

Executive summary

New Directions for the National Institutes of Health (NIH) Office of Behavioral and Social Sciences Research (OBSSR)

Robert M. Kaplan, Associate Director for the Behavioral and Social Sciences;
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The mission of the Office of Behavioral and Social Sciences Research (OBSSR) is to coordinate and stimulate behavioral and social science research across all NIH institutes and centers. Since OBSSR does not fund research directly, collaboration with the ICs is crucial. How much behavioral and social science research actually takes place at NIH? A reasonable estimate might be around 11-12 percent.

We have to think ahead, and try to imagine where the research will be in 15 or 20 years. OBSSR is trying to think ahead in a number of ways, considering the implications for new research designs, new methods of data fusion and synthesis, new generations of health data analysts, and new approaches to handling the privacy of health-related information and health data security.

To support dissemination and translation research, OBSSR is sponsoring conferences, training institutes, and trans-NIH Funding Opportunity Announcements (FOAs) that highlight different aspects of dissemination, translation, and implementation.

OBSSR is working with the National Academy of Sciences and Institute of Medicine to explore international health differences in high-income countries and identify public health opportunities. Behavioral and social science research clearly has a significant role to play in reducing the global burden of disease.

While OBSSR has been active in each of these areas and will continue to be, we also want to think about what the world — and science — will look like in the next decade or two, and how they can best prepare for it. Discussions with leaders of academic research institutions and with faculty research innovators will help guide future NIH policy and research agendas.

Managing Multi-Institutional Projects

Virginia Moxley, Dean and Professor, College of Human Ecology, Kansas State University

Current scholarly and fiscal environments can make multi-institutional projects preferable to single institution undertakings. Some elements of multi-institutional alliances are common to all alliances. There are competing interests that must be managed. Each partner institution seeks to maximize institutional advantage while also contributing to the common good of the alliance.

Alliances are composed of a complex web of relationships. The chemistry of these relationships is essential to their long-term viability. Because alliances are essentially a web of re-

relationships without much in the way of hierarchy, the maintenance of trust in leaders is an essential component in alliance viability over time.

The organizer of multi-institutional proposals needs to implement a communications plan that assures transparency so each partner understands the basis for the distribution of funds and assignments. Once a multi-institutional project is funded or simply undertaken, the leadership issues change from managing the transition from idea to proposal to managing the realities of working together.

When conflicts are discussed openly by individuals empowered by their employing institutions to resolve such issues, they often lead to innovative and eminently workable solutions. Alliances need to attain fiscal sustainability to endure over time. This requires the decision of one of the institutional partners to serve as fiscal agent to hold funds. Big bureaucracies at the center of the alliance can doom it to financial failure, as can large investments in low value outcomes.

For academic partnerships these tools are needed: a secure student data management system, a student learning outcomes system, a communications system, electronic access for partners and students, and written principles, policies, and procedures. Research alliances will also require tools to make working with colleagues at partner institutions as seamless as possible.

The best alliance experiences come with serendipities. These include an expanded network of valued professional colleagues and advisors, immersion in multiple higher education cultures, rapid dissemination of technical skills because these teams work virtually most of the time, and the ability to easily capitalize on the wisdom of colleagues with similar interests.

Human Dimensions: Integrating the Social and Behavioral Sciences with the Biophysical and Natural Sciences

Prem Paul, Vice Chancellor for Research and Economic Development

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As the needs and challenges of our societies become increasingly complex and interrelated, so has the research required to generate solutions to these challenges. NSF's Integrated Graduate Education Research and Training (IGERT) program, competitions such as Science and Technology Centers and Engineering Research Centers, and other programs throughout NSF increasingly have emphasized interdisciplinary teams.

In the 21st century, the growing specter of climate change and other environmental threats brought a new kind of interdisciplinarity to research: the human dimensions. The human dimensions of global climate change – how human social systems affect and react to change in natural systems – became a critical focus of climate change research.

The need to address the human dimensions of science became clear at the University of Nebraska-Lincoln through two major research initiatives over the last five years. We devel-

oped a significant partnership with the U.S. Geological Survey to address climate change in the Greater Platte River Basin. The impact of climate change on agriculture and the water supply was a key focus of the research framework developed through the initiative.

In 2008 the University of Nebraska launched the Water for Food initiative, with the goal of forming a research, education and policy analysis institute with a global reach that would address the critical challenge of growing more food using less water. Nowhere are the human dimensions of research more important than in the issues of food and water security, which go directly to the sustainability of life on the planet.

Research in the social and behavioral sciences is critically important in meeting major challenges facing our society in education, national security, human health and well-being, food and water security, climate change and other areas. Despite the need for this research, funding from the federal agencies for these disciplines has lagged far behind that available for engineering and the physical and biomedical sciences. The National Science Foundation (NSF) and National Institutes of Health (NIH) are two examples of funding agencies where the social and behavioral are being emphasized more and more.

Our experience in fostering interdisciplinary collaboration amongst social sciences, physical sciences, and life sciences research has met with some success. Demand for scholars in social and behavioral sciences is only going to increase as global society faces challenges in dealing with health, food security, national security, climate change and national competitiveness.

Functional Neuroimaging Studies of Obesity: Linking Neuroscience to Health Behavior

Cary R. Savage, Director, Center for Health Behavior Neuroscience; John H. Wineinger Professor of Psychiatry and Behavioral Science, University of Kansas Medical Center

Obesity rates are on the rise and associated with serious public health consequences and rising health care costs. Since 1990, however, rates of obesity have increased dramatically, to the point that over 30% of the U.S. adult population is now obese. In fact, if rates continue unabated, approximately 75% of the adult American population will be overweight or obese by the year 2020. Obesity also has dramatic impacts on increasing health care costs. Recent estimates of the total costs of obesity in the U.S. are over 140 billion dollars per year.

We live in a society where food is plentiful and exercise is optional. Until very recently in our evolutionary history, acquisition of calories for consumption required work. This is no longer the case. We can drive up to a window, and for a few dollars, have literally thousands of calories handed to us from a window. Food portion sizes have also increased.

Given these changes in lifestyle and magnified across a population, we end up with a societal obesity epidemic. The solution is easy – eat less and exercise more. Biology plays a critical role in determining poor health choices at the individual level. Research is now aimed at understanding the biological roots of this resistance to healthy decision-making.

The availability of plentiful, calorie dense, food is a recent development in modern society. We remain biologically driven to consume calories whenever possible and move as little as needed to conserve energy. These drives are largely regulated by the brain.

Motivation and reward processing are especially important contributors to overeating and sedentary lifestyle in humans. Our initial functional imaging studies have identified brain regions that respond differently to visual food cues in obese and healthy weight individuals, and are positively correlated with reports of hunger in obese participants.

Our preliminary data indicate that unsuccessful dieting is predicted by decreased activity in parts of the brain implicated in behavioral inhibition and control (prefrontal cortex) and increased activity in the areas of the brain controlling the mouth and tongue. These results provide important clues about resistance to weight loss in diets. We are now analyzing the longitudinal data from the study in order to identify predictors of 6-month weight loss maintenance.

Healthy behaviors are in part difficult to maintain because they are less immediately gratifying. In fact, exercise may initially be perceived as aversive. Despite this challenge, some people are able to persevere and experience long-term benefits. We hypothesize that brain processes underlying reward processing and impulse control will help us better understand mechanisms of obesity and health-related decision making.

The Center for Health Behavior Neuroscience was formed at the University of Kansas Medical Center (KUMC) in 2010 to support and unify research efforts at KUMC that are focused on brain function contributions to obesity, addiction, and other health behaviors.

Dilemmas and Opportunities Surrounding Participatory Research to Promote Health in Small Towns

Elaine Johannes, Associate Professor and Extension Specialist, School of Family Studies and Human Services, Kansas State University

The Kansas population is surging in urban areas while declining in small towns and rural areas. De-population of rural areas and small towns due to lack of well-paying jobs, viable schools and inspirational leadership is an issue. Working through volunteer networks comprised of youth and adults around issues of health for all residents, Kansas State Research and Extension's *Get It – Do It!* program has helped small towns move toward sustained quality of life and thriving.

Targeted programs that increase the social, built and human capitals of communities can result in health and quality of life improvements. But unfortunately, many small towns in the United States lack the resources to adapt health promotion strategies to their unique cultural features. Successful and sustainable efforts to improve the health of small town citizens require a community development – participatory approach which is distinct from the traditional expert service delivery model.

Kansas State Research and Extension developed the *Get It – Do It!* program in 2007, using a community-based participatory approach. The goals of *Get It – Do It!* are to foster youth-

adult partnerships, engage youth in meaningful roles, enhance social capital, support the local development vision, and increase health-promoting opportunities (e.g. park improvements, summer camps, trail development, out-of-school health programs)

Get It – Do It! accomplishes these goals through networks of youth-adult partnerships in small towns that receive financial resources, training and support from local intermediaries to increase opportunities for physical activity, improve built environments and strengthen community social capital. Of special focus is increasing the engagement of young people - thereby increasing their community attachment through community-based participation.

Since 2010, *Get It – Do It!* communities reached over 1,500 rural individuals and generated nearly \$75,000 in-kind through volunteer involvement. Local projects have also improved places such as town squares, parks, walking trails, skate parks and have used those places to launch health promotion campaigns and activities. Most importantly, the small towns have discovered that promoting health is a viable way to engage young people and to build leadership skills and community attachment among youth.

Behavioral Sciences and Drug Discovery

Sam Enna, Professor of Physiology and Pharmacology; Associate Dean for Research and Graduate Education, University of Kansas Medical Center

Defining the behavioral effects of chemical substances remains an important component in the modern era of drug discovery. Agents are sought that provoke desirable, or diminish undesirable, behaviors. Behavioral tests are employed to determine whether a drug candidate unintentionally modifies central nervous system function, with such an action often being considered a side effect or toxicity.

Given the ongoing need to define the behavioral consequences of potential pharmaceuticals and environmental agents, there is a critical need for research and training in the behavioral sciences. Unfortunately, support for such programs has waned. This reflects a general shift away from *in vivo* animal experimentation to *in vitro* assays for identifying and characterizing drug candidates.

As a result of this shift in research emphasis, the number of scientists trained in organ system and behavioral pharmacology has declined. This was driven primarily by stagnation in federal funding for research involving vertebrate animals. The shift away from *in vivo* assays has had practical consequences – it ultimately led to a shortage of scientists capable of conducting well-designed, and appropriately interpreted, *in vivo* laboratory animal studies in general, and behavioral experiments in particular.

Within the past decade the emphasis on first characterizing molecular mechanisms in the search for new drugs had led to erosion in the expertise ultimately needed to develop chemical leads into viable drug candidates. Among the disciplines that were becoming underrepresented in this regard were the behavioral sciences, and both basic and clinical pharmacology.

More recently, it is acknowledged that efforts must be made to re-establish the importance of *in vivo* testing, behavioral observations and analysis in the drug discovery process. Because the expertise necessary for designing such tests is diminishing, funding agencies in the United States, United Kingdom, and Europe are underwriting training programs aimed at exposing biomedical scientists to the fundamentals of whole animal research.

As the response to systemically active drugs and other xenobiotics typically involves the interplay of several organs and organ systems, the ability to understand such interactions, and to examine such effects experimentally, is an essential component of the drug discovery process. The renewed appreciation of the importance of whole animal and organ system research, and the appropriation of funds to reinvigorate training in these areas will help redress the imbalance in preclinical research emphasis in the search for new drugs.

The evidence suggests that efficient and productive biomedical research programs should include equal measures of studies involving whole animals and organ systems and those aimed at characterizing the biochemical and molecular targets of the drug candidates.

Developing a Top 25 Program in the Behavioral and Social Sciences

David Geary, Curator's Professor; Thomas Jefferson Professor, Dept. of Psychological Sciences, University of Missouri

In 2002, the contributions of the Department of Psychological Sciences to the University of Missouri were evaluated. Our goal was to determine changes that needed to be made to become a nationally recognized top 25 department.

Two policies allowed us to work toward self-enhancement without the need for additional general operating funds. The first was the College of Arts and Science policy of allowing departments to keep general operating salary funds that are covered with federal or other grants; and the second is the Office of Research policy to return 25% of facilities and administration funds to departments.

When I became chair, our course load was four courses per academic year. I determined that for top public research universities, the teaching load for psychology faculty members was three courses per year, with a grant release option of two courses. We determined that our departmental policy of four courses each academic year placed us at a disadvantage relative to these departments.

During the same five-year span (1997-2001), an increase in grant-related activities created additional demands on the associated support staff. The department's external funding has reached a level that would have been difficult to maintain much less increase without additional support staff. To address these issues the department proposed the institution of a "Research Intensive Track" for faculty who meet expectations for research contributions, and added a grant-writer to the staff.

The 2010 NRC ranking provided an opportunity to assess our progress toward achieving our top 25 goal. Using the lower value of the ranges, the Department of Psychological Sciences was ranked 41 on reputation and 29 in faculty productivity. As a comparison, the Psy-

chology Department at the University of Texas-Austin (highest in Big 12) was 26 on reputation and 27 in faculty productivity. We seem to have gained some ground.

In summary, there are university policies that can increase incentives for faculty members to seek external funding and incentives for departments to change their workload and governing policies to further support these activities. Developing and maintaining strong departments in the social and behavioral sciences requires some creativity and risk taking.

The Nexus of Scientific Integration with Behavioral and Social Sciences

Sharron Quisenberry, Vice President for Research and Economic Development, Iowa State University

In a recent strategic planning process, Iowa State University developed and implemented a research enterprise plan that balances the multiple goals of the institution while taking into consideration public and private interests. Research focus areas identified are as follows: Integration of behavioral and social sciences; integrated, innovative health; biorenewables; new technologies; environment.

Faculty are encouraged and rewarded for working across disciplinary lines. The solution of complex problems needs a diversified approach or contributions from multiple disciplines and thus, must be promoted from a transdisciplinary scholarship perspective. This approach will also allow us to study the past, to imagine the future, and to synthesize the constantly changing technology, viewpoints, and culture through creative inquiry – the behavioral and social sciences.

By daring to be different and using a transformational systems approach for the research enterprise, we are able to prioritize and integrate our research activities and thus, better able to set achievable and targeted goals and metrics that meet societal challenges and public/private interests.

Working at the intersection of biology, engineering, physical sciences, and behavioral and social sciences, the university has a basic foundation of talented faculty and research accomplishments to build successful food security, nutrition, and infectious disease portfolios at the interface between plant, animal, human, and environmental health.

Iowa State University has significant transdisciplinary research strengths that can be integrated to create a unifying and systems-wide vision for resolving society-related challenges such as health, energy, food, and environment. This vision will be achieved by creating a seamless research program that spans basic, applied, and translational research and exploiting synergies among the life sciences, the physical sciences, engineering, and the social and behavioral sciences to create platform technologies and solutions for the significant challenges facing society.

Advancement of the Social Sciences through Interdisciplinary Collaborations

Robert Duncan, Vice Chancellor for Research, University of Missouri

Rapid advances in virtually all other disciplines today are being propelled by interdisciplinary collaborations. I will give some specific examples of successful collaborations in this category at MU, including:

Understanding perfect autobiographical memory: A collaboration between psychologists, neurologists, and brain imaging scientists. About 20 people have been identified with perfect autobiographical memory. An understanding of the underlying reasons for this exceptional ability may prove useful, even revolutionary, in the study of how brain structure and dynamics influences human capability, and in how emotional stability is influenced, if at all, by the ability of people to forget prior experiences.

Nuclear activation analysis and the MU Archaeometry Program: A collaboration between archeologists, anthropologists, and nuclear scientists and engineers. The MU Research Reactor Archaeometry Program analyzes many different artifacts from ancient indigenous populations. This powerful new technique can provide a valuable new source of data to test earlier thoughts, hypotheses, and assumptions regarding the movements of ancient populations, such as those for which there is only a limited record of their society and traditions.

Applications of Complexity Theory to the Social Sciences, especially in the systematic development of 'Econophysics'. The application of scaling and self-organized criticality (SOC) to the social sciences appears to be a rich area for interdisciplinary collaborations. The systematic development of complexity theory has been remarkably systematic, and its applications to the social sciences are profoundly enabling of our abilities to understand much more deeply the true nature of risk and benefit in these systems.

The advancement of all of our disciplines will depend largely on the expansion of resources available for our professional pursuits, and this in turn will require society to see and understand an expanding relevance of our work to the betterment of humanity. In my experience, fresh approaches that become ever more demanding on data-based inferences, and on the systematic development of knowledge through the Scientific Method, most rapidly prove this worth to society, and hence win their support.

Such opportunities are also thrilling intellectually, since they almost always lead to unexpected discovery, and the elucidation of systems and processes that were at best poorly understood before. It is this spirit of discovery, coupled with the broader relevance of our work in the social sciences, which promises to reverse the current negative opinion trends, and provide a healthy advancement of these social science disciplines for many decades to come.

Building Collaborative Research Teams in the Social and Behavioral Sciences

Chitra Rajan, Associate Vice President for Research, Iowa State University

For the past few years, Iowa State University (ISU) has experienced severe and permanent reductions in state support. We considered and adopted a number of structural changes aimed at reducing costs. At the same time, this was a period when many of the prior investments in faculty recruitments and research infrastructures were beginning to pay off: after three years of declines in sponsored funding, the university saw not only an up-turn, but significant growth in research expenditures.

The university had adopted a decentralized budget plan whereby colleges and vice presidents received a share of the F&A revenues and were responsible for overhead costs. We also made the difficult decision to discontinue support for several centers and institutes so that we could re-organize and truly support a smaller number of programs.

The faculty members were able to garner enough grants to cover their direct expenses; it was the overhead costs that had become prohibitive. To address this problem, we had to find a way to reduce the overhead costs. We decided to consolidate the “service” components from both centers to create a new unit – the *Survey and Behavioral Research Services center* (SBRS).

The SBRSs’ primary mission was to serve as many faculty as possible, and once established, it would operate as a fee-for-service unit. If successful, it would attract enough ‘business’, become self-reliant (or at least, require minimal institutional funds) and therefore unaffected by fluctuations in state support for the university. It has the capacity to provide a full set of services to researchers including both proposal development and administration and all modes of data collection services.

The SBRS is now a year old and its first year proved to exceed all our expectations. The unit helped faculty submit over 30 grant proposals worth about \$16 million. SBRS has 3 years to prove its viability and the associated faculty have been told that they will be assessed based on the following: (a) it has enabled research that was otherwise not possible (and not just diverted research management from other units); (b) impacted a broad group of faculty; and (c) is able to develop a “business model” that makes it fairly independent of institutional support.

One Approach to Establishing a Research Center in Today’s University Environment

Dennis Molfese, Mildred Francis Thompson Professor; Director, Center for Brain, Biology, and Behavior, University of Nebraska-Lincoln

In the fall of 2010, the University of Nebraska-Lincoln recruited a senior investigator to build an interdisciplinary brain-imaging center. This recruitment developed from a faculty initiative, Systems Biology of Social Behavior (SB²), which was supported by several departments within the College of Arts and Sciences.

Faculty from behaviorally-oriented departments requested access to brain imaging equipment to address questions related to their own fields of study. One year later, an officially des-

ignated “Center for Brain, Biology and Behavior,” exists that houses two different functioning brain imaging systems (high-density EEG, NIR) with a third type (fMRI) on order.

Faculty support is essential to the success of any large-scale initiative within the University. Faculty and their students must support the initiative, and Center objectives must also be congruent with faculty interests and goals. In our case, the faculty and Administration had already begun to develop a shared vision as part of the SB² initiative.

For a Center to be successfully established and thrive, there must be sufficient faculty interest, the means to grow additional involvement from other faculty and students, Administrative support, common activities to facilitate professional interactions, a training program in the use of Center equipment and facilities, a scheduling program to maximize the effective use of core facilities, the means to foster grant development projects to federal and private agencies, and a strong external panel of expert advisors willing to lend their expertise to support the Center’s success.

Some institutions such as the University of Missouri-Columbia maintain an imaging center within a specific department. Other institutions have established stand-alone Centers overseen directly by an administrative level or maintained as part of a medical school as is the case at Yale University. In our case, an administrative decision was made to have the Center Director report directly to the Vice Chancellor for Research and Economic Development.

In the 10 months since the Director was hired, 134 faculty and students have attended training workshops. Three faculty have already been sponsored for NIH K award submissions and six students have submitted NSF predoctoral training applications and NIH NRSA training applications. A competitive State of Nebraska Research Initiative grant for \$1.2 million was awarded that augmented funds for purchasing imaging and computing equipment for the Center. In the meantime, plans are finalized for installing the 3T fMRI in temporary housing so that research using the magnet can begin in January.

This fall and winter will be a critical time for the Center. The hope is that spring will see manuscripts being submitted from faculty and students citing a literature and using neuroimaging techniques that were unknown to them a year ago. Our goal is that these manuscripts will break new and fertile ground. The success of the faculty, students and Center are intertwined. All the tools needed for success are here. The most important of these of course is the talent, enthusiasm and energy possessed by the faculty and students to conduct cutting-edge science!

Evolutionary Neglect of Aging: An Opportunity for the Behavioral and Social Sciences

David Ekerdt, Director, Gerontology Center; Professor of Sociology, University of Kansas

The late Paul Baltes, a psychologist at the Max Planck Institute in Berlin, was the leader of a sprawling international network of scientists concerned with human development across the life span. Baltes outlined the basic biological and cultural architecture of human development (Baltes, 1997). He argued that this architecture is progressively less complete

across adulthood and into later life. This contention about incompleteness is what I will review here.

Three principles support the proposition about incompleteness. As the first principle, Baltes observed that the benefits resulting from evolutionary selection diminish with advancing age. The main takeaway is this: that as life goes along, there is less fitness from our biological design.

Baltes's second principle is that there is an age-related increase in the need or demand for culture. "Culture" here is shorthand for all sorts of knowledge-based resources: psychological, economic, material, technical, symbolic. It encompasses advantages from public health, educational strategies, literacy, human rights, medical care—all the fruits of human ingenuity.

With advancing age, evolutionary benefits weaken, but culture compensates. However, according to Baltes's third principle, there "is an age-related loss in the effectiveness or efficiency of cultural factors and resources". The goods and affordances that were

Longer life expectancies (the biblical four-score years) allow adults the imagination of things that *could yet* happen or *could yet* be tried. This is the great shining promise of retirement, for which people start saving decades in advance.

At the same time, in later life people begin to sense their finitude. Intimations of mortality can promote additional personal development even as the life-world narrows. However, another outcome can be a sense of despair and frustration about what is no longer possible. In either direction, the resolution of this problem of meaning will have consequences for those to whom our lives are linked.

In the case of human development across adulthood, the research program for the social and behavioral sciences requires great skill in the characterization and interpretation of within-individual change. The theory-driven, action program is this: (1) Appreciate (but do not exaggerate) the contours of declining bodily fitness. (2) Analyze how cultural habits, social structures, human ingenuity, and a will to survive extend life and promote welfare. (3) Devise ways by which this support can be optimized, to the end.

This year, 75 million Baby Boomers—nearly one-quarter of the American population—begin to turn 65. For the behavioral and social sciences, there is plenty to do.