

The Future of Health Behavior Research and Training: A Modified Delphi Study

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Abstract

The purpose of the current study is to assess (1) health behavior researchers' opinions on significant new foci emerging over the next 20 years, (2) disciplines that can serve as important partners, and (3) adjustments needed for doctoral training programs to prepare researchers for emerging trends. A two-wave modified Delphi procedure was employed to assess opinions and perspectives of current health behaviors researchers. Participants were recruited through email invitations sent to the membership listserv of the American Academy of Health Behavior. In Wave I, respondents generated up to three ideas for each of four prompts: (1) the biggest game changers in health behavior research, (2) the disciplines most important to partner with, and (3) what should be added or (4) removed from doctoral training programs. In Wave II, participants rated the importance of each of the responses generated in the first wave. 39 and 48 people completed Waves I and II, respectively. Wave I yielded 46 respondent-generated items for the new foci, and 28 different partner disciplines. Respondents identified 47 topics not currently covered in health behavior Ph.D. programs, and 8 topics that should be removed from current Ph.D. programs. Seven new foci were endorsed by 80% or more of the respondents, including studying cultures of illness and health, as well as better operationalization of social-ecological models. Seven disciplines were seen as essential partners by at least two-thirds of the respondents, including public health, biostatistics, and public policy. Five additions to doctoral programs were endorsed by 80% or more of the respondents, including stronger research skills, advanced statistical methods, writing, and evaluation. Years since earning a doctoral degree was negatively correlated with a number of suggested new foci, disciplines to partner with, and areas that should be added to health behavior Ph.D. programs. There was a high level of consensus about potential new foci in the field, focusing on population health, stronger scientific techniques, and more research training. There was less consensus on related disciplines' potential, based on the respondents' type of work and field. Overall, results have potential to shape doctoral training and preparation of future health behavior researchers.

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Poor health behaviors have been estimated to cause up to half of premature mortality in the United States.¹ Changes in health behavior including smoking cessation, weight loss, preventive health measures, fall prevention, and many others have shown demonstrated effects on reducing morbidity and mortality throughout the lifespan.¹⁻³ The field of health behavior can trace its history to the development of Lewin's Field Theory in the 1930s and 1940s.⁴ The field grew and developed with a focus on individual behavioral theories from the 1950s through the 1990s and included the Health Belief Model, Social Learning Theory, Theory of Reasoned

Action/Planned Behavior, Social-Cognitive Theory, the Transtheoretical Model, and others.⁵ In the late 1980s this focused began shifting to a social ecological approach which considered behavior change within the nexus of policy, environmental, and social contexts.⁶ A recent review of health behavior change theories found a proliferation of theories, as many as 83 theories.⁷ Despite this proliferation however, most published studies focused on the Health Belief Model, Social Cognitive Theory, Theory of Planned Behavior, social support, Diffusion of Innovations, and the Social Ecological Model, indicating little change over a 30 year period.⁵

Directions and trajectory of a field are set and defined during a number of time points in the lifespan of the field; at conception, at birth, during times of crisis, and when members of a field recognize the need to revisit and potentially modify the current course of action. It is important to reassess directions and assumptions in a field regularly to ensure that the most important questions are being addressed and that the next generation of students are trained to respond to emerging issues in the field.

The field of health behavior has seen growth and change in demands since the conception of this multi-disciplinary field. At conception, the field of health behavior focused mostly on intrapersonal-level factors and determinants of health behavior. Most theoretically based and empirically supported approaches implemented were narrow in this manner, and although they confirmed the role of individual-level characteristics, they also highlighted a large gap in understanding the complete picture of health behavior and how to modify it. These approaches supported multiple levels of influence, models depicting these multiple levels, an enhancement of evaluation, assessment methodologies to better measure potential determinants and changes, and subsequently stronger analytics to support the types of data being collected and research questions being tested. The last decade has seen major developments in areas related to health behavior change including the rise of wearable technologies, ubiquitous mobile phone penetration, the mapping of the human genome, the rise of personalized medicine, and an increased understanding of the microbiome. All of these and other major advances are sure to influence the art and science of health behavior change.

These recent and growing advances in technology, analytics, and policies will continue, and while many of the original needs of our field still remain, there is a need to reexamine how we are training and equipping current students and ourselves, and whether current approaches and foci, aligned with our field's original needs, still meet current and emerging demands.

Delphi Technique

The Delphi method is a technique for assessing consensus among a group of experts regarding a particular topic.⁸ The Delphi method was developed as a forecasting tool, used to predict the likelihood of future events.⁹ The process of a Delphi study involves first providing a series of prompts to experts in the field to generate their opinions on the topic. In round two, these are sent back to the experts to rate each item on some defined criteria. There are several variations of this process that may involve different levels of review.¹⁰ Although statistical power is not an issue, studies have indicated that at least 10-18 experts are recommended.¹¹

Study Aims

In order to begin to assess future research directions, we conducted a modified Delphi study with members of the American Academy of Health Behavior. The Academy requires

scientific publications in health behavior to become a member and consists of current experts, including several original founding “fathers” and “mothers” of health behavior research, mid-career professionals, and recently trained researchers or current trainees (students). We examined perceptions of where the field is going, promising and emerging multidisciplinary collaborators, and what is currently needed to best prepare those in the field of health behavior and future generations for current and emerging demands and challenges. In this, we also critically assessed which current skills, concepts, and philosophies being taught within training frameworks of health behavior research remain essential and relevant for entry into and continued success in the field of health behavior.

Methods

A two-wave modified Delphi procedure was employed to assess opinions and perspectives of current health behavior researchers during 2016. Participants were recruited through the American Academy of Health Behavior listserv ($n = 185$). Email invitations and three reminders were sent via the listserv to invite participation. In Wave I, respondents generated up to three ideas for each of four prompts based on the following introduction and instructions: “The field of health behavior change research has been evolving over the past twenty years. For example, the recognition and inclusion of ecological models moved from fringe to commonplace. Over the next 20 years we can expect additional transformation to occur. As an expert in health behavior change research, we would like you to consider the next 20 years when you answer the following questions.” Prompts included:

- (1) What do you think will be the biggest game changer in health behavior research (list up to 3)?
- (2) Which disciplines outside of health behavior programs will be the most important to partner with (list up to 3)?
- (3) What skills or topics will be the most essential to add to health behavior Ph.D. programs? and
- (4) What skills or topics should be removed from health behavior Ph.D. programs?

After all responses were received from Wave I respondents, two members of the research team examined responses for conceptually unique themes or ideas. These conceptually unique themes and ideas were then confirmed by the entire research team and subsequently used in Wave II.

In Wave II, email recruitment invitations were again sent through the American Academy of Health Behavior listserv ($n = 185$). Email invitations and three reminders were sent via the listserv to invite participation. Participants were invited to participate whether or not they had participated in the first round. In this round, participants rated how important each of these unique response themes (those generated in Wave I for the first three prompts) would be to changing health behavior research in the next 20 years. Responses were collected on a 5-point Likert scale from “not all important” to “extremely important.” For the final prompt, on which skills or topics should be removed or modified, response prompts were: “should definitely be removed,” “could be removed,” “should be reduced,” “could be reduced,” and “keep as is.”

Basic sociodemographic information was also collected (age, gender, years since doctoral degree, primary area of health behavior of work, and number of publications). IRB approval was obtained prior to study commencement.

Data Analysis

We examined variables where consensus occurred. Consensus was assessed as > 80% endorsement of an item as important or extremely important.

Results

Sample Characteristics

Thirty-nine and 48 people participated in Waves I and II, respectively. Of the respondents in Wave I ($n = 39$), the mean age was 45.3 ($sd = 14.5$), 53.9% were women, and 79.5% were white, non-Hispanic. The mean of years since doctoral degree was 14.3 ($sd = 11.2$), ranging from 0 to 40. Mean number of publications for Wave I respondents was 53.0 ($sd = 47.9$; range: 0-200+). Primary health behavior research areas included: physical activity (38.5%), nutrition (15.4%), smoking/tobacco use (12.8%), substance abuse (7.7%), and sexual health (7.7%).

Wave II respondents ($n = 48$) were mostly female (61.7%), mean age was 48.9 years ($sd = 15.7$), and 91.5% were White, non-Hispanic. The mean for years since degree was 16.6 ($sd = 13.5$), ranging from 0 to 40. Mean number of publications for Wave II respondents was 75.7 ($sd = 69.3$; range: 1-200+). Primary health behavior research areas included: physical activity (29.2%), nutrition (8.3%), smoking/tobacco use (14.6%), substance abuse (12.5%), and sexual health (7.7%). Complete sample characteristics are displayed in Table 1. There were no statistically significant differences in demographics between the two waves.

Table 1

Sample Description

	Wave I	Wave II
Sample Size	39	48
Gender	54% Female	61.7% Female
Age	$M = 45.3$ ($sd = 14.7$)	$M = 48.8$ ($sd = 15.9$)
Race/Ethnicity	79% White, Non-Hispanic 8% Black 8% Asian 5% multiracial	91.4% White, Non-Hispanic 6.4% Asian 2.1% Hispanic
Years Since Doctorate	$M = 14.3$ ($sd = 11.3$)	$M = 16.7$ ($sd = 13.6$)
Number of Peer-reviewed Publications	$M = 53.0$ ($sd = 48.54$)	$M = 48.9$ ($sd = 15.9$)
What health behavior do you work most with?		
-Physical Activity	38.5%	29.2%
-Nutrition	15.4%	8.3%
-Smoking/Tobacco Use	12.8%	18.8%
-Sexual Health	10.2%	12.2%
-Drugs & Alcohol	7.7%	12.5%
-Other	15.4%	10.4%

Delphi Process: Wave I

Wave I of the modified Delphi procedure yielded 46 respondent-generated items as the biggest game changers for health behavior research. These included virtual reality, cross-sector collaboration, big data, and others (see Table 2). Twenty-eight different disciplines with great potential for collaborating as partners were identified in Wave I (see Table 3). Respondents also identified 47 topics of potential importance not currently covered in health behavior Ph.D. training programs, and 8 that should be removed from current Ph.D. programs (see Tables 3 and 4).

Delphi Process: Wave II

Seven new foci were endorsed by 80% or more of the respondents: creating a science of behavior change that includes discernable behavior change techniques (85.4%), decline of funding (85.1%), changing from a culture of illness to a culture of health (81.8%), population health and the growing involvement of non-traditional health systems (81.2%), extensive application of translational health research (80.9%), recognizing that cookie cutter theories do not apply to all health behaviors and populations (80.9%), and learning to better operationalize aspects of the social ecological model (80.4%). Complete results for this question are displayed in Table 2. Seven disciplines were seen as essential partners by at least two-thirds of the respondents: public health (88.6%), biostatistics/statistics (77.3%), public policy (70.5%), communications (70.4%), economics (68.2%), nutrition (68.2%), and health services and policy research (68.2%). Complete results for this question are displayed in Table 3. Five additions to doctoral programs were endorsed by 80% or more of the respondents, including actually using research skills (92.7%), evaluation and implementation (87.8%), effective writing techniques (85.0%), advanced research design and statistical methods (80.0%), and social determinants of health (80.0%). Complete results for this question are displayed in Table 4.

There was little consensus on what items to remove from Ph.D. training programs. Most respondents (85.0%) felt that program planning and evaluation should be left in doctoral programs as is. About half of respondents felt that the following topics should not be changed: significance testing (53.7%), individual behavioral change in the realm of behavioral medicine (52.5%), and focus on randomized controlled trials (RCTs) (46.2%). Almost all respondents thought that old, outdated theories should be changed, but there was not agreement on whether they should be removed (25.0%), could be removed (20.0%), should be reduced (17.5%), or could be reduced (32.5%). There was significant disagreement on what should be done regarding: a specific set of courses for a Ph.D. program, specific health area content courses, and individual psychology, with none of the response choices receiving more than 40% endorsement.

Differences in Priorities by Demographic Characteristics

We then assessed differences in priorities by demographics. For gender, of the 46 game changer concepts only two were significantly different: recognizing that cookie cutter theories do not apply to all health behaviors and populations (males: $M = 3.72$, $sd = 1.07$; females: $M = 4.43$, $sd = 0.79$; $t(44) = -2.57$, $p < .05$); and multiple behavior change (males: $M = 4.33$, $sd = .91$; females: $M = 3.72$, $sd = .89$; $t(41) = 2.21$, $p < .05$). There were no significant differences for any of the disciplines that were important to partner with or topics that should be removed from Ph.D. programs. For topics that should be added to Ph.D. programs, only the development and application of technologies for health behavior research was significantly different (males: $M = 4.13$, $sd = 0.72$; females $M = 3.50$, $sd = 0.80$; $t(36) = 1.62$, $p < .05$).

Table 2

How important will these areas be in changing health behavior research in the next twenty years (Wave II)?

Item ¹	% Important or Extremely Important
1. Creating a science of behavior change that includes discernable behavior change techniques	85.4
2. Decline of funding	85.1
3. Changing from a culture of illness to a culture of health	81.8
4. Population health and the growing involvement of non-traditional health systems	81.2
5. Extensive application of translational research	80.9
5. Recognizing that cookie cutter theories do not apply to all health behaviors and populations	80.9
7. Learning to better operationalize aspects of ecological models	80.4
8. Timely evaluation and dissemination of results to show program impact and outcome	79.6
9. Strategies to increase quality of life among the aging population	79.1
10. Cross-sector collaborations	78.7
10. Identifying and demonstrating both proximal and distal effects	78.7
12. Increasing demand for racial justice and equity	78.2
13. Environmental and policy supports for behavior change as well as collective input and impact	77.3
14. Larger investment in social services and preventive services	76.8
15. Expansion of reimbursable prevention services	75.0
16. Advanced application of multi-level social ecological approaches to prevention	72.3
17. Technology and the ability to reach individuals, target audiences, communities, and populations	71.7
18. Multiple behavior change	70.5
19. Integration of society and more social theory into behavioral research	70.3
20. Innovative analytic techniques	70.2
21. Implementation science	69.8
22. Increasing demand for racial justice and equity	68.2
22. Better educating practitioners on the role of health behavior theory in public health practice	68.2
24. Spatial aspects of health and behavior	67.5
25. Big data	66.0
26. The use of adaptive behavior change interventions	65.9
26. Technological advances in measurement and data collection	65.9
28. The modification of the environment to make people behave in a particular way	63.5

Table 2 (continued)

How important will these areas be in changing health behavior research in the next twenty years (Wave II)?

Item ¹	% Important or Extremely Important
29. Focusing less on the individual but rather directing policy pressure towards the alcohol, tobacco, and food industries	61.7
30. Application of lifestyle medicine for the treatment of disease	61.4
31. Community-based participatory research	60.4
32. Use of technologies including virtual technologies, biometric tracking, and behavioral apps	59.6
33. Convergence of medical, genetic, socio-psychological, and behavioral profiles	59.5
34. Instead of thinking about theories, thinking about theoretical paradigms	59.3
35. Electronic medical records	56.8
36. Increased understanding of neuroscience and the impact on behavior	55.3
37. Biobehavioral health	54.6
38. Our understanding of genetic influences on health behavior	54.3
39. Mindfulness and other attention regulation models and theories	52.3
40. Personal technology and links to big data/personalized medicine	48.8
41. Personalized interventions	47.9
42. Epigenetics, gene-environment interactions	44.7
43. Engagement and the use of incentives	40.9
43. Medication and treatment availability in developing countries	40.9
45. Microbiome	25.6
46. Virtual reality	15.9

Table 3

Which disciplines outside of health behavior programs will be the most important to partner with (Wave II)?

Item ¹	% Important or Extremely Important
1. Public health	88.6
2. Bio-statistics/statistics	77.3
3. Public policy	70.5
4. Communications	70.4
5. Economics	68.2
6. Nutrition	68.2
7. Health services and health policy research	68.2
8. System science	65.9
9. Sociology	65.9
10. Big data	65.1
11. Education	63.6
12. Psychology	62.8
13. City/urban planning	61.4
14. Law and policy	58.2
15. Medicine	56.8
16. Parks and recreation	52.3
17. Geography	52.3
18. Digital media development	46.5
19. Gerontology	45.4
20. Ecology	45.4
21. Political science	43.2
22. Computer science	38.7
23. Anthropology/cultural anthropology	38.6
24. Social work	37.2
25. Genetics	32.5
26. Engineering & computational science	31.8
27. Biomedical engineering	29.6
28. Architecture	29.5
29. Genetic epidemiology	27.2

Table 4

What skills or topics are currently not routinely covered in health behavior Ph.D. programs but should be incorporated? (Wave II)

Item ¹	% Important or Extremely Important
Research skills (actually using them)	92.7
Evaluation and implementation	87.8
How to write effectively	85.0
How to appropriately select and apply theory to health behavior research	82.5
Advanced research design/statistical methods	80.0
Social determinants of health	80.0
Integrating research and practice	78.1
Implementation and dissemination research	76.9
Professional skills development	75.0
Behavior couched within policy and systems	73.1
Mixed methods	72.5
How to facilitate a mentor/mentee relationship	72.5
Cultural competence	71.8
Leadership	71.8
Statistical thinking vs. statistical computation	70.7
Team science	70.7
The political aspects of funding, research, and working in academia	70.0
Teaching	69.3
Operalization of the ecological model for research	68.2
Connection between research and practice and their reciprocal relationship	66.6
Tailoring research results to various audiences	64.1
Built environment	63.5
Integration between behavior, biology, and health	63.1
Development and application of technologies for health behavior research	61.5
Qualitative research methodology	60.0
Job opportunities outside of academia	52.5
Big data skills	51.3
Law & policy	51.3
Basic genetics	50.0
Behavioral economics	50.0
Budgeting, hiring, and managing staff	48.7
Complexity and systems theory	48.7
Social network analysis	46.1
Persuasion & communication science	46.1

Table 4 (continued)

What skills or topics are currently not routinely covered in health behavior Ph.D. programs but should be incorporated? (Wave II)

Item ¹	% Important or Extremely Important
GIS/geocoding	45.0
Corporations and their influence on unhealthy behavior	43.6
Legal issues (HIPPA, contract, etc.)	43.6
Urban health issues	41.1
Relational database theory and utilization	38.4
Patient-centered research	36.8
Data mining	32.5
History (health & inequity)	27.5
Evolution of science	20.5
Epiphanies	20.1
Compassion fatigue	15.4
Business analytics	10.6
Finance/business	10.6

Since there were strong correlations between age and number of publications ($r = .70$), age and years since doctoral degree ($r = .87$), and years since doctoral degree and number of publications ($r = .79$), we decided to use years since doctorate as a measure of length of academic career. Among the game changer ideas, four were significantly related to years since doctorate at $p < .05$. These included big data ($r = -.30$), recognizing that cookie cutter theories do not apply to all health behaviors and populations ($r = -.29$), timely evaluation and dissemination of results ($r = -.32$), and medication and treatment availability in developing countries ($r = -.31$). For disciplines that were important to partner with, seven were significantly different including economics ($r = -.46$), city/urban planning ($r = -.30$), medicine ($r = -.36$), public health ($r = -.39$), system science ($r = -.36$), big data/informatics ($r = -.33$), and biostatistics ($r = -.39$). For topics that should be added to doctoral programs, there were three significant items. These included: history (health and inequity; $r = -.33$); political aspects of funding, research, and working in academia ($r = -.53$); and data mining ($r = -.37$). No significant differences were found for topics to be removed from doctoral programs.

Discussion

The results reflect the evolution and maturation of the field of health behavior. There was a high level of consensus about potential new foci in the field: focusing on population health, stronger scientific techniques, and more research training. There was less consensus, however, on related disciplines' potential, based on the respondents' type of work and field. Overall, results have the potential to shape doctoral training and preparation of future health behavior researchers. With the exception of ever-present concerns about funding, all items that received more than 80% endorsement revolved, to some extent, around operationalization and translation of integrated theory to practice. Translation of basic and theoretical research into practice

remains a significant problem in all aspects of health research.¹² Glasgow noted a pressing need for pragmatic approaches to translating research into practice, with timely advice to make research more practice-relevant. There is now a rich body of literature addressing practice-based evidence and theory in which the problem is well-identified but solutions have not yet been implemented, leaving the field ripe for innovation and discovery in all stages of the theory to practice process.¹³ Many fields have seen this evolution in the field of practice. For instance, social work has evolved from a generalist field into one more focused on specialization and evidence.¹⁴ Whereas, pharmacy has evolved to include more direct relationships with physicians and in some countries prescription writing authority.¹⁵

Nationally, there is growing interest and policy focused on improving quality of life and reducing the burden of chronic diseases. In other words, the cultural and professional shift towards creating a culture of health, rather than treating illness, recognizes population health, social determinants of health, and recognition of ecological impacts on health, as areas of foci called for in health behavior research doctoral training.¹⁶⁻¹⁷ Although these are identified as areas to enhance training, concepts central to population health and RWJF's *Building a Culture of Health* have been at the core of many Ph.D. training programs for decades. For instance, public and community health programs view health from a more macro-ecological perspective, which includes the need to address health disparities and social determinants of health. Enhancing explicit training in these areas would continue to improve skills and abilities of future graduates of health behavior research programs, so that we as health behavior researchers are able to engage in and lead cross-sector collaborations, secure funding, and ultimately impact our nation's health by "enabling all in our diverse society to lead healthier lives."¹⁷ Given the demand for evidence-based methodologies and practice to assist with cross-sector approaches to address health, as is also at the core of the population health and culture of health movements,^{18,19} it also is not surprising that these Delphi results identified an increased demand for stronger methodological and statistical skills and training.

While we did not reach consensus in identifying areas that should be removed from current training practices, other disciplines are also wrestling with similar areas to those we identified. The ongoing debate regarding significance testing has been occurring for decades, with many methodologists urging for the abandonment of this practice and others encouraging the use of effect sizes in their place.²⁰⁻²² Health behavior research doctoral training programs need to ensure that these concerns and alternative approaches are being addressed. To date, data contend that health behavior researchers unfortunately fail to report metrics, such as effect sizes, in their published research.²³

The utility of behavioral theories is also not a new debate, as can be evidenced by the consistent emergence of varying theoretical models across the decades all with the aim of better describing, explaining, or predicting behavior change. While our results identified a concern around the utility of current behavioral theories and a charge to move away from individual-focused models in particular, there was not consensus as to how to best move forward within this realm. This concern and lack of conclusion is also evident in other disciplines, as was seen in a recent debate held by the Society of Behavioral Medicine at their 2016 annual meeting in which there was almost a 50-50 split vote by participating behavioral scientists as to whether or not social cognitive theories *provide* or *no longer provide* a comprehensive approach for understanding and improving health-related behaviors.²⁴ That said, we contend health behavior researchers should seek to strike a balance, that is thinking theoretically about behavior, while also unshackling themselves from the confines of single theory approach to assessing behavior.

The relationship between years since doctoral degree and seven disciplines to partner with seems to indicate the growing level of importance in multidisciplinary work among early career scholars. This is encouraging given funding, and perhaps the most impactful research, is typically tied to “team science.” Similar results were seen for what to add to doctoral programs. This demonstrates a potential need to include early career faculty in decisions about curricular changes to, and future directions for, doctoral programs.

This study also had several limitations. Respondents were all members of the American Academy of Health Behavior. Membership in the Academy is based on self-selection and may not reflect the broader community of health behavior researchers. Also, the number of people who chose to participate in the study may not reflect the entire membership of the Academy. However, for a Delphi study, the participation was quite robust, exceeding recommendations for the number of experts to take part in the study. We also did not ask what environment they worked in (eg, School of Public Health, Cancer Research Center, etc.). This may have affected the disciplines that were most important to partner with. Finally, the combination of responses generated in the first wave did not allow for exact language for every response. This may have resulted in some loss of information. Notwithstanding these limitations, results of this study should be helpful in assessing emerging trends in the field, identifying important disciplines to partner with, and assisting in curricular reform in doctoral programs.

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