TEACHING VERBAL BEHAVIOR TO THE DEVELOPMENTALLY DISABLED

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SECTION TWO --VERBAL ASSESSMENT

Future chapters will include:

CHAPTER ONE

Verbal behavior and the Developmentally Disabled

Verbal behavior is an important aspect of daily human life. Its absence or delay can cause serious problems for a developmentally disabled (DD) person. The inability to verbally interact with others may produce inappropriate social behaviors such as physical aggression, self-abuse, tantrums, or social withdrawal. These behaviors can become very difficult to change after years of reinforcement, especially if the inappropriate behaviors are not recognized as a form of verbal behavior. Most individuals who are identified as developmentally disabled have some type of verbal disorder. On one end of the continuum there are many people who have failed to acquire a single standard verbal response, or can only emit a few words--even after years of special training. On the other end of the continuum there are individuals who are very high functioning, yet lack several features of the strong and highly complicated verbal repertoire of the typical speaker in today's society.

This book provides an innovative and scientific approach to analyzing and ameliorating defective verbal behavior. The approach presented in the book is based on three major developments in verbal behavior instruction; the application of behavior modification techniques, the use of sign language and pointing systems, and most importantly, the use of the behavioral analysis of language presented by B. F. Skinner (1957).

The field of behavioral psychology, as initiated by Skinner (1938, 1953), has been responsible for many of the advances in work with the DD during the past 30 years. Thousands of research articles, contained in the many behavioral books and journals, clearly demonstrate the learning abilities of DD persons. This rather large body of research has already provided the practitioner with a number of methods and techniques to improve the lives of DD persons (e.g., Ayllon & Michael, 1959; Wolf, Risley, & Mees, 1964; Foxx & Azrin, 1973; Bailey & Iwata, 1974). Since speech and language constitute behavior these same techniques of behavior modification can be applied to teach DD people

several aspects of verbal behavior (e.g., Baer, Peterson, & Sherman, 1967; Guess, Sailor, & Baer, 1974; Lovaas, 1977; Risley & Wolf, 1963). Due to research such as this, and additional research from the field of speech pathology, many speech therapists have found such behavioral procedures as shaping, prompting, fading, and reinforcing successive approximations as essential to their profession. Many colleges now recommend that speech therapists take a course in behavior modification, and some departments even offer their own course.

The second major advance, and perhaps one of the most fascinating innovations, has been the use of sign language as a response form. It has been repeatedly demonstrated that individuals who have failed to communicate vocally can be taught to communicate gesturally (e.g., Bonvillian & Nelson, 1976; Carr, 1979; Fristoe & Lloyd, 1978, Sisson & Barrett, 1983; Sundberg, 1980). Many DD persons have acquired highly complicated sign repertoires in a relatively short period of time, and as a result show a rapid increase in their scores on traditional IQ assessments. In addition, most individuals who are appropriately taught to sign show clear improvements in articulation. Some eventually discard the signs and become successful speakers. Certainly many DD persons can benefit from early sign language intervention. Thus, procedures and techniques for the use of sign language as well as other non-vocal forms of communication (e.g., computer generated speech, Bliss, Rybus) will be discussed.

The third major development in teaching verbal behavior to DD persons is the use of Skinner's book Verbal Behavior (1957) as a guide for verbal assessment and programming. Skinner's analysis differs in many ways from traditional accounts of language. Basically, Skinner analyzes language as learned behavior controlled by environmental events such as discriminative stimuli (S^D), consequences, motivational variables (termed establishing operations (EOs) by Michael, 1982), interacting with each person's social history. Skinner rejects the common view that verbal behavior is controlled by a person's cognitive processing system, or mind. He also rejects the view that verbal behavior is inherited as proposed by Chomsky (1957). The advantage of Skinner's analysis is clear when verbal behavior fails to develop for a particular individual. If verbal behavior is a product of a cognitive processing system, then its failure to develop indicates defective internal mechanisms which are not accessible through any direct means. If verbal behavior is inherited, then its failure to develop indicates defective genes, a problem not easily corrected. If verbal behavior is learned and controlled by historical and environmental variables, then its failure to develop

indicates a defective environment, a situation which can be altered much easier than biological composition or a hypothesized cognitive processing system. (It is important to note that several verbal disorders, such as those which often result from Downs Syndrome, are related to inherited factors but in a different way from that discussed above.)

The program presented in this book is unique because it is based on the above three developments in behavioral research on verbal behavior. The most important is undoubtedly Skinner's (1957) analysis of verbal behavior. Skinner's analysis of language as behavior under the control of environmental events is quite different from many of the traditional views of language acquisition and language development found in the literature. Hence, the methods of language assessment and language training are also quite different from those typically used by professionals who work with persons who have language deficits. As a result, there has been a longstanding controversy over Skinner's work, however, mainly by critics who have lacked a technical understanding of Skinner's behaviorism (Chomsky's 1959 review of the book Verbal Behavior is a classic example). The current book will make use of the behavioral vernacular which consists of terms such as reinforcement, stimulus control, shaping, prompting, fading, and chaining, without attempting to define or explain them. Therefore, it is important that the reader have some background in basic behavior analysis (e.g., Martin & Paer, 1988; Whaley & Malott, 1971).

The Importance of verbal behavior

The ability to interact verbally with other members of society is a major component of a civilized culture. For most people, verbal behavior is an essential component of their daily activities. A competent speaker can ask questions, state opinions, identify personal needs and wants, discuss current as well as past and future events, make judgments, assessments and analyses, and with special training, read and write. Verbal behavior can also provide reinforecment in the form of entertainment such as that provided by reading a novel, telling jokes and stories, or listening to poems and songs. Instructions and information can also be powerful verbal reinforcers, especially when there is a great need. Most of the field of education is concerned with developing a student's verbal repertoire. Reading, writing, and arithmetic all are forms of verbal behavior, as are the essential features of many of the standard topics taught in high school such as English, history, government, literature, and science. As a competent adult it is easy to underestimate the power of

successful verbal interactions. What would life be like without verbal behavior? How would a person spend his or her time? What would be of interest to a person who did not understand many of the verbalizations of the members of his environment?

The answer to many of these questions can be obtained by spending time with individuals who have failed to acquire an effective verbal repertoire. Their lives are quite different. A typical child learns to talk, in part, because of the various basic motivational conditions that affect him as a living organism (e.g., hunger, thirst, warmth, sleep, aversive stimulation). Life becomes much easier for a child when he can successfully ask for food or water, or tell his mother he is sick. Appropriate verbal behavior often results in a quick remediation of these problems. A child without verbal behavior is unquestionably at a great loss, and many of the problems and discomforts are never understood, yet they continue to occur day after day. Therefore, it is reasonable to expect various inappropriate behaviors might be learned in place of the standard responses forms used by members of a child's immediate social environment. Screaming, for example, can function as verbal behavior under certain circumstances. A hungry Downs Syndrome child may learn to scream when food becomes a strong form of reinforcement. The scream may stop when food is delivered, thus eliminating an aversive stimulus for the caretakers. Next time the child is hungry a scream is likely to occur. Hence, screams become equivalent to the request "Give me food." When verbal behavior is defective an individual may acquire several odd forms of verbal behavior such as aggression, self-abuse, tantrums, or property destruction. After several years, and thousands of reinforced occurrences, these behaviors become quite a strong part of the individual's repertoire and difficult to eliminate.

Self-stimulation and social withdrawal are also common by-products of defective verbal skills. Verbal behavior, after all, allows a child to interact with others in the environment and usually brings a child a large amount of attention and specific reinforcement from parents. A child who continues to fail at attempts to communicate may soon give up due to the punishing effects of failure and withdraw to his "own world" of rocking, spinning, or other repetitive behaviors. These behaviors are successful for the child because he controls their reinforcement value (unlike his ability to control the social reinforcers of others in his environment). Body movement can be a strong reinforcer (like the runner who feels great after a long run), and when

other reinforcers are unavailable, what other options does the nonverbal individual have?

High rates of activity (i.e., hyperactive behavior) may also function as a form of verbal behavior for a child because the behavior may produce specific attention (e.g., chasing, grabbing) by parents or program staff. Thus, when attention is strong as a motivator, running around may be equivalent to the vocal response "Chase me." Hyperactivity, as a way of inducing adults and peers to behave, is then reinforced and this behavior is more likely to occur again in the future, especially when other means of getting attention are unavailable.

These by-products of defective verbal behavior are often treated simply as inappropriate behavior which must be reduced. Programs are frequently designed to eliminate a certain behavior (e.g., aggression) without consideration of its possible link to defective verbal behavior. A punishment procedure may reduce the aggressive behavior but it may not eliminate the true cause of the problem, hence we can expect the effects of punishment to be temporary, or other inappropriate behaviors may come to function as verbal behavior. Eliminating an undesired behavior that is linked to a defective verbal repertoire without considering the verbal behavior link is an example of the mistake of treating the symptom and not the cause.

Traditional approaches to language training

Speech therapy is often ineffective with individuals who have a long history of unsuccessful vocal verbal behavior. There are many training techniques used by speech therapists that are frequently successful with some individuals, but not with others; perhaps because the vocal cords consist of a highly complicated set of muscles which must move in a specific sequence to produce specific sounds. These muscles can not be physically manipulated to produce specific sounds so indirect methods of manipulation must be used. Unfortunately, the task is an extremely difficult one. A typical infant can produce these sounds effortlessly because of the high frequency of practice trials which occur during the babbling stages. This practice strengthens the vocal cords and makes echoic training possible. A nonverbal developmentally disabled (DD) child, teen, or adult will most likely have little control of his vocal muscles (except for screaming etc., which is like banging on the piano rather than playing it). In addition, these muscles are going to be extremely weak. (Try pronouncing some sounds from one of the Asian languages--even after years of practice a native English speaker can rarely hide his

pronunciation errors and accent from the native Asian speaker and vice versa).

The fine motor control necessary for speech is certainly more difficult then the fine motor control necessary for a concert performance of classical music on the piano or guitar. Such a performance is typically guided by additional prompts as a musical score and performed by an individual who can verbalize the various chords and movements necessary. The motivation is also substantially different in that a performer often receives pay or greatly enjoys performing. Thus, the task of the speech therapist may be like teaching a nonverbal person who has no knowledge of music, interest in performing, or cues to guide him, to perform "A prelude in E minor" on the piano.

Sign language: An important tool for speech and language therapists

An essential component of verbal behavior is the form of the response. If you cannot understand what a person is saying you cannot effectively respond to him as a listener. If a DD child wants to play with a certain missing toy or object but cannot say, or even approximate, the correct name of the item it is difficult for a parent or teacher to determine what the child wants. This can be a very frustrating situation which may quickly lead to inappropriate behavior (e.g., screaming, tantrumming, withdrawing). Much of the preliminary work in language instruction consists of establishing an acceptable response form. This often takes several months or even years.

The use of sign language may avoid many of the problems inherent in developing vocal response forms and can be acquired by many DD persons in an extremely short period of time. (Signed English rather than American Sign Language is preferred for syntax but not necessarily for lexicon, a point that will be discussed later.) There are at least four reasons why it is easier to teach a nonvocal person to communicate using sign language along with speech rather than speech alone. First, many DD persons can already emit motor responses under imitative control. For example, many nonvocal individuals will readily imitate several fine and gross motor movements when asked to do so. These responses, via the training procedures described later, can easily become functional signs. Second, when a person does not have a strong imitative or echoic repertoire, it is still easier to teach the person to imitate actions than to repeat sounds. The student's hands can be physically guided by the teacher to the appropriate position and then the physical prompts faded out. This procedure is impossible with the

vocal musculature since one cannot directly manipulate the parts of the vocal system to produce specific sounds. This advantage in teaching a visual response form makes the shaping process much quicker and it allows for clear and unambiguous models of the appropriate response form.

A third feature of a signing system is that many of the signed response forms closely resemble the controlling referent in the environment. The sign "ball" for example, is made by placing the curved finger tips of both hands together out in front of the body. The sign looks like a ball made with the hands. The iconic relation between referents and appropriate responses make sign acquisition easier than vocal response acquisition. Spoken English has only a few of these iconic, or onomatopoetic relations (e.g., "hum," "buzz"), and they are of little help in early language acquisition.

A final issue involves the student's history of reinforcement and punishment related to his attempts at vocal communication. Such histories typically involved frequent failure to communicate vocally and often there has been considerable urging on the part of others for that student to continue attempting to speak. Due to the high response effort of speaking and to the low probability of reinforcement, this situation can produce various negative emotional reactions (e.g., withdrawal, aggression). Effective instruction in signing may, to some extent, avoid involvement with this negative history, especially since the hands are a set of muscles which often have a very positive interactional history with the environment. For example, a person may be successful in picking up things, manipulating things, pushing things and so on. Along with the other factors previously mentioned, this history of success with the hands makes sign language a much easier system to teach.

Sign language programs that fail

Sign language programs are often tried and haven proven unsuccessful with many nonvocal DD persons. The point is frequently made that the DD person "only acquired a few signs and never used them spontaneously." A review of the sign language literature was recently published (Poulton and Algozzine, 1980), and the authors concluded:

> The literature specifically supports the notion that manual signing can facilitate word-object associations. It does not, however, support the contention that retarded persons attain a functional communication system based on manual signing or that manual signing

has become a primary mode of communication for nonverbal retarded individuals (p. 51).

It is true that many research studies and training programs for sign language do not generate a complete verbal repertoire. However, this result is due to the procedures and methods used rather than an inherent limitation in the use of signs, or in a DD person's ability to learn verbal behavior. The research cited by Poulton and Algozzine (1980) used training procedures which mainly taught object and action naming, and receptive identification. The literature review by Sisson and Barrett (1983) also shows that most programs and research projects failed to teach a complete repertoire. For example, when the student could produce a sign (unprompted) that corresponded to a specific object of action he was given credit for "knowing the meaning of the word." Most of the procedures described in the literature (e.g., Carr, Binkoff, Kologinsky & Eddy, 1978; Kanh, 1981; Kotkin, Simpson, & Desanto, 1978) did not include steps to, for example, teach a person to ask for something when it was absent or missing. Thus when a particular object was a strong form of reinforcement the student was expected to "use his memory to recall the sign." Failure to do so was attributed to the student's "defective cognitive system" rather than the inadequacies of the training program.

In a similar manner, procedures to teach a student to sign in response to the signs of others are not well incorporated into most programs. For example, a student should be able to sign "pencil" when someone signs "you write with a ...." Poulton and Algozzine (1980) also point out that students were not using their signs outside of the training sessions. There are several other reasons why sign language programs fail. The wrong signs are taught first (e.g., "more," "please," "toilet"), or the first signs "rhyme," that is, they look very similar, or the signs are of little functional use to the individual, or shaping and prompting procedure are inadequate and the student becomes prompt bound or emits chains of signs until the right one occurs. In addition, problems may result from not enough training trails, no use of the signs outside of the training session, or failing to develop a signing community for the student. However, it should be made clear that all of these serious problems relate to training procedures rather than to the limitations of a sign system or the individual.

Opposition to the use of sign language

Perhaps the most frequently voiced opposition to sign language is that it will deter attempts to speak. This opposition stems from the area of deaf education, and from the longstanding controversy between "oral" and "total communication" approaches to deaf education (Ling, Ling, and Pflaster, 1978; Moores, 1978, Sundberg and Fuqua 1980). With hearing individuals the situation is quite different, yet parallels are commonly drawn by those who oppose signs. If a sign language training program is conducted in the manner described in the upcoming chapters, vocal behavior will improve. The field testing of this program involved several hundred infants, children, and adults over the past 15 years. In virtually all cases, articulation improved.

Several other concerns have been raised by various persons over the years. The lack of a signing community in the student's home and natural environment has frequently been voiced; the decision as to which sign system to use; the preference for a symbol board; and the extra effort on the part of trainers to learn and use signs. These points will all be discussed in upcoming chapters.

How sign language can improve speech

Sign language improves speech for several reasons. First, trainers should always speak as they sign, and require and reinforce approximations to spoken words if possible (the specific procedures will be discussed in a later section). Once a nonvocal person begins to learn signs the reinforcement for successful communication is substantially increased. The person has an opportunity, often for the first time in his life, to experience the benefits of communication by being able to identify things, ask for reinforcers and get them, participate in verbal games and so on. This situation alters the motivation to attempt to speak, especially since many DD persons have a long history of being encouraged to speak, but never come in contact with the reinforcers available for successful verbal behavior. That is, a lot of training is often given on producing understandable response forms before those forms can become functional words. This training situation often leads to increased inappropriate behavior for obvious reasons. Sign language can, quite easily, solve this problem.

Many nonvocal people attempt to vocalize, but the sounds cannot be recognized as words, thus it is impossible for others to respond as an audience, or to correct articulation errors. Sign language allows the audience to understand what the person is asking for and what word he is trying to say. At this point, when the motivation is high

and the audience knows exactly what word the person is saying, a trainer has the best opportunity to shape vocal behavior. For example, if a functionally nonvocal person wants a ball but none are available and his words alone cannot produce a ball, however the sign "ball" can allow the trainer to obtain the correct desired item, and know what vocal word the "nonvocal" person is trying to say. At this point a trainer has the best chance of improving a vocal approximation by using echoic prompting procedures (described in a later section). This type of articulation training, which capitalizes on a person's immediate motivation in the natural environment, can be far more effective than formal articulation training done in the absence of a natural functional context.

Sign language also improves articulation because students learn to sequence motor movements which are similar to the sequencing of the vocal cords necessary for particular words. The particular sounds of a word can be prompted by emitting the sign along with the word. This is an effect which is often seen in the competent speaker who moves his hands and arms as he speaks, or to try to remember what he wants to say.

Once a person's vocal behavior improves to the point where several words are understandable it is often tempting to eliminate the signs. However, this situation can lead to the weakening or stagnation of vocal performance if the signs are not faded correctly. A student's articulation is often tested in the presence of specific objects or actions (considered unprompted) or by matching echoic stimuli. Under these circumstances speech may seem deceptively good, but in the absence of the object, action, or echoic prompt, as in asking for a missing object or answering a question, it is often very hard to understand a person's speech. The probability of failure and punishment is high, and a trainer may risk much of the work which has been responsible for a student's overall linguistic and behavioral improvement.

Sign language can allow a person to be much more articulate in the absence of specific objects or actions because many of the signs contain an iconic relation to the referent. That is, when a student wants a cup but there is not one present, the sign "cup" looks a little like the form of a cup and can prompt articulation in a manner similar to the actual object. This can result in more successful verbal interactions and less punishment for attempts to communicate. The point at which signs should be faded out will be discussed in a later section along with the use of fingerspelling as a bridge between signs and speech.

The use of symbol systems

Currently, the trend in speech pathology is to use symbols boards, picture boards, and more recently, computer generated speech, rather than signs. Mainly because it is easier for the listener to understanding what is being pointed to as opposed to what is being signed. The signs require special training on the part of the audience where as the boards and computers do not. Symbol and picture are effective, and can constitute a useful communication system for nonvocal persons (e.g., deVillers & Naughton, 1974; McNaughton, 1976). However its use should be restricted for only those individuals who do not have the manual dexterity for producing signs (e.g., those with cerebral palsy). There are several linguistic limitations inherent in a symbol or picture system. These can have a major impact on the acquisition of verbal behavior. Sisson and Barrett (1983), and Alpert (1980) have pointed out several of the disadvantages of pointing systems. Perhaps the most obvious problem is the necessity of depending on auxiliary equipment (i.e., a board) which may be difficult to have near by at all times (e.g., in a car, on the toilet, in bed). An important facilitating feature of speech is that it is free from any environmental support (Skinner, 1974) and can be carried with the speaker at all times (e.g., we don't need a bicycle, or a picture of a bicycle, to talk about a bicycle). Other problems concern the abstractness of symbols beyond simple objects. Verbs, prepositions, adjectives etc. are very difficult to portray clearly in symbol form, and even picture systems (e.g., Rebus) cannot clearly portray such forms of verbal behavior.

The major problem with pointing systems is that the form of the response (the actual muscle movements made by the student) is the same for each word. The symbols and pictures are different so the student must first scan the pictures, then point at the appropriate one. The pointing response is the same for each picture, hence no specific muscle movements get linked with a specific referent. Michael (1985) describes varying response topographies as a important feature of a vocal and sign system and calls this type of verbal behavior "topography based." The pointing responses, which lack a specific topography, are differentiated by the stimuli on the board, and are what Michael (1985) calls "stimulus selection" verbal behavior. Only topography based systems are free from environmental support. Since signs are conceptually equal to words, most of the training procedures developed in speech pathology and in behavior analysis can be easily used. A stimulus selection based form of verbal behavior requires quite different approaches to training.

A final point about symbol systems is the lack of any link between speech and pointing, thus vocal behavior rarely improves with such systems. As mentioned above, sign language improves speech for a number of reasons. Only the point about the facilitative effect of successful communication would hold for symbol systems. In their review of the literature on pointing systems Sisson and Barrett (1983) note that none of the studies mention vocal behavior or vocal improvement.

Summary

Verbal skills are essential for everyday living in today's world. A person without verbal behavior will suffer in many ways. Recent developments in verbal instruction may be of substantial help to individuals who have a history of failing to acquire verbal behavior, or those who might have potential for verbal problems. The developments include the use of behavior modification techniques, the use of sign language (or pointing systems), and the use of Skinner's (1957) analysis of verbal behavior.

CHAPTER TWO

A Behavioral Analysis of Language

The techniques of behavior modification have proven successful in teaching language to the developmentally disabled. Techniques such as differential reinforcement, shaping, prompting, and fading have become essential for effective language training, as have many of the other "tools" of behavior analysis (e.g., differential reinforcement, stimulus shaping, extinction, backward chaining). There is a large body of literature on the use of these methods. One of the first of these studies was Greenspoon's (1955) demonstration that social reinforcement affected adult verbal behavior in a manner similar to the way it affected nonverbal behavior. Greenspoon asked his subjects to simply say words randomly, then he differentially reinforced subjects' emission of all words which could be classified as plural nouns by responding "mmm-hmm." The results showed an increase in the frequency of plural nouns from approximately 11 responses per five minute interval to 22 responses per five minute interval. This study was soon followed by a large number of similar investigations on the role of consequences to verbal behavior and several reviews of these works appeared in the literature (Greenspoon, 1962, Holz & Azrin, 1966, Salzinger, 1959, 1969).

Several of the studies which followed Greenspoon's research involved infant, rather than adult, vocal behavior. Perhaps most influential was Rheingold, Gewirtz, and Ross (1959) who demonstrated that the rate of vocalizations for 3 month old infants increased with the application of adult social reinforcement (smiles and touches) and decreased during extinction. Other studies attempted to improve the verbal behavior of individuals in state institutions. Ayllon and Michael (1959) conducted an experiment which showed that "bizarre statements" by psychotic clients could be reduced by extinction and differential reinforcement of incompatible verbal behavior. Ayllon and Michael also examined several other applications of behavior modification to the institutionalized person and their research is considered by many as the first systematic application of behavior modification procedures to the problems of the

psychotic and developmentally disabled (Cooper, Heron, & Hewitt, 1987; Martin & Paer, 1982).

Following this early research on the effects of consequences on the nonverbal and verbal behavior of adults, infants, and the disabled, there was a rapid increase in research on the engineering of environment to modify behavior. During the 1960's and 1970's books (e.g., Ulrich, Statnick, & Mabry, 1966, 1970, 1974), journals (e.g., Journal of Applied Behavior Analysis), and organizations (e.g., APA division 25, The International Association for Behavior Analysis, Florida Association for Behavior Analysis, Northern California Association for Behavior Analysis) appeared and behavior modification began to flourish. A number of studies on teaching language to the DD began to appear in the literature. One of the first thematic lines of research was in the area of imitation training (Baer & Sherman, 1964; Lovaas, Berberich, Perloff, & Schaeffer, 1966; Metz, 1965; and Baer, Peterson & Sherman, 1965) which was important because successful imitation made the teaching of other forms of verbal behavior possible. These researchers developed several successful training procedures for teaching an individual to echo the sounds of a trainer. Another collection of early research examined the distinction between "expressive" and "receptive" behavior (Dickerson, Girardeau, & Spradlin, 1964; Guess, 1969; Mann & Baer, 1973). The data from these studies indicated that the expressive and the receptive repertoires were separate skills but training on one may facilitate training on the other. Other language research reported in the early behavioral literature concerned techniques for teaching the components of a verbal repertoire. For example, Guess, Sailor, Rutherford, and Baer (1968) taught the generative use of plural morphemes, Hart and Risley (1968) taught descriptive adjectives, Sailor and Taman (1972) taught prepositional usage, and Lutzker and Sherman (1974) taught generative sentences.

This collection of research demonstrated that behavioral methods could be very effective in teaching aspects of language to developmentally disabled individuals. The research showed that reinforcement was an extremely critical component of language instruction as was shaping, prompting, fading, etc. The behavioral literature now contained hundreds of studies on language training with many new techniques and training programs appearing. Hart and Risley (1975) introduced the incidental teaching model which emphasized situations in the natural environment to require an individual to respond, and to expand their responses to obtain reinforcers. Engelmann and Osborne (1969) developed the popular Distar Language Program, Kent (1974) published

her Language Acquisition Program (LAP), Guess, Sailor, and Baer (1976) came out with the Functional Speech and Language Training Program for the Severely Handicapped, and Lovaas's (1977) work on teaching language to the autistic was published as a training program. All of these programs were based on behavior modification procedures and provided a refreshing alternative to the traditional methods of teaching language to the developmentally disabled. These early research papers and training programs were followed by a number of additional studies on language covering a wide variety of populations and verbal disorders.

However, this research and the earlier mentioned adult conditioning research has not had the impact on the field that one might have predicted. The adult conditioning research died out in the early sixties because no major breakthroughs in the understanding of verbal behavior occurred (Holz & Azrin, 1966; Michael, 1984). Perhaps this was because these research projects were based on traditional theories of language acquisition and development. It is important to note that this line of research has been extremely productive and has made several contributions to language training. However, Michael (1984) points out that

> This work seems to have resulted most directly from the basic notions of operant conditioning and single-subject research methodology as described by Skinner (1938), from the broad implications of this work for all aspects of human behavior discussed in Science and Human Behavior (1953), from the development of basic-research methodology for the study of children's behavior, and a strong societal need to deal more effectively with the developmentally disabled, culturally disadvantaged, and other handicapped children.
>
> Interestingly, this extensive body of research makes almost no use of the concepts, terms, and analyses that appear in Skinner's (1957) Verbal Behavior (p. 368).

Several behavior analysts have attempted to explain why Skinner's work on verbal behavior has not been well incorporated into behavioral research. Michael (1984) attributes part of the problem to the complexity of the subject matter and the necessary prerequisites consisting of a complete understanding of radical behaviorism as well as the basic issues of linguistics. Michael (1984) also identifies the constraints of traditional behavioral methodology as a contributing factor to the paucity of verbal behavior research. Vargas (1982) blames college

distinguished between different types of stimulus control, and how stimulus control differed from establishing operations (e.g., deprivation, satiation, and aversive stimulation). He also examined the effects of consequences on verbal behavior and how units of verbal behavior occur.

The functional unit

Skinner identified the functional unit of verbal behavior as composed of four things: 1) discriminative stimuli, 2) establishing operations 3) behavior and 4) consequences. This formulation of language identifies the form of the response (what is said, signed, written, etc.) as controlled by its immediate antecedents, establishing operations, and consequences (as well as the individual's history with respect to those contingencies). For example, a complete account of a child's tendency to say "ball" must include a description of the stimuli (and the establishing operations if present) that preceded the response and the consequences that followed the response. An analysis of verbal behavior must include an analysis of all these controlling variables.

The definition of verbal behavior

What are the defining features of language? This question has plagued many theoreticians, and has been a matter of controversy for centuries. Most definitions of language consist of long lists of defining properties which are most often restricted to the form, or what's commonly called the structure of language. Catania (1986) reviewed several of the popular views of the defining features of language (e.g., Hockett, 1958, Miller, 1965, Osgood, 1980), and concluded that most authors failed to adequately identify the functional aspects of language.

From a behavioral point of view, verbal behavior involves a four-term contingency (discriminative stimulus, establishing operation, response, consequence). The functional verbal unit is operant behavior like other nonverbal operant behavior except in the way in which the behavior is reinforced. Nonverbal behavior has a direct effect on the environment and the consequences are direct. For example, a person can open a door by emitting the appropriate hand and arm movements which are directly reinforced by the open door. Or, the person may emit the verbal response "Open the door." in the presence of an appropriately trained audience and also be reinforced by an open door. However, in the latter case the reinforcement of an open door is mediated. Verbal behavior is a unique type of behavior because the reinforcement is mediated through

another person specifically trained to do so. (Skinner, 1957, P. 2; P. 224-225). This "indirect reinforcement" that characterizes verbal behavior and is responsible for many of the important features that distinguish verbal from nonverbal behavior. Catania (1986) has extended Skinner's original definition to include stimulus equivalency classes (Sidman, Rauzin, Lazar, Cunningham, Tailby, & Carrigan 1982; Sidman & Tailby, 1982), and Skinner's concept of autoclitic processes (Catania, 1980, 1986).

The term "verbal behavior"

Skinner used the term "verbal behavior" to distinguish between his functional approach to language and the traditional structural approach. In searching for a term Skinner (1957) wrote:

> Unfortunately, the term "speech" emphasizes vocal behavior and is only awkwardly applied to instances in which the mediating person is affected visually as in writing a note (or signing). "Language" is now satisfactorily remote from its original commitment to vocal behavior, but it has come to refer to the practices of a linguistic community rather than the behavior of any one member. The adjective "linguistic" suffers from the same disadvantage. The term "verbal behavior" has much to recommend it. Its etymological sanction is not too powerful, but it emphasizes the individual speaker and, whether recognized by the speaker or not, specifies behavior shaped and maintained by mediated consequences. It also has the advantage of being relatively unfamiliar in traditional modes of explanation (p. 2).

However, the term "verbal behavior" has acquired a new meaning, independent from Skinner's usage. In the field of speech pathology verbal behavior has come to be used synonymously with vocal behavior. Also, in traditional psychology "nonverbal communication" became popular and was contrasted to verbal behavior implying the latter was vocal communication and the former "nonvocal communication." Skinner's use of the term "verbal behavior" includes all forms of responses including speech, sign language, written words, gestures, symbols, morse code, semaphore flags, etc. The form of the response alone is not the most relevant feature of verbal behavior (as is emphasized by traditional linguistics), rather, the form in relation to its functional properties is what makes verbal behavior unique.

The speaker and the listener

One final distinction is necessary before a treatment of Skinner's classification system is possible. In traditional theories of language (Piaget, 1926, Brown, 1973) it is common to minimize the differences between the behavior of the speaker and the behavior of the listener. The essential feature of both is considered to be the "understanding of the meaning of words." The behavior of the speaker and the listener are then characterized as simply the expressive and receptive manifestation of this cognitive understanding. This type of explanation is, of course, totally unsatisfactory from a behavioral view. Skinner emphasizes that only a speaker can engage in verbal behavior and a listener mediates the reinforcement. In Verbal Behavior (1957) Skinner writes:

> the behavior of the listener in mediating the consequences of the behavior of the speaker is not necessarily verbal in any special sense. It cannot, in fact, be distinguished from behavior in general, and an adequate account of verbal behavior need cover only as much of the behavior of the listener as is needed to explain the behavior of the speaker. The behaviors of the speaker and the listener taken together compose what may be called a total verbal episode (p. 2).

This issue is very important because most language training programs currently available emphasize teaching receptive language before teaching expressive language (e.g., Kent, 1974). It is often argued that receptive precedes expressive as is often observed in a normal infant (Piaget, 1926). Hence, if an individual fails to learn verbal behavior it is very common to begin language intervention with receptive training. This skill does not, however replace the training needed for teaching expressive behavior. Receptive training does not teach a person to ask for or name things. It does not teach a person to engage in conversations. It does not teach a person to initiate language. It does not teach a person to read, write, and spell. However, receptive training does teach an individual to comply with the instructions of teachers and caregivers. However, it is the teachers and caregivers who reap the benefits of a strong receptive repertoire because the person can now do what he his told. But, the expressive repertoire allows a person access to the reinforcers available from affecting an audience and only by speaking (or signing) can an individual benefit most directly from a language repertoire. It is a major mistake, and waste of a person's time to neglect expressive behavior in favor of receptive training. Receptive behavior is important and should be trained, but not in place of expressive behavior, rather, it should be trained along with expressive behavior.

Frequently, the tendency to prefer receptive instruction over expressive is fostered by a student's lack of any vocal behavior which can be conditioned to occur as expressive words. It is often felt, due to theoretical positions that receptive and expressive language are similar, that some receptive training is better that nothing. However, here is a situation where sign language, computer generated speech, or a symbol system could allow for the immediate teaching of expressive language.

Summary

The techniques of behavior modification have proven very successful in teaching the developmentally disabled individual. During the past 30 years a large body of literature has developed on teaching language to the DD, but little of it has incorporated the very analysis which is the basis of behavior modification. Skinner's (1957) analysis of verbal behavior treats language as behavior controlled by discriminative stimuli, establishing operations, and consequences. This approach substantially differs from the traditional treatments of language, that is, the view that language is inherited or controlled by cognitive processes. Skinner's analysis provides a new and refreshing approach to the verbal problems of the developmentally disabled. The upcoming chapters contain a detailed treatment of Skinner's analysis, methods and procedures for language assessment, and training procedures based on that analysis.

CHAPTER THREE

The Elementary Verbal Operants

A behavioral analysis of language describes verbal behavior by its formal and functional properties (Catania, 1974; Skinner, 1957, chap. 2). The formal properties of verbal behavior consist of the physical description of specific response topographies, or classes of responses. It also includes the syntactical order of phrases, and adherence to grammatical conventions. The formal properties of verbal behavior also include intonation, pitch, emphasis, and so on. The functional properties of verbal behavior consist of the circumstances under which responses occur, more specifically, an analysis of the discriminative stimuli, establishing operations, and consequences which control a response, or class of responses.

Traditionally, the way of distinguishing between different types of verbal behavior is a formal distinction of the different classes of speaker behavior, the commonly known terms noun, verb, pronoun, adjective, adverb, conjunctive, preposition, and so on serve this function. This system is useful, but by itself incomplete as an account of the behavior of the speaker. Some important aspects of language are ignored by traditional linguistics, specifically, the controlling contingencies. The traditional system is based on a structural analysis of language which tends to emphasize the form as the unit of analysis, rather than the form and the function as a total unit. As a result of this structural approach, sentences are classified with little or no reference to the behavior of the speaker. The causes and variables which are responsible for the occurrences of verbal responses are the antecedents and consequences related to those responses. A functional analysis of language, which consists of an analysis of the contingencies which control the speaker's behavior, can identify verbal weakness, and be essential for developing intervention programs to ameliorate those deficits.

In Skinner's (1957) functional analysis of verbal behavior he distinguished between several different types of verbal responses. The distinction is based on an analysis of the discriminative stimuli, establishing operations, and

consequences of verbal behavior. This analysis has resulted in a classification system (see Tables 3-1 and 3-2) that allows for the identification of functionally different types of verbal behavior. Peterson (1978) explains that

> this classification is based on three factors: the musculature involved in the behavior--either those muscles used in speaking (or signing) or writing; the type of controlling variable--verbal stimulus, nonverbal stimulus, or establishing operation; and finally, the nature of the controlling relationship--point-to-point correspondence, formal similarity, or neither (p. 44).

Based on this system, Skinner (1957) identified and named seven types of relations between controlling variables and verbal responses (echoic, mand, tact, intraverbal, textual, taking dictation, and copying a text). Michael (1982b) has reorganized Skinner's verbal relations into five separate categories; duplic, mand, tact, intraverbal, and codic (Table 3-2). Michael introduced two new terms, the codic and duplic, but he points out that

> This addition...does not identify new or previously overlooked relations, but rather provides names for implied categories, and thus a place for several forms of verbal behavior that were not previously classifiable. The suggested change also makes the basic categories more nearly collectively exhaustive (p. 1).

THE DUPLIC REPERTOIRE

Skinner (1957, p. 52-65) provides an analysis of imitation and echoic behavior as a type of verbal behavior where the form of the response (what is said, signed, written, etc.) is controlled by (1) an immediately prior verbal stimulus that has (2) point-to-point correspondence (i.e., the form of the stimulus and the response product match) and (3) formal similarity (i.e., the form of the stimulus and response product are in the same sense mode, and physically resemble each other). The consequences for this type of verbal behavior usually consist of (4) conditioned reinforcement such as praise for correct imitation. For example, when a child's says "ball" after some one else says "ball" his behavior is controlled by (1) an immediately prior verbal stimulus, that (2) matches the response, and (3) is in the same sense mode. If the sense mode is auditory this relation is called <u>echoic,</u> if it is

visual, the relation is called imitation, or "mimetic" (Vargas, 1986), and if it involves the tactual senses and written material this relation is called copying a text, or "identigraphic" (Vargas 1986). Reinforcing and punishing consequences are what establish these stimuli as effective discriminative stimuli or s^D's. Hence, due to a positive history of reinforcement when the stimulus "ball" is presented there is an increased probability that the response "ball" will be emitted. If the response is reinforced there will be a higher probability that the response will occur the next time that same stimulus is presented.

Michael (1982b) has introduced the term duplic to identify verbal relations which meet the four criteria presented above. There are three major types of duplic behavior; echoic, imitation (mimetic), and copying a written text (identigraphic). These verbal repertoires are distinguished by the different sense modes involved and will be described independently.

The echoic relation

In the echoic relation the stimulus is auditory and the response is speaking (echoing what one hears). Saying "apple" after someone else says "apple" is an example of echoic behavior. In the process of acquiring a verbal repertoire a child learns to echo the sounds and words of others. The ability to duplicate these sounds is essential in learning to identify objects, actions and so on. "An echoic repertoire is established in the child through "educational" reinforcement because it is useful to the parents, educators, and others" (Skinner, 1957, p. 56). For example, if a child can say "bear" (or a reasonable approximation) after a parent says "bear" then it becomes possible to teach the child to say "bear" in the presence of the bear by using a transfer of stimulus control procedure. A parent might say "That's a bear, can you say bear?" If the child can respond "bear" then the parent says "Right, now what is that?" Eventually, the child will learn to say "bear" without an echoic prompt. This often occurs in only a few trials. This procedure continues to be useful in formal education where a teacher spends a good amount of time trying to teach new forms of verbal behavior to students. For example, the following might be a typical interaction between a teacher and a student: "What is the capital of California Johnny?" "I don't know." It is Sacramento, say 'Sacramento is the capital of California.'...Good, I'll ask you that question again tomorrow."

Echoic behavior continues to be useful for the adult speaker when, for example, he is asked a tough question which might require an immediate response as in "What are the three laws of motion?" "The three laws of motion are...." The echoic response "buys a little time" to formulate an appropriate answer. Echoic behavior may also help an adult in other ways, as when given a complicated set of directions to be followed it may be advantageous to repeat them echoically. A short order cook might repeat each order as it is given to him, as might a helmsman on a ship. This echoic behavior allows for more effective performance, and assures those giving the instructions that they have been received.

The echoic repertoire is very important for teaching language to the developmentally disabled. Many DD persons can echo sounds and words, but frequently the words do not occur "spontaneously" or under the desired type of control. The echoic repertoire can be very useful in teaching more advanced forms of language as well as improving articulation. The methods for assessment and training will be discussed in a later section of the book.

The imitation (mimetic) relation

The echoic repertoire involves the vocal musculature while the imitative repertoire involves the fine and gross motor movements of the skeletal muscles. The tendency to stand up when some one else stands up exemplifies gross motor imitation. The tendency to touch your ear when someone else touches their ear exemplifies fine motor imitation. In imitation the stimulus is visual (verses the auditory stimulus of the echoic) and the response is visual (verses the auditory response of the echoic).

Perhaps the most obvious linguistic use of the imitation repertoire is in facilitating the acquisition of sign language. Imitation is extremely important for the deaf population and plays a major role in sign language acquisition for a deaf child with deaf signing parents. The imitation repertoire has the same functional properties as the echoic repertoire, and can help a deaf child acquire the names of objects, actions, relations, and so on. Imitation is also critical for the teaching of sign language to the non-vocal DD person. Many individuals do not have a strong enough echoic repertoire for language instruction, and a lot of time is spent on teaching echoic behavior rather than more useful types of verbal behavior. A strong imitative repertoire can allow a trainer to begin immediately working on teaching more advanced forms of language by using sign language. This can allow a DD person to almost immediately

communicate with others without using inappropriate behavior as a response form.

Copying a text (Identigraphic)

> When both stimulus and response are written, they may be in similar dimensional systems, and all the chacteristics of echoic behavior, except they are now expressed in visual rather than auditory form (Skinner, 1957, p. 70).

The ability to copy written material from the blackboard exemplifies this repertoire. Being able to copy a text is obviously not as critical to early language acquisition as echoic or imitative behavior. However, this repertoire is essential when it comes time to teach an individual to write effectively.

Summary

The duplic repertoire is very useful in establishing other types of verbal behavior. Without this repertoire it is virtually impossible to conduct language instruction trials. However, it is not the case, as will be discussed later, that this repertoire must be at full strength before other types of training can occur.

THE TACT

Skinner (1957, p. 81-146) suggested the term "tact" as a descriptor for the type of verbal relation in which the form of the response is controlled by a prior nonverbal stimulus (Table 3-2). Saying "chair" <u>in the presence</u> of a chair is a tact. The consequences for the tact, like those for duplic behavior, usually involve some type conditioned reinforcement. In common sense terms the tact can be thought of as naming the physical features of the environment. The nonverbal environment consists of objects (nouns), actions (verbs), relations (prepositions), properties of objects and actions (adjectives and adverbs), and so on. There are a great number of nonverbal stimuli in the environment, and these nonverbal stimuli can affect any one of the different sensory systems, hence "the tact emerges as the most important of the verbal operants because of (this) unique control exerted by the prior stimulus" (Skinner, 1957 p. 82).

A typical child quickly learns the names of common items in his environment. Most traditional theories of language describe this behavior as "words and their

meanings of the bear are specified.

meanings" with the word acting as a referent to a particular object or action. "To say that a word refers to something often simply implies that the word is a response controlled by a prior nonverbal discriminative stimulus" (Peterson, 1978, p. 70). By identifying a tact as behavior controlled by a prior nonverbal stimulus we eliminate the cognitive variable as a causal mediator of the behavior. That is, object identification is controlled by the environment, not by a cognitive processing system. The behavioral analysis of this large class of behavior is much more useful than the cognitive analysis when language is absent or defective. It is much easier to manipulate variables in the environment than it is to manipulate hypothesized internal mechanisms.

Tact extensions

A novel situation may evoke an appropriate verbal response without any specific training. After learning to tact a small red ball as "ball" a child may successfully tact a large green ball as "ball." This is the familiar process of generalization. Skinner (1957) uses the term verbal "extensions" to describe generalizations that occur in verbal behavior. Extensions are an extremely important aspect of verbal behavior and of language training. Skinner (1957) begins his section on the extended tact by writing:

> a verbal repertoire is not like a passenger list on a ship or plane, in which one name corresponds to one person with no one emitted or named twice. Stimulus control is by no means so precise. If a response is reinforced upon a given occasion or class of occasions, any feature of that occasion or common to that class appears to gain some measure of control. A novel stimulus possessing one such feature may evoke a response. There are several ways in which a novel stimulus may resemble a stimulus previously present when a response was reinforced, and hence there are several types of what we might call "extended tacts" (p. 91).

The types of extensions described by Skinner are "based on the degree to which a novel stimulus shares relevant or irrelevant features with a stimulus that has already gained some measure of control over a particular verbal response" (Peterson, 1978, p. 93). For example, the stimulus chair may control the particular verbal response of "chair" by a young child; a novel (untrained) stimulus of a sofa has some of the relevant features of a chair and may, without any training, evoke the same response "chair." Tact extensions occur very frequently in the young language learner, and understanding them can help in determining the level of a

> newborn infant. For some time it is a function of various states of deprivation and aversive stimulation. But when crying is characteristically followed by parental attentions which are reinforcing, it may become verbal according to our definition. It has become a different behavioral unit because it is now under the control of different variables (p. 45).

For example, a hungry child may cry because of the aversive nature of food deprivation (unlearned behavior), but when crying is characteristically followed by receiving food crying becomes learned behavior, specifically a mand for food. The UEO is food deprivation, the response is crying, and the specific consequence is food. Crying may become a mand for other reinforcers as well (e.g., comfort, water, removal of aversives), but the intonations and intensities of the cries are usually different. Most parents can recognize these differences in crying as being related to a specific need (UEO).

The mand becomes a strong form of verbal behavior because of the specific reinforcement characteristic of this verbal relation, and the fact that this reinforcement often satisfies a strong deprivation condition or removes some aversive stimulus. A child very quickly learns how to ask for what he needs or wants. Asking for help, directions, instructions, and for information are mands, as are most other questions asked by children and adults. Manding often gets something, hence it is said that the mand directly benefits the speaker which is why it becomes such a strong form of behavior.

The role of the mand in language instruction

features of the original training stimulus. A child's tendency to call a horse "an apple" after seeing a horse eat an apple exemplifies this type of extension. An irrelevant feature of the stimulus configuration has gained control over the verbal response. Understanding this type of extension can be very helpful in analyzing the causes for verbal mistakes.

THE MAND

The mand (Skinner, 1957, p. 35-51) is a type of verbal relation where the form of the response is controlled by a motivational variable such as deprivation or aversive stimulation. Michael (1982a, 1982b, 1988) has termed these

Many of the inappropriate behaviors of DD clients are actually mands. Screaming, for example may occur when the value of a certain consequence is high (another client has a favorite toy) because that behavior has been followed by the receipt of a specific reinforcer in the past (the return of the toy). The scream then, is a mand for the toy. Aggression may also function as mands for "Give me that" "Leave me alone" "Get out of my way" and so on. If a person has several years of interacting with other people in this manner the behavior may become quite strong and difficult to change. However, it is clear that the most important step in changing the behavior is the development of another response topography (e.g., words, signs, or a symbol system) which can occur when the EO is strong.

Establishing operations are perhaps the most important independent variable in language training. In traditional terms it is often said that a child must be "motivated to learn" and without such motivation teaching is very difficult. This is quite true, but traditional programs have not had a clear handle on what constitutes motivation or how to control it. The concept of the establishing operation identifies motivation as an environmental variable which can be manipulated to evoke behavior. This allows for the use of several new techniques in language instruction such as contriving EO's and using strong natural EOs to train specific verbal responses. These procedures will be described in detail in the training section of the book.

The difference between mands and tacts

In common sense terms, the mand is asking for objects and actions while the tact is naming objects and actions. In technical terms, the mand is controlled by establishing operations and the tact is controlled by discriminative stimuli. In traditional linguistic terms, the mand is imperative and the tact is declarative. For example, asking for water when one is thirsty (UEO) is a mand, while identifying water in a picture (S^D) is a tact. A second difference between the mand and the tact is in the consequence. The mand is followed by specific reinforcement (the receipt of water) while the tact is followed by generalized conditioned reinforcement ("Right, that's water"). The form of the response is the same, "water," but the antecedents and consequences are different. Another difference between the mand and the tact concerns who benefits from the response. Peterson (1978) writes that

> In the case of the tact, the listener benefits because the speaker has provided some information about the environment, to which the listener might not have ready

> access. In the case of the mand, the speaker is the one who benefits because the listener provides the reinforcement indicated by the response.... It could be said that the tact tells the listener something about the environment...whereas, the mand tells (the listener) something about the condition of the speaker (p. 77).

There are a number of conceptual and empirical research papers on the distinction between the mand and the tact. A major conceptual paper on the distinction between establishing operations and stimulus control was written by Michael (1982a). In that paper Michael points out that an s^D evokes a response because

> It is a stimulus change which, (1) given the momentary effectiveness of some particular type of reinforcement (2) increases the frequency of some particular type of response (3) because that stimulus change has been correlated with an increase in the frequency with which that type of response has been followed by that type of reinforcement (p. 149).

An establishing operation evokes a response, not because of the presence of a stimulus in which a response has had a successful history of reinforcement, but rather because the value of a particular consequence is momentarily strong. For example, a smoker can ask for a match at any time and be successful in obtaining a match given an appropriate listener. However, the person only asks for a match when he is about to smoke a cigarette and discovers he is out of matches. At this point the "value" of matches becomes momentary strong and evokes the mand "Do you have any matches?" In other words, a smoker asks for matches only when he wants them, even though he could get them at any time (given the appropriate listener).

In mand training the objective is to bring verbal behavior under the control of the relevant establishing operations rather then the presence of a specific discriminative stimulus. Frequently, a student can tact an object when it is present (s^D control), but when it is absent, and its value is high (EO), he is not able to mand for it. Several research studies have been conducted which demonstrate this effect. Hall and Sundberg (1987) showed that verbal behavior which occurred under tact conditions did not automatically transfer to mand conditions. Stafford, Sundberg, and Braam (1988) demonstrated the differences between the consequences of the two relations showing that the specific reinforcement characteristic of the mand shapes behavior faster than the generalized

conditioned reinforcement characteristic of the tact. Lamarre and Holland (1984), and Carroll and Hesse (1987), also showed this separation in the two verbal repertoires.

The mand relation is a very powerful type of verbal behavior. It allows a speaker to directly control the behavior of a listener, while satisfying personal establishing operations by obtaining specific reinforcement. The mand verbal relation has traditionally been overlooked by most language theorists and, by and large is absent from most language training programs. The notion that a speaker can, and should be able to, mand for everything that he can tact is essential to language training. Also, an appropriate analysis of the mand may demonstrate the real cause for a large amount of inappropriate behavior engaged in by nonverbal persons.

THE INTRAVERBAL REPERTOIRE

The intraverbal (Skinner, 1957, p. 71-78) is a type of verbal relation where the form of the response is controlled by antecedent verbal stimuli that lack point-to-point correspondence to the response. That is, the stimulus and the response do not match. The consequences for the intraverbal usually involve some form of conditioned reinforcement (Table 3-2). Some examples of intraverbal behavior would be the tendency to respond "dog" when asked to name an animal, or "apple" when asked to name a fruit, or California when asked to name a state, or "Skinner" when asked about behavioral psychology.

Intraverbal behavior allows a speaker to talk about objects and events even though those objects and events are not physically present. In order to be an effective speaker a person must acquire this repertoire. For example, a speaker would be very limited if he could only identify animals when they were present and not when someone said "What animal lives in the water?" or "What animal has a long neck?" Traditional theories of language identify this as a cognitive memory task, often with many complicated prerequisites. Behaviorally it is called intraverbal behavior and can be easily taught if other types of verbal behavior (i.e., tacts) are strong in the student's repertoire.

In a child's early educational (preschool) training a considerable amount of intraverbal behavior is developed by encouraging the child to say the alphabet, to rote count, to

recite poems, to tell stories, to sing songs, to play word games, and so on. This type of daily verbal practice results in fairly strong tendencies for certain verbal stimuli to evoke certain verbal responses which do not copy or correspond to the form of the prior verbal behavior, but simply follow it. Some of these verbal relations may seem trivial in their communication effects (e.g., one, two, buckle my shoe, or Old McDonald had a farm), but these "word associations" are not trivial in their role in facilitating effective verbal behavior. A strong intraverbal repertoire is very important for rapid and effective speaking and listening. For example, it is relatively important that verbal responses such as "dog, cow, bird, and fish" be readily available when asked about animals, or "red, blue, green, and yellow" when asked about colors. Other verbal behavior which is usually intraverbal consists of completing sentences, classifying and defining words, giving speeches, and performing in a play.

In later aspects of education, the intraverbal repertoire becomes an extremely important aspect of daily instruction. Knowledge about history, political science, literature, science, sociology, psychology, etc., is usually intraverbal. When asked to describe the events that lead to the stock market crash in 1929, a student's answer would not be a mand or tact, nor should it be duplic or codic. The response be a verbal response with no point-to-point correspondence to the stimulus, hence intraverbal. Answers to essay exam questions are also intraverbal (unless copied from another paper--duplic behavior is called "cheating" in this situation) as are answers in an oral exam. For professionals in areas such as law, the intraverbal repertoire becomes very critical to a person's daily performance. In the court room a lawyer must be able to state the facts of a case, identify precedents, analyze situations, and draw conclusions all without many verbal or nonverbal prompts. A college instructor, clinical psychologist, historian, politician, etc., all depend on their intraverbal repertoires for a successful career.

Conversations between people usually involve intraverbal behavior in that one person asks a question (mand), or states a fact (tact, codic, or intraverbal), and another responds (intraverbal). The response is usually not duplic (if so, it would be a very limited conversation), rather the response usually has some thematic relation to the initial verbal stimulus. For example, the first speaker might ask "Who won the baseball game last night?" and the second speaker responds "The Giants won." This verbal interaction is not duplic because there is no point-to-point correspondence between the stimulus and the response; it is

not a tact because there are no relevant nonverbal stimuli; it is a mand for the first speaker, and an intraverbal for the second speaker.

The role of the intraverbal in language instruction

A large number of severely disabled individuals have strong receptive skills, and strong tact repertoires, but weak mand and intraverbal repertoires. The importance of the mand and intraverbal repertoires in every day verbal interactions is frequently underestimated in the language training programs currently available for DD persons. The emphasis in many programs is on extensive receptive training (a major mistake), and expressive training which mainly focuses on the development of the tact repertoire. When a DD person has virtually no vocal behavior it is very common to provide receptive language training rather than pursue a new response topography such as sign language. When sign language training is provided it often involves programs that focus primarily on receptive skills. Expressive training, when given, often consists of teaching the person to emit the sign for specific objects or actions (tact training). And when a typical verbal repertoire fails to develop the blame is placed on the handicapping condition of the DD person, or the inadequacies of sign language, or the failure of behavior modification techniques. Rarely is the problem identified as the failure to teach mands and intraverbals along with tacts. This is an example of the importance of behavioral theory as a guide to language assessment and training.

A common situation in work with the DD is that a person can emit hundreds of signs for objects and actions (tacts) but "rarely uses his signs" or fails to sign "spontaneously." A more careful analysis of each person's verbal repertoire may show that their verbal behavior is under the strong stimulus control of the nonverbal stimulus and a verbal prompt by the trainer (e.g., What is that?"). The response has not been effectively transferred to other types of control, specifically, to establishing operations, and to verbal stimuli which lack point-to-point correspondence to the response. For example, a person who has been trained the receptive skill of touching a bike when asked "Can you find the bike?" and to sign "bike" when shown a bike, or picture of a bike (tact), and asked "What is this?" will not necessarily be able to sign bike when one is a strong form of reinforcement but absent (mand), or when someone says "What has two wheels?" (intraverbal). These two verbal relations (mand and intraverbal) are under a type of control which is often not visible or identifiable to a

listener, hence are termed "spontaneous" as if there were no control, or as if some internal cognitive device was active. These views typically hinder progress in acquiring verbal behavior because they mask the appropriate environmental controlling variables.

Defective intraverbal behavior

When a difficult verbal situation requires a response it is common to see inappropriate behavior occur in the form of avoidance or escape responses (hiding behind mother reduces the aversive stimulus). There are many behavior problems which can be specifically linked to a weak intraverbal repertoire. Perhaps the most obvious is what is often identified as "shy" behavior. When a young child fails to respond to questions by an unfamiliar person they are often called shy of the person rather than "shy" of the verbal challenge. An intervention program which works on developing a stronger intraverbal repertoire often removes the "shyness condition." In work with the DD person with a weak intraverbal repertoire the avoidance behavior is often very obvious. The following two samples of intraverbal interactions will demonstrate this point. The first samples are from a verbal interaction with a 40 year old blind woman.

Teacher: "Ann, what do you like to drink?"
Ann: "You guess."
Teacher: "What do you like to drink Ann?"
Ann: "I went swimming."
Teacher: "Ann, what do you like to drink?"
Ann: "I dress myself."
Teacher: "Ann, what do you like to drink?"
Ann: "You know what happened?"
Teacher: "Ann, what do you like to drink?"
Ann: "I got a boy friend."
Teacher: "Ann, what do you like to drink?"
Ann: "Give me a kiss first."

This type of verbal interaction was typical for this individual. She had a very strong avoidance repertoire consisting of responses and topics which were most familiar to her. It was very difficult to get her to answer any specific question, even though she could always tact the item being talked about (e.g., a cup of coffee) by touching or smelling it. This avoidance behavior made instructional tasks very difficult with this person, hence people didn't ask her to do any of these "difficult" things. After a few months of intraverbal training (described in detail in a later section) the interactions looked like the following.

Teacher: "Ann, what do you like to drink?"
Ann: "Coffee."
Teacher: "Good Ann. What's something cold to drink?"
Ann: "Milk."
Teacher: "Right Ann. What's something you like to eat?"
Ann: "Hamburgers."

Conversations with Ann became much more productive, and it became possible to start teaching her academic material such as "Who was the first president?" and "Who invented the telephone?"

The intraverbal repertoire is frequently one of the weakest verbal operants for a DD person. However, it is clear that if a person has a strong tact repertoire (even if it is a small repertoire) that intraverbal behavior can be acquired by transfer of stimulus control procedures. The most common objection to teaching intraverbal behavior to the DD person is that "he won't understand it because it is beyond his cognitive level." This clearly reflects the traditional cognitive orientation to language training which dominates speech pathology, special education, and psychology, and as a result, has limited the verbal development and academic potential of a great many DD persons.

THE CODIC REPERTOIRE

The codic repertoire (Michael, 1982b) involves what Skinner (1957, pp. 65-71) called "textual behavior" and "taking dictation" as well as some additional relations. Recall that Michael's addition of duplic and codic "does not identify new or previously overlooked relations, but rather provides names for implied categories, and thus a place for several forms of verbal behavior not previously classifiable" (p. 1). The codic is defined by Michael 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 the stimulus and the response product. Formal similarity is Skinner's term for the case where the controlling stimulus and the response product are (1) in the same sense mode (both are visual, auditory, tactile, etc.) and (2) resemble each other in the physical sense of resemblance (p. 1).

The consequences for codic behavior usually involve some type of conditioned reinforcement (Table 3-2). A tendency to say "This side up" as a function of seeing a written verbal stimulus on the side of a box is an example of codic behavior (specifically, textual behavior). There is point-to-point correspondence between the stimulus and the response product, and no formal similarity because the stimulus is visual and the response product is reading out loud. There are several possible types of codic behavior and each will be described below.

Textual Behavior

In the textual relation a vocal response is controlled by a visual written stimulus (either cursive, printed, typed, or fingerspelled), and there is a match (point-to-point correspondence) between the stimulus and the response product. In common sense terms, this is reading out loud (without any implications that the reader "understands" what is being read). In some respects, textual behavior is like echoic behavior except the stimulus and the response product are in different sense modes, and do not physically resemble each other. The term "codic" suggests a type of translation between the stimulus and the response. Seeing the word "apple" written on the board and saying "apple" is a lot harder than simply copying the word "apple." Transforming a written word to a spoken word is obviously a difficult repertoire exemplified by the fact that so many "normal" people have strong mand, tact, and intraverbal repertoires, but are illiterate. A behavioral analysis of this repertoire and the use of behavioral procedures could greatly change this situation.

The relevance of textual behavior to language instruction

Textual behavior is often viewed as complex behavior that is beyond the reach of many DD persons. This position is maintained by psychologists and generative grammarians who have emphasized internal cognitive events as the critical features underlying reading. As a result, many programs focus on developing "cognitive reading readiness skills" that are viewed as necessary before actual reading instruction can begin. Furthermore, as Engelmann (1975) has pointed out, when reading instruction does finally begin it is usually a poor quality of instruction. From a behavioral orientation, textual behavior can be acquired by bringing a vocal response under the control of a written stimulus. Transfer of stimulus control procedures are very effective in teaching this repertoire. If a person can say "apple" when he sees an apple, it is often not to difficult to

transfer stimulus control from the object to the written stimulus; keep in mind that the response "apple" is always the same behavior. Reading comprehension, quite different from textual behavior, involves a person's receptive, tact, and intraverbal repertoires and will be discussed later.

Spelling

When asked to spell the word "pencil" a student's response "p-e-n-c-i-l" is a form of codic behavior where there is point-to-point correspondence between the stimulus and the response product and no formal similarity. The stimulus and the response product are in the same sense mode, but they do not physically resemble each other, thus, this type of verbal behavior is not formally similar. Spelling is a difficult repertoire to acquire due to the non-phonetic nature of the English language. Many of the words in our language are not spelled like they sound, hence it is very difficult to shape an appropriate discriminative repertoire.

Teaching the DD person to spell

A DD can learn to spell if he has a good echoic repertoire, can tact the nonverbal stimulus, and has some reinforcers available to him. The procedures consist of transferring stimulus control from echoic to codic by using prompts and fading the prompts. Teaching a person to spell in the written mode requires an additional repertoire discussed below. There have been several conceptual and empirical studies on spelling, as well as teaching programs. The conclusions and suggestions from these programs will be presented in the training section of the book.

Taking Dictation

Taking dictation is a form of verbal behavior where the stimulus is auditory and the response consists of writing what is heard. This is codic because there is a point-to-point correspondence between the stimulus and the response product, but they are in different sense modes and do not physically resemble each other. The ability to write "apple" upon hearing the verbal stimulus "apple" exemplifies this type of codic behavior. This repertoire is quite different from the other verbal repertoires discussed thus far (except copying a text) because writing, unlike speaking and signing, requires support from the external environment--a writing instrument. Also, and most important, writing involves a different response form. A writer must first learn to make each individual letter, then acquire the appropriate codic repertoire for transcribing spoken words

into written words. This repertoire is commonly known as spelling, and the non-phonetic nature of the English language makes this a difficult repertoire to acquire.

Teaching the DD person to take dictation

Writing the words that one hears (or says overtly or covertly) is a complicated form of verbal behavior. Many DD persons have difficulty getting past the first requirement of being able to produce the response forms. This obstacle can be overcome by the use of typewriters and computers, and in the process, greatly reduce the aversiveness typically associated with learning to write acceptable letters (individuals who are left handed can relate to this point). If the response form problems can be removed, then instructional time can be spent on the more important aspects of teaching a person to spell correctly, and learn to correctly follow the rules of composition and grammar.

Braille

Reading braille is also codic behavior where the stimulus is tactual and the response product is auditory. There is a point-to-point correspondence between the stimulus and the response product, and there is no formal similarity (thus, textual behavior). Writing braille is also codic behavior, specifically taking dictation, and analogous to standard writing except the response product is tactual rather than visual (one feels the written word rather than sees it). Procedures for teaching this repertoire differ only in that the stimuli (in textual behavior) and the response form (in taking dictation) involve a sequence of bumps on a page. Hence, differential training on bump discrimination and formation rather than letter discrimination and formation is given.

Fingerspelling

The alphabet can be produced by a series of hand movements known as fingerspelling which is commonly used, along with sign language, by members of the deaf community. Fingerspelling is a form of codic behavior. When the stimulus is fingerspelled and the response is spoken this is textual behavior. If the stimulus is spoken and the response is fingerspelled this is taking dictation. Fingerspelling can also be duplic if one person imitates the fingerspelling of another.

Written sign language

A written form of the American Sign Language was developed by Stokoe, Casterline, & Croneberg (1965). In their system cheremes, analogous to phonemes, are used as the basic elements to write signs. Cheremes are notations for hand configurations, locations, movement, and orientation. These notations can be read in manner similar to reading written words where each part of the verbal stimulus controls part of the verbal response form. For example the stimulus B>'B<* can be read as the sign for "book." Written sign language meets all of the requirements for codic behavior. The stimulus (B>'B<* and the response product (of the sign "book") have point-to-point correspondence and are in the same response mode but the stimulus and the response product do not physically resemble each other.

Summary

Skinner's elementary verbal operants are the result of his analysis of the environmental contingencies responsible for the behavior of the speaker. This analysis provides a new framework for language assessment and training. That is, in addition to measuring the physical properties of the response form such as mean length of utterances, syntax, pitch, intonation, etc., a complete account of verbal behavior must also include an analysis of the behavior under duplic, mand, tact, intraverbal and codic conditions.

CHAPTER FOUR

Assessing Verbal Behavior

There are a number of traditional assessment programs available (e.g., Illinois Test of Psycholinguistic Abilities, Peabody Picture Vocabulary Test, Preschool Language Scale, Test for Auditory Comprehension of Language), but these tests are based on cognitive theories of language development. As discussed in chapter 2, these orientations to verbal behavior emphasize the grammatical and syntactical structure of language, and the cognitive understanding and production of words and sentences. This focus tends to neglect, or underestimate, the functional control of environmental variables. This tendency to place the causes of language development inside a person's cognitive world makes it very difficult to determine exactly why a person fails to learn to communicate, and how to best improve their verbal behavior.

In traditional language assessments a verbal repertoire is typically divided into expressive and receptive sections. These two repertoires are then tested by presenting an increasingly complex set of expressive and receptive tasks. The tests emphasize the formal properties of language (e.g., articulation, sentence structure, use of appropriate grammatical rules) and the mean length of utterances (MLU) in both the comprehension (receptive) and production (expressive) of words and sentences. The goal of these traditional language assessments is to identify a DD person's linguistic functioning level which is obtained by a comparison of a person's score to the language abilities of normal children. The scores on the two parts are converted to obtain a chronological functioning level and are either summated (e.g., language age of 2.1 years), or presented individually (e.g., receptive functioning level of 3.2 years and an expressive functioning level of 2.4 years). Sometimes a high score on the receptive test may offset a low score on the expressive test as if these two repertoires were equivalent in some manner.

Rarely do these traditional assessments provide a teacher or parent with a specific starting point for

improving the language repertoire, or with an explanation of the causes of the defective verbal behavior. It is assumed that if an age level can be identified then the teacher can provide material and training that would be appropriate for that age. As a result of these standardized tests, many language assessments are as useless to parents and teachers as traditional psychological tests which only give IQ scores.

A behavioral assessment of the verbal repertoires

A behavioral analysis of verbal behavior can be more productive by identifying the functional, as well as the structural, parts of a language repertoire. Also, the variables which are responsible for defective verbal development can often be identified by a functional analysis, and as a result, a more effective individualized intervention program can be developed for a person. A cognitive approach to language often masks the true causes of defective language by the tendency to attribute most verbal deficits to defective cognitive processing systems as in aphasia, dyslexia, apraxia, memory deficits, processing disorders, attention deficits, etc.

Skinner's (1957) analysis of verbal behavior provides quite a different framework and orientation to language assessment. His functional analysis of verbal behavior rejects the traditional framework of expressive and receptive language as a totally inadequate formulation of verbal behavior. Receptive behavior is considered nonverbal behavior on the part of a listener and expressive behavior consists of five quite separate verbal repertoires; duplic, mand, tact, intraverbal, and codic (complexities such as autoclitic and creative verbal behavior are also assessed). Thus, an adequate language assessment must determine the strength of each of these verbal repertoires, in addition to the traditional measures of receptive behavior, response form, and sentence structure.

The first published program that used Skinner's analysis of verbal behavior for language assessment was the Parsons Language Sample (Spradlin, 1963). Spradlin was a pioneer in the use of Skinner's analysis of verbal behavior with the DD and has inspired a number of research projects and programs since the 1960's. One of which was a language assessment program by the current author (Sundberg, 1983), another is the following program.

Preliminary Assessment Activities

Establish rapport

Prior to the formal assessment of a DD person's verbal skills it is important to establish rapport with the person. This, unfortunately, is rarely done (testers often have 100s of clients). Frequently, a DD person's language is assessed by an unknown person (a speech therapist assigned to do the mandatory three-year evaluations), who takes the child out of his daily environment (to a testing room), and presents the person with novel verbal and nonverbal stimuli, under extinction conditions (i.e., correct answers are not reinforced in most standardized testing). The odds are certainly against the DD person, and this seems like a major mistake since these results are critical for teachers and parents who must provide daily language intervention for the person. The purpose of a language assessment is to determine what aspects of a person's verbal behavior are weak and where to begin language instruction, hence it is extremely important that an assessment be appropriate, and be administered very carefully.

Establishing rapport with a client is often very easy and knowledge about the verbal repertoire can begin with the first interaction. However, a formal test should not be administered because the tester most likely does not have enough stimulus control over the client's verbal behavior and any test will reflect this brief history. Stimulus control develops as a function of the reinforcement of a person's behavior. One must know what functions as reinforcement for a person first, then provide some of that reinforcement for appropriate responses of any sort. Simply playing and having fun with a person will help establish stimulus control and establish the tester, and his behavior, as forms of conditioned reinforcement. By spending this time with a person the assessment will be much easier and clearly more valid. The failure to develop this control will result in an assessment of a very atypical sample of the DD person's verbal behavior. With the stakes so high, this seems like a major injustice.

Inappropriate verbal and nonverbal behaviors

Inappropriate behavior such as aggression, screaming, crying, and self-abuse may be functioning as verbal behavior for a DD person. It will be useful to carefully analyze the antecedents and consequences of these behaviors as well as other inappropriate behaviors. Most DD persons have some

form of communication which has been shaped over the years and understanding the current forms of verbal behavior can be useful in developing a language intervention program.

The testing environment

There are two general circumstances under which a language assessment should be conducted--the person's natural environment, and in a formal trial-by-trial examination. A person's natural environment (classroom, home) where he comfortably interacts with familiar things and people provides the best circumstances to assess several aspects of the verbal repertoire, especially the mand repertoire. It is important to observe verbal behavior under these circumstances, especially since an assessment is only a sample of a person's verbal repertoire. The formal testing is necessary for presenting increasing more complex stimuli and recording latencies and specific responses. These procedures will be described in more detail in the upcoming sections.

Data Collection

It is extremely important to collect the right data on verbal interactions. Knowledge about the response topography, stimulus control, establishing operations, and consequences is essential for determining what type of verbal behavior has been emitted and at what strength. Antecedent stimuli can be verbal (with and without point-to-point correspondence and formal similarity), or nonverbal; establishing operations can be conditioned or unconditioned; consequences can also be conditioned or unconditioned; responses can be absent, wrong, approximations, or correct, they can be immediate or latent, weak or strong, etc. Appendix 1 contains data sheets and sample items which can be used for a language assessment based on these variables.

Materials

Different materials are required for each verbal operant (except echoic and imitation where the stimuli consist of the tester's behavior). The tact requires a collection of nonverbal stimuli (e.g., objects and pictures), the mand requires specific reinforcers and materials to contrive establishing operations (described later), the intraverbal requires a series of verbal questions, definitions, classifications, fill in the blank items, etc., and the codic requires paper and pencil. Reading each assessment section and reviewing the test forms can help in gathering the materials.

Reinforcers

Traditional language assessments and psychological tests are conducted under extinction conditions and performance usually reflects these contingencies (Breuning & Davis, 1981; Young, Bradley-Johnson, & Johnson, 1982). The current assessment program encourages the use of strong reinforcers for correct responses in order to determine more accurately the strength of the person's verbal repertoires. Therefore, the tester should find out what reinforcers are effective for an individual (usually discovered by talking to those who know the person), and acquire them prior to beginning the formal testing procedures.

Summary

Language assessments which focus on age equivalent scores, and expressive/receptive distinctions, are less useful to parents and teachers who are often at a loss as to what to do with a particular individual. The purpose of a verbal assessment should be to determine what aspects of a person's verbal repertoire are weak and where to begin intervention. The tester should establish rapport (stimulus control) with the student, and the assessment should be conducted for all the verbal operants in both formal and natural situations, with correct responses reinforced.

CHAPTER FIVE

Assessing the Receptive and Duplic Repertoires

Receptive behavior consists of appropriately reacting to the instructions, directions, commands, etc. (mands) of others. This repertoire has been termed "mand compliance" by Michael and his colleagues (Michael, Hesse, & Whitley, 1983). The ability to touch a c[illegible] (response) on command (stimulus) exemplifies simple receptive behavior, while the ability to pick up a small red triangle and place it in a large square box exemplifies more complicated receptive behavior. The stimuli presented in the first trial are simpler and the response is simpler, as the stimuli become more complicated the response may be a more difficult to emit. The general purpose of this part of the assessment is to determine at what point stimuli become too complicated to evoke a correct response from the student. These data should help the teachers and parents know where to begin instruction on this repertoire.

The receptive assessment forms (Appendix 1) begin with very simple verbal stimuli and progress to more complicated receptive tasks. The purpose of this assessment is not to determine the total number of receptive responses in the student's repertoire, rather it is to determine at what point the stimuli become too complicated to evoke appropriate behavior. Thus, the questions on the form are on a continuum from simple to complex. There are blank spaces for the tester to write in items which may be relevant to the individual student. This is possible because this assessment is not standardized, and the form of a particular response is not as relevant as the whole three-term functional relation.

The assessment begins with simple tasks such as "Stand up." The tester asks the student to stand up and reinforces a correct response, or approximation, with praise and other reinforcers if necessary. (Note that the tester does not stand up or the student's response could be part imitation and part receptive, or "multiply controlled." This is a procedure which may be necessary for some clients and is included in an upcoming section.) The student's response should be recorded on the assessment form as correct (+),

incorrect (-), an approximation (/), or no response (0). The trials may be repeated as many time as necessary as long as these data are kept. (If it takes several trials to get a student to emit an approximation or correct response, but he finally does so, then intervention may involve the reduction of trials necessary for correct behavior.) The latency between the stimulus and the response can be useful data, especially if one is interested in clearly demonstrating the effects of the training procedures. Latency can be recorded by using a stop watch and determining how long it takes for a student to respond to a tester's instruction. Latency is a very sensitive measure (Hesse, Michael, Whitley, Schlinger, Nuzzo, and Sundberg, 1982) which can show changes in a repertoire which otherwise go unnoticed.

Some individuals may not respond to instructions to move, but they might respond to other commands such as "Look at me," "Touch your nose," and so on. These items are listed on the form. If a person does not respond correctly to many of the items on the form, but can respond to a other receptive tasks, the tester should present the appropriate stimulus and record the response in the blank spaces on the form.

The items on the receptive assessment increase in complexity in terms of the number of stimulus components in the question and the content of the question. The first items contain instructions with only one or two relevant stimuli (e.g., "Look at me," "Stand"), while later items have two and three components (e.g., "Touch your nose," Give me the shoe"), and so on. The content of the questions also can go from simple topics (e.g., body parts, objects in the immediate environment) to more difficult concepts such as colors, shapes, position, and attributes, to even more difficult items such as "Show me who lead the American revolution," or, "Give me a 9/16 bit." However, often there is no need to go into complicated questions because much of complex receptive behavior depends on expressive behavior.

Analyzing the receptive repertoire

An endless list of questions could be asked, but the objective of the assessment is to determine the strengths and weaknesses of the receptive repertoire so an appropriate intervention program can be developed. If a person easily responds (mostly correct responses with short latencies) to the receptive questions then specific intervention on this repertoire probably in not necessary. The major part of the intervention for someone with this level of receptive

behavior will most likely be in the expressive area (i.e., mands, tacts, intraverbals, and codics). It is important, however for a person to continue to develop his receptive repertoire, but it should not be viewed as a prerequisite to verbal behavior. Instead, both repertoires should be developed simultaneously. Receptive trials can easily be interspersed with expressive trials. Such interspersal is desirable because it often occurs in normal discourse and makes conversation smoother by keeping the reinforcement rate high.

If a student incorrectly responds to any of the questions on the receptive assessment then a rigorous program is necessary. The training program for this level of individual requires a skillful trainer who has a good history of behavior modification training. The procedures require careful shaping of successive approximations to target responses by using prompting, fading, reinforcement, and extinction techniques. A complete data collection system is essential because progress will most likely be slow, but the correct measurement will show the positive (and negative) effects of the daily teaching procedures and methods of interacting with the student. These procedures will be described in Chapter 11 "Developing a beginning verbal repertoire."

A student who can correctly respond to a few (3-5) of the receptive instructions can learn more by using behavior modification techniques. The student may also be able to emit a few expressive responses, and the intervention program would be similar to the one described above but progress should be faster. If a student can correctly respond to several, but not all of the questions, he probably has some verbal behavior and this should be the emphasis of the intervention program, especially since it is verbal behavior which benefits the student and helps him obtain reinforcers. It is the improvement of verbal behavior that has the greatest effect on the reduction of inappropriate behavior because the negative behavior is often controlled by the same establishing operations and reinforcers that control verbal behavior. For example, self-injurious behavior (SIB) may occur when the value of a specific reinforcer is strong (e.g., attention), and the student has a history of obtaining it under those circumstances. This behavior would be more correctly classified as a mand, therefore, teaching a more appropriate mand for attention may be the best way to eliminate this type of SIB. As with the lower scoring individuals, staff who are skilled in behavior modification techniques, data recording, sign language, and Skinner's analysis of verbal

behavior will be more successful in teaching these behaviors.

THE DUPLIC REPERTOIRE

The ability to duplicate (thus the word "duplic") the words or signs of others is essential to verbal instruction. The stronger this repertoire the faster the student acquires more complicated forms of verbal behavior (except under circumstances where the DD person is echolalic). However, if a person has a weak duplic repertoire it is still possible to teach him mands, tacts, and intraverbals. As a result of this training, and the procedures later suggested for teaching duplic behavior, the number of new duplic responses can be substantially increased. The initial assessment of the duplic repertoire will help determine if speech, sign language, symbols, or a computer generated speech apparatus would be the most appropriate for a particular individual. The person's ability to duplicate written text is essential for teaching writing, and this part of the assessment will also be presented in this section.

Echoic behavior

A typical infant learns to echo the sounds and words of his caretaker around one year of age. Once this repertoire becomes strong the child begins to learn new words every day with a minimal amount of instruction. Echoic behavior (and automatic reinforcement) plays a major role in helping a child develop acceptable response forms which can be understood and reinforced by members in his social environment. If a DD person cannot echo words and sounds such that they can be understood by others, then it's hard to learn new words, and the typical reinforcement available for successful communication is absent. This part of the assessment determines a person's echoic ability and potential for a vocal-verbal program.

Recall that the echoic is defined as a three term relation involving an auditory stimulus, a matching vocal response product, and a form of conditioned reinforcement. A toddler's tendency to say "light" right after a parent says "light" exemplifies the echoic relation. The parent's vocalization evokes a matching vocalization from the toddler because of a history of reinforcement for similar behavior. Children learn to echo individual phonemes, sound blends, whole words, and phrases, as well as intonation, pitch, rhythm, vocal patterns, and so on. The current assessment

will focus on determining an individual's ability to echo specific sounds, words, and short phrases.

The echoic evaluation is basically an articulation test. The simplest type of echoic relation is the ability to produce a single phoneme that matches a presented auditory stimulus. For example, a teacher asks a student to say "Ba" and the student responds "Ba." There are 42 individual phonemes in the English language and an effective speaker can easily echo all of them. (A perfect match is not required for successful verbal interaction however. Several non-English cultures have difficulty echoing English sounds, "th" for example). Some sounds and blends are easier to produce than others, for example "ah," "ya," and "ma," are often emitted early by an infant because there are fewer muscles involved. Other sounds such as "la," "ja," and "rr," involve more muscles and usually develop later.

The first page of the echoic assessment form (see appendix 1) contains a list of the 42 phonemes, and words that contain those phonemes. The evaluator should first pronounce only the sound to the left of the word and ask the student to echo him. Then, ask the student to echo the whole word. Correct responses should be reinforced with praise, and edibles if necessary. The student's response should be scored as correct, an approximation, incorrect, or no response, and these data should be recorded on the form. The echoic repertoire should be assessed in conjunction with the assessment of the other repertoires, that is, the mand, tact, intraverbal, receptive, duplic, and codic trials should be interspersed with each other. This will make the assessment much more interesting for both parties.

The second page of the echoic assessment contains more words and some phrases. The same general testing procedure should be followed. The evaluator asks the student to echo the word or phrase she emits and reinforces correct responses or approximations and records the data. The list of words progresses from simple words to more complex words. In this section approximations should be noted on the form. It may be useful to identify what phonemes were included or were missing from the student's response. The phrases also progress from simple to complex and notes on the error may be useful for designing an intervention program.

It is important to again point out that the assessment is only a sample of verbal behavior, thus it is not necessary to determine all possible echoic responses. The objective is to assess the strength, not the size, of a person's echoic repertoire.

Interpreting the echoic assessment

If a person has a strong echoic repertoire this will be quickly observed in the assessment (for example, a person who can emit whole words and phrases). Under these circumstances there probably is no immediate need to conduct the evaluation on each phoneme, unless it is desirable for detection of specific articulation errors. Language intervention for such a person will most likely not specifically involve echoic behavior, rather the trainers should emphasize mand, tact, intraverbal, and codic programs. The other aspects of the assessment will help determine exactly what intervention program will benefit this type of person most.

A person who can only echo a few sounds, or none at all, is in need of a rigorous intervention program. If the individual is over three years of age vocal training may be slow and not very functional for the person. Under these circumstances, and if the person does better in the imitative assessment below, it may be reasonable to use sign language as a response topography in addition to speech. This will allow the teacher to immediately work on developing more useful forms of verbal behavior, specifically, mands, tacts, intraverbals, and codics. The procedures described in Chapter 11 "Developing a beginning verbal repertoire with sign language" may be most useful for this level of person.

Some individuals will correctly respond to several of the echoic items including some approximations to words. For these persons sign language may not be necessary. The use of behavior modification and Skinner's analysis of verbal behavior may be enough to show substantial improvement.

Imitative behavior

The results of the imitative assessment may only be relevant to individuals who have weak vocal behavior, and who are candidates for sign language training. If a person can emit words then most of the training would not involve imitation, but rather training on the echoic, mand, tact, intraverbal, and codic relations. However, imitation trials may improve performance on the other repertoires if they are interspersed. Imitation trials help establish stimulus control by setting up behavior which has a high probability of reinforcement. Also, these type of trials may be reinforcing for particular individuals and can be used as positive consequences for other correct responses.

The tendency to copy the fine and gross motor movements of others can be assessed by presenting a sequence of physical movements and asking the student to "Do this." The evaluator should be careful not to describe the movement (e.g., saying "clap your hands") because this provides a prompt which may overshadow the attempt to assess only imitative behavior. Correct responses and approximations should be reinforced and recorded.

The evaluation forms contain a sequence of activities which progress from simple and gross motor movements to fine and more complicated movements. The evaluator should begin with the simpler movements and progress to the more difficult ones. The evaluator's task is not to determine the total number of imitative responses, but rather the strength of the imitative repertoire in terms of stimulus control. That is, at what level of complexity does the stimulus fail to evoke matching behavior. As mentioned above, the items on the imitative evaluation should be interspersed with test items on the other aspects of the verbal repertoire.

The use of receptive and imitation assessment trials

If a person fails to respond to imitation trials alone, or receptive trials alone, then the evaluator should present both trials simultaneously. For example, while raising her hands the evaluator should say something like "Raise your hands, put them up...." Typically, these two stimuli combined are more likely to evoke a response, and some students may be successful under these circumstances.

Interpreting the imitative assessment

If a person has a strong imitative repertoire this should be recognized within a few minutes of presenting trials (assuming the individual is willing to respond for the evaluator, or stated in behavioral terms--the evaluator has stimulus control over the student's behavior). If speech is the main mode of responding, then the imitative repertoire will have a limited linguistic function. However, if speech is unintelligible then the imitative repertoire serves as a base for teaching sign language. Imitation has the same function for sign language that echoic behavior has for spoken languages. New mands, tacts, and intraverbals can be taught rather quickly if a person has a strong echoic or imitative repertoire. A student who cannot speak but has a strong imitative repertoire can be taught sign language easily and at a rate commensurate with the trainer's time and ability. A developmentally disabled teen or adult who has never spoken but will easily imitate

needs, and deserves, sign language training. An effective communication system will produce major, and unprecedented, breakthroughs for these individuals.

If a person can imitate only a few actions then, most likely, the other verbal repertoires will also be quite weak. However, a nonverbal person who can at least imitate some movements can be taught one or two signs. Often, these new signs have powerful effects for people who have never spoken before and other imitative or echoic responses become easier to teach. This level of person will progress best with staff who are trained in behavior modification, sign language, and the analysis of verbal behavior. The training procedures which would be most appropriate for working with these persons can be found in Chapter 11.

A person who cannot correctly respond to any duplic or receptive items, or to the receptive and duplic trials combined, is in need of some skillful intervention. For these individuals careful shaping procedures, strong reinforcers, and well trained staff are necessary. The most appropriate procedures for these persons are presented in Chapter 10 "Teaching duplic behavior."

Individuals who have cerebral palsy, traumatic brain damage, or other physical disabilities, may not be able to emit correct responses to any of the imitative or echoic trials, but are capable of learning to communicate. For these individuals a pointing system or computer generated speech system may be the most effective.

Summary

The results of the duplic assessment can be useful for predicting a person's success in language training. Also this assessment will help to determine whether to use speech, signs, symbols, or computers for an individual. A person who has very little duplic behavior, but is not physically involved, can learn language. However, special staff requirements are needed in order to obtain measurable success.

CHAPTER SIX

Assessing the Mand Repertoire

The mand is an important, but complicated type of verbal behavior. Like the other types of verbal behavior, the mand relation is a three-term contingency. However, instead of responses controlled by discriminative stimui and generalized consequences, the mand is controlled by motivational variables (termed "establishing operations" or EOs by Michael, 1982), and consequences which are specifically related to the response form and the EO. In common sense terms, when we want something, we may ask for it, and often receive what was wanted. For example, when the value of food is strong a person may mand for something to eat. Unfortunately, many DD persons are unable to ask for all the variety of reinforcers that might occur throughout their day. This situation may lead to inappropriate behavior because the establishing operations may not easily "go away" until the specific consequence is received. A person who is hungry, but cannot "express" it, may whine and cry until fed. However, the feeding may reinforce whining and crying and this behavior becomes a functional "word" (or more accurately "mand") for the individual. The next time he is hungry (the EO is strong) the inappropriate behavior of whining and crying may come to strength. Extinction, punishment, and differential reinforcement for incompatible behaviors (DRI) may not completely eliminate whining and crying because the responses are controlled by EOs. The best way to reduce this inappropriate behavior is to teach a more acceptable mand for "eat."

How to tell if a response is a mand

There are several ways to determine if a response is a mand. In addition to identifying an active EO, the strength of the response can be a good indicator of a mand. When the value of conditioned or unconditioned reinforcement is strong, behavior is strong. For example, a hungry child may whine endlessly, a toddler may ask for a cookie over and over again, or a teen may continually ask for the car. Strength can be measured by the frequency, intensity, or duration of a response, or its resistance to extinction. A

second indicator of a mand is that when the reinforcer is delivered there is a very short latency to the acceptance response. If the EO is strong and manding is occurring, for example the response "I want out" then there will only be a short latency between the opening of the door and going out. If the person does not go out, then there were probably other variables controlling the response. Third, a mand response will cease after the delivery of the specific consequence. A child who wants a crayon, and asks several times for the crayon, will stop manding after the crayon is received, unless there are other variables are in play.

There are two major types of mands. Mands which are controlled by unconditioned establishing operations (UEO), and mands which are controlled by conditioned establishing operations (CEO). The difference is in terms of the individual's learning history. A person emits UEO mands for things they were born to like (e.g., food, water, heat regulation, physical contact), and they emit CEO mands for things they have learned to like (e.g., toys, sailboats, cars). Both types of mands should be assessed in (1) a person's natural environment and (2) under specifically contrived situations.

Assessing mands in the natural environment

Observations in the natural environment will provide information about a verbal repertoire that is usually unobtainable in a formal testing situation--this is especially true with the mand. The controlling variables for the mand often cannot be replicated in a test situation. That is, the mand is controlled by establishing operations which are difficult to manipulate, and almost constantly changing. For example, as the value of food changes, behavior that has obtained food in the past comes to strength. An evaluator who is present as reinforcers become valuable can observe what behavior comes to strength.

A developmentally disabled person is at a great loss if they cannot mand when EOs are strong. Some nonverbal people may seek to obtain the reinforcement without the help of verbal behavior (e.g., they may go to the kitchen and get something from the refrigerator themselves). Other individuals may learn a response, but it may be grabbing, aggressing, crying, or other forms of inappropriate behavior (e.g., social withdrawal, self-abuse, self-stimulation). Fortunate individuals may learn to mand by emitting a word, sign, or pointing to a picture, or pushing a computer key. Mands may take several different forms and most DD persons will somehow let caretakers know when their EOs for reinforcers are strong. A standard response form (speaking,

signing, writing, or pointing to stimuli) is essential for a listener to provide the correct reinforcer, or the response and the this particular EO may not cease. A person who has learned to scream when EOs are strong creates a situation where the caretaker may find himself guessing as to which EO, if any, is controlling the screaming. The ability to emit specific responses for specific EOs is essential to effective communication, and will greatly improve a person's probability of obtaining reinforcement. Simple observation, without intrusion, can be very useful in determining how a particular person gets his needs and wants known.

The evaluator should record data while observing the individual interact with things and persons in his immediate environment. The evaluator should be unobtrusive (although this may not be entirely possible) while recording data. His presence can function as independent variables which may have strong effects on the student's behavior. While observing the person, the evaluator should record (1) exactly what the person said (the mand response form), (2) the establishing operation, (3) other nonverbal or verbal S^Ds present, and (4) the consequences. All four variables are necessary because "No response can be said to be a mand from its form alone. As a general rule, in order to identify any type of verbal operant we need to know the kind of variables of which the response is a function" (Skinner, 1957 p. 36). However, in some circumstances it may be safe to infer that a particular response is a mand by its form alone as in "Help!" EOs and specific consequences are certainly present, but under these conditions, the evaluator need only record the response form.

Mands controlled by unconditioned establishing operations

The objective of this aspect of the assessment is to determine a person's tendency to emit verbal responses when unconditioned establishing operations are strong. For example, when he is hungry, does he ask for food? If so, what is the form of the response? If he does not emit any identifiable words or sentences, how does he let people know when he is hungry? Does the person ask for a coat or sweater when he is cold, liquids when he is thirsty, the bathroom when he has a full bladder. These are mands which allow an individual to obtain powerful forms of unconditioned reinforcement with a relatively low response effort. This is a very important aspect of verbal behavior because these needs must be met in order for a person to survive, thus they are strong EOs and occur at various levels throughout a person's day, year, and life. The data sheets contain a space for each of these mands. Record the time and a description of the response strength, along with

the EO, and delivery of the specific consequence. The parents or caretakers can often provide useful data as to an individual's likes and dislikes (EOs), and his behavior patterns (ways to get those reinforcers). This information should be recorded on the sheets.

Mands controlled by conditioned establishing operations

Data on mands controlled by CEOs can also be obtained by observations in a person's natural environment. Does he ask for certain toys, books, or clothing? Does he have a favorite color, doll, or game? How does he ask for them? Or, does he obtain them without verbal behavior? These are conditioned reinforcers, and each individual differs with respect to these reinforcers. The data sheets contain samples of these types of mands, and blank spaces for others that the evaluator might observe.

Multiply controlled mands

There may be other controlling variables present for a response that is mainly a mand. The mand may be multiply controlled by either nonverbal, intraverbal, duplic, or codic discriminative stimuli. These stimuli may occur individually or in combinations and under some circumstances help evoke a mand. For example, a child who has always wanted a talking teddy bear may begin manding at a high rate when he sees one. This response would be part mand and part tact, although mostly a mand because if the CEO for the bear was not strong the bear alone would not have evoked the behavior. For some individuals these variables may be important and should be recorded on the assessment forms. These other discriminative stimuli will be used extensively in some of the training sections presented in later sections.

Structured mand assessment

The mand repertoire can also be assessed in a more formal testing situation where the evaluator directly manipulates variables, and then records the student's response. These procedures involve contriving, or setting up, CEOs. The basic technique consists of presenting stimuli which alter the value of other stimuli. For example, if a person likes to draw, give him a sheet of paper and observe his response. Does he emit the appropriate mand for something to draw with, or does he emit some other form of behavior? The presentation of the paper should alter the value of a writing instrument, and a skilled speaker should emit an appropriate mand. Another example of a contrived mand would be the presentation of a

toy which needs batteries to operate but has none. This may be another situation where an evaluator can observe the distinction between the mand and the tact. If the DD person can tact batteries when he see them, but cannot ask for them when they are missing from a toy, the distinction can be observed. The assessment forms contain a number of possible mands. However, the evaluator should include others that are particularly relevant to the reinforcers for the individual being tested.

Interpreting the mand assessment

The objective of the mand assessment is to determine the degree to which a person's verbal behavior is under the control of establishing operations. If a person (1) is able to easily and appropriately mand for his reinforcers in the natural environment, (2) and under contrived situations, and (3) does not emit excessive mands, then he may not need intervention on this repertoire. However, the results of the mand assessment may be very useful in understanding several aspects of a person's behavior when this repertoire is weak or defective. A weak or defective mand repertoire may produce several behavior problems. Establishing operations are in effect for all organisms and these operations frequently change. A DD person is going to be hungry, tired, and thirsty at times. And at certain times he may want a particular song, object, or color of clothing. If a person does not have an appropriate mand, then some other form of behavior probably occurs which lets the caretakers know when these reinforcers are strong.

Mands for unconditioned reinforcement may be easy to understand in any form because of their strength and frequency of occurrences, but other mands, especially mands controlled by CEOs, may be difficult to understand without a standard form. Therefore, inappropriate behavior may occur, and the caretaker may not recognize it as a mand and implement some specific type of punishment and DRO procedure, which in the long run will not substantially change the behavior. If a person can emit mands for strong UEOs, but not for many CEOs, then the procedures described in Chapter 14 "Developing a complex mand repertoire" would be appropriate. If the person can emit some mands but is limited, then the later section of Chapter 11 "Teaching a beginning verbal repertoire" would be appropriate. If the person cannot emit any mands, or any other type of verbal behavior, then the procedures in Chapter 10 "Teaching duplic behavior," and 11 would be appropriate.

A person who has a strong mand repertoire may present other problems to those who live with and teach the

individual. Mands can be very demanding on an audience. Some DD persons constantly mand for attention and other reinforcers. This strong mand repertoire is often characteristic for some DD blind persons who must depend on others in their environment for support. The person may constantly ask questions such as "What time is it?", "Where am I going after dinner?" and, "When are we going home?" Mands control the behavior of listeners, and as a result, directly benefit speakers with the specific reinforcement they bring. As a result, mands can become quite strong. To reduce the punishing effects, some individuals learn to disguise, or soften their mands by emitting them in tact form. For example, "I like my radio" sounds like a tact, but it may really be a mand for receiving the radio. When mands become too strong and creates other problems the procedures described in the later section of Chapter 14 titled "Procedures for reducing excessive manding" may be effective.

Summary

The mand relation is an extremely important aspect of verbal behavior. It is frequently neglected however, in traditional assessments. For many language delayed individuals, mands take the forms of negative behavior such as tantrums, aggression, or social withdrawal. In order to eliminate these behaviors, more acceptable topographies must be trained, and for these individuals the teaching of mands can be quite useful. However, the mand relation is complex due to the involvement of establishing operations. Since it is often difficult to control EOs, assessment in the natural environment should be conducted along with assessment in contrived situations.

CHAPTER SEVEN

Assessing the Tact Repertoire

The tact is the most familiar of the verbal operants. Children learn to identify common nonverbal stimuli early in their educational career. In line with this, most language assessment programs contain items which ask the student to identify objects, actions, pictures, locations, relations between objects and actions, properties of objects and actions, and so on. These tasks share the common element that the verbal response is controlled by a prior nonverbal stimulus. The stimulus, or "referent" in traditional terms, is some aspect of the physical environment that is accessible through the sense modes (e.g., visual, auditory, olfactory, kinesthetic, vestibular).

The term "tact" was proposed by Skinner (1957, p. 81) to reflect this "contact" that a speaker has with the physical environment through his senses. However, traditional psychology has become more interested in inventing cognitive pathways and processes between the referent and the response, and assigning those cognitive events causal status. Hence, when responses fail to occur, it is common to blame the causes of the problem on defective cognitive processing, rather than defective stimulus control, and defective contingencies of reinforcement. The traditional intervention then, is naturally based on developing cognitive processing rather than verbal responses. Most current language assessment programs for the developmentally disabled reflect these traditional views. The classification of various cognitive processing activities are basic to the evaluation (e.g., coding, decoding, storing, encoding), while important environmental variables are ignored.

The current assessment program approaches the task of assessing this repertoire by an analysis of the complexity of the **discriminative stimulus** (sD), and the complexity of the **response.** The stimulus can be a very simple nonverbal stimulus such as a shoe, or it can be a highly complicated nonverbal stimulus like a cancer cell. The stimulus can have one part (e.g., a spoon) or many parts (e.g., a car); it may affect one sense mode (e.g., light), or several sense modes (e.g., cake); it can be fixed (e.g., a crayon) or

transient (e.g., a clap). These are just some of the distinctions that can be made between types of nonverbal stimuli when assessing the strength of a person's tact repertoire. These distinctions, as well as some others, are useful in determining the strength of a tact repertoire and will be presented in detail in this chapter.

The tact repertoire may also be assessed by determining the complexity of the response topography. A successful tact may only contain a single phoneme, or it may encompass an entire book. It may be one word, a sentence, or a whole paragraph. It may be spoken, signed, written, or teletyped. Traditional linguists have studied this aspect of verbal behavior extensively, and use the concepts of phoneme, morpheme, syntax, grammar, and mean-length-of-utterance (MLU) to describe the topography of verbal behavior. Basically, the form of a verbal response can be assessed by measuring its uniformity to various verbal conventions of the reinforcing community. For example, In English, adjectives precede nouns; whereas in French, nouns precede adjectives. Adherence to many of these verbal conventions is automatically reinforcing for native speakers, but they may be extremely difficult to acquire for a second language learner. The mean-length-of-utterance is a common measure of verbal responses, and will also be discussed below.

Assessing a rudimentary tact repertoire

The first nonverbal stimuli which acquire control over an infant's behavior are usually highly reinforcing stimuli, such as the parents, pets, foods, or certain toys. These nonverbal stimuli come to control behavior because of their reinforcing value. Also, they are objects that are constant and important aspects of an infant's life. Hence, the first section of the tact evaluation contains a suggested list of items which are clearly definable and familiar objects, and which may have a high reinforcement value. These items may also occur as mands for some individuals, and in the early stages of language development the response may occur both as a mand and tact, identified as a "multiply controlled" response. Recall that in the behavioral analysis of verbal behavior the same response form can, and usually does, occur in duplic, mand, tact, intraverbal, and codic verbal relations. Also, the stimulus can be visual, auditory, olfactory, gustatory, tactual, kinesthetic, vestibular, and so on.

The evaluator should be prepared by obtaining a collection of nonverbal stimuli which are relevant to the individual being tested. At the beginning level this may include common objects (nouns) such as a ball, spoon; shoe,

hat, car, cup, and so on (see the tact evaluation sheet in Appendix 1). Pictures can also be used, but they should be noted on the assessment forms since they contain different stimulus properties than real objects. Much of the tact repertoire involves verbal behavior controlled by visual stimuli, although the other senses, especially auditory and tactual, should be included in the assessment. The evaluator should also bring a good supply of reinforcers which are effective for the particular individual, and the assessment should be conducted in a positive manner.

A sample trial might be as follows: the evaluator presents a cup in front of a DD person and says "What is that?" Correct responses, and approximations, should be reinforced with praise, and with an edible (if necessary), and possibly, with contact with the object if that is a form of reinforcement. The response form should be recorded on the forms by writing the word, or a phonetic transcription of the word. What's of interest is the person's pronunciation of the word, or appropriate execution of a sign or pointing response, and its relation to the stimulus. The latency between the evaluator's question and the student's response can provide valuable information for some persons and should be recorded. However, this measure may be difficult to obtain and may be most relevant for individuals who are slow responders, or have very weak verbal skills. If the student fails to respond, re-present the question (up to two more times). If a correct response occurs, reinforce it, and note that the response occurred after multiple presentations of the stimulus. Tact trials should be interspersed with the other verbal trials presented in this assessment program. This will make the assessment process more interesting and easier to conduct.

Tacts for actions (verbs) are often more difficult to acquire because the stimulus is transitory, and control is harder to establish. When an action is presented as a stimulus, for example, twisting a knob, the action is a fleeting stimulus only present for a few seconds. Often, it takes more trials for behavior to come under control of this type of stimulus. However, this doesn't mean that all tacts of objects are acquired before tacts of actions. In fact, many children and DD persons learn tacts for actions faster than nouns because of the reinforcing value of movement. These types of preferences should be observed in the assessment, and incorporated into the training programs.

The assessment forms contain samples of actions which begin with simple movements and progress to more complicated actions. The examiner should present the action (e.g., bounce a ball, open a box, jump), and say "What am I doing?"

The student could also be encouraged to imitate the behavior and asked "What are you doing?" Both are tacts controlled by moving nonverbal stimuli. Correct responses and approximations should be reinforced and the relevant data recorded. More complicated actions, such as shopping, swimming, and picnicking are often presented pictorially in traditional assessments. However, tacting "action" from pictures is obviously not really tacting action. A picture of a child swimming is a visual stimulus which is substantially different from actually swimming or seeing someone swim. Therefore observations in the natural environment might be the best way to assess this type of verbal behavior.

Noun-noun combinations

Following the assessment of individual nouns and verbs the evaluator should test the student's ability to tact multiple objects. The first set of items on the forms are to determine if the person can tact two objects. The evaluator should place two known objects (those which were scored correct on simple tact assessment) on a table and ask the student "What do you see here?" The objective is to determine if the individual can emit multiple responses, or the rudiments of sentence construction. A correct response or approximation should be reinforced and recorded. If an incorrect response occurs, such as naming only one object, the evaluator should re-present the trial with a prompt. Two types of prompts can be used to evoke the second response; a verbal prompt where the evaluator repeats the first word and and says "...and," and a pointing prompt where the evaluator points to the second object. If the "and" prompt does not work, re-present the trial with a pointing prompt. If the response still fails to occur try both prompts simultaneously. If this does not evoke the response, use duplic or physical prompts, then move on to other items.

Noun-verb combinations

Next, known nouns and verbs should be presented in combination with each other. For example, a bouncing ball, a spinning top, or a running dog. The evaluator should present the stimuli and say "What am I doing? The objective of this aspect of the assessment is to determine if the individual can tact the particular movement of a particular object. Correct responses and approximations should be reinforced and recorded. Incorrect responses should be followed with a prompting procedure similar to the one suggested above. If the student emits only one of the responses, say, just the spinning action, prompt him by

saying "What am I spinning?" Record the response, note the prompt, and then present the next trial. Pictures can be used for this part of the assessment, but they are separated on the forms because of the problems of pictorially presenting actions.

Adjectives

All objects have properties which distinguish them from other objects. The term adjective is characteristically used to identify these properties by describing them, or telling "what kind." Adjectives modify nouns or pronouns. A ball which is brown, leather and pointed at both ends has properties distinctly different from a red, round, plastic ball. However, the properties of objects are not restricted to specific objects, rather, many objects share the same properties such as color, shape, weight, and size. "Any property of a stimulus present when a verbal response is reinforced acquires some degree of control over that response, and this control continues to be exerted when the property appears in other combinations" (Skinner, 1957, p. 107). This makes the discrimination rather complicated when a property of an object, such as its color, acquires control over a verbal response, rather then the defining stimulus features of the object. For example, if a child, learns to say "wagon" under the control of a red wagon, then later calls a red ball a wagon, the property of the wagon acquired more control than the defining features of a wagon (e.g., four wheels, a base, a handle). A similar problem with acquiring tacts for properties may occur when a child learns to identify an object by one of its properties, for example, calling a wagon a "red." This person may face some difficulty when encountering other red objects, or wagons which are not red.

Another complexity in acquiring tacts of properties is that many of the properties of objects are relative to the properties of other objects. A box might be heavy compared to empty boxes, but light when compared to larger and heavier boxes; or a pencil might be long compared to a shorter one, but that same "long" pencil will become short when compared to a baseball bat. This complicates the acquisition of adjectives because the language learner must abstract the critical features from the stimulus configuration, which may be very difficult because of the problem of shared properties.

As a result of these complexities adjectives are typically more difficult to acquire than nouns and verbs. Therefore, when they are present in a DD person's verbal repertoire, they are a useful measure of his verbal ability.

If they are not present, but the person can tact nouns and verbs then they, with the appropriate procedures, can relatively easy to teach. In order to assess this repertoire the evaluator should present the student with different known objects, and request that the student identify various properties of the objects. For example, the evaluator should hold up a ball and say "What color is this?" A correct response or approximation should be reinforced and recorded. An incorrect response should simply be recorded, and the evaluator should present the next trial, such as "What shape is this this ball?" The evaluation forms contain several different suggestions for test items. As always in this evaluation, other responses can be assessed, but they should be noted on the forms.

A single word may have several different functions

It is important to note that the same word can be a noun, verb or adjective; just like the same word can be a mand, tact, or intraverbal. For example, consider the following uses of the word "farm."

1. Did Jim farm all last summer? (A verb.)
2. His farm is in Oregon. (A noun.)
3. Jim enjoys farm life. (An adjective.)
4. That is a farm. (A tact controlled by nonverbal stimuli.)
5. Can we go to the farm? (A mand controlled by an establishing operation.)
6. Cows live on a farm. (An intraverbal controlled by the verbal stimulus "Where do cows live?")

This exercise demonstrates the point that the form of the response (what is said, signed, written, etc.) can be the same word, but have different "meanings" when there are different controlling variables. The current assessment program is designed to determine what controlling variables are responsible for what responses.

Combinations of nouns, verbs, and adjectives

A good way to measure the strength of a tact repertoire is to identify the complexity and the components of the nonverbal stimulus configuration. A tact which includes a simple object, a property of that object, and an action has three separate stimulus functions and represents the most complex multiple tact presented thus far. The tact "Bouncing red ball," for example, is a verb-adjective-noun combination which demonstrates that the individual's verbal behavior was controlled by all three nonverbal stimuli. The strength of the stimulus control can be more completely

assessed by separating the elements and presenting them in different arrays (e.g., present a rolling blue ball, or a spinning red top). The evaluator should present the student with the multiple stimulus and say "What do you see here?" Correct responses and approximations should be reinforced and recorded. If a student emits an incorrect responses the evaluator should record the response, noting which part of the response was correct and which part was incorrect, and move to the next trial.

Adverbs

Adverbs typically serve as modifiers for verbs, adjectives, other adverbs, or prepositions. A particular action may have properties which distinguish it from other actions. These properties can be in terms of manner (how), place (where), time (when), degree (how much), and number (how many), as well as others such as opposition, affirmation, and denial. For example, the sentence "He quickly jumped down," contains two modifiers for the verb jump; quickly (how he jumped) and down (where he jumped). The stimulus control involved in tacting adverbs may be somewhat more complicated than that of tacting properties of objects (adjectives), because of the transitory nature of the primary action. This is not to say that the acquisition of adjectives always precedes the acquisition of adverbs, but rather to simply note that one is more complicated than the other and, all other things being equal, usually takes more time (and trials) to acquire.

In order to assess the student's ability to tact adverbs the evaluator should present the nonverbal action (quickly jump down from a chair), and should ask the student to describe the properties of the action by using a question such as "How did I jump?" An array of trials should be presented, and several suggestions for these trials can be found on the assessment forms. As always, correct responses and approximations should be reinforced and recorded. Incorrect responses should be followed by a second presentation with any prompts noted on the form.

Prepositions

Prepositions are also more complicated than simple nouns and verbs. They are tacts of relations that exist between a noun, or a pronoun, and some other aspect of the nonverbal situation. For example, the tact "Book on table," identifies the relation between the book and the table. The book and the table are tangible objects which have clear and individual stimulus features, but what about the word "on?" It cannot be touched or picked up because it is a nonverbal

spatial relation between two objects. The acquisition of tacts for these relations is more complex, hence, can be used as a measure of verbal competence. The evaluator should present the student with several different nonverbal relations (e.g., in, out, under, over, between) and score his response. A typical trial might involve placing a spoon in a cup and asking the student "Where is the spoon?" Correct responses and approximations should be reinforced and recorded. Incorrect responses should be followed by a prompted trial (e.g., the evaluator says "Look right there, where is the spoon?" while pointing to the spoon).

Pronouns

A pronoun is a word which stands for a noun, or a group of words used as nouns, and refers to persons or things named or understood in the context. For example, the sentence "The pigeon pecked the key, but he pecked it slowly," contains the two pronouns "he" and "it." Both pronouns are irrelevant unless "he" and "it" have been previously identified as they are in the first part of the sentence. This necessary process makes the acquisition of pronouns somewhat complicated, hence, like adverbs, adjectives, and prepositions, successful e
mission of pronouns can be used as an indication of an advanced tact repertoire. The use of pronouns can be tested in a formal testing situation or in the natural environment. In the formal situation, the procedure might consist of the evaluator presenting a sentence and asking the student to identify what or who the pronoun represents.

More complicated combinations and grammatical sentences

A complex tact can involve any combination of nouns, verbs, adjectives, adverbs, prepositions, pronouns, conjunctions, and articles. For example, "The small rabbit quickly hopped up on the table." If the student has been successful on several of the tact items presented thus far, then the evaluator should present these more complicated nonverbal events. Stimuli can be combined in a variety of ways, and several suggestions are presented on the assessment forms. However, as always in this assessment, the evaluator should include other combinations which may be relevant to the individual being tested.

Auditory tacts

The tacts discussed thus far all consist of responses controlled by visual nonverbal stimuli. However, a large part of an effective speaker's repertoire consists of tacts which are controlled by stimuli affecting any one of the

other four major senses. Auditory tacts are verbal responses which are controlled by an auditory nonverbal stimulus and reinforced by some form of generalized conditioned reinforcement. Auditory stimuli are certainly not as ubiquitous as visual stimuli, but they occur at a high rate and play an important role in day to day behavior. The tendency to say "telephone" when one hears a ring, or "dog" upon hearing a bark exemplifies the auditory tact. There are many different sounds in the environment that a speaker learns to identify. Children learn to tact the auditory sounds produced by animals, toys, parents, moving objects, dangerous events, entertaining events, and so on. A skilled adult acquires many complex auditory tacts. For example, some individuals can instantly identify a musical note or a slight tone difference. These auditory discriminations, like visual discriminations, are behaviors learned by contact with the environment. This type of tact repertoire is obviously important for the typical speaker, as evidenced by the problems faced by individuals who lose their hearing, or were never able to hear (Moore, 1978).

The assessment forms contain several test items to present in order to determine an individual's ability to tact the auditory stimuli produced by objects and events in the environment. Observations in the person's natural environment can be very helpful in assessing this repertoire. Especially since many of the sounds are difficult to reproduce in a formal testing situation. However, some sounds may never occur in the presence of the evaluator and must be presented in a more formal manner. The formal testing procedure consists of presenting auditory stimuli on a cassette tape, or in removing the visual properties of the stimulus (blindfolding the student, or turning out the lights). The evaluator should say "What do you hear?" and reinforce correct responses and approximations. Incorrect responses should be followed by repeating the trial a second time and recording the behavior if an appropriate response occurs. If not, move on to a different sound.

Tactile tacts

An effective speaker also tacts nonverbal stimuli that affect his sense of touch. There are many objects which can easily be identified by touching them (e.g., ball, pen, cup, light bulb), and many that only a skilled person can tact (e.g., a breast cancer). The typical blind person acquires a very strong tactual (and auditory) tact repertoire. They learn to identify people by their voices, actions by their sounds, and auditory complexities that go completely unnoticed by the seeing person. The blind person learns

these discriminations because of the environmental contingencies in his day-to-day living. A blind person may quickly learn to identify the rooms and obstacles in a house because it allows him to move around successfully without being hurt. It is often important that even sighted people be able to identify things without the benefit of seeing them. For example, if the lights go out it is useful for a person to be able to identify a candle by touch alone; or if a pipe behind a wall is broken, to be able to repair it without seeing it.

The assessment procedures for this repertoire are very similar to those of the auditory tact repertoire. Observations in the natural environment and formal testing can be used to assess the strength of tactile tacts. The evaluator should block the visual and auditory components of the test stimuli (e.g., have the student reach into a bag or box) and should ask "What do you feel?" The assessment forms contain several suggestions ranging from simple to complex discriminations. The standard procedures for consequating and recording the response should be employed.

Olfactory tacts

Olfactory stimuli can also control verbal responses. These tacts make up a smaller part of a typical speaker's verbal repertoire, but they can be essential to survival. The ability to identify the smells produced by smoke, gas, or other harmful chemicals may save a person's life. There are several pleasant smells which a person may learn to identify such as the odor produced by certain foods, flowers, and fragrances. The olfactory tact repertoire can be assessed in basically the same manner as the auditory and tactile evaluations. The assessment should include natural environment data as well as formal testing data. In the formal test the evaluator should block off the other senses and ask the student "What do you smell?" Responses should be appropriately consequated and recorded.

Gustatory tacts

The last of the more common sensory systems which can control tacts is the gustatory (taste) repertoire. These tacts, like olfactory tacts, comprise only a small portion of a typical speaking repertoire, but it is an important portion. Consumption of some poisons or 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. These should be assessed along with the tastes for specific foods and liquids. The assessment of this repertoire should be conducted in the natural environment

and under formal testing procedures. The evaluator should block the other senses (e.g., ask the person to close his eyes, don't let him touch it) and present the stimulus and the question "What does this taste like?" As always, appropriately consequate the response and record the data.

Tacting complex social behavior

The ability to tact social interactions between people is an advanced form of verbal behavior. A person who can tact friendship, quarrels, agreements, contracts, embarrassments, disagreements, and so on is most likely a skilled speaker. The evaluator should indicate the strength of this repertoire by observing the individual (or asking those who know him well) in the natural environment, and recording his behavior and its controlling variables on the assessment forms.

Private events

How do we learn to talk about events that occur within our body? All organisms experience stimulation which arises within the body and is accessible to no one but the individual. This stimulation can come from the mechanoreceptors (deep touch, kinesthetic, and vestibular sensors), deep thermoreceptors (internal temperature sensors), and free nerve endings (pain sensors). These sensory systems are affected by any number of environmental events, for example, a virus acquired by contact with a sick person may increase body temperature and result in aversive stimulation from the thermoreceptors, mechanoreceptors, and other receptors of the body. However, it is very difficult to learn to tact these nonverbal stimuli accurately. A child may simply say "I don't feel well" without knowing (tacting) the causes of the pain.

Tacting private events is complicated because members of the verbal community (e.g., parents, teachers, and friends) do not have access to the same stimulation as the child. As a result they cannot accurately identify, or teach, the relevant features of the event. Skinner (1957) discusses this problem in his analysis of private events.

> the investigator cannot readily point to the stimuli to which he must appeal in predicting and controlling behavior....for example, if we could say precisely what events within the organism control the response <u>I am depressed</u>, and especially if we could produce those events at will, we could achieve the degree of prediction and control characteristic of the verbal responses to external stimuli (p. 130).

Verbal responses to external stimuli are relatively easy to teach. For example, when teaching a child to tact "shoe," a parent can present or remove the shoe, present other objects, prompt an appropriate response, and differentially reinforce successive approximations to the word. When the stimulus is private these shaping procedures are difficult to conduct. A trainer cannot present and remove a private stimulus which is inside a person's body, and cannot differentially reinforce responses. Yet, children and developmentally disabled individuals do learn to talk about private events, and it is often important to be able to do so (e.g., sickness). How does this happen since we will never be able to completely solve the problem of privacy? How do we assess and teach verbal behavior which is controlled by stimulation arising within the skin?

Skinner (1945, 1953, 1957, & 1974) has described four methods which members of the verbal community use to teach individuals to tact private events. They are (1) public accompaniment, (2) collateral events, (3) common properties, and (4) response reduction. These methods can be helpful in assessing (and teaching) a tact repertoire. Each will be described.

Public accompaniment

Frequently a private event is accompanied by an observable public stimulus. For example, a painful internal stimulus may be accompanied by blood and bruises, or by observations of the person falling down or bumping into something. An observer who sees these stimuli can safely assume that painful stimuli are affecting the free nerve endings. Members of the verbal community use these circumstances to teach children to identify correctly painful sensations. For our purposes of assessment they can be used to determine whether or not a person can tact the private event. This can only be observed in the natural environment, because the private stimulus cannot be easily presented by the evaluator, rather it occurs due to several environmental (including the environment within the skin) variables. The evaluator should observe the person during typical activities and determine if appropriate verbal behavior is emitted (e.g., "That hurts") when the public stimulus is observed (e.g., falling and bumping a knee). If the person does not tact the private event the evaluator should prompt a response by saying "What's wrong?" If it is impossible to observe such events, the evaluator should ask others who know the student about his ability to describe private stimuli when they are accompanied with a public stimulus.

Collateral events

A person may also engage in collateral behavior (e.g., holding his stomach) when a private stimulus is present (e.g., a stomachache). These collateral behaviors can be used to teach, as well as assess, verbal behavior about private events. Again, observations in the natural environment are the only way to assess this repertoire. The evaluator should observe (or ask others if necessary) the individual and record the relevant data.

Common properties

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 leg that "fell asleep." Metaphors, such as this, are frequently used by individuals to describe private events. A patient at a physician's office often uses metaphors to describe private events such as pain (e.g., dull, sharp, or stabbing). These metaphors are typical because, as Skinner has pointed out, we don't have a sensory system which allows us to view the inside of the body in the same manner we view the outside. (Technology is changing that situation, but it currently plays only a minor role in the individual's moment-to-moment private events. How often do you have x-rays or CAT scans?) The ability to tact private events by using metaphor represents a rather sophisticated speaker. The evaluator should observe the individual in the natural environment and record these types of tacts.

Response reduction

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 teaches a person to tact the fact that he is sitting down. Along with the visual (public) stimuli there are kinesthetic (private) stimuli (i.e., the sensations that sitting produces on the muscles, tendons, and joints). A student may be able to say "sitting" 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. A person may look and see that he is beginning to sit, and feel his muscles, etc. moving in a consistent pattern each time. Soon, he learns that he doesn't need to look at his body to tell if he is sitting because whenever his body moves in that sequence he is moving to a sitting position. Eventually, there is no need to check the public stimuli because the private stimuli are always reliable. This transfer of stimulus control allows

one to describe his bodily conditions in the absence of visual or tactual stimuli.

The ability to tact kinesthetic stimuli can be done by blindfolding the person and asking them to identify their body position and movement (e.g., standing, turning, jumping, twisting). The evaluator can move the person's arms, fingers, legs, etc., and ask the student "What do you feel moving?" Responses should be appropriately consequated and recorded.

Accurate verbal behavior under the control of private events represents an advanced form of verbal behavior. Many DD persons suffer from the inability to tact private events. It is important to be able to tell someone when you are in pain, uncomfortable, sick, or otherwise in need of some help. This obvious problem with nonverbal persons often encourages parents and teachers to immediately begin a language program with procedures to teach this behavior. The importance of expressing one's "wants and needs" is often given as the rationale for teaching one to tact private events. The first words is a language program are often "toilet," "happy," "sad" "angry" and "tired." However, these verbal responses exemplify a very complicated form of verbal behavior. Teaching this behavior can be very time consuming because the stimulus which should control the verbal behavior is not available to the teacher for differential shaping, hence the acquisition can take some time. If a person has a weak verbal repertoire, other aspects of verbal behavior should be stressed rather than tacting private events.

Interpreting the tact assessment

If a person is unable to emit duplic or simple mand behavior, then they probably will not be able to emit tact, intraverbal, or codic verbal behavior either. These persons should begin with the training program with the procedures suggested in Chapter 10. If a person can not tact their reinforcers, or simple objects in the immediate environment, but can emit some duplic and simple mand behavior, then the procedures suggested in Chapter 12 "Developing the tact repertoire," would be most appropriate. A person who can tact several objects and actions, but not prepositions, adjectives and so on, should receive the interventions suggested in Chapter 15 "Developing a complex tact repertoire." In general, the results on the specific sections of the tact repertoire will immediately allow the evaluator to list many of the tacts the student needs to learn.

Some DD individuals may be able to tact several hundred stimuli, but still have a very weak verbal effect on the environment. Often, it is the intraverbal or mand repertoires which are weak and in need of intervention. For these persons the emphasis of intervention should be on these other verbal operants, although some tact training should be included.

Summary

The tact is a form of verbal behavior where the form of the response is controlled by a prior nonverbal stimulus. In order to assess the strength of this repertoire nonverbal stimuli can be arranged from simple to complex. An orderly progression of complexity can be obtained by an analysis of the nature of the stimulus, or stimulus configuration controlling the response. For example, it appears that is it easier to bring a response under the control of a constant stimulus than a moving or relational stimulus. More complex stimuli such as stimuli which are the properties of objects and actions, or stimuli arising within the body, tend to be more difficult to establish as discriminative stimuli for verbal responses. Complexity can also be increased by progressing from common and familiar stimuli, to less common and even obscure stimuli. The objective of this part of the assessment is to determine at what point stimulus control weakens, and where to begin intervention.

Assessing simple intraverbal behavior

Recall that an intraverbal is a type of verbal relation where the form of the response is controlled by a verbal discriminative stimulus (s^D) that lacks point-to-point correspondence to the verbal response. For example, the tendency to say "Socks" when someone says "Shoes and..." is an intraverbal. The stimulus is verbal (as opposed to a nonverbal stimulus, or to an establishing operation), and the form of the response product does not match the form of the stimulus. But, the pairing of the verbal stimulus and the verbal response is not adventitious. The verbal community reinforces some pairings, and not others (Vargas, 1986).

The intraverbal repertoire can be analyzed in terms of the complexity of the stimulus control, and the complexity of the response. The most basic form of a verbal stimulus is one that contains a single component (or unit) such as "Dog and____." At the basic level the content of the verbal stimulus should be common and relevant to the person being tested. The evaluator should begin by presenting the DD person with simple "open-ended" phrases and questions. For example, the evaluator should ask the person to name a food, drink, color, friend, toy, and so on. The point of this aspect of the evaluation is to assess verbal behavior controlled by verbal stimuli. The evaluator should therefore, take care to see that nonverbal stimuli are not present (or in sight) during the assessment. If they are present the answers may be tacts instead of intraverbal.

The intraverbal assessment forms contain a list of single component items which have a relatively simple content. The evaluator should proceed through the questions and appropriately consequate and record the student's response. Next, these single component stimuli should be increased in complexity by moving to more difficult topics such as asking the person to name a city, state, president, river, or metal. A person's ability to emit appropriate responses is dependent on his verbal history, and the current contingencies (i.e., the evaluator should have stimulus control over the person's behavior and consistently use effective reinforcers during the evaluation). A careful sequencing of the verbal stimuli will provide the evaluator with some indication of the person's verbal history, and the current strength of his intraverbal repertoire.

Multiple intraverbal responses

The number of responses that a person can emit to a single question is another indication of the strength of the

intraverbal repertoire. For example, given the verbal stimulus "Name some fruits," how many different fruits can the person name? The evaluator should encourage the student to name as many items as he can. The answers obviously should be appropriate for the question being asked. If they are not, move on to the next item. Many items may not have several different answers, in which case the evaluator should not request them. Recall that interspersing the intraverbal trials with the duplic, mand, tact, and codic assessment trials may make the evaluation more interesting, thus improving performance.

Multiple verbal stimuli

The verbal stimuli which control verbal behavior in day-to-day situations usually involve multiple components. (This is in addition to single component stimuli, as well as, duplic and codic verbal stimuli, nonverbal stimuli and the establishing operations which are also present in many verbal interactions.) At a simple level, a multiple component question can be "Name some hot drinks." In order to respond correctly, the student's verbal behavior must be controlled by both "hot" and "drink." That is, the student must list hot things, and things to drink. An incorrect response will occur if either one of these stimuli fails to control behavior. The evaluator may discover that an individual can emit appropriate intraverbal responses to these stimuli when presented individually, but not when presented as a unit. Perhaps this is because the student must attend to both stimuli presented by the evaluator. This increase in the complexity of the verbal stimulus also limits the possible number of correct responses (i.e., there are only so many possible hot drinks.)

The assessment of a person's ability to emit multiple component intraverbals begins with stimuli which contain two or three components on an easy topic (e.g., "Name some things in a kitchen, some cold drinks, or some breakfast foods"). Then the topics increase in complexity, for example, "Name some Italian foods, some warm fabrics, or the capital of Michigan). As the evaluator progresses through the items the questions begin to include more components, as well as more complicated topics. The advanced items on this assessment require that the person attend to three or more stimulus components such as "Name some animals that live in the water and on land." Topics can be increased in complexity to the point where a specific college education is required (e.g., define stimulus control). For our purposes of assessing the DD person, we need not go to this level of complexity. However, a strong intraverbal

repertoire will allow a language trainer to teach a person many of the same topics presented in public education.

Fill in the blank questions

The strength of the intraverbal repertoire can also be assessed by presenting sentences with missing words and asking the student to fill them in. For example, "You wake up in the_____, and you wash your_____, and you put on your_____, and you eat your_____, and then you go to ." A number of different fill in questions are presented an the assessment forms. As always the evaluator should include other test items which may be especially relevant to the individual being tested.

Discussions on specific topics

Another method to assess the intraverbal repertoire is to pick certain topics and ask the person a series of questions. The questions listed on the forms are "who, what, where, which, when, how, and why. And the topics range form simple to complex. The evaluator should pick a topic, for example, "policemen" and ask the student "What does a policeman do? Where do policemen work? How can you find a policeman. Why do we need policemen." Only a skilled speaker could appropriately answer as the topic gets more complex. The point of these items is to determine the depth of a person's intraverbal repertoire on specific topics. Appropriate answers should be consequated and recorded.

Additional methods to assess the intraverbal

Intraverbal behavior about current events indicates a strong repertoire. Newspapers, magazines, and books are good sources of verbal stimuli to present. The evaluator can ask the person what he knows about a certain topic, or the evaluator can read about topics and then, at a later time, ask the student questions in the manner suggested above. A dictionary is also a good source of verbal stimuli. The evaluator can ask the student to define any number of words, at several levels of complexity.

The translation of English words into signed words is a form of intraverbal behavior, as is all translations from one language to another. Many DD persons who have learned to sign can quickly learn to produce the sign given the relevant English word, and vice versa. This repertoire often develops prior to the types of intraverbals presented above, and should be included in the assessment if it is appropriate for the individual being assessed.

Interpreting the results of the intraverbal assessment

A person who has a weak mand and tact repertoire will most certainly have a weak intraverbal repertoire. This does not mean that all tacts and mands are acquired before intraverbals, but rather a single response usually comes under nonverbal and EO control before it comes under intraverbal control. If a person is unable to respond correctly to any of the intraverbal items, but can emit some mands and tacts, then the intervention program should begin with the procedures suggested in Chapter 13 "Developing a simple intraverbal repertoire."

Many of the DD persons who have received this assessment in the past have had strong mand and tact repertoires, but very weak intraverbal repertoires. This is usually because the instructional histories of these individuals have mainly consisted of mand and tact (and usually duplic and receptive) training. It is often stated by professionals who work with these individuals that the problem is that the DD person does not possess the "cognitive ability" to process these more complex types of verbal relations. Hence, little intraverbal instruction is given to these individuals. However, the data clearly indicate that many "low functioning" DD persons can acquire intraverbal behavior (e.g., Braam & Poling, 1982; Luciano, 1986; Sundberg, 1980; Watkins, Pack-Teixteira, & Howard, 1989). The procedures simply involve the transfer of stimulus control from nonverbal or duplic stimuli to intraverbal stimuli. If a person can emit several mands, tacts, and intraverbals, then the procedures suggested in Chapter 16, "Developing a complex intraverbal repertoire," would be appropriate.

Like most effective criterion referenced assessments the specific results of the intraverbal assessment will give the language trainer a starting point for intervention. For example, if the person can emit serveral responses to simple stimuli, but no responses to compound stimuli, then intervention should begin with this repertoire. On the other end of the continuum, if a person can respond to several complex questions, and emit multiple responses, then intraverbal training should include more complex topics, and use academic material characteristic of typical elementary education.

Summary

The intraverbal repertoire plays a major role in conversation, social behavior, academic behavior, and what is often referred to as "intelligence." The repertoire is

easy to teach if a person knows the techniques of behavior modification and the procedures for transferring stimulus control. This type of training requires less staff sophistication then the training procedures necessary for lower level persons. It is important not to neglect intraverbal training for the DD. The concepts of memory, cognitive processing, and so on, often stand in the way of intraverbal training because professionals views these as prerequisits for intraverbals, rather then the products of intraverbal training.

CHAPTER NINE

Assessing the Codic Repertoire

The ability to read and write was a status symbol 100 years ago. Now the inability to read and write is often cited as one of our country's biggest intellectual problems. The "failure of the American educational system" has been a frequent headline in the past decade (e.g., Newsweek, 1985), often with the current illiteracy figures leading off the story (followed by SAT scores with math, srience, and English breakdowns). The problems are usually attributed to the lack of funds, unmotivated students, low teacher salaries, larger class sizes, shortened school days, an so on. Rarely is teaching technology presented as a factor responsible for student performance. Yet, as Skinner (1957, 1968, 1981) has pointed out, reading and writing are verbal behaviors shaped by the teacher's arrangements and presentations of textual stimuli, his appropriate consequation of successive approximations, and his establishment of motivational contingencies. Reading and writing, like the other verbal repertoires presented thus far, can be most effectively taught by using techniques of behavior modification, and the analysis of verbal behavior.

Given the current status and ineffectiveness of typical codic instruction, it is no surprise to find that reading and writing are de-emphasized for many of the developmentally disabled. Traditional trainers view these skills as complex behaviors beyond the reach of many DD persons. Part of the problem is related to the traditional view that cognitive processing activities are responsible for the development of a reading repertoire. Since most DD persons' scores on traditional psychological assessments show "cognitive deficits," codic behavior is assumed to be too advanced for their abilities. As a result, neither reading and writing are included in their daily curriculum. If they are included, the training programs often focus on developing the "cognitive reading readiness skills" which are viewed as being necessary before actual reading and writing instruction can begin. Furthermore, when it does begin, it usually is of poor quality (Engelmann, 1975). The "cognitive" skills (e.g., so-called visual processing, auditory processing, coding and decoding practice) may take

a long time to develop, if at all, and many DD persons who could learn to read an write, never do.

Moxley's (1986) paper on a functional analysis of reading is a good demonstration of how to use Skinner's analysis of verbal behavior to improve our understanding of reading. Moxley points out that reading involves a number of different repertoires which are usually under multiple sources of control. A careful analysis of these repertoires, and their sources of control, can lead to better instructional programs and more effective reading by students. Engelmann's Distar Reading Program is very close to a behavioral approach to reading. Distar has helped many DD individuals learn to read, and has proven successful with typical school age children (Project Follow Through; Becker, 1982). Behavior analysis in general, and Skinner's (1957) analysis of verbal behavior in particular, can greatly improve a person codic repertoire. The following assessments are derived from that work.

Assessing the textual repertoire

Recall that the codic relation (Michael 1982b) includes what Skinner (1957, pp. 65-71) calls "textual behavior," and "taking dictation" as well as some additional relations. Michael (1982b) defines codic behavior as a type of verbal behavior where

> the response form is controlled by (1) a prior verbal stimulus, with (2) point-to-point correspondence, but there is NO formal similarity between the stimulus and the response product....The textual relation is where the stimulus is visual (written, or printed words), and the response consists of speaking. In common sense terms the behavior is reading out loud (without the implication the the reader "understands" what is being read) (p. 1).

The objective in this part of the assessment is to determine the degree to which an individual can (1) produce the appropriate sounds of the individual letters, and (2) can produce words that corresponds to the written word. Braille and fingerspelling (if they are relevant to the person being tested) should be included in this part of the assessment. They can have the same functional properties as spoken words, but are in different sense modes, and involve different stimulus and response topographies. The evaluator should first present the individual letters to the student and ask "What sound is that?" (Note that many children and DD persons are taught to produce the letter names which conflicts with pronouncing words. For purposes of this

assessment we would like to know the strength of both repertoires, but producing the sounds of letters are the skills most relevant to reading.) Next, the evaluator should present the individual words to the person and ask "What word is that?" The word list on the assessment forms begins with simple words for common objects, actions, etc. and progresses to more complex topics and larger words. The evaluator should appropriately consequate and record all responses.

Assessing "reading comprehension"

Reading comprehension is typically referred to as a persons's ability to understand what he has read. A person literate in English may be able to "read" Spanish, but "understand" nothing about what he is reading. This understanding of what has been read involves a complex set of verbal and nonverbal behaviors which depend on the person's history. For example, a person who reads "Don't walk" at the corner waits, when it says "Walk" he crosses the street. Comprehension of what has been read can be measured by the degree to which one appropriately reacts to the products of his textual behaviors, or in common sense terms, reacts to what he has read. This reaction can be nonverbal, or receptive, as in the current example. A common test of receptive comprehension occurs for the young reader who is asked to identify, by pointing, the person, object, or action being discussed in the passage. To assess this receptive reaction to what has been read, the evaluator should ask the student to read a word, or phrase, and point to the appropriate referent. The forms contain a list of words for common objects and actions etc. which can be used. All responses should be consequated and recorded.

A more advanced form of comprehension occurs when a textual response evokes other verbal behavior, specifically mands, tacts, or intraverbals. Reading a passage about video tape recorders (VCR's) may evoke a mand such as "I want one of those," a tact such as "We have a VCR right there," or an intraverbal such as "I wonder about the quality of that brand." Comprehension then, is not some mysterious cognitive processing of what has been read, but rather a situation where textual responses evoke other behavior (receptive, mand, tact, and intraverbal) in the speakers repertoire. Given this orientation, the teaching of comprehension becomes a more direct activity, rather than the typical indirect methods of teaching "cognitive comprehension."

In order to assess comprehension of a segment being read, the evaluator should either ask the person mand, tact

or intraverbal questions about the passage. For example "Who was in the tree? Why did he climb the tree? What is color is Johnny's shirt? Do you want to do what Johnny did? The responses should be appropriately consequated and recorded.

Summary

Reading, from a behavioral view, involves several different repertoires and behavioral histories. There are two major repertoires: emitting the correct textual response, and reacting to the auditory product of that textual response by emitting other forms of verbal (mand, tact, intraverbal) and nonverbal (receptive) behavior. This orientation allows one to directly measure a reading repertoire and more clearly identify deficits in the repertoire.

Writing

Writing can be assessed by using a paper and pencil, typewriter, or computer. There are two basic repertoires involved in writing: the physical ability to produce the letters, and the physical ability to produce a specific letter, or combination of letters (spelling), when it is important to do so. Emphasis is often placed on the form of the written response (as in the extensive instruction often necessary for teaching cursive writing) which may make writing aversive for the student. Hence, a person may have a weak tendency to write in the future (the same result is possible with reading if it is taught in an inappropriate or aversive manner). The use of a computer or typewriter may allow one to by-pass the requirement that a person be able to write letters before he can be taught to produce letter sounds, spell, or emit other verbal behavior by writing (e.g., writing messages, letters, notes). This may be especially relevant for the DD person who has the prerequisite repertoires for spelling, but cannot produce the letters. In order to assess this repertoire the evaluator should vocally present the student with letters and words, and ask him to write or type the letter, and spell the word. Responses should be appropriately consequated and recorded.

Interpreting the codic assessment

Since reading comprehension is based on the receptive, mand, tact and intraverbal repertoires, a person who does not have these repertoires will probably not be able to read effectively. (However, individuals who have suffered some severe traumatic brain injury often can still read, even

though the other repertoires are very weak.) If a person can emit other verbal behavior, but cannot appropriately respond to letters, then the procedures described in Chapter 17 "Developing the codic repertoire" would be appropriate. Some individuals will be able to produce some of the letter names and sounds, and perhaps recognize some words. For these individuals, the procedures described in the second section of Chapter 16 would be appropriate.

GENERAL SUMMARY

This assessment of verbal behavior based on Skinner's (1957) book is a criterion referenced test (CRT), as opposed to a norm referenced test (NRT). The language assessment activities described in the current book are designed to determine specifically what verbal abilities a person has, and does not have, rather than the searching for a linguistic age equivalent score. The results of the two approaches to language assessment substantially differ. The CRT provides teachers and parents with exact starting points for intervention, and can be directly used as a measure of progress. The traditional NRT only indirectly measures performance, because the objective of these teats is to determine a DD person's cognitive functioning level by comparing test results with the normative population. As a result, teachers and parents receive age equivalent scores which do not tell them where and how to begin a language intervention program for a particular individual. A criterion referenced assessment suggests a personalized curriculum at every step of the way.

Several issues concerning other aspects of this assessment program should be addressed. This program facilitates a thorough and integrated understanding of the components of verbal behavior so that an evaluator is in a flexible position to individualize the assessment, and hence, develop the most beneficial verbal intervention program for the student. The specific items on the mand, tact, and intraverbal assessment forms are only suggestions, since it is impossible to determine what EOs, and specific verbal and nonverbal stimuli will affect a particular individual at a particular point in time. There are blank spaces on the forms to include verbal relations which are specific to the individual. The evaluator should make use of these spaces.

Assessment in the natural environment is essential for an adequate scope of a person's verbal repertoire. Several types of verbal behavior may never occur under formal testing situations, because many of the typical stimuli and

each other, keep accurate data, and use the assessment program as a measure of progress. Verbal assessment is an ongoing process since, in a facilitative environment, new verbal responses should be acquired every day.

CHAPTER TEN

Teaching Duplic Behavior

The results of the verbal assessment will help to determine which aspects of this training program are most relevant for the individual being considered for verbal intervention. The language training chapters begin with basic verbal behavior, and progress to complex behavior. The current chapter is designed for individuals who are over three years of age, and who do not emit any identifiable words (or signs), under any circumstances (i.e., echoic, imitation, mand, tact, intraverbal). These individuals may have strong repertoires of inappropriate behaviors ranging from social withdrawal to severe self-abuse. The common feature among these persons is the total absence of a functional verbal repertoire.

A large number of developmentally disabled persons who are unable to duplicate any forms of verbal behavior. These persons, especially if they are adults, are often placed in "low functioning" groups in large DD facilities. Attempts at teaching verbal behavior to these individuals have failed. Most do not currently receive any form of intense verbal training due to this history of failure. If a person cannot echo a word, or even a close approximation to a word, it is difficult to teach functional verbal behavior. However, there are several variables, which if correctly manipulated, can increase the probability of successfully teaching these individuals to speak, or sign, or point to pictures, words, or letters. The first suggestion is to consider the use of sign language. (The advantages and disadvantages of a signing system were presented in Chapter 1). It may be easier to teach someone to imitate actions then to echo words. If a person can imitate some actions, but can't speak, then the procedures suggested in the next chapter would be most appropriate. If a person cannot emit any duplic behavior, then the procedures suggested below may be most appropriate.

Establishing stimulus control: Teaching duplic behavior

There are many DD persons who virtually never emit words, approximations to words, or even gestures which function as verbal behavior. These same persons probably have several inappropriate behaviors, and are given

medication to control their negative behaviors. The terminal objective (at this point) is to get the person to reliably duplicate specific vocalizations or gestures of the trainer. (Most likely gestures and sign language will be more successful than speech, especially when working with a teen or adult). The first task in developing a functional verbal repertoire for these individuals is to establish stimulus control for some type of behavior. That is, the trainer must be able to reliably evoke some specific behavior from the DD person. Often, the person can emit some receptive behavior such as following simple instructions (e.g., stand up, look at me). These repertoires can be useful for developing stimulus control over more advanced form of behavior because they consist of a situation where the trainer emits a stimulus, the student responds, and the trainer delivers reinforcement. The frequency of these trials will certainly affect the strength of stimulus control, but the mistake in many language training programs for low functioning people, is to conduct only receptive trials within a given language session. Rather, the emphasis should be to use this repertoire as a tool for strengthening stimulus control in order to increase the probability of developing more useful forms of verbal behavior.

Several variables will increase the probability of successfully teaching someone to emit duplic behavior. First, strong forms of reinforcement should be used. Most DD persons are reinforced by attention, food, drinks, objects and toys, and so on. However, each person is different. The value of reinforcers may change many times throughout the day, week, or month. Hence, as a second tool in developing duplic behavior, training should be conducted when establishing operations are strong. If a certain toy is being used as a reinforcer, then trials and sessions should be conducted when the EO for that toy is strong. For example, if a DD person does not emit any echoic or imitative behavior, but likes to listen to music in the morning before breakfast, then some duplic training trials should be conducted at that time. The EO is strong, and music as reinforcement is the most potent, thus at this point in time, a trainer would have a relatively high probability of evoking a duplic response.

The procedure for teaching duplic behavior consists of asking the person to imitate a physical movement (e.g., clapping, or raising arms) with the verbal prompt "Do this." The teacher should immediately reinforce any correct responses or approximations to the target response. If the person does not respond, or emits an obvious incorrect response, then the teacher should repeat the request and

movement a few more times. If the person still fails to respond, then the procedure should be repeated with the use of physical prompts to guide the person's arms through the correct imitative action. The student should be reinforced immediately with strong reinforcers (e.g., certain foods, drinks, toys) and praise. The next trial should occur within a few seconds, and the teacher should slightly reduce the physical prompt, and of course, immediately reinforce the student's correct behavior. Other potent reinforcers should be used as well, interspersing them with each other. The teacher should try to conduct as many trials as possible each session, and each day. The critical feature of this procedure is the careful shaping and fading necessary to develop the duplic behavior. Hence, the statement in a previous chapter that this particular procedure is most effectively carried out by staff members who are well trained in behavior modification. Progress may be slow, but well trained shapers and observers of behavior will most likely be able to produce behavior change, and thus see the progress.

Additional variables for developing stimulus control

EOs will weaken if the reinforcement being used can be obtained free (i.e., without responding) outside the session. For example if music is obtained noncontingently throughout the day, then its value may not be so strong when some response effort is required to obtain it. Also, its removal (under circumstances where the individual always has it) may be an aversive event that evokes aggressive behavior.

Many nonverbal DD persons have at least some receptive behavior under stimulus control (i.e., they can successfully follow instructions such as "Look at me." "Sit down). These repertoires demonstrate that at least some of the person's behavior can be brought under a teacher's stimulus control. (Although this behavior is not very functional for the person, it is functional for the staff who work with the person.) These successful repertoires can be interspersed with the targeted duplic response, and may increase the probability of bringing this new (potentially verbal) response under stimulus control.

Martin and Paer (1988) identified several other factors which contribute to the development of stimulus control. These factors should be taken into consideration, especially when attempts at developing control have failed. First, they note that stimuli should be presented clearly, and be distinct from other stimuli in the person's environment. The imitative and vocal stimuli that a teacher uses for

duplic training should be presented concisely, and should not be accompanied with other verbal or physical responses. For teaching imitative behavior, the stimulus should simply be "Do this," for example, while clapping (for teaching echoic behavior the stimulus should be "Say..."). The teacher should avoid emitting additional verbal behavior such as "Come on Fred, do this, you can do it Fred. Look at me Fred." Or, perhaps even more important, the teacher should present the clap in exactly the same manner each trial (e.g., same force, position, number of claps) and avoid emitting additional physical behaviors such as head and body movements. It should be noted that since every DD person is different, and their exact training histories are usually unknown to the current teacher, the additional verbal and physical stimuli may actually help evoke a response.

Martin and Pear also suggest that "stimulus control can be developed much more effectively when the teacher attempts to minimize the possibility of errors on the part of the student" (p. 121). This suggestion is derived from the work of Terrace (1963), and Touchette (1971), as well as several other basic behavioral researchers. The skillful use of prompts, and the fading of those prompts, can help minimize errors. A student who cannot emit any duplic behavior has obviously had a long history of failure. If no response occurs after the "Do this" prompt then the teacher should (within about 5 seconds) give the student a physical prompt and immediately reinforce the behavior. A teacher who skillfully uses prompts (adjusts the delivery of the prompts such that they have a maximum effect) and reinforces successive approximations can greatly reduce a student's errors, thereby increasing the probability that behavior will come under stimulus control.

A final point presented by Martin and Pear is to maximize the number of training trials. Training should be conducted every day with as many trials as possible each session. Some students may need several hundred trials every day in order to show improvement, others may require less. However, it is clear that sporadic training is not very effective for this level of DD person, the training must be very intense and conducted by skillful staff members.

If a trainer is still unsuccessful in evoking duplic behavior after an intense effort, then he should try to systematically reinforce a specific vocal or physical response that may eventually function as a verbal response form. The response targeted should be one that already occurs during the person's day, and can be used as an

approximation for a word or sign for a strong reinforcer. The goal of this procedure is to strengthen a particular behavior, thereby increasing its frequency, thus making it easier to bring the behavior under stimulus control. There are two separate ways to use reinforcement to strengthen behavior. Behavior may be directly reinforced, or behavior may be automatically reinforced. These procedures should be used in addition to the shaping procedures described above.

The direct reinforcement procedures consist of reinforcing a particular behavior (e.g., clapping, saying "ah ha") every time it occurs (or as often as possible) in the person's natural environment. Strong reinforcers should be used and delivered immediately after the targeted behavior. The automatic reinforcement procedures consist of pairing strong reinforcers with the teacher's specific behavior. For example, if you are trying to shape a clapping response, then the teacher should emit a clap and deliver a strong reinforcer to the student. The clap should always slightly precede (1 to 2 seconds) the delivery of the reinforcer. This procedure should establish the clap as a conditioned reinforcer (it may develop quickly, or it may require several hundred daily pairing trials, for several weeks). If clapping becomes a conditioned reinforcer, then when the clap occurs in the person's daily activities the product of the student's clap should function as reinforcement, thus automatically reinforcing the clap response (Skinner, 1957; Sundberg, 1979; Vaughan & Michael, 1982). The strengthening effect may be small, but when combined with the direct reinforcement procedures, and the shaping procedures described at the beginning of this section, and the techniques to develop stimulus control, duplic behavior may begin to emerge.

Summary

A student who cannot emit any form of duplic behavior will require an intense intervention program conducted by staff who are skilled in shaping and discrimination training techniques. Several variables can be manipulated which will increase the probability of developing stimulus control. Most important are the use of strong forms of reinforcement and their related establishing operations. Additional variables include interspersing other repertoires (such as receptive behavior) with the training on the duplic repertoire, using of clear stimuli, applying errorless learning techniques, maximizing the number of daily training trials, and increasing the direct and automatic reinforcement of the target behavior in the natural environment. When these techniques are combined and used on a daily basis they may produce successful duplic behavior

for individuals who have never emitted this behavior. One single successful duplic response will allow for the use of transfer of stimulus control procedures, and mands and tacts can now be developed much more quickly. Often the first few duplic behaviors are the most difficult to develop. But as the DD person comes in contact with the reinforcement for emitting verbal behavior, teaching and learning get easier.

CHAPTER ELEVEN

Developing a Beginning Verbal Repertoire

Many developmentally disabled individuals have weak echoic repertoires, but relatively strong imitative repertoires. If a DD person cannot echo sounds, but can imitate some simple movements (e.g., clapping), and he is reinforced easily, it may be possible to teach the first sign (mand/tact) in a few minutes. Several variables contribute to a person's interest in emitting words or signs. The two major variables are (1) the establishing operations (EOs) as they occur in the person's day to day environment, and (2) the reinforcement which satisfies those EOs. When a typical infant is hungry, for example, he begins to emit behavior which has in the past been followed by food. If this behavior consists of whining and crying, and is again followed by the receipt of food, then the behavior of whining and crying as a form of verbal behavior becomes even stronger. Other factors increase the probability that a child will emit a specific response. An item of food (e.g., a cracker) can prompt the response, as well as a verbal prompt such as "What do you want?" These two variables, along with establishing operations, specific reinforcement, and the person's imitative repertoire can be used to teach the first sign as a mand/tact (see Table 11-1).

Picking the first signs to teach a nonvocal person

The decision to teach a particular sign must be made carefully. Many teachers and parents have tried and failed to teach sign language to their students and children. Often this is because the signs were not appropriately selected. The first sign to be taught should be (1) easy to produce, (2) relatively iconic (i.e., the sign resembles the object or action), (3) one that matches an imitative response already in the person's repertoire, and most important, (4) the sign should be for a strong form of reinforcement, such as food (or a highly preferred item or activity such as listening to music). The person's hunger, the presence of food, a verbal prompt, and an imitative prompt, all combine to increase the probability of evoking at least an approximation to an appropriate sign, especially if the

person can already imitate the physical action, and the sign shows some resemblance to the reinforcer.

How to teach a person to emit a sign

Teaching verbal behavior to a non-vocal DD person is often very difficult and unsuccessful. Hence, start with a carefully selected sign, and use all of the relevant independent variables in order to evoke a response. Figure 11-1 contains a diagram of the seven (independent) variables and their relationship with the behavior (the dependent variable). Four of the variables precede the verbal behavior, and are technically referred to as antecedent events. The trainer should hold up the food item (which the person wants), and ask the student "What do you want?" After 3-5 seconds, present the imitation prompt (the trainer signs food) and immediately reinforce with praise and a food item the emission of the sign, or a successive approximation to the sign. This reinforcement will increase the controlling strength of the antecedent variables. However, it does not teach any new behavior because the student can already imitate. New behavioral relationships will develop as a function of using a fading procedure which should begin immediately on the next trial (Risley & Wolf, 1966; Martin, England, Kaprowy, Kilgoure, & Pilek, 1968) in order to transfer stimulus control from imitation to the the other three antecedent variables.

Fading out the imitative prompt

The second step in teaching a mand/tact sign is to fade out the imitative prompt in order to transfer stimulus control to the remaining three variables: the EO, the object, and the verbal prompt "What do you Want?" or "Sign____," (see the second panel of Table 11-1). For example, the trainer should hold up the food item and say/sign "What do you want?" The sign "food", or an approximation should be reinforced immediately with praise and the food item. No response, or an incorrect response should be followed by the inclusion of the imitative prompt of signing "food." The imitative prompt should be faded out the next trial by increasing the delay (Halle, Baer, & Spradlin, 1981) between the presentation of the question and the delivery of the prompt. Or, the imitative prompt can be faded out by decreasing the intensity or the physical characteristics of the prompt (e.g., only give part of the sign). The next time the food item and the verbal prompt "What do you want?" are presented the student is more likely to emit a verbal response without the imitative prompt.

This transfer of control from imitation to the other variables is the primary objective of initial verbal training. This transfer will usually occur within a few trials if the EOs are strong, hence, the term "quick transfer procedure" has been used to identify this technique (Sundberg, 1980). Once the behavior occurs without the imitative prompt, we could say the person has emitted a verbal response which is part mand (the EO variable), part tact (the food item), and part intraverbal (the verbal prompt). Eventually, it is important that the person sign "food" under the individual control of each of the above variables.

At this point, a second sign should be introduced. The new sign should also be iconic, easy to make, related to a strong form of reinforcement, and the form of the sign should match an imitative response (or an approximation) already in the person's repertoire. The second sign should be very different in form from the first sign. If the signs look alike, or "rhyme," they will be harder to acquire. Training on the two signs should be interspersed with each other, as well as with other receptive, echoic, and imitation responses which are already strong in the person's repertoire. The quick transfer procedure should be used as described above for the new sign. The procedures described below should be used to further develop the first sign.

Fading out the verbal prompt

Now, returning back to the first sign, the student should be able sign "food" without the imitative prompt, but the other three antecedent variables are still present (i.e., the EO, object, and the verbal prompt). It is important to free the response from these multiple sources of control since they will not always occur together in the natural environment. For example, if a student responds only when verbal prompts are given, his verbal repertoire will be greatly limited. In order to fade out the verbal prompt, and transfer stimulus control to the EO and the object, the trainer should present the student with the object (when the EO is strong) and say nothing, simply wait a few seconds. If an appropriate response occurs, reinforce it immediately; if a response fails to occur within 5-10 seconds give the verbal prompt and reinforce a correct response. Repeat the trial within a few seconds, that is, present the object to the student again and wait. Usually, after a few trials the student will begin to respond prior to the prompt. When he does so for the first time he should receive extra reinforcement. When the behavior occurs under these circumstances we can say it is both a mand and a tact.

Fading out the object

The next step is to teach the person to ask for the food item in the absence of that item (mand). The trainer should place the food behind his back, or in a bag, and ask the student "What do you want?" The trainer should then wait for at least 5 seconds before presenting a prompt, which should consist of bringing the food item out in front of the person. Since the person can already tact "Food," the response should quickly occur. Reinforce the person's response with food, and repeat the trial. Place the food item out of sight and ask "What do you want?" Usually, within a few trials, the response will occur under the control of the EO, and the verbal prompt which should eventually be faded out in the same manner as described above. When this occurs, the student has emitted a "pure mand," that is, the response is controlled solely by the EO and the specific reinforcement. However, a second reinforcing object should be interspersed with the item in order to teach the person to ask for specific reinforcers. Finally, always give the student exactly what he asks for. This helps to bring verbal behavior under better establishing operation control. (Note that the two fading procedures need not occur in the order suggested here--fade the verbal prompt, then the nonverbal prompt. The opposite order may be more effective and appropriate for some individuals. It is important however, to at some time to fade out both of these prompts.)

Training in the natural environment

The training procedures should be conducted in the person's natural environment to ensure the verbal behaviors occur in settings other then the formal training setting. The training procedures can be easily conducted during the person's normal day. If this is done it will most likely increase the speed of acquisition. The signs (and words) must be functional for the person in his day-to-day interactions with others in his environment. Parents, staff, and friends should encourage the person to emit the signs when appropriate and reinforce attempts to do so. Verbal behavior is maintained by a verbal community, and if a person leaves a training session and goes to an environment where the signs are not required, and the previous inappropriate verbal behavior gets reinforced (e.g., whining to get food), what's the point of the training? Parents and staff often complain about the difficulty of learning signs, but at this point they should be able to learn the signs at least as fast as the DD person. (This issue will be discussed in more detail in a later section.)

Moving on to a third sign

Once a person can at least mand/tact the first two signs, a third sign should be introduced. The training procedures for the third sign should be similar to those for the previous signs. Note that the acquired signs need not be perfectly executed, or need be under each source of control independently to move on to additional signs. However, the response should be strong under EO and nonverbal control (i.e., reliably occurring without any imitative prompts). Also, the signs should be occurring outside the session as described above.

Make sure the early signs are strong before adding too many new signs. Think of the thousands of times a toddler emits his first few words before others develop. We need not wait for several months to pass, as may occur in typical early language development, but we should make sure that there have been a sufficient number of training trials to insure that the response will remain strong as others are introduced. Also, the first signs still may need to be trained to occur independently under EOs, as well as verbal and nonverbal sources of stimulus control. This training can be conducted simultaneously with the training on new signs (in the same session). When the new signs are introduced, the previously acquired repertoires should always be interspersed with them, as well as the other repertoires of receptive, echoic, and imitative behaviors.

Adding more signs for reinforcers (mands)

Establishing operations and specific reinforcement, characteristic of the mand, can play a helpful role in the acquisition of other forms of verbal behavior (Carroll & Hesse, 1987; Stafford, Sundberg, & Braam, 1988; Sundberg, 1980). Therefore, at this point in the person's rather fragile verbal history, additional signs should be added which contain those strong variables as sources of control. In other words, the next several signs should be for items and events which function as reinforcement for the particular individual (e.g., music, ball, book, hat, bubbles, car, boat, cracker, drink, candy, milk, cookie).

Summary

Hundreds of DD individuals have received this training during the past fifteen years. Most of them had long histories of failing to acquire language, but all of them were successful in at least learning and using some signs (see, for example, those in Sundberg, 1980). The procedures described above are effective for several reasons. Perhaps

the most important is the use of the establishing operation and specific reinforcement as independent variables. These variables, when combined with basic behavior modification techniques, Skinner's analysis of verbal behavior, and sign language can allow a teacher to generate verbal behavior for an individual who has never been successful in language training. This is only the beginning however. The following chapters use the same basic procedures to teach a wide variety of verbal skills. The chapters begin with teaching simple tacts and intraverbal, then progress to more complicated mands, tacts, and intraverbals, followed by reading, writing, spelling, sentence construction, and social interaction.

CHAPTER TWELVE

Developing the Tact Repertoire

After the successful training of 10 to 15 (or more) mands for reinforcers, training should begin on the names of common objects and actions in the DD person's daily environment. Training should also continue on the other verbal relations (i.e., duplic, mand). The only prerequisite skill necessary for beginning tact training is that the person already have some responses (either signs or words, including approximations) under duplic stimulus control. Once the person has developed a minimal duplic repertoire (i.e., he can imitate new words and signs without much training) transfer of stimulus control procedures can be used to bring the response under the nonverbal stimulus control characteristic of the tact.

Beginning tact training

Following the acquisition of the tacts related to strong reinforcers (described in the previous chapter), objects (nouns) most common to the DD person should be trained. These objects should consist of items which are in the person's immediate environment, and ones that he comes in contact with on a regular basis (e.g., shoes, socks, hat, shirt, pants, pen, paper, car, table, chair, door, window, bus, tree, water). The procedure used to train these words/signs will be essentially the same as the quick transfer procedure previously described for the mand. However, the EO and the specific reinforcement variables are not present for the tact. Initially the student may receive the object named, but after the behavior becomes strong it is important to fade from specific reinforcement (characteristic of the mand) to nonspecific, or generalized conditioned reinforcement (characteristic of the tact). The consequences for tacting are conditioned reinforcers which are often set up for educational reasons. It is important that a student learns they will not receive everything they talk about. The use of mand variables for tact training has been shown to accelerate the acquisition of tacts (Carroll & Hesse, 1987), but eventually the EO and the specific reinforcement must be faded out in order to develop a pure tact.

Real objects should be used in the early stages of tact training. Pictures can be used, but real objects may be more effective in developing the behavior because they are three dimensional, and present in the person's daily environment. Eventually pictures can be used for generalization and for teaching tacts for nonverbal stimuli not easily brought into a training session (e.g., a circus).

The first step in tact training is to present the object in front of the person along with a duplic prompt (see Table 12-1). For example, while holding up a shoe the teacher says/signs, "Shoe, say/sign shoe." Correct responses (or approximations) should be reinforced with praise and, if necessary, the shoe (eventually the generalized conditioned reinforcement alone should follow the response, and the specific reinforcement--assuming it is reinforcement--of the receipt of the shoe should be faded). Beginning with the next trial the teacher should start to fade out the duplic prompt, and introduce the intraverbal prompt "What is that?" The fading of the duplic prompt can be accomplished by using a delay procedure which was previously described. Another procedure for transferring stimulus control consists of decreasing the auditory level of the prompt. This procedure consist of reducing the intensity of the duplic prompt. The teacher should continue to decrease the intensity of the prompt until the response occurs in its absence. If errors occur, the intensity of the prompt should be increased slightly, and reduced again.

Transfer of stimulus control can also occur by fading from full prompts to partial prompts. Once the student responds correctly in the presence of a full duplic prompt the prompt should be faded to a partial prompt. For example, in teaching "shoe" the teacher should fade to "Sh," or a partial sign for shoe. The prompt should be continuously reduced until the response occurs in the absence of the prompt. If errors occur while fading the prompts, the teacher should again back up to more full prompts and reduced again.

All of these techniques can be combined to form one teaching procedure. The main purpose of this procedure is to transfer stimulus control while reducing errors, thus providing the student with a good schedule of reinforcement. It is important in early training to keep errors low and review previously acquired tacts. If a student makes errors on previously mastered tacts, they should be placed back on the training list.

Fading out the verbal prompt

The prompt "What is that?" should also be faded. However, this is a complicated issue because the student needs to learn to identify objects without relying on the verbal prompts to do so. But also, the student still must tact when asked to do so. Therefore training should be given with both types of trails so that pure tacts will develop, as well as tacts that occur when a parent or teacher asks "What's that?"

Tacting actions

After the student has acquired several tacts for common objects (perhaps 5-10), then training should begin on teaching tacts for actions (verbs). These tacts are a little more complicated to bring under stimulus control because the controlling variable for a verb is a fleeting, or transitory stimulus. That is, the stimulus is only temporary, as in a push or jump, whereas the stimulus for a noun is constant as in the physical presence of a pen. The actions used should be performed by the teacher (or another student) rather than presented in pictures (pictures may be used for generalization trials after the response becomes strong). The teacher should pick a few common actions (e.g., roll, stand, jump, bounce, walk, run, dance) and teach the student the tact by using the same transfer procedures used above (see Table 12-2). However, the intraverbal prompt "What am I doing?" (or "What is s/he doing?") should be substituted for "What's that?" Initially the stimulus will consist of three types of control (duplic, tact, and intraverbal). The teacher's task is to fade the duplic prompt, and eventually the intraverbal prompt. However, transfer of stimulus control can be observed when the action and verbal intraverbal prompt alone evoke a correct response.

Pure tacts

A pure tact is a verbal response controlled only by a nonverbal stimulus (and consequence). This behavior, like a pure mand, is often referred to as "spontaneous" language, because the verbal response appears to come "from within the speaker." Pure tacts are important (especially in science) and can be useful in several situations, such as social interactions or starting conversations. Often these tacts are trivial "ice breakers" such as tacts of the weather, or one's clothing (however, there may be an EO involved in some situations). Pure tacts can benefit a listener in other ways as well. For example, a person may tell another "It is cold outside." The listener may say, "Thank you, I better

get my coat." This type of tacting is, of course, more advanced then the material presented thus far, but it should give the reader a general indication of the social role of this repertoire. However, pure tacts may not be as useful as pure mands. Pure tacts may be socially inappropriate, and some may not be tact but be mands for attention. For example, it is inappropriate for a person to repeatedly tact the nonverbal features of his daily environment (unless he is just learning this behavior). A speaker doesn't typically walk into a room and start overtly tacting, "Light," "Wall," "Chair," "Books," and so on, although he may do so if it is an especially interesting stimulus as in "What a beautiful painting!" We may tact several stimuli at a covert level, but it would be considered inappropriate to emit pure tacts constantly at the overt level. This behavior may be considered a "behavior problem" for some DD persons, such as those labeled autistic.

Generic Tact Extensions

Following training on specific nonverbal stimuli it is important to introduce other stimuli which have the same defining features, but differ with respect to some particular feature which is irrelevant to the definition of the object. For example, if the student learns to tact "car" in the presence of a model of a red thunderbird, then training should be given on a blue thunderbird, a red corvette, a white cadillac, and so on. Training should also be given on pictures of cars, and on real cars out on the street. To teach this behavior the student should be presented with the novel (untrained) stimulus and asked "What is this?" The trainer should use the prompt and fade procedures described above. This training should be conducted with every tact response acquired. (However, after the tact repertoire becomes strong these generic extensions may occur without training). Training should also occur across the day, with different teachers (and students), in different environments, and at the person's home. It is also important to conduct training across different sense modes. The person should also be able to tact "car" when he hears a car, or touches a car in the dark or has his eyes covered. Training with these different senses will be discussed more in an later section.

Summary

A typical child first learns to tact (and mand) the strong reinforcers in his daily environment. The child then acquires tacts of common objects and actions. The training sequence for the DD person should follow this same general order. The quick transfer procedure can be very effective

in teaching a person to tact the nonverbal stimuli in his environment, and can be done almost errorlessly which can make learning more reinforcing. Tact training should begin with real objects and actions, and should use pictures for generalization purposes. A student must also learn to tact in the presence of other people and in other environments, as well as in the presence of nonverbal stimuli which differ slightly from the training stimuli. Tacting should also be freed from verbal stimulus control in order to develop pure tacts. Finally, the tact response must also be brought under auditory and tactile stimulus control (olfactory and gustatory may also be relevant for some tacts).

Tact trials should be interspersed with trials on the other repertoires discussed thus far (i.e., mand, echoic, imitative, receptive), especially if learning is slow and it takes several trials and strong reinforcers to develop tacts. The tacts for objects and actions are only the beginning of tact training. However, at this point the student is probably ready to acquire some intraverbal behavior (he may already have some). The following chapter will present the basic procedures for training intraverbal behavior. More complex tacts will be presented in Chapter 15 "Teaching complex tacts."

CHAPTER THIRTEEN

Teaching Simple Intraverbal Behavior

A DD person who can mand for several reinforcers, and tact several objects and actions is ready for intraverbal training. The mand and tact repertoire need not be extensive to begin this training. Remember that in intraverbal training the response is the same as that as the mand and tact. It is the controlling variable which is different. As discussed previously, the intraverbal is a form of verbal behavior where the form of the response is controlled by a prior verbal stimulus which lacks point-to-point correspondence to the response product. For example, a tendency to say "Three" when someone else says "One, two..." is intraverbal. The form of the stimulus does not match the form of the response product.

Verbal behavior typically develops along two general dimensions. The first is an increasing number of response topographies (vocabulary words, sentences, correct syntax, etc.). The second is an increasing number of different controlling variables which evoke verbal responses (i.e., mand, tact, intraverbal etc.). It is important to progress along these dimensions simultaneously. In traditional language training, there is a tendency to delay intraverbal training (usually called "classification and categorization" skills, which are not totally intraverbal because of the characteristic presence of pictures or objects) until several hundred tacts and receptive responses are acquired. This occurs because intraverbals (as conceptualized by traditional linguistics) involve "higher cognitive process," and "many DD persons don't possess these cognitive abilities during the early stages of language intervention." This is a mistake, because much of a typical speaker's daily verbal behavior consists of intraverbal behavior, and the only prerequisite to intraverbal behavior is duplic, mand, or tact behavior.

The intraverbal repertoire is also frequently neglected because it is assumed that if a person can tact and mand, then they will "use these words" in conversation. However, the data indicate that these repertoires are separate verbal skills (Braam & Poling, 1984; Sundberg, 1980; Watkins, Pack-Teixteira, & Howard, 1989). As a result intraverbal

behavior usually needs to be directly trained for an individual with defective verbal behavior.

Procedures for teaching intraverbal behavior

Intraverbal training procedures should be conducted simultaneously with training on the other repertoires. That is, don't stop teaching new mands or tacts in order to teach intraverbals, simply add the intraverbal procedures to the others discussed thus far. The following procedures for training a basic intraverbal repertoire involve the transfer of stimulus control from establishing operations (mand), nonverbal (tact), or duplic stimuli, to verbal stimuli which lack point-to-point correspondence to the response product. If the student has a strong mand, tact or duplic repertoire the transfer should occur quickly (using the quick transfer procedure).

A student who has acquired sign language along with speech may already have acquired some simple intraverbal in the form of translations. That is, when the teacher says "Ball" the student signs "Ball" (or vice versa). This is intraverbal behavior and may be very useful in early language training. This repertoire can be used to help transfer stimulus control to other variables, or to intersperse with training on new verbal relations.

The first intraverbal relation to be specifically trained should be based on what functions as reinforcement for an individual, and on what he can already mand or tact. The establishing operation and specific reinforcement can be an important tool in developing early intraverbal behavior (as it is with developing early tacting, cf. Carroll & Hesse, 1987). The student enters the intraverbal session with verbal responses which are controlled by the EO, the object, and perhaps, the question "What is that?" For mand/tact to intraverbal procedures the first step is to transfer control from the EO and the nonverbal stimulus to the EO and verbal stimulus by fading out the object. The same prompting and fading procedures which were described for mand and tact training can be used for intraverbal training. For example, a student who can easily mand and tact "Cracker" should be presented with the cracker (which he wants) along with the verbal stimulus "You eat..." (see Table 13-1). A correct response should be followed be delivery of a small cracker. On the next trial the teacher should cover up the cracker (remove the nonverbal stimulus) and repeat the verbal stimulus "You eat...." Then the teacher should wait several seconds (delay procedure) for a response. If no response occurs (within 10 seconds) then the teacher should slightly uncover the cracker. If this

evokes the response "Cracker" then reinforce the behavior with praise and the cracker. If the response does not occur, completely uncover the cracker, and reinforce a correct response with only praise and repeat the trial. Transfer to the verbal statement should occur in a few of these trials, hence a multiply controlled intraverbal response has been successfully trained.

Transfer of stimulus control procedures can also be used by fading out a duplic source of control. This procedure is essentially the same as that described above, but the duplic prompt "cracker" is faded out rather than the object. This procedure can be equally effective (as it appears to be in mand training, cf. Hall & Sundberg, 1987), but it gives away the form of the response and it may be more desirable for the student to emit the response form without duplic prompts.

Once the duplic or tact variables are eliminated the next step is to fade out the EO and the specific reinforcement. Both of these sources of control can be eliminated by fading from specific reinforcement to generalized conditioned reinforcement. The procedure described above should be repeated but use only praise as a reinforcer and don't deliver the cracker. If the response quickly weakens, then fade out the cracker by using a variable ratio reinforcement schedule (i.e., reinforce on an average of every other correct responses, then an average of every three responses, then four responses, and so on). This move to generalized conditioned reinforcement should help to free control from the EO and bring the response solely under the control of the verbal stimulus (Skinner, 1957, p. 53).

Pure Intraverbals

A verbal response that is solely under the control of a verbal stimulus which lacks point-to-point correspondence to the response is a pure intraverbal. "Spontaneous" participation in conversations may be pure intraverbal behavior, in that a speaker's response functions as a verbal stimulus which evokes an appropriate intraverbal response from the DD person without any prompting (i.e., verbal prompts to speak or sign, nonverbal stimuli present, or EO in effect). This behavior often must be directly trained. It is a mistake to assume that it will develop as a function of receptive or tact training, cognitive processing, cognitive awareness, perception, and so on. When it fails to develop for a DD person the blame is often placed on these cognitive difficulties, and thus the person's "retardation," rather than on the failure to fade the other

sources of control for intraverbal behavior. It may take several trials (and sessions) to completely free control from these other variables, so training should begin with additional intraverbals once the first response has been brought under some degree of intraverbal control.

Teaching additional intraverbals

The next several intraverbals to be trained should also be linked to strong establishing operations and to specific reinforcement to maximize the student's probability of success. Also, the responses should already be in the person's repertoire as duplics, mands, or tacts. At this early stage of training avoid teaching trivial intraverbals such as "How are you?" "I am fine." Instead keep the intraverbals relevant to the individual person (e.g., eat--raisin, drink--juice, mommy--daddy, dog--cat, bounce--ball, ride--bike).

It is important to note that the main point of Skinner's analysis is that the same response can occur for different reasons or "meanings." These meanings or reasons are simply different types of control (i.e., duplic, mand, tact, intraverbal, codic), and it is essential that all the "meanings" be taught to the person. Therefore, additional intraverbal responses should be drawn from the list of acquired duplics, mands, and tacts, and brought under intraverbal stimulus control. It is the teacher's behavior, not the student's cognitive processing, which changes to teach each "meaning."

A typical language session should contain trials on all of the different verbal operants. By interspersing the mand, tact, and intraverbal, the verbal interactions between a student and a teacher more closely approximate typical interactions between speakers and listeners. Speakers don't, for example, just tact things or point to things when asked to do so, or speakers don't just mand for reinforcers, or just emit intraverbal behavior. Rather speakers do all of these at different times in a conversation. A more typical language repertoire will develop if the training sessions contain trials on these different repertoires. While conducting intraverbal trials, for example, the teacher should intersperse a few mand and tact trials.

Training in the natural environment

New words or signs should be added daily, if possible, in the formal sessions and in the natural environment. Often, the point is made that the DD person will become confused with all of these procedures and new words.

However, the strength of these repertoires depend on the stimulus control developed by daily training and daily use in the natural environment. If training does not occur, and verbal behavior is not carefully reinforced, then stimulus control will be weak, and the person's verbal behavior will be less effective. If language training is only conducted in formal sessions (typically a 1/2 hour session occurring two to three times a week), then the repertoires will be weak, stimulus control defective, and progress quite slow. (This point is relevant for all the verbal operants). On the other hand, if training is conducted on a regular basis throughout the day, at home and in school, in formal and informal sessions, with different teachers, parents, and materials, then a DD person's verbal repertoires will have a much greater probability of improvement, and even perhaps match the development of typical verbal behavior (Sundberg, 1980).

These suggestions may sound overwhelming, but it should be clear that they do not require that all involved with a DD person drop everything for the language program, rather simply incorporate these procedures into the person's daily activities. Formal sessions should be used to teach new words/signs. However, natural events in the environment are often some of the best contingencies to use for training, and they should incorporated into the program. The careful attention to opportunities to conduct the quick transfer procedure in the natural environment can produce relatively rapid language development. A teacher's careful arrangement of the environment can increase the frequency of such opportunities. For example, require a DD person to mand for reinforcers during the day. Also, parents and teachers can use the opportunity to mand for a reinforcer (and get it) as a consequence for a few correct intraverbal responses. For example, the trainer says "Name a state," and after a correct response the trainer say's "Good, what do you want?" Training language in the natural environment is essential to the success of this program. If a DD person is never required to emit the verbal responses under these contingencies, then a very atypical verbal repertoire will develop and other behavior which may function as language (e.g., aggression) may not decrease.

The effects of intraverbal training

The results of successful intraverbal training become obvious in many ways. The main objective is to free verbal behavior from exclusive control of duplic and nonverbal stimuli, or the EO, and bring the response under the control of a different type of antecedent--a verbal stimulus which lacks point-to-point correspondence to the response product.

Not only will the person be able to verbally classify objects and events when they are not physically present (e.g., name some animals), but the person may (and should) begin intraverbally responding to the verbal behavior of others. That is, prior to intraverbal training a DD person may emit pure duplic behavior (i.e., copying the verbal behavior of others without any prompts to do so). The pure duplic repertoire plays an important role in language development. But, in many respects duplics are trivial when compared to pure intraverbal behavior. With the development of intraverbal behavior a DD person may be observed to respond to the content of another speaker's verbal behavior, rather than its form. For example, a toddler emits pure duplic behavior when he immediately repeats some of the sounds or words made by his parents. His tendency to say "Bye bye" when a parent says "Get your shoes and we'll go bye bye." is controlled by the form of the parent's response (i.e., "bye bye"), thus echoic. Later, a parent says "Get your shoes." and the toddler says "Bye bye." Here the toddler's response is controlled by a verbal stimulus which lacks point-to-point correspondence, thus intraverbal (it may also be part mand in that the toddler has a strong EO to go bye bye). Under these circumstances we could say that the toddler is responding to the content of the adult's verbal behavior which is often taken as a demonstration of "higher cognitive processes." Behaviorally, we have observed the transfer of stimulus control from echoic to intraverbal S^{D}s.

Summary

At this point the DD person should have received training on the basic aspects of verbal behavior. The person should be able to mand for several reinforcers, even in their absence, (although maybe for only a few reinforcers, and not always pure mands). The person should also be able to tact several common objects and actions in his environment, and be able to do so without specific reinforcement. In addition, he should be able to tact some stimuli which affect other sensory systems (e.g., tactile, auditory). And finally, as a result of the intraverbal training presented in this chapter, the person should be able to emit correctly several responses which are intraverbally controlled by the verbal behavior of others (or possibly himself). Once an individual has a basic duplic, mand, tact, and intraverbal repertoire, the language instruction task becomes easier in some respects, but much more complicated in other respects. The following chapters consist of suggestions for further developing each of the verbal operants, as well as some other, more complex forms of verbal behavior.

CHAPTER FOURTEEN

Teaching Complex Mands

The mand is the most important verbal operant for an early language learner. Manding allows an individual to control his environment with relatively little response effort. A skilled mander who can ask for help with a heavy box, for example, can avoid the effortful lifting response by emitting a rather simple verbal response (provided the appropriate audience is available). The consequences for this behavior can be exceptionally strong, not only because little physical effort is required to obtain it, but because the consequences can involve specific unconditioned, and conditioned reinforcement. That is, a good mander can often get what he wants.

In chapter 11 procedures for teaching a beginning mand repertoire were presented. These procedures made use of strong establishing operations such as food deprivation and highly preferred items. These strong variables are essential for successful language training with an individual who has a long history of ineffective verbal behavior. However, there are often only a few strong reinforcers which are effective with a particular individual, yet it is essential that a speaker be able to ask for things other than food, water, and favorite items. In order to develop such a repertoire it may be necessary to contrive conditioned establishing operations (CEOs) in order to evoke these mands. The current chapter contains several basic procedures and suggestions for developing these types of mands.

The blocked-response CEO

Michael (1988) describes a blocked-response CEO as a stimulus change which alters the value of a particular learned consequence, but that consequence cannot be obtained without a specific response. For example, a child picks up a cassette tape player and attempts to play it, but discovers that there are no batteries in the unit. The playing of the music is "blocked" until a response is emitted which will obtain batteries. The response could be nonverbal by simply getting the appropriate batteries from a drawer, or it could be verbal by manding for them from a

listener with a response such as "I want batteries." For a nonverbal DD person with a defective mand repertoire this set of circumstances may lead to negative behavior such as a tantrum or aggressive behavior which may result in obtaining batteries. When it does, it most likely develops an inappropriate form of manding.

Teaching mands controlled by these types of CEO's is often difficult because they can only be taught when the establishing operation is present. This may be difficult because the establishing operation can be a transient variable present only briefly (once it is reinforced the EO may dissipate quickly). Therefore, in order to develop the EO as a controlling variable for verbal behavior the EO must be captured, or contrived. Capturing an EO requires that a training trial be conducted when the EO is at strength. For example, if the objective is to teach the child to ask for batteries when they want them, then training must occur at the moment the child wants them. The "incidental teaching" procedure developed by Hart and Risley (1974, 1976, 1978), makes effective use of ongoing EO's, and allows for an excellent opportunity to develop and expand verbal responses. The training procedure is implemented when the motivational variable is strong, for example when a child wants to play music, but discovers his batteries are too weak to successfully operate the radio. A teacher, who has access to batteries, can be most successful at that moment in evoking the response "batteries" (either vocalized, signed, or pointed), and depending on the child's verbal history, transferring control to the establishing operation.

A successful transfer (or pure mand) can only be observed at a future time when the EO is again present (the batteries wear out). In incidental teaching the occurrence of the EO is used to expand the response to larger, more grammatical, units, such as "I want batteries please." However, the problem with naturally occurring EOs is that they are too infrequent. A long time delay (long-life batteries) between opportunities to respond can easily further weaken an already tenuous response. This circumstance is often responsible for verbal behavior that becomes "prompt bound" in that either duplic, and/or tact, and/or intraverbal controlling variables need to be present, along with the EO, in order to evoke the appropriate response. The child may only "mand" for batteries when he, not only wants them, but when he see's them and is perhaps given an echoic or intraverbal prompt. This type of verbal response is a multiply controlled mand rather than a pure mand. If the batteries are given on the first trial then there is no opportunity for a transfer trial which is necessary to free the response from control by echoic, tact,

or intraverbal variable and bring it solely under the control of the EO.

Contriving establishing operations

Contriving EOs may allow for more frequent training trials, as well as provide opportunities for a greater variety of mands. Hall and Sundberg (1987) developed a procedure for contriving EOs with developmentally disabled deaf individuals. Two subjects, both of which had very weak mand repertoires, were taught to complete nonverbal chains of behavior which led to an effective form of reinforcement. For example, one subject was taught to make instant coffee by completing a sequence of steps involving (1) opening the jar of coffee, (2) taking out a teaspoon full of coffee, (3) putting it in the cup, (4) pouring hot water in the cup, and (5) stirring the coffee with a spoon. The subject could tact each item in the chain, but when an item was removed (e.g., the cup) the subject was unable to produce the correct mand response, and often engaged in some form of negative or disruptive behavior. The removal of the cup blocked the response of drinking the coffee, thereby increasing the value of the cup as a reinforcer. However, the mand for cup was not in the subject's repertoire.

The procedure to teach the mand for cup consisted of using the variables that controlled the tact (i.e., the actual cup) as a prompt for the response cup when the CEO was strong. Over successive trials the object was faded out and control was transferred to the conditioned establishing operation. This procedure allowed for the subject to successfully mand for the missing item. It is important to note that the negative behavior previously seen under these circumstances no longer occurred. This blocked-response mand training procedure has now been successfully replicated by several researchers (e.g., Carroll & Hesse, 1987; McCook, Cipani, Madigan, & LaCampagne, 1988; Sigafoos, Doss, & Reichle 1989; Sigafoos, Reichle, Doss, Hall, & Pettitt, 1990).

There are many situations which, if arranged properly, can be used to teach mands. A mand for batteries could be taught using the blocked-response procedure if the incidential teaching procedure was ineffective. In order to contrive the EO for batteries, the batteries could be removed from the player and the child given the player. Once the child discovers that the player does not work (and assuming the correct mand does not occur), prompts could be given (implement the quick transfer procedure). The first prompt should be the least revealing such as "What do you want?" Followed by, depending on the child's verbal

history, either an intraverbal or tact prompt. An intraverbal prompt might consist of asking the child "What do you need to put in the back of your cassette player?" For a signing child with less verbal behavior an effective intraverbal prompt might be the English words "sign batteries." The tact prompt would be the presentation of the batteries. These prompts should be faded out as quickly as possible, and the response brought under the sole control of the CEO.

Fading out the prompts requires careful execution and is a critical part of verbal instruction. Removing prompts too quickly, or too slowly, can result in failure to transfer. The intraverbal prompt, for example, can be faded out by first dropping off the last word or two in the teacher's question (e.g., "What do you need to put in the back of your..."). Then, each trial the teacher should reduce his prompt until "What" with a questioning look on his face. Finally, just a questioning look, then no special facial prompts. If these additional prompts are not faded out the response may always be multiply controlled and occur only when more than one of these variables are present.

Learning how to alter the value of objects and events is another important skill for a language teacher. Contriving establishing operations becomes easier once the essential features of the EO and the transfer procedure are understood and practiced. A teacher can often become quite skilled at seizing an opportunity to train a mand. The use of the verbal prompt "What do you want" can be very effective in teaching the child that a mand is needed to obtain what the child wants. Below are some examples of blocking a response.

Give the student a bowl of ice cream without a spoon.

Ask a student to check the air in a tire but don't give him a tire gauge.

While a child is on a swing don't push him until he asks.

Give the student a piece of paper but not a pen.

Ask the student to comb his hair but don't give him a comb.

Give the student a sandwich without his favorite meat in it.

Give the student a glass without any liquid in it.

Give the student a cassette tape but not a tape player.

Ask the student to plug a three prong plug into a two prong socket (provided there is no danger of shock).

Ask the student to get some water but turn the water off below the sink.

Give the student a hard nut but not a nut cracker.

These types of circumstances happen throughout a DD person's day, but often get solved without verbal behavior, or go unnoticed due to either no response on the part of the student, or because they evoke negative behavior which gets reinforced and thus becomes the mand. Special training under circumstances where the teacher knows what response topography to prompt may help to increase the chances of developing a generalized mand repertoire (Hall & Sundberg, 1987).

Manding for action

In chapter 12 procedures were presented for teaching a student to tact actions (verbs). It is also important that the student learn to mand for actions (as well as emit intraverbal responses involving the same action). When the value of some movement is strong the student should be able to obtain this reinforcement by emitting some form of verbal behavior. For example, if a student wants an item that is inside a container but cannot open the container the response "open" should come to strength. The student may be able to emit this response under tact contingencies, but that is no guarantee that the response will occur when the establishing operation is present. In order to teach this verbal relation the tact and duplic repertoires can be used to transfer control to the establishing operation. The procedure of contriving the EO might involve putting some form of reinforcement (e.g., a raisin) in a tupperware container and giving it to the student along with the prompt "What do you need to do to get the raisin? What do you want?" A partial prompt such as "Want o..." should be given if no response occurs within 5-10 seconds. If the student can emit the response "open" as a duplic and a tact it should only take a few transfer trials to teach the response as a mand. This procedure should be repeated with a variety of reinforcers and containers. In addition, training should be provided under other circumstances where the response "open" would be appropriate such as opening doors, or opening cans of fruit or soda.

For every tact of an action in a verbal repertoire there should be a corresponding mand. Some of these mands

will be easier than others, and some certainly more functional for the student. The focus of early training should be on the more reinforcing and functional relations in an effort to develop a generalized mand repertoire for actions. Verbs such as stand, sit, jump, run, and walk can be taught with the following procedure. Often students are reinforced by telling others to engage in some action (controlling a teacher's motor behavior may be surprisingly reinforcing for some students). In those situations a simple game where the teacher and student tell each other to stand, for example, may be quite effective. First the teacher can say to the student "Tell me to stand." If the student emits the duplic response the teacher should stand, and praise the student. Next, the teacher should mand "You (or use the student's name) stand." The student will most likely stand since this receptive skill is probably strong in his repertoire. Once the turn taking of standing is established with duplic prompts the prompts should be faded. The verbal prompts "Your turn," or "Now you tell me to do it," can be substituted for the duplic prompt. Other actions should then be tried such as jump. The procedure would be the same except a different action. If this is successful then the "game" should involve several different mands for actions between both individuals, then in a larger group (the game "Simon says" may further develop this repertoire).

If these procedures for manding actions are tried and the student does not mand the action without prompting and several sessions of training, then the teacher should carefully pick other actions to train. Actions that directly affect the student in some other way may be more effective. For example, mands for throwing or rolling, or mands for moving out of the way to a desired object. Training in a group situation may also produce different effects. Have one member of the group play teacher and tell the other members in the group, including the teacher, to engage in various actions. This can be made into a game and scores kept for each student, the winner being the one with the greatest number of mands. Whatever method is used it is important to remember that the specific reinforcement for manding actions is the behavior of the person who is given the instruction.

Manding for prepositions, adjectives, adverbs, and pronouns

The ability to tact prepositions, adjectives, adverbs, and pronouns does not, of course, guarantee that a mand for those same relations will occur when an establishing operation is at strength. Training on these verbal operants when the EO is strong will most likely be necessary for

establishing the appropriate mands. For example, a student may be able to distinguish between in and on when presented the corresponding nonverbal stimuli, but when he wants an item put in something, such as a key in a lock, the response may not occur. Instead, as suggested earlier, negative behavior such as whining may occur. In order to teach this type of mand it will be necessary to capture an existing EO, or to contrive an EO.

If the value of the key in the lock is strong for the student, then the quick transfer procedure could be used to transfer control from a duplic prompt to the EO. The teacher say's "What do you want?" followed by a brief delay then the prompt "Say 'in'" is given. A duplic response should then be reinforced, and the prompt faded on the next trail. If a naturally occurring EO does not exist then one can be contrived by placing a reinforcing object in a locked box. The procedure could be contrasted with "on" by placing the key on the lock instead of in and say "Is this what you want?" Individual procedure for training "on" as a mand should also occur. This type of specific training may be necessary for each preposition and may need to be conducted under a variety of situations before a generalized mand involving prepositions is established.

The ability to mand for the properties of objects will also probably need direct instruction. If a student has a preference for a certain color then it may quite easy to establish manding for that color. However, if no preference exists then specific procedure like the ones previously described will be necessary. Such a procedure may involve placing a reinforcer under one of several different colored plastic cups. The student would then be asked to mand for one of the cups to look for the reinforcer (e.g., "red cup"). A correct response would be followed by receipt of the reinforcer. This procedure could be used for several different adjectives such "long vs. short," or "big vs. little. Training in the natural environment under the control naturally occurring EOs, like with the other aspects of verbal behavior, will be essential for further developing this repertoire.

Manding for the property of actions would also need special training, as would manding for pronouns. Verbal games can be a useful vehicle for establishing various aspects of verbal behavior. A game for teaching adverbs might consist of moving a toy horse and cowboy slow and fast. The quick transfer procedure would involve the use of delays and duplic prompts to get the student to mand for fast movements versus slow movements. Taking turns between the teacher and the student, or perhaps even more effective,

between students can be an effective way to develop a variety of responses. Mands for pronouns could be taught also in the group situation where turn taking is the game and responses such as "mine" and "yours" are prompted and trained.

These various "parts of speech" may all need to be trained individually, but soon they will need to be placed together in a "sentence." The next section will describe procedures for developing larger and more grammatical units of verbal behavior as mands. The first procedures presented will involve the development of mand frames, then procedures for teaching multiple component responses will be presented.

Teaching the "I want..." mand frame and mand sentences

A mand is often embedded within a response frame which has a history of reinforcement. The "I want..." frame can be useful in establishing a generalized mand repertoire. The student's response "I want" can become equivalent to the response "I have an active EO." Training now must be given on emitting the particular response form linked to that EO. If a student can mand using single response forms, then the incidential teaching procedures can help expand the response form to include the "I want..." frame. For example, a student says/signs/points to "juice" as a mand. At that point the teacher prompts "Say 'I want juice'" and requires the student to emit a duplic response, then conducts a transfer trial consisting of the prompt "What do you want?" The teacher may need to prompt the first part of the response with "I...." A student who can emit "I want" before a specific topography can help a teacher discriminate between a response that is a tact and one that is a mand. There are several other mand frames which can help develop the mand repertoire such as "Can I..." "Will you..." "Give me..." etc.

This procedure may be a useful starting point for the development of more grammatically accepted mand sentences. Mands which contain only a single response form are often considered rude or inappropriate for a skilled speaker. Often, however, it is difficult to get a student to emit the "I want" response. Under these circumstances it may be more useful to pursue teaching multiple responses which involve specific features of the desired item. For example, it may be easier to teach the student to mand "Apple juice," or "Grape juice." If so, then the emphasis should be placed on expanding the mand topography this way rather then always allowing a single response form.

The quick transfer procedure can be used to link together nouns and verbs, as well as nouns, verb, adjectives, etc. Prompts such as "Say the whole thing," and the incidential teaching procedure, can be helpful in establishing larger response units.

A skilled mander softens his mand in many ways. The response "Please" is often an acceptable way to increase the probability that a listener will provide the specific reinforcement. However, the controlling variables for this response are quite complicated and it is usually best taught within a mand frame such as "I want ____ please." Eventually, the two procedures of teaching mand frames along with teaching multiple responses can be combined as in the response "I want apple juice please."

Question words as mands

Questions are mands because they occur under the control of establishing operations and are consequated by specific reinforcement. This, of course, is why young children reach a point in verbal development where questions begin to occur at a high rate. Questions are very important for verbal development because they allow a speaker to acquire additional verbal behavior. Once an early language learner can ask questions then the acquisition of verbal behavior begins to accelerate rapidly. For example, a child might ask "What that?" and the parent says "hammer," then the child might say "I want hammer," or "That's a hammer." If an individual can easily emit a number of mands, and does so with multiple component response forms, then he should be taught how to mand for information with the question words where, what, who, which, when, how, and why.

Where. The mand "Where?" involves asking for the location of a desired item. In order to teach this form of verbal behavior an establishing operation must be contrived. One way to do it is to play a game where a reinforcer is hidden under one of two colored cups. The teacher then moves the cups around and echoically prompts the student to ask "Where is the cracker?" (or simply, "Where cracker"). At first the duplic response should be reinforced, then prompts faded and reinforcement withheld until less prompted responses occur. Other objects for concealment of the item should then be used such as bowls, hats, paper, etc, as well as different reinforcers. Also, teachers should make use of the natural contingencies involving "where" throughout the student's day. Prompts such as "Where is your coat?" Can you say "Where is my coat?" can make the verbal relation more functional while increasing the strength of this type of mand.

What. The response "What?" is a mand when the response occurs under the control of the establishing operation involving the increased value of some verbal information. This response can often be taught by again playing a game where the teacher and the student take turns asking for the names of known items presented. The teacher should ask "What is this?" then after the student responds prompt him with "Your turn, you ask me." Additional prompts may be necessary to get the student to respond initially. After turn taking is established, unfamiliar items should be placed in front of the student. This type of training, along with training under the natural contingencies of the daily environment, can help establish the "What?" mand.

Who. A similar procedure can be used for teaching who, but persons should be used instead of objects. Real persons, or pictures of people in different professions (e.g., policeman, fireman), should be presented in a game and turn-taking format. The responses may require extensive prompting at first, but the student should be reinforced for approximations, and prompts should be faded. Training in the natural environment should also occur.

Which. This type of question involves a mand for a specific item, or information about a specific item, from an array of items. A game to teach this mand could consist of presenting the student with a number of similar items that differ in color (e.g., popsicles). First ask the student "Which one do you want?" Then, following the student's turn, prompt him with "Your turn, you ask me."

When. "When" is a mand for information involving time. This type of question might be taught by first telling the student that a reinforcing event is going to occur. This may help to create an EO for information involving the passage of time. The teacher can prompt the student to ask for example, "When are we going?" and reinforce this with information about when the departure is planned. This type of training is perhaps best done under the natural contingencies of day to day events.

How. This is a more difficult question then the others. Asking "how" might be taught by first demonstrating some activity such as constructing a toy, or a reinforcing object which would require some specific skill or behavior to operate. For example, a mechanical robot with a remote control. The teacher can then prompt the student to ask "How," and then reinforce the student by showing them how to operate the toy. Prompts should be faded, and trials conducted under natural contingencies as often as possible.

Why. This mand involves asking for the causes of behavior or events. These are perhaps the most difficult questions to teach. A possible way to teach this mand is to perform some action in the presence of the student such as opening the toy robot's battery compartment. The student should be prompted to ask "Why did you open it?" and the teacher should respond "To check the batteries." Then, have the student open it and the teacher should ask the "Why" question. Trials on other types of actions and in the natural environment will probably be necessary for the further development of this mand.

These procedures for question asking are general and meant to be examples of how these repertoires might be developed. It often takes several trials across a wide variety of situations to establish these repertoires firmly. Specific techniques will depend on the individual student, and on the degree to which, for example, the behavior of another person functions as reinforcement for that student. The game aspects of the procedures have been quite helpful in the past. These procedures often work well in a group situation with several questions developed simultaneously. For example, one student in the group is instructed to close his eyes or turn away from the group. A second student is then given some object which would function as reinforcement for the first student. The student who was give the object then hides it somewhere. The first student is then told he can have the object if he can find out who hid it, and where. This type of activity is often enjoyable to the students, and teaches cooperation along with question asking.

Arranging the daily verbal environment

A primary objective at this point in teaching verbal behavior is to increase the frequency of functional verbal operants occurring throughout a person's day. Many (if not most) of the early forms of verbal behavior for an early language learner consists of mands (one need only spend time with young children to be convinced of this). Parents and teachers need to establish an environment which requires and reinforces verbal behavior. Simple prompts such as "What do you want?" can have big effects. Rather than giving reinforcers away free use them as an opportunity to evoke a mand. A typical child may emit thousands of mands a day. A verbal training program which is in effect only a short time each day, or even worse a few times a week will have a low probability of producing a fluent speaker.

Contriving CEOs and incidential teaching are good ways to increase the frequency of verbal behavior. There are

several other activities which can help promote verbal behavior as well. The focus of the daily intervention should be on expressive (duplic, mand, tact, intraverbal, and codic) verbal behavior rather than on receptive responses. Require the student to talk as much as possible. Responses which are part mand and part tact (e.g., when playing catch with a ball request the child ask for the ball) may easily be worked into the daily routine. Also, interspersing trials on the other verbal operants with the mand can be helpful. Tact, dupic, and intraverbal trials at varying levels should occur as many times as possible each hour. For example, ask the student to identify common objects in the daily environment, to answer fill in questions, and repeat phrases. The more frequent these trials are the easier it becomes to verbally respond. Ivar Lovaas has said many times that much of his success with the autistic population is due to the thousands of daily training trials.

If a student is using sign language it is important that others in the environment sign in conversation with each other as often as possible. Don't respond for the student. There often is a strong tendency for parents and teachers to talk for the children and students. This of course only makes matters worse. Approximations should be reinforced and correct responses prompted. These are a few examples of how an environment can be arranged to be a "language based" environment.

Summary

In order for a response to be a mand it must occur under the control of an establishing operation. Therefore, training this operant must involve active EOs. The incidental teaching procedure and the blocked-response procedure are two ways to be assured that an EO is at strength. These procedures should be conducted as often as possible, and the student should be required to mand throughout the day. It is important to remember that if the object needs to be present for a mand to occur, then the response is also part tact. In order to train a pure mand the response must be solely under the control of the establishing operation.

Classification Chart

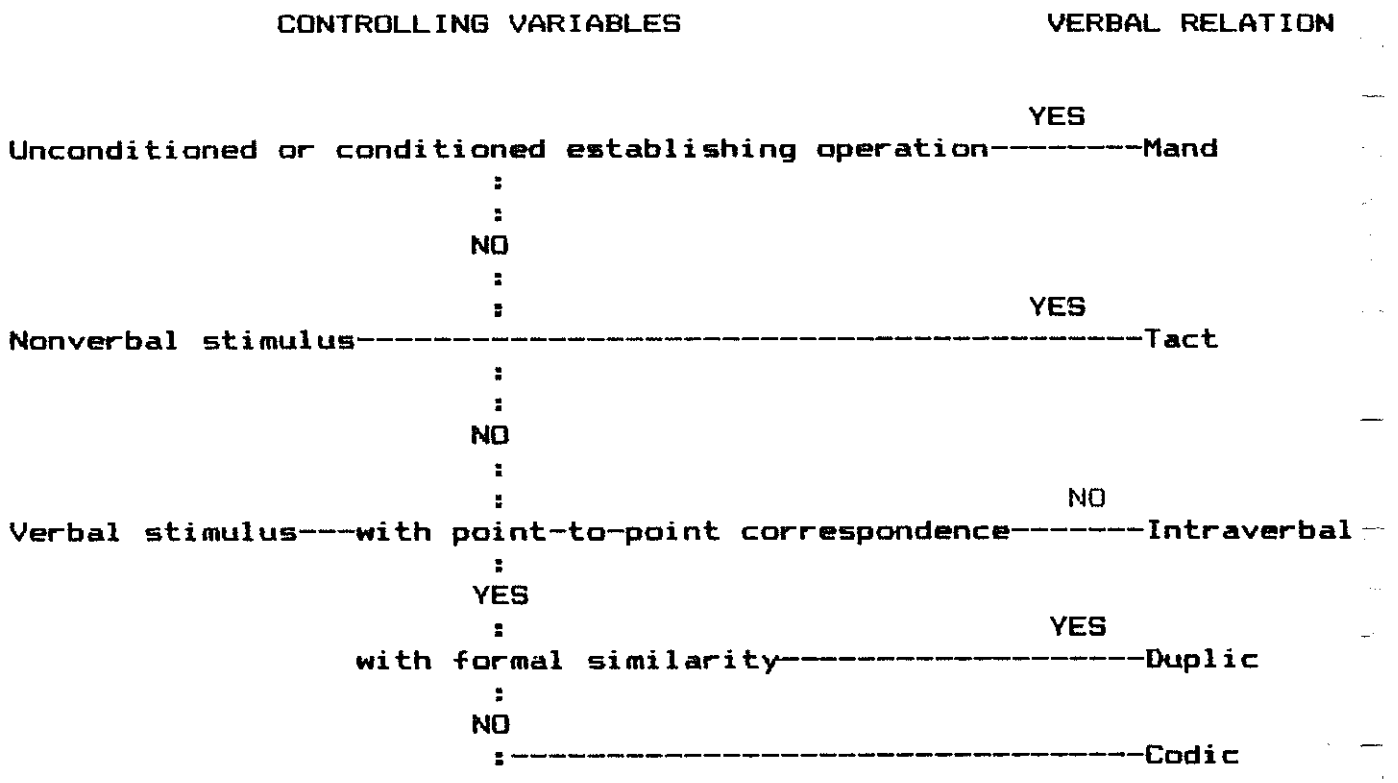

Table 3-1

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

Table 3-2

THE QUICK TRANSFER PROCEDURE FOR A PURE MAND

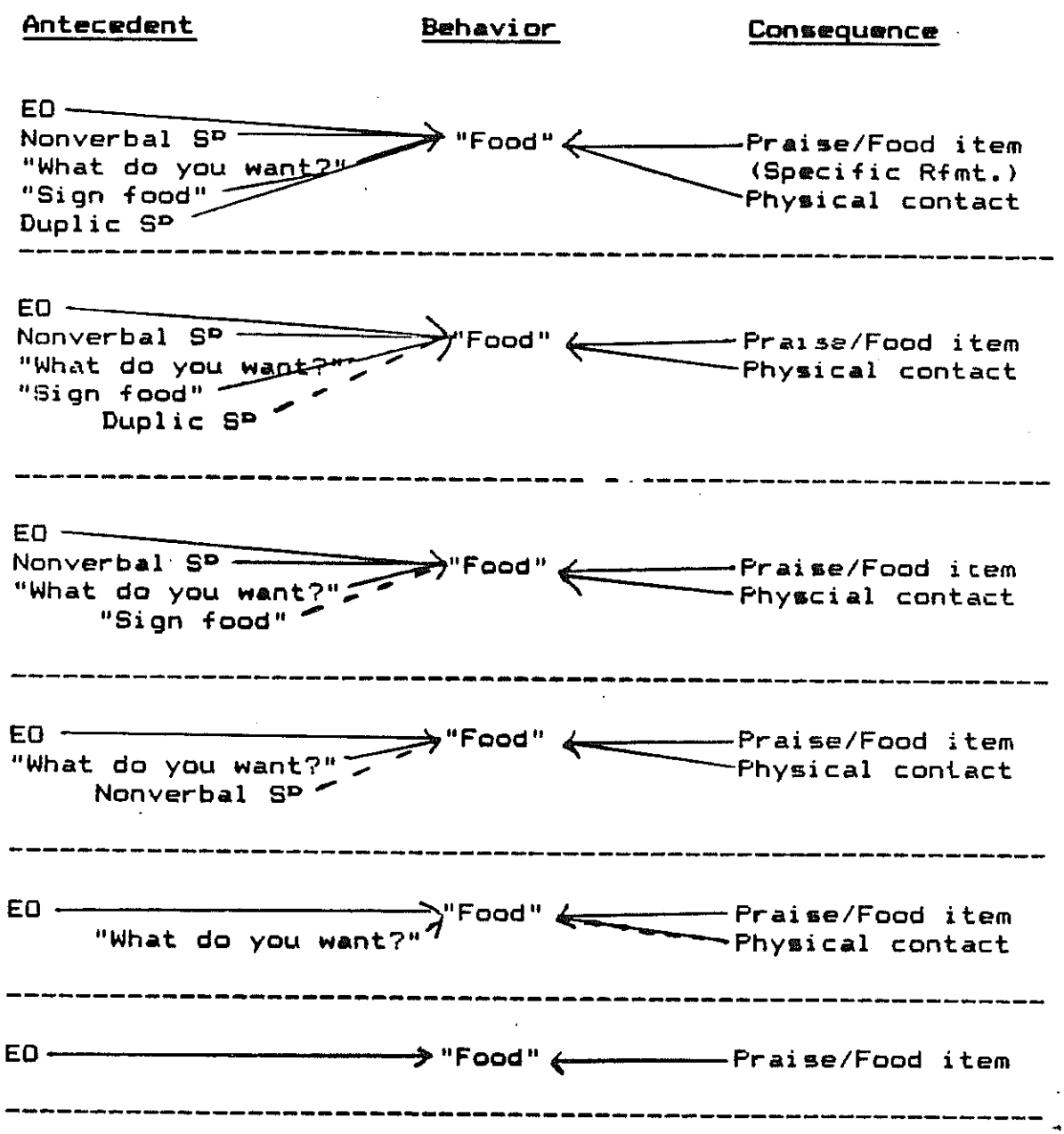

Table 11-1

THE QUICK TRANSFER PROCEDURE FOR A PURE TACT OF AN OBJECT

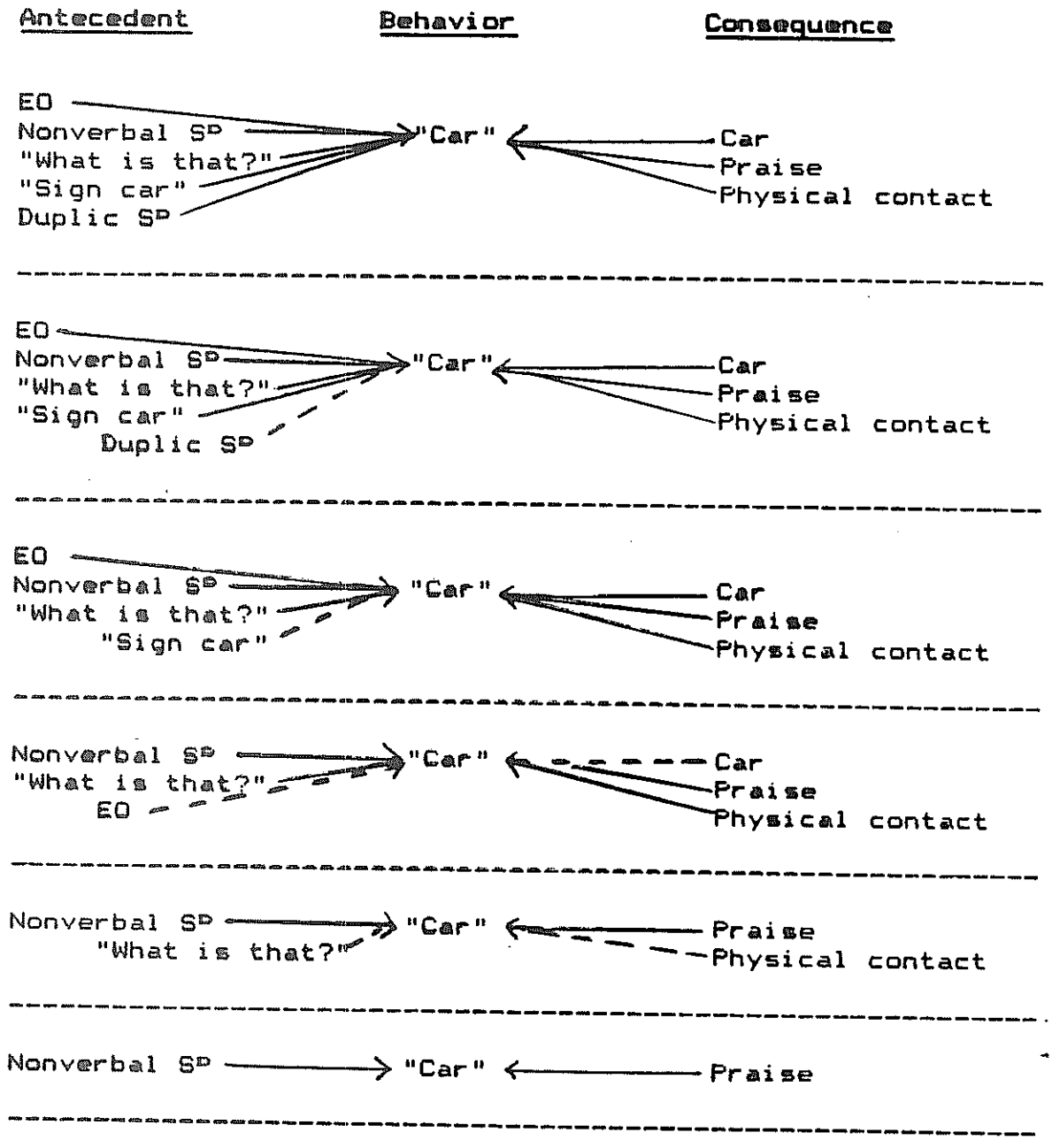

Table 12-1

THE QUICK TRANSFER PROCEDURE FOR A PURE TACT OF AN ACTION

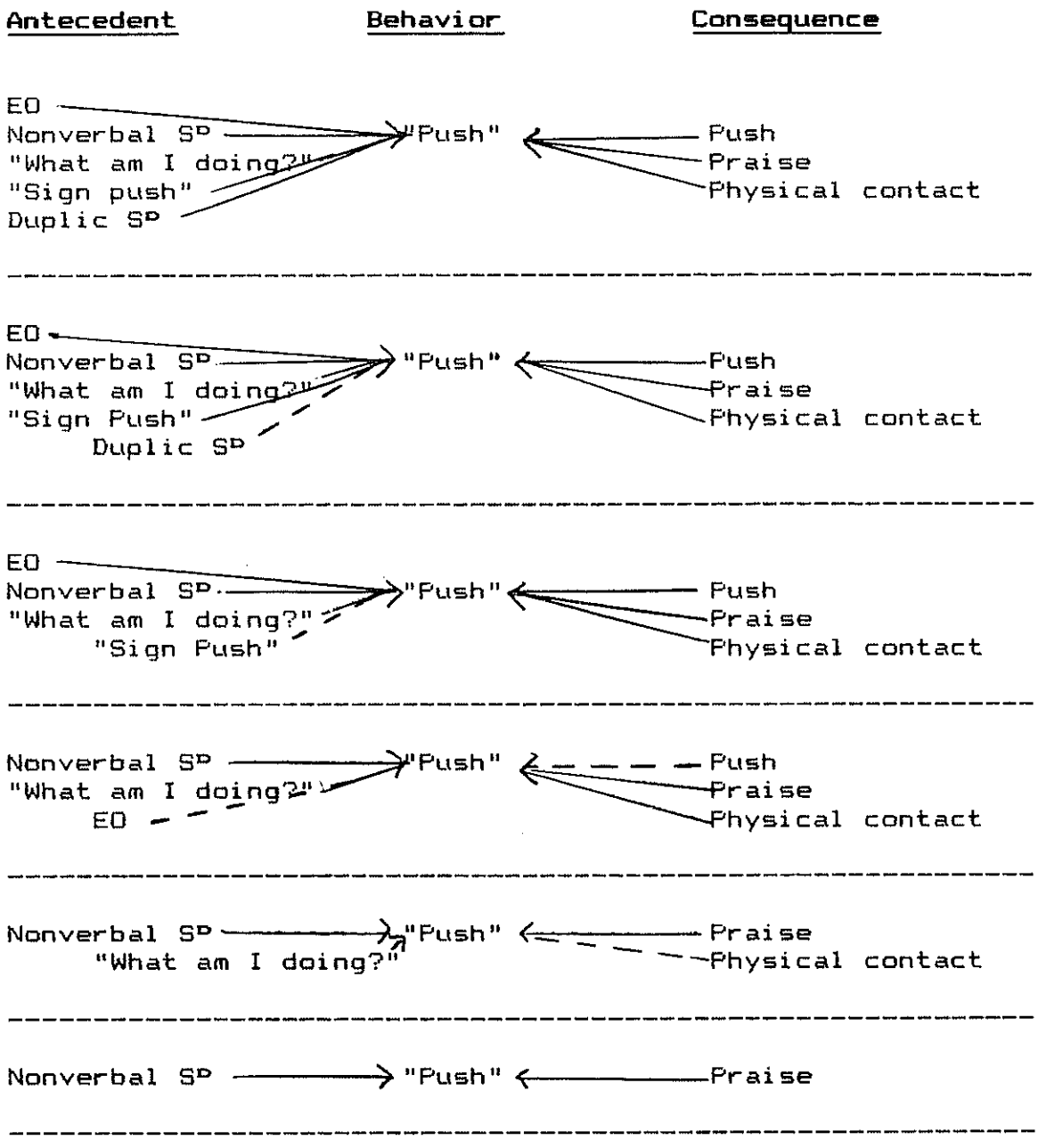

Table 12-2

THE QUICK TRANSFER PROCEDURE FOR A PURE INTRAVERBAL

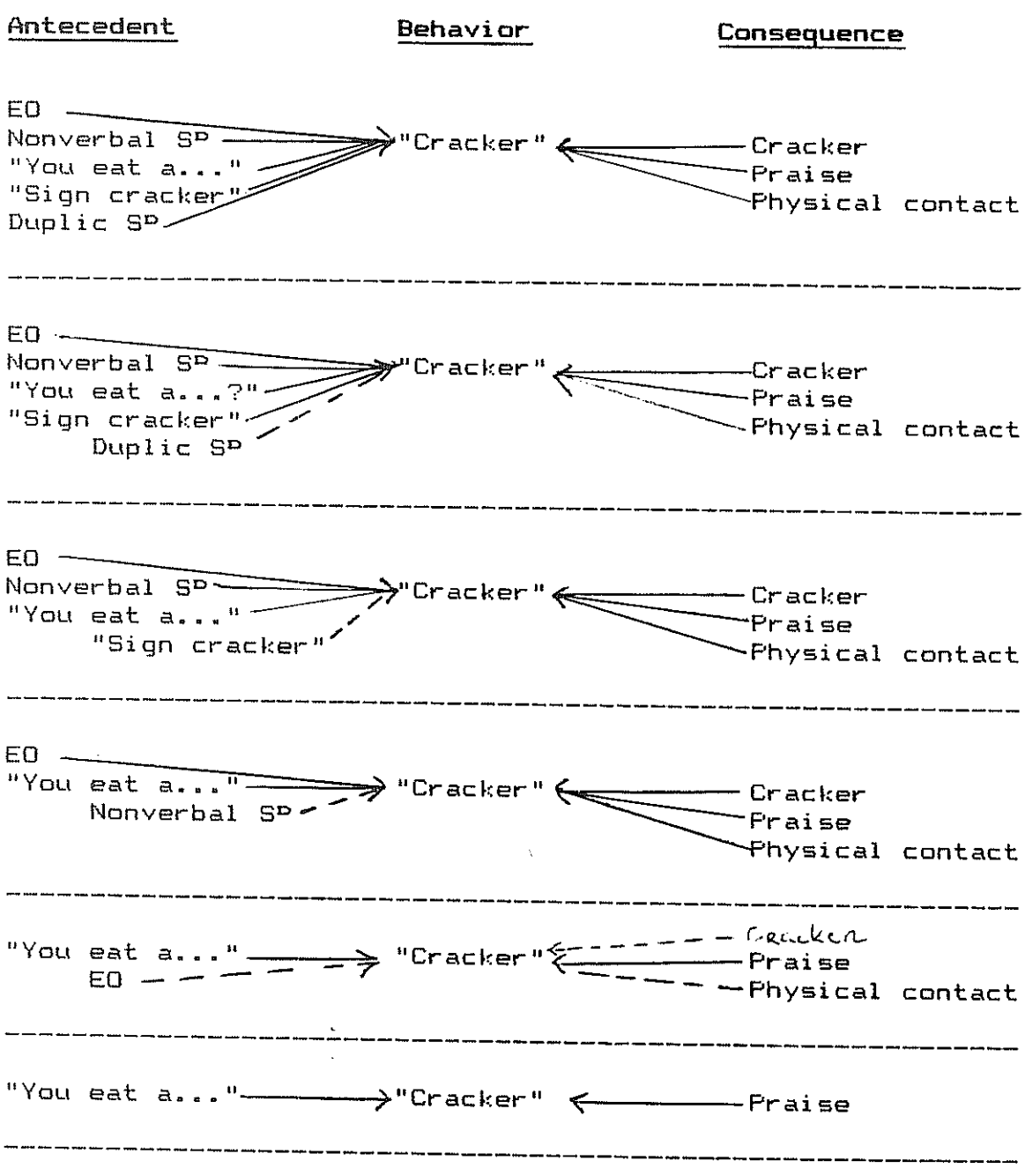

Table 13-1

APPENDIX 1

THE RECEPTIVE EVALUATION FORM

INSTRUCTIONS: The objective of this part of the evaluation is to determine how well the student follows commands and instructions. Ask the student to comply with each specific instruction. Record the responses, and reinforce correct responses and approximations. If necessary, intersperse these trials with other trials in this packet. Use the blank spaces for trials which might be specifically relevant to the individual being tested. Use a plus (+) for a correct response, a slash for an approximation (/), a minus (-) for an incorrect response and a zero (0) for no response. Write in the response if it is an approximation. The evaluator should consult the appropriate sections in the preceding text for more complete instructions.

	Stimulus	Response
1.	Look at me	
2.	Stand up	
3.	Come here	
4.	Go to the table	
5.	Eat your food	
6.	Drink your...	
7.		
8.		
9.	Touch the book	
10.	Touch the cup	
11.	Touch the car	
12.	Touch the table	
13.	Touch the cat	
14.		
15.	Pick up the book	
16.	Pick up the cup	
17.		
18.	Touch you ear	
19.	Touch your nose	
20.	Touch your eye	
21.	Touch your toes	
22.		
23.	Push the car	
24.	Pull the rope	
25.		
26.	Open the door	
27.	Jump	

28. Shake your head "yes" _____
29. Shake your head "no"_____
30. Touch the red book_____
31. Touch the blue circle_____
32. Touch the small table_____
33. Touch the red triangle_____
35. _____
36. Pick up the short yellow pencil_____
37. Put the large block in the orange cup_____
38. Go to the kitchen and get a spoon_____
39. Go to the backyard and get a leaf_____
40. _____
41. Touch the angry man (pictures)_____
42. Touch the busy lady_____
43. _____
44. Touch the lawn sprinkler_____
45. Find yesterday's newspaper_____
46. Make a sandwich_____
47. _____
48. Touch the calculator_____
49. Touch the generator_____
50. _____

THE ECHOIC EVALUATION FORM

INSTRUCTIONS: The objective is to determine the student's ability to emit specific phonemes and words. The evaluator should first pronounce the underlined letter and consequate and score the response. Then present the entire word and consequate and score the response (use the notations described above).

	Consonants		Isolation	Whole word
1.	/b/	boat	_____	_____
2.	/d/	dark	_____	_____
3.	/f/	far	_____	_____
4.	/g/	gold	_____	_____
5.	/h/	home	_____	_____
6.	/k/	cold	_____	_____
7.	/l/	let	_____	_____
8.	/m/	man	_____	_____
9.	/n/	next	_____	_____
10.	/p/	part	_____	_____
11.	/r/	rest	_____	_____
12.	/s/	send	_____	_____
13.	/sh/	ship	_____	_____
14.	/t/	ten	_____	_____
15.	/th/	then	_____	_____
16.	/O/	thin	_____	_____
17.	/v/	very	_____	_____
18.	/w/	went	_____	_____
19.	/y/	you	_____	_____
20.	/z/	zoo	_____	_____
21.	/3/	vision	_____	_____
22.	/wh/	when	_____	_____
23.	/ch/	children	_____	_____
24.	/j/	jury	_____	_____
	Simple vowels			
25.	/a/	far	_____	_____
26.	/ae/	sat	_____	_____
27.	/e/	pen	_____	_____
28.	/I/	in	_____	_____
29.	/.a/	all	_____	_____
30.	/U/	put	_____	_____
31.	/u/	but	_____	_____

	Diphthongs	Isolation	Whole word
31.	/ey/ late	_____	_____
32.	/iy/ see	_____	_____
33.	/ow/ go	_____	_____
34.	/ay/ I	_____	_____
35.	/au/ now	_____	_____
36.	/oy/ boy	_____	_____
37.	/u/ pool	_____	_____
38.	/o/ work	_____	_____

	Diphthongs before /l/ or /r/		
39.	/ie/ feel	_____	_____
40.	/ei/ sale	_____	_____
41.	/ea/ there	_____	_____
42.	/ah/ shall	_____	_____

ECHIOC ASSESSMENT--PART TWO

INSTRUCTIONS: The objective is to determine the student's ability to echo the evaluator's words. Ask the student to echo each word. Record responses, and transcribe approximations. Reinforce correct responses and approximations, and move to another word following incorrect responses, or no response.

	Stimulus	Response
1.	Hi	_____
2.	Bye	_____
3.	Mom	_____
4.	Dad	_____
5.	Car	_____
6.	Book	_____
7.	Eat	_____
8.	Drink	_____
9.	Pen	_____
10.	My	_____
11.	Door	_____
12.	Shoe	_____
13.	Hat	_____
14.	Milk	_____
15.	Plate	_____
16.	Teeth	_____

17. Bubble_____
18. Monkey_____
19. Cracker_____
20. Apple_____
21. Yellow_____
22. Window_____
23. Elevator_____
24. Stadium_____
25. Deliver_____
26. Innocent_____
27. Algebra_____
28. Recreation_____
29. Spontaneous_____
30. Exasperate_____

Unprompted echoic responses in the natural environment

_____
_____
_____
_____
_____

Inappropriate echoic behavior

_____
_____
_____

THE IMITATION EVALUATION FORM

INSTRUCTIONS: The evaluator should perform the actions below, and say to the student "Do this." Do not name the action, simply perform it. If a correct response fails to occur, then name the action while performing it and saying "Do this" (this is an imitation plus receptive trial, and the evaluator should note this on the forms below). Record and consequate all responses. Use the blank spaces for trials which are specific to the individual being tested.

	Stimulus	Response
1.	Walk	
2.	Jump	
3.	Clap	
4.	Stand up	
5.	Sit down	
6.	Raise arms	
7.	Shake head "yes"	
8.	Shake head "no"	
9.	Turn in a circle	
10.	Touch your toes	
11.		
12.		
13.	Smile	
14.	Frown	
15.	Make a fist	
16.	Wiggle your fingers	
17.	Touch index fingers together	
18.	Touch index finger to nose	
19.	Touch index finger to elbow	
20.		
21		
22.	Tap table twice	
23.	Tap table three times	
23.	Wiggle index finger	
24.	Wiggle baby finger	
25.		
26.	Fingerspell the letter A	
27.	Fingerspell the letter R	
28.	Fingerspell the letter K	
29	Fingerspell the word "Cat"	
30.		
31.	Assemble a nut and bolt	
32.	Use a screwdriver	
33.	Pound a nail with a hammer	
34.	Tap a rhythm on the table	

35. _____

Unprompted imitative responses in the natural environment

_____
_____
_____
_____
_____

Inappropriate imitative behavior

_____
_____
_____

THE MAND EVALUATION FORMS

INSTRUCTIONS: The objective of this part of the evaluation is to determine the student's ability to ask for reinforcers, or to remove aversives. Observations in the natural environment are critical for determining the strength of this repertoire, especially since the mand is controlled by establishing operations which vary throughout a person's day. The evaluator should observe the student in a variety of situations and record the person's requests for objects, actions, removal of aversives, or questions asked. Both primary and secondary mands should be recorded. Identify the EO, the response topography, and the specific consequences

Establishing operation	Response	Specific consequence

The mand can also be assessed by increasing the value of specific objects or actions (contriving the establishing operation). There are several suggestions below for this aspect of the assessment.

1. Give the student a cup when he is thirsty and wait to see if he asks for something to drink, or put in the cup.

---

2. Give a student a bowl of soup and wait to see if he asks for a spoon._____
_____

3. Give the student a familiar toy which needs a battery and wait to see if he asks for one._____
_____

4. Give the student who likes to draw, a sheet of paper and wait to see if he asks for a crayon, pencil, or pen.
_____

5. Remove the chairs from the room and ask the student to sit at the table._____
_____

6. Give the student a locked box and wait to see if he asks for a key._____
_____

7. When the student wants to go out, wait at the door to see if he asks to open the door or to go out._____
_____

8. Give the student some dry cereal and wait to see if he asks for some milk._____
_____

9. Give the student a toothbrush and wait to see if he asks for toothpaste._____
_____

10. Give the student a cassette (providing it is a reinforcer and he has a history with it) and wait to see if he asks for a tape recorder._____
_____

11._____
_____

12._____

_____

Asking questions

INSTRUCTIONS: In the natural environment, or under contrived situations, does the individual ask these questions? Record what is being asked for or talked about.

Who_____

What_____

Where_____

When_____

Which_____

How_____

Why_____

Inappropriate manding

_____

_____

_____

_____

_____

THE TACT EVALUATION FORMS

INSTRUCTIONS: This evaluation determines the student's ability to identify verbally the physical aspects of the environment. This part of the assessment requires quite a few materials. The evaluator should assemble a collection of nonverbal stimuli consisting of objects, actions, noises, taste, smells, pictures etc. Many of these materials can be found in a typical classroom or in the person's home. A department store catalog can be very useful for this assessment. A majority of the assessment should be done in a formal situation, however natural environment observations may reveal tacts which would not otherwise be observed. The evaluator should present the nonverbal stimulus to the student and say "What is that?" (or, What am I doing? What do you hear? etc.). Correct responses should be reinforced and recorded. Incorrect responses should be recorded and the evaluator should move to the next item.

Simple visual stimuli Nouns	Response
1. Food	_____
2. Drink	_____
3. Ball	_____
4. Car	_____
5. Pencil	_____
6. Book	_____
7. Dog	_____
8. Cat	_____
9. Cup	_____
10. Shoe	_____
11. Nose	_____
12. Ear	_____
13. Hat	_____
14. Table	_____
15. Spoon	_____
16. Light	_____
17. Door	_____
18. Comb	_____
19. Bird	_____
20. Phone	_____
21. _____	_____
22. _____	_____
23. _____	_____
24. _____	_____
25. _____	_____

Simple visual actions Verbs	Response
1. Jumping	_____
2. Running	_____
3. Walking	_____
4. Rolling	_____
5. Pushing	_____
6. Pulling	_____
7. Hugging	_____
8. Dancing	_____
9. _____	_____
10. _____	_____

Simple auditory stimuli	Response
1. Bark	_____
2. Music	_____
3. Bell	_____
4. Mom's voice	_____
5. Horn	_____
6. Phone	_____
7. Running water	_____
8. Motor	_____
9. _____	_____
10. _____	_____

Combinations Noun-noun	Response
1. Shoes and socks	_____
2. Pen and paper	_____
3. Dog and cat	_____
4. Spoon and fork	_____
5. Table and chair	_____
6. Bread and butter	_____
7. Mom and dad	_____
8. Car and truck	_____
9. _____	_____
10. _____	_____

Combinations Noun-verb	Response
1. Roll ball	_____

2. Push car
3. Spin wheels
4. Drinking water
5. Blowing out a candle
6. Falling leaf
7. Flying birds
8. Ringing a bell
9. _____
10. _____

Properties of objects
Adjectives

Response

1. Red
2. Big
3. Long
4. Tall
5. Heavy
6. Sharp
7. New
8. Funny
9. _____
10. _____

Multiple properties
Adjective-adjective

Response

1. Blue square
2. Hot and sharp
3. Short broken
4. Soft white
5. Pretty red
6. Empty old
7. Cold wet
8. Light plastic
9. _____
10. _____

Relations between objects
Prepositions

Response

1. On
2. In
3. Under
4. Over

5. Between	_____
6. Near	_____
7. Around	_____
8. Through	_____
9. _____	_____
10. _____	_____

Properties of actions Adverbs	Response
1. Quickly	_____
2. Slowly	_____
3. Quietly	_____
4. Happily	_____
5. Softly	_____
6. Wildly	_____
7. Carefully	_____
8. Pleasantly	_____
9. _____	_____
10. _____	_____

Tactile sense	Response
1. Ball	_____
2. Pen	_____
3. Wet	_____
4. Rough	_____
5. Smooth	_____
6. Broken	_____
7. Metal	_____
8. Rubber	_____
9. _____	_____
10. _____	_____

Olfactory sense	Response
1. Flower	_____
2. Cake	_____
3. Coffee	_____
4. Smoke	_____
5. Body odor	_____
6. Perfume	_____
7. Gas	_____
8. Garlic	_____
9. _____	_____

10. _____ _____

Gustatory sense	Response
1. Orange	_____
2. Cookie	_____
3. Lemon	_____
4. Salt	_____
5. Bread	_____
6. Milk	_____
7. Onion	_____
8. Pasta	_____
9. _____	_____
10. _____	_____

Complex objects	Response
1. Computer	_____
2. Species name of a bird	_____
3. Specific name of a car	_____
4. Species name of a plant	_____
5. Species name of a dog	_____
6. Carburetor	_____
7. Allen wrench	_____
8. Name of a painting	_____
9. _____	_____
10. _____	_____

Pronouns	Response
1. I	_____
2. You	_____
3. Me	_____
4. She	_____
5. He	_____
6. We	_____
7. They	_____
8. It	_____
9. _____	_____
10. _____	_____

Possessive pronouns	Response

1.	Mine	_____
2.	Yours	_____
3.	His	_____
4.	Hers	_____
5.	Its	_____
6.	Ours	_____
7.	Theirs	_____
8.	Them	_____
9.	_____	_____
10.	_____	_____

Multiple properties Adjective...Adverb	Response
1. Young...slowly	_____
2. Blue...quietly	_____
3. Hard...quickly	_____
4. Tall...brightly	_____
5. Mean...violently	_____
6. Sharp...carefully	_____
7. Large...steadily	_____
8. Fast...sharply	_____
9. _____	_____
10. _____	_____

Conjunctions and articles	Response
1. And	_____
2. Or	_____
3. Nor	_____
4. But	_____
5. A	_____
6. An	_____
7. The	_____

Grammatical sentences	Response
1. _____	_____
2. _____	_____
3. _____	_____
4. _____	_____
5. _____	_____

Social interactions	Response
1. Friendly	
2. Conversation	
3. Argument	
4. Upset	
5. Debate	
6. Embarrassing	
7. Affectionate	
8. Awkward	
9. _____	
10. _____	

Private events	Response
1. Pain	
2. Bathroom	
3. Happy	
4. Sad	
5. Angry	
6. Hurt	
7. Depressed	
8. Sick	
9. _____	
10. _____	

Inappropriate tacting

_____

_____

_____

THE INTRAVERBAL ASSESSMENT FORMS

INSTRUCTIONS: The objective of this part of the assessment is to determine the degree to which the evaluator's verbal stimuli control the student's verbal responses. The items are generally arranged in the order of simple to complex. The evaluator should make sure that the specific objects are not present (this would make the response part tact). Correct responses should be reinforced and the specific topography recorded below. Incorrect responses should be followed by representing, or restating the question a second or third time if necessary. Record the number of prompts and any approximations or correct responses.

	Simple intraverbals	Response
1.	Say eat-->sign eat	_____
2	Say drink-->sign drink	_____
3.	Say ball-->sign ball	_____
4.	Say pen-->sign pen	_____
5.	_____	_____
6.	Sign eat-->say eat	_____
7.	Sign book-->say book	_____
8.	Sign hat-->say hat	_____
9.	Sign bird-->say bird	_____
10.	_____	_____

	Single component S^D	Single/Multiple Responses
1.	What do you like to eat	_____ _____
2.	What do you like to drink	_____ _____
3.	Name some animals	_____ _____
4.	Name some clothing	_____ _____
5.	Name some fruits	_____ _____
6.	Name some vegetables	_____ _____
7.	Name some meats	_____ _____
8.	Name some colors	_____ _____
9.	Name some insects/bugs	_____ _____

10. Name a city _____ _____

11. Name a state _____ _____

12. What's in a house _____ _____

13. What's in a kitchen _____ _____

14. What's in a garage _____ _____

15. What's on a farm _____ _____

16. What's up in the sky _____ _____

17. Name some presidents _____ _____

18. Name some shapes _____ _____

19. Name some countries _____ _____

20. Name some seasons _____ _____

21. Name some songs _____ _____

22. Name some coins _____ _____

23. _____ _____ _____

24. _____ _____ _____

25. _____ _____ _____

Fill in the Blanks with the student's answer

1. You wake up in the _____, and put on your _____, and wash your _____, and brush your _____. Then you eat your _____. After you eat you go to _____. Your ride the _____to your school. Your teacher's name is _____, and your friend's names are _____.

2. In order to go fishing you need a _____. When you go fishing you put the _____ in the water. When you are in a boat you should always _____. To go fishing you need to put bait on your _____. Then you put your pole in the _____. If a fish pulls on the line you _____. If you catch a fish you _____.

3. The Pilgrims came to _____ on the boat named the _____. The Indians taught the pilgrims how to _____. They also taught them how to grow _____, and make _____in order to keep warm, and _____ for their feet. The Indians also taught the pilgrims how to make very pretty _____.

	Compound verbal stimuli	Single/multiple responses
1.	Name some hot foods	_____ _____
2.	Name some cold foods	_____ _____
3.	Name some hot drinks	_____ _____
4.	Name some cold drinks	_____ _____
5.	Name some breakfast foods	_____ _____
6.	Name some dinner foods	_____ _____
7.	What animals live in the water	_____ _____
8.	What animals live on land	_____ _____
9.	What animals live in trees	_____ _____
10.	What do you wear when it is cold	_____ _____
11.	What do you wear on Halloween	_____ _____
12.	What do you wear when it is hot	_____ _____
13.	What do you do when it is hot	_____ _____
14.	What do you pack in a suitcase	_____ _____
15.	Where do you keep your suitcase	_____ _____
16.	What movies do you like	_____ _____
17.	What TV shows do you like	_____ _____
18.	What shows don't you like	_____ _____
19.	What places do you like to visit	_____ _____
20.	Where do you live	_____ _____

21. _____ _____ _____

22. _____ _____ _____

23. _____ _____ _____

24. _____ _____ _____

25. _____ _____ _____

Complex verbal stimuli	Response
1. What books do you like to read	_____
2. What is 2 plus 2	_____
3. What is 5 plus 5	_____
4. What is 3 times 4	_____
5. Why do birds fly south	_____
6. Who was the first president	_____
7. Who were the pilgrams	_____
8. Who was Ben Franklin	_____
9. Who was Alexander G. Bell	_____
10. Can you name the Provinces	_____
11. What makes a watch work	_____
12. How do you fix a flat tire	_____
13. What temperature does it freeze	_____
14. What things are made from metal	_____
15. What things are made from plastic	_____
16. What things are made from wood	_____
17. Name the planets	_____

18. Name some stars or constellations _____

19. Recite a poem _____

20. Tell a joke _____

21. _____ _____

22. _____ _____

23. _____ _____

24. _____ _____

25. _____ _____

Inappropriate intraverbal behavior

_____

_____

_____

_____

_____

Intraverbal behavior in the natural environment

_____

_____

_____

_____

_____

THE CODIC EVALUATION FORMS

INSTRUCTIONS: The objective of this part of the evaluation is to determine the student's repertoire in reading, writing, and spelling. The evaluator should present the letters and words on a separate sheet of paper or flash cards. All correct responses should be reinforced and recorded. Incorrect responses should be followed by a second presentation of the trial, and prompts if necessary. Record all prompts, and reinforce successive approximations.

THE TEXTUAL FORMS

Letter identification

Written sp	Response
	name/sound
A	_____/_____
B	_____/_____
C	_____/_____
D	_____/_____
E	_____/_____
F	_____/_____
G	_____/_____
H	_____/_____
I	_____/_____
J	_____/_____
K	_____/_____
L	_____/_____
M	_____/_____
N	_____/_____
O	_____/_____
P	_____/_____
Q	_____/_____
R	_____/_____
S	_____/_____
T	_____/_____
U	_____/_____
V	_____/_____
X	_____/_____
Y	_____/_____
Z	_____/_____

Word identification

Written sp	Response
1. Car	_____

2.	Book	_____
3.	Tree	_____
4.	Hat	_____
5.	Apple	_____
6.	Light	_____
7.	House	_____
8.	Jump	_____
9.	Walk	_____
10.	Music	_____
11.	Out	_____
12.	Green	_____
13.	Slowly	_____
14.	Carefully	_____
15.	Happy	_____
16.	Strong	_____
17.	Traffic	_____
18.	Computer	_____
19.	Umbrella	_____
20.	Awkward	_____
21.	_____	_____
22.	_____	_____
23.	_____	_____
24.	_____	_____
25.	_____	_____

THE TRANSCRIPTIVE FORMS

Writing letters

Spoken sº	Response (written by student)
	name/sound
A	_____/_____
B	_____/_____
C	_____/_____
D	_____/_____
E	_____/_____
F	_____/_____
G	_____/_____
H	_____/_____
I	_____/_____
J	_____/_____
K	_____/_____
L	_____/_____
M	_____/_____
N	_____/_____
O	_____/_____

P	_____/_____
Q	_____/_____
R	_____/_____
S	_____/_____
T	_____/_____
U	_____/_____
V	_____/_____
W	_____/_____
X	_____/_____
Y	_____/_____
Z	_____/_____

Spoken s^p	Response (written by student)
1. Car	_____
2. Book	_____
3. Tree	_____
4. Hat	_____
5. Apple	_____
6. Light	_____
7. House	_____
8. Jump	_____
9. Walk	_____
10. Music	_____
11. Out	_____
12. Green	_____
13. Slowly	_____
14. Carefully	_____
15. Happy	_____
16. Strong	_____
17. Traffic	_____
18. Computer	_____
19. Umbrella	_____
20. Awkward	_____
21. _____	_____
22. _____	_____
23. _____	_____
24. _____	_____
25. _____	_____

Inappropriate codic behavior

_____

_____

_____

_____

Codic behavior in the natural environment

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 a baseline measure of inappropriate behaviors

Assessment of receptive behavior
- follows simple commands and instructions
- follows multiple commands and instructions
- follows complex commands and instructions
- follows multiple and complex commands and instructions

- Example of a strong receptive repertoire
  - a novice pilot landing a plane by vocal instructions
- Example of a weak receptive repertoire
  - a person who cannot touch any body parts on command

The duplic repertoire--Echoic
- can echo phonemes
- can echo blends and words
- can echo phrases and sentence

- Example of a strong echoic repertoire
  - a voice impressionist
- Example of a defective echoic repertoire
  - a person who is echolalic

The duplic repertoire--Imitation (Mimetic)
- can imitate simple gross motor movement
- can imitate simple fine motor movement
- can imitate complex gross motor movement
- can imitate complex fine motor movement

- Example of a strong imitative repertoire
  - a mime
- Example of a weak imitative repertoire
  - a person who cannot imitate any actions

The duplic repertoire--Identigraphic
- can copy individual letters
- can copy words and sentences

- Example of a strong identigraphic repertoire
  - a graphic artist who copies fancy letters
- Example of a defective identigraphic repertoire
  - a scribbler

The mand repertoire
- asks for unconditioned reinforcement in the natural environment
- asks for conditioned reinforcement in the natural environment
- asks for unconditioned reinforcement in formal testing
- asks for conditioned reinforcement in formal testing
- asks for missing items
- asks Who? What? Which? When? Where? Why? How? & Why?

Example of a strong mand repertoire
one who always asks the right questions
Example of a defective mand repertoire
nonstop trivial questions

The tact repertoire
can identify objects
can identify actions
can identify combinations of objects
can identify combinations of objects and actions
can identify properties of objects
can identify multiple properties of objects
can identify properties of actions
can identify multiple properties of objects and actions
can identify relations between objects
can appropriately emit pronouns
can appropriately emit possessive pronouns
can appropriately emit conjunctions
can appropriately emit articles
can emit grammatical sentences
can identify complex social interactions
can identify private events
can identify auditory stimuli
can identify tactual stimuli
can identify gustatory stimuli
can identify olfactory stimuli

Example of a strong tact repertoire
cytologist who identifies cells in a microscope
Example of a defective tact repertoire
excessive tacting of trivial stimuli in the environment

The intraverbal repertoire
can emit a single response given a single stimulus
can emit multiple responses given a single stimulus
can emit a single response given multiple stimuli
can emit multiple responses given multiple stimuli
can appropriately fill in the blanks in a sentence
can appropriately respond to a series of questions

Example of a strong intraverbal repertoire
a skillful lawyer who presents a case in court
Example of a weak intraverbal repertoire
one who avoids answering questions by emitting negative behavior

The codic repertoire
can produce sounds that correspond to written letters
can produce words that correspond to written words
can write a letter that corresponds to a spoken letter
can write a word that corresponds to a simple word
can write a word that corresponds with a complex word

Example of a strong codic repertoire
a person who is successful in reader's theater
Example of a weak codic repertoire
an illiterate person

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