A Classroom Demonstration of Self-Monitoring, Reactivity, and Interobserver Agreement

James E. Carr, Steven L. Taylor, and John Austin
Florida State University

A brief classroom demonstration designed to introduce students to the concepts of self-monitoring, reactivity, and interobserver agreement is presented. The demonstration provides students with opportunities to monitor their own behavior, record the behavior of others, and calculate interobserver agreement percentages. Results of using the demonstration with students from two classes are presented.

Key words: self-monitoring, reactivity, interobserver agreement, teaching behavior analysis

It has been our experience that hands-on techniques for teaching psychological concepts improve students' ability to learn the material and also provide concrete examples of their application. The purpose of this demonstration is to provide students with an opportunity to learn about self-monitoring, reactivity, and interobserver agreement in a hands-on manner. A brief review of these concepts is followed by a detailed description of the classroom demonstration.

Self-monitoring (sometimes called self-recording or self-observation) refers "to an individual's systematically observing his own behavior and responding to the occurrence or nonoccurrence of a specified target response" (Cooper, Heron, & Heward, 1987, p. 524). Self-monitoring has been called "the lifeblood of effective self-control methods" (Thoresen & Mahoney, 1974, p. 41) and has been widely researched and utilized in the applied behavioral literature (e.g., Broden, Hall, & Mitts, 1971; Lipinski, Black, Nelson, & Ciminero, 1975; Maletzky, 1974; McFall, 1977). An individual can monitor his or her own behavior as a means of assessment or

intervention. As a method of assessment, self-monitoring provides the behavior analyst with a dependent measure on which to base treatment decisions or evaluate treatment effectiveness (Thoresen & Mahoney, 1974). Because self-monitoring often results in desired behavior change, it can also serve as a form of treatment (e.g., to help students pay attention in class, Kneedler & Hallahan, 1981; to decrease aggression, Lovitt, 1973; to stop nail biting, Maletzky, 1974). It is important for the behavior analyst to understand the complexities and benefits of self-monitoring in order to ensure maximum behavior change.

Reactivity is the "process by which clients' behaviors change because the clients know they are being observed" (Spiegler & Guevremont, 1993, p. 520). For example, a classroom observer might influence student behavior simply by being in the room with a recording apparatus. Reactivity is typically a negative side effect that may occur during behavioral observations. It is imperative that behavioral observers understand reactivity and take measures to counter, assess, or take advantage of it. In general, the more obtrusive the observation procedure and measurement system, the more reactivity will occur (Kazdin, 1974). Observer obtrusiveness has been demonstrated to create reactivity such that data collected obtrusively often bear little or no relation to those collected unobtrusively.

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Reprints may be obtained from the first author at Department of Psychology, Florida State University, Tallahassee, Florida 32306-1051.

ly (Kazdin, 1979). The within-subject research design allows for the elimination of reactivity (if so desired by the experimenter) in data-collection procedures as a plausible alternative hypothesis to independent-variable effects. This is achieved through the acquisition of a stable baseline measure of the behavior before intervening and maintenance of the measurement system through the treatment phase (Baer, Wolf, & Risley, 1968).

When reactivity is an uncontrolled source of variation in the data, it is unwanted. When reactivity is produced under controlled conditions, however, it can also be a positive and useful phenomenon to the behavior analyst. Self-monitoring was originally an attempt to have the client simply collect data regarding his or her own behavior. However, its reactive effect on behavior has led it to become a very popular treatment because most behavior change as a result of self-monitoring is in the desired direction (Cooper et al., 1987).

Interobserver agreement refers to the extent to which two or more independent observers agree on the occurrence of some dependent measure (Sulzer-Azaroff & Mayer, 1991). Baer (1977) notes that rather than envisioning some "true reliability" (p. 117) that has an existence somewhere in reality but has to be estimated appropriately by scientists, applied behavior analysts rely on the very practical notion of how often "two observers watching one subject, and equipped with the same definitions of behavior, see it occurring or not occurring at the same standard times" (p. 118). Interobserver agreement is one of the most important methodological procedures in applied behavior analysis because in order for the data to be believable, they must be reliable (Johnston & Pennyacker, 1992).

The following classroom demonstration provides each student with an opportunity to monitor his or her own behavior, observe and record the behav-

ior of other students, and calculate interobserver agreement percentages.

HOW TO CONDUCT THE DEMONSTRATION

Begin by explaining to your students that they will be participating in a classroom demonstration in which they will encounter three important concepts. Although these are independent concepts, this one activity will provide a good demonstration of each. Next, present a short lecture on the definitions, uses, and examples of self-monitoring, reactivity, and interobserver agreement.

Self-Monitoring

Instruct students to count the frequency of their own eye-blinks for 2 min. Students can mark a simple tally of the number of eye-blinks on a sheet of paper. (You may want to develop a recording sheet to hand out to the class beforehand to record the self-monitoring, reactivity, and interobserver agreement scores.) Use a stopwatch, time the 2-min period, and cue students when to begin and stop self-monitoring. Do not attempt to develop an operational definition of an eye-blink at this time. If students should inquire about the definition of an eye-blink, tell them to use what they consider to be an eye-blink. After the 2 min are up, have the students calculate the rate by dividing their total frequency by two.

Inform the students that the average person blinks between 20 and 30 times per minute (Schiffman, 1990), and if their data fall within this range, it is possible that self-monitoring did not change their behavior. Scores outside of this range, however, might have been affected by the self-monitoring procedure. Ask the students to raise their hands if they felt that the procedure did, in fact, change their eye-blink frequency (i.e., if their scores were above or below the average). Chances are you will have students who report that they felt awkward monitoring their own behavior, that they blinked their

eyes much faster than normal, or they experienced an almost total suppression of eye-blinking. This provides a chance to discuss the implications of such changes in the target behavior for self-monitoring as an assessment method or as a treatment procedure.

Reactivity

Ask the students to form groups of three, turning their desks so that each student is facing toward the other two students in the group with approximately equal spacing between the desks. Have each group choose one student whose eye-blinks will be counted by the other two. After the two students observe and tally the eye-blink frequency of the third for 2 min (using the same method of timing as described for self-monitoring), have the students rotate twice so that each student is observed by the other two. After all three students in each group have been observed, ask the students to compare the scores recorded by their peers to the previous self-monitoring session, as well as to the approximate norm (20 to 30). Once again, ask students to raise their hands if they experienced a behavior change in this reactivity session. Discuss the implications of this change as they relate to the implementation of obtrusive and unobtrusive recording procedures. (Discussion of other variables that might account for changes in the frequency of eye-blinks, such as fatigue or practice effects, may also be warranted.)

Interobserver Agreement

In this phase of the demonstration, have the students calculate the interobserver agreement percentages from the reactivity phase of data collection. Interobserver agreement for frequency data is calculated by dividing the smaller number by the larger number and multiplying by 100% (for a discussion of other common methods of calculation, see Repp, Deitz, Boles, Deitz, & Repp, 1976). For example, if

two students recorded the third student's eye-blinks as 40 and 50, the interobserver agreement would be 80% [$(40 \div 50)100\%$]. If a recording form has been provided to students, appropriate visual prompts may be given on the form to guide calculation.

The purpose of interobserver agreement when collecting behavioral data is to answer the question, "Is that what I would have seen if I had been there?" (Hawkins & Fabry, 1979, p. 545). Discuss the utility of interobserver agreement measures in this exercise and in applied behavioral research. Compare the students' interobserver agreement results with the conventional standard of 80% for the acceptance of agreement percentages (Hersen & Barlow, 1976). Problems in getting acceptable agreement percentages may be due to observer drift, complexity of the observation system, and observer expectancies and feedback (Kazdin, 1977). These influences can be discussed in relation to problems encountered by the students. The possibility that students who recorded the same frequency may have counted different instances of the target behavior should also be discussed.

Students frequently report that problems with interobserver agreement occurred due to the ambiguous definition of an eye-blink, the blocking of someone's vision, or the observer momentarily looking away. Most will also report a feeling of uneasiness in looking at someone, or being looked at, for a 2-min interval. Further activities could include an individual or group assignment to develop a clear operational definition of an eye-blink and a description of how to better arrange the observation to minimize other problems (e.g., using smaller observation intervals). Students can be asked to apply what they have learned about operational definitions, self-monitoring reactivity, and interobserver agreement to a real-world situation, such as conducting observations in an elementary classroom. This could be followed up with assignments outside of class in the

TABLE 1

Frequency of student eye-blinks during each 2-min phase of the demonstration

Student	Baseline	Self-monitoring		Reactivity		
		Frequency	Change from baseline (%)	Frequency	Change from baseline (%)	Inter-observer agreement (%) ^a
1	43	78	+35 (81)	67	+24 (56)	96
2	79	63	-16 (20)	54	-25 (32)	100
3	20	24	+4 (20)	14	-6 (30)	100
4	83	45	-38 (46)	13	-50 (60)	86
5	35	20	-15 (43)	25	-10 (29)	92
6	27	29	+2 (7)	25	-2 (7)	79
7	28	27	-1 (4)	23	-5 (18)	97
8	34	33	-1 (3)	29	-5 (15)	73
9	33	33	0 (0)	47	+14 (42)	59
10	44	17	-27 (61)	14	-30 (68)	75
11	67	16	-51 (76)	30	-37 (55)	88
12	20	17	-3 (15)	11	-9 (45)	100
13	56	33	-23 (41)	30	-26 (46)	94
14	40	35	-5 (13)	30	-10 (25)	77

^a Percentage agreement between the observations made by two other students.

application of these procedures and reporting of the results.

RESULTS

We have conducted this demonstration with two undergraduate classes: Introduction to Applied Behavior Analysis and Business Psychology. The students had previously been presented lectures and read textbook chapters on behavioral observation and measurement methodology. As an additional component of the demonstration, we selected 14 students from the two classes and videotaped them during a lecture. Both classes had been videotaped previously and the students were not told what the camera was for. Later, the eye-blink frequencies of the 14 target students were recorded from a 2-min videotape sample. These results are presented in Table 1 (baseline). The standard demonstration does not include this videotaped baseline component, because it is a very labor-intensive extension. We thought, however, that it would be useful to report the actual student baselines instead of using the approximate norm.

Self-Monitoring

In the self-monitoring phase, three students experienced an increase in eye-blink frequency from baseline. The average increase was 36% (range, 7% to 81%). Ten students experienced a decrease in eye-blink frequency from baseline. The average decrease was 32% (range, 3% to 76%). One student experienced no change from baseline. Overall, self-monitoring decreased the eye-blink frequencies of the students. However, there were a few students whose eye-blink frequencies increased. This difference would make a good class discussion of the role of reactivity in self-monitoring.

Reactivity

In the reactivity phase, two students experienced an increase in eye-blink frequency from baseline. The average increase was 49% (range, 42% to 56%). Twelve students experienced a decrease in eye-blink frequency from baseline. The average decrease was 36% (range, 7% to 68%). All students experienced a behavior change due to

reactivity. However, there were still students who deviated from the normative behavior decrease. Once again, this difference would make a good class discussion of the role of reactivity in promoting and assessing behavior change.

Interobserver Agreement

The average interobserver agreement score was 87% (range, 59% to 100%). This could be discussed in class as a publishable agreement score, although 5 of the 14 students reported interobserver agreement percentages below the accepted 80% standard. A class discussion of these low agreement percentages and why they occurred would aid students' understanding of interobserver agreement.

Student Opinions and Evaluations

The students who participated in this demonstration were asked to evaluate the demonstration. Overall, there were no negative comments about the demonstration. Comments included, "This was very helpful. After doing the actual calculations, I understood how to find agreement much better. I believe this example was great for showing that self-monitoring can have a significant impact on a certain behavior." "Demonstrations in class that are real life make information stay in my memory." "I really liked the experiment. I understand the concepts better since I was an observer and an observee." "Being monitored certainly impressed upon me that watching/observing someone may alter their behavior."

CONCLUSION

This simple classroom demonstration can help to teach the concepts of self-monitoring, reactivity, and interobserver agreement by engaging students in observational behaviors that produce effects they can analyze. The activity is easy to conduct, and students seem to enjoy it. The entire demonstration takes less than 20 min to

complete and should prove to be a useful adjunct to instruction on behavioral observation and measurement methodology.

REFERENCES

- Baer, D. M. (1977). Reviewer's comment: Just because it's reliable doesn't mean that you can use it. *Journal of Applied Behavior Analysis*, 10, 117-119.
- Baer, D. M., Wolf, M. M., & Risley, T. R. (1968). Some current dimensions of applied behavior analysis. *Journal of Applied Behavior Analysis*, 1, 91-97.
- Broden, M., Hall, R. V., & Mitts, B. (1971). The effect of self-recording on the behavior of two eighth-grade students. *Journal of Applied Behavior Analysis*, 4, 191-199.
- Cooper, J. O., Heron, T. E., & Heward, W. L. (1987). *Applied behavior analysis*. Columbus, OH: Merrill.
- Hawkins, R. P., & Fabry, B. D. (1979). Applied behavior analysis and interobserver reliability: A commentary on two articles by Birkimer and Brown. *Journal of Applied Behavior Analysis*, 12, 545-552.
- Hersen, M., & Barlow, D. H. (1976). *Single case experimental designs: Strategies for studying behavior change*. New York: Pergamon Press.
- Johnston, J. M., & Pennypacker, H. S. (1992). *Strategies and tactics of behavioral research* (2nd ed.). Hillsdale, NJ: Erlbaum.
- Kazdin, A. E. (1974). Self-monitoring and behavior change. In M. J. Mahoney & C. E. Thoresen (Eds.), *Self-control: Power to the person* (pp. 218-246). Monterey, CA: Brooks/Cole.
- Kazdin, A. E. (1977). Artifact, bias, and complexity of assessment: The ABCs of reliability. *Journal of Applied Behavior Analysis*, 10, 141-150.
- Kazdin, A. E. (1979). Unobtrusive measures in behavioral assessment. *Journal of Applied Behavior Analysis*, 12, 713-724.
- Kneedler, R. D., & Hallahan, D. P. (1981). Self-monitoring of on-task behavior with learning disabled children: Current studies and directions. *Exceptional Education Quarterly*, 2(3), 73-82.
- Lipinski, D. P., Black, J. L., Nelson, R. O., & Ciminero, A. R. (1975). Influence of motivational variables on the reactivity and reliability of self-recording. *Journal of Consulting and Clinical Psychology*, 43, 637-646.
- Lovitt, T. C. (1973). Self-management projects with children with behavioral disabilities. *Journal of Learning Disabilities*, 6, 138-150.
- Maletzky, B. M. (1974). Behavior recording as a treatment: A brief note. *Behavior Therapy*, 5, 107-111.
- McFall, R. M. (1977). Parameters of self-monitoring. In R. B. Stuart (Ed.), *Behavioral self-*

- management* (pp. 196–214). New York: Bruner/Mazel.
- Repp, A. C., Deitz, D. E., Boles, S. M., Deitz, S. M., & Repp, C. F. (1976). Technical article: Differences among common methods for calculating interobserver agreement. *Journal of Applied Behavior Analysis*, 9, 109–113.
- Schiffman, H. R. (1990). *Sensation and perception: An integrative approach* (3rd ed.). New York: Wiley.
- Spiegler, M. D., & Guevremont, D. C. (1993). *Contemporary behavior therapy* (2nd ed.). Pacific Grove, CA: Brooks/Cole.
- Sulzer-Azaroff, B., & Mayer, G. R. (1991). *Behavior analysis for lasting change*. Fort Worth, TX: Harcourt Brace Jovanovich.
- Thoresen, C. E., & Mahoney, M. J. (1974). *Behavioral self-control*. New York: Holt, Rinehart, & Winston.