

## Quantifying Behavior the JWatcher Way

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## BOOK REVIEWS

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**Quantifying Behavior the JWatcher Way.**—Daniel T. Blumstein and Janice C. Daniel. 2007. Sinauer Associates, Sunderland, MA. 198 pp. ISBN 978-0-87893-039-5. \$19.95 (paper).

Studying behavior is an important facet in understanding the complex lives of animals; however, anyone who has done so has experienced the long hours of observations and the tedium of documenting, organizing, and analyzing the collected data. In effort to curtail such frustrations, Daniel Blumstein, Janice Daniel, and Chris Evans collaborated to create the free event recorder known as JWatcher. The software is available online in three versions: JWatcher 1.0, JWatcher-Video, and JWatcher-Palm, and each comes with access to a free online manual to help guide the user. Although these manuals are helpful, they are far from comprehensive and lack a lot of useful information. To resolve this problem, in 2007 Blumstein and Daniel published *Quantifying Behavior the JWatcher Way*. The book was meant to extend beyond a mere introduction to the software; it was intended to give step-by-step instructions in its use and to help guide the researcher through the process of answering a behavioral question. The book is a great success in accomplishing this purpose.

The book begins with a chapter geared toward those who are new to the study of behavior by giving advice on how to develop a focused research question and providing useful strategies for creating an effective ethogram. It addresses potential problems to help investigators avoid common mistakes, specifically discussing several aspects of the experimental design to be wary of, including random sampling, independence, and observer reliability. In addition, the authors list the three methods by which data are typically collected (live, dictated on audio, and video recorded) and discuss benefits and drawbacks of each. Although the majority of this chapter may be review for the experienced behaviorist, its conversational dialogue and use of examples make the book and the accompanying software accessible to researchers and students of all experience levels and interests.

Chapter 2 introduces the software itself, providing direction for online use and acquisition. It also provides trouble shooting for those unlucky enough to run into problems. The text describes the different file types used in JWatcher, which when coupled with the flow charts, helps to illustrate their roles in data collection and analysis clearly. Chapters 3 and 4 then give step-by-step instructions to creating these files. The directions are easy to follow, and screen shots of each step are provided, reassuring the user that he or she is navigating the program correctly. Moreover, warnings and advice on important features or limitations of the program are italicized and located in boxes for easy identification. As novice users lacking a guide to introduce the fundamentals, we found this section the most helpful in learning the basics of running JWatcher and how to best get started. Chapters 5 and 6 focus on data collection. It is here that the book's organization becomes especially accommodating to diverse users. Additional instructions for JWatcher-video are clearly separated from those for JWatcher

1.0, and different analyses and procedures one might employ are clearly labeled, allowing users to skip over sections that may not be of use for addressing their own data. This organization continues through the remainder of the book, allowing users to focus on areas relevant to their current or pressing needs.

Data analysis is introduced in Chapter 7, starting with how to check intra- and inter-observer reliability using percent agreement, Cohen's  $\kappa$  coefficient, and a confusion matrix. This well-developed section helps the reader understand the results of these tests, which otherwise might prove difficult, especially for those new to statistics. Several real-life examples, scattered throughout, strengthen the book's readability and utility. They allow the reader not only to learn how to navigate through JWatcher but also to become familiar with the entire thought process necessary for testing a behavioral hypothesis and deciding on the best methods with which to analyze one's data. Chapters 8 through 11 walk through the steps of determining how to analyze, interpret, and summarize the data. The book focuses on the "score once, analyze many times" theme and does its part on assisting the reader in accomplishing this feat by providing a variety of paths a researcher can take during analysis. Abundant tables and graphs help clarify the various analysis options and provide inventive ideas on how to use the same data to measure different aspects of behavior. We found these suggestions useful, as we were able to simplify our results output by analyzing smaller amounts of unrelated data separately, making the results much more manageable and organized.

JWatcher's ability to go beyond merely calculating time budgets and simple statistics makes it extremely useful. The program has the ability to detect temporal patterns in a sequence of behaviors to help determine the underlying behavioral structure. Chapter 13 focuses solely on the complex issue of sequential analysis. Although the chapter is rather long, its format of discrete, stand-alone sections allows the user to choose among options for analyses. Each analysis is accompanied by an example demonstrating what questions might be answered with that technique, and a variety of references are cited to illustrate where such methods have been used in the published literature. The complexity of this type of analysis may be daunting, yet the book does a phenomenal job in explaining it to even the most novice of users. The authors compensate for the difficulty of this analysis with additional matrices, graphs, tables, flow charts, screen shots, and illustrations. For those hoping to use the sequential-analysis function, the book is a must.

Chapter 14, a five-page review of the entire book, was extremely helpful. It concisely recaps the steps of answering a behavioral question, starting with creating a focused ethogram and ending with where your results will be stored. Each chapter is summed up in a single paragraph or less with only the most important pieces of information included. It is by far the chapter most revisited and becomes the "notes" one uses to prevent having to search the entire book for a simple answer. In addition, it provides helpful hints on how to manipulate JWatcher to do things it wasn't

necessarily designed to do, such as scan-sampling multiple individuals. Chapter 14 is not only the perfect summary of the entire book, it guides the user to making confident decisions.

The book ends with the chapter “Learning with JWatcher,” which focuses on four lessons that can help students learn to quantify behavior and gain experience applying the scientific method. These tutorials are conducted with JWatcher, and all files and videos needed for them can be downloaded free from [www.jwatcher.ucla.edu](http://www.jwatcher.ucla.edu). They are designed to help students develop a hypothesis and ethogram to use in scoring behaviors, compare results from time sampling and continuous recording, employ sequential analysis, and conduct a pilot study using both basic and sequential analysis. These tutorials would be great lab exercises for any class studying animal behavior, as they not only help students learn how to quantify behavior, they also provide discussion questions to incorporate critical thinking into the exercises.

We recommend this book to anyone studying behavior, from undergraduate students to experienced behavioral researchers. Its short chapters and concise directions allow one to skip around the book easily to find the pertinent information for a particular project without having to wade through vast amounts of superfluous material. This book is a remarkable improvement over the online manuals, and, although it is possible to use JWatcher without this book, we don’t recommend it. This book serves not only as an instruction manual, it is a guide to the scientific method, helping researchers seek new strategies for quantifying behavior.—AMY WORTHINGTON and ALISON EGGE, Department of Biology, University of South Dakota, Vermillion, SD 57069. E-mail: [amy.worthington@usd.edu](mailto:amy.worthington@usd.edu).