

and amalgamates evolutionary genetic theory into models of mating systems and strategies. Many aspects of the book are likely to be highly controversial, and many of the arguments raised in the book are currently being debated. Considerable prior knowledge of the topic of sexual selection is essential to grasp everything covered in this book, and it cannot be easily read over a weekend. However, it is likely that many ideas within this book will have far-reaching effects on future studies of mating systems and strategies.

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The Observer Video-Pro 4.1 and 5.0 Software Package. By Noldus Information Technology. Costerweg 5, P.O. Box 268, 6700 AG Wageningen, The Netherlands, <http://www.noldus.com>. Price depends on institution type.

The Observer is designed as software for the collection, analysis, presentation and management of observational data. The last review of this software package in *Animal Behaviour* was on version 2.0 (Visser 1993), and with increased technology and user demand there have been many changes in the program since then. The Observer is

currently offered in three editions: The Observer Basic (for live observations with a desktop or notebook PC), The Observer Mobile (for data collection on handheld devices) and The Observer Video-Pro (for data collection from videotapes or digital media files). The Video-Pro version of The Observer is specifically designed for flexibility in analyses using modern video and multimedia technology, and the creators of The Observer have written an extensive overview of its selling points (Noldus et al. 2000). Our purpose is to provide a critical review of our experience with both version 4.1 of The Observer Video-Pro as well as the upgrades and changes associated with the newer, 5.0 version. A comparison of 4.1 and 5.0 is useful for both prospective buyers of 5.0 new to The Observer technology as well as current users of 4.1 who are having problems or considering upgrading to 5.0. Overall we find The Observer a powerful program, allowing us to collect data on durations and frequencies on a level that would be unattainable by other methods, and we look forward to future products from Noldus.

Version 4.1 is much more powerful than its predecessors, with advances in technology allowing for accurate scoring of many behaviours, mouse-driven menus, as well as multisubject or group data collection. The program can be made to utilize media stored in many formats, including analogue or digital videotapes and digital video files, as well as to set up for data collection of live subjects. The Observer 4.1 allows up to 1000 subjects, 1000 behaviours/class in 100 classes, 1000 modifiers/class in 100 classes and a maximum length of observation of 1000 hours. Version 5.0 allows for only 250 subjects, 250 behaviours/class in 100 classes, 250 modifiers/class in 100 classes and a maximum length of 500 hours for an observation. Although this seems to be a step back in ability, these amounts still allow for many combinations and quite complex ethograms, and we believe that these new numbers will allow most if not all combinations of observational data to be analysed. According to Noldus (L. Noldus, personal communication) the reason behind the reduction is that the large number of combinations in version 4.1 led to memory problems and poor data analysis performance, and the combination numbers in 5.0 are both sufficient and solve these issues.

The installation of 4.1 was easy, but where to begin after installation was not clear. The software comes with three books: the Installation Guide, the Quick Start Guide and the 800-page Reference Manual. The Quick Start Guide was useful only as a reference tool and only after we had read the chapters in the Reference Manual that pertained to our project. This ‘Quick Start’ Guide would be more aptly named the Quick Reference Guide, because it is a refresher to the Reference Manual subjects. We found the manual not user-friendly, requiring much time and effort to read before beginning set-up. The manual for version 5.0 has similar problems, although it is an improvement from that for 4.1, and it includes a very useful chapter summarizing changes from 4.1 to 5.0. The Observer also comes with an extensive on-line help system for users who require more specific instruction.

We purchased version 4.1 to perform analysis of video footage stored as MPEG-1 files stored on DVDs. The

program was originally installed on a PC Pentium III with Windows 2000 as the operating system. There was additional software on the system to facilitate the transfer of data from analogue to digital media. Several incompatibilities seemed to arise after the purchase of a PC Pentium 4 with Windows XP Professional as the operating system. First, The Observer would not seem to save uploaded projects in the workspace, and they needed to be reopened and saved constantly. The second and largest problem was that the video files would not play in the observation module. Images would freeze and play erratically, and during this time no behaviour could be recorded. After troubleshooting unsuccessfully, we contacted technical support for assistance. It seems that The Observer will not run videos with certain codecs (compressor/decompressor files) with Windows XP Professional as an operating system, although Noldus's system requirements list this operating system as acceptable. The codecs on the system were necessary to continue the process of transferring our videotapes to DVDs by compressing AVI files to MPEG-1 files. We had several options to solve this incompatibility. We could (1) finish backing up the old videos, remove the codecs from the system and carry on with scoring behaviour, (2) remove each codec one at a time and see if this solved the problem or (3) remove Windows XP Professional as the operating system and return to using Windows 2000. After much discussion, we removed XP and replaced it with Windows 2000, reloading all programs and information back on to the system, and this solved all the codec-related incompatibility issues. After months of use, we began receiving error messages, and we were instructed by Noldus either to update version 4.1 with a download or to update to version 5.0. Installing version 5.0 and removing 4.1 went very smoothly, with no data loss or usability issues. We have encountered several error messages while using Windows 2000, including a message stating that data files have been deleted, but these problems were solved by installing a download provided by technical support at Noldus. A second error message involves the 'initialization file', but technical support at Noldus assured us that this error seems to pose no harm, although apparently they did not know where the error came from. The manager of technical support would have needed remote access to our system to troubleshoot this error, but we decided against this option. Fortunately, version 5.0 has built-in codecs to allow for AVI file capture and transfer to MPEGs, so there is said to be no codec/XP incompatibility issues with this version. This being said, version 5.0 would not run the observation module on a home PC with a Pentium 4 processor and Windows XP, but so far appears to be running smoothly on a new laptop PC that runs with Windows XP. After much investigation, it remains unclear why data collection is not possible on the home PC system. The built-in codecs in version 5.0 remove several steps for researchers working with digital media and storing information long term, and is one of the major advantages to version 5.0.

The Observer is extremely powerful and has strengths at many levels, including configuration, data collection, and statistical reporting. It makes defining behaviours within a configuration file easy with mouse-driven options. The

configuration is a complicated process in which the user sets up an ethogram, defining specific behaviours, behavioural classes and modifiers of behaviours. For example, behaviours can be defined as events, where the frequency will be reported, or as a state, where the duration of the behaviour will be measured. This is easily done by left-clicking on the desired choice. Making behaviours 'reciprocal', where the behaviour for one subject is automatically recorded for another subject, is very useful and also easy to set up. Each behaviour can have one or two modifiers, prompting further information to be recorded, which is useful because it allows the user to record intensity, direction, position and other information about behaviour. During data collection, the speed of any prerecorded video can be chosen, allowing the user to start slowly to get comfortable with the program. The entire process of scoring behaviour can be mouse-driven, thus requiring no memorization of keystrokes for individual behaviours, but it can also be keystroke-driven for those who choose that option. An active behaviour window serves as a reminder of behaviours that are currently being scored, which is useful with a complex ethogram. The backspace key will delete the last recorded behaviour in case of a mistake, and the correct behaviour, once chosen, will be inserted in its place. After scoring a file, a defined behaviour can be added by reopening the file and inserting the behaviour at the time specified. This process does not affect any other behaviour previously scored within that file. The Observer makes scoring data simple and easy. An advantage to version 5.0 is that it automatically changes a double-state, which is a state behaviour scored twice consecutively, and amalgamates these into a single scored state, saving the researcher time by automatically correcting reported frequency values to their true states. An advantage to analysis is within the statistical report function, where the user can use either time intervals or behaviours to begin and end the analysis period. This option can be quite useful if you always want to begin analysis when a particular behaviour occurs, and a combination of subject/behavior/modifier can also be specified as the start/end point of analyses.

Before collecting data, the customization of the collection screen must be specified. This includes setting preferences for the appearance on screen as well as several other steps ensuring optimization of data collection. The program is set up so that a behaviour must be specified at the outset of collection. In the field of behavioural ecology, often the user will not know what behaviour will occur first as the scoring process begins. We create a 'null' behaviour, and set the program to score that as the default behaviour. It is important to note that The Observer locks the configuration file after the first file has been scored, and making changes to the configuration file is difficult. This feature maintains scientific accuracy and integrity, and can minimize researcher bias, but the lock can be overridden. If the configuration is unlocked to modify or remove behaviours, data that have been scored previously may be rendered inaccessible or unrecognized by the current configuration file.

As behavioural ecologists, we found the analysis function to be somewhat limited, although this has improved

with the addition of Reliability analysis and higher order lag sequential analysis. The statistical reports generated in 4.1 were quite useful, albeit problematic. There is one option of having the program 'only show rows/columns for behaviors that occur', and for our purposes we chose not to have that option as the default, because we were comparing across many different files. The Observer displayed all behaviours, both possible and impossible, combining all behaviours, subjects and modifiers across the configuration file. This itself would not be unworkable; however, the program added in frequency values (nonzero values) for behaviours that were never scored, and in fact did not even exist. Thus, we had real data mixed in with data that had values that could not have existed, and sorting through it was a nightmare. We recommend choosing 'only show rows/columns for behaviors that occur' to get around this problem, but for those researchers comparing across many observations, this option is a limitation. Thankfully, version 5.0 seems to have solved this problem. We were impressed after running our first report to see that only events and states that had been scored had appropriate values associated with them, values of zero appeared in all appropriate places, and nonzero values did not appear where they should not have been.

One of the best aspects of the 5.0 version is the Backup Project function. This allows the researcher to back up an entire project to a disk or another hard drive with a click of the mouse. All files associated with that project including configuration file, observations, statistical reports, analyses and customizations are saved within that backed-up project. This removes the stress of guessing whether all the files have been backed up and makes project and file management easy. There have been other additions to data selection and analysis features, including flexible ways of defining pre-event and postevent time windows and grouping of observations, subjects, behaviours and modifiers, but the new Report Generator is particularly worth mentioning. This new function allows for customized reports of configuration files, as well as data and analysis profiles in a Microsoft Word template. This function is ideal for reporting details and necessary elements within a researcher's study in a report presentation format. Version 5.0 is also more compatible with Microsoft Excel, making exporting files to this program easier. Additional improvements in data selection and analyses include multilevel data selection, grouping, filtering and nesting, new descriptive statistics, confusion matrices and Cohen kappa. Advances in video technology in version 5.0 include the ability to score behaviour from DVD movies, creating MPEG 1, 2 and 4 video clips, and encoding DV signals to AVI files directly from within the Observer, as well as the ability to score data from a tape in a Digital Video recorder or directly from a camera through a FireWire-type connection. The Observer 5.0 also has a new feature that generates video highlights within the program, without the need for a separate editing program. All of these features enhance the usability and versatility of an already powerful program.

Versions 4.1 and 5.0 both have advantages and disadvantages, although 5.0 has worked out many of the problems that we seemed to have with 4.1. Without this program, much of the detailed data and depth of our analyses would

not be possible. With The Observer, complex configurations allow us to record many behaviours and report their frequencies and durations. That information allows us to address predictions that would have been difficult or impossible to explore without this technology, making this program an amazingly powerful tool. A steep learning curve and price are possible disadvantages that should be considered before purchasing The Observer, although these seem to pale in comparison to the advantages of the program. Version 5.0 of The Observer has solved many of the problems of 4.1, and the possibilities for using multimedia technology are very impressive.

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The Biology of Traditions: Models and Evidence. Edited By D. M. FRAGASZY & S. PERRY. Cambridge: Cambridge University Press (2003). Pp. xvii+456. Price £65.00 hardback.

Those of us interested in social learning in animals have been very fortunate in that there have been a number of excellent volumes published on the topic over the years (such as Zentall & Galef's (1988) *Social Learning: Psychological and Biological Perspectives*, and particularly Heyes & Galef's (1996) *Social Learning in Animals: The Roots of Culture*). I'm therefore pleased to be able to say that this new collection of chapters, edited by Fragaszy & Perry, easily lives up to this tradition (no pun intended).

The Biology of Traditions: Models and Evidence contains 15 chapters, with contributions from many of the field's best researchers. Traditions are defined throughout the volume as relatively enduring behaviour patterns that are shared by members of a group that depend to some degree on social learning. The specificity of this focus means that the emphasis is very much on field data (the chapter by Visalberghi & Adessi on food preferences in capuchins is an exception). This distinguishes this volume from the other collections mentioned above, which concern social learning more generally and include a number of chapters on laboratory-based studies. Also, as noted by the editors,