The Munroe-Meyer Approach: Continuous Integration of Didactic Instruction, Research, and Clinical Practice

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Abstract Increased demand for applied behavior analysis (ABA) services has increased the need for additional masters-level practitioners and doctoral-level academicians and clinical directors. Based on these needs, the University of Nebraska Medical Center's (UNMC) Munroe-Meyer Institute has developed a PhD program. The academic structure at UNMC allowed us to create our PhD program in a relatively quick and efficient manner. Our PhD program has many unique features, including (a) close integration of didactic instruction with clinical and research training provided by

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The authors are listed in reverse alphabetical order, which was selected over alphabetical order by a coin flip. Valerie M. Volkert is now at the Marcus Autism Center and Emory University School of Medicine. We thank Victoria L. Smith for her assistance in gathering the data reported herein.

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leading experts in ABA in which students immediately apply concepts introduced in the classroom during coordinated clinical and research practica; (b) structured grant writing training in which students learn to write and submit an NIH-level grant; (c) financial support in the form of a stipend of \$23,400 per year, free health benefits, and a full-tuition waiver for up to 12 credits per semester for UNMC courses (a benefits package worth approximately \$50,000 per year for an out-of-state student); and (d) encouragement and financial support to present papers at local, regional, and national behavior analysis conferences.

Keywords Behavior analysis · Graduate training · Munroe-Meyer Institute

The growth in demand for applied behavior analysis (ABA) services for autism and other conditions has created both opportunities and potential pitfalls for the discipline of behavior analysis. For example, this growth in the demand for ABA services has greatly increased employment opportunities as evidenced by the sharp increase in the number of Behavior Analyst Certification Board® (BACB®) certificants from a little over 3000 in the early 2000s to more than 23,000 today. Parallel growth has occurred in the number of registrants at the annual convention of the Association for Behavior Analysis International (ABAI; Kangas & Vaidya, 2007). However, this growth has also resulted in a greater division between the basic and applied branches of our discipline (Critchfield, 2011). Moreover, much of the growth in the number of practicing behavior analysts has been individuals who have completed master's degrees built around the BACB course requirements. Training many individuals at the master's level is critical to meeting the increasing demand for ABA services. However, the BACB course requirements specify minimal competencies for ABA practitioners, but not optimal competencies in all of the major areas of ABA, which are critical for the future development of the discipline. That is, for behavior analysis to grow and prosper over the long term, it is important that, at a minimum, a sizable minority of its incoming professionals develop more optimal competencies not only in clinical practice but also in clinical and translational research and in effective instructional strategies for teaching behavior analysis. Without a continual influx of budding leaders in all of these important areas of ABA, the discipline is likely to stagnate. Said another way, the discipline needs both additional practitioners who meet the minimum standards of competency and leaders (e.g., academicians, clinical directors) who are trained to the highest standards.

The faculty at the University of Nebraska Medical Center's (UNMC) Munroe-Meyer Institute (MMI) have a long history of training upcoming professionals in clinical, research, and teaching methods through its predoctoral internship and postdoctoral fellowship programs, producing more than 200 graduates from these programs to date. Nevertheless, we have long recognized that many of these trainees (most of whom have come from child clinical or school psychology doctoral programs) have had somewhat limited didactic instruction in (a) the theoretical foundations of behavior analysis, (b) the basic principles and experimental analysis of behavior, (c) the analysis of verbal behavior, and (d) the analysis of functional behavioral relations using single-case experimental designs. Based on the growing need in the discipline of ABA for leaders with strong foundational skills in these essential content areas and equally strong competencies in clinical practice, research, and instructional methods, we decided that MMI should initiate a PhD program that would train future leaders for our field.

Graduate Studies at UNMC

Faculty motivation served as a primary impetus for the development of the PhD program. Collectively, we had many years of experience training predoctoral interns and postdoctoral fellows prior to initiating the PhD program. Although it had been a pleasant and rewarding experience working with these trainees, they typically spend only a year with us, which limited the degree to which we could impact their professional and scholarly development. The ability to work with a graduate student over the course of either 2 or 3 years also presented the opportunity for the faculty at UNMC to benefit directly from the PhD training program. For example, graduate students assume lead roles in the context of programmatic lines of research that operate within MMI. Many, if not all, of these multi-year research projects would be impossible without the continued dedication and commitment of the PhD students. In addition, we find that the PhD students continually enhance the quality of our clinical services as well as that of our research programs.

Another factor that greatly facilitated the development of our PhD program was the flexible structure of the Graduate Studies program at UNMC. We developed MMI's PhD program in ABA through the UNMC Medical Sciences Interdepartmental Area (MSIA), which is a component of Graduate Studies at UNMC intended for students who wish to pursue individually designed graduate programs of an interdisciplinary nature within the medical sciences. Graduate faculty of MMI participate in the sponsorship of graduate students in the MSIA program in a variety of content areas such as ABA, health-services research, human genetics, neurological sciences, and rehabilitation science. The MSIA program is highly flexible in that a graduate program of study can be developed for (a) an individual student who wishes to study in a highly specialized area (e.g., assessing sinusoidal and chaotic rhythm patterns in the movements of children with autism) or (b) a group of students who wish to follow a common curriculum that meets specific professional standards (e.g., our PhD program in ABA that is accredited by ABAI). In addition, the MSIA program allowed us to create our PhD program in a relatively quick and efficient manner. For example, had we attempted to create a free-standing PhD program in ABA, we would have had to create our own academic infrastructure (much as a new college would), and the program would have required a new and unique funding line and approval from the Board of Regents for the University of Nebraska System, something that would have been nearly impossible in the aftermath of the Great Recession. Finally, the Graduate College at UNMC routinely waives tuition for graduate students in the MSIA program who work in faculty research laboratories as graduate research assistants and who are paid a stipend at the level commensurate with the recommendations of the National Institutes of Health (NIH). These unique aspects of the MSIA made it a fertile and inviting environment in which to plant and grow our new program.

The MMI Approach to ABA Training

As mentioned above, our PhD program is accredited by ABAI. In addition, to the best of our knowledge, it is the first doctoral training program in ABA to be integrated with a University Center of Excellence in Developmental Disabilities (UCEDD). Our UCEDD is part of a national network of university-based centers funded by the federal government that are designed to serve as a national resource for confronting issues, identifying

solutions, and promoting research that addresses the needs of individuals with intellectual and developmental disabilities and their families. The four core functions of each UCEDD are (a) providing preservice training and continuing education to professionals who serve individuals with developmental disabilities; (b) promoting and conducting basic and applied research, evaluation, and public policy analysis; (c) disseminating information; and (d) delivering empirically supported community services, including direct services, technical assistance, training, and demonstration projects.

Our PhD program integrates comprehensive didactic and experiential instruction in which renowned leaders in ABA serve as faculty. Many of these faculty existed at MMI well before the PhD program was developed and contributed to the ease with which the program was able to get started. Since then, faculty have been recruited primarily to complete responsibilities other than teaching in the PhD program. For example, Dr. Nicole Rodriguez coordinates our Early Intervention Program and Dr. Brian Greer is a Case Manager within the Severe Behavior Disorders Program. However, in the recruitment of new faculty, careful consideration was also given to their ability to serve as mentors, advisors, and professors of PhD students across all domains of students' training (e.g., clinical, research, and didactic).

The faculty introduce principles and concepts of behavior analysis during a variety of core and elective courses (see Table 1), and students immediately apply those concepts in coordinated clinical and research practica. Students receive structured training in grant writing and preparation, and most students write and submit a grant as part of their comprehensive examination, which could provide support for establishing a new line of research. Some students write and submit for publication a critical review paper in lieu of writing a research grant proposal. The final products often lead to publishable reviews or a federal grant proposal that is submitted to the NIH or a similar agency. Students complete a dissertation project that demonstrates conceptual and technical mastery of ABA, research design, and the specific, extant research literature relevant to the project. As part of the PhD program requirements, students submit a version of their dissertation to a peer-reviewed journal for possible publication prior to graduation. Every year,

Table 1 MMI PhD program in ABA curriculum

Core courses	Elective courses
Experimental and Quantitative Analysis of Behavior	Assessment and Treatment of Severe Behavior Disorders
Assessment and Treatment of Child Psychopathology	Behavioral Psychology in Autism and Related Disorders
Advanced Methods in Single Case Research	Behavioral Psychology of Parent-Child Interaction and Training
Behavioral Psychology of Development Across the Life Span	Community Applications of Applied Behavior Analysis
Analysis of Verbal Behavior	Applied Behavior Analysis in Education
Seminar in Research Grantsmanship	Behavioral Pediatric Psychology
Research Practica (Psychology, CASD)	Statistical Methods I or II (University of Nebraska Omaha [UNO])
Dissertation Research	Ethics and Law for Psychologists (via UNO)

almost all of our students in the PhD program present papers and posters at local, regional, and national behavior-analysis conferences (e.g., ABAI). In addition, many students graduate from the program having authored multiple articles published in peer-reviewed journals. To date, past and present students have successfully published a total of 38 scientific papers, all generated during their time in the program.

Our students are actively involved in research, in part, because our faculty are active and productive researchers. Recently, Dixon, Reed, Smith, Belisle, & Jackson, (2015) reported research rankings for training programs in behavior analysis and their faculty. Although our graduate training program met the inclusion criteria for this study, we were excluded because the investigators had difficulty navigating our website (D. D. Reed, personal communication, May 6, 2015). If our program had been included in their study, we would have ranked fifth in total faculty publications, between the University of Kansas and Western Michigan University. In addition, two members of our faculty, Drs. Fisher and Piazza, would have ranked second and fourth, respectively, among faculty with the most publications in the *Journal of Applied Behavior Analysis*.

When students take specific courses (e.g., Assessment and Treatment of Severe Behavior Disorders), many of the students in the course are simultaneously completing a practicum in the corresponding clinic (e.g., The Severe Behavior Disorders Program). These students bring real-life and real-time examples, issues, and questions to the class discussion based on their actual clinical and research experiences in the corresponding practicum. Few, if any, other programs integrate academic training, research, grant writing, and clinical service in such a comprehensive manner.

The Faculty and Clinics Associated with the ABA Program

The PhD training program at MMI benefits from the unique contributions of 20 graduate faculty, spanning four departments and 18 programs and clinics. Table 2 displays organizational information by faculty member. The majority of faculty in our PhD program hold doctoral-level certifications from the BACB, and 85% of faculty (17 of 20) are involved in two or more training programs or clinics. Most faculty members are also licensed as a psychologist or a mental health practitioner. Students who attend our PhD program can sample multiple areas of application (e.g., Behavioral Pediatrics, Autism Diagnostic Clinic, Family Behavior Management) or become an expert in a single specialization (e.g., Pediatric Feeding Disorders Program). Across programs, faculty place special emphasis on simultaneously developing the clinical and research skills necessary to conduct patient-oriented research, as well as skills to develop, refine, and ultimately obtain funding for more programmatic lines of research. Our faculty have combined to publish over 470 peer-reviewed articles in over 145 different behavioral or medical journals. This extensive research and publication history has been supported by over \$21.4 million in intramural and extramural research and training grant funding.

Financial Support for PhD Students

Students enrolled in our PhD training program receive a number of financial benefits. All students receive a full-tuition waiver (i.e., the equivalent of a full-tuition

Table 2 MMI PhD program faculty by department and program or clinic

Faculty	Year faculty started	Department	Program or clinic
Keith D. Allen, PhD, BCBA-D	1987	Psychology	IBH/BP/CP
Joseph H. Evans, PhD	1986	Psychology	IBH/BP/ADHD/ACT
Wayne W. Fisher, PhD, BCBA-D	2005	CASD	SBD/EI/VC/AD/FBM
Brian D. Greer, PhD, BCBA-D	2014	CASD	SBD
Allison Q. Grennan, PhD	2013	Psychology	IBH/BP
William J. Higgins, PhD, BCBA-D	2014	Psychology	IBH/BP
Brett R. Kuhn, PhD, C.BSM	1995	Psychology	IBH/BP/SL
Sara S. Kupzyk, PhD, BCBA-D	2013	Psychology	IBH/BP/AEI
Kevin C. Luczynski, PhD, BCBA-D	2011	CASD	VC
Terri L. Mathews, PhD, APRN, BCBA-D	2008	Psychology & Developmental Medicine	IBH/BP/ACT
Katheryn M. Menousek, PhD, BCBA-D	2013	Psychology	IBH/BP
Suzanne M. Milnes, PhD	2012	PFD	IO/IR
Kathryn M. Peterson, PhD, BCBA-D	2015	PFD	IO/IR
Cathleen C. Piazza, PhD, BCBA-D	2005	PFD	IO/O/IR
Holly J. Roberts, PhD	2007	Psychology	IBH/BP
Nicole M. Rodriguez, PhD, BCBA-D	2011	CASD	EI
Mark D. Shriver, PhD, BCBA-D	1994	Psychology	BP/AEI
Rachel J. Valleley, PhD	2002	Psychology	IBH/BP
William J. Warzak, PhD, BCBA-D	1987	Psychology	IBH/BP/NB
Amanda N. Zangrillo, PsyD, BCBA-D	2013	CASD	SBD/AD/FBM

CASD Center for Autism Spectrum Disorders, *PFD* Pediatric Feeding Disorders Program, *IBH* Integrated Behavioral Health Clinic, *BP* Behavioral Pediatrics, *CP* Cerebral Palsy Clinic, *ADHD* Attention Deficit Hyperactivity Disorder Evaluation Clinic, *ACT* Autism Care for Toddlers, *SBD* Severe Behavior Disorders Program, *EI* Early Intervention Program, *VC* Virtual Care Program, *AD* Autism Diagnostic Clinic, *FBM* Family Behavior Management, *SL* Sleep Lab, *AEI* Academic Evaluation and Intervention Clinic, *IO* Intensive Outpatient Clinic (Pediatric Feeding Disorders Program), *IRP* Intestinal Rehabilitation Program, *O* Outpatient Clinic (Pediatric Feeding Disorders Program), *NB* Neurobehavioral Clinic

scholarship) for up to 12 credits per semester for UNMC courses, which is jointly funded by our clinical programs, the administration of MMI, and the graduate school. The tuition waiver covers 2 years of didactic coursework and practicum training, 1 year of internship training, and research credits for students to complete their dissertation during the 3-year period. While enrolled in the program, students work and receive supervised training from leading ABA experts within the Institute's clinical and research programs for approximately 20 hr per week. This manageable workload allows students to receive specialized and practical training while accommodating for time spent completing coursework. All students receive a clinical-research stipend for their 20 hr of practicum work at a level commensurate with the NIH guidelines. Currently, the stipend is set at \$23,400 per year, and we plan to increase stipends as the NIH guidelines change. Each student receives his or her own desk within a shared office space specifically created for trainees of the program and located within the Institute.

MMI pays each student's health insurance fees in full, a benefit that is specific to our PhD students. The Institute or the departments in which the students are placed often provide financial support for travel, meals, and accommodations for students who present research findings at regional or national conferences. In addition, MMI covers some expenses related to professional development, including the costs associated with maintaining BCBA certification if MMI bills for services provided under the student's BCBA credential. Combining the tuition waiver, stipend, health benefits, and professional development opportunities, the program essentially offers a "full-ride" scholarship that is worth more than \$50,000 per year for an out-of-state student, setting this program apart from many others. Given the low cost of living in Omaha, Nebraska, our graduates are typically able to complete their PhD training without student loans or secondary employment. With this high level of financial support, PhD students can focus fully on the development of their clinical, research, and instructional skills.

Growth and Quality Control

The applicant pool for our PhD program has approximately quadrupled since its inception year in fall of 2009, and the number of applicants has continued to increase steadily as awareness of our PhD program in the discipline has grown. Despite the growth in the number of applications received, we have intentionally maintained a relatively low enrollment each year ($M=4.5$, range 1 to 7). The rationale for keeping the incoming class size relatively low is twofold. First, we are committed to providing full financial support to our PhD students because we believe that this level of support is important to the students and the program. Doing so allows our students to focus on their training rather than the additional stressors that accompany financial burdens, and our high level of support expresses our commitment to their success. The maximum number of students admitted per year is dictated by the number of funded positions that we can confidently support for 3 years. Since the program's inception, we have supported our PhD students using funds from MMI's administration pooled with funds from the following MMI departments: (a) the Psychology Department, (b) the Center for Autism Spectrum Disorders, and (c) the Pediatric Feeding Disorders Program. Internal and extramural grant funds have often allowed us to enroll additional students.

A second reason for keeping our incoming class sizes small is that we believe it is important to the success of our students and our clinical programs to carefully consider the fit between each applicant and our training model. Beyond meeting the basic program requirements, we look for students with both the potential and motivation to grow as scholars and scientist-practitioners. The combination of these factors has contributed to the quality of our students' training, which has impacted their ability to secure leadership positions following graduation. For example, in accordance with their professional goals (and the program's goals), each of our graduates has obtained a position as a clinical director of a program offering ABA services, a postdoctoral fellow, or a faculty member at a university offering graduate training in ABA (e.g., Johns Hopkins University School of Medicine, West Virginia University, St. Louis University, University of Alaska). Finally, two graduates have remained and joined the faculty of MMI's PhD program in ABA as scientist-practitioners.

The MMI Training Model

It is the mission of our PhD program to engender our students with (a) motivation that promotes continual self-improvement and development and (b) independent study, investigation, and research skills in ABA that will prepare them for prominent leadership positions in academic, clinical, and research arenas. The guiding philosophy of the program is that learning is maximized by integrating didactic and experiential instruction, such that principles and concepts introduced in the classroom are immediately applied in coordinated clinical and research practica. The training program follows the scientist-practitioner model in that we provide students with intensive didactic instruction in combination with hands-on experience in clinical research and the delivery of empirically supported clinical services. We encourage students to discuss their clinical and research experiences in their didactic courses to facilitate cross pollination. In addition, students participate in peer-review meetings multiple times per week in which students and staff present data from clinical and research cases, and students, staff, and faculty discuss these data. Students are required to attend the peer-review meetings for the program(s) to which they are assigned, and we encourage them to attend peer-review meetings for other programs to expand their knowledge. Our faculty members teach the didactic courses, chair thesis and dissertation committees, lead grant-funded and patient-oriented behavior-analytic research teams, and administer and supervise the clinical and research programs in which the students receive their hands-on clinical and research experiences.

Central to the philosophy of the program is the proposition that behavior analysis should be taught and practiced as a natural science. The principles and procedures of behavior analysis form the basis for effective and ethical clinical services and for expanding our understanding of both aberrant and prosocial behavior through ongoing research. A primary goal of the program is to train students to combine scientific knowledge with clinical research and practice as an integrated and unified entity rather than multiple distinct activities. As such, we emphasize empirical, data-based approaches to the study of behavior and the practice of ABA. We expect students not only to follow current standards of practice based on the extant research literature, but also to strive to continually refine clinical procedures and generate new knowledge through integrated clinical research. Effective clinical services should be informed by prior research and should also kindle future socially relevant research. Thus, the goal of our training program is to produce scientist-practitioners who skillfully provide the most advanced, empirically supported behavior-analysis services currently available and who engender the continual refinement of behavioral assessments and interventions for a variety of human problems through systematic clinical research.

Recommendations for PhD Program Development

If someone planned to initiate a PhD program in ABA within a medical center similar to ours, we would recommend the following activities. A good starting point would be to request a meeting with the dean of graduate studies at the medical school. The dean should be able to determine if there are any existing academic departments or structures into which such a program might fit. If an existing academic department or structure

could potentially accommodate the PhD program, we suggest talking with the directors of other PhD programs housed in that department or structure. It will be important to determine (a) what costs, if any, are associated with participation in that department or structure (e.g., a dean's tax); (b) whether it is possible to waive tuition for students who function as teaching or research assistants; (c) how new courses are reviewed and approved; and (d) how faculty members are credentialed as members of the graduate faculty.

We developed a PhD program in ABA with almost no start-up funds because the MSIA program was originally developed to accommodate basic science laboratories that had a few PhD students each, and the researchers in those labs taught courses for their students without additional remuneration. We adapted a similar practice by slightly lightening a faculty member's other responsibilities (e.g., supervising fewer clinical cases, adjusting expectations for writing) during semesters in which the faculty member teaches a didactic course in our PhD program. Furthermore, we were able to take advantage of the existing infrastructure (e.g., Graduate Studies office), which minimized the need for additional administrative support.

To develop a program of study, we suggest consulting the ABAI accreditation requirements for doctoral-level courses, as well as the coursework of other high-quality PhD programs. Core and elective courses should be based on these materials, as well as the specific strengths of the program, including the strengths of the faculty and available clinical practica. For example, several faculty in the Psychology department have clinical expertise in the assessment and treatment of child psychopathology (a core course) and experience applying ABA in the community and in education (two elective courses), whereas the Assessment and Treatment of Severe Behavior Disorders course is taught by one of the faculty in the Severe Behavior Disorders Program. In short, all courses are taught by faculty with conceptual and practical expertise in that area.

We have been fortunate that the MMI administration has been able to match departmental funds to provide a sizable stipend to our students. Even if such support is unavailable, program developers might be able to identify sources of funding via supervised clinical practica or graduate teaching assistantships. Such educational and professional development experiences often generate revenue, which can then be redirected to the students themselves, thus shoring up financial assistance while simultaneously advancing student qualifications. Program developers might also find that their university has a mechanism for providing internal funds for students who present at regional and national conferences. We encourage our students to apply for all applicable university-sponsored scholarships.

In conclusion, our model facilitated the rapid development and approval of MMI's PhD program in ABA within UNMC. We believe that it is a model that is easy to sustain because the costs associated with initiating and running the program remain low, and the students are well-integrated contributors to our clinical and research endeavors.

Compliance with Ethical Standards

Conflict of Interest All authors declare that they have no conflict of interest.

Ethical Approval This article does not contain any studies with human participants or animals performed by any of the authors.

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