Two Kinds of Verbal Behavior Plus a Possible Third

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Speaking, writing, and signing (American Sign Language) are types of verbal behavior where each different verbal relation involves a different topography. It is also possible to behave verbally by pointing at or in some way indicating the relevant verbal stimuli, where response topographies do not differ from one verbal relation to another. There are a number of potentially important differences between *topography-based* and *stimulus-selection-based* verbal behavior, although the two are often treated as equivalent from a behavioral as well as from a traditional perspective. Selection-based verbal behavior involves a conditional discrimination whereas topography-based verbal behavior does not. In topography-based, but not in selection-based verbal behavior, there is point-to-point correspondence between response form and relevant response product. Also, effective selection-based verbal behavior requires a good scanning repertoire whereas in topography-based verbal behavior the correct response simply becomes stronger under appropriate conditions. What is traditionally referred to as *receptive language training* is described as quite similar from a behavioral perspective to training in selection-based verbal behavior. Given the differences between topography- and selection-based verbal behavior, the wisdom of the current rather extensive reliance on selection-based verbal behavior in language instruction for developmentally disabled clients is seriously questioned.

Verbal behavior consists of relations between controlling variables (verbal stimuli, nonverbal stimuli, motivative variables or establishing operations, and consequences) and behavior. In terms of a speaker, writer, or user of sign language, the topography of the response is an important aspect of the verbal relation, being one of the factors that distinguishes one verbal operant from another. Saying "cat" and saying "dog" differ from one another in response topography—in the direction, force, duration, etc. of the action of the various components of the vocal musculature—as well as in terms of the controlling variable. The *unit of verbal behavior* can be described as an increased strength of a distinguishable topography given some specific controlling variable. In the case of the tact, in the presence of a dog the speaker has an increased tendency to say "dog" (assuming other appropriate conditions). In the case of the mand, as a result of an increase in the strength of some motivative variable or establishing operation (Michael, 1982) which makes a dog or dogs in general more valuable, the speaker has an increased tendency to say "dog"; and likewise for the other verbal operants. It will be convenient to refer to verbal relations of this sort as *topography-based*.

There is another type of verbal behavior, however, which does not involve distinguishable topographies and yet provides equally distinguishable stimuli to a listener. Under appropriate conditions a person may behave verbally by simply pointing at, touching, or in some sense selecting a stimulus which then plays the same role as the response-produced stimulus of a topography-based verbal response. Although the effects on a listener of such *stimulus-selection-based* verbal behavior seem quite similar to those of topography-based verbal behavior, from the behaver's perspective they are quite different. The basic verbal relation is between a controlling variable (verbal stimulus, nonverbal stimulus, establishing operation) and the control that another specific stimulus has over the pointing, touching, etc. behavior. It is a conditional discrimination in which a stimulus (or an establishing operation) alters the controlling strength of another stimulus over a nondistinctive response such as pointing or touching. The topography of pointing is pretty much the same irrespective of the thing pointed at, especially if the stimuli to be selected are not in constant positions relative to the pointer's body as is often the case. The *unit of verbal behavior* can be described as an increased control of the pointing response by a particular stimulus as a result of the presence of a different stimulus (or the strength of a particular establishing operation). Pointing at a

written word or at a picture to alter the behavior of a viewer exemplifies selection-based verbal behavior. Communication boards used with the physically handicapped, and the lexigram selection system used by Rumbaugh (1977) and Savage-Rumbaugh (1984) in their work with chimpanzees are probably the best known such examples.

The difference between topograpy-based and selection-based verbal behavior is likely to be overlooked or considered unimportant by those who are primarily interested in the effects of verbal stimuli on listeners. This is especially true in the case of writing and reading, since reacting to a written word would not seem to depend on whether it was written or simply selected by the verbal behaver. The difference is also likely to be ignored by cognitivists who see the selection of words from memory as the most significant aspect of topography-based verbal behavior, with the particular means of display for the listener—speaking, writing, pointing at words or at symbols or at pictures, etc.—being relatively unimportant. This is somewhat equivalent to inferring an internal stimulus selector when external behavior doesn't seem to involve this process, and is common in cognitive interpretations where internal choice is used as an explanation of external differential responding.

But even behaviorally oriented students of language often seem to favor selection-based over topography-based conceptualizations, especially when developing verbal behavior in nonverbal organisms. As an exercise in my graduate course on verbal behavior (which uses Skinner's (1957) *Verbal Behavior* as a text) I ask the students to explain how they would develop in a pigeon a color-naming repertoire as much like the analogous human repertoire as possible. Their pigeon color-naming behavior almost invariably has the bird pecking a key with a word or symbol on it appropriate to the particular color displayed. Thus, in the presence of three response keys, each with a different shape projected on it (circle, triangle, square) the pigeon is reinforced for pecking, for example, the circle when another display is red; the triangle when the other display is green; and the square when the other display is blue. This, of course, is not ordinary human color-

naming behavior, yet almost never does the student have the pigeon emit different topographies in the presence of the different color displays, for example turn in a circle when the display is red, peck its foot when the display is green, stretch its neck upward when the display is blue. It is possible that the somewhat famous experiment by Epstein, Lanza, and Skinner (1980) has become such a part of the behavioral culture that the students produce a similar experiment even though they claim not to be familiar with Epstein et al. It is also possible that the selection-based analogy is favored because of the ease of automating this type of experiment, but all the student is actually asked to create is a "thought experiment." One student, even though this exercise occurred near the end of the semester, said that for her, language still seemed to be essentially related to words, and a pigeon's pecking disks with words written on them (or symbols) seemed more like real language than a pigeon's turning in a circle when the display was red, pecking its foot when the display was green, etc. I suspect that her view (she is an excellent student with an extensive behavioral background) is not uncommon. I'm reasonably confident that laymen, linguists, philosophers, and others with a strong predisposition to mentalistic explanations of human behavior would agree with her sentiment, except they would probably find the analogy preposterous to begin with.

From a behavioral perspective the differences between the two types of verbal behavior would seem to be potentially quite important. A conditional discrimination involves two primary controlling variables whereas an "unconditional" discrimination involves only one. Of course, additional variables such as establishing operations, audience characteristics, etc. make unconditional discriminations actually conditional, but this means that selection-based verbal behavior has a further degree of significant conditionality. Our verbal behavior about behavior has not dealt much with discriminations of the sort that do not involve distinguishable responses. We are so response oriented that we deal with such functional relations as though they did involve responses. For example, we speak of the dependent variable in a simulataneous

color discrimination procedure as the response of "pecking the red key" or "pecking the green key," but these are not different responses, if "response" refers to topography, since the pecking may well be the same topography irrespective of the color that evokes the pecking behavior. It is hard not to believe that this further conditionality is relevant to such factors as ease of acquisition of a verbal repertoire, effectiveness of control by motivative variables, ease of interference by similar functional relations, etc.

Another difference (first brought to my attention by Paul Whitley) between these two types of verbal systems is that topography-based verbal behavior always involves point-to-point correspondence between the response form and the response product, whereas there is no such relation in selection-based behavior. When one speaks there is correspondence between the details of the vocal muscle action and the relevant details of the auditory stimulus that results, and likewise with writing and the use of signs and their respective visual response products. When one points at a word, picture, or symbol, however, the muscle action of the pointing response has no correspondence with the important features of the selected stimulus. Again, this difference would not seem to be irrelevant to such factors as ease of acquisition, precision of control, susceptibility to interference, etc.

Still another difference is the necessity of an effective stimulus scanning repertoire in the case of selection behavior. Typically the various visual stimuli from which the selection must occur cannot all be viewed at the same time. In the case of a selection-based tact, for example, some nonverbal stimulus affects the organism by increasing the control of one of the verbal stimuli over the pointing response. However, if the set of verbal stimuli is reasonably large, and the scanning repertoire not systematic the appropriate verbal stimulus may be overlooked. Also, if the scanning takes much time, the effectiveness of the nonverbal stimulus will be lost by the time the appropriate verbal stimulus is encountered. A good scanning repertoire is so well developed in the normal adult that one might overlook its existence, but when it is ineffective or absent, as with young children or with some severely retarded individuals, selection-based verbal behavior is not possible. Topography-based behavior requires no such scanning (although of course cognitivists typically invent an internal scanning process, as mentioned above) and would thus seem behaviorally simpler. The necessity of an effective scanning repertoire for selection-based behavior also constitutes an additional basis for the disruption of such behavior.

Closely related to the selection-based tact is what is ordinarily called receptive language. In typical receptive language training an individual is presented with a set of stimuli (objects or pictures) and asked to point to or touch a particular item in the set. For example, a teacher may present pictures of a cup, doll, spoon, and apple, and say "point to the apple." The teacher mands behavior on the part of the learner with respect to a particular stimulus. The learner can respond correctly only if the pointing response is jointly controlled by the auditory verbal stimulus provided by the teacher ("apple") and the nonverbal visual stimulus provided by the object (the apple). The reinforcement for such behavior is typically praise, an edible, a trinket, etc., depending on the nature of the learner.

The repertoire developed by such training is, in a sense, the opposite of a selection-based tact repertoire. In the latter an array of verbal stimuli is presented along with a nonverbal stimulus, which momentarily strengthens the control by one of the verbal stimuli over a pointing response. With the present example, the array would consist of the printed words "cup," "doll," "spoon," and "apple," and the learner would have an increased tendency to point to the word "apple" when shown an apple and asked by the teacher "What is this?" In manded stimulus selection the array consists of the several nonverbal stimuli (objects or pictures) and the teacher provides the verbal stimulus ("Show me the *apple*"). Both of these relations involve joint control by a nonverbal and a verbal stimulus, thus both are clearly conditional discriminations. Both also require an effective scanning repertoire.

This type of instruction is quite popular in work with the developmentally disabled, even to the neglect of other verbal relations such as the mand, tact, and intraverbal which would seem to be more directly valuable to the learner. Its popularity is pro-

bably related to the general belief that language learning consists in learning the meanings of words, which can then be used for various purposes; and this way of learning the meanings of words doesn't require the shaping of vocal or other topographies, nor the arrangement of motivative variables (as in teaching the mand relation). That manded stimulus selection enhances the control of the learner by the staff may also not be irrelevant. This is not to say that manded stimulus selection is unimportant as a part of one's repertoire, but only that it should not be considered equivalent to other equally important and behaviorally quite different kinds of functional relations.

Topography-based verbal behavior, selection-based verbal behavior, and manded stimulus selection are often considered to be equivalent forms of the same underlying language processes. It is true that the highly verbal adult human has well-developed repertoires of all three sorts, and behavioral

relations acquired as one type readily occur in the other types without further training. From a behavioral perspective, however, there are difference between these types of verbal relations which would be expected to be of special significance when verbal behavior is being developed in those whose verbal repertoires are seriously deficient, and it is important not to overlook these differences.

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