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commentaries

Mentoring Undergraduate Research: The Joys and Surprises of Giving Back

—Robert C. Drugan

Associate Professor of Psychology

My scientific career began in 1976 when a professor allowed me to test out an idea that I developed during my sophomore year of college. This initial idea became an honors thesis project involving the construction of a testing apparatus and independent research. I owe my undergraduate mentor a tremendous debt of gratitude for this experience, which launched my career as a behavioral neuroscientist. Twenty-nine years later I can vividly remember his intellectual challenges, strict discipline and childlike joy in the scientific process. Mentoring undergraduates at UNH allows me to give back to the field for the wonderful opportunities I had, myself, as an undergraduate. At the same time the students give me new ideas, questions from left field, and their unbridled energy, all of which lead my research down unexpected avenues. My current honors student, Dave Soucy, is a great example of a student breaking new ground in my research laboratory.

Dave began working in my lab during his sophomore year for the sheer experience of being involved in scientific research. I was delighted that he requested to work in my lab because, as a freshman, he was an outstanding student in my Psychobiology course. During his junior year we began to discuss what topic he would like to investigate for his honors thesis. Dave and I were both very interested in the phenomenon of individual differences in stress reactivity. How could such differences be predicted? We struggled with this idea and came up with "listening in" on the rats as they were experiencing stress, in the hopes of finding a non-invasive predictor of stress resilience, or stress vulnerability. We read articles that indicated rats emit ultrasonic vocalizations (USVs) (>20,000Hz) when placed in stressful situations...perhaps this was our measure. We purchased a \$75 Bat Detector, which provided a crude measure of USVs. We ran a few pilot rats through our intermittent cold water swim (ICWS) paradigm, and remarkably, picked up individual differences in their USV calls.

With this pilot data in hand, we went on a road trip to Tufts University to talk with my colleague, Dr. Klaus Miczek, who has measured USVs in rats for many years. He showed us his set-up and we came back to UNH to work on building our own system. We were fortunate to obtain a high frequency microphone and amplifier on loan from Dr. Todd Gross in Mechanical engineering at UNH. In addition, Todd suggested that we talk with Rob Cinq-Mars and John Wilderman at the University Instrumentation Center. Dave Soucy received a Summer Undergraduate Research Fellowship (SURF) award from the Undergraduate Research Opportunities Program (UROP) and funds from the Office of the Vice President for Research and Public Service, which enabled him to start work on his honors project during the summer of 2004. Rob and John worked tirelessly with us during the month of June to set up the physical apparatus and also provided us with Labview software for data capture and analysis. Through much trouble-shooting, we were able to develop an optimal system and Dave was off and running by the end of the month. Dave collected the data for his first experiment during the summer and his

results were quite provocative. Rats which were exposed to ICWS and emitted USVs showed stress resilience when tested in a forced swim escape test 24 hours later.

When we needed to return the borrowed microphone and amplifier in the fall, another UROP grant and matching funds from the Psychology Department allowed us to purchase our own high frequency microphone, signal conditioner, and amplifier. Dave is now collecting data on his third experiment. He plans to present this work at the University Undergraduate Research Conference as well as at the George M. Haslerud Psychology Undergraduate Research Conference this spring. This research will provide Dave with a springboard into a career as a biomedical researcher as he applies for a post baccalaureate Intramural Research Traineeship at the National Institutes of Health for next year.

This research story is an example of the evolution of a research idea and how many hands work together to make the scientific investigation a reality. I now have a new non-invasive measure of stress reactivity in my lab thanks to the collaborative idea that Dave Soucy and I shared. However, the testing of this idea would not have been possible without the efforts and contributions of colleagues in the UROP office, office of the Vice President for Research and Public Service, Psychology Department, Mechanical Engineering Department and University Instrumentation Center. We were lucky to have wonderful and talented people who lent their expertise to make this project feasible. UNH certainly has a cooperative and collegial atmosphere that fosters research inquiry at many different levels of analysis--and for this I am grateful.

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Robert C. Drugan, Ph.D, is an associate professor in the Department of Psychology at UNH. Drugan has been at UNH for 10 years. His area of specialization is Behavioral Neuroscience.