A Forgotten Resource Critical to the Future of Behavior Analysis: Undergraduate Psychology Majors

Gregory J. Madden, Kevin P. Klatt, David C. Jewett,
and Larry A. Morse
University of Wisconsin–Eau Claire

The demand for board-certified applied behavior analysts is not being met, and there is a perception that fewer students are exposed to systematic courses in basic and applied behavior analysis than was true a generation ago. This article outlines how we have successfully implemented an undergraduate curriculum in behavior analysis within a traditional department of psychology. Certification credentials offered by the Behavior Analysis Certification Board facilitated the approval of this curriculum, and the cultural practice selection contingencies that supported the creation of our curriculum in behavior analysis may be similar at other comprehensive universities. Advice for developing an undergraduate program in behavior analysis within a psychology department is outlined. We also summarize strategies we have used to attract talented students to the courses and the significant impact these strategies have had on the number of our graduates who pursue graduate training in basic and applied behavior analysis. Attracting the best and brightest students to behavior analysis is critical to the future of the field.

Key words: undergraduates, behavior analysis, teaching, certification

In this paper we will provide a concise argument that behavior analysts who work in colleges and universities should allocate more resources to training undergraduate students in behavior analysis. We will describe how such efforts may benefit the field of behavior analysis, the students involved, and the departments and universities that move in this direction. We will provide a description of how we have successfully implemented an undergraduate behavior-analysis emphasis within the psychology major at the University of Wisconsin–Eau Claire. Included in this description is an outline of strategies that colleagues who wish to pursue the creation of a similar program may find useful.

ADDRESSING THE NEED FOR MORE BEHAVIOR ANALYSTS

In both the applied and basic research arenas, there is a shortage of in-

dividuals with adequate training in behavior analysis. Although the membership of the Association of Behavior Analysis has increased steadily since its inception and the number of certified behavior analysts increases annually, there remains a paucity of certified behavior analysts working in applied settings. Consider, for example the application that has recently been most associated with behavior analysis—the treatment of autism. With conservative estimates of 11 in 10,000 children diagnosed with autism (Croen, Grether, Hoogstrate, & Selvin, 2002) and approximately 4 million children born in the U.S. each year, there are approximately 45,000 new cases of autism diagnosed each year. Some estimates of autism prevalence put the numbers as high as 425,000 current cases of autism in children under 18 years old (Fombonne, 2003). With 1,965 certified behavior analysts nationwide and the assumption that these practitioners are not serving over 200 clients each, it is clear that the overwhelming number of individuals treated for autism are being attended to by individuals with less than adequate

Correspondence should be sent to Gregory J. Madden, Department of Psychology, University of Wisconsin–Eau Claire, 105 Garfield Ave., Eau Claire, Wisconsin 54702 (e-mail: maddengj@uwec.edu).

training in behavior analysis. When one includes other diagnoses for which behavioral interventions have demonstrated cost effectiveness, the shortage of certified applied behavior analysts is even more striking.

There is also a perception that behavior analysis has increasingly been underrepresented in several areas of laboratory research from which applied innovations have so often sprung. At two separate conferences attended by authors of this paper, important discussions were held as part of the conference proceedings regarding the lack of well-trained behavior analysts in the fields of animal learning and behavioral pharmacology (neither of these conferences were affiliated with the Association for Behavior Analysis). In both instances, the discussion participants indicated both that it was difficult to interest graduate students in behavior analysis and that there were few places in the U.S. in which a systematic course of study in behavior analysis was still available. No consensus emerged from these discussions about the appropriate steps to remedy this situation, but in general it was agreed that something must be done to expose students to behavior analysis.

But which students should be exposed to behavior analysis? One might argue that graduate students are the appropriate target for this training, given that they have a higher likelihood of working in the fields of psychology or behavior analysis than an undergraduate. In our experience, and that of several of our colleagues, we find that graduate students who did not choose to study behavior analysis in graduate school are unlikely to be significantly affected by a single course in behavior analysis. These students' interests were shaped years earlier, and they may view a required course in behavior analysis as just another hurdle to be jumped before they can pursue a career in their area of interest. Even those graduate students who see the utility of a behavioral approach are unlikely to change their career path, because this

would require additional course work and might mean transferring to another graduate program. Training future clinicians, school psychologists, and experimentalists in the techniques and findings of behavior analysis is important at the graduate level, but we believe that this training is unlikely to yield many students who seek out the significant additional training required to adequately understand and contribute to the field of behavior analysis.

If it is too late to affect the typical graduate student, then we are left with either undergraduates or precollege students. Two authors of this paper spent several summers exposing academically gifted precollege students to behavior analysis, and to our knowledge none of these students went on to study behavior analysis. Thus, we cannot recommend reliance on this population. This leaves undergraduates. Certainly there is no shortage of undergraduates, with psychology being one of the most popular majors at many universities. Within this pool of undergraduate psychology majors, most have little focus (given the eclectic training common to most psychology department curricula) and may make their decisions about which area of psychology specialization to pursue from their understanding about the sort of training that will earn them a job or from portrayals of psychologists in the popular media. Thus, these students might become interested in a career in behavior analysis if they were exposed to a systematic program of study in basic and applied behavior analysis.

We recently surveyed the undergraduate psychology curriculum at 20 randomly selected U.S. 4-year public universities that post their curricula on the Internet. We found just two psychology departments that offered courses in both applied behavior analysis (Behavior Modification) and the experimental analysis of behavior (Learning). Two departments required no course work in applied or experimental behavior analysis. These same departments required at least two courses in cogni-

tive, developmental, or personality psychology. A course during which behavior analysis might be discussed was an option in 16 departments. In all but one situation, this course was Learning. The likelihood that behavior analysis is discussed in this course depends entirely on the instructor. Thus, many (if not most) students in these departments probably graduate with no exposure to behavior analysis. Given this state of affairs, it may be little wonder that so few people go on to pursue graduate training and eventually have careers in this field.

SPENDING TIME WITH UNDERGRADUATES

A few years ago we wanted to increase the number of students who are exposed to a systematic series of courses in behavior analysis. Our first idea was to create a graduate program, but we quickly learned that graduate programs are difficult to create—the departmental, administrative, and university system hurdles to overcome are formidable. On top of this, we worried that even if a program were approved, it would be unlikely to attract high-quality applicants for many years.

When a graduate program was ruled out, we were left with a desire to train behavior analysts but had only undergraduates available as students. We began to focus our attention on undergraduates—speaking with them about career opportunities in behavior analysis, recruiting them to serve as research assistants, and meeting with a group of interested students outside class to read and discuss empirical and theoretical papers published in behavioral books and journals. To accomplish this, we recruited the most talented students from our undergraduate courses. Most of these students reported that this was a unique experience. In the past, feedback from their professors came in the form of grades and written comments on term papers. Rarely were they invited to the professor's office to be given positive feed-

back and an invitation for faculty–student research collaboration. When students were informed that such collaboration could improve their chances of being accepted into graduate school, they rarely declined the offer.

Working with undergraduates outside the classroom proved to be unexpectedly rewarding. Perhaps because the undergraduate research assistants viewed their work as an opportunity extended to few of their peers, students were willing to work hard when asked to do so and when contingencies between effort and grades (students earned course credit as research assistants) and letters of recommendation were made clear by the faculty supervisor. These first students were so enthusiastic about their work outside the classroom that they began meeting every other Friday afternoon to discuss with faculty articles and books related to behavior analysis that were read in addition to their regular course work. Certainly not every student succeeded in carrying out his or her duties in the laboratory or participated regularly in these meetings. However, these failures were few and tended to fall in the category of “lack of interest” rather than “lack of ability.” In these cases, we found that working with undergraduates was better than working with graduate students. If our research assistants failed to prove their worth in a single semester, they were replaced. Graduate students who fail to prove their worth are typically allowed to continue for several semesters or years.

OUR BEST FRIEND: THE BEHAVIOR ANALYSIS CERTIFICATION BOARD

Shortly after our work with undergraduates began, the Behavior Analysis Certification Board (BACB) was established. It offered the credential of Associate Behavior Analyst to individuals who had received intensive behavior-analysis training as undergraduates. We began to explore the possibility of developing a systematic series of

courses in which we could train Associate Behavior Analysts, and in so doing we began to contact a number of cultural-practice selection contingencies that we had not anticipated. We found that these contingencies strongly supported an undergraduate program of study in behavior analysis within the existing psychology major. We believe that the local selection contingencies that supported the creation of our undergraduate program of behavior analysis may be common to other universities. Therefore, in what follows we outline these contingencies and how we took advantage of them.

Contingencies That Support Undergraduate Training in Behavior Analysis

As just noted, the establishment of the Associate Behavior Analyst credential by the BACB set the occasion for the design of undergraduate course work that would allow our graduates to pursue certification. At present, the BACB requires 9 credit hours of course work in behavior analysis plus a 6-month supervised internship (see www.BACB.com to examine current requirements). Because none of our existing course work adequately covered all of the topical requirements specified by the BACB, we proposed to add three new courses to the psychology department curriculum (adequate training might also be provided by addition of fewer courses if existing courses are modified to meet BACB specifications). In addition, we needed to propose an internship course so that faculty would receive teaching credit for providing weekly supervision to undergraduate interns. Our strategy was to argue that any curricular changes would have to meet BACB requirements; thus, offering this training opportunity for our students was going to require more than minor modifications to the curriculum. Keeping all of this within the psychology major, we called the training program the behavior-analysis emphasis.

Full of enthusiasm for the behavior-analysis emphasis, two of this paper's authors proposed its creation to the department's curriculum committee, where it received a mixed reception. Although some members of the committee were somewhat positive, others were openly opposed to the idea. In the end, the committee requested more information about the need for such a program. Specifically, the committee wanted to know (a) if students supported such a proposal, (b) where we would place our interns and if the internships would offer students financial compensation for their work, (c) what students could do with the Associate Behavior Analyst credential, and (d) whether the administration would support the proposal. We took a functional approach to garnering support from each of our constituents (e.g., students) by attempting to identify the consequences that would likely function as reinforcers while describing the contingency between acquisition of these consequences and successfully establishing the behavior-analysis emphasis. Readers who wish to create a similar program of study may want to provide this information with their initial proposal; thus, the results of our research are provided below.

Support from students. One of the faculty opponents of the behavior-analysis emphasis suggested that students would have no interest in studying such topics. This statement is probably true as long as students are unaware of the opportunities available to individuals trained in behavior analysis. Thus, before determining student support for the emphasis, we outlined the benefits that students should expect if they completed the course work. We provided this information as part of an e-mail survey sent to all of our psychology majors (approximately 400 students). The emphasis was described as a three-course sequence plus a 500-hr internship that would lead to national certification as an Associate Behavior Analyst. Students were informed that this credential would allow them to provide

behavioral services to individuals with special needs such as children with autism. They were also informed that Wisconsin is one of nine states that currently pays for behavioral treatment of autism, so the possibility of local employment providing behavioral services after graduation was quite good. Finally, students were informed that completing a 6-month internship would increase their chances of being admitted to the graduate school of their choice.

Approximately 22% of the students replied to the e-mail survey, and most of these were juniors and seniors. Of the responses, 99% were positive. Students typically indicated enthusiasm for the proposal, describing it as a "wonderful opportunity." Many juniors and seniors lamented that such a program did not exist earlier so that they could have taken advantage of the training (in the end, several of these students either delayed their graduation or returned after their graduation so that they might complete the emphasis). Students were very positive about the supervised internship opportunities, and several noted that this experience would greatly enhance their chances of being accepted into their chosen graduate program. These comments were summarized and presented when the proposal returned to the curriculum committee.

Support from the community. Next we met with representatives from three behavioral service organizations in our area. Two were providing intensive in-home behavioral services to children with autism, and one was providing services to institutionalized developmentally disabled individuals. Both organizations found it difficult to find employees with any formal training in behavior analysis. We described our proposed course work and our intent to provide supervised internship opportunities for our students. Because of the overwhelming demand for behavioral services and the lack of students receiving training in behavior analysis, representatives from all three organi-

zations provided written assurances that they would provide paid internship opportunities for our students, and that they would be willing to hire graduates who had completed the behavior-analysis emphasis. Thus, we could assure our curriculum committee that the Associate Behavior Analyst credential was worthwhile and virtually guaranteed our graduates employment in the field.

Support from other programs and departments. Although our curriculum committee did not request this information, when word of the proposed behavior-analysis emphasis circulated around campus, we found others who supported the idea. Within our department, the director of the school psychology graduate program was enthusiastic about the proposal because his graduate students would be able to take more advanced course work in behavior analysis than had been offered before. He informed us that new federal laws require that functional behavioral assessments be conducted in special education and that giving this skill to his graduate students was a priority. Unexpected support also came from the chair of the university's special education department, who learned of the proposal and was enthusiastic about her students completing the course work. Readers who wish to propose a similar program might seek out this support more systematically than we did.

Support from administration. Garnering administrative support for the behavior-analysis emphasis required that we examine the contingencies under which administrative decision making occurs. We did not thoroughly study these contingencies, so what follows is incomplete and is subject to change with time.

First, we examined the criteria employed by *U.S. News and World Report* to rank colleges and universities. These rankings are divided into various regions of the country and are subdivided into public, private, and regional universities. Thus, virtually every

school in the nation is evaluated and ranked against similar colleges and universities. Many university administrators are interested in improving their ranking because this may be used, among other functions, to advertise the university, attract higher quality applicants, and garner greater funding from alumni and the community (Monks & Ehrenberg, 1999).

Most of the criteria used by *U.S. News and World Report* are unaffected by individual programs within single departments (e.g., class size or faculty salary), but one criterion that such programs may affect is student retention (i.e., the number of freshmen who return and eventually graduate with the baccalaureate degree). Because the behavior-analysis emphasis was designed to fulfill the BACB requirements for certification as an Associate Behavior Analyst, we suggested to the administration that the unique nature of the proposed program would decrease the likelihood that students enrolled in the emphasis would transfer to another institution, thereby positively affecting the university's student retention rate.

A second *U.S. News and World Report* criterion that we addressed was alumni financial contributions to the university (this measure is used to gauge alumni satisfaction). We emphasized that many of the graduates of the emphasis would be immediately employed after graduation and would be likely to see the connection between this employment and their training. Thus, these individuals, we argued, may be more likely to contribute financially to the university. Likewise, those graduates who go on to graduate school may be more likely to give money to their undergraduate institution if they perceive the behavior-analysis emphasis as a unique program that instilled in them an interest in behavior analysis and prepared them to succeed in graduate school.

The potential connection between the proposed behavior-analysis emphasis and improved *U.S. News and World Report* rankings was, in our opinion,

not terribly convincing, so we also appealed to the administration's desire to demonstrate their contribution to the local community. Administrators are increasingly asked to demonstrate that their institution is engaged in bettering the local community (e.g., National Association of State Universities and Land Grant Colleges, 1999), and we argued that training students to provide applied behavior analysis services to individuals with developmental disabilities or autism would be an example of community service. Further, because our students would be completing extensive internships with these populations, we argued that these services would attract local media attention (which they did).

Finally, we appealed to the administrators' compassion by asking them to view a short piece produced by ABC News (Bettag, 2001) on the efficacy of and need for applied behavior analysis in the treatment of children with autism. This is a well-produced piece with a pro-behavior-analysis message. This emotion-provoking episode makes it clear that behavior-analytic services are effective, expensive, and inadequately available.

Eventual support from psychology department faculty. With support from students, the community, and administration, the department curriculum committee (and eventually the full faculty committee) voted overwhelmingly in favor of creating the behavior-analysis emphasis. Individual courses proposed under the emphasis had to be reviewed by two separate curriculum committees, but these were approved with no further objections.

BUILD IT (AND ADVERTISE IT) AND THEY WILL COME

The behavior-analysis emphasis was launched with an introductory behavior analysis course in the fall of 2000. Enrollment was low, with only 20 students taking a course designed for 25. Only 19 students enrolled the following fall semester. Given student enthu-

siasm for the emphasis in our e-mail survey (see above), we were surprised with these somewhat anemic enrollments. We suspected that departmental and administrative support for the emphasis would soon wane if we were not serving a significant proportion of the psychology majors.

Thus, we began advertising via an oral presentation to students who were enrolled in a one-credit course designed to help freshman and sophomore psychology majors and minors to plan their future in psychology (this advertising could just as easily be done in introductory psychology courses). Our advertising strategy, like our e-mail survey, was based on our armchair functional analysis of student behavior. We began our presentation by establishing that most psychology majors want to practice psychology but they cannot do this unless they go to graduate school. Next we described to them the sorts of qualifications that graduate programs typically look for when considering applications (students love this "insider information" and really pay attention). Of course, grades and GRE scores are minimal requirements, but beyond this, experience outside the classroom and strong letters of recommendation distinguish a successful application. This introduction was designed to establish as reinforcers those opportunities available to students who complete the behavior-analysis emphasis.

Our early presentations focused on the 6-month internship that students in the emphasis would be taking. Such an opportunity, we argued, is rare for undergraduates and would enhance the student's chances of being accepted into the graduate school of his or her choice. In addition, because students who complete the internship would meet weekly with a faculty supervisor and more frequently with an internship site supervisor, these individuals could write strong letters of recommendation for the student. We also spoke to those students who did not wish to pursue graduate school. We argued that with

the Associate Behavior Analyst credential from the BACB, graduates of the emphasis would have several local and long-distance employment opportunities working with autistic children. Students expressed interest in the emphasis following these presentations, and the introductory behavior analysis course filled to capacity in the following two semesters.

One year later we added two components to our advertising presentation. First we showed students the ABC News video presentation about behavioral treatment of autism (Bettag, 2001). As noted above, this is a 30-min program that provides an inside view of applied behavior-analytic treatment of children with autism and provides two cases that illustrate the range of successes that have been documented in the clinical literature (e.g., Lovaas, 1987). The program makes it clear that not enough applied behavior analysts are available to meet the demand for such services and that training in behavior analysis is a good career choice.

Our second addition to these presentations was to talk about research opportunities afforded students in the emphasis. Once again, we began by establishing that research experience could aid the student in his or her bid to enter graduate school. We noted that most graduate degrees in psychology involve completing a research project and that graduate student selection committees would positively view research experience (including laboratory experience working with animal subjects). Because our practice had always been to recruit research assistants from the top students in our classes, and because students trained in behavior analysis would make better research assistants given our areas of research, we could advertise exclusive research opportunities for students who performed well in emphasis course work.

Our final advertising strategy was to invite freshmen and sophomores with at least a 3.0 grade-point average to enroll in the first class in the emphasis.

This was done via e-mail using grade records available to faculty. These invitations were well received and appeared to increase the quality of students who entered the program. They also decreased the probability that academically talented students would graduate without having taken at least one course in the emphasis.

Which, if any, of these advertising strategies were effective is unclear, but demand for the introductory class increased after these changes were made. Subsequently, the enrollment cap increased to 30 students per semester. Currently 48 students are enrolled in the class. If this represents an enrollment asymptote, then approximately 60% of all psychology majors will be taking our introductory course.

CASTING A WIDER NET

In our experience, if one asks psychology majors about their plans after graduation, most say that they want to go on to graduate school. If one asks them what they want to study, most say clinical or counseling psychology. Further inquiries reveal that their interest in these topics has been influenced less by their course work and more by economics (i.e., the prospects of obtaining a high-paying job) and the portrayal of psychologists on television and in the movies. (The recent increase in student interest in forensic psychology may be related to positive portrayals of these professionals in movies such as *Silence of the Lambs* and television shows such as *Profiler*.) A subset of those students who have yet to decide on a career path are talented and highly motivated. Many of these will succeed in earning good grades and admission to a graduate program in traditional programs in clinical or counseling psychology. Many of these students, however, could be interested in behavior analysis if they had systematic course work in the area. We have found that enrolling a significant portion of our undergraduate psychology majors in our introductory behavior analysis

course has resulted in a larger portion of those talented students developing an interest in graduate study in behavior analysis. The continuation of behavior analysis as a cultural practice requires a constant influx of new and talented behavior analysts. Graduate programs in behavior analysis require talented students with sufficient training in behavior analysis. Increasing the number of undergraduates who complete the course work specified by the BACB may strengthen these graduate programs through increased applications by talented students. By exposing more psychology majors to behavior analysis courses, we cast a wider net, thereby "capturing" the next generation. These talented individuals will one day make the discoveries that advance the field and ensure that the wider culture recognizes our technological advances, which in turn will justify further support of our research endeavors.

A CULTURE OF EXCELLENCE

A final strategy that we have employed in our attempt to train a strong next generation of behavior analysts has been to create a culture of excellence in the behavior-analysis emphasis. Our goal was to attract a large number of students to the emphasis and to employ a "shaping approach" to develop skills that would serve our students well in graduate school. The first approximation in this shaping procedure is the first class in the emphasis, which uses a programmed instruction textbook that students rate very highly. Most students report that this format makes it easy to acquire an understanding of the basic principles of operant conditioning. Excellence is fostered by requiring that students earn an A to continue in the emphasis. Due to the format of the textbook and the mastery approach to testing (students may take three different versions of chapter quizzes until they have obtained 90% correct or higher), it is typical for over 50% of the students to achieve this

goal. The next course is a bit more difficult, in that it employs a more traditional textbook and is supplemented with a number of articles from the primary literature. An emphasis is placed on in-class discussion, and students are required to complete a term paper. The final course has no textbook, relying instead on two to five articles from the primary literature each week. In addition, students complete a term paper and an animal learning project.

As students earn their A in the first course, learn to read the primary literature in the second, and then take a quasi-graduate-level course to finish the emphasis (all while engaged in laboratory or applied research in most cases), they begin to see themselves among the top students in the department. As such, they have become more involved in department governance, have won a number of department awards, and, when most of their peers go on to graduate school in behavior analysis, view themselves as on the graduate-school track. In the 3 years preceding the approval of the behavior-analysis emphasis an average of 1.33 students per year pursued graduate training in behavior analysis. In the 3 years since the first cohort of students to complete the emphasis graduated, an average of 6.8 students each year went on to study behavior analysis in graduate school.

With over 50 students currently en-

rolled in the emphasis beyond the first class, we have high hopes that an even larger number each year will pursue graduate training in behavior analysis. We believe that this model of undergraduate training may be exported to other universities and that the future of behavior analysis can be strengthened by such efforts. A science is only as good as those who know it and contribute to it. If we do not put forth a strong effort to train a new generation of behavior analysts, we will leave the field weaker than when we entered it. Cultural practices that head in this direction are doomed to extinction.

REFERENCES

- Bettag, T. (Executive Producer). (2001, March 9). *ABC News Nightline: To find the words* [Television broadcast, episode N-010309-01]. New York: American Broadcasting Company.
- Croen, L. A., Grether, J. K., Hoogstrate, J., & Selvin, S. (2002). The changing prevalence of autism in California. *Journal of Autism and Developmental Disorders*, 32, 207–215.
- Fombonne, E. (2003). The prevalence of autism. *Journal of the American Medical Association*, 289, 87–89.
- Lovaas, O. I. (1987). Behavioral treatment and normal educational and intellectual functioning in young autistic children. *Journal of Consulting and Clinical Psychology*, 55, 3–9.
- Monks, J., & Ehrenberg, R. G. (1999). *U.S. News and World Report's* college rankings: Why they do matter. *Change*, 31, 42–51.
- National Association of State Universities and Land Grant Colleges. (1999, February). *Returning to our roots: The engaged institution*. Retrieved September 12, 2002, from <http://www.nasulgc.org/Kellogg/kellogg.htm>