. *Developing a verbal repertoire using sign language and Skinner's analysis of verbal behavior*. Unpublished doctoral dissertation, Western Michigan University, 1980

Perhaps the most interesting aspect of these data were that such individuals could acquire basic letter discrimination in such a short period of time. This may simply point out that the procedure of transferring stimulus control from an echoic stimulus to a manual stimulus is an effective procedure for generating a type of textual behavior. The procedure makes no appeal to "cognitive levels" or "reading readiness," both of which would have predicted failure. (p. 102)

Assessing the Codic Repertoire

The aim of this assessment is to determine the degree to which an individual can produce sounds (or fingerspelled letters) that correspond to a presented written (or Braille) letter; produce words that correspond to presented written (or Braille) words; write a letter (fingerspell it, or punch it in Braille) that corresponds to a vocal phoneme; and write words (fingerspell them, or punch them in Braille) that correspond to vocal words (spelling).

There are two general approaches to teaching reading. They have been called the "phonetic approach" and the "whole word approach." In phonetic reading, the student learns specific sounds for each letter in a word and then blends them together. Since English is a non-phonetic language (i.e., we have 42 phonemes and only 26 letters) a fair amount of whole word reading is also necessary for effective reading. Whole word reading consists of emitting a response that is controlled by the configuration of the word rather than that of each individual phoneme.

Since whole-word reading is often easier, many mentally retarded individuals can acquire this faster than phonetic reading. Although, as mentioned previously, a combination of both repertoires will eventually be necessary. The reading assessment should consist of presenting the student with the letters and asking "What sound is that?" and presenting the student with a sample of whole words and asking "What word is that?" Correct responses or approximations should be reinforced and the data recorded.

Reading comprehension is often referred to as a person's ability to understand what he has read. This repertoire is usually assessed by further tests consisting of questions (e.g., "Whose ball was it?" or pictures (e.g., "What word is that? Touch the ———."). Reading then involves two repertoires: emitting the correct textual response, and being able to react effectively to the verbal stimuli in other ways. The effectiveness of the reaction depends on the strength of the student's mand, tact, and intraverbal repertoires and these should be assessed as well.

Writing can be assessed by using paper and pencil or a typewriter. There are two basic repertoires involved in writing: the ability to write the letters, and the ability to write a specific letter when requested to do so. Emphasis is, unfortunately, usually placed on "writing form" and often becomes aversive for the student. Thus, he may have little tendency to write because of this aversive history. The use of a typewriter may allow one to by-pass the requirement that a person be able to write letters before he can be taught how to take dictation (or self-dictation).

The assessment of these repertoires can consist of presenting the student with letters and words and ask them to write or type them. Correct responses or approximations should be reinforced and data recorded.

Interpreting the Codic Assessment

If a student cannot emit vocal responses under the control of written stimuli, then transfer of stimulus control procedures should be implemented (Braam, Daeshlein, & Braam, 1979; Corey & Shamow, 1972; Engelmann & Bruner, 1974; Sundberg, 1980*). It is suggested that a trainer begin a reading program using words that are relevant and, even better, are reinforcing to the student. That is, do not use commercial readers; design one that is directly relevant to the person you are teaching (Engelmann, 1975). If a person can emit textual responses but fails to respond correctly on tests of comprehension, then training on those repertoires should occur. Since spelling and reading involve different contingencies (Lee & Pegler, 1982; Skinner, 1957) specific training for spelling should occur (Dixon & Engelmann, 1979; Dixon, Engelmann, Meier, Stecly, & Wells, 1980).

CONCLUSIONS

Several issues concerning the nature of this assessment need to be addressed. First, the program is not a "cookbook" that contains step-by-step instructions as to what words or items to assess. Rather, the goal of this chapter is to facilitate a thorough and integrated understanding of the components of language so that a tester is in an informal and flexible position to individualize the assessment, and hence, develop the most beneficial language program for a student. The author has, in some cases, suggested certain words, but these are only given as examples since it is impossible to specify which words are relevant to a particular student. Each has a different history and interaction with his current environment. The reader has access to some of these data and should incorporate them into a particular student's assessment.

Second, the assessment is only a sample of a person's verbal repertoire. It is impossible to determine all the verbal relations in a given speaker's repertoire (unless it is extremely limited). Verbal responses occur under such a wide variety of circumstances that, even if a tester followed someone all day for several weeks, all possible responses probably would not occur. Traditional assessments recognize this problem and only a sample of words are tested. But most programs fail to distinguish between the five verbal repertoires, and results are usually lumped together into one or two categories, thus, providing less useful information to the language programmer.

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*Sundberg, M. *Developing a verbal repertoire using sign language and Skinner's analysis of verbal behavior*. Unpublished doctoral dissertation, Western Michigan University, 1980

Third, the best conditions for conducting an assessment probably consist of a blend of natural and contrived situations. Several types of verbal behavior may never occur under formal testing conditions, and observations in the student's natural environment will allow the tester to obtain these data. Contrived conditions are useful because a tester can evoke a large amount of behavior in a short period of time, and control the antecedents much better, which allows for more appropriate sequencing of the material.

Fourth, it is not necessary to conduct every phase of the assessment for each person. For example, if one fails to tact objects and actions, then he probably cannot tact properties or private events, or read. Once a general functioning level has been determined (i.e., the strength of each of the verbal repertoires) then training on the weak areas should begin. Note that the order of items presented in this assessment should not imply that receptive behavior occurs, for example, before mands, or that mands occur before tacts. Rather, that language is made up of all these different repertoires and training should be conducted on them simultaneously (although, perhaps at different intensities).

Finally, language assessment is an ongoing process. In a good environment, new behaviors are acquired every day and a trainer needs to know what to teach next. Table 10-2 contains an overview of the assessment program and can be used as a quick guide for the major parts of each repertoire.

Acknowledgments

I would like to acknowledge Dr. Jack Michael for his numerous contributions to this chapter and Dr. A. Charles Catania for reviewing the manuscript. Also, I thank my research associates David Ray, Steven Braam, Mark Stafford,

Table 10-2
Assessment Overview

Pre-Assessment Activities
Establish rapport
collect list of reinforcers
deliver reinforcers contingent on appropriate behavior
deliver reinforcers contingent on a requested response
Acquire baseline measures of inappropriate behavior and social behavior.
Make a list of items and actions that are relevant to person being tested. These words will eventually be used as the initial vocabulary for language training.
Assessment of Non-Verbal Behavior
The receptive repertoire
follows simple commands, instructions
follows compound commands, instructions
follows complex commands, instructions

continued

Table 10-2 (continued)

- Assessment of Verbal Behavior
  - The duplic repertoire
    - can echo:
      - phonemes
      - blends, words
      - phrases
    - can imitate:
      - gross movements
      - fine movements
  - The mand repertoire
    - In the natural environment can ask:
      - for unconditioned form of reinforcement (EO)
      - for the removal of unconditioned forms of punishment (EO)
      - for types of conditioned reinforcement (S^E)
      - appropriate questions
    - In a contrived situation can ask:
      - for missing items
      - appropriate questions
  - The tact repertoire
    - can visually tact:
      - objects
      - actions
      - combinations of actions or objects
      - relations
      - combinations of relations
      - properties
      - combinations of properties
      - private events
    - can auditorily tact same items listed above
    - can tactilely tact same items listed above
    - can tact gustatory stimuli
    - can tact olfactory stimuli
  - The intraverbal repertoire
    - can provide a single response given a single verbal stimulus
    - can provide a multiple response given a single verbal stimulus
    - can provide a single response given a multiple verbal stimulus
    - can provide a multiple response given a multiple verbal stimulus
    - can appropriately respond to a series of questions on a simple topic
    - can appropriately respond to a series of questions on a complex topic
  - The codic repertoire
    - can produce sounds (or fingerspelled letters) that correspond to presented written (or braille) letters
    - can produce words that correspond to presented written (or braille) words
    - can write a letter (fingerspell it, or punch it in braille) that corresponds to a vocal phoneme
    - can write words (fingerspell them, or punch them in braille) that correspond to vocal words

Thomas Rueber, Cassandra Braam, James Partington and Gerald Shook for their contributions. Support for writing this chapter was provided by the Regional Center of the East Bay, Oakland, California; Jose Maltos, Executive Director, and Mike Weber, Program Director.

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