

On Verbal Behavior: The Fourth of Four Parts

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Editor's note: Interest in the behaviorological analysis of verbal behavior (Skinner, 1957) continues to grow. (For an example see the editor's note to Fraley, 2004a, which is Part 1 of this paper. Also see the syllabi for TIBI's two online verbal behavior courses, BEHG 355—Verbal Behavior I, and BEHG 475—Verbal Behavior II. These syllabi appear, respectively, in these issues of *Behaviorology Today*: Volume 7, Number 2, and Volume 8, Number 1.)

To help support continuing interest in verbal behavior, *Behaviorology Today* presents this four-part series on verbal behavior. The first part appeared in Volume 7, Number 1. The second part appeared in Volume 7, Number 2. The third part appeared in Volume 8, Number 1. This is the fourth part, the last part of the series. (One part appears in each consecutive issue, beginning with Volume 7, Number 1.) All four parts derive from a chapter of the author's book *General Behaviorology: The Natural Science of Human Behavior*. (At the www.behaviorology.org web site, you can find more detailed information about this book by selecting the "General Behaviorology" page.)

For each part, the headings hint at the contents:

✂ Some interesting headings in *Part 1* (Fraley, 2004a) were: Terminological Issues, The Antecedent Control of Verbal Behavior, How Instances of Verbal Behavior are Classified, and The Mand.

✂ In *Part 2* (Fraley, 2004b) some interesting headings were: Verbal Behavior Under the Control of Verbal Stimuli, The Tact, Abstraction, Private Events, Reality, and Temporal Relations.

✂ Some interesting headings in *Part 3* (Fraley, 2005) were: Autoclitic Verbal Behavior, Descriptive Autoclitics, Autoclitics that Function as Mand, Qualifying Autoclitics, Quantifying Autoclitics, The Autoclitic Functions of Grammar and Syntax, and The Nature and Occurrence of Composition.

✂ In *Part 4* some interesting headings are: The Private Verbal Behavior of Thinking, The Productivity of Thought, The Utility of Thought, Issues of Privacy and Antiquity, The Absence of Thinking, and Nonverbal Consciousness.

The original book chapter was undergoing revision when Part 3, and this part, were extracted for inclusion in the last issue and this issue. Here is Part 4.—Ed.*

Part 4

The Private Verbal Behavior of Thinking

In general, verbal behavior can stimulate additional behavior, both verbal and nonverbal. Furthermore, that evoked behavior may be exhibited by other persons or by the verbalizers themselves. That is, the mediator of a verbal response is not always another person. The mediator of a statement can be the same person who verbalized it.

For example, when a verbalizer says *pick up that pencil*, another person, as mediator, may pick up the pencil, but it could also be the verbalizer who picks up the pencil. A person who is under contingencies to recite the second line of "The Star Spangled Banner" may be unable to do so until the probability of saying the second line has been increased intraverbally by reciting the first line (*Oh, say can you see...*). If no other person is present who will provide that cue, the first line may be produced by the individual who is both prober and speaker. The first line of the song then functions as a probe to evoke the second line. That is, upon producing the self-probe *Oh, say can you see...*, the person may then continue with the vocalization of the second line, *by the dawn's early light...* — a continuation that occurs due to the intraverbal control that the first line exerts on the recitation of the second line.

Here the verbalizer and mediator are the same person, who is commonly said to have had to talk in some way about a particular behavior before becoming able to exhibit it. Such a situation may also involve a second remote mediator—perhaps a person who began the episode by manding the recitation of the second line of the song and who stands ready to consequence the verbalizer's production of it. In such a situation, where some important verbal behavior must be evoked by some preceding verbal behavior before it can be produced for the external mediator, some self-probing verbal behavior may be produced privately as subvocal speech. That is, with respect to the preceding example, the verbalizer may say the first line privately (subvocally) as a self-probe but must then audibly vocalize the second line to which the mediator can then respond.

An observer who would notice a slight delay in the verbalizer's manded vocalization of the second line, may conclude, from an agential perspective, that the verbalizer *had to think about it* before being able to respond. However, the self-probe, in the form of a private verbal rendition of the first line, does not manifest through the verbalizer's personal initiative—that is, as if the vocalizer were acting in the role of a verbally productive self-agent. Instead, the probing behavior, whether private or public, is evoked naturally by certain aspects of the situation.¹

*The author's footnotes are at the end of the paper

Let us review what occurs: A set of antecedent stimuli that is insufficient to evoke a specified response (here, the recitation of the second line of a song) may nevertheless be sufficient to evoke a probe for that response. When the probed response manifests and thereby becomes a part of the behavior-controlling environment, that environment, enhanced by the presence of that verbal probe, may thereby have gained evocative sufficiency, and the originally specified response may then be forthcoming.

Given the necessary micro-structural preparation (i.e., preconditioning) to support it, such a preliminary sequence of private events proceeds naturally and automatically. The only thing that can happen is exactly what always does happen. A distinction between *can* and *does* is not an aspect of natural function.

Often, such private neural events happen quite rapidly. However, they in no way require the intervention of representatives from a putative spirit world. For example, nothing remains to be done by the secular intellectual self-agent that is often conjured to create a redundant account for the kind of preliminary private neural behavior that bolsters an insufficiently evocative environment through the addition of some largely verbal evocative stimuli. That kind of thought, rather than the product of a mysterious originator, consists merely of some naturally occurring private neural behavior. An event of that kind always has its own natural history that, theoretically, can be analyzed by tracing the train of functional relations that have led to it.

In contrast with cases in which preliminary private verbal behavior shares in evoking a public behavioral display, both the preliminary verbal behavior and the ultimate verbal product may remain private. That can happen when the ultimate verbal behavior is intrinsically reinforcing, and no role is reserved for a remote mediator of reinforcers.

For example, suppose that a verbalizer is under contingencies to consider a particular joke but, at the outset, cannot produce the forgotten punch line. That person may start reciting that humorous story subvocally and in more detail, which allows any intraverbal control over the last line to come into full play. That failing, aspects of the maturing problem may stimulate recall of an occasion on which the joke was successfully told to another person, which, in turn, may stimulate the question *Why did that person find it so funny?* That indirect probe, featuring recall of a past listener's reactions to the joke, may finally prove sufficient to evoke the punch line, which may manifest subvocally. The intrinsic reinforcing quality of such a completed joke is described as *humor*. The verbalizer whose probes have finally produced the ending that renders the story humorous is said to find the story *funny* once it is successfully completed. All behavior in such an episode is private.

Private verbal episodes of self-probing are classed as *thinking*. The capacity of verbalizers to produce verbal

supplementation of the controls on further of their own verbal behaviors (that is, to think in a self-probing way that establishes improved potential controls for subsequent verbal behavior) seems to be most evolved in the human species.

An episode of thematic thinking is typically traceable to an external stimulus, or at least to a stimulus that is remote from the part of the nervous system that engages in the behavior of thinking. Often that stimulus is described as *that which is thought about*. The thinking, by a person whose thoughts pertain to pencil sharpeners, may have begun when contact was made with a pencil sharpener in the external environment.² Once it is evoked, a private verbal behavior often evokes a subsequent private verbal behavior, which evokes another, giving rise to what is commonly called *a train of thought*.

However, the thinker is not initiatively *doing* it (thinking isn't *done*; it *happens*). That is, thinking remains a functionally controlled class of mostly verbal events that happen to parts of the thinker's nervous system through the natural functioning of certain biologically evolved capacities to support environment-behavior functions. In the case of ongoing trains of thought, the behavior-controlling environment for a current thought is the private neural realm. That is, the stimulating antecedent events that evoke subsequent private verbal responses are manifesting internally, also as neural events. This process is commonly described as *one thought giving rise to another*.

The control of those links in such a chain of private verbal behavior may be shared with certain stimuli in the external environment, which are said to "keep the thoughts focused" (i.e., thematically related to those external stimuli). If the external stimuli that initiated the sequence of private verbal behavior are weak, transient, or unimportant, the train of thought may drift away from any control by the properties of those external originating events. The thinking will manifest progressively in forms that are more and more self-reinforcing. That kind of self-amusement may be as idle as a self-aggrandizing daydream or as substantive as the creative musing by which an intellectual person keeps in practice and occasionally solves an important problem.

Thinking often manifests both as subvocal speech and as the kind of behavioral product that is called a vision. That is, one may not only talk to one's self, one may also "see things" to one's self. While most episodes of human thinking manifest as combinations of those two kinds of private verbal behavior, one may also undergo other classes of sensations to oneself. As kinds of thinking, they may manifest as flavors, feels, odors, or sounds that occur in the absence of the things tasted, felt, smelled, or heard. A train of thought may lead first to any such response, ...for example, to the private vision of a skunk. That vision may then evoke the odor of a skunk,

the feel of a skunk, the sound of a skunk, and the subvocal tact *skunk*—all of which occur in the absence of contact with any skunk-related external stimuli. One is then said to be *thinking about a skunk* as opposed to making actual contact with such an animal. The imagined forms of those responses are usually less sharp or distinct than the versions that are evoked nonverbally by direct contact with the appropriate external stimuli.

Private verbal behaviors, like publicly evident behaviors, are evoked in a natural way. They are simply what happens when a nervous system of a certain structural configuration contacts a part of an environment having a certain structural configuration. In this case, the environment that is contacted is internal and consists of the preceding neural behaviors in the current train of thought. The term *contact*, in the sense of bodily contact with environmental stimuli, indicates a transfer of energy from the environmental structure to the bodily structure. The immediately ensuing private behavioral reaction of a body part to the impinging energy is natural, inevitable, and automatic. However, the energy that is transferred from environment to body part is not sufficient to fuel the behavior that it triggers. The manifestation of the resultant behavioral reaction must rely on the triggered release of potential energy that has been stored in the body.³

An environment-behavior relation is said to be *functional*. Mere proximity of body and environment will not suffice to establish function. The establishment of function requires what is called a *contact* between environment and body, which must be mediated by an energy transfer between their structures. That is how the environment-behavior functional relation is established between those structures. A behavioral manifestation, said to represent the dependent variable in such a behavior-controlling relation, is the inevitable outcome when two appropriate structures (one a piece of the environment and one a part of the body of an organism) come into the kind of proximity that insures an appropriate energy transfer from that element of the environment to that element of the body.

In the case of an ongoing train of thought, the behavior-controlling environment is inside the skin and consists of the preceding private neural behavior per se. Remember that once a behavioral response occurs, it thereby becomes an event that defines part of the proximal environment, and, as such, it may then share in the antecedent stimulus control of subsequent behaving by the same organism. This principle holds regardless of either the form of the behavior or the parts of the body through which it manifests.

Both the structure of the behaving organism and the structure of the environment to which it responds are always changing. It is that ongoing flux in the status of both systems that makes their interactions seem arbitrary

rather than deterministic. Because of ongoing changes in the structure of both of the interacting systems (environment and body), the precise behavior-environment function that is manifesting at one moment cannot endure to the next moment. Thus, each response necessarily differs at least a little from all others. Both operant and respondent conditioning restructure the organism so as to restore the eroding capacities to support certain environment-behavior functions against the inevitable and natural tide of microstructural degradation that, if unchecked, results in the kinds of behavioral failures that are known respectively as desensitization and forgetting.

Speaking in a linguistic form only for the benefit of self will tend, as a matter of natural economy, to recede to the subvocal level that we call *thinking*. Less energy is required merely to think *applesauce* than to say *applesauce*, and when the consequences of producing that response are being mediated by the verbalizer, the expenditure of the extra energy to vocalize may be redundant. When that is the case, across repeated occasions, the vocal facet of the behavior will extinguish, which leaves the person thinking *applesauce* but no longer saying *applesauce*.

Still, in some cases, verbalizers who are alone will emit audible speech (talk “out loud” to themselves). As in the case of subvocal linguistic thought, they continue to serve as their own mediators. However, speaking audibly to oneself occurs when the quality of the responding to one’s own verbal behavior is enhanced by increasing the volume of the speech until the sensory input occurs by way of the auditory system as well as by way of internal neural shortcuts. The verbalizer is among those who may be able to respond more effectively when the stimulus is loud, clear, and heard audibly, even when that stimulus is self-produced.

In some cases extraneous noise interferes with thinking behavior, and thinkers may begin an audibly vocalized copy of their subvocal speech with sufficient volume to overcome the disrupting effects of the noise. People may account for such loud vocalizations of their thoughts by explaining that the external noise was so loud that they “couldn’t hear themselves think,” so they had to “shout over that noise.” We must note, however, that any such vocalization emerges as a naturally occurring response to the shifting conditions, and its attribution to an internal manager is redundant.

Our analyses of instances of thinking are complicated by the privacy of most thinking, especially when the verbalizer who serves as the focus of our analytical concern is another person. While, for lack of effective contacts, we may not be able to give a completely detailed account of a given instance, our ignorance of the details does not shift the process of thought into a supernatural realm. It merely defines a technical challenge pertaining to accessibility.

The Issue of Thought to which the Thinker May Remain Oblivious

Covert thinking has often been posited to facilitate stalled explanations of behavioral phenomena. Difficult accounts have often been completed by explanatory recourse to thinking that presumably is so private and covert that even the person to whom it putatively happens remains unaware of its occurrence.

However, thinking, of any kind, as it manifests, *is* consciousness. There is no separate and independent entity that apart from a thought, becomes conscious *of* that thought. That is, no separate entity exists that could appreciate thought with a reaction of consciousness. People who nevertheless assume that that is the nature of consciousness often find it easy to suppose that the putative independent appreciator of thought can become distracted, which would allow some thinking to proceed unnoticed by the distracted agent whose response to that thinking, were it occurring, would be manifesting as consciousness of that thought. The ongoing but neglected thought would then be described as “unconscious thinking” or as “subconscious thinking.”

However, thought already *is* the consciousness, so the notion of its divorce from consciousness is a fallacy. That idea is another variant in the family of fallacies through which seemingly gainful employment is created for the nonexistent body-managing self-spirit. In this case consciousness is assumed to be that agent, although consciousness is nothing more than the occurrence of a class of neural behavior that, like all behavior, is the inevitable result of certain functional relations having been established.

Thus, no valid basis exists to assume that covert thinking can occur. Nevertheless, certain kinds of events have long facilitated that mistaken assumption. For example, when one is thinking about a tenaciously stubborn problem, the response that is the solution may not be forthcoming. That is, no special arrangement of the potentially evocative stimuli, nor operation that supplements or enhances the evocative stimuli, produces the response that answers the fundamental question. As such unsuccessful problem-solving behaviors slowly extinguish, other classes of environmental stimuli, unrelated to the unsolved problem, eventually gain control of the thwarted investigator's behavior. From the invalid but popular agential perspective, the person may be said to “drop that problem for the time being and move on to other things.”

The important aspect, however, is that thinking under stimulus control of the features of the problem has stopped. Furthermore, subsequent thinking is proceeding under stimulus control of events unrelated to the problem. Thinking is a one-channel phenomenon, and although many people are deceived by the evidence, the thinking that occurs to a person can occur though only a

single channel of stimulation—or, as it is commonly said, a person can think of only one thing at a time (or, alternatively, that a person can entertain only one train of thought at a time, because the capacity to think represents a one-track capability). People who are convinced that they are consciously thinking of different things at the same time are, in fact, responding to those various events in rapid alternation. People who suppose that they must be solving a problem covertly are not thinking about it at all. Independent evidence of a second hidden track has not been adduced scientifically.

Later, the person may be stimulated to think again about a problem that has been neglected for awhile, and the response that is the problem solution may occur immediately. The rather abrupt appearance of the solution behavior can be surprising, and people may be tempted to assume that the person has been thinking covertly about that problem in the meantime. That is, one may suppose that the person has managed to solve the problem through some kind of subconscious thought process while conducting and attending to, other business.

In fact, many people find it easy to suppose that now, as the problem is consciously revisited and the solution behavior occurs at once, that a solution was covertly produced while the person-agent was busy with other matters. It is commonly assumed that verbal and perhaps other kinds of neural behavior have continued in the subconscious background, eventually producing a solution to the problem. That unconsciously produced solution is thought to have been waiting there in what is believed to be a subconscious realm for the next opportunity to manifest publicly. That happens when the putative self-agent presumably decides to revisit the problem, and upon doing so is as pleasantly surprised as anyone to find the completed solution waiting there to happen in some public behavioral form.

Such popular assumptions have characterized common wisdom since antiquity. Those assumptions rely on the presupposition of a real and proactive inner person who initiatively “does things” (as they say), including thinking. In modern times introductory college psychology courses have often presented such a speculation either as scientific fact or as respectable theory. Explanatory reliance on proactive subconscious minds that continue autonomously to think in secrecy about a problem have also become well established in the literature of many other contemporary fields that rely on psychology for their behavior-related scientific foundation. Under disguised economic motivation, they typically cater to the general public's awe of science by proffering scientific treatments of such popular behavior-related lore in ways that do not challenge the underlying superstitious assumptions. However, the capacity for subconscious thinking imposes a heavy creative burden on the biological evolutionary

process, and substantive collateral evidence for subconscious thinking has not been forthcoming.

Readily available and far more parsimonious explanations for the sudden emergence of a problem solution following a period of distraction appeal, ironically, to the forgetting, extinction, and suppression processes. During an intense episode of the private verbal behavior of problem solving, a wide variety of previously conditioned verbal behaviors may be evoked precisely because, given similar problems in the past, those behaviors have enhanced the stimulus array sufficiently to raise its evocative capacity above the evocation threshold for the solution-type of responding. If, on a current occasion, such verbal behaviors fail to evoke the solution, their rapid and accumulating manifestations may clutter the stimulus landscape much as a worker who reaches successively for one wrong tool after another may find that the selection of the correct tool is hindered by immediate contact with so many closely related but inappropriate tools that then litter the work site

Forgetting. After a period apart from the cluttered stimulus array left in the wake of the earlier address of the problem, the person, upon again contacting the problem, may come again under stimulus control of its more critical features. While the mechanic may once again be confused by the strewn assortment of inappropriate tools that remain from the previous episode, the thinker may have the advantage of a stimulus landscape swept clean of unhelpful verbal clutter by the forgetting process. That is, the kind of ineffective thinking about the problem that occurred the first time may not occur this time, because the neural microstructures that mediate it have eroded. The person may say “*I can’t remember exactly how I last attacked this problem.*” Note that forgetting is an inevitable physiological process and that it proceeds whether or not the behavior being forgotten was originally reinforced. With the ineffective problem-solving behavior forgotten, more effective behavior may be evoked on the current occasion.

Extinction. Apart from any forgetting, extinction may reduce the reoccurrence of *ineffective* thinking behavior that occurred during the previous episode. In cases of extinction, the array of specially contrived and arranged but useless verbal and nonverbal neural behavioral stimuli that the problem evoked during the previous episode may not again be evoked by the salient features definitive of the problem. This is because, on the previous occasion, those neural behavioral supplements were unhelpful and thus became subject to extinction. That is, absent ultimate reinforcement, a thought—say, for instance, about a particular way to measure that proved to be impractical—will be less likely to occur again, because the functional link between that response (the thought) and the events that evoked it is weakened when reinforcing

outcomes are not subsequently contacted. During a current re-address of the old and still unsolved problem, with that neurally adduced clutter now out of the way (whether forgotten, extinguished, or both), the solution response may be forthcoming.

Suppression. The stimuli that define a problem are aversive, and the continuation of an unsolved problem is aversive. A potential solution behavior that fails to reduce that aversiveness (i.e., to solve the problem) is paired with that unabated aversive stimulation, and, through that pairing, becomes an aversive stimulus of the kind commonly described as a *disappointment*. A reoccurrence of thoughts that have undergone such a process is aversive, and any behavior including the thinking kind, the occurrence of which is aversive, occurs in the presence of its evocative stimuli with less frequency. Such behaviors (thoughts in this case) are said to be *suppressed* by punishment.

The failure of previous private neural behaviors to re-occur leaves the relevant neural body parts free to come under different stimulus controls that may evoke, at last, other private behavior that does solve the problem. If the problem is conceptual, such private behavior represents a direct solution. If the problem is of a practical nature, that private neural behavior shares in evoking subsequent practical behavior that is the solution. Those kinds of private neural behavior are often largely verbal, although nonverbal forms also occur... for instance, as a vision that has been conditioned by natural consequences featuring nonverbal events. (We suppose that a nonverbal animal such as a dog can revisualize one of its previous rabbit chases, although it cannot concurrently experience a subvocal description of it).

We must recognize, in general, that on a later occasion of contact with a previously unsolved problem following a period of neglect, neither the person who is responding nor the behavior-controlling environment are structurally the same. The neural status of a person is always in flux. The nervous system that on the previous occasion could not respond effectively, may by now be capable of doing so due to the ensuing and continual microstructural changes, be they (a) natural and seemingly random intraneural events, (b) the result of some relevant interim behavioral conditioning, or (c) the result of more direct interventions from without (via drugs, surgery, trauma, etc.).

Likewise, the environmental presentation of the stimuli that define the problem may now be somewhat sharper. The current stimulus array may now be more conducive to evoking the solution behavior as a result of either (a) the natural flux in the structure of the environment or (b) the contrived presence of some additional relevant evidence that has been rendered salient since the previous interaction with the problem.

The broad class of interacting kinds of explanations that are presented in this section for the sudden appearance

of the solution to an old problem rests on a much more secure scientific foundation than the imagined workings of an elaborate construct called the *subconscious mind*. Subconscious thought has seemed plausible only because it comports with certain superstitious mentalistic assumptions that need not have been encouraged in the first place.

In general, logical support for a well endowed fundamental fallacy such as the spiritual self agent soon compels reliance on additional fallacies. The ethereal motivator must be assigned body management duties lest it seem redundant. Peripherally relevant fallacies then emerge, simply because they comport with that growing core of descriptions of invalid relations. Within the community of persons who are mediating the expanding web of such fallacies no operant behavior can be allowed to occur beyond the oversight and authority of the putatively responsible self-agent. Theories that relate observed behaviors to the self-spirit tend to proliferate as rapidly as they seem to be needed.

A behavior that constitutes a problem solution, which presumably must be a work-product of the self-agent, upon suddenly occurring after an interval of distraction from the problem, needs to be explained in a way that seems to make clear its relation to that agent. The invention of a fictitious subconscious mind makes that possible. There, in the fictional subconscious part of an equally fictional mind, the putative self-agent is posited to have been toiling quietly on the problem in secret, and the person's new contact with problem-related environmental events is the occasion for that agent to emerge from that hidden workshop with a new set of behavioral prescriptions for the body to execute and thereby solve the problem.

Such approaches may be adorned with the trappings of science. Among those who mediate such fallacies, valid scientific practices may be applied to absurd questions. The fundamental miscarry lies in the philosophical domain, which must effect the quality-control that keeps scientific activity from being wasted on nonsensical issues. Absent a philosophy that precludes superstitious basic assumptions, a philosophically weak field of misdirected scientific study may eventually emerge that focuses mainly on such virtual phenomena and their misleading implications.

The Productivity of Thought

As is true of other classes of operant behavior, much thinking is inconsequential. Thinking becomes productive when its private responses share in evoking behavior that, because of those supplementary controls, leads to reinforcing consequences. Such thinking is then said to have been effective, and that thinking behavior is strengthened operantly by the effectiveness of the outcomes that it shares in making possible.

Thinking occurs in many varieties that are commonly called *strategies*—a reference that implicitly ac-

knowledges the function of an internal strategist whose proactive contrivance is presumed to be the source of whatever kind of thinking manifests in a given situation. However, what is generally regarded as a strategy of thought consists of conditioned behavior the nature of which may have evolved somewhat naturally in response to the prevailing contingencies, or which may have been crafted through the externally prescribed arrangement of the necessary contingencies (a process called *instruction*).

Consider a box maker who must design a thin cardboard box in which a certain kind of tool can be shipped to remote buyers. Given the tool and a flat sheet of cardboard stock, suppose that the designer places the tool on the sheet of cardboard, and begins to think about the design of a box that is to be made by folding the cardboard so as to enclose the tool. That kind of thinking can be traced to the designer's having come under contingencies to solve this problem.

Suppose that the above stimulus array evokes the box designer's visualization of certain cuts being made in the cardboard, with sections of the cardboard being trimmed away, while other sections of the cardboard are being folded along certain lines. Certain steps in that sequence of thoughts may also evoke previously conditioned mathematical operations (e.g., calculating the area of one of the faces of the box or the volume of a completed box). An experienced box designer⁴ may, in that way, be led to think through the process of creating a box into which the tool would fit snugly, and eventually the designer may visualize a completed box even though the only external environmental presentation remains the tool lying on a flat sheet of stock.

During this thought process, additional stimuli may have to be produced by the process of measurement, and certain responses in the box-designing thought process may, in turn, evoke those necessary behaviors of measuring. The measurement behaviors result in the production of records (e.g., *5.2 inches*) that, in turn, share in the control of certain steps in the box-designing process, such as locating the second of two points between which the stock will then be cut in a straight line.

When this kind of thinking is completed, that sequence of neural behavior may be subject to positive reinforcement contingent on how well the tool fits or apparently will fit into the box. Those functional reinforcers can be of various kinds. First, the completed design may be intrinsically reinforcing, because in the past such designs have always led to good-fitting boxes. It may be said that the designer "knows intuitively" that the tool will fit the box that is to be built in accordance with that person's design specifications. Additionally, when the designer actually folds the prepared cardboard into a box that is found to be a snug and proper container for the tool, that practical outcome may function as a further if

slightly delayed reinforcer of the thinking that led to the box. That reinforcing effect is greatest if the designer, upon completing the design, *immediately* builds a box and puts it to the test.

If, however, the construction is delayed, when a box is finally built and shown to be effective, that outcome may be too late to have any direct reinforcing effect on the behaviors of thought that led to the plan for that box. Nevertheless, that delayed feedback may evoke from the designer or from others some verbal products that are contacted by the designer of the box (i.e., something along the line of “whatever you did to develop this box proved to be quite effective”).

The function of such feedback then manifests *antecedently* with respect to that designer’s future work. That is, such feedback evokes the designer’s statement of rules or self-instructions such as “on the next box design project, behave in ways similar to the behavior on the previous project.” The designer has long been conditioned to follow self-instructions of that general kind.

Through such an antecedent function, long delayed feedback that pertains to a past project, although too late to reinforce directly the box designing activity during that past project, can still affect future design projects. The difference is in how a future project comes to be affected by a past one. Instead of immediate microstructural changes in the nervous system of the designer that render the designer a changed person who will behave even more effectively to similar future stimuli, the controlling environment of the next project is enhanced by the addition of some new verbal stimuli (i.e., the self-instructions). To say it differently, in the case of operant conditioning that is dependent on immediate feedback, the designer who tackles the next project is a structurally changed person, whereas, in the case of long delayed feedback, the antecedent environment for the next project may be changed by some enhancing verbal events. With respect to the next project, the distinction being drawn in this discussion is between a changed designer and a changed environment.

Now let us suppose a person is under contingencies to behave in a way that is aversive. As a result of having been punished on past occasions the behavior may be too suppressed to occur, and some alternative behavior that is more readily evoked continues to be exhibited. On such occasions, turning that prescribed aversive behavior into an escape behavior from a different kind of averser is a common technique. For example, persons who are conditioned to follow orders may covertly self-mand the aversive behavior that they are already under contingencies to execute. If an unobeyed order is aversive in general, then privately ordering oneself to “go ahead and *do*... [the aversive task]” generates an order that remains aversive until it is obeyed by an exhibition of the escape behavior. This

technique establishes a conflict between the originally prescribed behavior and whatever else one is doing.

Let us further analyze this technique. Arranging to place oneself under such a contingency of negative reinforcement to exhibit the desired but already aversive escape behavior increases the likelihood that a person will actually exhibit that previously indicated response. Theoretically, that originally prescribed behavior, which is probably going to be punished if it occurs, is made to occur by establishing another kind of aversive condition the relief from which is attained when that originally specified behavior is exhibited. The success of this technique depends on the additional increment of evocative strength that is contributed by the self-mand “to go ahead and do it,” which endows the previously prescribed behavior with the functional capacity of a negatively reinforced escape behavior. The trick is to make the prescribed but as yet nonoccurring behavior even more reinforcing (negatively) than the current alternative behavior (which may be getting positively reinforced) so that the prescribed behavior occurs even though it is will probably be punished when it happens. The utility of this approach relies in part on the strength of the person’s conditioning to do whatever one is self-instructed to do.

In general, people often respond effectively to their own private verbal behavior. We do so when we open a safe by following the private recitation of the combination that unlocks it. That is, as the covert intraverbal sequence of responses proceeds (e.g., “...*clockwise to 12, counterclockwise to 46, ...*”), the verbalizer’s looking behavior and finger manipulations of the dial jointly respond in a preconditioned way to each of those verbal responses. When the safe opens, the private verbal behavior is reinforced along with the manipulative behavior that it shared in controlling.

Standard patterns of behavior may be evoked by tacts that name those patterns. That is, we may be prepared to behave in certain preconditioned ways to a situation that can be described as a “red alert” or a “code blue.” However, until that verbal designator occurs, the situation may seem ill-defined and perhaps confusing in the sense that one exhibits no effective pattern of responding to it. If the situation can be described as a “red alert,” that verbalization evokes a well strengthened pattern of potentially effective action that the disparate elements of the situation collectively could not evoke. The kind of thinking that identifies that situation as a “red alert” is strengthened by the reinforcing aspects of the effective action that follows under partial control by that generic tact.

The thinking that leads to the critical verbalization (“*red alert*”) may involve the covert review, in a private verbal way, of criteria for a red alert condition, perhaps in contrast with the criteria for a *yellow alert*. The thinking may involve the comparative recall of previous circum-

stances of a similar nature that ultimately were, or were not, classified as red alerts. Other examples include the phrase “head wound,” which when uttered as a tact by a person who is examining an injured person, initiates a preconditioned sequence of effective responses by rescue and medical personnel who are available to offer aid.

Thus, verbal stimulation plays an important role in determining the behavior of verbal species. One class of verbal self-stimulation is called *decision making*, which is a verbal procedure designed to strengthen the relative evocative capacity of the stimuli that result in the occurrence of one action from among a set of potential alternative actions. A person may talk privately to self: “I will cast this die once, and if it comes up a four, I will jump; otherwise, I will stay put.” The person may then behave in accordance with the self-mand to cast the die. Once the die has come to rest, its top face—a face that the private statement has rendered interpretable as a kind of text—is then read by the verbalizer who is serving as his or her own mediator. A pattern of four dots is read as “*jump*”; while other dot patterns are read as “*stay put*.” Those verbalizations are both self-mands, and the person may then obey whichever mand is evoked by the textually interpreted top face of the die. To the extent that the unobeyed mand is aversive, the compliance response is negatively reinforced.

The result of this private verbal process is the arrangement of an additional contingency to act in one way or the other. Once the die has been cast, one’s predicting the behavior that will probably follow under the algebraically summed strengths of the respective prevailing contingencies, which include the new and perhaps deciding contingency, is described as the *decision* to jump or not to jump (i.e., *I will jump* or *I will stay put*). The subsequent manifestation of the specified behavior is said, agentially, to represent one’s “acting on that decision,” although the response simply happens as the inevitable and natural outcome.

The common explanatory reliance on a spirit-like self-agent called “one” that implicitly must “act” to produce that response, aside from the implausible nature of a spirit of any kind, represents an unparsimonious redundancy. Note that, in the current example, the preliminary thought process resulted in the contrivance of a supplementary contingency of negative reinforcement that was added to the existing mix of conflicting contingencies, perhaps in a way that tipped the balance in favor of either jumping or staying put. To speak agentially, the individual intuitively recognizes this contingency as negative reinforcement by saying “I don’t want to be one of those people who fails to do what they say that they will do.” The described procedure featuring the die may also establish a concurrent contingency of positive reinforcement when the top face of the die is read as a behavioral prescription. The person’s intuitive recognition of that

contingency of positive reinforcement is revealed by statements such as “In a situation like this, I’m proud of doing whatever I say that I will do.”

The functioning of a *resolution* (in the sense of an announced course of future action) often involves both private and public aspects. One may resolve privately to mop the kitchen floor once a week even though potential alternative behaviors are likely to be reinforced strongly. The tendency to do what we say that we will do gains its strength when community members praise compliance and punish failure. Nevertheless, if a resolution remains entirely private, it may prove to be ineffective, because people tend not to incur the cost of supplying the extrinsic consequences to their own behavior. That is, one may not inflict extrinsic punishment on oneself for failure, nor incur the cost of bestowing extrinsic reinforcers following success. For example, the person who fails to mop the floor may not pay the fine that was threatened as part of the private resolution to mop the floor, nor may the person who has mopped the floor bother to make the cookies that were self-promised as a positive reinforcer.

The automatic, intrinsic, and *respondently produced* consequences will continue to occur (one will feel good or bad depending on whether one has mopped the floor). However, those intrinsic respondent consequences may be too weak to have much effect, especially when the behavioral alternatives to mopping are strongly reinforced. That is, the private shame may be endured with ease if the exhibited alternative to mopping the floor happens to be a lot of fun.

If, however, we publicly announce the resolution to mop the floor, we bring into play the consequence that community members stand ready to supply. Community members tend to punish the failure by other people to do what they say they will do, because, in general, members of a verbal community are better able to behave effectively when others reliably behave as they are expected to behave. Thus, (to put it in common agential language) we often engage in the self-management strategy of deliberately revealing our private intentions so that we can benefit from the consequences that others can provide for our compliance or noncompliance.

A technical summary of such a procedure can be set forth as follows: We tend to arrange for such supplementary assistance by community members when we are under strong contingencies of other kinds to exhibit the behavior in question, and that behavior is also likely to be strongly punished. Initially, the behavior may tend not to happen, because the reinforcing and punitive contingencies are balanced, with the rate of the behavior suppressed to some low level... perhaps even zero. That is, the opposing contingencies acting together have so little evocative capacity that either the behavior occurs at a low rate or not to any extent.

The prevailing circumstances may then evoke some relevant thinking, which in the way previous described, upsets the currently existing balance in the opposing contingencies. With the addition of the new contingency that favors the relevant behavior, the suppression of that behavior by the punitive contingency is lessened, and the result is a new equilibration with the rate of the behavior at a higher level. That happens when an additional new and sufficiently conditioned contingency to behave in the specified way is established on the basis of some naturally evoked thought pertinent to the situation. The suppressive tendency of that behavior by the punitive contingency is proportionally reduced, which increases the relative frequency of that behavior. The behavior in question is said to have become more probable.

Of thinking, we can say, in general, that thoughts of whatever kind, upon manifestation, become environmental events that supplement other environmental events that are also being contacted. The new environment, enhanced by the addition of those added and mostly verbal stimuli, may thereby have gained the capacity to acquire functional control over behavior-capable body parts, resulting in behaviors that are more effective than those (if any) that the verbally unenhanced environment could evoke.

When we say that a thought, upon occurring, becomes part of the behavior-controlling environment that determines future behavior, we must account for how a transient behavioral event like a thought can remain an aspect of the behavior-controlling environment in which it occurs. After all, as is true of all kinds of behaviors, once the duration of a response has expired, that behavioral event is thereafter absent from that environment.

That dilemma is overcome naturally insofar as a response of the kind called thought, once it is evoked, is for a time thereafter very readily reevocable. That is, an initial thought of a particular kind may be evoked only with some difficulty, but once it occurs, it is readily reevocable, having come under control of various aspects of the ongoing situation. Its easy reoccurrence whenever it is again relevant, renders it reavailable to share with other features of the environment as a proximal cause of some specific subsequent behavior. For instance, it may, at first, be difficult for a person to “get the idea” of stiffening a flexible rod by freezing it, but versions of that thought then tend to reoccur readily during the establishment of contingencies under which one behaves in a way that stiffens a rod by freezing it. The reoccurrence of such thinking “as needed” happens naturally and not because some inner self-agent is smart enough to keep making it happen at just the right time.

Analyzing the Utility of Thought

Kinds of thinking that are reinforced become more probable on future occasions. The steps in any covert sequence of verbal behaviors that is ultimately reinforced

may subsequently be analyzed by the thinker. That analysis may render more salient the steps that establish that particular kind of thinking and may render the controlling relations more obvious... and hence more subject to reproduction. Once they are verbally delineated, the steps in a productive kind of thinking can become the subject matter in a training curriculum designed to condition other people to think effectively in a similar way on similar occasions.

Much of what is construed to be a person's *education* is supposed to condition sequences of verbal behavior such as those that lead to encounters with certain kinds of new antecedent stimuli and insure avoiding contact with certain other kinds of antecedent stimuli. A private verbal sequence that shares in the stimulus control of any such outcome is then put under initiating stimulus control of some aspect of the kind of problem that it can be helpful in solving. That is, aspects of a problem must come to evoke the kind of thinking that can share in producing its solution. A particular sequence of thinking may be pertinent to many different problems all of which share the necessary evocative feature.

When a person's involvement in a problem-solving episode yields contact with such a triggering stimulus, that stimulus then evokes the start of the potentially relevant and preconditioned sequence of private verbal behavior, the outcome of which either modifies the prevailing contingencies or changes the prevailing stimulus mix that defines the current situation. The behavior of the individual, in responding to that changed circumstance, is changed accordingly, and that behavioral change may represent the otherwise elusive solution to the problem.

For example, suppose that a person's problem is to select a precut baseboard that will be of proper length to fit, with minimal waste, along one side of the floor in a square room to which the person has no direct access. However, the only relevant fact available to the person is that the size of the floor is 118 square feet. Absent a calculating device, the person is left to his or her own repertoire of general verbal sequences, among which, hopefully, is the verbal prescription for extracting the square root of any given number. The description of that sequence of mathematical operations, if previously conditioned to sufficient strength, may then be initiated under the evocative control of the features of this problem-defining situation. The culmination of the verbally guided mathematical operation may consist of the emergence of the response “10.86 feet.” Subsequent easy reoccurrences of that response then share in the control of board selecting behaviors that procure a baseboard of length l feet such that the length of the resulting waste ($l - 10.86$ feet) is a practical minimum positive value.

Thinking is said to be useful in general, and the process delineated here provides one illustration how and why that may be so. One of the main aspects of *education*

is the conditioning of the specific sequences of thoughts that are called *verbal operations*, which yield special kinds of changes to a behavior-controlling environment. Those changes then result in new forms of behavior that may be more reinforcing or may yield access to more reinforcing outcomes (i.e., may “*solve a problem*”).

Issues of Privacy and Antiquity

Thoughts, more broadly construed to include raw awareness and recognition in its various manifestations as well as subvocal speech, are all private and consist of conditioned and unconditioned responses. We have no practical way to contact directly the private thoughts of other persons (i.e., their subvocal speech, their visions, their sensations of tactility, odors, and sounds). Instead we contact products of their thoughts, . . . for example, the observable behavior that occurs under partial control of their thoughts, such as their audible vocalizations and other motor behaviors of their body parts. We also contact environmental products that have been produced by behavior that was controlled in part by their thoughts, such as text that they have written, artifacts that they have created, or other kinds of changes to the environment that have resulted from their thought-controlled behavior.

Some of those environmental effects can endure beyond the lifetimes of those people. In the case of historical figures, in addition to enduring products that they produced, we may have pictures of them, which can evoke our behavior of seeing them, and we may even have recordings of their audible vocalizations if they lived after the development of voice recording technologies.

Our *knowledge* of a historical person consists of our reactions to the records of that person's existence. Knowing is a kind of behaving. Thus, we do not *acquire* such knowledge; we can only behave it . . . in part, verbally. Part of that private behavior may be evoked by the surviving products of the historical person's thinking. However, the capacity of any of those kinds of stimuli to evoke our behavior depends in part on the nature and extent of the relevant behavioral conditioning that we have experienced during our own lifetimes. To us now, the thinking of Antoine Galland, the French orientalist and numismatist (1646–1715), can be only the sum of whatever behavior of our own that our conditioning histories have prepared us to exhibit in response to the extant products, direct or indirect, of Galland's thinking.

Thus, to us, our concept of Galland's thought does not inhere in the surviving texts and artifacts the production of which was controlled in part by his thinking. Instead, the essence of our knowing of Galland's thinking inheres only in our neural behavioral responses to those products, and those responses depend heavily on our own respective conditioning histories. We can “know” only what (i.e., respond privately only in ways that . . .) our re-

spective conditioning histories have prepared us to “know” (i.e., to respond). That is the essence of our respective differences in relevant knowledge even after our having been presented with similar records.

Such interpersonal discrepancies have long posed a fundamental dilemma for historians. The problem arises because we do not *acquire* knowledge but instead behave it for ourselves. Our knowledge of a historical event consists of our private responses that its records evoke, and for us its nature is therefore determined both by the stimuli that evoke that behavior and by the intrinsic conditioned capacities of our bodies to produce the behavior that responds to those stimuli. Typically, much of that responding is verbal.

Within our verbal community we arrange peoples' education so as to insure commonalty in their respective reactions to such stimulus presentations. This lends commonalty to how you and I respectively will behave after we have both contacted the same or similar stimuli. However, at the same time, we value helpfully unique insights (helpfully unique responses) to the extent that we are not all equally prepared to behave them when initially contacting the same sets of historical evidence. Regardless of some essential commonalty designed into peoples' respective training programs, no two people can have identical conditioning histories, because (a) genetic endowments produce physiological differences among people, which affects their respective susceptibilities to conditioning and (b) no two people contact identical environments regardless of attempts to insure similarities in their respective experiences.

Maintaining Reliance on Function-Based Accounting for Verbal and Nonverbal Behavior

Form Versus Function

What we call a *stimulus* usually consists of sets of properties that share collectively in the control of any behavioral response to that stimulus. A single property that is functioning alone as an evocative stimulus is a very rare event, and what we are typically calling “a stimulus” is actually a set of stimuli that collectively exerts the detected functional control over behavior. In such cases, we do not distinguish the respective contributions of each stimulus element to that control. This is as true of verbal behavior as of any kind of behavior.

Thus, a tact such as *American flag*, uttered under stimulus control of a flag, is typically evoked by the minimum definitive set of properties that is shared by all American flags. While that response may be controlled by a composite of those definitive properties that functions

as a unit, with appropriate preconditioning, we can also exhibit tacts of the elemental properties of the American flag in response to presentations of smaller and smaller subsets of the included properties (*field, stripe, star, etc.*), and eventually perhaps even to a single property (e.g., *red* [of a certain wavelength]).

If we were to ignore the flag and examine only the responses to it, or to its various properties, we would see a lot of behavior that would seem oddly out of place in its apparent isolation from the stimuli that are evoking it. We may see a person salute, and wonder who or what is being saluted. Or we may suppose instead that the person is scratching an itching forehead with a fingernail. We may hear mention of some stars, and wonder why in broad daylight, the verbalizer would be referring to stars. Even the explicit mention of a *flag* leaves the possibility that the referent could be an image that is being evoked verbally in the absence of relevant stimuli in the external environment (as when a person who has been humming the national anthem experiences a private vision of the American flag when no real flag is present). Even though the complexity of the observed responding may imply the complexity of the stimuli that presumably are evoking it, a naive observer of only the behavior of another person could react with entirely incorrect assumptions about the controlling environment for that observed behavior. As the alternatives that are mentioned in this paragraph make clear, an effective account of behavior, verbal or nonverbal, must usually include both the independent and dependent variables in the behavior–controlling functions.

That is also true of the behavior known as thinking. No matter how complex some thinking seems to be, it is subject to a functional analysis in which responses are revealed to be controlled by stimuli that are to be found either in the external or the internal environment. The complexity of thought reflects the complexity but not the specifics of the environment that controls it. Only through a functional analysis can a reliable interpretation of those thoughts follow. Valid interpretive responses of thinking are controlled not merely by the neural behavior per se but by its functional relations to its specific evocative stimuli.

If the potential reactions of a mediator may have further implications of possible importance to a verbalizer, the mere form of the verbalizer's initial raw or primary response is usually insufficient to insure the subsequent realization of those mediated implications. We have noted in earlier examples that a mediator may not respond effectively if a verbalizer's utterance is that limited. For instance, an unsupplemented utterance of "*race*" could be a mand, tact, or even a vocalization of a term in an intraverbal sequence. A mediator's appropriate response would depend on which kind of antecedent control had been in effect as well as the specific stimuli that were functional under that kind of controlling arrange-

ment. Verbalizers, who are generally better positioned to emit descriptions of the controls on their own verbal behavior, become conditioned to supplement the formal presentations of their basic verbal behavior with additional indications of its controlling relations (via autoclitics), and potential mediators become conditioned to mand those verbal supplements if they fail to manifest.

Just as public verbal behavior is to be understood in terms of the functions according to which it manifests, so too is private verbal behavior. It is the privacy of thought that makes that analysis difficult for others. Thus, the conditioning of a person's language skills involves a substantial effort within the verbal community to compel such revelations by incorporating them as intrinsic characteristics of what is acceptable as proper linguistic behavior. That is, to speak "correctly," we are compelled to reveal at least some detail about the nature and strength of the controls on our primary verbal behavior.

Those revelations about the controls on our primary responses occur by way of our secondary, or associated, verbal behavior. A typical statement includes not only what, fundamentally, the speaker has to say about some environmental event, but also includes some detail pertinent to the functional controls that determine that saying behavior. If those supplementary details prove insufficient to evoke what would be an effective response from the perspective of a mediator, that mediator may instead respond with a probing question like *What was she thinking when she said that?... or What made you say that Uncle Ed has just come to mind?* The usual technical translation of such questions is "What evoked that statement?" Absent a description of the functional relation in which the behavior occurred, the mere form of the behavior is usually insufficient. A frustrated mediator may say something like *Without knowing why the person said that, I can't be sure of what is being said.*

People are taught simply to speak in ways that provide such details to the audience. Those details about the controlling relations may be revealed explicitly or implicitly, but those linguistically integrated revelations are no less environmentally controlled than the primary verbal behavior to which they pertain. It is just that they are controlled by different aspects of the environment than is the primary verbal behavior. For instance, consider the underlined part of "*I see a real car.*" It lets the mediator respond to *car* in a particular way that is determined by some control-related details pertinent to that particular utterance of *car*. Such additional details include (a) only one image of a car is evoking the report, (b) that image is present at the time of the statement, (c) the image of the car is being detected visually, (d) the image of the car is stimulated by a complete set of the definitive stimuli for a car, and (e) the image of the car is a response to an event in the *external* environment that, implicitly, is available to

stimulate a mediator's responses in the class called *personal confirmation*.

The linguistic indicators of those five classes of control-related details inhere respectively in *a* as a minimal tact of singularity and *car* as singular noun-form of the tact, *see* as a form indicative of the present tense, *see* as indicative of the visual form of contact, the tact *car* as a term controlled by the complete definitive set of stimulus elements for that particular tact, and a term (i.e., *real*) that indicates that the basic tact *car* is being stimulated by an environmental event that will withstand tests of confirmation involving similar tacts by other observers and non-visual sensory contacts by any person. That is, given a *real* car, people can not only see it, but potentially they can also feel it, hear the sound made by pounding on it, smell the fumes that exude from it, and experience the car-related tastes that are produced by licking it. Such confirmations rely on a general implication of *real*, . . .namely, that the verbalizer and the evocative environmental event (*car*) are related geometrically in the manner of a person's relation to any event that shares in defining a visually appreciable, external, environmental venue for that person. Navigation, via that geometry, by that verbalizer toward that car to any degree of proximity is implicitly a theoretical possibility.

The foregoing discussion presents a substantial amount of detail about the evocatives that shared in controlling the verbalizer's relatively simple report ("*I see a real car*"). In responding to this modestly enhanced form of the otherwise basic tact *car*, a mediator is much more likely to be effective than would progressively be the case were parts of that report successively to be stripped away leaving, finally, only the raw tact *car*.

From this simple analytical exercise, we gain some insight into the substantial help that, as listeners, we get from the familiar forms and conventions of linguistic expression. That, of course, is precisely why each of us, as a member of our own verbal community, shares in conditioning people to speak in the proper form of whatever language is native to that home community. "Proper form" alludes mainly to a variety of enhancements that indicate to a listener the various controls that have shared in evoking the more fundamental elements of a vocalizer's statements. Language development is thus driven by the behavior-controlling function of the linguistic products. The form of a basic utterance is typically insufficient to maximize the reinforcing qualities of a mediator's response. Progress toward that outcome tends to accrue from linguistic additions by the verbalizer that indicate the kind and nature of each function through which that basic utterance is manifesting.

The Absence of Thinking

Vocal behavior does not necessarily require mediation by thought (i.e., covert behavior, verbal or otherwise, may

not share in evoking it). In some cases vocal behavior may be verbal behavior that is occurring under direct stimulus control of certain environmental events. Suppose that a person who is familiar with flags and is looking for flags suddenly contacts a flag. If that person then exclaims *A flag!*, that individual has not necessarily experienced any thinking as a functional aspect of that utterance.

That may not be true if the verbalizer and mediator speak different native languages, and the verbalizer, not being fluent in the mediator's language, must first self-probe for the translation of the initial response before vocalizing it. In the presence of such a mediator, an initial statement by the vocalizer is likely to be produced privately. That version, in the presence of a foreign speaking mediator who serves as a function-altering stimulus, may then evoke various translation operations after which it is the privately translated version that then evokes its audible vocalization.

A vendor who sells floor tiles may ask each customer the size of each room that is to be tiled, to which many customers may reply by referring to the length of one side of the room (e.g., *Oh! I'd say it's about nine feet on a side*). An experienced tile salesperson may be so accustomed to such statements by customers, that the salesperson can respond directly to any such statement with an audible vocalization of the corresponding area of the floor of the room.

With respect to the current example, as soon as the customer says *nine*, the salesperson would respond directly with *81 square feet.*, a response that requires no mediating thought. For that sales person each number representing the feet measured along one side of a room directly evokes the audible number that represents its squaring. With additional experience, such salespersons may even become capable of responding directly with the square yardage that would be covered by tile (one ninth of the square footage) without the evocation of any private mediating verbal mathematical operations. Thus, a statement *81 square feet* would directly evoke the statement *nine square yards*.

Most people mistakenly assume that a salesperson has an inner self that proactively performs the calculations in some mysterious way. In this case people would tend to say of such salespersons' selves have become so skilled at that sort of thing that their calculations are occurring too rapidly for any kind of step-by-step account even if one could be privy to the fleeting ongoing operation. Thus, things that are not happening are conveniently said to be happening too fast to be noticed.

On the other hand, a novice salesperson may first have to exhibit one or more mathematical operations before the final response can occur. In that case, the customer's statement cannot directly evoke the response *nine square yards* or even *81 square feet.*, but such a statement probably can evoke a private subvocal multiplication of the kind that squares the given linear dimension (i.e.,

nine feet times nine feet is 81 square feet). The subvocal outcome of that operation (*81 square feet*) then evokes an audible vocalization of that subvocal response.⁵

Because the general conditioning of mathematical operations typically involves concurrently written copies on paper or chalkboards, the subvocal rendition of a currently applied mathematical operation may evoke concurrent private images of the numerical operations as one would write them. When the audible vocalized result emerges, the prevailing evocative stimulus for that utterance may be unclear. Is it subvocal speech or some privately visualized numerical text?

A customer may indicate autoclitically that the controls on the quantity *nine-feet* are weak (i.e., ...*it's about nine feet on a side*). That indication of weakness may then, in turn, evoke indications of corresponding weakness in the controls on the salesperson's reply (e.g., *Then that room will take about 81 square feet of tile*).⁶

Nonverbal Consciousness

Private verbal behavior is verbal because the particular responding that is occurring privately represents behavior that was originally conditioned through consequence provided by members of a verbal community who at that time had access to it. Those consequences, during the original conditioning, were supplied directly or indirectly through the verbal practices of those community members. Once conditioned, such verbal behavior can then reoccur privately whenever its evocative stimuli are encountered. If the verbalizer is the only potential mediator of an utterance, the occurrence of a subvocal version is usually a matter of simple economy.

Consider a manifestation of such previously conditioned private verbal behavior: Upon contact with a coherent set of environmental stimuli, one may experience a recognition response such as the tact *tree*, the manifestation of which is often said to represent the person's knowing that a contacted environmental stimulus is a tree. That tact, in turn, may stimulate various additional tree-related thoughts. If the initial verbal response to this particular tree is reiterated as a recurring aspect of additional private verbal behavior that the initial response has initiated, that train of private responding is said to remain pertinent to this particular tree. Typically, it is said incorrectly that the person is thinking about that tree. More correctly, the natural occurrence of such a train of private thought shares in defining *the person*. Such thinking is not a product of an independently existing person that has the mystical capacity to *do* that kind of thinking proactively. That is backwards; the person *is* that thinking, not a mystical agent who *does* it.

The linguistic elements of such private tree-related behavior were conditioned earlier when members of the verbal community were present to provide appropriate conse-

quences in a precise way. Now, in the absence of such an audience, the person's private verbal behavior in the presence of a similar tree, occurs in the previously conditioned verbal forms that are characteristic of that verbal community.

However, suppose that the person's original contacts with trees occurred in the absence of members of a verbal community, perhaps because the individual is a member of a nonverbal species. In that case, any consequences of private neural responding would have to manifest naturally without ever having been mediated by a verbal community. For instance, if a private response such as the vision of a prey animal evoked overt action from a predator, the natural consequences of that overt action would indirectly consequate those private behavioral links in the causal chain, again naturally. Thus, it is possible that a kind of awareness and perhaps nonverbal thought-like activity could arise naturally as nonverbal behavior. For example, for a non-human predator, the scent of a prey animal is normally closely associated with the vision of the prey on occasions when prey is closely contacted. On the basis of such prior stimulus pairings, it is logical to assume that the mere scent of a prey animal could directly evoke a vision of a prey animal by a predator when the prey is not yet in the predator's visual range. The plausibility of that speculation is enhanced by the fact that this also happens to humans, although they, unlike the nonverbal predator animal, can also respond verbally.

Such primitive conscious seeing in the absence of the thing seen would have been conditioned previously by tactile, olfactory, and gustatory contacts with prey animals that were first contacted visually, perhaps already in the presence of their odors. This represents a common kind of conditioning through the pairing of stimuli (viz., respondent conditioning). In this case it is some nonverbal private neural behavior that presumably gets conditioned. Once in place the relation can work backwards. That is, the odor of a familiar prey animal may evoke a vision of the prey when no looking behaviors will contribute to such a result.

For a predator, such odor-evoked visions of virtual prey would presumably evoke additional and possibly more focused sniffing responses, and any resulting olfactory reactions could lead to better vectored motor behaviors that shorten the distance between predator and prey. The odor-evoked vision of the virtual prey may also evoke a visual sequence of the behaviors of such prey on previous occasions thus affording the predator a preview of the prey's potential avoidance and escape behaviors as the present episode progresses. By virtually seeing what the prey may do when it detects the approaching predator, the predator's approach may be controlled in ways that propitiously postpone detection by the prey. Note, however, that no verbal community nor verbal practices would have been involved in the conditioning nor in the

subsequent occurrences of that class of awareness or consciousness. It would all occur nonverbally, but still naturally, and presumably does so in the case of nonverbal animals, . . . a speculation bolstered by the fact that such relations are characteristic of human behavior.

While the well conditioned nonhuman predator may be seeing an absent rabbit in response only to a scent, the tact “rabbit” could not emerge. As a nonverbal predator moves in the direction from which the odor of the prey is wafting, it cannot reiterate in verbal form a principle of rabbit behavior such as “*chased rabbits tend to circle back to the area from which the chase began.*” The nonverbal predator could not have produced such a generalized verbal principle on the basis of its accumulating experience nor could it have mastered such a principle through a verbally mediated training curriculum.

However, the nonverbal predator could perhaps imagine, in the form of private visualizations, routes followed during previous rabbit chases. As a result of their respective covert neural behaviors, both human and nonhuman pursuers may abort the direct pursuit of an out-of-sight rabbit and veer laterally—a move that could intercept the rabbit as it circles back toward the site where the chase began. While both species of predator could exhibit such hunting skill to a degree that we would deem effective, the human, with its capacity for verbal behavior, could theoretically undergo the necessary conditioning with greater efficiency—an advantage of the verbal kind of behavior of which the nonhuman counterpart is incapable.

In general, verbal behavior contributes a class of supplementary antecedent controls that tend to (a) insure quicker manifestations of new nonverbal behavior, and (b) alter the form of the behavior that it shares in controlling in ways that render that behavior more efficient and effective. Thus, with verbal behavior in the mix, behavioral conditioning tends to proceed more rapidly and to greater effect. With respect to behavior-related conditioning, verbal behavior functions as both an accelerator and a refiner.

The Selection and Control of Verbal Behavior

Verbal behavior is operant and is therefore selected by its consequences for survival or elimination across future occasions. Once a verbal response manifests, it can function antecedently to yield additional behavior, which can include either operant or respondent behaviors or both. If operant, the behavior may be either verbal or nonverbal. The subsequent behavior that a verbal response produces may be that of the verbalizer, or it may be the behavior of others whether they are human or nonhuman. That is, verbal behavior can affect the subsequent behavior of the body that produces it or the body of another organism.

This range of behavior-affecting possibilities defines the range of environmental effects that verbal behavior can pro-

duce. The affected organisms define the *functional* verbal community of a specific verbalizer, while the *potentially* affectable organisms define the verbal community at large in which not all members may be affected directly or immediately by a specific instance of verbal behavior by a member.

The organisms whose behavior is affected by a verbal response of a single organism are behaving differently as a result of the share of the control over their behavior that has been contributed by the verbalizer’s response. People often react to that difference in their behavior by saying that they *have been affected by what the speaker had to say*. Their different behavior (different because of the verbalizer’s response among its antecedent controls) provides consequating stimuli to the verbalizer, either as direct properties of their responding or as properties of its products. That is, the verbalizer is consequated either directly by a mediator’s behavioral response or by the environmental effects of that response.

That consequating stimulation, feeding back to the verbalizer, may strengthen or weaken that form of verbal response, as revealed across future occasions. In the case of vocal behavior, people may say that those consequences have rendered the verbalizer more or less likely “to say that again.” If they assume that the verbalizer is operated from within by a mystical self-agent, they may conclude that the self-agent has *learned* something about what to direct its host body to say or not to say on such occasions. However, operant conditioning does not validly imply the presence of a spirit that is benefiting from a lesson. Behavioral conditioning, respondent or operant, whether contrived or adventitious, is a natural process in which some neural microstructuring is altered through behavioral operations and thus reacts differently on future occasions. Such an accounting affords a more valid definition of *learning* that relies on recourse to both the behaviorological and the physiological levels of analysis.⁷

When the behavior that is changed by the verbalizer’s response is effective from that verbalizer’s perspective, the consequating stimuli are reinforcing in proportion to that effect. The particular verbal response is thus operantly selected for repetition in the sense of becoming more likely in the presence of its antecedent stimuli on future occasions. Its selection is verified by its more frequent occurrence on similar occasions in the future, and it will often manifest on those occasions with increasing resolution and energy. That is how all language skills are acquired.

If some particular form of verbal behavior continues to occur reliably in that selective way, the increasing strength of that verbal behavior may be indicated in part by the fading of any autoclitic enhancements that indicate that its controlling function is weak, tentative, or otherwise ill-defined. For instance, the student who has been saying that the correct verb form in a particular context “*could be . . . will-have-been-going-to-run . . .*” may then begin say-

ing that the correct verb form in that context “*is ... will-have-been-going-to-run...*” An assertive autoclitic (*is...*) comes to replace a qualifying autoclitic (*could be...*), and does so in response to the increasing strength of the functional control that the environmental context exerts on the specification of that particular verb form.

Once the relation between a part of the environment and an element of language is strengthened so that that behavioral linguistic element manifests reliably on occasions of contact with that particular subset of the environment, that linguistic feature can then be put under stimulus control of a broader range of environmental stimuli. That occurs responsively when additional features of the environment are reliably contacted along with those features that currently evoke the behavior by which the linguistic element manifests. Thus, while language is acquired operantly, its antecedent controls are broadened responsively, and both the operant conditioning and the respondent conditioning feature entirely natural functions. That is, with respect to verbal behavior, both kinds of conditioning occur through natural functions. Both kinds of conditioning can happen as an aspect of the natural interactions of people within a verbal community and without the benefit of contrived human intervention. However, both kinds of conditioning are also made to occur through the kind of contrivances to which we refer collectively as *instruction*.

The Implications of Ineffective Knowing

The analysis of verbal behavior from a natural science perspective controverts some of the most traditional and essential assumptions upon which basic aspects of traditional human culture rely. As that analysis proceeds, it can seem to persons who are heavily invested in those superstitious assumptions that the worthiness of their culture, including the very essence of humanity, is being stripped away, and for those people, it is. However, theirs is an invalid and unrealistic concept of nature, of human beings, and of human behavior.

Their heavy explanatory reliance on the superstition that has overtaken them leads often to mistakes, many with horrible implications for human well-being. The proposition that humanity is best protected and optimally nourished by substantial investments and protracted indulgences in superstitious fictions about the nature of nature is incredible to people whose distrust of superstition is a by-product of their scientific maturity. The well-being of any kind of organism results from its effective control over the environment. The extent and effectiveness of that control depends on intervening accurately and precisely in ongoing natural functions, a kind of operation that tends to be facilitated by accurate descriptions of all relevant phenomena.

Falling victim to superstition affords one approach to knowing, but it fosters unreliable verbal behavior, much

of which may be fraught with dangerous implications for the human condition. A prime example is the simplistic notion that private verbal behavior represents the manifestation of a body-managing spirit. That fundamental and long perpetuated analytical error is of ancient origin. That basic notion along with its compounding implications contribute to the invalid conceptual matrices of cultures whose members, because of those invalid conceptual foundations, remain susceptible to unnecessary tribulation. Such cultures may even confront disintegration. Such a calamity may occur through the ravages of neglected environmental factors that potentially could have been brought under effective control. It may also be of social origin as strife mounts between those who are blindly controlled by superstitious rules and those who are wrenched from the grip of superstition by the intruding implications of reality.✻

Footnotes

- ¹ People do not spontaneously initiate *any* of their own behaviors, whether public or private. The putative capacity to do so is a fictitious cultural endowment. In nature, *nothing* happens spontaneously. *Spontaneous* is an adjective of ignorance. It indicates that its verbalizer is not, and perhaps cannot, specify the independent variable(s) in the functional relation(s) through which the specified dependent variable is manifesting.
- ² This common way of speaking about contact with a pencil sharpener occurs in response to a neural sensation in reaction to the neurally transmitted arrival of an increment of energy from elsewhere. The neural sensation may take the form of a particular kind of vision, sound, feel, taste, or odor to which the individual has been conditioned to emit a variety of interpretive responses that collectively constitute the manifesting reality of a “contacted” pencil sharpener. Much of the further discussion in this section will be cast in common terms of a behavior-controlling environment with an endowment of intrinsic reality rather than a reality grounded in the inferential behavior of those said to be appreciating that environment.
- ³ A possible exception to this principle of energy insufficiency in environment-body contacts may be an individual’s thought-to-thought functions, in which the environmental stimulus and the response are both neural behaviors that occur in proximity. The idle flow of thoughts from one to another can seem to occur readily and without detected energy drain. However, when the train of thought fails to lead to a conclusion in a previously specified class, and self-probing is necessary to “keep the train of thought moving in a productive direction” (as they say), the

energy drain from the bodily reserves becomes more readily detectable. At that point the process tends to be described as “serious thinking” and, in response to that increased energy drain, is said to have become more “difficult.” A more complete account may require contributions from the neural physiologists.

⁴Such a person is called a *box designer* because of a conditioning history that has strengthened a repertoire of operations such as cutting, trimming, folding, and calculating, each occasioned by certain sets of stimuli and conducted in accordance with economic criteria. The appropriate elements of that repertoire are evoked by aspects of each stage of the box production. The behaviors in such a repertoire are not stored in mental archives within the designer, but are produced anew at each manifestation. The only enduring reality of such a “repertoire” is the structural capacity of the designer’s body to produce those specific behaviors as reactions to certain environmental stimuli. Our term for the operations that result in such neural microstructuring, is *conditioning*. The conditioning process may be contrived, or it may occur more naturally.

⁵A common inference is that such salespersons *have to work it out in their heads*, but any occurring mathematical operations are simply evoked by certain aspects of the ongoing events. An explanation that summons forth a mathematically skilled mental agent that proactively or initiatively performs such

necessary operations represents an exercise in redundancy and perpetuates a fundamental fallacy.

⁶In the context of this salesperson’s reply, the initial word *then* is an autoclitic that is equivalent to a prepositional clause that would function adverbially—namely, *to the extent that your estimate of the length of a side of the room is correct...*

⁷The term *learning* tends to imply the presence of an inner agent that learns in accordance with its predilections. Although the term *learning* can be redefined behaviorologically—usually in terms of the process of operant conditioning and in some cases respondent conditioning—the term *learning* seldom appears in behaviorological literature or discourse where it is usually regarded as too misleading or as an unnecessary obfuscation of what is often simple and always straightforward behavioral conditioning.

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