

# A Vision for Doctoral Research Training in Health Behavior: A Position Paper from the American Academy of Health Behavior

American Academy of Health Behavior Work Group on Doctoral Research Training<sup>a</sup>

**Objective:** To establish and disseminate the position of the American Academy of Health Behavior (The Academy) on doctoral research training. **Methods:** A collaborative process involving the Work Group on Doctoral Research Training with input from The Academy membership led to the development of the guidelines described herein. **Results:** A set of guidelines is provided that describe the process of learning to be a scholar/researcher

and the outcomes of learning the practice of health behavior research. **Conclusions:** The doctoral students who are to become the stewards of our field should be prepared to engage in scholarship that creates new knowledge, uses research to transform practice, and effectively communicates research findings.

**Key words:** doctoral education, research training

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The Woodrow Wilson National Fellowship Foundation<sup>1</sup> notes that complacency seems to characterize current views on doctoral education in the United States. Echoing this theme, the Carnegie Foundation for the Advancement of Teaching<sup>2</sup> has called for a revitalization of doctoral education. One problem facing many disciplines, including the health behavior field, is the lack of guidelines for insuring that doctoral students receive strong training in the crucial elements of scholarly inquiry and the practice of research.<sup>3</sup> To prepare doctoral students to be scholars capable of generating new knowledge, and to expand the research base of the health behavior field, investments must be made in doctoral

research training.

In this paper, The Academy offers a vision for doctoral research training to which we hope the discipline will aspire in the coming years. Part I describes the *process* of learning to be a scholar/researcher in the health behavior field, including the learning conditions, opportunities, and resources needed to provide excellent research training at the doctoral level. Part II identifies the *outcomes* of learning the practice of health behavior research.

The paper is intended to establish a conceptual foundation for the discussion of critical issues on this subject. It represents a starting point, not the last word, on a set of problems that has beleaguered many disciplines in recent years.<sup>4</sup> We do not expect that all disciplines involved in health behavior research will achieve consensus on all of the positions taken by The Academy in this paper. We do hope the work stimulates critical discussion about the quality of training currently being provided to prepare doctoral students to engage in significant scholarly

<sup>a</sup> The Academy Work Group was Chaired by Dennis L. Thombs. The group is listed in alphabetical order in Appendix A.

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inquiry and research.

Health behavior researchers come from a variety of disciplines, including but not limited to health education and health promotion, nursing, psychology, anthropology, sociology, social work, and medicine. The standards and mechanisms of doctoral education vary across these disciplines. The focus of this paper, and the examples used, are concerned primarily with training health behavior researchers, not students in disciplines that may have only a collateral interest in human health. Furthermore, the intention of The Academy is not to explain how the guidelines described herein should be implemented by academic programs. Therefore, the paper offers no recommendations for an interdisciplinary implementation of doctoral training. However, we recognize that many of these recommendations are sufficiently broad and extend beyond our field, and thus may be applied to other disciplines.

#### METHOD

As the chair of The Academy's Professional Development Council, Dennis L. Thombs led the collaborative effort to create this paper. The inspiration to develop it can be traced to informal discussions that occurred among attendees at the First Scientific Meeting (2000) of The Academy in Santa Fe, NM. In 2002, calls were made to the membership of The Academy to create the Work Group on Doctoral Research Training. Following several solicitations for participation in the initiative, a series of early drafts of recommendations was circulated among the membership. At the Third (2003) and Fourth (2004) Scientific Meetings of the Academy, colloquia were held to recruit additional members for the Work Group and to discuss the development of a set of guidelines for doctoral research training. The 9 original members of the Work Group published an editorial in the *American Journal of Health Behavior* to announce the initiative and to garner further support for it.<sup>5</sup> In addition, the Work Group's progress was discussed at several Academy Board of Directors meetings. By 2004, more than a dozen members of The Academy were actively involved in preparing different sections of this paper and providing critical reviews of the contributions of other Work Group members.

#### PART 1

##### **The Process of Learning to Be a Scholar/Researcher: Core Values in Doctoral Research Training**

Values play a significant role in guiding all human behavior. One type or set of values is *core values*. Core values are shared values or beliefs held by a collective body or group about certain endeavors, actions, or behaviors relative to the collective values or beliefs of the entire body or group. These values are important for groups as well as individuals for making decisions about the appropriateness or inappropriateness of engaging in certain decisions or behaviors. In doctoral research training programs, it is important that core values be made explicit to aid in their mutual understanding by both students and faculty. The identified core values have been annotated from a variety of sources and are endorsed by The Academy.<sup>6-13</sup>

**(A) Research or discovery is a priority.** Learning and engagement are important higher education missions, but they are subservient to discovery as a means for enhancing the health of the population. In doctoral-level research training programs, generating new knowledge is a professional obligation and responsibility.

**(B) Research should be conducted for the sake of discovery.** The work should be free of hidden agendas. Researchers must be aware of their biases and communicate them openly when discussing their research.

**(C) Research excellence is "the" standard.** Research training programs must pursue and be committed to research excellence. Priority is given to conducting systematic studies that are credible (internal validity), transferable (external validity), dependable (reliability), and confirmable (neutrality).

**(D) Ethical conduct and research integrity are requirements.** Students are to be given opportunities to evaluate the risks and benefits of research participation critically and will be able to identify appropriate human subject protections. All research involving human participants are conducted in accordance with human subject requirements and carried out under approved research protocols. Research is conducted with respect for human decency; rights to privacy; informed consent; and personal safety, confidentiality, and well-being of and com-

mitment to study participants. Faculty and students must forthrightly share and disclose relationships that may be advantageous or may lead to biased reporting or the perception of bias, and they must conduct interpersonal and interdisciplinary relationships in a professional manner.

**(E) Research should focus on pressing problems of public health significance.** Mentored research experiences should concentrate on investigating and solving critical problems important to improving society. Research pursuits of faculty and students should be aligned with the 10 leading health indicators identified in *Healthy People 2010*: injury and violence, physical activity, overweight and obesity, tobacco use, substance use, responsible sexual behavior, mental health, environmental quality, immunization, and access to care.<sup>14</sup>

**(F) Research training should stimulate creativity and innovation.** State-of-the-art methods should be a primary training focus. There also is a need for creative conceptualization of the causal and mediating processes that might be used to explain a gap in knowledge.

**(G) Altruism is necessary for creating a community of scholars to support a research training program.** For the good of science, scholars should forego personal goals when consulting with colleagues, mentoring, reviewing manuscripts for publication, and conducting research.

**(H) Effective research training relies on mentorship.** Mentorship is prized and accepted as a faculty responsibility as well as an opportunity to endorse research core values and guiding principles.

**(I) Adherence to publication conventions is important.** Use and endorse the IMRAD format of Introduction, Method, Results, and Discussion and multiple subheadings. Retention and protection of reviewers' confidentiality are expected and submission of manuscripts and reviewers' comments are confidential. Manuscripts should be published in peer-reviewed journals before receiving media coverage.

**(J) Studies that support the null hypothesis or report negative findings should be viewed as making a potential contribution to the knowledge base.** Studies that support the null hypothesis should be valued and published in peer-

reviewed journals. These reports should be published in a timely manner.

### **Establishing a Research Culture**

The recruitment of prospective doctoral students and the orientation of new doctoral students should emphasize that research involvement is an expectation and a primary feature of doctoral study.<sup>2</sup> Doctoral students should be encouraged to believe that they have an obligation, both to their institution and to their discipline, to create new knowledge as well as to disseminate it through publication, teaching, mentoring, public speaking opportunities, and other venues. Most important, research and teaching should be viewed as complementary forms of scholarship, rather than conflicting ones. Research can enhance the teaching and learning experience in the classroom through the sharing of new theories and advanced knowledge. Moreover, teaching and practice can help generate and test new research questions.

Establishing and maintaining a research culture requires faculty and student collaboration in a number of scholarly activities. A substantial and varied body of faculty research is needed to support a doctoral program, ie, a sufficient faculty capacity for significant research activity. Funded research activity is particularly important because of the opportunities it creates to support doctoral students. In addition, there is a need for graduate faculty who can provide high-quality research coursework designed specifically for the preparation of health behavior investigators. The rich research content and methodological issues to be garnered from the field of education and the fertile disciplines encompassing the social and behavioral sciences notwithstanding, coursework should place heavy emphasis on examples from health behavior research. Thus, the professional preparation of health behavior researchers should focus on injury and violence prevention, tobacco control, physical inactivity, high-risk sexual behavior, and other national health priorities (see *Healthy People 2010*<sup>14</sup>). Furthermore, departmental colloquia, involving students, should be held on a regular basis to discuss research problems and findings.

### **A Research Apprenticeship**

The mastery of research tools will re-

quire the doctoral student to work with faculty members, as an apprentice, on research projects and other scholarly work. In this capacity, doctoral students should be expected to have coauthored data based publications before graduation (or at least have papers accepted for publication). It should be recognized that many research tools will not be mastered as a result of classroom learning. There is a long and steep “learning curve” for competence in research. Thus, doctoral students should be engaged in research at the beginning of their program of study, and they should be exposed to the entire research process, including the proposal and budget development of grant applications. The dissertation project should not be the student’s first and only research experience in a doctoral program.

Compared to baccalaureate and master’s level education, doctoral study should be a highly concentrated learning experience. The student should expect to be immersed in the discipline. In most circumstances, full-time employment of the doctoral student during this period of time should be considered unrealistic by both the student and the faculty.

### **The Qualifying or Comprehensive Examination**

Doctoral preparation in the basic theory and research methods of our field typically begins in foundation coursework, where students are exposed to national health priorities (injury prevention, HIV/AIDS prevention, etc), the seminal research studies, major theories, conceptual models and classic research methods in the field. Beyond the individual course level where students demonstrate their mastery of the material of each course’s subject matter, there also is a need for a formal mechanism that tests the student’s ability to synthesize a body of research and apply theory toward a science of evidence-based practice. Within the evaluation parameters of a single course, it may be adequate for students to demonstrate their knowledge of theories. However, to engage in the types of scholarship expected in the profession, doctoral students must be able to apply theories and concepts to researchable questions.

Research in the health behavior field is decidedly applied in nature, and therefore, the involved disciplines need to pro-

duce professionals who can function effectively in this arena. Although doctoral students will acquire research tools through coursework, many practical research skills can be learned by working with faculty and more experienced students on research projects, and through other experiential features of their graduate program. Thus, the qualifying or comprehensive examination represents an important evaluation milestone for assessing a doctoral student’s potential for engaging in the scholarship of discovery, integration, and application, as described by Boyer.<sup>15</sup> This examination typically occurs prior to the dissertation and is the benchmark used to determine the doctoral student’s advancement to candidacy. That is, the student is no longer a doctoral student, but a doctoral candidate, and is qualified to begin significant research – the dissertation – under the supervision of a faculty advisor.

Some doctoral programs will require students to sit for this exam relatively late in their program, after all coursework has been completed and the only requirement to complete is the dissertation. This approach assesses students’ ability to engage in advanced forms of scholarship after they have been exposed to all the formal and informal elements of their training. Other doctoral programs will require students to sit for this exam relatively early in their program, that is, after their basic or foundation course work has been completed, but before they take more advanced and specialized coursework. The aim of this approach is to identify any deficiencies early in their training so that corrective actions can be taken.

Regardless of when in a student’s program the qualifying or comprehensive examination occurs, 2 overarching principles should guide development of the examination. First, the examination should be a test of synthesis of knowledge and experiences, not a reiteration of previously tested material. Second, the examination should provide an opportunity for students to demonstrate that they possess the potential for producing meaningful scholarship in the health behavior research arena. With respect to research competencies, the qualifying or comprehensive examination should specifically test whether a doctoral student can integrate the application of a theoretical or conceptual framework with a research

design to address a gap in the knowledge base. There is a professional responsibility to ensure that future researchers have the capacity to engage in policy-relevant, evidence-based evaluation of health promotion programs. The qualifying or comprehensive examination should be viewed as one evaluation milestone for assessing the research competence of a doctoral student.

### **The Purpose of the Dissertation**

The doctoral degree is a research degree with the essential goal of preparing researchers and scholars. The doctoral dissertation should document, and the oral defense should demonstrate, the doctoral student's ability to research a problem independently with a high level of competence and make an original contribution to knowledge.<sup>16</sup> In most cases, the process and outcomes of the research should represent the "scholarship of discovery," as described by Boyer.<sup>15</sup>

Some doctoral programs attempt to assess research competence through a series of smaller projects instead of one large doctoral dissertation. Such alternative methods of evaluating research competencies include papers published in refereed journals and edited volumes. Nevertheless, The Academy agrees with the majority of graduate program faculty members that the dissertation plays an indispensable role in the metamorphosis of student to scholar.<sup>17</sup>

Boyer,<sup>15</sup> in *Scholarship Reconsidered*, argues that every scholar must demonstrate the capacity to do original research and to present the results to colleagues. This set of tasks is accomplished through examinations, completion of a dissertation, and oral defense of a dissertation. There is some disagreement about the necessity of the oral defense. Nobel,<sup>18</sup> for example, has recommended that the oral defense of the dissertation be abolished as a requirement for a doctorate as it represents what the candidate has already written. Furthermore, he argues, it can be a disastrous experience for a doctoral candidate when examiners try to demonstrate their brilliance in finding fault in the dissertation.

The Academy believes that doctoral programs should require an oral defense of the dissertation. During the defense, questions are asked of the candidate. The defense is the time the candidates must

be able to demonstrate their knowledge of related literature and competence in understanding of theories related to the research, how the data were analyzed, and weaknesses in the study.

Successful defense of a dissertation should be considered the passage through which a doctoral student demonstrates competency in conducting original research and gains entry into the community of scholars. Failing a defense is unusual, as most doctoral committees will not permit the candidate to advance to this stage if there is a serious problem with the research. Nevertheless, it is quite appropriate for the doctoral committee to require revisions to enhance the quality of the dissertation and the learning experience. Furthermore, the oral defense should help prepare the candidate to present and defend the research to larger audiences of their professional colleagues and well-known researchers in health behavior and, also, to external audiences, such as the media.

Boyer<sup>15</sup> discusses how graduate study tends to become increasingly narrow, culminating in a focused dissertation topic. He encourages scholarly breadth and integration of knowledge by inviting representatives of related disciplines to read the dissertation and participate in the oral defense. During such an oral defense, candidates should not only demonstrate that they can discover, but also integrate, apply and communicate knowledge.

### **The Contribution of the Dissertation**

Dissertation research should make a meaningful contribution to the professional literature. As Boyer<sup>15</sup> notes, some dimensions of scholarship are universal. To demonstrate one's capacity to do original research, one studies a serious intellectual problem and presents the results to colleagues. This is the purpose of a dissertation, or a comparable piece of creative work. Hawley<sup>17</sup> also states that the dissertation not only is a "rite of passage into the world of scholarship," but also can be "a gold mine of researchable questions" for future studies. Hawley<sup>17</sup> continues: "From modest beginnings, some scholars spend years developing and refining their original topics and eventually become recognized authorities in the subject matter of their dissertations."

The major purpose of the dissertation is to provide the student with an educa-

tional experience, which results in a significant contribution to the field of health behavior. A meaningful dissertation is one that contributes to the theoretical, conceptual, empirical, or knowledge and practice base of health behavior. The doctoral dissertation should include a study or analysis of a contemporary public health problem or issue relevant to health behavior, and it should be grounded in social and behavioral science theory. The doctoral candidate should conduct original research that draws on a theoretical or conceptual framework to articulate and organize hypothesized relationships among factors that either contribute to the etiology of a health problem or phenomenon or test an intervention designed to address a health problem.

Dissertation research should do more than simply determine the extent to which measures representing one set of theoretical constructs correlate with a measure of health behavior. The dissertation project should be a rigorous *test* of a theory or theories.

Not only should the dissertation topic be of public health significance, but the research also should help fill an important gap in knowledge. Although there is a need to use existing knowledge and information better, there also is a need for new knowledge, for work on that which academics refer to as “the cutting edge of knowledge.” As Boyer<sup>15</sup> noted, “the work of a scholar also means stepping back from one’s investigation, looking for connections, building bridges between theory and practice, and communicating one’s knowledge effectively to others” (p. 16). Oscar Handlin observed, our troubled planet “can no longer afford the luxury of pursuits confined to an ivory tower... scholarship has to prove its worth not on its own terms but by the service to the nation and the world” (cf. Boyer,<sup>15</sup> p. 23).

Boyer<sup>15</sup> also believes that what we urgently need today is a more inclusive view of what it means to be a scholar: “a recognition that knowledge is acquired through research, through synthesis, theory practice, and through teaching” (p. 24). Thus, although doctoral students should continue to pursue a specialized field of study and do original research, students also should be encouraged to work across the specialties, taking courses in other disciplines to gain a broader perspective.

Clearly, one’s research findings are of little value until they are disseminated to appropriate audiences. The Academy believes that publication of the dissertation research in a peer-reviewed publication should be an expectation of doctoral students. Only when one’s work is published in a “refereed” or “juried” journal will it contribute to one’s standing as a scholar.

Today, health behavior researchers feel the need to move beyond traditional disciplinary boundaries, communicate with colleagues in other fields, and discover patterns that connect. The most striking change in health behavior research in the coming decades will be the transition from research dominated by a small number of disciplines to transdisciplinary research. The Institute of Medicine also predicts a shift toward more intervention-oriented research, which, in turn, will dictate a greater emphasis on community participation in research.<sup>19</sup>

The application of community-based participatory approaches to public health already has increased dramatically.<sup>20,21</sup> This growth also reflects movement from a largely singular focus on individual behavior change interventions to an ecological model focused on the interaction of social, environmental, and individual influences on health.<sup>20,22,23</sup> It also reflects an evolving belief that active participation by community members in researching and implementing interventions may lead to more successful outcomes than those that are achieved if interventions are executed exclusively by external researchers.<sup>22,24,25</sup> In *community-based participatory research* (CBPR), community members work with researchers to define the research problem and set research objectives, design research methods and instrumentation, collect and interpret the data, and use the results to guide program planning and evaluation.<sup>20</sup> Community members’ involvement in creating new knowledge and determining how that information is used in the community change process addresses underlying social and political inequities and empowers the community. The inclusion of CBPR in the assets acquired during doctoral training also brings us closer to meeting the ideals set forth in the Institute of Medicine’s pleas for improved research translation and dissemination.<sup>19</sup> Moreover, the transition toward increased involvement in CBPR further

necessitates the utilization of transdisciplinary research skills and perspectives mentioned earlier.

Doctoral candidates should conduct original research, based on theories, models, or concepts from the behavioral and social sciences, to improve understanding of health-related problems and their social, cultural, economic, political, interpersonal, and intrapersonal determinants. Doctoral candidates also should be challenged to think about the usefulness of their research, to reflect on its social consequences, and to share their research with their peers and other audiences. In so doing, they will gain a better understanding of how their research can be translated into practice.

### **The Role of Information Technology**

The overarching disease prevention agenda for the Department of Health and Human Services (DHHS), *Healthy People 2010*, calls for attention to specific measurable objectives of importance. Section 11 of the agenda refers to 3 key information technology objectives that direct attention to the need for doctoral-level research competencies in health behavior research. These objectives include

- 11.1: Increase the proportion of households with access to the Internet at home;
- 11.2: Improve the health literacy of persons with inadequate or marginal literacy skills; and
- 11.4: Increase the proportion of health-related World Wide Web sites that disclose information that can be used to assess the quality of the web-site.

These objectives underscore the importance of understanding interactive communication technologies as tools for practice relevant to health behavior research and, ultimately, population health. The Science Panel on Interactive Communication and Health<sup>26</sup> has defined interactive health communication (IHC) as “the interaction of an individual—consumer, patient, caregiver, or professional—with an electronic device or communication technology to access or transmit health information or to receive guidance on a health-related issue.” Many IHC applications exist, including health web sites, CD-ROM applications, and

online chat groups. IHC offers many benefits in educating and promoting health of individuals and groups. People who use IHC applications are more likely to receive tailored feedback that is specific to their information needs, while maintaining their anonymity. IHC can enhance interactions with health professionals and other community members and provide increased opportunities for information and social support. IHC also allows for the widespread dissemination of ever-evolving health information without restrictions to geographical location and time.

Though computer applications are widely used in health behavior research and health promotion practice today, there remains an inadequate understanding of the consequences of this technology on human health. According to Berliner,<sup>27</sup> the medium itself may be transforming what it means to be a learner – and by extension – how one is or is not motivated to protect oneself from health risks in the social environment. Clearly, doctoral students should be encouraged to study computer applications as health promotion tools. However, a more ambitious research goal will be to explore the ways in which computer technology and the social environment mutually influence one another to promote and compromise the health of the population.

At an increasing rate, health behavior researchers are using a variety of information technology tools to address research questions, including the design, development, and evaluation of behavioral interventions. Thus, doctoral-level research training programs must become intentional about the advanced technology competencies they expect students to master during their course of study. Information technology applications should be integrated into graduate research methods courses, and doctoral students should be involved in research projects that provide opportunities to learn state-of-the-art technologies. We are now at a point where every doctoral student seeking to establish credentials as a health behavior researcher must be exposed to and receive specific training in the area of public health informatics. Moreover, the augmentation of informatics skills has been identified as one of the requisite public health workforce development needs of the early 21<sup>st</sup> century<sup>19</sup> and one, that if achieved, could decrease the gap that sepa-

rates researchers and practitioners.

### **The Preparation of Ethical Scholars/ Researchers**

Research training in doctoral programs should insist upon ethical conduct. Doctoral students should be provided with “real-life” opportunities that require them to balance the potential risks and benefits of research involving human subjects. These research opportunities should be available to students at the beginning of their doctoral program.

The *preparation* of doctoral students as health behavior researchers should require them to have specific learning experiences about the Responsible Conduct of Research (RCR). RCR is defined as a “commitment to intellectual honesty and personal responsibility” or “adherence to rules, regulations, guidelines, and commonly accepted professional codes or norms.”<sup>28</sup> In short, RCR means that researchers have integrity in their research practices. Doctoral programs should establish and enforce expectations that clarify or delineate the RCR standards for students and expect that graduate faculty model these standards in both their research and classroom teaching.<sup>29</sup>

Perhaps the single most significant factor that can either undermine or promote research integrity is the *environment* in which health behavior researchers do their work. Doctoral training programs in health behavior need to foster an environment that provides specific learning experiences for students that build research skills. Faculty mentoring should instruct, guide, counsel and strengthen students’ skills in both research and the integrity of their application. Competitive research environments that tilt the balance toward quantity over quality of publications compromise research integrity. Our intent should be to develop researchers who value both systematic inquiry and an honest and responsible environment in which to practice it. This proposed environment is established in the classroom through direct instruction about research integrity that is then reinforced by faculty mentors who model those research integrity principles in practice. Above all, doctoral students should be encouraged to resist pressures to engage in poor science or to conduct research that serves only the parochial needs of a special interest group.

*Research misconduct* is generally categorized by fabrication – making up data or results that do not exist; falsification – providing misleading or intentionally inaccurate information that cannot be substantiated or sheds light on a work more positively than data would support; and plagiarism – using someone else’s ideas or work without crediting them for having done so. These are the most egregious examples of research misconduct. Doctoral students need to learn this experience early in their training that conducting research with integrity is the only option. This will happen when faculties provide a research environment that rewards integrity and prohibits misconduct.

*Careless research* practices are really not research.<sup>29</sup> Such practices, however, do find their way into the literature, creating inaccuracies that are often difficult, if not impossible, to correct, even in the face of errata that journals publish. If we prepare our students and follow The Academy’s guidelines about attention to consistency and detail, careless research practices are less likely to occur.

*Statistical errors* in health behavior research can produce results that are erroneous and lead to practices or applications that are misleading, or even harmful. The quality of health behavior research findings are a function of the design employed to answer the research question(s) and the analytical approaches that were used to explain the nature of relationships between and among variables studied. Students should experience a strong statistical training regimen that requires them to work with original or secondary data sets as they learn the progressive approaches to data analysis with special emphasis on multivariate techniques.<sup>30</sup> At the same time, students and faculty alike must consult with those who have the statistical expertise that will increase the probability of selecting the appropriate statistical methods and accurately interpreting their results.

*Publication practices and authorship* are other instances that can involve questionable research practices. Examples include improper authorship (order not earned, inclusion not justified, exclusion not justified), publishing multiple papers of selected findings from one data set beyond that which would be considered reasonable, and inaccurate references. Further, more journals are requesting

**Table 1**  
**Knowledge of the Field**

What doctoral students need to know and be able to do	Habits of mind doctoral students need to develop
<ul style="list-style-type: none"> <li>✓ Historical foundations of public health, health behavior, health promotion, and health education</li> <li>✓ The parameters of professional practice</li> <li>✓ Major and emerging theories of health behavior, including social ecological frameworks</li> <li>✓ Research on risk and protective factors associated with the major sources of human morbidity and mortality</li> <li>✓ Outcomes of major preventive interventions</li> <li>✓ Major controversies in public health policy</li> <li>✓ Principles of RCR</li> </ul>	<ul style="list-style-type: none"> <li>✓ Keen awareness that they are preparing themselves to become a steward of their field</li> <li>✓ Basic desire for discovery</li> <li>✓ Intellectual curiosity about the research others have conducted in a specific area</li> <li>✓ Read research journals to gain more substance and to identify gaps in the knowledge base</li> <li>✓ Follow new developments in public health, health behavior, health promotion, and health education</li> </ul>

that each author identify the specific contributions made to the paper to justify their inclusion on the authorship list. A normative practice in research is that authorship listing is a function of contribution and authors are listed in descending order of that contribution.

Clarification regarding *data ownership* is another potential questionable research practice. Ownership needs to be established early and in writing, particularly in light of public health research that often involves multiple parties as part of par-

ticipatory and collaborative practices.<sup>31</sup> Addressing this issue early avoids unnecessary conflicts later.

All health behavior research that involves humans must be reviewed by university *institutional review boards* (IRB) prior to commencing the research. Doctoral students should be responsible for completing human subjects review applications. The application process will require them to become familiar with the U.S. Code of Federal Regulations – Protection of Human Subjects, known as the

**Table 2**  
**Thinking Theoretically and Critically**

What doctoral students need to know and be able to do	Habits of mind doctoral students need to develop
<ul style="list-style-type: none"> <li>✓ Distinguish conceptual or analytic issues from empirical issues</li> <li>✓ Understand different theoretical perspectives and what each illuminates and obscures</li> <li>✓ Read broadly, in other fields, seeking connections that are not at first obvious</li> <li>✓ Explain problems in the field using theory</li> <li>✓ Produce a synthesis of the research literature on a topic</li> <li>✓ Compare different ways of knowing</li> <li>✓ Compare across research methods and allied philosophical traditions</li> </ul>	<ul style="list-style-type: none"> <li>✓ Respect for others' research</li> <li>✓ Awareness of one's own assumptions and possess a willingness to examine those critically</li> <li>✓ Discrimination between knowledge and subjective beliefs</li> <li>✓ Willingness to change one's mind based on argument or evidence</li> <li>✓ Willingness to challenge conventional or popular educational practices and interventions</li> <li>✓ Flexibility to adapt and apply theories to be relevant for diverse populations</li> </ul>

**Table 3**  
**Frame Significant Questions**

What doctoral students need to know and be able to do	Habits of mind doctoral students need to develop
<ul style="list-style-type: none"> <li>✓ The research literature on a topic</li> <li>✓ Identify knowledge gaps of public health significance</li> <li>✓ Identify the inadequacies in existing measurement instruments and procedures that need to be challenged</li> <li>✓ Specify causal processes</li> <li>✓ Formulate clear research questions</li> <li>✓ Formulate a testable hypothesis or hypotheses</li> <li>✓ Identify critical elements of a research problem</li> </ul>	<ul style="list-style-type: none"> <li>✓ Passion for the ideas of one's research, but ability to view results objectively</li> <li>✓ Willingness to take intellectual risks</li> <li>✓ Willingness to subject one's research to peer review</li> <li>✓ Tolerance for nonsignificant findings</li> </ul>

Common Rule.<sup>32</sup> This code is available online at <http://ohsr.od.nih.gov/mpa/45cfr46.php3>. It provides elaborate detail regarding human subjects' protection including risk assessment and ensuring informed consent. Although students should experience and be responsible for completing human subjects review applications, the faculty advisor should be responsible for ensuring its completion.

All doctoral programs should require that students obtain RCR training. The federal government has provided leadership regarding RCR training with publication of PHS Policy on the Instruction of Responsible Conduct of Research (available at <http://ori.dhhs.gov/html/programs/finalpolicy.asp>). The National Institutes of Health has produced an online training course on the protection of human research protections (available at <http://cme.nci.nih.gov>).

Graduate faculty in health behavior doctoral programs need to maintain integrity in the research process for its own sake, as well as to model how research should be conducted for doctoral students. When graduate faculty follow these guidelines and require their doctoral students to do the same, we will be preparing generations of researchers who understand, value, and adopt research integrity.

#### **The Designation of Graduate Faculty Status**

Capable and qualified graduate faculty – active researchers in their own right –

should direct doctoral-level and dissertation research. In addition, graduate faculty should be qualified to serve on doctoral committees that supervise interdisciplinary dissertation research. Academic departments should confer graduate faculty status only on those members who maintain a sustained involvement in research as documented by authoring publications in major refereed journals. Graduate faculty status should be considered a privilege. The designation should not be automatic or dependent upon academic rank, tenure status, or years of service to an institution. Departments should establish measurable criteria for faculty to receive *and* maintain graduate faculty status and provide incentives, such as research assistantships and other mechanisms that support research endeavors.

#### **PART 2**

#### **Seven Outcomes of Learning the Practice of Health Behavior Research**

In an essay on doctoral education for the Carnegie Foundation for the Advancement of Teaching, Richardson<sup>3</sup> presents a "crucial elements" framework that focuses on the outcomes of learning the practice of research. The 7 outcomes are intended to provide a model for establishing a new doctoral program or assessing and revising an existing one. For this paper, a number of Richardson's crucial elements have been modified to adapt them to the health behavior field.

The learning outcomes are not de-

**Table 4**  
**Partnerships With the Community**

What doctoral students need to know and be able to do	Habits of mind doctoral students need to develop
<ul style="list-style-type: none"> <li>✓ Build trusting relationships with people and groups in the community who work on a health problem and have been affected by it</li> <li>✓ Understand how the profession and its research is viewed in the community</li> <li>✓ Connect one’s research to the work of practitioners and community members in the field</li> <li>✓ Collaborate with other disciplines in the community</li> <li>✓ Build upon strengths and resources in the community</li> <li>✓ Ground research questions in practice, reflective of the needs of and priorities of the community, as well as theory</li> <li>✓ Engage communities as partners in the research process</li> <li>✓ Communicate research findings in ways that lay people can understand</li> </ul>	<ul style="list-style-type: none"> <li>✓ Understand that the purpose of research is to improve the health of the population</li> <li>✓ See community criticism as contributing to the quality of one’s research</li> <li>✓ View one’s research as a contribution to an ongoing community process</li> <li>✓ Recognize, value, and use local knowledge sources in the research process</li> <li>✓ Be sensitive to different public discourses in reporting research – depending upon the audience</li> <li>✓ Value co-learning and capacity building among community partners</li> <li>✓ Recognize and embrace the long-term process and commitment required for community-based participatory research</li> </ul>

signed to map onto specific graduate courses, but instead provide a tool for determining the extent to which doctoral

students learn the crucial elements in the program of study as a whole.<sup>3</sup> Many of these learning outcomes will not be mas-

**Table 5**  
**Identifying Appropriate Methods of Inquiry**

What doctoral students need to know and be able to do	Habits of mind doctoral students need to develop
<ul style="list-style-type: none"> <li>✓ Threats to validity of quantitative and qualitative designs</li> <li>✓ Align researchable problems with appropriate methods of inquiry</li> <li>✓ Identify useful sources of data</li> <li>✓ Identify novel approaches to address research questions</li> <li>✓ Explain the advantages and disadvantages of different sampling strategies</li> <li>✓ Identify independent and dependent variables when appropriate</li> <li>✓ Articulate the strengths and weaknesses of various methods of inquiry, including those selected for use in an investigation</li> </ul>	<ul style="list-style-type: none"> <li>✓ Respect for research participants</li> <li>✓ Investigating research questions that involve uncertainty – not merely to support current beliefs on a topic</li> <li>✓ Seek novel approaches to address research questions</li> <li>✓ Seek and use feedback from faculty mentors, community members, and other experts</li> <li>✓ Choose research methods without partisan loyalties – should be matched to research question</li> <li>✓ Consider research methods used in previous research on the topic</li> </ul>

**Table 6**  
**Collecting and Analyzing Data**

What doctoral students need to know and be able to do	Habits of mind doctoral students need to develop
<ul style="list-style-type: none"> <li>✓ Understand methods of analyzing both quantitative and qualitative data</li> <li>✓ Develop quantitative measures to assess theoretical constructs</li> <li>✓ Develop psychometrically sound quantitative measurement tools</li> <li>✓ Select statistical tests based on data structure and statistical assumptions</li> <li>✓ Develop proficiency in using various statistical software packages</li> <li>✓ Interpret quantitative and qualitative data</li> </ul>	<ul style="list-style-type: none"> <li>✓ Openness to unexpected findings</li> <li>✓ Consider alternative interpretations of the data and plausible rival hypotheses</li> <li>✓ Seek and carefully consider criticism from lay persons and experts</li> <li>✓ Avoid drawing conclusions that are not supported by the data</li> <li>✓ Interpret one's findings in the context of the existing research literature</li> </ul>

tered in courses, but will be learned through mentoring, guided research experiences, participation in community coalitions, conference attendance, etc. Richardson<sup>3</sup> proposes that doctoral students use the crucial elements framework to assess their progress in their program of study.

#### **Possess Substantive Knowledge of the Field**

In addition to understanding the foundations of the field, doctoral students should possess cutting-edge knowledge about the theoretical frameworks used in the discipline and the empirical research generated by it. Among the most important "habits of the mind" are a basic desire for discovery and a sense of intellectual curiosity. These habits find expression in the reading of research journals, a hallmark of active scholars (Table 1).

#### **Think Theoretically and Critically**

Health behavior scholars rely on theory to explain conditions that promote and compromise health as well as to design health promotion interventions. Theory functions as a conceptual framework for organizing data. Such frameworks allow us to impose meaning on isolated observations. Theory also allows us to explain relations among variables of interest (Table 2).

#### **Frame Significant Research Questions**

Doctoral students should understand that they are preparing to become stew-

ards of the health behavior field. One of the obligations of being a steward is the transformation of the discipline.<sup>2</sup> Pursuit of innovation depends upon the ability to identify gaps in the knowledge base, the willingness to take intellectual risks, and a tolerance for nonsignificant findings (Table 3).

#### **Establishing Research Partnerships With the Community**

However broad or narrow the focus of the investigation, the goal of health behavior research is explicit: to improve the health of the population. A relatively unique aspect of the field is the emphasis on engaging the community in the research process whenever possible.<sup>24</sup> In their program of study, doctoral students should be provided opportunities to work in collaborative partnerships with community groups (Table 4).

#### **Design Research**

Doctoral students should be able to identify appropriate methods of inquiry without relying on allegiances to a particular assessment or evaluation paradigm. In selecting methods to address a research question, students should strive to generate the highest quality data while working diligently to respect and protect research participants (Table 5).

#### **Collect and Analyze Data**

Doctoral students should understand methods of analyzing both quantitative and qualitative data. In the health behav-

**Table 7**  
**Communicating Research**

What doctoral students need to know and be able to do	Habits of mind doctoral students need to develop
<ul style="list-style-type: none"> <li>✓ Characteristics of different audiences</li> <li>✓ Different genres and forms of dissemination (eg, dissertation, data-based article, conceptual analysis, press releases)</li> <li>✓ Writing precisely and plainly for technical and general audiences</li> <li>✓ Effective oral presentation of one’s research in professional and public forums</li> <li>✓ Present findings with community members in a way that is culturally appropriate</li> </ul>	<ul style="list-style-type: none"> <li>✓ Seek opportunities to present one’s research in professional and public forums</li> <li>✓ View writing as part of the interpretive and analytic activity – rather than a “write-up burden”</li> <li>✓ Seek peer review of one’s work</li> <li>✓ Expect peer review to lead to revision or even rejection</li> <li>✓ Sensitive to different discourses in reporting research – depending upon the audience</li> <li>✓ View one’s published research as contributing to an ongoing dialogue in a community of scholars</li> </ul>

ior field, proficiency in using statistical software is a high priority. A working knowledge of multivariate statistical procedures is crucial for generating high-quality research and answering complex questions. Qualitative methods and mixed methods are useful as well for addressing some research questions. Doctoral students should receive strong training in both traditions of research (Table 6).

**Communicate With Various Audiences About Research**

The ability to write precisely and plainly for both technical and general audiences is a skill that doctoral students need to develop during their program of study. The ability to present research in professional and public forums also is important. In this regard, it is crucial that students learn how to tailor presentations and discussions to the level of expertise of the audience (Table 7).

**CONCLUSION**

The positions taken by The Academy in this paper strongly endorse the view that the health behavior field is a scholarly discipline as well as a health promotion enterprise (or practice). Both the disciplinary study and the enterprise are complex endeavors. They cannot be extricated from one another because the transformation of the discipline and the preservation of best practices depend upon both. Thus, doctoral students who are to become the stewards of this field should

be prepared to engage in scholarship that creates new knowledge, uses research to transform practice, and effectively communicates research findings. In these ways, doctoral-degree holders are distinguished from health promotion practitioners holding baccalaureate and master’s degrees.

Why articulate a set of guidelines for research training excellence in doctoral programs? What practical value do these guidelines have for our field? The Academy believes there are a number of benefits for each of the constituencies that have a vested interest in doctoral-level research training programs. Most important, these guidelines can be used to strengthen the field’s research capacity and thereby improve the nation’s health. At the institutional or graduate-school level, the guidelines can assist in the allocation of resources to departments and programs that are meeting standards of excellence set by their discipline. They also may serve as a new benchmark for institutions in selecting faculty for prestigious research honors and awards, such as the university professor designation. At the departmental level, this document may be useful in leveraging additional institutional resources to build faculty research capacity, or it could provide planning assistance to academic departments seeking to launch a new doctoral program. The guidelines identified in this paper also could benefit departments in the recruitment of promising new re-

searchers and esteemed research faculty. Furthermore, departments offering baccalaureate and master's degrees might find the guidelines beneficial for assessing the ability of their programs to prepare students for doctoral-level research and to be strong applicants for admission to competitive programs. The guidelines described herein can provide prospective students from a variety of disciplines with a framework for comparing the research training offered by various doctoral programs, and they could be used in orientation programs for new doctoral students. ■

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**Appendix A**  
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