Updates From Past SABA Awardees

2012 International Development Grant

BY ROGELIO ESCOBAR

A significant event for the development of behavior analysis in Mexico was the creation of a curriculum of psychology in 1971 at the National Autonomous University of Mexico (UNAM). Behavior analysis was used as one of the foundations of the curriculum replacing the medical model that dominated psychology during the 1960s. This event was followed by the creation of departments of psychology in other Universities in Mexico. At that time, behavior analysis became a dominant view that helped understanding a variety of psychological phenomena. As years passed, however, prejudices and misconceptions of behaviorism and behavior analysis accumulated to the point that, in the new curriculum of psychology created in 2008 at UNAM, the foundations that were once inspired by behavior analysis were almost entirely replaced with constructivist theory and cognitive psychology.

Interestingly, the antipathy towards behavior analysis expressed by many psychology professors, contrasts with the enthusiasm of graduate and undergraduate students that now, immersed in constructivism and qualitative views of psychology, are interested in effective ways of understanding and changing behavior described in the few remaining courses on behavior analysis. Such enthusiasm for behavior analysis, is reminiscent of the one that preceded the creation of the curriculum of psychology in 1971. However, in a climate in which behaviorism is seen as ancient practice, and with limited resources, operant conditioning laboratories for course demonstrations are now scarce. Furthermore, aside from the known academic pressures, young researchers interested in a career in behavior analysis, and sometimes even those with established laboratories, face the burden of obtaining resources to acquire equipment for operant research. From the time in which researchers write a grant proposal and receive the imported equipment, 1–2 years could elapse. It is understandable that many researchers succumb to the lure of fast results by substituting direct observation of behavior with interviews and questionnaires. This environment inspired my project that consists of designing low-cost interfaces to conduct operant research and teaching professionals and students how to build them. It is expected that this project will contribute to the revitalization and dissemination of behavior analysis in Mexico.

During the first part of the project, a low-cost interface to control experimental events and to record behavior accurately, was designed. Carlos A. Pérez-Herrera, one of my undergraduate students and to whom I am indebted, worked assiduously on the design of the interface. We reasoned that, to reach a wider audience, the interface

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should be easy to build, easy to operate, and should be compatible with modern net books, lap tops, and desktop computers. The funds provided by the 2012 International Development Grant were used to purchase the materials required for the tests. The result was an interface based on an Arduino microcontroller board that can be found easily not only in Mexico, but also in 63 countries around the world. The Arduino platform uses open-source software for programming the board using a USB port. Because Arduino programming language that is similar to C/C## may be unfamiliar to behavior analysts, we decided to use the freely distributed Visual Basic Express Edition 2010 to create the program that generates the schedules of reinforcement by communicating with a simple Arduino program. The Arduino program and the Visual Basic project are freely available on my website (**http://analisisdelaconducta.net/?page_id=520**). Instructors or researchers without knowledge of Visual Basic programming, can operate the user friendly program to generate basic schedules of reinforcement. Experienced users of Visual Basic could modify the code to create their own schedules. Thanks to the funds provided by the 2012 International Development Grant, the prototype of the interface and the controlling software were presented this year during the ABAI 39th Annual Convention of at Minneapolis, MN and during the 22nd Convention of the Mexican Society of Behavior Analysis at Guanajuato, Mexico. The poster in English can also be downloaded from my website.

During the second part of the project, currently on its way, we will teach professionals and students how to build their own interfaces during workshops in academic meetings. Currently, workshops are scheduled during the

1 The upper photograph shows a rat inside a low-cost experimental chamber controlled with a net book computer using the Arduino-based interface. 2 The lower photograph shows groups of students using the interface with rat chambers inside the classroom.

4th International Seminar on Behavior and Applications, to be held at Sonora, Mexico, as an invited event at the University Center of the South, in Guadalajara Mexico, and during the 23rd Convention of the Mexican Society of Behavior Analysis at Cuernavaca, Mexico. These events will be held during October and November of 2013.

Thanks to the visibility and prestige of the 2012 International Development Grant, I received a grant awarded by the National University of Mexico (PAPIIT TA300213-2) to extend the project. With this grant, I purchased new computers, more electronic materials for tests, obtained scholarships for students interested in behavior analysis, and I have secured the funds to achieve the goal of teaching the instrumentation skills to build the interface in academic events in the forthcoming years.

The funds provided by the 2012 SABA International Development Grant in conjunction with the grant awarded by UNAM, were used to set up and test a low-cost rat laboratory for advanced undergraduate courses in operant conditioning. In the test group, 30 undergraduate students built their own chambers and connected it with the Arduino interface to their computers (see Figure 1). The syllabus, created ad hoc for this course, includes readings of Pierce and Cheney´s (2008) *Behavior Analysis and Learning*.

The funds of the 2012 International Development Grant and the grant awarded by UNAM, were also used to design an Arduino-based instrument to record behavior accurately in natural settings for human research. This device allows continuous recording of behavior in real time, is accurate and portable. The prototype was presented during the Seventh International Conference at Mérida, Mexico. The presentation can be downloaded from my website (**http://analisisdelaconducta.net/?page_id=532**).

It is expected that this project will help those interested in behavior analysis to set up new laboratories for research and demonstrations not only in Mexico, but also in countries where resources are limited or it is problematic to have access to commercial equipment (e.g., Latin-American and Middle East countries). I am grateful to the SABA board of directors for selecting this project and to SABA donors for their commitment to behavior analysis.

References

Pierce D. W., & Cheney C. D. (2008). *Behavior Analysis and Learning* (4th ed.) New York: Psychology Press.

2013 Experimental Analysis of Behavior (Basic) Grant

BY DEREK A. POPE

I am extremely grateful to have been one of the recipients of the 2013 SABA Experimental Analysis of Behavior grants. Firstly, I would like to thank the SABA board and the contributors that made the grant possible. Without it, I would not have been able to conduct the experiments described below. I would also like to thank Dr. Blake Hutsell and Dr. Chris Newland for their continued guidance and support during my graduate career.

The first study we are in the process of completing concerns differences in delay discounting between BALB/c and C57Bl/6 mice. We previously found that BALB/c mice display greater sensitivity to reinforcer magnitude (additional reinforcers are more valuable) and discount at a much higher rate than C57Bl/6 mice. Having established these baseline differences, we were interested in how systematic environmental manipulations could help us understand the mechanisms responsible for these differences

Specifically, subjects responded on a six-component, concurrent-chained schedule in which the order of terminal-link delays preceding the larger reinforcer was determined randomly without replacement. In one condition, one of six unique auditory stimuli signaled the reinforcer delay ratio in a component (i.e., multiple schedule). In another condition, no auditory stimuli signaled the reinforcer delay ratios (i.e., mixed schedule). A generalized matching-based analysis was used to assess the effects of previous and current-component delays on choice within a component. Overall, asymptotic estimates of magnitude and delay sensitivity were higher for BALBs, but acquisition of preference was faster for C57s. Asymptotic levels of delay and magnitude sensitivity did not differ across schedules for the BALBs, but were higher in the multiple schedule for the C57s. The multiple schedule resulted in faster acquisition relative to the mixed for the BALBs, but the speed of acquisition did not differ across schedules for the C57s. To us, these findings suggest that phenotypic differences in discount rates between these two strains depend, in part, on the presence of delay-correlated stimuli. It may also suggest that discount rate or delay sensitivity is more affected by events other than the delays to reward. Lastly, the differential effects on the speed of acquisition and asymptotic levels of preference between the two strains may imply that the prevailing stimuli are signaling different aspects of the procedural context for each strain. Further experimentation awaits.

These two strains of mice also differ greatly in their neurobiological profiles, and as a result, display differential sensitivity to acute pretreatment of dopaminergic drugs. It is well known that drug effects are sensitive to the environmental

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