VB News

Official Publication of the Verbal Behavior Special Interest Group

Volume 5 – Issue 1 May 2005

Table of Contents

Announcements

Editorial

Matthew Normand, Ph.D.
Florida Institute of Technology

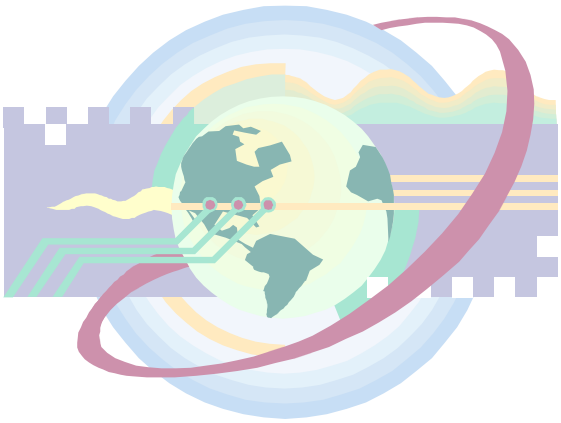
Welcome to the latest installment of VB News (the fifth under my helm). Once again, I am quite happy with the product you now hold in your hands. It is encouraging that there are enough scholars interested in and actively working with Skinner's analysis of verbal behavior that even a meager newsletter can, year after year, include so many quality articles. The current issue contains a nice cross section of article types, including one research article (Palmer & Katz), one conceptual piece (Stemmer), and one program report (Miguel et al. from NECC). Additionally, we have a business report from Bill Potter, the VB SIG chair, and an update on *The Analysis of Verbal Behavior* from the current editor, Jack Michael.

I would like to thank all of the contributors to this issue and encourage others to think about possible contributions for the next issue. Any and all submissions and questions can be sent to me at mnormand@fit.edu. See you all at ABA ! !

Join Us for the VB SIG Business Meeting @ ABA 2005!

Sunday, May 29th 2005
Hilton-Chigago Hotel
Boulevard C (2nd Floor)
7:00 PM – 7:50 PM

Want To Get Involved?



Visit us on the Web
http://www.vbsig.org

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verbalbeh@listbot.csustan.edu

Report from the Chair

Bill Potter, Ph.D.
California State University, Stanislaus

The Verbal Behavior SIG can attest to the growth of Behavior Analysis – two years ago we did a mailing to approximately 3,500 folks who were on the ABA mailing list. This year that list was over 5,500! This task turned out to be our major undertaking for the year – we sent out postcards that hopefully will obtain more subscribers to the Analysis of Verbal Behavior, as well as solicit more submissions. Thanks to the California State University, Stanislaus PSI CHI club, who helped with the mailing. If you are interested in the subscribing, or submitting, you can find out more information at http://www.abainternational.org/avbjournal/. The current issue is filled with theoretical and experimental articles as well as commentary on Verbal Behavior. The SIG has also experienced growth, with approximately 60 people attending last year's business meeting, which also roughly corresponds to the number of SIG members.

We also have redesigned the SIG website, providing a more friendly and appealing site. The website is used to disseminate the SIG newsletter as well as presentations (primarily from ABA or other conferences), allow for discussions on various VB topics, and in general supports the community interested in verbal behavior. That site is located at www.vbsig.org. Thanks To Matt Normand and Patrick Williams for the new design. The site should be fully operational shortly after ABA. If you wish to submit a presentation, or some other material for publication on the website, please email me at wpotter@athena.csustan.edu. If your submission is your work, please include a note clearly specifying that you give permission to the SIG to post the item on the website. Unfortunately, we cannot accept third party submissions unless they are accompanied by a letter granting permission to use the material - from the original author.

And, since you are reading this, Matt Normand pulled off another issue of the VB SIG newsletter. Each year Matt solicits articles for the newsletter, which invariably come in at the last minute, including this column! Matt has done an amazing job of putting the newsletter together in a very short amount of time. Kudos to Matt and to the contributors. Feel free to contact Matt at mnormand@fit.edu for additional information on the newsletter. Current and past copies will be available on the new website once it is completed.

The listserv is still up and running – it tends to be a low volume listserv, and you can set it for digest mode. To be added to the listserv, visit http://listbot.csustan.edu/mm/listinfo/verbalbeh where you can sign up for the listserv, or send an email to the listserv members. I recently changed the listserv so that all posts from non-members must be approved. This means that it is a bit more work maintaining the listserv, but few, if any, spam emails ever get through. It also means that there may be somewhat of a delay for non-spam emails to get through, but generally no more than a week (if I am away from a computer).

One of our goals for last year was to establish By-Laws for the SIG, unfortunately, due to busy schedules and geographical dispersion this was not accomplished. I am hoping that the officers can get together at ABA and establish an outline for the bylaws, which can be completed over the next year. We will establish our goals for this next year at the annual business meeting at ABA '05. This year's meeting will be held on Sunday, May 29th, from 7-7:50 pm in Boulevard C (which is on the second floor). Feel free to attend, the meeting is open to the public – we would love to have your input!

If you are unable to attend the business meeting, but would still like to pay your SIG dues ($10 full member, $5 student), or make a donation to the SIG please send an email to David Reitman at reitmand@nova.edu and he can provide you with details. I hope to see you at ABA!

The Intraverbal Effects of Briefly Presented Verbal Stimuli

David Palmer, Ph.D. and Sara Katz
Smith College

In *The Behavior of Organisms*, Skinner proposes the use of *response strength* as a summary term reflecting a variety of response measures that tend to covary, such as latency, intensity, frequency, and resistance to extinction (1938, p. 15). Presumably there is nothing "left over" after we have specified these other measures, but we are seldom in a position to specify them all. The summary term implies a generality not commonly found in a set of experimental measures. However, the term is sometimes used as a hypothetical construct. We are apt to say, for example, that rate is a *measure* of response strength, as though response strength had an independent status. The term connotes a property or dimension of a response rather than an index of the control exerted by a set of antecedent variables. Terms often evolve insidiously, as Skinner reminds us in *About Behaviorism:*

> Turning from observed behavior to a fanciful inner world continues unabated. Sometimes it is little more than a linguistic practice. We tend to make nouns of adjectives and verbs and must then find a place for the things the nouns are said to represent. We say that a rope is strong, and before long we are speaking of its strength. We call a particular kind of strength tensile, and then explain that the rope is strong because it possesses tensile strength. The mistake is less obvious but more troublesome when matters are more complex. There is no harm in saying that a fluid possesses viscosity, or in measuring and comparing different fluids or the same fluid at different temperatures on some convenient scale. But what does viscosity mean? A sticky stuff prepared to trap birds was once made from *viscus,* Latin for mistletoe. The term came to mean "having a ropy or glutinous consistency," and viscosity "the state or quality of being ropy or glutinous." The term is useful in referring to a characteristic of a fluid, but it is nevertheless a mistake to say that a fluid flows slowly because it is viscous or possesses a high viscosity. A state or quality inferred from the behavior of a fluid begins to be taken as a cause. (Skinner, 1974, p. 161)

We must be equally careful about our use of the term response strength. We are perhaps less apt to be careless with the comparable term *response probability*. Probability connotes the interplay of many variables, whereas strength suggests an inherent property.

Neither term is entirely satisfactory. The term probability is associated with models of random events, which are presumably of limited relevance to predicting and controlling behavior. If one is in leg irons, the probability of running away from a firing squad is zero, but there is a sense in which running is a strong behavior. Similarly, we may be silent while another is speaking but nevertheless be "bursting" to interrupt with our own trenchant or witty observations.

Skinner wrestled with the problem of an appropriate term in a 1958 letter to Percival Symonds:

> I am currently not happy about the notion of "probability of a response." It would be nice to adopt a pure frequency theory of probability, but this obviously won't work in talking about multiple contributions to the control of a single instance. I don't know of a better term, however, and I believe that we are dealing essentially with a

continued on p 5

Verbal Stimuli

continued from p 4

> probability function and that it will do no harm to reiterate this by adopting the term. This is one point where a further systematization will be most valuable. For that matter, I am not happy with the present status of the response as a unit of behavior, and in our animal work we are, I think, moving slowly toward a more flexible formulation—one which will reflect the continuous flow of behavior. The notion of a verbal "atom" is a simple step in that direction."

Nevertheless, the concept of response strength—or response probability—lies at the heart of a science of behavior. We say that reinforcement alters the probability of a response in the presence of a discriminative stimulus, that establishing operations alter the probability of a response, that the evoking or suppression of competing behavior alters the probability of a response. The terms may be troublesome, but they are not merely explanatory fictions. In the laboratory they are operationalized easily enough.

The terms are perhaps most useful when interpreting behavior outside the laboratory. In such cases changes in response measures are often inferred rather than observed, and it is convenient to have a term to capture a set of correlated changes. Outside the laboratory behavior is commonly determined by a confluence of variables, with many concurrent behaviors in competition. Under such conditions the addition of a discriminative stimulus may have no observable effect at all, but we can reveal an effect by removing other discriminative stimuli: Weak stimulus control may be sufficient in the absence of competing contingencies. Similarly, each member of a set of discriminative stimuli may be unable to evoke a response alone, but in concert they are able to do so. A conception of response strength incrementing with the addition of each stimulus until it becomes the dominant response accommodates the facts smoothly. Specific measures are sometimes inappropriate to the interpretive task at hand. For example, rate of response has proven a sensitive experimental variable in free operant procedures, but it is seldom useful in the interpretation of verbal behavior. (Our listeners rarely delight in hearing the same utterance again and again.) However, by appealing to the concept of response strength as a set of correlated measures we may use another such measure, e.g. resistance to extinction or response latency, in its stead.

In this paper we describe a pilot experiment designed to evaluate the use of response latency as a measure of intraverbal stimulus control. We assume that latency permits the same foundation for interpretation as rate, resistance to extinction, and so on, although, of course, its relationship to those measures is inverse. That is, we take it that latency is encompassed by the concepts of response strength and response probability.

We employed a "semantic priming" procedure, a procedure widely used in the literature of cognitive psychology (e.g. Balota & Lorch, 1986; see Neely, 1991, for a review) but only rarely used by behavior analysts (Hayes & Bissett, 1998, is the only exception of which we are aware). In the semantic priming procedure, stimuli are briefly flashed on a screen, and the participant has to press keys indicating that the stimulus is, or is not, a common English word. The typical finding is that participants respond more quickly when an English word is preceded by another word with which it is intraverbally related. For example, if presented with the sequences, WAR-PEACE, and LION-TABLE, participants usually respond more quickly than to PEACE than to TABLE. The preceding stimulus is said to "prime" the response to the second stimulus.

In the literature of cognitive psychology such findings serve as the grist for models of mental architecture, but the procedure is of course a behavioral procedure, and the dependent variable is response latency, one of the correlated measures embraced by the term response strength. Any decrement in response latency is apparently an indirect index of the strength of intraverbal control.

Intraverbal control is presumably pervasive in verbal behavior, since verbal operants typically occur in the context of other verbal behavior. Most verbal operants are multiply determined.

continued on p 6

Verbal Stimuli

continued from p 5

When we say, "Pass the salt," the response "salt" is in part a mand, under control of salt-deprivation, the taste of food, the context, etc.; it may be in part a tact, under control of the shaker across the table; and it may be in part an intraverbal under control of the prior stimuli (produced by the speaker) "pass the ...", for the speaker has presumably encountered the expression or uttered the expression many times in the past. It is a plausible assumption that most utterances contain verbal operants that are related intraverbally, however weakly. Moreover, it follows that most examples of intraverbal "strengthening" are unobservable: Most verbal operants have occurred contiguously with many other verbal operants. "Pass the ..." has presumably been paired with many things other than "salt." Hearing someone say it, or hearing ourselves say it, must have a slight strengthening effect upon a wide variety of mutually incompatible responses. Skinner has made the same points: "The intraverbal relations in any adult repertoire are the result of hundreds of thousands of reinforcements under a great variety of inconsistent and often conflicting contingencies. Many different responses are brought under the control of a given stimulus word, and many different stimulus words are placed in control of a single response." (1957, p. 74)

It is beyond our ability to measure such slight effects in any given instance. Commonly, we do not overtly respond intraverbally at all: When we hear someone begin to say, "Pass the ...", we do not blurt out "sugar, salt, mayonnaise, Cheerios, time of day, pitcher of beer" and so on, in a kind of verbal salad. Nevertheless, there is presumably some tendency to do so.

The priming procedure might be able to provide an experimental foundation to such tenuous interpretations. The procedure appears to be a measure of intraverbal control. Since the typical procedure uses textual stimuli and keystroke responses, the measure is indirect, but any observed decrease in latency to a target stimulus is presumably due to the intraverbal relationship between the priming stimulus and the target response. A modification of the procedure, in which subjects simply read the second word, would provide a more direct measure, since it would omit the judgment of whether the string was an English word, but such a procedure would require specialized apparatus to time the onset of the textual response.

Our purpose was simply to replicate the procedure as it is commonly studied, to confirm that we would observe a priming effect and to evaluate its reliability and its suitability as an experimental preparation for the study of intraverbal behavior. The procedure has been widely used, but results are invariably reported as averages. One gets no sense of the texture of the data from the extant literature.

Method

We recruited 15 Smith College students, all women. We did not evaluate them in any way, nor did we gather demographic data. One woman confessed to being "dyslexic," but we ran her anyway. We ran participants one at a time on a single Macintosh computer in an open computer lab in which other people were occasionally working or milling about. Participants were given brief instructions to respond to the second of two stimuli as fast and accurately as possible, with a Y or N on the keyboard, to indicate that the second stimulus was or was not a well-formed, common, English word. Stimuli were presented and responses recorded by a commercial program called Mindlab.

We presented each participant with 60 pairs of stimuli in randomized order. The first member of each pair was a common English word. Following two "get ready" signals, the word would appear alone in the center of the screen. After 250 ms, the second stimulus would replace it and would remain on the screen until the subject responded. The second stimulus was a nonsense word (20 examples), an unrelated word (20 examples), or a related word (20 examples). A 5 s intertrial interval (ITI) followed each response. The sequence of events was as follows:

ITI (screen blank) (5 s)
Get ready stimulus #1 (a row of stars) 367 ms
Screen blank (367 ms)
Get ready stimulus #2 (a row of slashes) 150 ms
Screen blank (367 ms)
Priming stimulus (250 ms)
Target stimulus (on until response occurred)

Thus each trial lasted less only a couple of seconds, not including the ITI.

Our stimulus words were a subset of those used by Balota and Lorch (1986). We chose

continued on p 7

Verbal Stimuli

continued from p 6

those stimuli because of their demonstrated effectiveness in producing a priming effect and because they had been validated as "related" or "unrelated" by prior word-association tests in other studies. We do not subscribe to the assumption that "relatedness" is constant across the verbal community, of course, but our purpose was replication not experimental analysis.

Note that the measure of interest was the difference in response latency to related words and unrelated words. The nonsense words served only to provide a pretext for responding: Y if the string was a word, N if it was a nonsense word. They played no role in the analysis.

Results

We confirmed the typical results of such studies. On average, participants responded faster to related words than to unrelated words. The average latency to respond to related stimuli, across all participants and across all stimuli, was 645 ms. Average latency to respond to unrelated stimuli was 687 ms, or 42 ms longer. The effect is statistically significant ($p < .01$). However, those figures mask considerable individual differences. Four of the 15 participants responded more quickly to the unrelated stimuli than to the related stimuli, and one participant responded at the same rate to both. The following table shows the differences in latency (average latency to unrelated stimuli minus average latency to related stimuli in milliseconds):

Subject	Difference
1	116
2	66
3	46
4	70
5	-24
6	34
7	120
8	48
9	-31
10	-18
11	0
12	101
13	46
14	-34
15	73

The differences for participants 5, 9, and10 were distorted by one or more anomalously long latencies. If those latencies were dropped from the analysis, the difference in latencies was positive for all three participants. (There were no such anomalies for subject 14.) Recognizing that the subject is always right, we present the data as we found them.

Trial-by-trial data also reveal considerable differences. The standard deviation of latencies to respond to related stimuli was 189 ms and ranged from 416 ms to 2150 ms. The corresponding standard deviation for unrelated stimuli was 228 ms, ranging from 183 ms to 2250 ms. Across both conditions, there were seven trials in which response latency exceeded 1.5 seconds.

Discussion

If our data are representative, the typical priming effects reported in the literature are misleading. Only four of fifteen participants showed an average difference in latencies in the ballpark of 40 milliseconds, and individual trials differed by as much as two seconds. (The shortest latency was 183 ms, the longest 2250ms.) One would expect considerably less variability in the data if they reflected only the effect of an intraverbal relation. That there is a difference in responding to related and unrelated stimuli requires an explanation, but that there is so much variability in the effect also requires an explanation.

It is a plausible assumption that the difference in latencies reflects intraverbal control. Presenting the stimulus WAR potentiates the response PEACE, and this potentiation is reflected in a reduced latency to respond to the word when it appears as a textual stimulus. That is, the "topography" of saying *peace* is controlled by two supplementary stimuli. "Topography" is in quotes because only rarely does a subject utter the response overtly. Nevertheless, if we assume that covert behavior is still behavior, it must have physical dimensions, however obscure and diffusely distributed.

However, the latencies found in priming studies cannot be taken as direct measures of intraverbal control. That latencies range over two seconds indicate that other variables are at play. It is possible that the variability arises directly from the stimuli used and differences

continued on p 8

Verbal Stimuli

continued from p 7

in the participants' histories with respect to different stimuli. For example, the intraverbal relationship between *war* and *peace* no doubt varies from one subject to the next. The arbitrary parameters of the procedure might also play a role. For example, we used a 250 ms interstimulus interval (between priming and target stimulus) because others have used that interval, and we used a 5 s ITI because we found it annoying to wait longer. Such parameters can be fine-tuned, but it is unlikely that the observed variability is due only to such problems.

The typical priming procedure terminates in a "lexical decision task," that is, a response that reflects whether a stimulus is or is not a familiar word. This task is quite complex and only obliquely reflects intraverbal control. It is highly unlikely that the latency to complete such a complex task is a direct reflection of any single basic process. The procedure might be improved by requiring participants simply to read aloud the second of two stimuli, timing the onset of the response with a voice-activated switch. The latency of the response would presumably reflect both textual and intraverbal control and would be relatively uncontaminated by other variables.

One might ask for what purpose one might want to measure intraverbal control with any precision. Is not intraverbal behavior of interest only when analyzing recitations of poetry, memorized facts, and so on? Certainly not. The Holy Grail in the interpretation of verbal behavior is accounting for regularities in the sequencing of verbal operants, that is to say, grammar. A behavioral account must explain the sequencing of behavior moment to moment in time. An invariant property of sequences of operants is that they occur contiguously. Intraverbal control presumably arises from contiguous usage (Skinner, 1957, p. 75), though the role of frequency and reliability is unknown. Behavior analysts face the daunting puzzle of how structural regularities in verbal behavior generalize from one example to another in new constructions, as they undoubtedly do. (If you are told that Jack Michael flobbered his toe on a brick in the hall, you can use the word in novel ways, even though it is nonsense: "How can I avoid flobbering *my* toe?") Intraverbal control is one variable that may play a role in controlling the sequencing of responding or of triggering shifts in stimulus control in such sequences. We need to exploit all of the variables at our disposal.

In particular, it would be worthwhile evaluating how quickly intraverbal behavior can be established. Does hearing a passage in which two distinctive terms appear contiguously establish some intraverbal control in a subsequent priming task? If not, how many replications are typically required? If so, how long does the effect endure? Does silent reading have the same effect, or any effect? Reading aloud? Must the terms be familiar, i.e., already in the speaking repertoire of the listener? Such questions should be easy to evaluate once suitable apparatus has been set up, for a priming procedure is easy to run. If, as we suspect, intraverbal control is quickly established, it may play a pervasive role in the sequencing of verbal operants.

Response latency may be a productive alternative to more common dependent measures encompassed by the concept of response strength, such as response rate. Verbal behavior is so tightly controlled by context that free operant procedures are inappropriate. Some modification of the priming procedure described here may enable us to put an empirical foundation under inferences about fluctuations in response strength in verbal behavior.

References

Balota, D. A. & Lorch, R. (1986). Depth of automatic spreading activation: Mediated priming effects in pronunciation but not in lexical decision. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 12*, 336-345.

Hayes, S. C. & Bissett, R. (1998). Derived stimulus relations produce mediated and episodic priming. *The Psychological Record, 48*, 617-630.

Neely, J. H. (1991). Semantic priming effects in visual word recognition: A selective review of current findings and theories. In D. Besner & G. W. Humphreys (Eds.) *Basic processes in reading: Visual word recognition* (pp. 264-336). Hillsdale, NJ: Lawrence Erlbaum Associates.

Skinner, B. F. (1938). *The behavior of organisms*. NY: Appleton-Century-Crofts, Inc.

Skinner, B. F. (1957). *Verbal behavior*. New York: Appleton-Century-Crofts, Inc.

continued on p 9

Verbal Stimuli

continued from p 8

Skinner, B. F. (1958). Letter to Percival Symonds. Harvard University Archives: HUG(FP) 60.20; BFS subject file 1932-1979, Box 2, Folder B9.

Skinner, B. F. (1974). *About Behaviorism*. New York: Alfred A. Knopf.

On MacCorquodale's Reply to Chomsky

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Grammatical Generalizations

There is a prevalent belief among behavior analysts that MacCorquodale (1970) has conclusively refuted Chomsky's arguments against Skinner (1957). But this is only partially correct. MacCorquodale has indeed shown that most of Chomsky's arguments are invalid. However, there is a crucial point, and it is the one that stands behind Chomsky's nativist hypothesis, that has not been answered by MacCorquodale. The point is that children have the ability to produce new sentences that "are not similar to those previously heard in any physically defined sense … nor obtainable from them by any sort of "generalization" known to psychology and philosophy" (Chomsky, 1965, p. 58; similar statements can be found in Chomsky, 1959, pp. 55-57 and other places). In other words, grammatical behavior is based on generalizations that are not derived from physical similarity.

Consider, for example, plural endings. Children are able to produce the plural endings of a very great number of verbal stimuli, such as 'house-houses', 'song-songs', 'dream-dreams', etc. But there is no doubt that the children have not been exposed to concrete examples of each and all of the singular-plural pairs they are able to produce. Rather, the production of the plural endings is the effect of a generalization from a particular set of examples. Some of the children even "overgeneralize", e.g. 'foot-foots', which is a pair that is obviously not included in the sample to which most English speaking children have been exposed. So the question arises, which is the stimulus class that is the basis of the generalization? The answer that the class is the class of nouns will not do, because there is no physical similarity between the elements of this class. As Palmer (1986) says:

> …within a language there is no relationship between the sound of an utterance and its grammatical structure. Clearly, there is no physical property of the stimulus that suffices to identify its part in speech. Nothing about the word 'house' enables us to conclude that it is a noun, or that it might be a 'subject' (pp. 54-55).

Since there is no physical property (or stimulus) that controls the generalization from a sample of nouns to further nouns, the question that has to be answered is therefore: Which is the property that controls the generalization and how does it receive its controlling efficacy?

MacCorquodale (1970) does consider this problem but his analysis is insufficient for refuting Chomsky's argument. He argues that grammatical generalizations derive from the child's ability "to make complex abstractions and to generalize from them to diverse new instances" (1970, p. 93). It is very likely, however, that the main reason why MacCorquodale's paper had only a minimal impact on cognitivists is that his reply is merely an instance of "name giving" to an empirical phenomenon. The minimum that is necessary for giving a methodologically adequate explanation of grammatical generalizations, such as the generalization that stands behind plural endings, is to specify at least, (1) the nature of the property P that controls the generalization, (2) the child's experiences that confer controlling efficacy to P, (3) the empirical evidence that shows that such experiences indeed confer controlling efficacy to P and, (4) a discussion of the plausibility that the child, who is able to produce the grammatical behavior, has indeed had the opportunity to undergo the required experiences. But MacCorquodale does not even begin to specify these items. Therefore, his explanation cannot be considered a rebuttal of Chomsky's argument. By attributing

continued on p 10

Chomsky

continued from p 9

grammatical behavior to generalizations based on unspecified "complex abstractions" the explanation is subject to Chomsky's criticism that "talk of generalization in this case is entirely pointless" (1959, p. 56; see also Chomsky, 1965, pp. 57-58, and other places).

Still, MacCorquodale's shortcoming does not imply that we have to adopt Chomsky's conclusions. It merely shows that we have to investigate more closely the nature of the generalization processes that establish grammatical behavior. But before dealing with this topic, let me notice two issues. First, it does not matter whether the set of examples to which children are exposed is small or rather extremely large. As long as there is at least one instance of generalization, we must show that it is of the sort "known to psychology" if we don't want to accept Chomsky's conclusion that children are born with some kind of innate category, a category that contains all and only the expressions for which they perform the generalization. Second, Chomsky's argument is valid even if the children's *generalization classes* do not match the adult categories -- if, in our example, the class that contains the singular-plural pairs that a child produces does not match the adult class Noun. Chomsky's argument does not require such matching. As long as there is a generalization, it has to be accounted for.

Acquired Generalization Classes

So what is the nature of the generalization processes that give origin to grammatical behavior? To start such an investigation with the complex and sophisticated generalizations that occur in grammatical behavior is probably useless. Rather, and in accordance with usual scientific methodology, we should begin by examining relatively simple generalizations that are not physically determined. And, indeed, in several publications (see, e.g., Stemmer, 1973, 1980, 1987, 1992; see also Quine, 1974, pp. 20-24), I have examined the process by which children learn the word 'toy' (or similar words such as 'clothes' or 'tool') which involves generalizations that are not based on physical similarity. Very briefly, and restricting ourselves to listener behavior which requires less variables than speaker behavior, the process is the following. In a first stage, the children undergo the experiences by which they learn that one can play with certain objects, say with a doll, a ball, and a toy-car. And the most common experience by which children learn this is by playing with the objects -- more exactly, by being exposed to the pairing of the objects with a playing action. Now, as has been shown by various experiments (see, e.g., Goldiamond 1966; Pavlov, 1927, pp. 55-56; Razran, 1937), such learning experiences transform the *arbitrary* class containing dolls, balls, and toy cars -- i.e., a class of objects that are not physically similar -- into an *acquired* generalization class for these children. Then, in a second stage, the children hear the word 'toy' in the presence of a number of objects that already have a playing function for them. Since these objects belong to a class that has become an acquired generalization class for the children, they will be able to generalize from these objects to further elements of this generalization class. That is, and ignoring many details, they will now be able to apply the word 'toy' to those objects with respect to which they have learned that they have a playing function, and this generalization takes place in spite of the fact that these objects are not physically similar to the original objects.

Our analysis shows that even though, and paraphrasing Palmer, "there is no physical property of the stimulus that suffices to identify" the class of toys, certain experiences can transform the class into an acquired generalization class for certain subjects. We notice that this explanation of the children's learning of the word 'toy', which requires a generalization that is not derived from physical similarity, satisfies the four conditions mentioned above. First, the property P that controls the generalization is the playing function of toys. Second, I have specified the experiences that confer controlling efficacy to this property, namely, the experiences in which the children learn that one can play with certain objects. Third, I have mentioned the empirical evidence that shows that such experiences indeed confer controlling efficacy to the property. Fourth, it is plausible that the children who are able to apply the word 'toy' to a relatively correct class of objects have undergone the experiences in which they learned that these objects have a playing function. And this explains why children do not usually apply the word 'toy' to objects that do not have a playing function for them even if they may have such a function for others, e.g., for adults.(*1*) We notice that the fourth condition rules out a stimulus-equivalence explanation of the generalization, since children learn words such a 'toy' or 'clothes' before they can have undergone the complex

continued on p 11

Chomsky

continued from p 10

experiences that are required for stimulus equivalence. Moreover, the appeal to stimulus equivalence is unnecessary since we have already the above explanation which attributes the generalization to a functional property and which requires only a limited number of relatively simple experiences. (For a devastating criticism of the stimulus-equivalence program, see, Tonneau, 2001.)

Still, the above process is not yet sufficient for producing generalization classes containing Nouns, or in our example, classes containing the verbal responses that, among other features, show the singular-plural endings. In order to account for this generalization, and this is actually a research project, we must attribute to the children not only the above capacity to learn to generalize according to non-physical classes but also the capacity to pay attention to many subtle features that occur in verbal behavior, such as the possibility of being preceded by articles like 'the' (see, e.g., Stemmer, 1973, pp. 69-71; 1987; cognitivists often speak in this connection of performing a *distributional analysis*, see, e.g., Maratsos, 1982). And the observation of these features plus, and this is crucial, the above capacity to acquire new generalization classes then confers a generalization efficacy to the relevant classes. In this way, then, we can explain generalizations such as plural endings without having to assume innate syntactic categories. Again, it is clear that stimulus equivalence cannot explain such complex generalizations.

The generalizations that stand behind grammatical transformations such as the formation of passive sentences from corresponding active sentences are still more sophisticated. To be sure, as Moerk (1983) has reported, children experience every major sentence *type* about 100.000 times per month. But since there is no doubt that children do not hear examples of each of the active-passive sentences they are able to produce, the transformation capacity requires a generalization according to non-physical dimensions.(*2*) Therefore, and as stated earlier, a large sample by itself is not sufficient to answer Chomsky's argument.(*3*)

Conclusions

What is now necessary is a research program that studies in detail the generalizations that underlie grammatical behavior. And in the present note, I have indicated four points that are necessary for giving a behavior analytic and methodologically correct explanation of these generalizations. Moreover, I have briefly analyzed an instance of a simple, non-physical generalization, the one that stands behind the use of words such as 'toy' and I have cited the empirical evidence that explains the behavior. This explanation satisfies the four points. Finally, I have claimed that the sophisticated generalizations that underlie grammatical behavior are likewise derived from the children's capacity to learn to generalize according to new classes. In addition, the capacity to pay attention to subtle features of verbal behavior also plays a crucial role in enabling the generalizations.

Notes

(*1*) Once a child has learned to apply the word 'toy' to a number of toys, then hearing an utterance of, say, 'This is a toy' in the presence of a new object, may give her the knowledge that the object has a playing function. But this is a more complex process.

(*2*) In Stemmer (1987), I analyze the generalizations that are involved in the transformation of 'The man who receives the book receives the prize' into 'The prize is received by the man who receives the book'. (The example is adapted from an analogous example given by Chomsky, 1975, p. 31.) In this transformation, the generalizations are not only very complex but the controlling function of the bi-relational expression '*x* who *y*', which is obviously a highly subtle function, plays a crucial role in them.

(*3*) The need for discussing the non-physical generalization in such cases is frequently ignored because it is generally assumed that mentioning a *type* is sufficient for explaining the generalizing behavior. But unless the elements of the type are physically similar, which of course does not hold for the category containing active-passive pairs, one has to show that the category has behavioral validity.

References

Chomsky, N. (1959). Review of Skinner's Verbal Behavior. *Language, 35*, 26-58.

Chomsky, N. (1965). *Aspects of the theory of syntax*. Cambridge, MA: MIT Press.

continued on p 12

Chomsky

continued from p 11

Chomsky, N. (1975). *Reflections on language*. New York: Pantheon Books.

Goldiamond, I. (1966). Perception, language, and conceptualization rules. In B. Kleinmuntz (Ed.), *Problem solving* (pp. 183-224). New York: Wiley.

MacCorquodale, K. (1970). On Chomsky's review of Skinner's Verbal behavior. *Journal of the Experimental Analysis of Behavior, 13*, 83-99.

Maratsos, M. (1982). The child's construction of grammatical categories. In L. R. Gleitman & E. Wanner (Eds.), *Language acquisition: The state of the art* (pp. 240-266). New York: Cambridge University Press.

Moerk, E.L. (1983) A behavioral analysis of controversial topics in first language acquisition. *Journal of Psycholinguistic Research 12*, 129-155.

Palmer, D.C. (1986). Chomsky's nativism: A critical review. In P.N. Chase & L.J. Parrott (Eds.) *Psychological aspects of language*. (pp. 44-60). Springfield, IL: Thomas.

Pavlov, I.P. (1927). *Conditioned reflexes*. London: Oxford University Press.

Razran, G.H. (1939). A quantitative study of meaning by a conditional salivary technique (semantic conditioning). *Science, 90*, 89-90.

Quine, W.V. (1974). *The roots of reference.* La Salle, IL: Open Court.

Stemmer, N. (1973). *An empiricist theory of language acquisition*. The Hague: Mouton.

Stemmer, N. (1980). Natural concepts and generalization classes. *The Behavior Analyst, 3*, 41-48.

Stemmer, N. (1987). The learning of syntax: An empiricist approach. *First Language, 7*, 97-120.

Stemmer, N. (1992). The behavior of the listener, generic extension, and the communicative adequacy of verbal behavior. *The Analysis of Verbal Behavior, 10*, 69-80.

Tonneau, F. (2001), Equivalence relations: A critical analysis. European Journal of Behavior Analysis, 2*, 1-33.*

Verbal Behavior Initiatives at The New England Center for Children

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The New England Center for Children

The New England Center for Children (NECC) is a private, nonprofit autism center providing state-of-the-art education and individualized treatment for children diagnosed with autism. Internationally recognized for its scientific approach based on the principles of ABA, NECC strives to be at the forefront of conducting and disseminating research to further understand autism and related disabilities. Our staff of over 600, includes master's and doctoral-level clinicians and teachers with expertise in ABA, speech pathology, special education, nursing, and occupational therapy.

Over the last few years, NECC has utilized Skinner's analysis of verbal behavior as an interpretative tool to better understand language development from a functional perspective. This taxonomy has also been incorporated into NECC's curriculum. Even though teaching procedures directly derived from Skinner's analysis of verbal behavior have gained widespread dissemination, there is a pressing need for empirical support for this approach. There have been, however, numerous published studies providing evidence for training procedures of specific verbal operants with individuals with and without communication deficits (Carr & Firth, 2005). Given NECC's commitment to teaching effectiveness, several steps have been taken to incorporate data-based verbal behavior training strategies. Empirical studies are also being planned in order to specifically address questions related to communication training. The present paper is an attempt to describe some of these verbal behavior initiatives.

Curriculum Development

Classification systems for communication skills are quite different in the disciplines of behavior analysis and speech and language pathology. At NECC, 8 speech and language pathologists create and organize the communication curriculum for over 200 students. Given that

continued on p 13

NECC

continued from p 12

communication is a primary need for all children with autism, NECC's Speech and Language department has generated over 800 curricula that encompass all areas of communication development. These curricula were previously organized using the general categories of pre-language, receptive language, expressive language, speech, augmentative communication, and social skills. A dedicated department manages the communication curriculum as well as curricula for skill acquisition in the areas of life and academic skills. This department consists of two behavior analysts, one of whom is also a master's level certified teacher for children with severe special needs, and one speech – language pathologist. Skinner's classification of language had not been introduced as a method to organize these skills until recently.

Using verbal behavior as a basis for categorizing existing language-based curriculum became important as more colleagues began using the verbal behavior taxonomy. At NECC, a collaborative effort between behavior analysts and speech-language pathologists resulted in a systematization of the curriculum. The language skills themselves did not change, and the functions of the skills remained consistent. However, the system of classification changed significantly. Professional development trainings were provided to the speech and language department to demonstrate that verbal behavior classification offered an alternative method of organizing communication skills. The curriculum department and speech language department then examined each existing language category and the skills within it while reassigning those skills according to Skinner's classification of verbal behavior. General areas of classification include speaker behavior and listener behavior with breakdowns into specific categories. Speaker behavior includes mands, tacts, intraverbals, and autoclitics. Listener behavior includes following directions, receptive vocabulary (auditory-visual matching-to-sample), receptive syntax, and receptive feature function and/or class. A final category called communication topography was included to house curriculum for non-speakers learning to use voice output communication aids (VOCA), speech acquisition curriculum, and manual sign learning curriculum. Once the technical skills of communication topography are acquired by the student, the language learning curriculum housed in speaker behavior is modified to incorporate the communication mode used by the student. NECC has provided a supportive environment in which to launch these initiatives.

Speech and Language Pathology Services

Virtually all of the students at NECC experience difficulties in communicating with others, and approximately 40% are unable to speak. The speech-language pathologists' first priority is to increase students' independence by teaching functional communication. To do this most effectively, we use a consultative, collaborative service delivery model that allows training to be delivered consistently and continuously throughout each student's day. Within this model, the speech-language pathologists work closely with behavior analysts to instruct teachers/direct care providers on how to deliver communication curricula to the students not only during language training classes but also during other skill building activities. In this model, the students learn from the people with whom they interact daily. Training occurs throughout the students' ongoing daily activities, and communicative opportunities are both arranged and naturally occurring. Given training in the principles of ABA and in how to capitalize on daily opportunities, teachers are more effective and students learn more quickly. Speech-language pathologists follow the consultative collaborative model in: 1) developing goals and objectives to improve students' skills in listener and speaker behavior; 2) designing functional communication goals that will span the student's day; 3) providing ongoing assessment of student needs in the classroom, community, and home; and 4) adapting objectives to any environment.

At NECC, speech-language pathologists are trained in a variety of areas, including reinforcement procedures, conducting behavioral observations and measurements, assessing student preferences, collecting data, analyzing complex skills, and decreasing challenging behavior. They also meet bi-weekly to discuss theoretical/conceptual issues, as well as empirical research related to Skinner's analysis of verbal behavior. SLPs hold a master's degree in Communication Disorders and the certificate of clinical competence (CCC/SLP). Additionally, 2 SLPs are board certified behavior analysts (BCBA), and 4 are currently working toward the certification.

continued on p 14

NECC

continued from p 13

The speech-language pathologists at NECC are devoted to their work and continue to expand their education through NECC educational programs to become skilled in applied behavior analysis and to broaden their expertise in the area of verbal behavior. There are benefits of a cooperative effort between speech language pathologists and behavior analysts. Contributions from both fields are important in developing a comprehensive language curriculum.

Verbal Behavior Research

Even though behavior analysts have drawn implications from Skinner's analysis of verbal behavior for developing communication skills in children with autism, their procedures need to be subjected to experimental testing before being further disseminated (Carr & Firth, 2005; Green, 2005). There are several areas of research and application in need of investigation that may have direct impact on current teaching practices at NECC.

There has been some evidence, for example, that mands and tacts are separate verbal operants, and thus, should be taught separately (e.g., Lamarre & Holland, 1985). On the other hand, replications have found that some transfer between operants may occur and need to be accounted for (e.g., Petursdottir, Carr, & Michael, 2005). Research has also reported that the interspersal of mand and tact training trials may foster the acquisition of tacts (e.g., Carroll & Hesse 1987; Arntzen, & Almas, 2002). These results may have direct implication on teaching practices and, thus need to be further evaluated.

Questions may also be posed in the area of intraverbal training. There has been mixed evidence, for instance, that tact training may foster acquisition of intraverbals (e.g., Miguel, Petturdottir, & Carr, 2005). If this were the case, tact training should always precede intraverbal training. There has also been some evidence that mand, tact and echoic training (naming) may foster acquisition of non-identity matching (e.g., Lowe, Horne, Harris, & Randle, 2002; Miguel, Pettursdottir, Carr, & Michael, 2005). However, more research needs to be conducted before such recommendations can be made.

Other areas of research that have been prioritized at NECC are the development of effective receptive discrimination/auditory-visual matching-to-sample strategies, generalization between listener and speaker repertoires, and comparisons of selection-based vs. topography-based verbal behavior. We have also initiated research in the areas of receptive discrimination training/listener behavior, intraverbal training, and the effects of naming on stimulus categorization. We are attempting to systematically answer some of these questions of practical application to maximize effectiveness of communication training techniques that can then be incorporated into our curriculum.

Learning about VB

The New England Center for Children and Northeastern University collaborate to offer an on-site Master of Science program in Applied Behavior Analysis (MABA). The MABA program is academically rigorous and emphasizes the scientist/practitioner model, with a heavy emphasis on practical experience and faculty mentoring. Though Skinner's account has long been a part of the MABA curriculum, as of Summer 2005, students have had the opportunity to enroll in a semester-long class on Skinner's analysis of verbal behavior. Two sections are taught by Dr. Caio Miguel and Dr. Bill Ahearn. The course covers the following topics: Introduction to the basic verbal operants, motivative operations and the mand, codic vs. duplic, automatic reinforcement and language development, the tact, the listener (receptive language, naming and rule-governed behavior), VB under control of private stimuli, intraverbal relations, tact distortion and audience relations, multiple causation, and autoclitic processes. The course content is heavily influenced by the teachings of Dr. Jack Michael at Western Michigan University.

In addition to the VB class being taught to master's students, the clinical staff at NECC receive in-service training on the basic verbal relations and the practical applications of Skinner's analysis of VB. BCBA continuous education credits are offered to trainees.

Conclusion

Skinner's book *Verbal Behavior* is described as "an exercise in interpretation", an "orderly arrangement of well-known facts, in accordance with a formulation of behavior derived from an experimental analysis of a more rigorous sort" (Skinner, 1957, p. 11). In

continued on p 15

NECC

continued from p 14

other words, Skinner organized and interpreted the act of speaking and listening in terms of respondent and operant functional relations relevant to the analysis of behavior first presented in *The Behavior of Organisms* (Skinner, 1938). An important implication of his approach is the focus on breaking language down into separate functional components (elementary verbal relations) that can later be combined for the development of more complex language skills (Sundberg & Michael, 2001). At NECC, applied behavior analysis has been extended to the understanding and teaching of one of the most complex behaviors – verbal behavior. By analyzing language by its function, it is hoped that this will improve our teaching techniques and promote language acquisition in children diagnosed with autism and related disabilities.

References

Arntzen, E., & Almas, I. K. (2002). Effects of mand-tact versus tact-only training on the acquisition of tacts. *Journal of Applied Behavior Analysis,* 35, 419-422.

Carr, J. E., & Firth, A. M. (2005). The Verbal Behavior Approach to Early and Intensive Behavioral Intervention for Autism: A Call for Additional Empirical Support. *Journal of Early and Intensive Behavior Intervention, 2*, 18-27.

Carroll, R. J., & Hesse, B. E. (1987). The effect of alternating mand and tact training on the acquisition of tacts. *The Analysis of Verbal Behavior*, *5*, 55–65.

Green, G. (2005, May). "*Verbal Behavior" and Autism: A Review and Call for Research*. Paper presented at the 31st Annual Convention of the Association for Behavior Analysis, Chicago, IL.

Lamarre, J., & Holland, J. G. (1985). The functional independence of mands and tacts. *Journal of the Experimental Analysis of Behavior, 43*, 5-19.

Lowe, C. F., Horne, P. J., Harris, F. D. A., & Randle, V. R. L. (2002). Naming and categorization in young children: Vocal tact training. *Journal of the Experimental Analysis of Behavior, 78,* 527-549.

Miguel, C. F., Petursdottir, A. I. & Carr, J. E. (2005). The effects of multiple-tact and receptive-discrimination training on the acquisition of intraverbal behavior. *The Analysis of Verbal Behavior, 21* 27-41.

Miguel, C. F., Petursdottir, A. I., Carr, J. E., & Michael, J. (2005, May). The role of verbal behavior in stimulus categorization by preschool children. In C. Miguel (Chair), *Basic and Applied Research on Verbal Behavior and Emergent Relations.* Symposium conducted at the 31st Annual Convention of the Association for Behavior Analysis, Chicago, IL.

Petursdottir, A. I., Carr, J. E. & Michael, J. (2005). Functional Interdependence of mands and tacts in preschool children. *The Analysis of Verbal Behavior, 21*, 59-74.

Skinner, B. F. (1957). *Verbal behavior*. Englewood Cliffs, NJ: Prentice Hall.

Skinner. B. F. (1938). *The behavior of organisms*. NY: Appleton-Century-Crofts.

Sundberg, M. L., & Michael, J. (2001). The benefits of Skinner's analysis of verbal behavior for children with autism. *Behavior Modification, 25*, 698-724.

Sundberg, M. L. & Partington, J. W. (1998). *Teaching language to children with autism and other developmental disabilities*. Pleasant Hill, CA: Behavior Analysts.

An Update on *The Analysis of Verbal Behavior*

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Western Michigan University

Editing Volume 21 of TAVB has been a very enjoyable and rewarding experience for me. There were enough submissions and acceptances for us to have a 207-page volume. Interacting with the various scholars who contributed has been surprisingly easy. Everyone responded well to my urgings about deadlines, as did the associate editors and the reviewers. It was as though the contributors were as concerned for the journal's health and success as the current editor and as have been the previous editors.

I would like to take this opportunity to thank the ABA staff and especially Majda Seuss who was my main contact in the ABA office, and also Kevin Hile, the Managing Editor. Majda provided very useful input about formatting and writing style, and Kevin dealt with my lack of experience with respect to the figures in the manuscripts with patience and excellent suggested changes.

I would now like to enlist your aid in finding manuscripts for Volume 22. When you attend a conference and see a poster or attend a session with a potential TAVB paper please jot down the author(s) and title, email me, and I will invite the submission. If you read a paper that has been published that seems especially appropriate for TAVB, email me and I will contact the authors to see if they have any other papers on the topic that are in the works. Also if you see a book that would be of interest

to our readers, send me the title and I will try to find a reviewer. A special section (with a special editor) on autism in each volume would be very useful, and similarly on American Sign Language, both topics being highly susceptible to a useful interface with Skinner's analysis of verbal behavior. Volunteers for editing and soliciting manuscripts for such sections are welcome, as for any other verbal behavior topics that could benefit from having a special section.

A good approach to scholars considering a submission is to show them your most recent issues of TAVB as evidence of the breadth of topics and types of articles that are appropriate. Also, while you are at ABA in Chicago, encourage non-subscribers to take a look at the TAVB volumes that will be on display at the ABA bookstore.

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All submissions should be prepared as a Microsoft Word document and sent as an E-mail attachment. The manuscript should be single-spaced in 11-point Times New Roman font. APA style conventions should be followed.

Discussion and Review Articles

Brief surveys and/or analyses of verbal behavior related research or theoretical discussions will be accepted. These reviews should not exceed six-pages.

Program Reports

Brief descriptions of the application of verbal behavior to language curricula are welcomed. These reports should not exceed six-pages and may include up to an additional two-pages of appendices.

Pilot Research Reports

Descriptions of innovative pilot research targeting verbal behavior related phenomena are acceptable. These reports should not exceed three-pages and must include a complete description of your methods, a brief summary of your results with one figure, and only a one or two paragraph introduction.

As VB News is a newsletter publication, these reports need not meet the stringent methodological requirements for publication in a peer-reviewed journal. The intention is to inform interested parties so as to stimulate discussion and further research.

Book Reviews

Brief reviews of books likely to be of interest to the verbal behavior community are encouraged. These reviews should not exceed two-pages and should include only a short reference list.

Brief Commentary

Short articles, in the mold of traditional op-ed pieces or letters to the editor, will be accepted at the discretion of the editor. Articles should not exceed a single page.

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