

*PREPARING TOMORROW'S BEHAVIOR-ANALYTIC RESEARCHERS:
A REVIEW OF RESEARCH METHODS IN APPLIED
BEHAVIOR ANALYSIS BY JON BAILEY AND MARY BURCH*

JENNIFER L. AUSTIN

UNIVERSITY OF SOUTH FLORIDA

Although there are many books about behavioral research methods, there are very few guidebooks. This review describes a book by Jon S. Bailey and Mary R. Burch that has been written specifically as a guide for the new researcher. Replete with helpful tips on navigating the research process, the book is organized into 10 sequential research steps that guide the reader through each phase of conceptualizing, conducting, and analyzing an applied study. Although not as detailed as other texts with regard to the specifics of methodology, this book is reader-friendly and accessible to both undergraduates and graduate students who are beginning the process of becoming applied behavior-analytic researchers.

DESCRIPTORS: research methods, single-subject design, graduate training, undergraduate training

Although the behavioral textbook market includes a number of high-quality publications on behavior-analytic research methods (e.g., Barlow & Hersen, 1984; Johnston & Pennypacker, 1993; Kazdin, 1982; Poling, Methot, & LeSage, 1995), it has been somewhat difficult for the beginning researcher to find straightforward, step-by-step instructions for conducting applied single-case studies. Bailey and Burch have filled this gap with their book entitled *Research Methods in Applied Behavior Analysis*. Written in a handbook format, the authors guide new researchers through the behavior-analytic research process in manner that is logical, clear, and easily readable.

Poling et al. published a similar book in 1995, complete with guidelines for conducting research, that was targeted toward novice researchers. However, Poling et al. covered a wider range of research areas (basic and applied) as well as between-subjects designs and statistical analysis of data. Bailey

and Burch focus their efforts squarely on research arising from real-world problems, the use of basic single-subject designs, and consideration of issues specific to those endeavors. Narrowing the scope of their book has allowed Bailey and Burch to analyze comprehensively the entire process of applied behavior-analytic research and to include details that cannot be found in any other textbook (e.g., how to manage data collectors, the importance of building rapport with the research site staff, etc.). Although some of the suggestions and considerations provided by the authors might appear blatantly obvious to the seasoned researcher (e.g., make sure your participants are people who have a record of good attendance at the site, the researcher must provide the motivation for data collectors to do their jobs well, etc.), the obviousness of these factors is exactly what makes them so likely to be overlooked in the researcher training process. It is clear that failing to consider such things can have disastrous effects on the final outcomes of a study. Bailey and Burch allow new researchers to avoid some costly contingency-shaped behavior by providing a clear and organized

Address correspondence to Jennifer L. Austin, who is now at the Department of Psychology, California State University Fresno, 5310 N. Campus Dr., M/S PHII, Fresno, California 93740 (e-mail: jaustin@csu.fresno.edu).

set of rules for conducting solid applied research.

“Part One: What is Applied Behavior Analysis Research?” provides the reader with an overview of operant research and a brief history of “methodological milestones” that led to the creation of the *Journal of Applied Behavior Analysis (JABA)*. The authors subsequently describe the seven dimensions of applied behavior analysis (Baer, Wolf, & Riskey, 1968) with clear definitions and relevant examples. They also describe why attention to each of these dimensions is crucial for sound applied behavior-analytic research.

“Part Two: Research Methods in Applied Behavior Analysis” is divided into 10 chapters that each deal with separate steps in the research process. Step 1 addresses selecting a topic, finding a setting, and choosing appropriate participants. Consistent with the book’s focus on real-world research, the authors suggest that a good way to find a research topic is to identify problems that need to be solved in some applied setting. However, they are quick to point out that not all settings in which problems occur turn out to be good settings to conduct research. To help the reader identify whether a particular setting would prove to be an appropriate environment for a study, Bailey and Burch describe the characteristics of good research settings as well as the characteristics of good participants. These descriptions offer useful guidelines to help researchers avoid many of the pitfalls that can ultimately doom applied studies. The authors also delineate some methods for gaining entry into applied settings, along with tips for maximizing the chances that decision makers in the setting will agree to have research conducted there. A particularly useful section of this step deals with cultivating relationships with potential research sites. Bailey and Burch provide the reader with practical advice on developing such relationships, including step-by-step guidance on establishing oneself as a rein-

forcer and increasing the likelihood of positive meeting outcomes.

Step 2 deals with narrowing the research question. An important consideration for new applied researchers is whether someone else has already solved their problem. Bailey and Burch guide the reader through the crucial (yet for many new researchers, daunting) process of conducting a literature review. They tell the reader where to look (including a list of behavioral journals and databases) and what to look for, and offer guidelines for discriminating good research from bad. Next, they provide suggestions for defining the target behavior and determining the dimension of behavior that would be most appropriate for the research question. Finally, the authors guide the reader through an assessment of the resources available for doing a study. It is not uncommon for new researchers to ask a research question for which providing an answer would exceed the available resources. To help avoid this problem, Bailey and Burch discuss several key considerations in resource assessment. Specifically, they address the compatibility of the setting with the demands of data collection, the equipment required to collect and analyze the data, the personnel required to collect data (along with specific considerations for using undergraduates as observers), and the time required to complete the study.

Step 3 addresses issues associated with the selection of dependent and independent variables. Bailey and Burch make clear to the reader that dependent variables should not only be relevant and appropriate to the research question but also should demonstrate social relevance. Strategies such as seeking expert professional judgment, using authoritative sources, and reviewing previous research are discussed to provide guidance in validating dependent measures. The authors follow this discussion with some common pitfalls in dependent-variable selection, in-

cluding the use of secondary data sources, inappropriate labeling of behavior, faulty selection of the dimension to be measured, and confounding with the independent variable. They conclude with some tips for properly defining dependent variables that help the reader to consider the relevant issues of using an existing definition or creating a new one. The authors also provide instructions for piloting the dependent variables prior to baseline data collection, which is a step that might be easily overlooked by the novice researcher.

The next section of Step 3 addresses issues of independent-variable selection. Bailey and Burch first divide independent variables into two broad categories (antecedent events and consequent events) and then describe three other less traditional categories (structural or environmental design variables, biological variables, and establishing operations). The authors then discuss several considerations in selecting independent variables. Of particular importance is the notion that independent variables for applied research should be selected with an understanding of the skills of those who will be asked to implement them. Clearly, figuring out whether one's independent variable is too difficult or aversive for the direct-care staff, teacher, or manager who will be required to take it on, and making adjustments accordingly, are essential for a successful study. Exact specification of the independent variable so that it meets the technological criterion (Baer et al., 1968) is another issue discussed by the authors.

Step 4 addresses social validity measurements. Following a description of the three major components of social validity (Wolf, 1978) and a brief history of the role of social validation in the field of applied behavior analysis, the authors present four steps involved in social validation. The authors provide several examples of research involving the use of social validation measures, and conclude the chapter with a section on the

issue of measures of rehabilitative validity (Hawkins, 1991) versus traditional social validity.

Step 5 covers data-collection systems. Bailey and Burch begin with descriptions of the dimensions of behaviors that can be measured and follow with descriptions of the types of measurement strategies available to collect data. The sections on direct observation provide detailed descriptions of recording strategies (e.g., event, interval, time sampling) along with sample data sheets and data. The inclusion of event records for each data set helps to illustrate the relative benefits and drawbacks of particular data-collection strategies. The authors' review of research on observation methods also assists the reader in considering these issues. Whereas many textbook chapters on data collection stop at this point and leave the researcher to figure out the "ins and outs" of data collection, Bailey and Burch continue their discussion with several sections replete with helpful insights and tips. Topics discussed include frequency of data collection, necessary components of a data sheet, and development of observation protocols for observers. One of the most unique (and helpful) parts of this chapter is the section on using observers. Bailey and Burch devote several pages to helping researchers avoid common problems associated with depending on others to collect one's data. The authors provide information on how to select observers, how to train them, and how to keep them happy and productive. They also address the complications associated with using observers, which leads logically into a comprehensive discussion of interobserver agreement. Instead of simply offering descriptions and calculations for interobserver agreement, however, Bailey and Burch guide the reader through the process, including discussion of such issues as independence of observations, the effect of knowledge of the reliability check on the agreement score, ob-

server drift, and observer bias. The chapter concludes with a list of 10 helpful tips for dealing with observer and agreement issues.

Step 6 addresses the process and importance of pilot testing key variables. Although the issue of pilot testing dependent variables is mentioned in an earlier chapter, Step 6 focuses more directly on testing the measurement system and independent variables. Issues associated with determining the best location for observers, the feasibility of the data-collection system, and training observers are discussed, as are the relevant issues of piloting the independent variable. These discussions are presented in a manner that prompts the reader to consider factors that might be overlooked or left uncompleted until the research begins. In short, the chapter illustrates how a failure to plan properly prior to beginning a study may affect the quality of the research.

Step 7 deals with the identification of appropriate research designs. Instead of delving straight into a description of designs, Bailey and Burch prepare the reader by first presenting information on the purpose and logic of single-subject designs. Inasmuch as it is as important for researchers to know *why* the field of applied behavior analysis uses these types of designs as *how* to use them, the authors present a well-organized conceptual framework for the rationale behind single-case research methodology. To provide points of comparison, the authors first describe some examples of weak designs (e.g., AB, B only, etc.) and the difficulties of data interpretation presented by such designs. In their discussion of proper single-subject designs, the authors provide descriptions and figures to illustrate appropriate usage as well as examples from actual research studies. The authors also provide information about the circumstances under which each design would be most appropriate and present potential limitations of each design. The authors conclude the chapter with a discussion

of the application of group designs to behavior-analytic research.

Step 8 addresses issues of ethics. Bailey and Burch include a complete listing of the guidelines for responsible conduct delineated by the Behavior Analysis Certification Board and define the purpose and general processes of institutional review boards. The authors follow with some guidelines on developing a responsible research study that are likely to reduce breaches of ethical behavior. Ethics of publication are also addressed. The chapter includes several helpful examples to illustrate points.

Step 9 presents critical considerations for carrying out a successful research study. Bailey and Burch arranged this chapter in the format of daily and weekly checklists. They address such critical applied research components as preparing a site contact person, preparing observers, planning for the first intervention phase, and managing the rest of the study. This chapter contains more than a dozen helpful hints to assist researchers in staying on top of their studies and managing the process effectively. Tips for “wrapping things up” are included at the end of the chapter.

Step 10 is devoted to analyzing and graphing data. The chapter presents the “virtues” of visual analysis, which provides a discussion of the strengths, weaknesses, and difficulties of determining treatment effects through graphic representation of data. The relative merits of statistical analyses are also presented. The authors also provide a discussion of graphing conventions, including reference to both American Psychological Association standards and those used by *JABA*. The chapter includes several figures that are helpful in illustrating some common graphing pitfalls and how to avoid them.

Part 3 of the book is devoted to a discussion of different ways of communicating the findings of a study to others. Entitled “Going Public,” this section begins with a dis-

cussion of the importance of dissemination. Methods of dissemination, including presentations, posters, and publications, are each discussed in turn. In addition to providing an explanation of each of these modes of communication, Bailey and Burch also provide the reader with several tips for ensuring that one's ideas are communicated effectively. Making a talk fit within the allotted time, avoiding distracting tics during a presentation, testing projection equipment, and using an appropriate font size for posters are just a few of the topics covered in this section. Bailey and Burch also include an informative discussion of the functions of journal publications in addition to providing the reader with tips for finding a good fit between one's research and a journal, preparing manuscripts according to formatting guidelines, and dealing with rejections.

Despite the multitude of helpful information in this book, a few cautions are warranted. Although the authors are to be commended for their diligence in showing the importance of identifying research questions based on real-world problems, novice readers may miss the importance of examining the existing literature as a method for delineating research questions that need to be answered. Bailey and Burch do a laudable job of explaining the importance and process of literature reviews in Step 2; however, their discussion centers on making sure that someone else has not already done a study as opposed to using the literature review as a tool for discerning important research questions yet to be answered.

Another concern involves the authors' treatment of social validity. It is heartening to see this topic included in the book, especially in light of what appears to be a decline in social validity reporting in behavioral journals (Carr, Austin, Britton, Kellum, & Bailey, 1999). Although the steps presented in the social validity chapter were adopted from Wolf's (1978) seminal article, they ap-

pear to deal exclusively with community validation of behavior change. Steps for assessing treatment acceptability or consumer satisfaction with treatment outcomes are not included, nor are discussions of the importance of repeated measures of social validity in preventing social invalidity (Schwartz & Baer, 1991).

Another caution concerns the authors' standards for evaluating treatment effects based on graphic data displays. Their standards are rigorous, which is by no means inappropriate. However, students may need additional guidance in discerning whether they have produced valuable research findings in the absence of perfect differentiation between baseline and treatment conditions.

The beauty of Bailey and Burch's book is its readable, straightforward, step-by-step approach. However, by writing the book in such a highly organized and sequenced manner, some degree of breadth and detail was sacrificed. As stated previously, Bailey and Burch have included some details that one will not find in other textbooks. However, finding a comprehensive discussion of more foundational aspects of research (e.g., design, data analysis, etc.) will require researchers to consult more advanced textbooks. A research methods course that supplemented Bailey and Burch's book with a book more focused on basic methodological issues (e.g., Barlow & Hersen, 1984; Johnston & Pennypacker, 1993; Kazdin, 1982) would provide students with a strong foundation in both the technical and practical considerations of conducting applied research. This foundation would also provide preparation for tackling more advanced textbooks in behavior-analytic research, not only with regard to the mechanics of design and analysis (e.g., Kratochwill, 1978) but also to the conceptual issues that arise within this type of research (e.g., Kratochwill & Levin, 1992; Poling & Fuqua, 1986).

In conclusion, *Research Methods in Applied*

Behavior Analysis makes a solid contribution to the behavioral textbook market. It is likely to be viewed as a godsend to undergraduates and beginning graduate students who are attempting to navigate their way through the design, implementation, and analysis of their own studies. In addition to presenting the required “nuts and bolts” of the research process in an easily understandable manner, the authors have gone a step further by providing multiple insider tips that will prevent some common (and sometimes costly) research mishaps. Their efforts will undoubtedly increase the quality of contributions from our field’s newest researchers.

REFERENCES

- 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.
- Bailey, J. S., & Burch, M. R. (2002). *Research methods in applied behavior analysis*. Thousand Oaks, CA: Sage.
- Barlow, D. H., & Hersen, M. (1984). *Single-case experimental designs: Strategies for studying behavioral change* (2nd ed.). Boston: Allyn & Bacon.
- Carr, J. E., Austin, J. L., Britton, L. N., Kellum, K. K., & Bailey, J. S. (1999). An assessment of social validity trends in applied behavior analysis. *Behavioral Interventions, 14*, 223–231.
- Hawkins, R. P. (1991). Is social validity what we are interested in? Argument for a functional approach. *Journal of Applied Behavior Analysis, 24*, 205–213.
- Johnston, J. M., & Pennypacker, H. S. (1993). *Strategies and tactics of behavioral research* (2nd ed.). Hillsdale, NJ: Erlbaum.
- Kazdin, A. E. (1982). *Single-case research designs: Methods for clinical and applied settings*. New York: Oxford University Press.
- Kratochwill, T. R. (Ed.). (1978). *Single subject research: Strategies for evaluating change*. New York: Academic Press.
- Kratochwill, T. R., & Levin, J. R. (Eds.). (1992). *Single-case research design and analysis: New directions for psychology and education*. Hillsdale, NJ: Erlbaum.
- Poling, A., & Fuqua, R. W. (Eds.). (1986). *Research methods in applied behavior analysis: Issues and advances*. New York: Plenum.
- Poling, A., Methot, L. L., & LeSage, M. G. (1995). *Fundamentals of behavior analytic research*. New York: Plenum.
- Schwartz, I. S., & Baer, D. M. (1991). Social validity assessments: Is current practice state of the art? *Journal of Applied Behavior Analysis, 24*, 189–204.
- Wolf, M. M. (1978). Social validity: The case for subjective measurement or how applied behavior analysis is finding its heart. *Journal of Applied Behavior Analysis, 11*, 203–214.

Received April 10, 2003

Final acceptance February 19, 2004

Action Editor, Patrick Friman