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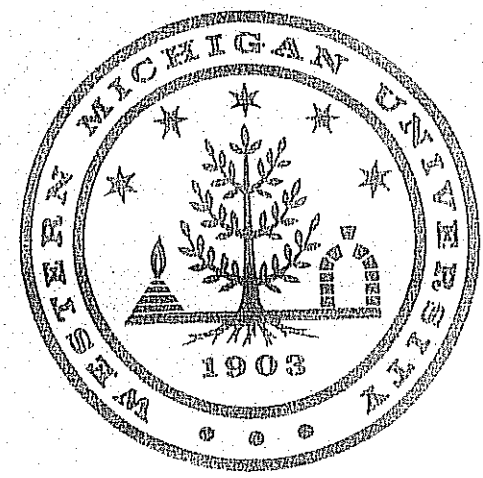

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A MANUAL FOR THE USE OF B.F. SKINNER'S ANALYSIS OF VERBAL BEHAVIOR FOR LANGUAGE ASSESSMENT AND PROGRAMMING

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Most language assessments and programs are based on a theoretical analysis of language development. However, there exists a wide variety of speculations as to how the human acquires his language behavior. These various orientations have resulted in a large number of techniques and procedures for teaching language to individuals in whom it is absent or defective. However, the programs can only be as effective as the theories upon which they are based. If, for example, a theoretical orientation emphasizes internal entities as controllers of behavior, then their language program will contain assessments and programming for such internal operations. On the other hand, if it turns out that a given analysis of language omits important aspects of verbal development, their assessments and programs will be less effective in discovering and improving language deficits. Therefore, it seems most appropriate to organize and develop a language assessment and program based on a theoretical analysis which accounts for as many of the critical variables as possible, while careful not to include unnecessary ones, omit important ones, or blend useful distinctions.

However, such a program has not been developed, perhaps, because the task requires the expertise from more than one profession. The field of language is traditionally seen as the subject matter of the linguist, who analyzes and classifies the structure of a language system. However, eventually it becomes important to explain how and why an individual uses certain words, or says things as he does, or fails to say anything at all. This is the subject matter of the psychologist, and it's perhaps here where the confusion begins.

The field of psychology has three general orientations to language development: theorists who emphasize cognitive variables as explanations of behavior, those who emphasize innate biological variables, and those who emphasize environmental variables as explanations of behavior. Unfortunately, the field of linguistics has heavily relied on theories which are based on biological and cognitive variables. The structure of language is considered to be the structure of thought. It then becomes the job of the psychologist to understand the structure of such mental events. However, those who explain behavior in terms of internal mediating events between the environment and the organism must, in turn, explain the mediating events; that is, to explain verbal behavior as being controlled by intentions, meanings, ideas, feelings, etc., leaving us yet another explanatory task. Skinner (1969) writes:

> "The objection is not that these things are mental, but that they offer no real explanation and stand in the way of a more effective analysis. This sort of psychologizing was wisely rejected by linguists in the early years of the century, but efforts to find a behavioral alternative, particularly by Bloomfield (1933), failed because of the shortcomings of the stimulus-response psychology that was dominant at that time. The result was either a pure structuralism or a return to mentalistic explanations such as those of generative grammarials." (p. 10)

Skinner surpassed the stimulus-response paradigm by clearly distinguishing between operant and respondent behavior. And, in 1934, he began to develop a new behavioral analysis of language, which was published in his book Verbal Behavior (1957). The essential feature of Skinner's analysis is an emphasis on language as operant behavior controlled by its relationship with antecedent and consequent environmental events as well as the operations that establish those consequences as effective forms of reinforcement (e.g., deprivation, aversive stimulation). This differs from biological and cognitive analyses, mainly, in that it keeps the causes of

verbal behavior as observable and measurable entities, rather than hypothesized internal processes or neuromusculature activity. Also, an environmental analysis allows us to make use of the mass amounts of data from research within the field of the Experimental Analysis of Behavior.

The objective of this manual is to provide a language assessment and programming package based on B.F. Skinner's analysis of verbal behavior. The manual is mainly designed for, and has been field tested with, individuals with defective verbal behavior, but it is also appropriate for work with normal pre-school children. There are three main components: A Behavioral Analysis of Language, Procedures for Language Assessment, and Procedures for Language Training.

A BEHAVIORAL ANALYSIS OF LANGUAGE

There are two critical components in a behavioral analysis of language. The formal aspects of language concern the specific topographies or structure of a language system, and the functional aspects represent an account of the circumstances under which the response occurs.

The Formal Analysis

The linguist uses the concepts of phoneme, morpheme, lexicon, grammar, syntax, and semantics in order to analyze the formal properties of a language.

The phoneme is the basic vocal unit in a language system. English has 42 phonemes which are blended in several different ways to produce thousands of morphemes in the language. A morpheme is considered to be the basic unit with meaning; that is, a referent for the response can be identified (this issue will be discussed in more detail in connection with semantics). A morpheme may occur as free or unbound as in "dog" or as a bound form as the -s in "dogs". The -s clearly refers to the plurality of what is seen, but it's meaningless without identifying what is seen. Bound and unbound morphemes make up the lexicon of the language. The lexicon may be thought of as the total number of words in a language.

Grammar involves the classification of words and their inflections into types (e.g., noun, verb, preposition) as well as their functions and relations in the sentence. Each language system has its own grammatical conventions, such as -ed endings for past tense or -s for

The Functional Analysis

As mentioned previously, a functional analysis is concerned with the circumstances under which a response form occurs. Skinner analyzes these circumstances in terms of the antecedent and consequent events, and distinguishes between several types of relationships. Before describing these, however, it's important to first, provide a definition of verbal behavior and, second, distinguish between the behaviors of a speaker and a listener.

Skinner defined "verbal behavior" as behavior which achieves its effect on the environment through the behavior of some other person. One can close a door by the appropriate hand and arm movements, which thus achieve their effects directly; or one can say "Close the door" and, in the presence of an appropriate listener, achieve the same effect indirectly. It is this indirect reinforcement that characterises verbal behavior and which is responsible for many of the important features that distinguish verbal from nonverbal behavior. (Try to avoid confusing this use of "verbal" with "verbal" as synonymous with "vocal", or with "verbal" as contrasted with "quantitative" or "mathematical".) This identification of language behavior with behavior which is indirectly reinforced will include some topics which are not ordinarily considered linguistic and will exclude a few things that some might wish to include; however, it coincides well with the areas dealt with conventionally and has the advantage that it does not make use of terms such as "meaning" or "communication" that are, themselves, in need of further definition.

The second issue concerns the distinction between the speaker and the listener. In traditional treatments of language it is common to minimize differences between the behavior of speaker and listener (or,

for sign language, "signer" and "observer"). It is said that the essential feature of both is the understanding of the meanings of words. The two different behaviors are then characterized as simply the expressive or receptive manifestation of this understanding. From a behavioral point of view, however, this is quite unsatisfactory. It is true that the roles change rapidly in conversation, and it is also true that in some especially interesting cases a speaker is behaving primarily for himself as the listener. Still, for most purposes, the distinction is an important one, and especially when one's goal is to teach language behavior to someone in whom it is absent or defective. To be able to say "Open the door" under conditions where an open door would be a form of reinforcement is quite different from being able to open one when asked, and in the area of developmental disabilities it is not at all uncommon to find individuals who have one but not both of these repertoires, as well as those who have neither.

For several reasons, we will concentrate on the behavior of the speaker or the signer rather than the listener or observer. It is primarily by speaking or signing that the individual benefits most directly from his language repertoire. Also, listening when the language stimuli are simple seems little different from reacting to non-language stimuli. And, on the other hand, reacting to more complex language stimuli seems to depend considerably upon behaving, in part, as a speaker.

The Elementary Verbal Relationships

Skinner distinguishes between seven types of verbal relationships: echoic, mand, tact, intraverbal, textual, transcriptive, and copying a text. This classification is based on an analysis of both antecedent

and consequent events (See Table I and II for a diagram and definitions of these relationships).

TABLE I

B.F. SKINNER'S VERBAL BEHAVIOR

The Elementary Relationships

CONTROLLING VARIABLES	RESPONSE	CONSEQUENCE
Establishing Operation	Mand (asking)	Specific Thing/Action Manded
Non-Verbal Stimulus	Tact (naming)	Social (Non-Specific)
Verbal Stimulus Has: Point-to-point Correspondence with Formal Similarity	Echoic Imitative (Copy) Written	Social
Verbal Stimulus Without: Point-to-Point Correspondence	Intraverbal (conversation)	Social
Verbal Stimulus (Written) With: Point-to-Point Correspondence	Textual (reading)	Social
Verbal Stimulus (Vocal) Point-to-Point Correspondence	Transcriptual (writing)	Social

TABLE II

THE BASIC TERMS USED IN B.F. SKINNER'S

ANALYSIS OF VERBAL BEHAVIOR

Echoic Behavior

Echoic behavior can be understood as a type of verbal behavior where a verbal stimulus is repeated by an individual (e.g., "mmm - mmm", "Book - Book", "How are you? - How are you?").

Verbal Stimulus: That which has a specific topography which has controlling effectiveness. A verbal stimulus is the result of verbal behavior. The more common verbal stimuli are, for example, spoken and written words, signs, symbols, morse code, semaphore flags, etc.

Formal Similarity: This occurs when the stimulus and the response are in the same sense mode.

Example: 1. Vocal-vocal
2. Visual-visual

Point-to-Point Correspondence

The beginning, middle and end of the stimulus match the beginning, middle and end of the response.

"D - O - G" "D - O - G"

For Example: 1. You say "good" because someone else said "good".
2. You write "Test on Friday" because it was written on the blackboard and you don't want to forget.

Mand Behavior

The mand can be understood as a type of verbal behavior where what

is said is determined by what the speaker wants; that is, the establishing operation (e.g., "Give me that!", "Where is class?", "Move, please", "Break it!"), and the reinforcement is specific to that response.

Establishing Operation: Any change in the environment of the person which alters the value of objects or events as a form of reinforcement automatically alters the strength of the repertoire that has been developed with that form of reinforcement.

Example:
1. A tendency to say "let's go dancing at that time" because dancing would function as reinforcement (social mand).
2. A tendency to say "can I have some water" because water would function as reinforcement (biological mand).

Tact Behavior

The tact can be understood as a type of verbal behavior where things, actions, etc., are named (e.g., "That is a Rembrandt", "That bolt is too large", "The cup is broken").

Non-Verbal Stimulus: These consist mainly of objects, actions, properties of both objects and actions, and relationships between both. A non-verbal stimulus can be auditory, visual, tactile, olfactory or gustatory.

Example:
1. A tendency to say "airplane" because you hear one.
2. A tendency to say "rough" because you feel sandpaper.
3. A tendency to sign "grape" because you taste the flavor.

Intraverbal Behavior

Intraverbal behavior can be understood as a type of verbal behavior where a verbal response is controlled by a different verbal stimulus. Therefore, there is no point-to-point correspondence between the stimulus and the response.

Example:
1. You have a tendency to say "pen" because someone asked "What can I write with?"

2. You have a tendency to sign "You're welcome" because someone signed "Thank you".

Textual Behavior

Textual behavior can be understood as a type of verbal behavior where written stimuli control vocal-verbal responses (sign textual behavior is also possible). There is point-to-point correspondence; however, only thematic similarity.

Transcriptive Behavior

Transcriptive behavior can be understood as a type of verbal behavior where a sign/vocal-verbal stimulus controls a written response. There is point-to-point correspondence.

Example:
1. You write "ball" because someone says "ball".
2. You write the notation for "animal" because someone signed "animal".

The Elementary Relationships in More Detail

Echoic

Echoic behavior is a type of verbal relationship where an antecedent vocal stimulus evokes a vocal response which has point-to-point correspondence with that stimulus; that is, the stimulus matches the response. A child's tendency to say "ball" as a function of someone else saying "ball" exemplifies the echoic. (In Sign Language, a signed stimulus may evoke a matching signed response -- this also is a form of echoic behavior, except it's non-vocal). The reinforcement for echoic (or sign imitation) is usually some form of social approval. When a child behaves appropriately in response to the adult's "Say dog", the adult is likely to smile, or in some other way show his approval. Also, echoic behavior may be strengthened

by the automatic conditioned reinforcement obtained for sounding like others in the environment. The echoic plays a major role in early language learning. Once an adult can get a child to make an echoic response to a sound or word, he can transfer control to the appropriate object. An adult may try to induce a child to say "dog" in the presence of a dog as a way of teaching him the name for that kind of animal (e.g., "That's a dog, say dog" -- "What's that?" -- "Say dog"). A child acquires a great deal of his verbal repertoire in this manner. Echoic behavior continues to occur as an important form of adult language but is reinforced in other ways, as when we repeat a set of instructions to be sure we understood them.

The echoic relationship is an extremely important tool for teaching language to the individual in whom it's absent or defective. Once echoic stimulus control is established, it is usually quite easy to transfer stimulus control to the other verbal operants.

Mand

A large part of our verbal repertoire involves asking for objects and actions. This repertoire differs from the others described in this manual in that a response is controlled by the establishing operation (e.g., deprivation, aversive stimulation) and characteristically reinforced by a specific object or event. That is, when we ask for things, we specify what will be reinforcing at that time. Asking for help, for example, specifies that some assistance would function as reinforcement, or asking for someone to "move" specifies the reinforcing properties of a clear path. Our asking for something is controlled by what would function as reinforcement at that time (e.g., "Water, please", "Can I

go outside?", "What's that?"). Skinner thought it useful to call this type of relationship "manding". The variables controlling a mand, establishing operations, are described by Michael (1978) who writes:

> "Any change in the environment which alters the effectiveness of some object or event as a form of reinforcement, and simultaneously alters the probability of the behavior that has been strengthened by that reinforcement."

An individual may ask for an object at any time and, given an appropriate audience, will likely receive the object requested. It is infrequent that people ask for things when those things would not function as reinforcement (when they do not "want" them). For example, a smoker could ask for a match at any time and be successful in obtaining a match given the presence of an appropriate listener. However, we observe this response to occur only when the smoker has placed a cigarette in his mouth and checked his pockets for matches. At this point, he is likely to ask for a match in the presence of a listener who is likely to have matches. This example illustrates the distinction between the Establishing Operation and an S^D. Recalling the definition of S^D to be

> "A stimulus change which increases the probability, quantity or quality of reinforcement; a decrease in the delay to reinforcement or the effort to obtain reinforcement, or a decrease in some form of punishment being provided in addition to the reinforcement." (Michael, 1978)

In other words, an S^D evokes some response because in the past the response has been more successful in obtaining reinforcement in the S^D than in its absence. There is less of a tendency for the behavior to occur in the presence of the S^D if the consequence associated with that S^D does not currently function as reinforcement. In the example above, the S^D for the response of asking for a match is the presence of a listener who is likely to have matches. However, one does not ask for matches when they would not function as reinforcement. But when an

establishing operation is in effect (the smoker has a cigarette ready for lighting and is under some nicotine deprivation), the response of asking for a match is strengthened.

In mand training, therefore, we are interested in bringing verbal responses under the control of the relevant establishing operations rather than the presence of some specific S^D.

The reinforcement for mands is specific to the response. Under the appropriate condition of the deprivation, a child responds "water" or "water, please", and then receives water as a form of reinforcement. The response is controlled by water deprivation and then reinforced with water. Had the response not been reinforced with water, and given that none was present, it would still be classified as a mand. The child has had some history of being reinforced with water under conditions of water deprivation. Now, under similar conditions, the response occurs but is not reinforced; that is, it is on an intermittent schedule. If there is no other verbal or non-verbal stimuli which controls the response, it is likely that the response was evoked by conditions of water deprivation and, therefore, is a mand.

As Skinner has pointed out, the mand cannot be classified by the form of the response. This is true of all the operants, but is particularly important when we identify and teach mands and tacts. Mands are controlled by some establishing operation, and the reinforcement is specific to the response. The tact is controlled by non-verbal stimulus, and the reinforcement may take any form. Other operants are controlled by verbal stimuli and are much more readily identified as different from the mand or the tact. Few current language training programs make this distinction or teach mands and tacts specifically. Often picture or

object tacting (naming) is taught as well as receptive behavior, touching an object when asked. When, on a later occasion, one of the objects which was trained as a tact would function as reinforcement, the response is not strong in the individual's repertoire since the non-verbal stimulus (the object) is not present. During training, the child has never been reinforced by gaining access to the object named nor has training taken into consideration any establishing operations which may be in effect. The child, therefore, has no tendency to ask for (mand) the object when it would function as reinforcement.

Another unique property of the mand repertoire is that the main benefit of the consequences is to the speaker rather than the listener. Tacts are often beneficial to the listener, as when one person (speaker) tells another (listener) the name of an object so that the listener may then more appropriately interact or refer to the object in the future. Mands, however, usually get the speaker some specific reinforcement.

It is the mand repertoire which allows one to reduce states of aversive stimulation and deprivation. The other operants, though no less important, do not serve this function. It is typically stated that the goal of language training is to teach individuals to "communicate their needs and wants"; stated in a more behavioral manner: the goal is to teach individuals to make verbal responses which reduce the relevant states of deprivation or aversive stimulation. Skinner (1957) writes:

> "In the traditional treatment of verbal behavior the 'meaning' of a mand is presumably the reinforcement which characteristically follows it. The meaning of 'candy!' is the kind of object frequently produced by the response. But what is communicated would appear to be 'the speaker's need for candy', which refers to the controlling state of deprivation. The concept of the mand, or of the verbal operant in general, explicitly recognizes both the contingency of reinforcement and deprivation or aversive stimulation and is free to deal with these variables in appropriate fashion without trying to identify a relation of

> reference of a process of communication... The traditional classifications suffer from a mixture of levels of analysis. In particular they show the influence of formal descriptive systems in which sentences are classified with little or no reference to the behavior of the speaker."

It seems clear that with language delayed individuals specific training is required for the training of each verbal operant. When our goal is to teach individuals "to communicate their needs and wants", we are concerned with teaching mands.

For a response to be classified as a "pure mand" it would, necessarily, be under the control of an establishing operation. We would exclude responses partially controlled by verbal or non-verbal stimuli. Most mands, however, do have an additional source of control and should be classified as multiply controlled. Multiple control results from having more than one type of stimulus controlling a response. Other sources which frequently occur contiguously with an establishing operation would commonly be echoic, intraverbal or tact. An echoic source of control would be said to be in operation with an establishing operation when one provides a verbal stimulus (echoic component) when he sees a child engaging in behavior which has previously led to a specific form of reinforcement (E.O. inferred). For example, a teacher sees a child pick up a glass and walk to a sink; at this point, the teacher says, "water, say water". The child's response "water" is then partially under the control of an establishing operation (thirst) but, in this case, more under the control of the echoic stimulus. Intraverbal control is frequently seen in a mand relation. A common example is when one asks "What do you want?" and the response to this question specifies some form of reinforcement, such as "cake". Here, the response is largely controlled by an establishing operation. The verbal stimulus "What do

you want?" does not specify any specific form of reinforcement. The form of response is controlled by what would function as reinforcement at that time. Had the person responding to the question just finished eating a large piece of cake when the question was asked, we would likely observe some other topography, such as "coffee". Tact control is observed in a mand relation when the response occurs in the presence of some non-verbal stimulus in conjunction with an establishing operation. Children are frequently observed to respond with a mand frame (to be discussed later) when they see an object which would function as reinforcement. However, they do not emit the response when the object is not present. For example, a child sees his mother bring home a package of cookies. Upon seeing the cookies, the child says, "I want cookie". Had the cookies not been present, the child would not have been likely to make such a response. There may also be more than two sources of control. For example, if several objects are present in the environment, and a person says, "What do you want?", the response would likely be one of the objects. Here, the response has tact control (the sight of the objects), intraverbal control (the question), and control by an establishing operation specifying what would function as reinforcement at that time.

The Tact Repertoire

Skinner suggested the term "tact" (as in contact or tactile) for the type of verbal relationship where the topography of the response (what is said, signed or pointed to) is controlled by a prior non-verbal stimulus. The common non-verbal stimuli in a child's environment are objects (e.g., cup, book, tree), actions (e.g., stand, jump, zip), properties of objects and actions (e.g., red, hot, wet, quick, slow, quiet), and relationships (e.g., on, in, above). The reinforcement for the tact is usually social,

or non-specific. A lost person may mand to you "What building is that?" Your response would be, in part, controlled by the verbal stimulus; but what you would say (that is, the topography of your response) would be controlled by the building itself. "That is Wood Hall." This would characteristically be followed by some social reinforcement, such as "Thank you". Therefore, tacting can be thought of as naming, whereas manding can be thought of as asking. Note how tacting benefits the listener, whereas manding benefits the speaker. Also, it's important to point out that we can ask for or name the same object or action. One can say "water", for example, because he wants water, or one can say "water" because he sees water. Both are different repertoires and must be individually trained -- in one condition, the water is there and in another it might be absent. It's easy to observe a young child's weak manding repertoire as in "I want that what-cha-ma-call-it", but if you show him the object, he can surely name it. Traditional programs fail to note these differences and simply teach topographies without regard to the circumstance under which they are used. A child may be able to say "cup" in the presence of a cup, but not ask for one when he wants one. When working with individuals in whom verbal behavior is defective, these differences become much more apparent.

The form of the response may be vocal, sign, symbol, or written, and the controlling variable may be visual, auditory, tactile, olfactory, or gustatory. A person can make the response "apple" when he sees an apple, when he hears a person eating an apple, when he feels an apple, or when he tastes an apple.

Most traditional programs describe the tact relationship as "words and their meanings". A word acts as a referent to a particular object or

action, but, as Skinner points out, "sign, symbol and more technical terms from logic and semantics commit us to special schemes of reference and stress the verbal response itself rather than the controlling variables."

The clarification should be made that the response is under the control of a specific discriminative stimulus, and to say that a word refers to an object implies that the response is under good stimulus control of the non-verbal stimulus. The tact is a discrimination with the appropriate response under the stimulus control of some aspect of the physical environment. This discrimination is similar to the work of Terrace (1963a, 1963b) as reported by Michael (1967). The stimulus control of the response is acquired as is any other operant behavior. This analysis avoids having to explain vague terms such as "meaning" and "interval events", thus making for a straightforward analysis within the 4-term contingency.

As mentioned earlier, the reinforcement for the tact is usually social or non-specific as compared to the mand (reinforcement is the specific thing or action manded for). A child may say, after seeing a dog, "There's a dog", and the reinforcement may be "good", "That's right", "Yes, that is", possibly paired with some approval such as smiling, nodding of the head, etc. The response is controlled by the prior non-verbal stimulus rather than the reinforcement that is received (as with the mand). In an educational setting, edibles are frequently used to reinforce a correct response when initially developing a tact repertoire; but the edibles are usually randomized, and the student is not responding to get a specific form of reinforcement (Stafford, et al, 1978).

In his analysis of the tact relationship, Skinner describes verbal behavior under the control of novel non-verbal stimuli. Skinner (1957) opens his section on the extended tact by writing:

> "If a chair, acting as a stimulus, made the response 'chair' probable, and if a cribbage board, acting as a stimulus, simply made the response 'cribbage board' probable, we could deal with the 'semantics' of verbal behavior merely by supplying an inventory of tacts. But 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 omitted 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 stimulus may resemble a stimulus previously present when a response was reinforced and, hence, there are several types of what we may call 'extended tact.'" (p.82)
> (For a condensed version of Skinner's book Verbal Behavior, and of tact extensions, see Peterson, 1978.)

The types of extensions described by Skinner are based on the degree to which some feature of the stimulus or topography of the stimulus differs from the training stimulus. The three types of extensions are: generic, metaphorical, and metonymical extension.

The generic extension of the tact relationship is the most important for training verbal behavior to persons who have weak repertoires. In this extension, the novel stimulus that controlled a previously learned response form has all of the relevant features. This extension has been referred to by many as "generalization". If a child has been reinforced in the past to make the response "plate" when presented with a plastic plate and later makes the response "plate" in the presence of a paper plate, followed by some generalized reinforcer, this would be an example of a generic extension. If a child was presented with a paper plate at some other time, and he made the response "plate", this would be a correct tact and no longer a generic extension because the response form had been reinforced in the presence of that stimulus in the past. If we were to present a glass plate to the child and he were to respond "plate", this, again, would be a generic extension because it was under control of the

novel stimulus and had all of the relevant features. This is very critical in early language training. Once a child learns to say "cup" in the presence of a small red cup, you would want him to say "cup" in the presence of a big cup, little cup, orange cup, etc. (A more detailed description of this will be made in the training section.)

The metaphorical extension of the tact relationship has some, but not all, of the relevant features of the stimulus that previously controlled the response. If the child responds "car" in the presence of a semi-truck, this would be an example of metaphorical extension. (We should note that extensions may vary as a function of the degree of stimulus control over the response and the specific verbal community. In the case of an adult that responds "car" in the presence of a semi-truck, this would be considered an incorrect tact.)

The last extension described by Skinner is the metonymical extension. This extension of the tact relationship has none of the relevant features of the stimulus that previously controlled the response. This response may occur where no appropriate stimulus is present and may be a function of some past pairings. For example, if a child made the response "book" in the presence of a few books between a pair of bookends and was consistently reinforced by the verbal community and later made the response "book" in the presence of the bookends alone, that would constitute a metonymical extension. The shape of the bookends are irrelevant features, as a book is that which contains textual stimuli. The bookend may have none of the defining features of a book, but that pairing, as a function of reinforcement, may have controlled the response.

Skinner also describes tacts under some form of multiple control. Not only is the response form controlled by a prior non-verbal stimulus, but it also may be attributed to some aspects of generalized reinforcement.

In the example of the distorted tact, Skinner (1957) refers to this as "stretching the fact". The response may be partially controlled by a prior non-verbal stimulus and also partially controlled by some aspects of generalized reinforcement. If a baseball player has received more reinforcement in the past for talking about how far he hit a baseball, then when he describes a short distance hit, he may talk more about hitting the ball a far distance. This may occur after hitting a short distance, or he may not have gotten any hits, thus "stretching the fact".

In the analysis of the impure tact, the response may be controlled by prior non-verbal stimuli and also partially controlled by some mand characteristics (establishing operations, Michael, 1978). An example would be to tell someone how good the fried chicken looks as a function of the topography of the fried chicken, and also that a piece of chicken would function as reinforcement.

The Intraverbal Relationship

Skinner (1957) defines "intraverbal" behavior as a verbal relationship characterized by an antecedent verbal stimulus followed by a response which lacks point-to-point correspondence with that stimulus. When the vocal stimulus "mom" results in the vocal response "dad", it can be clearly seen that the first phonemic unit of the stimulus ("m") is not related to the first phonemic unit of the response ("d"), and so forth. The mode of stimulation is an irrelevant feature of the intraverbal. Verbal responding may result from any form of verbal stimuli, either auditory or visual. Therefore, in response to the auditory stimulus "dad", the written response "mom" is intraverbal.

The intraverbal repertoire can be observed in many daily settings and events. The young child's recitation of the alphabet, nursery rhymes and

singing of simple songs (e.g., "Old McDonald had a farm. . . and on this farm he had a _____") all exemplify intraverbal behavior. At school, the child that answers by saying "four" as a result of seeing a flash card with "2+2=__" printed on it is responding intraverbally. Likewise, the auditory stimulus "two plus two equals ____" which evokes the written response "four" is also intraverbal behavior. Learning responses to questions such as, "What's your name?", "Where do you go to school?" and "How are you?" also involve intraverbal responding.

Spradlin and Girardeau (1970) implicate the importance of the intraverbal repertoire in a person's formation of concepts:

> ". . .if a child says, "book" in the presence of only one specific book, we would probably say that he did not have the "concept" of book; however, if he names many books with the label "book", we would likely say that he has the concept of book. Natural concept learning, though, involves more than a response to a visual stimulus. If a child could say "cat" to all the cats that walked by, but could not respond to a question such as "What has four legs, a long furry tail and goes meow?", we would consider his conceptual development inadequate." (p. 75)

Examples of concept-formation testing which involve the intraverbal repertoire can be found in traditional standardized tests of "intelligence" and language. These tests all measure an individual's intraverbal repertoire, although they do not refer to the repertoire as intraverbal. Tests such as the verbal scales of the Wechsler Intelligence Scales (Wechsler, 1949; 1967), the Stanford-Binet Intelligence Scale (Terman and Merrill, 1960), and the ITPA - Illinois Test of Psycholinguistic Abilities (Kirk, McCarthy and Kirk, 1968) test the intraverbal repertoire in the following ways:

1) Answering questions --

   "What do you do when you're hungry?"

   "What do we do with our eyes?"

"Where do we buy food?'

2) Completing sentences --

"Brother is a boy; sister is a ____"

"Coal is black; snow is _____"

"A bird flies; a fish ____"

3) Word classification --

"Tell me the names of some foods."

"Tell me the names of some colors."

"Tell me the names of some animals."

4) Word definitions --

"What is an orange?"

"What is a horse?"

"What is a car?"

In addition to the above tests, the Vineland Social Maturity Scale (Doll, 1953) measures social skills as a result of conversational abilities, another demonstration of the intraverbal repertoire. Although these standardized tests provide a reliable system for evoking verbal responses, they usually measure verbal behavior in a rather restrictive testing situation which does not allow the examiner to account for the test-taker's individual interactional history and does not allow the examiner to provide the test-taker with feedback about his/her performance. Observation of the individual engaging in verbal interactions with the community which reinforces it on an everyday basis would provide the most accurate information about his/her verbal skills.

Skinner (1957) notes that the reinforcement for intraverbal behavior often begins as a specific educational reinforcement. Through repeated pairings with praise and other social reinforcers, the more developed intraverbal repertoire is sensitive to social or conditioned reinforcement

contintencies. These social contingencies often serve to maintain responding or "talking". This skill of maintaining verbal interactions with another person or the "ability to keep the conversation going" has been validated as a skill of an effective conversationalist (Minkin, Braukman, Timers, Fixsen, Phillips and Wolf, 1976). Skinner (1957) introduces the concept of "contiguous usage" to explain this reinforcing function of the intraverbal. That is, it is advantageous to the speaker to have words which tend to go together strong in the verbal repertoire in a given situation (p. 75). For example, the verbal stimulus "school" might strengthen other responses in the individual's verbal repertoire such as "teacher", "book", "write", "pencil", "paper", etc. These responses will ensure that responding may continue and maintain the effects of social interaction in the following example:

(Speaker 1) Mother: What did you do in school today?

(Speaker 2) Child : We read a book about snow.

M: That sounds like fun!

C: It was fun to hear, but we had to write a report about it.

M: Did you use your new pencil?

C: Yes, and my new paper pad, too.

Strong verbal responses related to "school" permit the verbal interaction to continue uninterrupted.[1] Verbal responses unrelated to school, such as "battleship" or "farming", would be "out of context" of the conversation and would not be reinforced. Therefore, in teaching conversation skills,

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[1]Spradlin and Girardeau (1970) state that "the discriminative stimuli controlling . . . often have multiple functions serving both as discriminative stimuli for the speaker's responses to follow and as reinforcers for his previous responses."

we would begin to increase the number of stimuli (words) that a person responds to intraverbally.[2]

Intraverbal behavior functions much the same way in the writing repertoire. Writers who are judged to be creative are usually so judged by the number of stimuli that they respond to while writing. In turn, their written products should serve as discriminative stimuli for intraverbal behavior by the reader (as a speaker). When students are taught to write creatively, it is usually accomplished by working through exercises which strengthen weak "word associations" or intraverbal relationships (Vargas, 1978).

Besides the role intraverbal behavior plays in conversation and composition, it is also important in extending the reading or textual repertoire (Staats, 1968). Although the responses "table" and "chair" may be strong in a child's vocal verbal repertoire, the child may only be able to respond to "table" textually. A study by Samuels (1965) has shown that such a child could correctly respond to the unknown textual stimulus "chair" if presented in the manner of "table and chair". These facts suggest a ready transfer of control between stimulus conditions. The importance of the intraverbal operant in conjunction with the other operants, discussed earlier in this paper, that make up the verbal repertoire is also addressed by Raymore and McLean (1972) in studying speech articulation. They began by teaching correct articulation of a phoneme within a word under a vocal, echoic stimulus condition. . Upon reaching criterion, the echoic stimulus condition (vocal word) was paired

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[2]Of course, there are other sources of control in conversations such as asking questions (manding) and delivering verbal conditioned reinforcers (Polirstok and Greer, 1977). These behaviors involve multiple stimulus control, part of which is intraverbal. However, the discussion of such topics would be beyond the scope of this paper.

with the tact stimulus condition (picture) until the child was responding correctly to the picture alone and with correct articulation. The tact stimulus condition (picture) was then paired with the textual stimulus condition (printed word) until the child was responding at criterion to the verbal stimulus. Finally, a printed sentence was presented along with a non-verbal (picture) prompt in the intraverbal condition. The non-verbal prompt was a picture of some object or event other than that specified in the printed sentence. In the example, "We write with a _____", a picture of a pencil would be presented to evoke the vocal response "pencil". As a result of this speech articulation training in several different stimulus conditions of the verbal repertoire as described by Skinner (1957), the child could correctly articulate the targeted speech phoneme in any position within novel (untrained) words. Simultaneous training in each of the verbal operants and combinations of such produced a more effective verbal repertoire. That is, a verbal repertoire that allows generalization to novel stimuli.

The particular problem of language training with children lies in the area of stimulus control. Terrace (1968) defines stimulus control as:

> ". . .the extent to which the value of an antecedent stimulus determines the probability of occurrence of a conditioned response. It is measured as a change in response probability that results from a change in stimulus value. The greater the change in response probability, the greater the degree of stimulus control along the continuum being studied.
>
> The function relating stimulus value to response probability is, of course, identical to what we traditionally refer to as the generalization gradient. By our definition of stimulus control, a generalization gradient whose slope is zero indicates no stimulus control along that continuum. As the slope of the gradient increases we say that stimulus control increases." (p. 271)

The vocabulary (the number of words that an individual can say or sign) of many language-deficient individuals is usually under minimal stimulus control. The vocal (or sign language, or symbol system) repertoire(s)

may be under good echoic or tact control; however, in order for the verbal repertoire to be completely functional, the same verbal response must be made under a variety of related stimulus conditions (refer to Table I). This does not require the training of any new response forms; rather, it involves the transfer or shift of antecedent control to other related stimulus conditions (Spradlin, 1966).

Many retarded, emotionally-impaired, or autistic children learn words under isolate stimulus conditions and may seldom be given the opportunity to learn to respond under different stimulus conditions. For example, although these children may have learned to say "cookies" when someone says "cookies" (echoic); or when they want cookies (mand); or when they see cookies (tact); they cannot respond to such complex verbal stimuli as, "What do you like to eat?" or "What are sweet and good to eat?" or "Milk and _____". Children that respond in such ways often achieve good scores on language tests which involve the presentation of picture stimuli (tacts) but are judged to be language-deficient in the natural environment. That is, their verbal behavior may be under the control of echoic stimuli, establishing operations in the case of the mand, and non-verbal stimuli in the case of the tact. However, their verbal behavior is not under the control of other people's complex verbal behavior. Such control is often difficult to establish because of the number of different stimulus conditions under which people's verbal behavior occurs.

Textual Behavior

Textual behavior is defined as a vocal response under the control of a non-auditory stimulus, usually written, typed or printed, and there is point-to-point correspondence between the stimulus and the response; that is to say, textual behavior is reading out loud. An

example of textual behavior is saying "no smoking" as the result of seeing a "no smoking" sign.

There are several types of reinforcement for textual behavior. Similar to the echoic, "educational" reinforcement is given to foster the development of a textual repertoire. That is, generalized conditioned reinforcement is given contingent upon a "reader" giving a vocal response which corresponds to certain marks or symbols on a page. A student who says "boy" in the presence of marks "boy", and not in the presence of other marks, might receive some social reinforcement, such as "That's right! That says boy".

After a textual repertoire has started to develop, "educational" reinforcement is characteristically given for textual responses because they aid in the acquisition of other operants. For example, an illustrated dictionary, as might be used in a first grade class, evokes textual responses because of printed words which are paired with pictures. This allows the student to simultaneously build up a tact repertoire in which pictures are named. An American history text may be used by teachers to build a student's intraverbal repertoire. Having made the textual response "George Washington" as the result of seeing the printed words "George Washington", a student can make the correct vocal intraverbal response when asked "Who was the first President of the United States?"

Another source of reinforcement for textual behavior is a type of automatic reinforcement which occurs when emitting a textual response allows one to act effectively in a non-verbal manner. For example, you emit the textual responses "Men's room. Ladies Room" either out loud or sub-audibly while looking at two signs. After emitting the textual response, you acted effectively and avoided an embarrassing situation.

Thus, textual behavior can be automatically reinforced because it permits you to acquire information which allows you to behave effectively.

Another type of automatic reinforcement for textual behavior involves what could be described as the "pleasures of reading". Due to "literary license", the subject matter of texts is varied and often deals with issues that might even be inappropriate to talk about. Through a text, one might read about experiences which, even though happening to another individual, can be reinforcing to the "reader". For example, it might be reinforcing to read about the success of a good friend in the newspaper.

Textual behavior should be distinguished from "reading behaviors". The textual relationship, as previously stated, is a type of verbal behavior in which the form of the response (vocal) is controlled by a non-auditory stimulus (printed, typed, or written). "Reading" refers to a class of behaviors which include word attack skills (e.g., "sounding out words"), word discrimination, reading comprehension, and textual behavior. Reading comprehension is a complex set of behaviors. Research over the last 10 years (by Murray Sidman) has shown that regarding comprehension at an elementary level (picture to word matching) need not be directly taught, but stimulus control will transfer to reading comprehension after picture and word discriminations have been taught. More recent research shows that tact and textual training will also lead to the development of reading comprehension skills and picture and word discriminations. Reading comprehension at a more complex level allows one to make intraverbal responses (e.g., "What's the capital of Iowa?") and to emit rule-governed behavior (e.g., cooking a souffle).

More Complex Verbal Behavior

What has been described so far are the elementary verbal relationships. These elements can be seen to constitute a large part of the child's verbal behavior, or that of the non-verbal person who is being taught some form of verbal behavior, and they constitute a useful basis for such instruction. But verbal behavior quickly becomes more complicated, with long and rapidly emitted sequences, controlled by events and relationships of extraordinary complexity. Part of this complexity is due to behavior controlled by private stimuli (stimuli which arise within the body of the speaker but which are not available to anyone else); some of it results from the fact that in most normal speaking or signing situations more than one controlling variable is present at a time, and the resulting behavior is the joint product of this multiple control; finally, a good deal of the complexity of ordinary speaking or signing arises from the development of secondary verbal behavior, mands and tacts which are controlled by other aspects of ongoing verbal behavior. Skinner called this type of verbal behavior "autoclitic" behavior. Such behavior involves the manipulation of verbal behavior.

The Verbal Community

Our verbal environment generates and maintains our practices as speakers and listeners. In order for a verbal repertoire to develop, audiences which act as stimuli as well as provide consequences must be available. When such audiences are unavailable, verbal behavior weakens. This is exemplified by cases where a child fails to develop a verbal repertoire when isolated for an extended period of time.

When our main interest is to teach verbal behavior to someone in whom it is absent or defective, we can't afford to overlook the critical

nature of a reinforcing verbal community. People must reinforce new words as they are trained; they must present stimuli which evoke verbal behavior so they can reinforce its occurrence. The community must serve as a resource for new information (e.g., new tacts, mands, intraverbals). This can only happen if such a community exists. Also, the verbal community plays an important role in teaching a person to describe the states of his own body.

A recent study was conducted on the effects of a verbal community on the usage of a newly acquired sign repertoire. The data indicate that such a community will greatly increase the frequency of emitting appropriate verbal behavior (Sundberg, Milani and Partington, 1977). Research in this area is just beginning; however, it is clearly a necessary component of any language program (for a more detailed treatment of the nature of a verbal community see especially Skinner, 1957; Chapter 2, Skinner, 1974).

The primary purpose of this manual is to provide language therapists with a completely behavioral method for assessing and programming language for individuals in whom it's absent or defective. Many times, such persons receive labels such as autistic, schizophrenic, aphasic or emotionally impaired and are often treated in a manner which further precludes any verbal development (e.g., institutionalization, medication, inappropriate programming).

Explaining why certain individuals fail to acquire conventional verbal skills can be a difficult task. Usually, the analyst does not have access to all of the critical variables. Some possible explanations may include an early, but temporary hearing loss due to meningitis, german measles, etc., or some physical damage to the vocal musculature caused by

infections, operations, cerebral palsy, etc., or a traumatic brain injury to the pariatal lobe of the brain, or placement in an essentially non-verbal environment as in some state institutions. A somewhat speculative explanation might be that verbal behavior fails to develop due to extensive punishment for early vocal behavior (e.g., "Shut up", "Why do you always make noise?"). However, with the exception of obvious cases (e.g., cerebral palsy, traumatic brain injury) it is usually quite difficult to determine the specific cause for an individual's loss. A child with a temporary hearing loss, for example, may be placed in an institution where the staff infrequently require the individual to verbalize. When the child attends school all are mystified with a physiologically normal child who can't talk. Unfortunately, when environmental causes can't be identified, the educators and specialists invent internal deficiencies (as in minimal brain dysfunction or defective language acquisition devices) which are not explanations but are often stated as such (e.g., he can't talk because he has minimal brain dysfunction). This only removes the responsibility from the educators and, as a result, the search for solutions is discontinued.

The By-Products of a Defective Verbal Repertoire

The individual who fails to acquire the conventional verbal repertoire will probably acquire some other means of verbally affecting the environment. The specific topography varies greatly for each person (this is mainly a function of their reinforcement history). High rates of activity, for example, seem to be common among such individuals. This can result in extensive attention (e.g., chasing, reprimanding) by parents or staff, thereby having an effect on the environment which functions as reinforcement and maintains the behavior targeted for elimination. Such

ways of inducing adults and other children to behave can be very reinforcing when other means are unavailable. A child learns that his mother will look at him, scream, get up and run across the room if he climbs into the baby's crib. This may be followed by some mild punishment, thereby decreasing climbing in the crib; but the reinforcement of the specific environmental change probably maintains large classes of behavior, and other topographies will eventually come to strength. A fish tank, for example, contains some of the defining features of a crib (i.e., four legs, opening at the top) and that stimulus may control similar climbing behavior which, again, would result in the parents' attention followed by mild punishment and the cycle continues. The parent may heavily reinforce appropriate behavior, but this is poor competition for the reinforcement from specific environmental control. As a result, parents may give up and institutionalize the child.

Other behaviors, such as aggression, screaming, tantrumming, or extensive babbling, also affect the environment in a consistent way. All these behaviors can function as verbal behavior for such individuals because the conventional ways of environmental change (vocal-verbal behavior) are not functional for them.

The following sections should provide the language therapist with the essential guidelines for the development of an individualized language assessment and program.

ASSESSMENT

The following section of this manual is divided into each of the elementary relationships. It provides procedures and suggestions for assessing each operant as well as the student's entire verbal repertoire. There are not standardized measures currently available to assess these relationships; these are merely suggestions and procedures the authors have found helpful during their language training experience.

A language assessment is only a sample of the verbal repertoire because a child's verbal behavior is acquired under several different sources of control and is only strong when this source of control is present (e.g., R. Smith only can evoke a mand for "HaHa" from Corey). When someone tries to measure this language, the only way is to follow the child around for his waking hours for several weeks and months. -- Still, it's unlikely that one could evoke all the verbal responses in a child's repertoire because, for example, if you played an active role you could arrange the environment such that several new verbal responses are developed (as in "My name is Paul, what's yours/" or "Look over there - what's that called?"). Every individual the child interacts with may emit verbal behavior, some of which is, perhaps covertly, echoed by the child and may immediately transfer but not come to strength until, say, the tact variable is present again. The tester will never have access to these data.

Language assessments are difficult for other reasons as well. Typically, evaluation takes place in a novel setting with novel testing stimuli and often is conducted by an individual who's only contact with the student is in the evaluation setting. Under these conditions,

responses which may be at strength in the child's natural environment may not come to strength, and others which do not occur in the natural environment frequently may occur in greater strength in the evaluation setting. At least part of a language assessment should occur in the natural environment. Another difficulty with many assessments is that they fail to take into account the verbal behavior of the community in which the individual resides and how training relates to the community (Spradlin, 1967). If we teach a child to tact an object from which he drinks as "cup", but the community in which the child interacts restricts its use of "cup" only to drinking vessels with handles and refers to vessels without handles as glasses, we have then erred in our training.

The Parsons Language Sample (Spradlin, 1963) was the first attempt to apply Skinner's analysis to assess the various operants in a person's verbal repertoire. This assessment is divided into subtests which are: Tact, Echoic, Echoic Gesture, Comprehension, Intraverbal, Intraverbal Gesture, and Mand. In this manner, the student's expressive and receptive verbal behavior is assessed under several sources of control. However, as Spradlin has pointed out (1967), there is no clearcut statement regarding how the processes sampled or evaluated relate to language usage in the community. For example, how is gestural imitative behavior functional in the verbal community. Also, the tests are not ordered in such a way as to indicate the point at which we should start training. His final point is that none of the tests provide a prediction concerning which students may be trained by a given procedure and which students cannot be so trained. However, Spradlin's assessment package was clearly a step in the right direction.

The function of a language assessment is to provide the therapist with the necessary data for developing an individualized language program.

These data are best obtained from assessing 1) articulation skills, 2) social interaction, 3) incompatible behaviors (e.g., withdrawal, aggression), and, most importantly, 4) the strength of a given response under all the different types of stimulus control. It has been shown (Stafford, Sundberg and Braam, 1978, 1979) that verbal responses do not necessarily occur at the same strength under different sources of control. This research compared two five component responses under two conditions. In one condition, the reinforcement was specific to the response (as in the mand relation), and in another condition the reinforcement was non-specific (as in a tact relation). The results indicated that the latency in the specific (mand) condition was shorter than the latency in the non-specific (tact) condition. A second study (Hall, Sundberg and Stafford, 1979) has shown that mand responses do not necessarily occur unless specifically trained. In this study, students were able to tact all objects involved in completing a chain of non-verbal behavior which terminated with some form of reinforcement, but when one object was removed the students failed to mand the missing object. Following training, the students would mand for the object required to complete the chain. These data indicate that the assessment of an individual's verbal repertoire should include assessing responses under a variety of controlling relations (e.g., echoic, mand, tact, intraverbal, etc.) as well as the specific vocal topographies. The remainder of this section contains specific procedures for assessment within each verbal operant.

Echoic Assessment

In preparation for language intervention, the initial step is to assess the known vocal topographies. Essentially, this is an assessment of the stimulus control of the motor behavior of the vocal musculature.

The therapist should be most interested in the probability of a vocal response being emitted which matches or approximates the topography of the initial stimulus. The smallest minimal unit of a language system is the phoneme. There are forty-two phonemes in the English language, and it's very important to assess the strength of these units both in isolation and in combination with the other phonemes. Also, the occurrence of these phonemes in initial, middle and final positions in various words.

For some individuals, this assessment can be quite simple; that is, the echoic behavior is strong, and the language deficit may involve other operants. But for those who have virtually no verbal behavior, the echoic assessment is critical to the development of a language program.

The first step is to individually present the student with a variety of phonemes, blends and words, and ask the student to repeat the initial stimulus. This should be done under the best motivational conditions possible (e.g., run the assessment prior to lunch time and give edible reinforcement for correct responses). Also, the assessment should be conducted by the therapist who has exhibited the greatest degree of stimulus control over the student. For those students who correctly echo many phonemes and blends, language training will be quite simple; however, for those who have virtually no echoic behavior other topographies should be considered (i.e., sign language, symbol systems).

A vocal system is, of course, preferred because of its use by other members of the culture. And systematic application of the training program described in the next section should improve the vocal repertoire of most students; however, the degree of improvement is dependent upon each particular student's individual history and handicap. Such histories typically involve frequent failure to affect the environment and considerable urging on the part of others to attempt such interactions. This

situation can be quite punishing and may result in a variety of inappropriate behaviors. The use of a sign or pointing system will provide much more consistent and immediate reinforcement for language behavior. Also, such systems will provide a new topography which has not been associated with punishment.

The decision to use a sign system should, of course, be a careful one. The person must have the dexterity to make the signs and someone to teach him. Also, the environment must provide a verbal community for maximal development (Sundberg, Milani and Partington, 1977). However, the success of the various sign systems has been well-documented within the literature (for a review, see Fristoe and Lloyd, 1977).

There are clear reasons why such populations can acquire sign language more readily than vocal language. First, the form of the response is easier to teach. That is, the learner's hands can be placed in the appropriate position, whereas the vocal musculature can only be altered indirectly. This makes the shaping process quicker, as well as allowing for more clear and unambiguous models of the appropriate response.

A second feature of a signing system is the greater potential for resemblance of the sign and the controlling variable. The sign for food, for example, is made by moving the closed finger tips to the mouth as in the process of eating. Because a large number of signs do resemble some aspects of the variable controlling the response, the controlling relationships are probably easier to develop. Another feature of a signing system is the use of a novel topography; that is, the person does not have a past history of failure in that mode (for a more detailed analysis of sign language, see Sundberg, Michael and Peterson, 1977).

For severely physically impaired individuals who lack the dexterity

for sign language, a pointing symbol system is appropriate. It has advantages over a sign system in that the audience need not be specifically trained in a new language (symbol systems usually have the English word printed below the symbol). Unfortunately, there are some verbal limitations of such systems. Mainly, the basic elements of the language are not part of the individual's musculature (as in vocal behavior and signs). Symbol systems require the use of a board which is extraneous to the individual and precludes several key features to verbal development (e.g., babbling, correct verbal behavior). However, for the individual who has neither the vocal or physical capabilities for the other systems, a pointing system will certainly provide a functional verbal repertoire.

Mand Assessment

The mand repertoire has been overlooked by virtually all language assessments; however, as previously cited, research indicates a thorough language assessment must include the assessment of all the verbal operants. Mostly, we are interested in evaluating the strength of the mand repertoire as it occurs in the natural environment. It's also important to know the complexity of the mands used. Does the student mand for water when thirsty? Does he mand for objects in their absence as well as when they are visible? Does he mand others to engage in activities (i.e., throw the ball, walk with me, give me the toy)? Does the student mand for information, such as use of the various -wh question words? All these mands are important to have an effective verbal repertoire, and each is under somewhat different stimulus control. This assessment will provide some guidelines on how one might go about assessing a mand repertoire in conjunction with all other operants.

Assessment should begin in the natural environment. Observe the student for several days in settings in which verbal behavior instruction is not structured and in which there is no history of punishment for verbal behavior. For example, we do not want to assess verbal behavior in a classroom situation where "talking out" would be, or has previously been, reprimanded; rather, in situations such as play periods, meal times, and in conversational settings with both children and adults. Later, we can assess the verbal repertoire under specific stimulus conditions. One task in our observation in the natural environment is to develop a list of objects the student frequently comes in contact with and actions the student engages in . These objects and actions are likely to be effective forms of reinforcement for the student. Items which might appear on this list would be things such as, food, water, pop, bike, ball, play, run, throw. We also want to develop a list of items regularly found in the child's environment, such as table, chair, window and door. These items are ones which are present in the environment but not ones which would seem to function as reinforcement. For example, most children frequently see chairs and sit in chairs; however, they do not go to a chair and play with it as they would a toy truck. Trucks, therefore, would appear on our first list of items which function as reinforcement and chairs on our list of items frequently in the child's environment. It is not the case that this list be developed separately from beginning our assessment of the verbal repertoire. If, for example, a child picked up a ball and uttered the sound "b" the conditions under which the child made the utterance and the utterance itself would be recorded. In addition, ball would be added to the list of possible reinforcers.

Our objective in assessing the mand in the natural environment is

to find out what stimulus conditions are presently evoking mands and how complex the mands are. To do this most effectively, we need to record descriptions of the conditions under which verbal behavior occurs, the topography of the response, and any consequences. A tape recorder may prove very useful for this--especially when responses occur at a high rate. In this way, the evaluator can record the actual verbal behavior as well as comment on stimulus conditions and consequences. The stimulus conditions and consequences are very important in assessing the mand, since responses are somewhat difficult to identify, especially when the verbal repertoire consists of only single word responses or even less.

Recall that a response cannot be classified as a mand or any operant from its form alone. In some cases, responses are clearly mands (as when one utters "I want candy"). Other responses, such as saying "candy" alone or "ca, ca" are not as easily identified as mands. Other behavior may be of assistance in identifying such responses as mands. As when a child utters "candy" and simultaneously reaches in the direction of the candy. In this case, the response "candy" would likely be a mand, since it appears that it would be reinforcing for the child to have the candy, and his response specifies this reinforcement. We also need to know something about the history of the child with regard to such responses. Has the child in the past been given candy when he has said "candy" or "ca, ca"? If he has, then the response presently observed would be considered a mand unless there were some verbal stimulus which occurred prior to the response. For example, if another person nearby the child said "candy" or "What do you like to eat?", then the response would be largely an echoic or intraverbal response.

In gathering data on the mand, it is necessary to record all stimuli

and consequences for observed responses. A data sheet or coding system should be developed to do this. Responses which are recorded along with the stimulus conditions and consequences allow us to assess the complexity of the mand repertoire. An individual with a well-developed mand repertoire will exhibit mands which contain partial control from all the other sources previously discussed (tact, echoic, intraverbal) as well as mands totally under the control of establishing operations. In looking at the complete assessment, we may find that mands never occur without some additional source of control. It also may be discovered that mands only occur when one of the other sources of control is present. It is therefore necessary to look at the other operants to find correlations between multiply controlled mands and the other operants which may exercise partial control. For example, we may find that mands only occur when the object manded is present, or only when an echoic stimulus is provided, but not when an intraverbal stimulus is provided. In this case, it would be likely that we would find a weak intraverbal repertoire.

When the various operants are compared, there are several trends which one should attend to. The first is the consistent occurrence of mands when no other source of control is observed. In this case, the mand repertoire is at a fairly strong level, and it will not be necessary to teach the child to ask for things when they are not present or without some verbal stimulus. His responses under these conditions may consist of only one word or be grammatically incorrect; however, the student does ask for things because it would be reinforcing to have an object or engage in some activity. At this point, we should look at the other kinds of verbal behavior to see if they are equally well-developed. If so, then it would be appropriate to begin teaching more complex responses.

A second trend to look for is mands which seldom occur without the object present in the environment. In this case, there is a strong amount of tact control involved in bringing about the mand response. It is desirable for people to ask for things when they are not present in the environment as well as when they are. Training here, then, will focus on teaching the student to ask for things when they are present, he will also be able to make the same responses under both echoic and tact stimulus control.

A final trend is when most of the mands observed are accompanied by some echoic stimulus. The student will say "ball" when he wants one but only when someone else has said "ball" prior to his response. In this case, the student's response is more controlled by another person's verbal behavior than by an establishing operation (wanting a ball) or the sight of the object. The tact assessment would probably also show a few responses occurring without an echoic stimulus, and our training will focus on the mand, tact and intraverbal repertoires at a simple level.

Mands become increasingly more complex. In a well-developed verbal repertoire, mands occur which specify the action another person should engage in. Mands of this type include: push the door, talk to me, run to the store, as well as simpler actions: sit, stand, jump. Another type of mand is a mand for information; that is, the student is requesting some verbal behavior from his audience. Mands for information may also be called question asking. It is necessary to record the strength of such behavior during the assessment. Some examples of this type of mand are: "When do we go swimming, "Where is the dog?", "What am I doing?", and "How did I do it?". Also, one should look for the use of what have been called mand frames or generalized mands. Responses here include things like: "I want ___", "Please may I ____?", "I need ____". In

general, mand frames are simply a more grammatically correct utterance. It is useful to know if such utterances are occurring before we begin our training.

Up to this point, the discussion of assessment has been concerned with observation in the natural environment. Unfortunately, the natural environment may not provide us with all the proper stimulus conditions to observe all the types of mands. It becomes necessary to test the student under some specific stimulus conditions to see if specific types of mands occur. In general, what we are doing is contriving a situation in which someone would emit one of the certain types of mands. For example, if, in the observation in the natural environment, no mands or few mands occurred without an object present, we would set up several situations in which some object would be desired but is not present. These might include giving the student a bowl of pudding but no spoon and observing whether or not the student asks for a spoon. Several different situations, specific to each child, should be set up and data collected on the occurrences or non-occurrences of the mand response (for an experimental analysis of contrived mand variables, see Hall, Sundberg and Stafford, 1979).

Tact Assessment

The assessment of the tact involves examining the probability of a given response occurring under non-verbal stimulus control.

The traditional assessment measures currently available range from standardized tests to non-standardized tests, informal interviews and procedures designed to assess the occurrence of the verbal operant in the natural environment. The most common standardized tests available

are tests such as that devised by McCarthy and Kirk called the Illinois Test of Psycholinguistic Abilities (ITPA), which is based on both auditory and visual presentations to assess the client's use of grammatical structure. The assessment is broken down into 9 subtests. One subtest that would be appropriate for tact assessment would be Visual Decoding subtest in which a student is shown a picture and then the picture is removed. The student is then asked to point to the correct picture from a set of four pictures. The stimulus picture and the correct picture are similar, but are not the same. Another subtest related to the tact would be the Visual-Motor Association. In this subtest, the student is shown a picture and then a plate of four pictures. He is asked to show the picture which is similar. Also, the Auditory-Vocal Automatic Ability subtest may be related to the tact relationship. This is a test for correct grammar. An example of this subtest would be that a student is shown a picture of a ball and a picture of two bats. The assessor would say "Here is a ball. Here are two ____". The student should complete the sentence with the plural form of the noun to be correct. Dunn (1965) developed the Peabody Picture Vocabulary Test in which the student points to a specific picture on the examiner's command. The picture cards are in blocks of four. Thus, the student has four-to-one odds to make a correct response. The Northwestern Syntax Screening Test (developed by Lee, 1969) is used as a screening instrument to make a quick estimate of syntactic development for both expressive and receptive components. Like other tests, this uses blocks of pictures as the testing stimuli.

Other standardized tests for the tact repertoire are included in the intelligence scales, such as the object naming sections of the Stanford-

Binet Intelligence Scale and the Wechsler Intelligence Scale for Children. These tests incorporate the use of miniature objects and pictures as testing stimuli. In the tact section of Spradlin's (1963) Parson's Language Sample, the testing stimuli consist of 7 real objects, 7 miniature objects, 7 colored pictures, and 7 non-colored pictures. A problem with this is that the objects are not the same across the different stimuli.

Some non-standardized assessments consist of measures such as the Bzoch and Leage (1970) Receptive-Expressive Emergent Language Scale which is designed to inform the examiner of the client's general language level. The test is considered general and is exemplified by items such as, "uses three or more words with some consistency". The Zimmerman (1967) Preschool Language Scale is designed to isolate areas of strengths and deficiencies of preschool children. In this assessment, a section related to the tact would be the picture discrimination. Many of the stimulus items of this test are pictures used to evoke a response.

Many of the language assessments described above would simply not be appropriate to assess the tact repertoire of an individual client. First, the tests were prepared and standardized on normal populations. When working with developmentally disabled persons, the standardized scores become misleading. If a stimulus does not evoke the correct response it is assumed that the child does not have that response in his repertoire. Third, these assessments fail to observe verbal behavior that occurs in the child's natural environment. The behavior scored in a testing situation is generally under control of novel stimuli, such as the examiner, the stimulus materials, an environmental change.

When assessing a child's tact repertoire, items should be chosen that are in the child's immediate environment -- items that are functional to the child and that will later be transferred to mands, intraverbals, etc. These initial items are most familiar, and a person would have a greater tendency to verbalize about such items. In assessing a person with a weak verbal repertoire, it would be most appropriate to test the child with real objects as opposed to picture cards (tact extensions). The common categories for early tact repertoires are items that function as reinforcement (to be used in mand training), clothing items, foods, drinks, parts of the body, furniture, animals, and other common nouns that make up the child's immediate environment. These will consist of the first training items. The common way to assess this is to present the child with the object and the verbal stimulus, "What is this?". The data that would be of interest would be whether the child made a correct response, incorrect response, approximation, or did not respond to the stimulus.

Actions (verbs) should be selected and assessed. The assessor should perform an action (e.g., stand, sit, jump, eat, drink, etc.) and present the initial stimulus "What am I doing?". Depending on the complexity of the child's verbal repertoire, object/action combinations should be assessed as well as properties of objects (color, size, etc.), properties of actions (fast, slow, etc.), possession (pronouns: I, my, your, etc.), and relationships (in, on, under, etc.).

Extensions of the same stimulus should also be assessed with colored pictures, miniature objects, line drawings. If the child can correctly tact "book" in the presence of a big book, can he also tact "book" in the presence of a picture of a book, a big or small book, a drawing of a book? These will all need to be assessed depending on the complexity of the

child's verbal repertoire.

It is also important to assess the student's tact repertoire across different stimulus modalities. If a child can verbalize "water" when he sees water, can he also verbalize "water" when he touches, tastes or hears water? These should all be assessed.

Another area of assessment would be the occurrence of the verbal operants in the natural environment. This should be done in a variety of settings (e.g., school, free play, one-to-one training sessions, home, etc.). The observer records the topography of behavior and classifies it as a function of its controlling variables (e.g., topography - "table/table present - classification - tact).

Intraverbal Assessment

The usual tools used in evaluating a person's intraverbal repertoire are (as mentioned previously) traditional tests of intelligence. Although such tests often provide a score which can be compared with normalized standards, important information may be lost in a basic interpretation of the scores. A child who responds to the question "What color is an apple?" with the answer "blue" should not be considered entirely incorrect. In this case, the child responded to the verbal stimulus "color" with a correct intraverbal response, "blue". Of course, apples aren't blue, but responding in the above manner might suggest that the child is not responding to all the relevant controlling variables present in the verbal stimulus (e.g., "color", "apple"). A consistent pattern of responding would suggest that the child needs further training in responding to more complex verbal stimuli.

Another point to be made in the assessment of the intraverbal repertoire is that the child's individual interactional history should

be evaluated, and appropriate test stimuli should be drawn from this history. Activities shared by parent and child, teacher and student, or child and child are excellent sources of intraverbal testing stimuli. For example, when at home after a trip to the apple orchard, the parent/teacher should ask the child, "What did we do?", "Where are the apples?", "What color are the apples?", "Why do we pick apples?". Since both parent/teacher and child have shared the same experience, the training and reinforcement of correct intraverbal responses is facilitated.

Instead of listing a very specific procedure for assessment of the intraverbal repertoire, the following general guidelines have been established for use in conjunction with the thematic categories listed in Table III. These categories are by no means exhaustive and should be considered only exemplary. Many other categories can be developed simply by observing the child's interactions with the environment.

TABLE III

LIST OF THEMATIC CATEGORIES USED IN TRAINING THE INTRAVERBAL RELATIONSHIP

Actions (verbs)	Activities	Animals
Appliances	Bank (-ing)	Barber/Beautician
Boating	Books	Bowling
Calendar (Aspects of Time)	Camping	City (Cities)
	Clothes	Colors
Countries (Nations)	Dairy Products	Dance (Dancing)
Days (of the week)	Drink (-s)	Eat (Food)
Emotions	Family	Farm (-ing)
Fishing	Fruits	Fuels
Furniture	Gardening	Gas Station (Auto Repair)
Government	Groceries	Holidays
Home	Industry	Jobs
Library	Months of the Year	Music
Names	Newspapers	Nursery Rhymes
Occupations	Party	People
Pets	Plants	Play (-ing)
Restaurants	Roller Skating	Seasons
Shopping	Songs	Sports
Stores (Grocery, Shoe)	Television Shows	Time of Day (morning, afternoon, evening)

TABLE III (continued)

Tools	Toys	Vegetables
Vehicles	Utensils	Weather
Work (-ing)		

Intraverbal Assessment Guidelines

1. Does the student respond to a vocal/verbal stimulus with a response that lacks point-to-point correspondence? (For example, teacher says "da", child says "dee".)
2. Does the student sing simple songs or recite nursery rhymes?
3. Does the student make verbal classifications? (For example, "Tell me the names of some colors", "Tell me the names of some animals", "Tell me the names of some fruits".)
4. Does the student recite math, answer math problems without performing calculations? (For example, flash cards of addition problems, multiplication tables, etc.).
5. Does the student correctly respond to "who", "what", "where", "when", "which", "how", and "why" questions?
6. Be sure to investigate the above guidelines in all repertoires the child is capable of emitting. Don't neglect reading, writing, sign language, or braille if your student responds with any of these forms.
7. When evaluating, be careful not to punish any appropriate verbal behavior. If a correct response occurs in testing, be sure to reinforce it. This will prevent the elicitation of emotional respondents in the student for incorrect responding and provide the teacher with the most accurate information.
8. Don't ever consider your assessment to be complete. Keep exploring and training.

Textual Assessment

Traditionally, "reading" is assumed to be a single behavior. This makes the tasks of assessment and programming more difficult. A wide variety of packaged assessments are available which attempt to analyze the range of behaviors known as "reading". The assessment of a part of a reading repertoire, textual behavior, is a straightforward and relatively simple task. It is desirable to do a textual assessment in conjunction with an echoic (or sign copy), tact, mand, and intraverbal assessment. It should not be assumed that a child who is starting to talk or sign will not emit a textual response. Previous textual responses may have been inadvertently reinforced at home or school even though the parents or past teachers do not account for this training. Therefore, an appropriate strategy for a textual assessment would be to choose words which the student may have come in contact with at home or at school. Words used in an assessment could be drawn from objects in the child's home or school environment (e.g., ball, cup, hat, etc.), common signs (i.e., Men, Women, Stop, other children's names posted at school), or words from objects found in the child's home or school environment (e.g., food labels, child's own name, labels on cleaning projects, etc.). Stimulus materials used in a textual assessment should be varied both in size and kind of textual stimulus (printed, written or typed). Books, readers, and labels of food, etc., may be used. Typed, hand-printed or written stimuli on paper on index cards are also appropriate to utilize. One should also assess the transfer of stimulus control from one type of textual stimulus to another. For example, if a child can emit a textual response in the presence of a food label, also assess if he/she can do

the same when the word is hand-printed or typed. If transfer does not occur, the child may be attending to another irrelevant (to the textual response) feature of the stimulus. Don't rule out the occurrence of a textual response based on this lack of transfer. However, take it into consideration in planning a textual program.

TRAINING

Echoic Behavior

Behavior comes under the control of a specific stimulus when the behavior is reinforced in the presence of that stimulus. This paradigm of stimulus control is consistent regardless of the specific topography used (vocal, sign, or symbol system). Our terminal objective is to get the person to copy the vocalization and/or gestures of the teacher. For some persons, this may be extremely easy to develop (e.g., several non-verbal persons have strong imitation skills); however, for others it may require very small steps and extensive training (at this point, the teacher should know if a person is appropriate for a vocal system or a sign system).

There are several techniques which will maximize the probability of obtaining echoic stimulus control. These include use of high motivational conditions, direct reinforcement, automatic conditioned reinforcement and interspersal with motor behaviors.

The probability of evoking an echoic response is highest when the student is motivated to do so. Therefore the trainer should start with very strong forms of reinforcement. Each student is effected by reinforcement differently so the trainer should assess what's best individually. For most students food is a strong form of reinforcement. So training sessions should be conducted prior to meal times. And small bits of food should be given contingent upon successive approximation to the desired response. There are many other types of reinforcement which can be used such as physical contact, moveable toys, novel objects, wagons, mirrors, bubbles, view masters, and rattles. Often a bag full

of novel toys can be a remarkable tool for the language therapist attempting to acquire echoic stimulus control. The sight of this bag alone often evokes vocal behavior (mands) from students.

The trainer should conduct the session in this manner, "Say ba" (holding up the bubbles which are known to be a strong form of reinforcement) any approximation should be specifically reinforced with playing with bubbles. Also, starting with vocal responses which the child already emits will save the trainer from shaping a new response form, this is, his only task is to bring the vocal response under stimulus control.

Another procedure for increasing the probability of echoic stimulus control involves the pairing of vocal behavior with various forms of conditioned and primary reinforcement. Skinner (1957) writes "when a sound pattern has been associated with reinforcing event, it becomes a conditioned reinforcer". This has been called automatic conditioned reinforcement and seems to explain why children babble. It appears that sounding like others can be reinforcing (Sundberg, 1979).

The procedure for this technique involves the straight pairing of the trainers vocal behavior and types of reinforcement. Saying "tickle, tickle, tickle" while tickling a student (if that functions as reinforcement) may increase the probability of the onset of babbling. Such babbling is important because it allows a student to practice his vocal behavior. Thereby, which permits closer approximations to other persons vocal behavior.

The interspersal of other motor behaviors which are under imitative stimulus control may also increase the probability of obtaining echoic stimulus control. This allows for the student to come in contact with some reinforcement for successful behavior. The therapist should, for example, say "Do this, touch your nose, say ba" (holding the bubbles)

and reinforceing all correct or approximate responses (for more detail on these procedures, See Bell, Sundberg, Rueber, and Yutzy, 1979).

As stated previously, the echoic repertoire is a stepping stone to more complex verbal behavior. A shotgun approach (that is, using all of the suggested techniques) may be the best procedure to establish echoic stimulus control.

Once echoic control is established the language therapists job is to transfer this stimulus control to other verbal operants. The therapist could begin by asking the student to say "ball" and, if correct, say "Right, 'ball', What's this?" (tacting), you throw a "(intraverbal) and ending it by asking "What do you want?" (Mand).

Training the mand repertoire should occur simultaneously with training on the other verbal operants (echoic, tact, intraverbal, and textual). That is, instruction should never be totally discontinued on one operant to work on another. The assessment data should indicate where training should begin and any components of the repertoire which may require special instruction (e.g., use the why questions). Procedures for training a mand repertoire will be described along a continuum from simple to complex manding behaviors for the student who emits only echoic responses (e.g., the student can say "ba" when the trainer says "ba") the specific reinforcement characteristic of the mand relationship can first be used to strengthen echoic behavior. Then, eventually, transfer stimulus control completely to the establishing operation. The first (as described in the echoic section) step is to pick phonemes, blends and words which already at strength and items which are known to function as reinforcement.

If the phonemes -ba, -ta, and -ca are frequently uttered, for example, the reinforcement items might be ball or bubble, tickle or

truck, car or cookie. The procedure consists of the trainer holding up one of the items, ball, for example, while saying "ball, say ba". When the child says -ba the teacher should reinforce this response by giving the ball to the student as well as praising his behavior. Allow five to ten seconds for the response to occur. If no response occurs the teacher should also represent the stimulus. Also, alternate randomly between the phonemes used.

Data should be taken during all phases of training. A simple data sheet with each of the targeted phonemes will suffice. Record responses as correct, incorrect or no response. This can be done by simply using a "+" for correct, "-" for incorrect, and "0" or "NR" for no response. This will provide information as to when to move on to more complex responses. When the student reaches a criterion of nine out of ten correct responses work can begin on making the responses more functional for the student.

The next task is to fade out the verbal stimulus ball. To do this the trainer should first hold up the ball, as before, and in addition say "What do you want?" Wait about five seconds and then present the same verbal stimulus as in the first step ("ball say ba"). If the student responds by producing the correct phoneme before the echoic stimulus -ba the student should be reinforced by being given the object and with enthusiastic praise. If an incorrect response occurs the teacher should immediately present the correct verbal stimulus. Nine out of ten correct responses is sufficient to move to the next phase.

Now it is important to bring these responses under control of only a verbal stimulus. The same basic procedure is followed except that the trainer says, "What do you want?" without presenting an object. The training items should be placed behind the teacher or in some other

place where it is within easy reach but out of sight of the student. The teacher reinforces that response with praise and the object and a correct response should be recorded. If no response occurs within 5 seconds the teacher should provide an echoic prompt ("ba"). When a response occurs to this stimulus the teacher should represent the stimulus "What do you want?" and reinforce any correct responses. Training the student to respond to only this question brings his responses more under the control of establishing operations or what the student wants at that time. Since there is no visual or verbal control the specific response is controlled by what the student wants at that point in time - a true mand.

It should be pointed out that these procedures need not be followed exactly as stated. Individual students may require more training on any specific level and it may be necessary to increase or decrease the suggested criterion. The main point is to have the child produce phonemes or blends for reinforcing objects or events without verbal or non-verbal prompts.

Throughout training verbal behavior should be assessed in the natural environment, because the occurrance of mands in the natural environment is the terminal objective of the training program. The same procedures used in the initial assessment can be used. A graph should be maintained on the number of trained responses which are used in the natural environment. As training progresses, the rate of mands used in the natural environment should increase. Those who interact with the student should reinforce the response when they occur outside the training session. This is essential for training to be maximally effective.

The above procedure is specifically designed for bringing verbal

responses under the control of establishing operations. There is also some tact training occurring when the child responds in the presence of the ball as well as intraverbal training to respond to the question "What do you want?" Also as mentioned previously this procedure can be used to strengthen existing echoic responses and develop new responses.

The expansion of verbal behavior into more complex forms can and should move in numerous directions simultaneously. In the procedure described above we should be working not only on the three phonemes picked for mand training but also on increasing the number of sounds a child is able to make. It may be that the child has a strong echoic repertoire if so, procedures for bringing these sounds under other forms of control (mand, tact, etc) should be conducted. This can be accomplished with the above procedure. A student who has a fair echoic repertoire that is, can match many sounds may need to work on finer approximations to complete words. To accomplish this an approximation which more closely resembles a correct articulation would be required before the student gains access to the reinforcement. For example, if a student consistantly says "ca" when he wants some cake then in training he should be required to say "Ca-k" before being given a piece of cake. It is most effective when this occurs in the natural environment, also, those who interact with the student should always require his best articulation throughout the day. This should be continued until the student can emit whole words when manding. Training on the other operants will then bring these single word responses under all forms of stimulus control.

As training occurs in all other operants at increasingly complex levels, and if the student is required to use more complex forms in the natural environment, then verbal behavior will strengthen.

It is frequently observed that language does not develop at the same rate in all the operants. Often times one or more operants is defective to some degree. Recall that in the assessment we recorded various types of mands which occur. If we discover that the mand repertoire is faulty under some of these conditions we will need to do specific training in these areas to improve on those deficits. We must first look at what types of mands are not occurring, and how we might use behavior which is strong in another operant to develop a more appropriate mand repertoire.

One situation which may occur is a student who has a weak mand repertoire but a strong echoic repertoire. The student is able to repeat verbal chains up to three words, however, he does not ask for things using these words. The procedure would consist of contriving an establishing operation. Our list of possible reinforcers developed in assessment may show, for example, that coloring is an activity frequently engaged in. We now give the student a coloring book but no crayons and insure that no crayons are immediately available to him. The teacher then says to the student "What do you want?" pause "Want crayon". After several trials the teacher begins to probe to see if the mand will occur without the echoic stimulus. The teacher gives the child the coloring book and says "What do you want?" and waits about ten seconds. If no response occurs after ten seconds the teacher says "Want crayon" and repeats the question "What do you want?". In this manner the students behavior of saying "Want crayon" comes under the control of the establishing operation (wanting a crayon). Other responses can be trained with this same procedure such as, "Want blue crayon", I want the blue crayon please". Also the coloring book could be removed and the crayons used to train "Want book". The teacher should

conduct probes in the natural environment to see if those or other mands occur.

A second situation which frequently occurs, possibly more frequently than the one just described is a student who is able to tact things but does not mand them. Training here is very similar to the training for transfering control from echoic to the mand. Using the same example, the coloring book is given to the student without the crayons and the crayons are kept out of sight. The teacher then says "What do you want?" and waits about ten seconds. At this time the crayons are shown and the teacher says "What do you want?" the student may then say "crayon" the teacher then says "Right, what do you want?" The student has just said crayon and was reinforced and due to the short-time which has elapsed he is likely to again respond "crayon". Eventually, the response should come under the control of the question "What do you want?" and the establishing operation.

When using procedures as those described above it is desirable to set up several situations so new forms of reinforcement can be given the training session. This further increases the probability of a response occurring since repeatedly presenting the same form will rendor it a less effective form of reinforcement. (It should be noted that no procedure is given to transfer control from an intraverbal stimulus to control a mand. This is first because it is unlikely that a student would have intraverbal repertoire at strength but no mand repertoire, and second, if there is intraverbal behavior then there should be either echoic or tact behavior or both which may be easier to use to transfer control, however control can certainly be transferred from intraverbal to mand).

As stressed throughout this manual, we must continue to assess

verbal behavior in the natural environment. The trainer should record the occurance of any trained mands occuring in the natural environment or the occurrance of any new mands which occur as a result of training. It is possible to do a good deal of training in the natural environment. When interacting with the student outside the training setting various behaviors such as pulling, pointing, pushing, all may indicate that some establishing operation is in effect. For example, when a student pulls on the arm of an adult and points to some object it is likely that the object would function as reinforcement. The adult can take this opportunity to teach the student to mand the object and other mands such as "Go there please".

The student should also be taught to mand actions from other people. This training should occur after the student has learned a wide range of mands for objects and should occur concurrently with tact and intraverbal training with regard to actions. Often students are reinforced by telling the teacher to engage in activities (i.e., controlling the teachers behavior). In those situations the teacher can say to the student, for example, "Tell me to stand". The teacher should then carry out the action manded by the student. If the student does not give an instruction to the teacher, the teacher can prompt him to respond by saying "Say, stand up". When the student says stand up the teacher stands up and provides some form of praise. Some students may not be reinforced by controlling the behavior of other people. If simple actions are tried and the student has not manded an action without prompting after several sessions then the teacher should carefully pick other actions to train. Such actions which directly effect the student in some way (e.g., "Throw the ball", "Pass the bread") may result in the student in obtaining some other form of reinforcement. It may then

be easier to train the mand, for the other actions such as sit, stand, walk. A second way to enhance the effectiveness of training mands for actions is to use a group situation where one student plays teacher and tells the other members of the group, including the teacher to engage in activities. This can be made into a game and scores kept for each student, the winner being the one with the greatest number of different 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.

Question asking or manding for information is the last type of mand to be dealt with in this manual. Essentially we are interested in teaching the student how to use the words, who, what, when, where, why and how. The best teaching technique seems to be to create situations in which asking such questions will result in a strong form of immediate reinforcement. It is not possible in this manual to outline procedures for the teaching of each specific question word under all the possible conditions where it would be appropriate to use these words. However, a description of the contingencies in effect for using each question word and some training suggestions will be described. The consequences for each word will vary with each use, but there is still specific reinforcement in that each question word specifies a certain class or responses.

The question words, who, what, and where are best taught in group situations. One student in the group, for example, is instructed to close his eyes or turn away from the rest of the group. A second student in the group would then be given some object which would function as reinforcement for the first student. The student who was

given the object then hides the object in some place. The first student is then told that if he asks the right question he will get the object. He should first ask a who question, "Who hid the ____?" When the student who hid the object has identified himself, a what question can be asked, "What did you hide?" when this question is answered the student should ask a where question "Where did you hide the _____?" The student then goes to the location specified and retrieves the object. This type of situation is often enjoyable to the students and teaches cooperation along with question asking.

Data can be collected on number of questions asked correctly as well as the number of prompts required for each question. (The teacher may need to do considerable prompting of students at the beginning of the group to evoke appropriate question asking. An errorless transfer of stimulus control procedure should be used to accomplish this). "Which" questions could also be incorporated into the group by having various types of the same object. For example, if tokens (poker chips) were used in the group the series of questions required to get the object could be expanded to include "Which token did you hide?" to which the response would be, "The red one."

"When" questions might be taught by first telling the student that a reinforcing event is going to occur. Then the student is likely to want to know when this event will take place. The teacher can prompt the student to ask such a question and then reinforce asking the question by telling him when it will occur. Obviously, the student needs to have some skills with respect to time for this to be effective.

"How" question asking can be taught by first demonstrating some activity such as construction of a toy or by showing the student some object which would likely be reinforcing to the student by requiring

some skill to operate. The teacher can then prompt the student to ask a "how" question and reinforce the student by showing him or telling him how to operate the object.

"Why" questions are probably the most difficult to train. When and individual asks "why" he is asking for the controlling variables of another's behavior. One technique to train this is to perform some action in the presence of the student. The action demonstrated should result in some obvious form of reinforcement for the teacher. And then the student should be prompted to ask, "Why did you do that?" or a similar question. When the question is asked the teacher should respond by giving the controlling variables for the action and then allow the student to engage in the activity.

The procedures described for question asking are general and are meant to be examples of some techniques which may be used. Specific techniques will depend largely on the individual student, especially on the degree to which behavior from another person functions as reinforcement for the student, since that is the natural reinforcement for asking questions. We can inhance the reinforcing aspects of verbal behavior by bringing the student in contact with the reinforcement for asking questions immediately. Usage in the natural environment is of vital importance here since it may be more difficult to set up situations which reinforce question asking.

Summary

Training of the mand varies from the very simple to quite complex. Discussed here have been techniques for mands from the very simple single phoneme mand which allows a single phoneme response to bring the student in contact with some form of reinforcement to complex question asking. The general procedure at all levels has been to pick reinforcers from

those ovserved in our initial assessment and then contrive situations in which the student would be likely to mand the object or action. The reinforcement is provided which is specific to the response trained. Finally, it is necessary that those who regularly interact with the student be regularly informed of progress so that they will require mands from the student throughout his day.

PROGRAMMING FOR A TACT REPERTOIRE

The prerequisite skill necessary for developing a tact repertoire is that the child already have some responses under echoic stimulus control. Once the child can imitate vocal sounds and words and has developed a minimal echoic repertoire (i.e. he can match new sounds or words with little training), the next step is to transfer that stimulus control from the prior verbal stimulus to a non-verbal stimulus. This transfer of control from an echoic response to functional verbal behavior will be described in detail later in this section.

Selection of Materials

As stated in the assessment section, the first set of tact relationships that a child should acquire are those items in his immediate environment. These are the most familiar, and a student would have a greater tendency to verbalize about such items. The first step is to take a child through a reinforcement sampling procedure. This may be done by placing food items, toys, etc., in front of the student and scoring which items he selects. Also, the student may be placed in a room and the trainer should observe what the child interacts with or does in his free time. Record the items that the student manipulates or other items that he chooses. You may then remove him from the room and rearrange the location of the items and then allow the student access to the items once more. Again, the trainer should record the preferred items while watching for any consistency of chosen items. These should constitute the first tacts to teach the student. When the student can tact preferred items, mand training may be done in conjunction

with tact training.

Programming Errorless

During language training, it is important to minimize errors and thus provide the student with the maximum density of reinforcement. In the experiments conducted by Terrace (1963 a,b), the findings suggest that there are certain behaviors that occur during acquisition of a discrimination with errors that are absent in errorless learning. If the child has an "errorful" history with language training tasks, he may engage in inappropriate topographies to escape those tasks, avoid the tasks, or may not be motivated to engage in verbal behavior. When beginning to train a student with a weak verbal repertoire, minimize errors, maximize reinforcement and make the langauge training session reinforcing to the child. Procedures to reduce errors during training will be described.

Expressive/Receptive Issue

Procedures for training expressive language will be emphasized in this program. Contrary to many beliefs a strong receptive repertoire is not a prerequisite to expressive language training. The student need not be able to receptively identify (point to) items prior to teaching him an expressive tact for an object. What is important is that the child be under good echoic stimulus control. After training has occurred on expressively tacting an object, the trainer may test the receptive repertoire and if the student does poorly on the receptive test, then training should be implemented. However, research by Guess (1969) suggests that training in the expressive mode may actually

facilitate the acquisition of a receptive repertoire and data gathered by the authors also seem to support this notion.

Teaching Techniques

There are different techniques one may employ in transferring stimulus control from the echoic to the tact. Virtually all language programs available use a different procedure to transfer that stimulus control. Some of these will be described below.

The most common procedure used is the trial and error procedure, or differential reinforcement method. The student is shown an item and is asked, "What is this?" If the student makes the correct tact, he is reinforced, and if the student makes an incorrect response or no response, he is put through a correction loop that usually supplies the student with the correct tact and concludes with representing the question. This procedure increases the probability of making errors and their possible side effects.

Another procedure used to minimize errors and to transfer stimulus control is to decrease the auditory level of a verbal prompt. With this procedure, the child is shown the object and is asked, "What is this?", followed by a verbal prompt (e.g. "Cup"), the child then making an echoic response "Cup". As the child continues to make correct responses under the control of the non-verbal stimulus (object) and the verbal prompt, the loudness (or intensity) of the verbal prompt is reduced. The child is again presented with an object and asked, "What is this?", followed by a softer verbal prompt. The trainer continues to decrease the intensity of the prompt until the response comes under the control of the object itself. If errors occur, the loudness of the prompt is

again increased.

Another common procedure to transfer stimulus control is to fade from full to partial prompts. The child is presented with a verbal stimulus and object followed by a full verbal prompt. The child may be shown a hat and asked, "What is this?", followed by a full verbal prompt, "Hat" in which the child makes an echoic response. As the child responds correctly to the full verbal prompt, the prompt is faded to a partial prompt. The child is shown the hat with the verbal S^D, "What's this?", followed by a partial prompt "Ha". The prompt is continuously faded until the control has transferred from the prompt to the non-verbal stimulus. If effors occur while fading the prompts, the child is again presented with the full verbal prompt and the sequence repeated.

Minimizing errors during tact training may also be accomplished by increasing the time interval between the verbal S^D and the prompt. This procedure is based on discrimination work done by Touchette (1971), called delayed prompting. In this procedure, a prompt is presented after the verbal stimulus, "What is this?" After a number of trials, the time between the presentation of the object and question, "What is this?" and the prompt is delayed. After a number of reinforced trials, transfer of stimulus control has occurred when the subject comes under the control of the object and verbal S^D, "What is this?" and responds correctly prior to the presentation of the prompt. One may present an object and a verbal S^D, "What is that?" followed immediately with a verbal prompt, requiring the student to make an echoic response. As the student continues to make correct responses, the time interval from the S^D to the prompt may be increased to 1 second. This procedure is continued until

the child makes the correct response prior to the prompt. At this point, control has transferred from the prompt to the non-verbal stimulus. If errors begin to occur, decrease the time interval from the S^D until the prompt to maintain correct responding. The delay between the presentation of the S^D and the prompt may stay the same. If you set the delay for 4 seconds and the child does not respond, you may then present another prompt. These procedures will depend on your specific child.

All of the techniques described above may also be combined to form one teaching procedure. The main aspect of the described procedures is to minimize errors, and thus provide the subject with the maximum density or reinforcement. (It should be noted that, by definition, a pure tact would be one where even the S^D, "What is this?" is faded until the child responds when the trainer just holds up the object.)

It is important in early training of a tact repertoire that there exists a built-in system for review of previously mastered tacts. During training sessions, known tacts should be interspersed with new tacts that are currently being trained. If a student begins to make errors on previously mastered tacts, they should be placed back on the training list. Assessment of the tact repertoire should be continuous across training sessions and in the natural environment.

Program Sequence

As mentioned previously, first select objects (nouns) within the child's immediate environment. These include reinforcing items: foods, drinks, room parts, clothing items, parts of the body, animals, person's names and other common nouns the child comes into contact with. The

training procedure would be one of those described previously, with the reinforcement of being non-specific. The trial should begin with the stimulus "What is this?"

Actions (verbs) should be selected and taught next. These include stand, sit, jump, run, eat, drink, walk, etc. These are usually a little more difficult to acquire because of their transitory nature. An object is constant (e.g., a table) and has only a few varying characteristics (see the section on tact extension). Actions, on the other hand, involve a number of transitory events. Jumping, for example, is usually done differently by each person, and large numbers of irrelevant features are included (i.e., height off the floor, various body movements, location of jump). For actions, the teacher should change the initial stimulus to "What are you doing?" or "What am I doing?"

While new topographies are being acquired, it is important that procedures for teaching a person how to combine the words be ongoing. The person should learn to tact multiple objects and objects and actions. If the stimulus is a boy jumping on a chair, for example, the person should be taught to tact jump - chair (later, as the person acquires more topographies, he will be able to tact more of the stimuli in this situation). Also, a person can mand using any topography in his repertoire. Therefore, the child should be taught, for example, to ask for chair when he wants one, as well as asking for combinations of objects and actions.

Next, the person should learn topographies for the relationships (prepositions) between objects, as well as between objects and actions (e.g., in, on, above, below, out, between). The procedure is again

the same, with the exception of a different stimulus: "Where is _____" should be used. Once the person learns a topography for a relationship, procedures should be used to train the person how to use that relationship in combination with other objects and actions. And, of course, to ask for object-relationship-action as well as using several topographies and arrangements.

Properties of objects, then actions, are usually the next repertoires acquired by normal children. These are a little more difficult because of their relative nature. Fast, for example, is a property which can be given to a car; however, a car is slow when compared to a plane. It simply requires more trials for the normal child to acquire these behaviors. For the language-delayed person, these may be difficult repertoires to teach; however, specific procedures and consistent training can usually help them. Our objective in tact training is to provide a person with a repertoire which will allow him to effectively react to objects and actions in his environment.

Extensions

Immediately following training on a specific object, action relationship, etc., it is important that the student be able to respond appropriately in the presence of new stimuli which resemble those previously tacted. If a child learns to say "cup" in the presence of a large white coffee cup, it is important that he be able to make the same response in the presence of a small brown coffee cup. To train such a repertoire, one simply needs to present the person with novel (untrained) items and continue to

shape the response until the behavior becomes strong. This should be done with every topography acquired. Also, it should be done across the day, with different teachers, and in different types of learning situations. It is also important to conduct tact training across different sense modes. If a child can verbalize "water" when he sees water, it should not be taken for granted that he can verbalize "water" when he touches, tastes, or hears water.

INTRAVERBAL TRAINING PROCEDURES

Training the intraverbal relationship involves the transfer of stimulus control from non-verbal stimuli or from verbal stimuli which have point-to-point correspondence with the desired response (i.e., echoic, textual, transcriptive repertoires) to verbal stimuli which lack point-to-point correspondence with the desired response. It is suggested that a procedure which transfers stimulus control from non-verbal to verbal stimuli be employed at the beginning of training. As training continues to progress and the student becomes increasingly skilled at interacting with verbal stimuli, both vocal and printed transfer procedures may be used in training appropriate responses.

Minimal-Error Training

All levels of the intraverbal relationship, as the other verbal operants, should be trained in a method which minimizes the student's probability of making errors. This is accomplished by employing a minimal-error prompting procedure. This procedure involves two types of prompts: immediate prompts and delayed prompts. Training is started by presenting a non-verbal stimulus (picture, object, taste, smell, etc.) immediately after presentation of the verbal stimulus. For example:

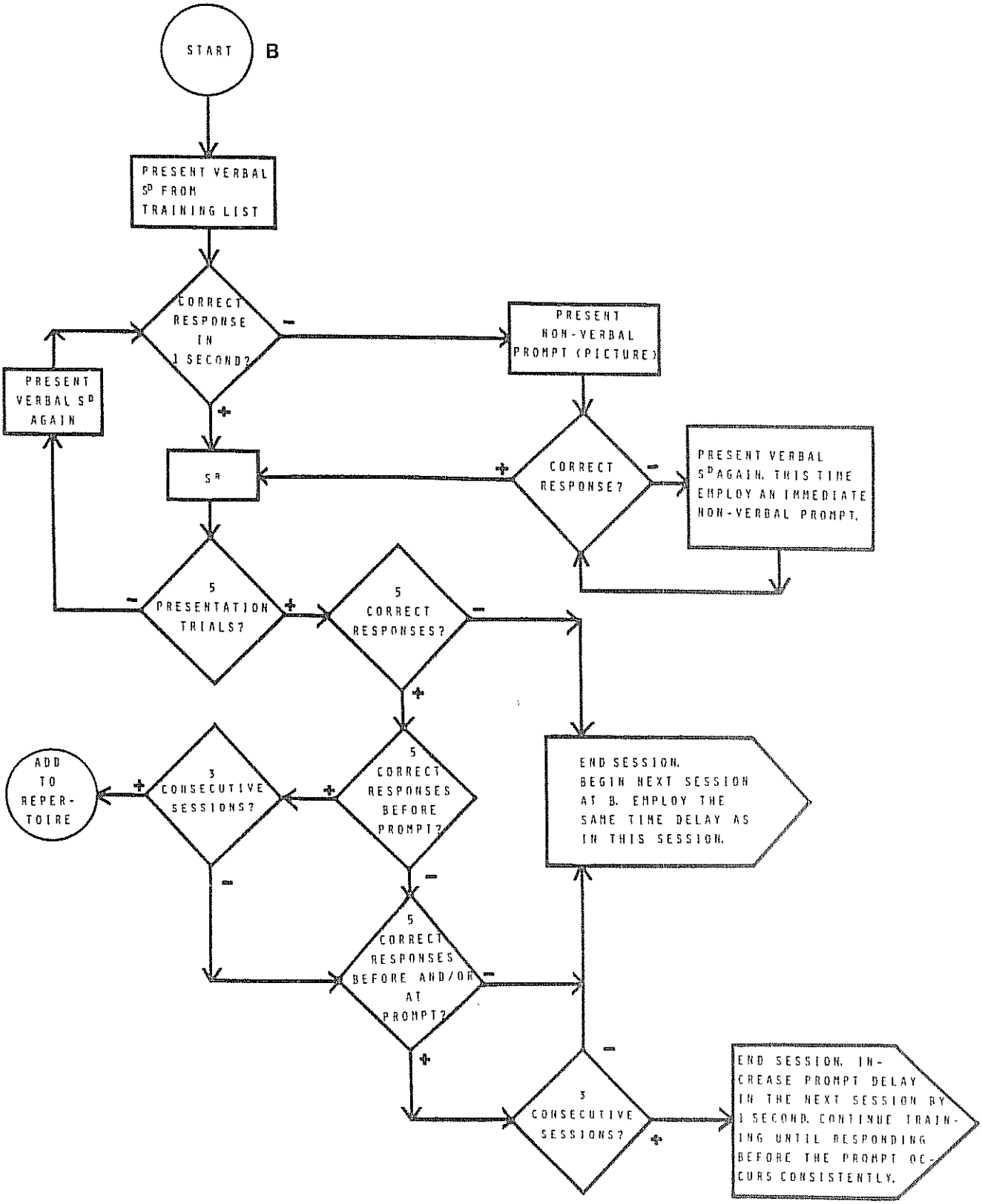
Teacher: "Tell me the name of an animal."

(Teacher then immediately presents a picture of a dog.)

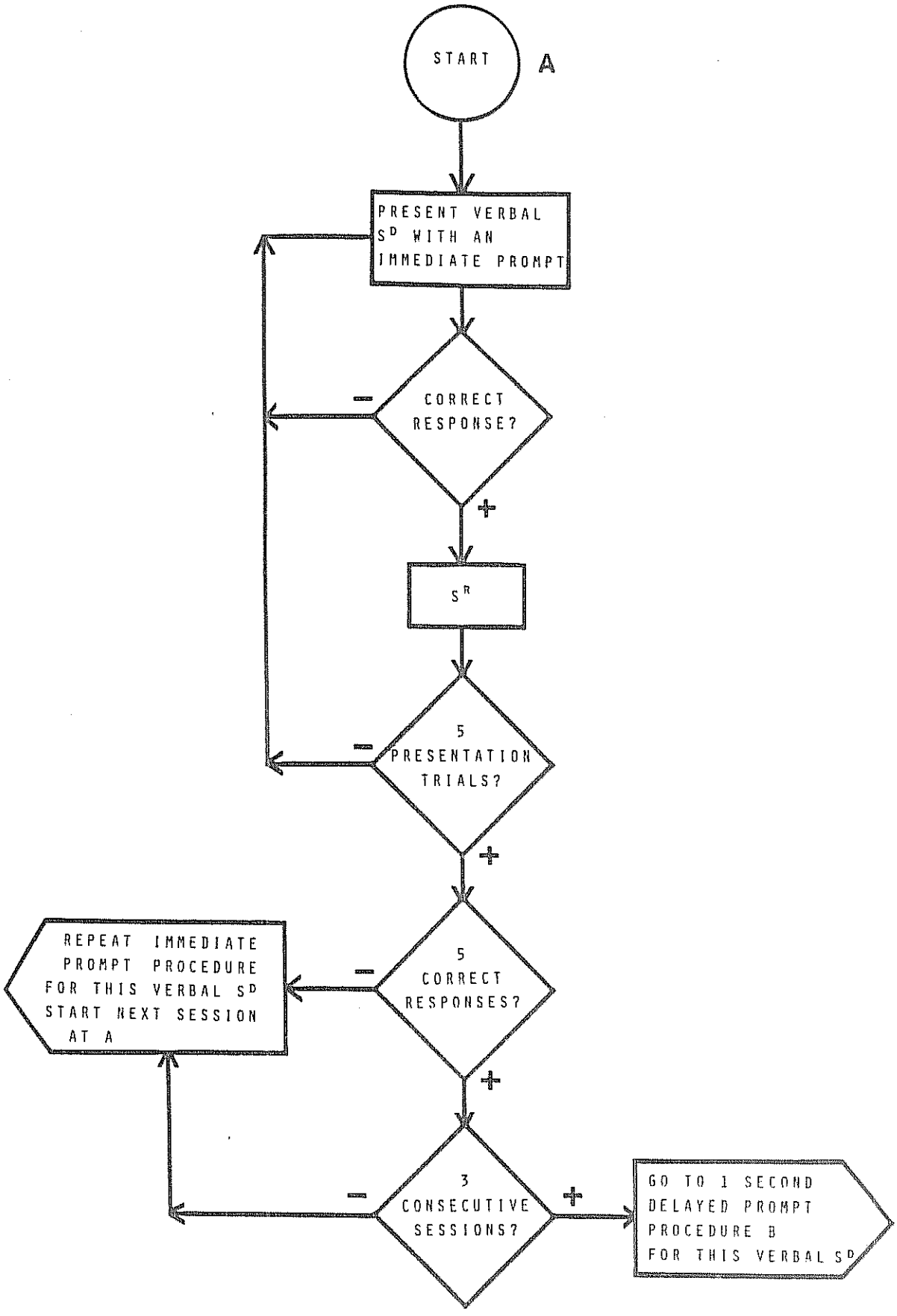
Student: "Dog."

Teacher: "That's right! A dog is an animal!"

DELAYED PROMPT PROCEDURE



IMMEDIATE PROMPT PROCEDURE



Teacher: "What do you see at school?"

(Teacher them immediately presents a picture of a blackboard.)

Student: "Blackboard."

Teacher: "That's right! You see a blackboard at school."

(See Figure 1 for a flow chart of this procedure.)

Once the student is responding consistently with the immediate prompt, the teacher should begin delaying the non-verbal prompt by one second after the verbal stimulus presentation. For example:

Teacher: "What is the name of a color?"

(Teacher counts silently, "One-thousand-one", then presents a piece of red colored paper.)

Student: "Red."

Teacher: "That's right! Red is a color!"

If the student answers correctly before the non-verbal prompt is presented, he should be reinforced appropriately. If the student answers incorrectly before the non-verbal prompt is presented, the teacher should return to the immediate prompt procedure. If the student answers correctly at the prompt for approximately three consecutive sessions, the time delay between presentation of the verbal stimulus and the non-verbal stimulus should be increased to two seconds. Time delays should be increased at regular one-second intervals until the student begins to respond consistently before the non-verbal prompt. Training should eventually be conducted with <u>no non-verbal stimuli present</u>.

(See Figure 2 for a flow chart of this procedure.)

As the student becomes more proficient in interacting with verbal stimuli, the stimuli in the minimal-error prompting procedure can be varied. Printed stimuli (flashcards) and vocal stimuli may be used in place of the non-verbal stimulus prompts.

Multiple Responses

Once the student learns several specific intraverbal relationships (one response to one stimulus), the teacher should begin to introduce elements of multiple responses and multiple controlling variables. An easy way to begin is by teaching the student to make multiple responses to a single stimulus. This type of behavior is often referred to as "verbal classifications" on traditional intelligence and language tests. The minimal-error prompting techniques described previously should again be used. This time, however, the same verbal stimulus should be presented several times and a different response should be required each time.

For example:

Teacher: "What do you like to eat?"

(Teacher immediately presents a picture of a hot dog.)

Student: "Hot dog."

Teacher: "Good! You like to eat hot dogs! Now, tell me something else that you like to eat."

(Teacher immediately presents a picture of popcorn.)

Student: "Popcorn."

Teacher: "Great! You like to eat hot dogs and popcorn."

The teacher should follow this sequence several times until responding

comes consistently at the prompt. Then, time delays can be employed, as described previously, until the student responds consistently before the prompt.

When presenting the verbal stimulus several consecutive times and requiring a different verbal response each time, the teacher should leave the prompt stimuli in view of the student after he responds correctly. This is helpful for making corrections as follows:

Teacher: "What do you see at school?"

(Teacher immediately presents a picture of a blackboard.)

Student: "Blackboard."

Teacher: "That's right, you see a blackboard at school. What else do you see at school?"

Student: "Blackboard."

(Child responds with the same response as to original stimulus.)

Teacher: "Yes, that's right, but you already said 'blackboard' (pointing to picture). Tell me something <u>different</u> that you see at school."

(Teacher then immediately presents a picture of a desk.)

Student: "Desk."

Teacher: "That's right. At school you see a blackboard and a desk."

This type of training should continue until the child is responding consistently.

The next level of training multiple responding in the intraverbal relationship has to do with training responding in sentence form. For example:

Teacher: "Tell me the name of a vehicle."

Student: "Car."

Teacher: "Great! Now make a sentence."

(The teacher repeats the stimulus.)

"Tell me the name of a vehicle."

(The teacher responds immediately before the child.)

"A car is a vehicle."

Student: "A car is a vehicle."

Teacher: "Wonderful! That's a nice sentence."

Training should continue in the minimal-error format described previously until the student responds in sentences and without prompts.

Multiple Controlling Variables

Now that the student can respond to verbal stimuli with single and multiple verbal responses, the complexity of the stimuli in the intraverbal relationship can be increased. Now the child should begin training on such categories as school people, home people, school days, hot food, cold food, water animals, tree animals, heavy things, light things, etc. Training should continue in the same manner (minimal-error procedure) as previously described. Eventually, we would want the child to respond to complex verbal stimuli such as "Who is the person that wears a badge and drives a car with flashing lights?"

Along with increasing the complexity of the stimulus in training the intraverbal relationship, the teacher should also begin to require the same degree of complexity in verbal responding. Again, the minimal-error procedure should be used to transfer stimulus control from verbal (echioc) to verbal (intraverbal).

The teacher should never consider training of the intraverbal repertoire to be complete. Assessment and training should be continual, ongoing procedures. The teacher should also be careful not to neglect other stimulus modes. The child's use of an intraverbal repertoire in different modalities is important to the development of a complete verbal repertoire. Foreign languages involve the training of an advanced intraverbal repertoire. Sign language is a very easy way to quickly train an intraverbal repertoire for hearing children. Stimulus control very quickly transfers from vocal English to sign language (e.g., "Show me the sign for cat."). Crossword puzzles, fill-in-the-blanks, and other word games are excellent sources for improving the intraverbal repertoire in conjunction with textual (reading) and writing behavior.

Training students to answer "Who?","What?", "When?", "Where?", "Which?", "How?" and "Why?" questions is another example of multiple control and the intraverbal relationship, since the above -wh stimuli often occur in conjunction with other verbal stimuli (either vocal or written). A procedure for teaching these discriminations involves first teaching the student to make multiple responses to each of the -wh stimuli in a manner similar to that previously described for verbal classifications. The verbal stimulus "Who" could result in responses such as "Mom", "Dad", "Brother", "Storekeeper", "policeman", etc. At this point, stimulus complexity can be increased as, again, previously described. After responding to "Who" is consistent, the child can be taught to respond to stimuli such as "Who home?" or "Who work?". Later, complexity is again

increased to result in stimuli such as "Who plays piano?" This same manner of teaching may be effectively employed across all the other -wh stimuli.

A final word on training the intraverbal relationship is that the relationship occurs in conjunction with so many other types of verbal stimuli that it is often difficult to assess the amount of intraverbal control. This shouldn't concern the teacher, for the "pure" intraverbal relationship as defined by Skinner (1957) is rarely seen or heard. What should concern the teacher, however, is that the training is done in a conducive environment with minimal-error training procedures, and it is experience-based. A most effective way of doing this is to arrange outings or field trips which serve as language learning experiences. Many of the stimuli used in tact training while on the field trip serve as excellent stimuli for intraverbal exercises when back at school. For example, training stimuli such as "Where does the fireman sleep?" or "Who is the person that gives you money at the bank?" serve as excellent intraverbal stimuli back at school (when responding is no longer under the control of any non-verbal stimuli). The teacher can feel comfortable in reinforcing and correcting responses, since he/she shared the non-verbal stimuli with the child.

Programming for a Textual Repertoire

When programming for a textual repertoire, no one method of training is suitable for all children. Some children achieve faster and with greater success in learning through a phonic approach. That is, learning the phonetic sounds for single letters and combinations of letters, then combining these sounds in the presence of textual units -- words, phrases, and sentences. Other children learn best when a "sight word" approach is used. In this method, reinforcement is contingent upon the student making a textual response in the presence of a word unit. Even units larger than a word (e.g., phrases or sentences) can be taught from a "sight word" approach. Most students learn best from a combination of methods. It is important to remember that the order of teaching is irrelevant. Depending on the particular child, a phonic, then a sight word approach or a sight word, then phonic approach can be utilized. Other children benefit from a program employing both methods taught simultaneously. However a student is taught, the "reader" will eventually develop textual operants of many different sizes.

Another issue to be considered is how early in a language training program is it appropriate to start teaching a textual repertoire. From a developmental learning orientation, teaching a child to read would occur only after a child has several thousand words under echoic, tact, mand and intraverbal control. This generally occurs around the age of 4 in normal children. For the child who has a deficient verbal repertoire, the factor of time is critical. If a 5 year old child with a weak or deficient verbal repertoire

begins a textual training program according to standard developmental guidelines, the student may be 10 years of age before he/she would begin textual training. The student will lose valuable time and will always remain deficient in his textual repertoire. A more appropriate approach to language training is to continually probe and start training of all operants as soon as possible. It has been shown that a language deficient child who has about 75 words under echoic and/or copy control, 50 under tact control and about 15-25 under mand and intraverbal control can already begin training of textual behaviors (Braam, 1979). Receptive discrimination behaviors and match to sample behaviors need not be at strength before textual training can start.

Selection of Materials

In selecting textual materials, use the data generated in the textual assessment to determine the appropriate materials. Is the student able to discriminate words and letters in primary readers or books? If the student has a vision impairment, what size type or printed letters or words can be used? It is desirable to use as wide a variety of stimulus materials as possible. This would eliminate having to later transfer stimulus control to other textual materials. In most children, transfer of stimulus control occurs readily without specific training. In other children, appropriate training on other materials must be given.

When developing materials, consider words that are under echoic/copy control, tact, mand and intraverbal control. With a past history of reinforcement and stimulus control in other operants, a

student would have a greater tendency to learn the textual response to a particular word. For example, if a student can say "ball" when he hears the word "ball", when he wants a ball, or when he sees a ball, then he would have a greater tendency to learn a textual response to the printed stimulus "ball". Many beginning reader word lists and vocabularies are also available from which materials can be generated on an individual basis.

Once words, phrases, or sentences are under textual control, it is fun for the therapist and student to construct a book. The book can be labelled as "_____'s Book", and pictures can be drawn or cut out from magazines to add novel interest to the material.

One issue that might concern the therapist at this point is the issue of reading comprehension. Research has shown that if a student can say "car", and can tact a picture of a car, and then learns to emit a vocal response in the presence of the textual stimulus "car", he can then demonstrate reading comprehension (e.g., match picture of "car" to word "car") without direct training in this task (Braam, Jackson, et. al, 1979). The student is also able to discriminate the words and pictures in receptive discrimination tasks without direct training of these behaviors.

Teaching Techniques

The best method to teach a textual response is to transfer stimulus control from echoic to textual. Another method would involve transfer from tact to textual control. The therapist should refer to the section on the tact for a review of general teaching techniques which can be used to develop a textual repertoire. For

example, in the trial and error method, present the textual stimulus, tell the child the correct response -- "This says baby", and then present the verbal S^D, "What does this say?" Reinforce the child for correct responses. If the student is incorrect or makes no response, put him through a correction procedure. The therapist says, "This says baby", while presenting the textual stimulus. When using a phonic method, the same procedure can be used. For example, the therapist presents the textual stimulus "b" and says, "What does this say?" From the material in the section on the tact, it can be seen that an errorless approach using delayed prompt is perhaps the best method to use in training a textual response. Again, one method is not suitable for every child, and the therapist should use the method best suited to the individual child.

As with training of any of the operants, ongoing review of previously mastered textual responses is mandatory. Review can take the form of a book made by the therapist and student, flashcards, or a primary text or reader, etc. Vary the maintenance materials as one would in the training phase.

Program Sequence

As mentioned in the section on "Selection of Materials", training should begin on words which are already under echoic/copy, tact, mand or intraverbal control. These words will probably be words of objects in a student's immediate environment, common signs, and common labels (see Assessment of Textual Repertoire).

If using a phonic method, sequencing of letter and phonetic sound presentation can be determined by the echoic assessment (which phonetic sounds student can emit).

In the event that programming for a textual repertoire is occurring simultaneously with tact and intraverbal programming, words can be assimilated into the textual program as they are taught in the other programs (see Tact Program Sequence).

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Also, we encourage suggestions, comments and data that will improve our understanding of verbal behavior.

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