

# Conditioning the Behavior of the Listener

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## ABSTRACT

Among the many behaviors of speakers and listeners, perhaps none is more interesting from a behavior analytic perspective than those that modify the future behavior of the listener. Skinner first mentioned this possibility in *Verbal Behavior* (1957) in a section titled, "Conditioning the Behavior of the Listener," in which he described how certain relational autoclitics could produce changes in the future behavior of listeners separate from their more immediate and straightforward conditioned reflexive and discriminative effects. Oddly, Skinner never returned to this topic, even when he described problem solving and rule-governed behavior in the late 1960s. As behavior analysts celebrate the 50th anniversary of the publication of *Verbal Behavior*, I believe that it is important to revisit this feature of verbal behavior. In the present article, I (a) describe how the behavior of the listener is "conditioned" by verbal stimuli, (b) address the question of whether these changes in the listener's behavior represent actual operant conditioning or an analog of it, and (c) discuss some implications for rule-governed behavior.

*Keywords:* verbal behavior, listening, analog conditioning, rule-governed behavior.

## RESUMEN

Entre las numerosas conductas de hablantes y oyentes, probablemente ninguna es tan interesante, desde una perspectiva analítica conductual, como aquella que modifica la conducta futura en el oyente. Skinner mencionó, primero, esta posibilidad, en *Conducta Verbal* (1957) en una sección titulada "Condicionando la Conducta del Oyente" en la que describió como ciertos autoclícticos relacionales podían producir cambios en la conducta futura de los oyentes, separando estos efectos de aquellos discriminativos y condicionados a nivel reflejo, de modo más directo e inmediato. Extrañamente, Skinner nunca volvió a este tema, aún cuando describió la conducta de solución de problemas y la conducta gobernada por reglas a finales de los sesenta. Como analistas de la conducta celebramos el quincuagésimo aniversario de la publicación de *Conducta Verbal* y pienso que es importante re-visitar esta característica relevante de la conducta verbal. En el artículo presente, (a) describo cómo la conducta del oyente es "condicionada" por estímulos verbales, (b) planteo si estos cambios en la conducta del oyente, representan actual condicionamiento operante o es un análogo de tal condicionamiento, y (c) discuto algunas implicaciones sobre la conducta gobernada por reglas.

*Palabras clave:* conducta verbal, oyente, condicionamiento análogo, conducta gobernada por reglas.

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In a brief 10-page section of *Verbal Behavior* placed, almost as an after thought, at the end of Chapter 14 titled, «Conditioning the Behavior of the Listener,» Skinner addressed what may be the most interesting feature of verbal behavior. This is how the first paragraph of that section reads:

In the behavior of the listener (or reader), as we have so far examined it, verbal stimuli evoke responses appropriate to some of the variables which have affected the speaker. These may be conditioned reflexes of the Pavlovian variety or discriminated operants. The listener reacts to the verbal stimulus with conditioned reflexes, usually of an emotional sort, or by taking action appropriate to a given state of affairs. The autoclitic of assertion makes such action more probable. Relational autoclitics, especially when combined with assertion to compose predication, have a different and highly important effect. Since it does not involve any immediate activity on the part of the listener (although responses of the other sorts already noted may take place concurrently), we detect the change only in his *future* behavior. (1957, p. 357)

Here, Skinner notes that not only can verbal stimuli (generated from relational autoclitics), like non-verbal stimuli, produce immediate conditioned reflexive or discriminative effects (as CSs -conditional stimuli- and  $S^D$  -discriminative stimuli-respectively), but they can also produce effects that look like operant or respondent conditioning. Skinner called the change brought about in the listener's behavior *instruction*. Blakely and I described the process as altering the function of antecedent events [CSs, EOs (Establishing Operations),  $S^D$ s ] (Schlinger & Blakely, 1987, 1994; Vaughan, 1987,1989). In essence, certain relational autoclitics can produce changes in future environment-behavior relationships involving the listener. As we will see, though, almost any verbal stimulus can condition the behavior of a competent listener.

Since the publication of *Verbal Behavior*, only a few behavior analysts have addressed this function-altering feature of verbal stimuli (e.g., Alessi, 1992; Hayes & Hayes, 1989; Hayes, Barnes-Holmes, & Roche, 2001; Palmer, 1998, 2007, Schlinger & Blakely, 1987, 1994). In fact, although Skinner wrote about verbal behavior several times, he never returned to the topic of conditioning the behavior of the listener. As behavior analysts celebrate the 50<sup>th</sup> anniversary of the publication of *Verbal Behavior*, especially at a time when the book is making a comeback in terms of sales, research, and application (see Schlinger, 2008a), I believe that it is important to take a fresh look at the conditioning of the listener's behavior.

In this article, I first provide a brief summary of Skinner's contribution to this topic, including his treatment of the behavior of the listener in *Verbal Behavior*. I then describe the concept of function-altering operations, both nonverbal and verbal, paying particular attention to how verbal function-altering operations condition the behavior of the listener. Then, I address the question of whether the listener's behavior is directly conditioned or represents an analog of conditioning. Finally, I briefly discuss the implications for rules and rule-governed behavior.

### SKINNER'S LEGACY: AN OVERVIEW

In *Verbal Behavior* (1957), and in subsequent writings on the topic, Skinner introduced many of the concepts, if not the terms, behavior analysts have studied in the years since. I have already noted that he described the conditioning of the listener's behavior by verbal stimuli as instruction, but there are other examples as well. It seems as if Skinner actually introduced the concept of relational framing (Hayes *et al.*, 2001) and hinted at the multiple exemplar training that relational framing theorists have implicated in its formation in a section titled "Relational Autoclitics," in the chapter "Grammar and Syntax as Autoclitic Processes." As Skinner (1957) explained,

Something less than full-fledged relational autoclitic behavior is involved when partially conditioned autoclitic "frames" combine with responses appropriate to a specific situation. Having responded to many pairs of objects with behavior such as *the hat and the shoe* and *the gun and the hat*, the speaker may make the response *the boy and the bicycle* on a novel occasion. If he has acquired a series of responses such as *the boy's gun*, *the boy's shoe*, and *the boy's hat*, we may suppose that the partial frame *the boy's \_\_\_\_\_* is available for recombination with other responses. The first time the boy acquires a bicycle, the speaker can compose a new unit *the boy's bicycle*. This is not simply the emission of two responses separately acquired . . . The *relational* aspects of the situation strengthen a *frame*, and specific features of the situation strengthen the responses fitted into it. (p. 336, emphasis added)

Several years later Skinner tackled the concept of "rule-governed behavior" in a paper titled, "An Operant Analysis of Problem Solving" (1966), which then became a chapter in his book *Contingencies of Reinforcement* (1969). In that paper, Skinner, motivated by the burgeoning area of cognitive psychology and its discussion of rules, offered an analysis of rules as "contingency-specifying" S's and contrasted their effects on the behavior of listeners with those of nonverbal contingencies.

Thus, by 1966, Skinner had introduced into the vernacular of behavior analysis the basic concepts of *relational frames*, *contingency-specifying stimuli*, *function-altering operations*, *instructions*, and *rule-governance*. Over the ensuing 40 or so years, behavior analysts have attempted to understand these and other complex verbal operations under various labels, including *relational-frame theory* (Hayes *et al.*, 2001), *naming* (Horne & Lowe, 1996), *function-altering operations* (Schlinger & Blakely, 1987), and *intraverbal frames* (Palmer, 1998), among others. With few exceptions, however, the conditioning of the listener's behavior as originally described in *Verbal Behavior* was not explored further, even by Skinner.<sup>1</sup>

In fact, more than three decades after the publication of *Verbal Behavior*, Skinner had an opportunity to expand on his discussion of conditioning the listener's behavior in a chapter titled, "The Behavior of the Listener" (Skinner, 1989). In that chapter, he wrote:

Most of my book *Verbal Behavior* (1957) was about the speaker. It contained a few diagrams showing interactions between speakers and listeners, but little direct discussion of listening. I could justify that because, except when the listener was also to some

extent speaking, listening was not verbal in the sense of being “effective only through the mediation of other persons” (Skinner, 1957). But if listeners are responsible for the behavior of speakers, we need to look more closely at what they do. (p. 86)

Unfortunately, instead of returning to what I argue is the most important function of verbal stimuli -conditioning of the listener’s behavior- Skinner (1989) continued to talk about rules as  $S^D$ s. In that discussion, Skinner described some of the effects of the speaker’s behavior on listeners that shape and maintain the behavior of speakers, including telling, teaching, advising, and directing the listener via rules, adding that listeners are governed by rules as well as by the laws of government and science.

However, these examples of listeners’ behaviors seem no different than basic discriminated operant behavior except that the discriminative or motivating stimuli are generated by the speaker’s verbal behavior. So, for example, the behavior of a student (listener) who sits down when a teacher (speaker) asks her to is unremarkable. Instead of asking the student to sit down, the teacher could have simply reinforced sitting in the presence of a light and then turned the light on when he wanted the student to sit down. To the extent that warnings, advice, directions, instructions, and rules evoke discriminated or motivated behavior, a further analysis seems unnecessary, and such behavior probably should not warrant a special term -*listening* (see Schlinger, in press). Therefore, we ought to distinguish unremarkable discriminated or motivated behavior in the listener from the much more interesting effects Skinner first described in that section at the end of Chapter 14 of *Verbal Behavior*. Before returning to the function-altering effects of relational autoclitics and other verbal stimuli, however, let us look briefly at Skinner’s treatment of the listener in *Verbal Behavior*.

### THE LISTENER IN *VERBAL BEHAVIOR*

According to Skinner (1957), the difference, if any, between verbal and nonverbal behavior is that verbal behavior acts indirectly on the environment “from which the ultimate consequences [of the behavior]... emerge” (p. 1). By “indirectly” Skinner meant that the reinforcement of the speaker’s verbal behavior was mediated by the listener rather than coming from direct action by the speaker on the environment. Although *Verbal Behavior* was primarily about the behavior of the speaker, Skinner did not neglect the listener. In fact, he made frequent mention of the listener throughout the book -the word *listener* occurs 793 times compared to 893 instances of the word *speaker*.

Skinner himself acknowledged that his definition of verbal behavior -as “behavior reinforced through the mediation of other persons”- seems to omit the listener. He accounted for this omission by noting that although listeners have acquired “special responses to the patterns of energy generated by speakers” (1957, p. 2), the behavior of the listener in mediating the consequences of the speaker’s behavior is not verbal in any special sense. At the beginning of *Verbal Behavior*, Skinner seemed to minimize the role of the listener, for example, when he wrote, “an adequate account of verbal behavior need cover only as much of the behavior of the listener as is needed to explain

the behavior of the speaker” (p. 2). However, elsewhere in the book, Skinner addressed aspects of the listener’s behavior that he believed needed to be considered more fully. For example, toward the end of the first chapter, Skinner set the stage for a more complex analysis that hints at his discussion of partially conditioned autoclitic frames combining with responses appropriate to a specific situation, as well as the conditioning of the listener’s behavior, which he discussed some 340 pages later:

Once a repertoire of verbal behavior has been set up, a host of new problems arise from the interaction of its parts. Verbal behavior is usually the effect of *multiple causes*. Separate variables combine to extend their functional control, and new forms of behavior emerge from the recombination of old fragments. All of this has appropriate effects upon the listener, whose behavior then calls for analysis. (p. 10)

Several behavior analysts have addressed what may be called the creative aspect of language at which Skinner hinted in the foregoing quotation (e. g., Hayes, *et al.*, 2001; Palmer, 1998). However, I want to look more closely at the conditioning of the listener’s behavior by verbal function-altering operations. I begin by briefly reviewing operant and respondent conditioning as function-altering operations.

### NONVERBAL FUNCTION-ALTERING OPERATIONS

All things being equal, classical and operant conditioning occur when there is a contingency between the relevant elements of each process. In classical conditioning the contingency is between a CS (conditioned stimulus) and US (unconditioned stimulus), and in operant conditioning between a response and consequence in a particular context, given a relevant motivational operation (MO).

It can be argued that the net effect of these contingencies is to alter the behavioral functions of antecedent events and consequently the relations in which they participate (Schlinger & Blakely, 1994). For example, in classical conditioning, a contingency between an NS (neutral stimulus) and a US endows the NS with US-like evocative functions, thus establishing a (conditioned reflexive) relationship between the now CS and CR (conditioned response). Conversely, uncorrelating the CS and US (as in extinction) weakens the evocative function of the CS over the CR.

In operant conditioning, a contingency between a response and a consequence increases the evocative function of both the MO in effect and stimuli present, especially those most correlated with the response-consequence contingency. In particular, given an effective MO, reinforcement increases the probability that both the MO and  $S^B$  will evoke members of the relevant operant class, thus establishing a four-term contingency. Conversely, operant extinction and punishment weaken the evocative functions of the MO and  $S^D$  over the operant class.

On this view, then, operant contingencies do not condition behavior, they alter the evocative function of antecedent events. In particular, and contrary to the commonly held definition, reinforcement does not strengthen behavior; it increases the evocative value of the MO and  $S^D$  over behavior.<sup>2</sup> There are, however, other, less straightforward function-altering operations.

### VERBAL FUNCTION-ALTERING OPERATIONS

In essence, verbal operations can mimic the function-altering effects of classical and operant conditioning (Schlinger & Blakely, 1994). Skinner described this type of effect in the previously referenced section of *Verbal Behavior*, titled, "Conditioning the Behavior of the Listener." Consider the following from a sub-section titled, "The Conditioning of Discriminative Stimuli":

The verbal stimulus "When I say 'three', go!" may have no immediate effect classifiable as a response, but it changes the subsequent behavior of the listener with respect to the stimulus "Three." We are... concerned... with the operant behavior of "going" evoked by the discriminative stimulus "three." (pp. 358-359).

Prior to the statement, hearing the word "three" does not evoke going (although it may evoke covert echoic, intraverbal, or imaginal responses). But, as a function of the statement, the word "three" now evokes going. In terms of the present discussion, the statement, "When I say 'three', go!" momentarily increases the evocative function of the stimulus "three" over the listener's behavior of going in the appropriate context.

The statement, "When I say 'three', go!" conditions the behavior of going to the stimulus "three," much like a direct reinforcement history would. In function-altering terms, hearing the word "three" evokes going only as a function of the statement, "When I say 'three', go"! We may or may not want to call "three" an  $S^D$ . The question is whether we can make the case that "three" (as an  $S^D$ ) has directly participated in a four-term contingency (with an MO, response and reinforcer) at the time of the statement or whether it only functions like an  $S^D$  because it evokes the behavior of going. If it is the latter, then perhaps we can call it an analog  $S^D$  (or  $S^{DA}$ ) (see Alessi, 1992). Later, I will address the question of whether such effects result from direct operant conditioning or represent an analog of operant conditioning.

Blakely and I (Blakely & Schlinger, 1987; Schlinger & Blakely, 1987) adopted Skinner's term "contingency-specifying stimulus" as a formal descriptor of function-altering verbal operations because often such statements specify two or three elements of a contingency, and although we suggested that at least two members of a contingency had to be "specified," I later pointed out that there are probably no formal requirements for function-altering verbal operations (Schlinger, 1993). Others have offered examples of verbal operations that can produce function-altering effects and condition the behavior of the listener without "specifying" contingencies (e.g., Palmer, 2007; Skinner, 1957). For example, Skinner (1957) pointed out that ostensive definition can condition the behavior of the listener as, for example, when in the presence of a BMW automobile, a speaker states, "This is a BMW." Assuming a relatively sophisticated listener, her or his future behavior with respect to BMWs is relatively permanently altered as evidenced by the fact that the presence of a BMW, now evokes the tact "BMW," or when someone utters "BMW," the intraverbal response "car" is momentarily strengthened or vice versa. Thus, a number of different verbal and nonverbal relationships are altered by the ostensive definition. Additionally, simply telling someone that, "A BMW is a make of

automobile,” conditions their intraverbal behavior such that they can later report that one kind of car is called a BMW, or when hearing someone utter “BMW,” they can report that it is a car.

Palmer (2007) has written that “almost any salient verbalization” can bring about conditioning in both a listener’s verbal and nonverbal behavior:

If I announce “The boy’s bicycle...” my listeners are likely to be able to report, some half-hour later, that I brought up the boy’s bicycle. In this case, their behavior has been conditioned with respect to my behavior as a stimulus, as it might have been conditioned by witnessing any salient event: a frog on the porch, a salt-shaker in the shape of a nutcracker, a jogger with a ponytail. However their behavior has not been modified with respect to the boy’s bicycle. But if I announce “The boy’s bicycle is blocking the driveway,” they can report what I said, as they would with respect to any other event, but they will also behave in a new way with respect to the boy’s bicycle. (Palmer, 2007, p. 168)

Elsewhere, Palmer (1998) has suggested that intraverbal frames are continuously being conditioned, often by only a single example of such a frame. Ostensive definitions in the form of, “This is a \_\_\_,” qualify as intraverbal frames as do statements such as “A BMW is a car” (“A \_\_\_ is a \_\_\_”). What this means is that in a verbally competent listener, any verbal stimulus can alter the behavioral functions of objects, events, or other verbal stimuli. Consider a relatively common example. Suppose you meet someone for the first time and that person introduces herself by saying, “Hi, my name is Julie.” Simply introducing herself as “Julie” alters several behavioral functions for you as a listener with respect to her name. For example, you can probably now answer “Julie” to the question, “Who did you meet today?” Or, when given the name “Julie,” you can say something like, “Oh, I met a woman named Julie today.” In fact, providing any information in the form of a verbal stimulus to someone who is listening (i.e., someone in whom echoic or intraverbal behavior is evoked) can alter numerous verbal and nonverbal relationships.

The verbal stimulus does not just condition the behavior of the listener, it conditions it to specific antecedent events (e.g., MOs and S<sup>d</sup>s). Thus, in the previous example, the response “Julie” (as a tact) is only occasioned by seeing Julie or (as an intraverbal) by someone asking, “Who did you meet today?” We can also condition our own behavior, as for example, when I say to myself before going to bed, “I’ve got to remember to take *Verbal Behavior* to work with me tomorrow.” The next morning when I am getting ready I might not remember that I wanted to take the book to work in the sense that I am not saying the same thing to myself. But suppose I then happen to glance at the bookshelf where my copy of *Verbal Behavior* is, and upon seeing the book, say, “Oh yes, I have to take that book to work with me.” The question is how did the sight of the book evoke my remembering. The answer must be my own verbal conditioning before going to bed.

### *Durability of Verbal Conditioning*

The examples in the previous paragraphs illustrate the function-altering (i.e., conditioning) effects of verbal stimuli. But a closer look reveals some differences. If we compare the example of introducing oneself to the example of reminding oneself to bring a book to work, a subtle difference appears. In some instances of conditioning the listener's behavior, the effects are relatively long lasting, as is the case when you are introduced to someone or when someone tells you that, "That car is a BMW." In other instances, however, the "conditioning" is temporary. Take Skinner's (1957) example, "When I say 'three,' go!" In this case, the listener's behavior is momentarily altered in that the behavior of going is only conditioned to the stimulus "three" one time in a specific context. In both instances we may describe the effect of the verbal stimulus as function altering in that the evocative function of antecedent events is altered. So what is the difference?

The difference lies in the form of the frame that conditions the listener's behavior. For example, Skinner (1957) refers to autoclitic frames of the form "When \_\_\_ do \_\_\_" as conditional mands. According to Skinner, these are mands comparable to "Do or say \_\_\_," "except that the listener withholds the response until the condition in the *When* clause is satisfied" (p. 361). In other words, the autoclitic frame brings the response mandated under the control of some future MO or S<sup>D</sup>. But Skinner reminds us that, "this cannot occur until such clauses have become effective in the verbal behavior of the listener, as the result of a long and difficult process" (p. 361).

In situations where predication facilitates "the transfer of response from one term to another or from one object to another" (Skinner, 1957, p. 361), Skinner appeals to a history of multiple exemplar training in which the variable terms in the relational autoclitic frame have already become important verbal stimuli for the listener. For example, the autoclitic frame, "The vending machine is broken," alters (decreases) the function of the vending machine in evoking behaviors such as approaching and inserting money. But the variable terms in this autoclitic frame ("vending machine" and "broken") have presumably already become effective for the listener in a variety of verbal contexts through a history of multiple exemplar training. And the listener presumably has a long history with similar frames (e.g., "The \_\_\_\_\_ is broken"). According to Palmer (1998), such frames "have certain prosodic, temporal, and semantic properties but are otherwise free to vary from one example to the next, according to the context" (p. 10). Thus, once a listener has learned to respond effectively to "The radio is broken," and "The lamp is broken," etc., usually by direct contact with the contingencies, and has a history with working vending machines, a novel construction ("The vending machine is broken") will be effective in momentarily altering the function of seeing the vending machine.<sup>3</sup>

### LITERAL OR ANALOG CONDITIONING?

Returning to the example of reminding myself to bring *Verbal Behavior* to work the next day, I stated that my behavior of remembering to take the book had been conditioned (that is brought under the control of relevant MOs and S<sup>D</sup>s) by my self-

statement the night before. But is the conditioning literal operant conditioning or should we refer to it as analog conditioning because it doesn't seem to possess all the features of the operant contingency? Specifically, does the fact that the sight of the book (or some other related stimulus) the next morning evokes remembering indicate that actual operant conditioning took place at the time I told myself to take the book to work? Or does it just look like operant conditioning? Very few behavior analysts have addressed this issue (e.g., Alessi, 1992; Palmer, 2005, 2007; Schlinger & Blakely, 1994), leaving the problem essentially unresolved<sup>4</sup>.

### *Analog conditioning*

Simply speaking, analog conditioning is used to describe function-altering effects of verbal stimuli that are produced without direct conditioning. Consider an example of the apparent conditioning of respondent relations by verbal stimuli. In "Conditioning the Behavior of the Listener," Skinner (1957) described how respondent conditioning-like effects can be produced by pairing the word *shock*, which had already been established as a CS through direct pairing with actual shock, with another verbal stimulus. According to Skinner, the statement "When I say 'three,' you will receive a shock," changes the future behavior of the listener with respect to the stimulus "One, two, three" (p. 357). Skinner went on to describe another variation in which pairing verbal stimuli alters the evocative function of a nonverbal stimulus. For example, saying, "When you hear a bell, you will feel a shock," alters the function of the bell to elicit sympathetic autonomic nervous system activity in a listener.

Cognitive psychologists have long been aware of these issues, and have even used them to criticize behaviorists. For example, in a chapter provocatively titled, "There Is No Convincing Evidence for Operant or Classical Conditioning in Adult Humans," Brewer (1974) argued that there is no instance of automatic, unconscious conditioning in verbal human subjects. He illustrated his argument with the following example:

The naive S comes to the experiment curious about what is going to happen and how he is to respond. During the CS-UCS pairing in classical conditioning, he develops conscious hypotheses about the relationship between the CS and UCS (e.g., "Every time the red light comes on I get shocked")... In classical autonomic conditioning, once S has developed a hypothesis about the CS-UCS relationship, a built-in system is brought into operation, so that S's expectation of shock... automatically produces the autonomic responses. (p. 2)

More important for the present paper, Brewer went on to say,

(...) a number of other predictions can be easily derived from cognitive theory. For example, telling the S the CS-UCS relation should have a very dramatic effect in... classical autonomic conditioning -*conditioning in zero trials*. (p. 3) (cf. Palmer, 2005)

Finally, Brewer stated that "conditioning theory... is not capable of making a well motivated prediction... about the outcome of telling the S the CS-UCS relation." (p. 4)

Cognitive theory, according to Brewer, appeals to the subject's conscious awareness and expectations. For behavior analysts, conscious awareness and expectations can be interpreted as a subject's (covert) verbalizations (Schlinger, 2008b). Such verbalizations are evoked by the experimenter's statements, which, as I have discussed, can themselves have evocative and function-altering functions. Let us look at Skinner's example in the context of the present discussion.

Prior to the statement, hearing the bell does not evoke sympathetic arousal. But, in a sophisticated listener, and assuming a reliable speaker and a context in which it is likely to be carried out such as a psychology experiment, this statement will endow the ringing bell with CS-like functions such that the bell will evoke increased heart rate and other sympathetic autonomic responses without the subject ever experiencing the shock.

Following Brewer's logic, after hearing the statement, the sound of the bell might cause the subject to say "When I hear the bell, I'm going to get shocked" -the subject's expectation- which may have CS-like evocative effects on the subject's autonomic responding. In this sense, Brewer's cognitive theory only accounts for the relatively simple evocative effects of the subject's self-awareness or expectation, in the form of a self-statement. But it leaves unanswered how the researcher's statement produced the subject's expectation when the bell rings other than saying that "a built-in system is brought into operation..." The question of how this comes about remains unanswered. Do these examples illustrate second-order (direct) classical conditioning or analog classical conditioning?

According to Alessi (1992), because a novel stimulus "can acquire functional transformations of behavioral properties of unconditioned stimuli without direct pairing" (p. 1367), including second-order conditioning, and thus, function like a CS, we might want to call the stimulus an analog CS and describe the process by which it acquired its evocative properties as verbal analog conditioning. Alessi (1992) also described the function-altering effects of other analog processes, including analog conditioned reinforcers and analog discriminative stimuli, and concluded:

There thus appear to be two processes for creating CSs within the respondent paradigm, and for creating conditioned reinforcing and discriminative stimuli within the operant paradigm. Stimulus functions can be altered either (a) by direct-acting contingencies (based on basic principles derived from laboratory research on respondent and operant conditioning) or (b) by the indirect-acting analog verbal transformation processes, once language has been acquired. (p. 1368)

### *Literal conditioning*

If verbal function-altering operations reflect direct operant conditioning, it is certainly not like what we typically expect. That is, given an MO and an  $S^D$ , a behavior produces some obvious stimulus change that we can identify as a reinforcer. If direct operant conditioning is occurring, then we need to look at what the listener does at the time that a verbal function-altering stimulus is stated.

Given that “almost any salient verbalization” can condition verbal relations in a listener, we can ask how this happens. Although a complete account awaits further study, we can speculate at least about what the listener may do at the moment conditioning occurs. Consider the frame, “Tomatoes are a fruit”<sup>5</sup>. First of all, such a statement would only effectively alter the future behavior of a competent listener, that is, one with an extant repertoire including similar frames and the variable terms in the frame (e.g., “tomatoes” and “fruit”). Whether the listener does or does not know that tomatoes are technically considered a fruit, the frame probably evokes an echoic response (“tomatoes are fruit”), and possibly also intraverbal responses such as “orange,” “banana,” “apple,” as well as imaginal responses (e.g., “seeing” a tomato, orange or banana). By echoing, “tomatoes are a fruit,” the listener converts the verbal stimulus into a response (Palmer, 2007). As a new response form (but not frame) in the listener’s repertoire, the variable terms in the frame evoke other responses (either echoic, intraverbal, and/or imaginal). For example, the listener may at the time say to herself, “Apples are also a fruit.” In the future, when someone mentions tomatoes, the listener may find herself saying, “Did you know that tomatoes are a fruit?”

But are these verbal and imaginal responses reinforced and, if so, how? Since there is likely no contrived exteroceptive reinforcement, any reinforcement is probably automatic. For example, if I hear someone say, “Tomatoes are a fruit,” then I will probably either echo the statement or repeat some intraverbal version of it. We have a long and rich history of automatic reinforcement for repeating or restating what we hear, starting when, as babbling infants, we echo phonemic sounds we hear from native speakers in our verbal community (Schlinger, 1995, pp. 158-160). For example, once infants’ vocal musculature changes such that they can produce consonantal sounds, they begin to systematically produce consonant-vowel sequences that linguists refer to as babbling. The role of automatic reinforcement can be inferred from the fact that the intonation and segmenting of babbling of hearing vs. non-hearing infants begins to match the language of their phonological environment (see Bates, O’Connell, & Shore, 1987). The closer the match is between what we echo and what we hear, the stronger the reinforcement for echoing. Moreover, many parents ask their children such questions as “What did I say?” and then reinforce them for answering correctly (either echoically or intraverbally). In addition to automatic reinforcement for parity (Palmer, 1996), there is probably also automatic reinforcement for being able to behave effectively. For example, if someone tells you that “Tomatoes are a fruit,” you may immediately say something like, “Really, tomatoes are a fruit? I always thought they were a vegetable,” to which the other person replies with an explanation. This “conversational give-and-take” (Palmer, 1998) generates automatic reinforcement for the listener’s verbal behavior by simply being able to effectively interact with the speaker.

The point of this brief and speculative analysis is that appealing to the ongoing discriminated verbal behavior of the listener represents a parsimonious approach to explaining how verbal stimuli may condition the behavior of the listener without resorting to analyses at other levels.

## RULES AND RULE-GOVERNED BEHAVIOR

Thus far, I have suggested that verbal stimuli generated by speakers frequently condition the behavior of listeners in that they alter the evocative functions of antecedent events. Some behavior analysts have discussed similar relations in terms of rule-governed behavior (Blakely & Schlinger, 1987; Hayes & Hayes, 1989). And numerous behavior analysts have offered interpretations of rules and rule-governed behavior (e.g., Catania, 1989; Cerutti, 1989; Glenn, 1987; Hayes & Hayes, 1989; Schlinger, 1990; Skinner, 1969, pp. 133-171). However, Blakely and I have argued that the term “rule” should be reserved for events that do something more than evoke behavior as  $S^D$ s (or MOs) (see also Vaughan, 1987). We have argued that the term “rule” should be used only for verbal stimuli that are function-altering (Blakely & Schlinger, 1987; but see Hayes & Hayes, 1989). Thus, a statement such as “Please stand up,” while formally an instruction or a request, would not be considered a rule if its only effect was to evoke standing up (as an MO or  $S^D$ ), because such behavior has been reinforced in the past when the instruction was given. We could condition such behavior to a light onset in the very same way. Conversely, saying “That kind of mushroom is poisonous” (Skinner, 1957, p. 362) in the presence of a particular kind of mushroom, while not formally an instruction or rule, should be considered a rule if it alters the function of that kind of mushroom such that it suppresses eating by the listener. Thus, on the present view, rules should be seen as verbal stimuli that condition the behavior of listeners.

### SUMMARY AND CONCLUSION

In this article, I have suggested that perhaps the most interesting effect of verbal stimuli is to condition the behavior of the listener. Skinner first mentioned this possibility in *Verbal Behavior*, but despite writing about verbal behavior on many occasions, he never returned to the topic. In different ways, a few behavior analysts have addressed the function-altering effects of verbal stimuli on the listener’s behavior (e.g., Alessi, 1992; Blakely & Schlinger, 1987; Hayes & Hayes, 1989; Palmer, 1998, 2005, 2007; Schlinger & Blakely, 1987, 1994). However, with very few exceptions, these behavior analysts have not fully tied their analysis to the foundation Skinner built in that 10-page section at the end of Chapter 14 of *Verbal Behavior*.

Before concluding, I should point out that in that brief section of *Verbal Behavior*, Skinner not only discussed the conditioning of respondent and operant discriminated relations, he also described how what was later termed observational learning can be conditioned by verbal stimuli. To update his example, suppose the first time you are riding in a friend’s new car you witness her say “Play Mozart” and her digital player immediately begins playing something by Mozart. As a result, you are now able to do the same thing. Simply hearing your friend utter “Play Mozart” has altered the function of that particular context such that it may evoke a similar response in you (if you want to hear Mozart in that context). But as Skinner noted about all of these examples, “...this does not all happen in the naïve speaker or listener; it is the end result of a long process of verbal conditioning” (p. 360). The next step for behavior analysts is to move

beyond demonstrating these and similar effects in competent listeners, and design experimental preparations that may help them discover what happens during this verbal conditioning and what kind of history is necessary and sufficient for it to occur.

#### NOTES

1. For a very thorough and readable history of the concept of rule-governed behavior in behavior analysis, with an emphasis on Skinner's contribution, see Vaughan (1989).
2. For a more detailed account of how operant and respondent contingencies alter evocative functions of antecedent events, see Schlinger and Blakely (1994).
3. For a more extensive discussion of these issues, see Palmer (1998, 2007).
4. There have been other attempts to account for similar effects on the listener's behavior, for example, stimulus equivalence (Sidman, 2000) and relational frame theory (e.g., Hayes, *et al.*, 2001). Describing these approaches, however, would require much more space than is possible and would take me beyond the scope of the paper. Both of these approaches have been thoroughly vetted by their proponents and I encourage interested readers to become familiar with them.
5. Skinner (1957) would call this an autoclitic frame and Palmer (1998) would broaden the category to include intraverbal frames.

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