

Post-session Verbal Reports and the Experimental Analysis of Behavior

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Experimental analyses of the performance of verbal subjects often include verbal reports, obtained during post-session interviews, about within-session covert verbal behavior (e.g., hypotheses about the contingencies). But such post-session reports are not necessarily accurate, and procedural details of how the samples were obtained are typically inadequate. Even when the post-session reports are accurate, the within-session hypotheses do not have the status of causes of within-session nonverbal performance. In an experimental analysis, it is important to treat such reports as instances, not causes, of behavior.

Behavioral analyses of operant performances of nonverbal organisms typically involve descriptions of antecedent stimuli, consequences, and the relations of these to the organism's behavior. Accounts of the performance of verbal organisms (e.g., college students) are likely to include an additional dimension: consideration of either observed or hypothesized verbal processes. Concern for subjects' verbal behavior is justified for two good reasons. First, so much important human behavior is either primarily or exclusively verbal that no complete account of human behavior can ignore the verbal component. Second, verbal behavior may play a role even in nonverbal behavior, so that even accounts of *nonverbal* performances must address the complexity added by the subject's verbal behavior.

Experimental analyses that follow from the first of these concerns focus on verbal behavior as a response class of particular significance. Issues addressed by such analyses are important: what are the fundamental classes of verbal operants, how do they function, how do they interact, and how are they eventually synthesized into such complex instances of verbal behavior as "No black scorpion is falling upon this table." Skinner's seminal *Verbal Behavior* (1957) provided a framework for such analyses, although it appears to have occasioned more vituperative discussion than empirical research.

But verbal behavior is so pervasive that even accounts of *nonverbal* behavior seem incomplete without some examination of verbal events (perhaps because our thinking about nonverbal behavior is itself verbal). In laboratory settings, the verbal contribution to nonverbal behavior may be an inevitable by-product of our experimental protocols; both the response and the reinforcer are typically established by instructions.

Traditional behavior analytic tactics suggest procedures for examining the role of verbal behavior in the acquisition and maintenance of nonverbal repertoires. For example, one might systematically vary properties of instructions (e.g., Shimoff, Matthews, & Catania, in press), or restrict the opportunity for verbal responding (Lowe, 1979), or explicitly manipulate verbal behavior during experimental sessions (e.g., Catania, Matthews, & Shimoff, 1982).

An alternative approach adopted by some investigators to assess the role of verbal behavior is to rely on post-session verbal self-reports to gain access to subjects' within-session verbal behavior.

These two approaches—experimental manipulation and post-session interviews—are not mutually exclusive, and many experiments have incorporated both. There are, however, potentially serious conceptual problems in the analysis of post-session verbal reports. About half of the papers examining the behavior of adult humans published in *Journal of the Experimental Analysis of Behavior* in recent years describe such post-session verbal reports. What is the

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status of these post-session verbal reports in behavior analysis?

The practice of soliciting post-session reports of within-session performance appears to follow from three implicit assumptions: (1) that verbal processes are generally (perhaps inevitably) evoked by the experimental procedures, (2) that post-session reports accurately reflect these within-session verbal processes, and (3) that the within-session verbal processes must have some causal role with respect to the nonverbal behavior observed within the session.

The first of these assumptions—that our experimental procedures generally occasion subjects' verbal behavior—is based on introspection; since we do not readily imagine ourselves failing to talk to ourselves, it is difficult for us to imagine a verbally capable subject whose verbal behavior remained unaffected by experimental procedures that arranged contingencies for nonverbal responding. Whatever our subjects may say to us or to others, we assume that they say things to themselves. But our introspections about such covert within-session verbalization must be suspect; the introspections are themselves instances of verbal behavior, peculiar only in the sense that the inaccessibility of private events to external control does not allow society to differentially reinforce the accuracy of the reports. To say that these introspections are accurate is to assert that they are controlled by the private events they are said to describe, but we have no independent way of confirming the nature of those private events.

We might suspect that some nonverbal behavior is executed without any verbal contribution. Likely candidates for purely nonverbal status are such well-practiced performances as driving a car, or the postural adjustment involved in standing upright. But evidence of the "nonverbal-ness" can come from neither the driver nor the stander. Asking the performer (or ourselves) in mid-act cannot help; the question may occasion the very verbal behavior to which it refers, and the data source would in any event remain introspective (but cf. Hayes, in press).

We could examine the performance of subjects known to be nonverbal (e.g., preverbal children, or brain-damaged adults), but problems would remain. It may be difficult

to determine the degree of verbal deficit (e.g., Devany, Hayes, & Nelson, in press). And the fact that behavior *can* occur in nonverbal subjects does not mean that it *does* remain nonverbal in verbally capable subjects; that rats press bars nonverbally does not imply that college students also press bars nonverbally.

There are other possibilities. Some experimental manipulations may have different effects on verbal as opposed to nonverbal behavior, analogous to procedures for distinguishing between rule-governed and contingency-shaped responding (e.g., Matthews, Shimoff, Catania, & Sagvolden, 1977). But until the appropriate experiments have been done, it is important to recognize that the assumption that verbal behavior is inevitably evoked as a component of nonverbal behavior remains precisely that—an assumption whose primary support is introspective.

The second assumption implicit in soliciting post-session verbal reports is that they accurately reflect the within-session verbal behavior. For the issue of accuracy, introspection is patently inadequate; we cannot fruitfully introspect about the accuracy of our introspections without descending into an infinitely regressive spiral.

A more productive way of addressing the accuracy of reports about *private* events might be to examine the accuracy of post-session reports of *public* events. There is, in fact, substantial evidence that, under appropriate conditions, subjects fail to report within-session events that we know occurred and affected performance. A classic study (Hefnerline, Keenan, & Harford, 1959; see also Laurenti-Lyons, Gallego, Chambille, Vardon, & Jacquemin, 1985) involving conditioning an invisibly small muscle twitch found some subjects unable to report their own responses or the reinforcers that maintained those responses. One might argue that an invisibly small muscle twitch is a special case, and that grosser responses would be reported more consistently. But even when the behavioral events are patently overt, subjects may fail to report the response, stimuli that occasioned the response, or even that their behavior changed during the experiment (Nisbett & Wilson, 1977; see also Smith & Miller, 1978)

Failure to report within-session events,

public or private, in a post-session interview may be the product of a variety of influences. If the temporal gap between the session and the post-session interview is sufficiently long, we might guess that the events no longer controlled verbal behavior (colloquially, that subject simply forgot what had occurred). Alternatively, the questions might have been phrased inappropriately, and different questions might have occasioned correct reports. Or, subtle contingencies and discriminative stimuli may have occasioned incorrect reports, as when a subject lies to please the experimenter.

It is thus apparent that post-session interviews may occasion reports of events that did not occur, and may fail to occasion reports of events that did occur. The correspondence between within-session performance and post-session report is a special case of verbal-nonverbal correspondence, and is clearly amenable to experimental analysis. Unfortunately, the procedural descriptions in most published studies that include post-session interviews provide almost no information on how the interviews were conducted; after many paragraphs describing such details as the manufacturer, model number, size, and color of the manipulandum, one reads "At the end of the experiment, subjects were asked . . ." How were the questions phrased? If the questions were read to the subject by the experimenter, what steps were taken to control for differences in phrasing and intonation? If the subject responded vocally, how did the experimenter avoid subtle prompts? (Requiring subjects to respond in writing to written questions limits the opportunity for such subtle experimenter bias, and allows more precise procedural descriptions.) Without appropriate details, it is impossible to assert anything about the possible correspondences between the within-session performance and the post-session report.

To examine the status of the third assumption—that within-session verbal behavior causes within-session nonverbal behavior—consider the idealized situation, in which subjects accurately and thoroughly report within-session verbal behavior. Imagine an experiment in which college students' button-presses have produced points according to a fixed-interval 60 second schedule, and that some students pressed at high rates,

and others at low rates (approximating one response per point). Assume further that, in post-session interviews, the high-rate responders reported that point deliveries depended on the number of presses (a "ratio hypothesis"), while the low-rate responders reported that points were available for the first press after 60 seconds (an "FI hypothesis"). What then might we conclude about the relations between the verbal report and the nonverbal performance?

There are at least two possibilities: (1) the subjects generated hypotheses during the experiment, (that is, the procedures occasioned covert verbal behavior) about the nature of the contingency, tested those hypotheses, covertly verbalized the contingency as either interval or ratio, and then pressed the button accordingly. Or, (2) the subjects' button-pressing came under control of the contingency (the inaccuracy of the high-rate responders presumably attributable to behavioral histories acquired before the experiment), and the nonverbal behavior occasioned the hypotheses. There are, of course, other possibilities. For example, the hypotheses may have been occasioned during the interview, rather than during the session. But we are working under the unrealistic stipulation of accurate and complete verbal reports.

Based on intuition and introspection, the first alternative is the most appealing. But such an analysis might lead to curious conclusions. We must assume that the primary effects of the contingency imposed on the nonverbal pressing acted on a completely different response class—verbal behavior—and the changes in pressing rates were only secondary effects. In fact, we might conclude that the changes in pressing rates were useful primarily as indicators of the unrecorded verbal behavior that occurred. Overt behavior might be viewed as an epiphenomenon, a by-product of mental activity, and we might find ourselves squarely among the mentalists.

The second alternative—that behavior changes occasioned the covert verbal behavior—is at least equally tenable. The verbal hypotheses could have been by-products of the contingency's effects on the nonverbal performance. The possibility that verbal reports come to correspond to nonverbal behavior has long been recognized by social

psychologists who suggested that correspondence between discrepant attitudes and behavior is often attained by attitudinal (that is, verbal) changes.

In statistics, correlations between events A and B do not imply causality; A might have caused B, B might have caused A, or both A and B might have been caused by a third event. For a behavioral analysis of the relations between within-session behavior and post-session report, however, the variety of acceptable causal relations is more limited. In the imaginary experiment involving verbal reports after exposure to an FI schedule, the assertion that pressing was caused by the hypotheses and the assertion that the hypotheses were caused by pressing are both inadequate. The behavioral analysis of such an experiment would necessarily assert that both the pressing and the verbal reports were caused by the contingencies and behavioral histories.

Post-session verbal reports are instances of behavior, not causes of behavior, and not necessarily accurate reflections of within-session verbal behavior. Within-session verbal behavior is also behavior, and not an ultimate cause of behavior. The ultimate causes of behavior—at least for a behavioral analysis—are in the environment. The goals of an experimental analysis are not served by post-session interviews obtained under inadequately specified conditions; reports of such interviews are less than useless, for they are likely to mislead, and cannot provide useful information. On the other hand, examining post-session reports as behavioral events and analyzing the relations between such reports and other response classes and

contingencies is central to the experimental analysis of verbal behavior.

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